Analysis of an LPG Explosion and Fire

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ABSTRACT

In September 1997 an LPG release occurred at the Hindustan Petroleum Corporation, Ltd refinery in Vishakhpatnam, India. The resultant explosion and fire destroyed most of the facility's administrative buildings, numerous LPG storage vessels, processing units, and an adjacent petroleum liquid storage terminal. Loss of life was declared at 56, but could have been as high as 3 times the official estimate. Property damage was estimated at US $15 Million dollars.

During receipt of LPG cargo from a pressurized ship, a leak occurred. The subsequent vapor cloud spread throughout the refinery tank farm, administrative complex, utilities area, and at least one process unit before eventually finding an ignition source. The investigation team developed numerous release theories. However, none of these theories could be substantiated by first-hand witness testimony since all personnel directly involved in the tank filling operation were killed. Vapor cloud dispersion computer modeling was used to evaluate the credibility of various release scenarios. This paper discusses the events leading up to the explosion, the damages sustained, and the comparison of quantitative dispersion modeling results to the physical damage and witness testimony obtained during the investigation.