

Overfilling Tanks — What Happened?



Photograph courtesy of Royal Chiltern Air Support Unit.

On Sunday, December 11, 2005, gasoline (petrol) was being pumped into a storage tank at the Buncefield Oil Storage Depot in Hertfordshire, U.K. At about 1:30 A.M., a stock check of the tanks showed nothing abnormal. From about 3 A.M., the level gage in one of the tanks recorded no change in reading, even though flow was continuing at a rate of about 550 m³/h (2,400 U.S. gal/min). Calculations show that the tank would have been full at about 5:20 A.M., and that it would then overflow. Pumping continued, and the excess gasoline overflowed from the top of the tank and cascaded down the sides, forming a liquid pool and a cloud of flammable gasoline vapor. At about 6 A.M., the cloud ignited, and the first explosion occurred. This was followed by additional explosions and a fire that engulfed 20 storage tanks. Fortunately, there were no fatalities, but 43 people

were injured. Approximately 2,000 people were evacuated. There was significant damage to property in the area, and a major highway was closed. The fires burned for several days, destroying most of the site and releasing large clouds of black smoke, which impacted the environment over a large area.

Did You Know?



Photo
courtesy of
Royal Chiltern
Air Support
Unit.

- ▶ Overfilling of process vessels has been one of the causes of a number of serious incidents in the oil and chemical industries in recent years — for example, the explosion at an oil refinery in Texas City, TX, in March 2005.
- ▶ The tank involved in this incident had an independent high-level alarm and interlock, but these components did not work. The cause of the failure is still under investigation.
- ▶ A spill of flammable material, such as gasoline, can form a dense, flammable vapor cloud. This cloud can grow and spread at ground level until it finds an ignition source. This ignition source can cause the cloud to explode.

What Can You Do?



Photo
courtesy of
Hertfordshire
Constabulary.

- ▶ When you transfer material, make sure that you know where the material is going.
- ▶ When you are pumping into a tank, and the level or weight indicator in that tank does not increase as you would expect, stop the transfer and find out what is happening.
- ▶ Make sure that all safety alarms and interlocks are tested at the frequency recommended in the plant process-safety-management procedures.
- ▶ If you have alarms and interlocks that are not regularly tested, ask the plant process safety manager if they are safety critical and whether they should be on a regular testing program.

Read the reports about this incident at:
<http://www.buncefieldinvestigation.gov.uk>

If you are pumping material, be sure you know where it is going!

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