

Pollution following an acid leak

May 26, 2000

Le Thillot – [Vosges]

France

Aquatic pollution
Tannery
Fixed storage tank
Sulfuric acid
Maintenance
Layout
Catchpit
Periodic inspection
Dead fish

THE INSTALLATIONS IN QUESTION

The site:

The *commune* of Thillot is located in the Moselle River Valley, in the southern portion of the Vosges *département* on the Epinal – Mulhouse highway. In 1864, the company was created on the site where it still stands today, on the banks of the Couard Stream that it uses for its water supply. The company produces full grain, corrected grain and nubuck leathers and flesh splits from French bull hides.

The company's product markets are thus 65% shoes, 25% leathercraft and watchbands and 10% belts. With its workforce of 80 people and roughly a dozen temporary labourers on average, the company processes 2,630 tons of raw materials per year and has a turnover of 80 MF (12.2 M€).

On May 26, 2000, a sulfuric acid leak polluted the natural environment and the fish farming activity in the area. The accident could have disrupted the operation of the community's treatment station located 2 km further down the valley.

This station, created in the 1980s by the local communities with the manufacturer's participation, was designed for urban effluents and the effluents produced by the tannery using a biological treatment process. The tannery's effluents are initially treated with a lime slurry and ferrous sulfate (pH control and precipitation of the sulfides) before being combined with the domestic effluent in the aeration tank.

A supply channel of a micro-treatment plant also supplying the ponds of a fish farming operation were effected by the pollution of the Couard stream. 10 brook trout breeders of the 30 present were destroyed.

The installation:

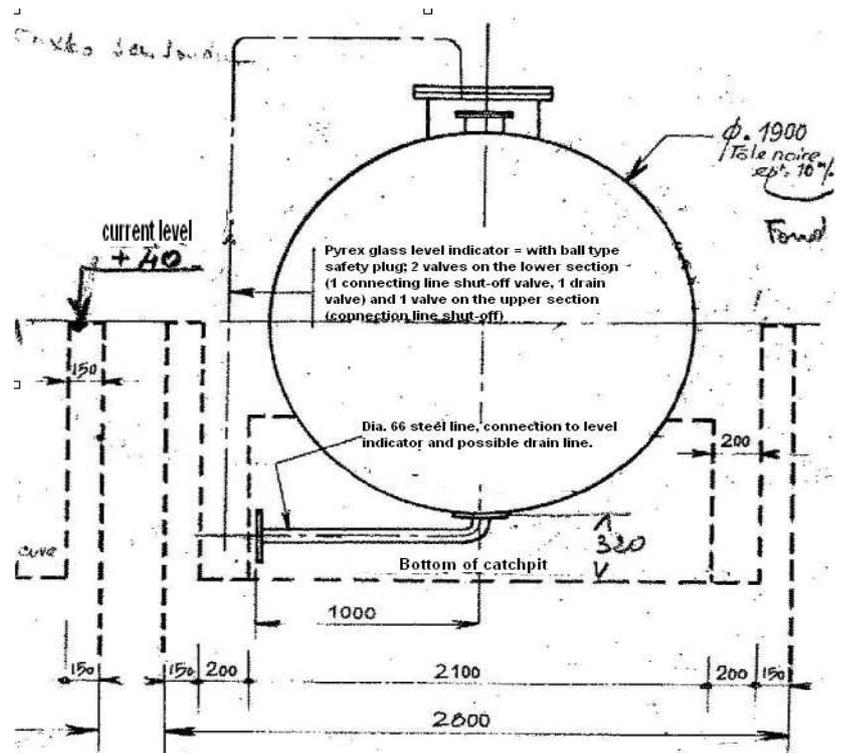
The sulfuric acid storage tank on the site was designed in 1967 by the tannery's engineering department. During the design phase, the general requirements of the standard order relative to sulfuric acid storage facilities subject to declaration under the terms of ICPE legislation (formerly section 31a) which requires that the lower drain pipe not be constantly under load and that an interior plug can be used to block the drain pipe.

The dimensioning of this tank took into consideration the transport costs and initially allowed the number of deliveries to be limited. With a storage capacity of 16,000 litres and consumption of 37,000 litres in 1999, 2 or 3 deliveries per year were sufficient. This situation goes against all economic logic which attempts to limit needless stocks and sources of financial expense as well environmental protection logic which attempts to reduce the quantities of dangerous materials stored on site.

The storage tank is located close to the tanning workshop where the acid is used in the pickling operation. As the tank is pressurised (2 bar), the acid is conveyed directly to the workshop via overhead piping.

The pickling operation prepares the skins for tanning in a kicker machine in the presence of sodium chloride and strong acids. The pH is dropped from 12 to 8.

The last inspection of the tank and its concrete catchpit dates back to 1994. Although the inspection organisation had concluded that the storage tank was apt for service, it recommended that the highly corroded access catwalk be replaced and that the catchpit be refurbished as it was cracked and chipped in several locations.



