



Prevention of Overfills from Aboveground Storage Tanks: Introduction to a Three-part Feature

This is the introduction to a three-part series on the prevention of spills from overfilling aboveground storage tanks that is the culmination of a three-year study by storage tank expert and API committee chairman Philip Myers. Next article will feature Part 1 which is a general discussion of AST overfill prevention and API 2350; Part 2 is a synopsis of Chevron's first major overfill prevention study; and part 3 describes Chevron's most recent overfill study and overfill prevention program.

Storage of petroleum liquids is generally considered relatively safe. However, there are many different modes of failure that allows the petroleum to escape its primary containment envelope (in our case, the aboveground storage tank) and create hazards and risks not only to the owner/operators but the public as well. Understanding the mechanism of failure allows for development of measures to reduce the probability of failure, thus reducing risk for everyone.

In this series of articles we are addressing the spilling of petroleum liquids resulting from overfilling aboveground storage tanks. While this may seem like a relatively simple task, it has taken me a large fraction of my time and effort for the last three years to develop a cohesive plan to address and prevent potential overfills. It may also appear that overfills are not serious. The following photographs provide visual impact about how severe the effect of such an incident can be and the immediate consequences of the incident shortly after its occurrence.



There is a regular occurrence of tank overfills at petroleum storage facilities. This happens in spite of the existence of two industry standards: API 2350¹ and NFPA 30². While overfills are nearly entirely preventable, their regular occurrence has caused several states to consider and enact rules regulating tank transfers. It is the purpose of this three-part series to discuss overfills, why they occur, how to prevent them, and what the industry should do in terms of self-regulation and regulatory advocacy. During the course of this discussion, we rely heavily on the principles of API 2350.

The information below was taken from email correspondence in January of 2000. The accuracy of the information or the statements made cannot be guaranteed, endorsed or commented upon. The

purpose of providing this information is to provide real, relevant information as seen by a party closely involved with the breaking news at the time and who works in the petroleum business. The abridged information follows:

"This incident happened in a refinery as a result of the free movement of transport vehicles inside the plant without permits. There were eight fatalities and 13 hospitalized with serious injuries. As you will see from the photos, it would have been significantly worse if it had occurred during the daytime working hours; the death toll would have been easily over 100."

"Basically one of their gasoline tanks overflowed at 11:30 pm on Thursday 2nd of December, 1999. A security guard detected a strong smell and notified shift control who sent two operators to investigate. And as some of you know Thai's don't walk anywhere, they drive; say no more. The bang was so big that it shook my apartment building in Pattaya (it's about 20km away) and it was the closest feeling I have had to an earthquake. "

"The fire spread from one tank to 4 others before it was contained and eventually put out by allowing the fuel to completely burn out, over a 'zillion' liters. Apart from the five tanks, the admin building, maintenance workshop, store, medical center, engineering office and ironically the fire station with three fire fighting trucks (which is right next door to the tank farm) were either completely gutted or severely damaged by the blast."

This extensive, exhaustive and timely information on is divided into three parts, the first of which will appear next month. The future topics are:

Part 1 - General Discussion of AST Overfill Prevention and API 2350 (August 2001)

Part 2 - Chevron's First Major Overfill Prevention Study

Part 3 - Chevron's Most Recent Overfill Study and Overfill Prevention Program and Overall Conclusions

Philip E. Myers, retired from Chevron Products Co., where he specialized in tank and pressure-vessel technology. He is currently consulting.