Two hydrocarbon tanks ablaze subsequent to a malicious act

14 July 2015 (French national holiday)

Berre-l'Étang (Bouches-du-Rhône)
France

Malicious intent
Hydrocarbons
Fires
Pollution
SEVESO facility

THE ACCIDENT AND ITS CONSEQUENCES

On a petrochemical platform, 2 explosions occurred at around 3 am in the storage zone: 2 tanks ignited, causing damage to their floating roofs. The 1st tank contained 11,300 m³ of pyrolysis gasoline (cuts C5 to C9) while the 2nd, located 300 m away, contained 48,000 m³ of naphthalene (light hydrocarbon cuts). In-house fire-fighters, backed up by units in the vicinity, responded massively. The plant operator activated the site's Internal Emergency Plan and notified local emergency services. Thick black smoke was visible at daybreak several kilometres around.

Major fire-fighting resources deployed

The authorities convened a crisis unit at 5:35 am. Police teams closed a motorway access ramp for 7 hours. Both departmental highways leading to the site were closed for a full 12.5 hours. Access to the storage zone was restricted. Municipal fire-fighters arrived at the site periphery around 3:40 am with a contingent of 120 responders and 64 vehicles. Their efforts in support of internal fire-fighters began at 7:30 am. Drawing water from the nearby pond, 6 sprinkling lines 1.8 km long supplied 1 heavy-duty foam vehicle and 3 emulsifier tank cars.
Priority was assigned to extinguishing the 1st gasoline tank. This fire was put out at 4:35 am following a foam assault by the on-site crew. A foam blanket was kept in place until noon. Extinction of the 2nd (naphthalene) tank got underway at 6:20 am and ended by 11:15 am, with the foam blanket being maintained until 3 pm. The floating roof collapsed 48 hours later. Both tanks remained structurally intact. External responders left the scene around 8:30 pm. In all, 170 m³ of foam were sprayed.

Discovery of damage to a 3rd tank

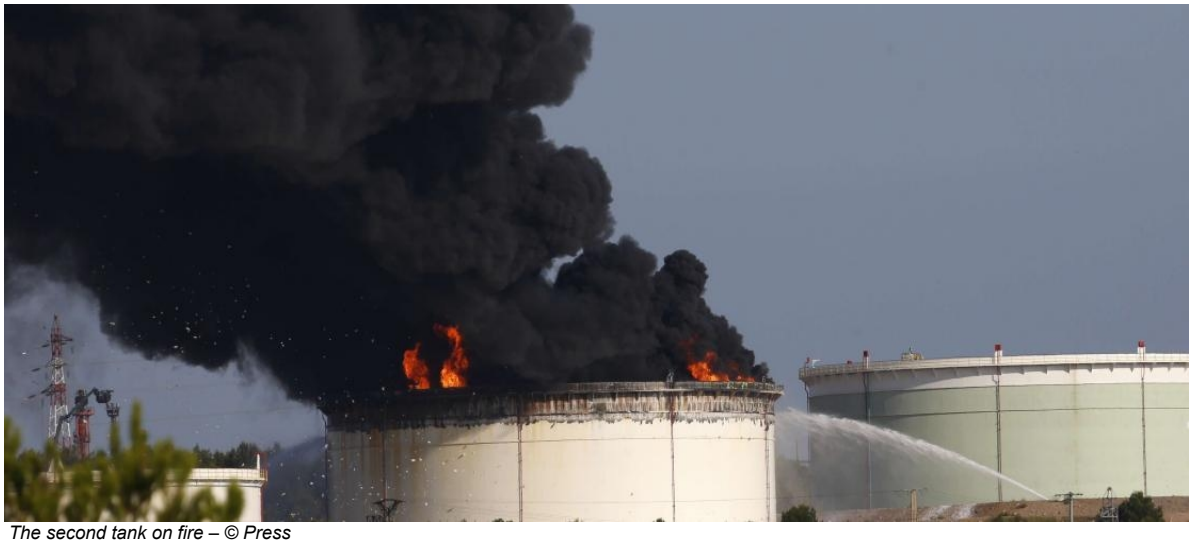
The next morning around 11 am, an inspection of the floating roof on an adjacent tank containing 25,000 m³ of condensates revealed the presence of a fire ignition system and a 4-m² opening running through the central part. The partially submerged roof had not collapsed, and the risk of ignition was still present.

