

Oil Tank Fire Caused by Static Discharge

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An 80,000 barrel (3.6 million gallon, 12,700 cu. M.) floating roof storage tank exploded and burned while being filled with diesel oil at a petroleum product storage terminal. The tank contained approximately 7000 barrels (300,000 gallons, 1,100 cu. M) of diesel oil at the time of the incident, and had previously contained gasoline. The fire burned for 21 hours and damaged two nearby storage tanks. There were no injuries or fatalities, but the total loss was over two million US dollars, nearby residents were evacuated, and schools in the area were closed for two days.

Initially, the fire was blamed on a lightning strike, but a thorough incident investigation by the United States National Transportation Safety Board (NTSB) found that the causes included an improper procedure for switching the content of the tank from gasoline to diesel oil, and an unsafe filling procedure. NTSB concluded that the flow rate (velocity) of material flowing into the tank was too high while the tank level was low and the incoming liquid discharged into the vapor space of the tank. The high flow rate caused a static electric discharge in the tank vapor space, which contained a flammable atmosphere.

Do you know?

- When changing the contents of any vessel (tank, tank truck, railroad tank car), without thoroughly cleaning the tank and purging the vapors, you can possibly create an unexpected flammable atmosphere in the tank. The flammable atmosphere might not be expected based on the properties of the new material being introduced to the tank.
- High flow velocity of material discharging into the vapor space of a tank can cause static levels sufficient to ignite flammable vapor inside the tank.

What You Can Do?

- Ensure that you have, and follow, safe operating procedures for any routine change of the contents of a tank.
- For a non-routine change of the contents of a tank, make sure that a management of change review is done and that safe operating procedures are developed and used.
- To minimize the potential for static discharge, follow the guidelines in API RP 2003. This requires that the velocity of material discharging into a storage tank which can contain a flammable atmosphere be no more than 3 ft/sec until the fill pipe is submerged in the liquid, either 2 pipe diameters below the liquid level or 2 feet, whichever is less.
- Learn more of the many lessons from this incident from the US NTSB investigation report at:

<http://www.nts.gov/publictn/2004/PAR0402.htm>

Remember that rapid flow of liquid into air can cause static electric sparks!