THE ACCIDENT, ITS BEHAVIOUR AND CONSEQUENCES

The accident

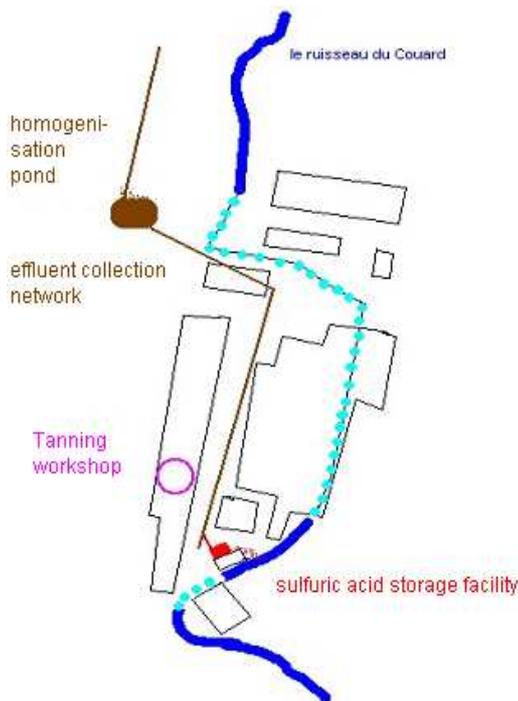
Chronology of events:

- 05/26/2000 5.00 am:** Workers discover a leak on the elbow of the lower drain pipe (suspicious odours).
- 6.15:** As the maintenance worker was unable to stop the leak, he contacted the director and stopped the tank's booster compressor
- 7.15:** The director arrives at the site
- 7.30:** The treatment station attendant raises the alarm concerning the arrival of a highly acidic effluent, which proves that the catchpit's drain line was open
- 7.30:** Shut-down of the setting pond pump, transfer of the acid still contained in the catchpit into 1,000-litre bag-in-box "cubitainers" and closure of the catchpit's drainage connection.
- 8.00:** Leak on the catchpit
- 8.15:** The fire department, *gendarmerie*, town hall and *préfecture* are called.
- 9.00:** Arrival of specialised "pollution" firemen to control the leak on the drain line
- 2.30 pm:** A specialised company comes to pump the 500 l of acid still remaining in the tank and catchpit
- 5.30 pm:** An emergency prefectural order is issued prohibiting the station from releasing effluents to the station whose pH may endanger the station's biological balance
- 05/29/2000 3.00 pm:** An independent laboratory intervenes to advise on what measures should be taken to raise the settling pond's pH and monitor this parameter before release to the treatment station
- 06/02/2000** Return to normal, allowing the effluents to be released to the treatment station

The consequences:

The existence of two contamination routes used by sulfuric acid should be noted:

- ✓ 6,000 litres directly in the site's settling pond menacing the treatment station
- ✓ 500 litres polluting the Couard stream (over 400 m), then the Moselle River (sur 500 m) and a supply channel. Extensive fish mortality was noted in these streams and in a fish farming operation.



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Diagram: DRIRE Lorraine

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 Thillot 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"/>
Environmental consequences		<input checked="" type="checkbox"/>	<input checked="" 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 900 m of polluted waterway explains the level 2 classification of the 'environmental consequences' index (Env14).

ORIGIN, CAUSES AND CIRCUMSTANCES OF THE ACCIDENT

The direct and obvious origin of this type of accident was the lack of maintenance of the storage tank and catchpit installations.

The location of the leak on the lower drain pipe elbow which is always in contact with the acid and under pressure, attests a design flaw in this tank, which also does not respect the requirements of standard order type 31a regarding sulfuric acid storage facilities.

Maintenance, inspection and design faults in the storage installations are responsible for this accident. The pressurisation of the tank's gases is a drawoff method that can aggravate the consequences in the event of a leak.



Photo: DRIRE Lorraine

ACTION TAKEN

Measures taken by the manufacturer at the time of the accident

As demonstrated by the actions initiated immediately following the discovery of the leak, the manufacturer did not have much leeway to operate as the concrete catchpit was out of service.

The first measures taken by the manufacturer (transferring the acid remaining in the tank, shut-down of the booster compressor and confinement of the majority of the spill in the settling pond, partial neutralisation of the acid still present in the catchpit with sodium carbonate) allowed the environmental consequences of the accident to be limited.

Administrative actions

The Supreme Council for Fishing (France) reported damage to the natural environment and piscifaua. The Classified Installations Inspectorate noted the disregard for the order's technical requirements.

Faced with the operator's refusal to halt production and considering the danger of destroying the treatment station's bacterial fauna due to the massive influx of highly acidic effluent, the Classified Installations Inspectorate proposed the Vosges Prefect an emergency measures order based on two main points:

- × The protection of the station's biological balance: ensure the compatibility of the contents of the homogenisation pond with correct biological treatment under the control of a laboratory authorised by the Ministry of the Environment for the water analysis
- × The restriction to operate could lead to the production of residual effluents as long as the homogenisation pond was not treated.

The operator was issued the emergency prefectural order by the *gendarmerie* at 5.30 pm on May 26, 2000, and was effective immediately.

In order to ensure that the operator did not place its acid storage facility back into operation without completely overhauling it in compliance with the standard order type No. 31a, a formal prefectural notice was issued July 5, 2000. Before being placed back into service, the order required an internal and external examination of the tank, the backfitting and installation of a hermetic retention structure or the refurbishing of the catchpit.

Owing to the cost of such measures, the operator decided not to place the faulty storage facility back into operation. The manufacturer now uses 1,000-litre containers directly in a catchpit inside the tanning workshop. There is now only a maximum of 2,000 litres on the site, which are located in catchpit and area where even in the event of a problem during installation or handling, any spillage cannot enter the natural environment.



Photo: DRIRE Lorraine

LESSONS LEARNED

The operator learned two major lessons:

- × The primary role that the homogenisation pond plays in confining all pollution on the site, with the risk of having to stop its production long enough to treat this pollution.

- × The problem with dimensioning storage tanks. It is not really necessary to store 16,000 litres on site when 40,000 litres are consumed annually knowing that the supplier makes several deliveries per year? We can only regret that the solution to reduce the stock to 2,000 litres was made only because refurbishing work was too costly after the accident and not a voluntary and preventive measure on the part of the manufacturer.