The ensuing pollution created a nuisance for locals

During the drainage phase, the evaporation of hydrocarbons from damaged tanks and their retention basins caused air in the immediate vicinity to be polluted by VOC and BTEX compounds for roughly 10 days.

The air quality monitoring association measured peaks in pollutant concentrations (BTEX, ozone) in the city downwind of Berre as of the very next day. Neighbours complained beginning 2 days after the accident, citing hydrocarbon smells, headaches, itchy eyes, sore throats and runny noses.

Subsequent to the measures adopted to mitigate this pollution, concentrations gradually diminished for 7 straight days after the accident, before dropping precipitously on Day 8, while still remaining above local background levels.



The second tank on fire – © Press

THE ORIGIN AND CAUSES OF THIS ACCIDENT

The initial findings of the accident investigation pointed to an act of malicious intent due to the simultaneity of the explosions as well as to the discovery of detonation devices alongside the damaged tanks and on the roof of the 3rd tank. Property damage amounted to millions of euros. One year later, a suspect, apparently acting alone, was indicted and jailed as part of the case opened for a deliberate destruction of property using explosives and for the transport of explosive substances, with these charges carrying a 10-year prison sentence.

ACTIONS TAKEN

Secure the tanks

The 3rd tank was drained for 5 days following the accident, the 1st tank underwent 2 days of drainage as of the 6th day, and the 2nd tank drained for 10 days beginning on Day 3. All of them were degassed, scoured and ventilated. The structural integrity of their shells was also verified.

Limit soil and subsoil pollution

The tanks' earthen basins contained hydrocarbons that flowed from the storm drain of the damaged roofs. These hydrocarbons thus mixed with the fire extinction water and emulsifiers before penetrating into the ground. The basins of the first 2 tanks were drained, with the fouled earth being excavated and then treated. In all, the total surface area of ground polluted by hydrocarbons amounted to between 0.5 and 2 ha.

Mitigate air pollution

A foam blanket was installed on the first 2 tanks the day after the accident. The 3rd tank was not covered by foam in order to both prevent the roof, already weakened by the explosion, from breaking and enable the judicial investigations to proceed.

The basin of the 2nd tank, which had been filled to the highest level, was pumped as a priority to free its drainage valve. It was also covered with foam to limit the release of pollutants. On the 4th day after neighbours complained, drainage of the 3rd tank was accelerated. Basin contents were redirected from an open-air settlement basin to closed tanks.

Reduce water pollution

An anti-pollution dam was installed at the “Berre’s pond” outlet. Pollutant concentration values at the waste water treatment plant outfall remained normal. The results of groundwater monitoring campaigns south-east of the site revealed the presence of supernatants in wells equipped with piezometers, in addition to high BTEX concentrations in certain spots. The pollution resulting from this accident might have exacerbated the area's pre-existing pollution problems.

On the 14th day, supernatants appeared within a resurgent flow located some 100 meters outside the storage zone, beyond the site boundary. These supernatants were pumped and treated. The treatment of this pollution incident was guided via several orders issued by the Prefecture. Oversight of treatment efficiency as well as the quality of water discharged into the natural environment was instituted as an ongoing process.

LESSONS LEARNT

Civil protection resources may be rapidly deployed, even on a national holiday like Bastille Day. Heightened and constant vigilance is needed over the long run to confront malicious acts or terrorism. The site operator would introduce a robust anti-intrusion monitoring system in the months thereafter and had permanently installed a more stringent site entrance protocol. A comprehensive in-depth strategy was elaborated, focusing on areas of improvement, while at the same time financial investments were earmarked for implementation steps.

In light of this event and the one at Saint-Quentin Fallavier (ARIA 46767), a meeting was arranged on 17 July 2015 between the French Ministry of the Environment and several major operators to address the topic of malicious acts. The Ministry announced that Seveso rated sites would be inspected with this in mind before the end of 2015.

Several areas of emphasis were also included in the action plan, namely:

- Audits by experts with administrative agencies at volunteer sites to analyse the relevance of existing monitoring procedures;
- Scheduling of joint drills with police units and industry groups targeting malicious acts or terrorism;
- Strategy session devoted to the need for transparency with residents living near industrial sites, as well as to the transmission of sensitive data capable of giving rise to a malicious act;
- Request addressed by the Environment Minister to local Prefects for the purpose of accelerating approval of the Technological Risk Prevention Plans.