Flash Fire from a Fractionator Overflow

Christopher S. Buehler and Gregory J. Haussmann
Exponent, Inc. Houston, TX 77042
Russell A. Ogle, Exponent Inc., Warrenville, IL 60555

Abstract

A fire occurred at a petroleum refinery when a fractionator overflowed resulting in the release of a hot flammable liquid. The initiating event of this incident was a fault in the fractionator’s level control transmitter. The control room operator failed to diagnose the level control fault and executed specific actions which worsened the process upset. The fractionator filled with naphtha and overflowed into process vents through the column’s pressure relief valves. Through a series of missteps, the emergency flare was inadvertently extinguished, allowing the uncontrolled release of hot naphtha from the flare stack. The naphtha release was ignited and the subsequent flash fire injured three workers.

In this paper we discuss the causal factors of the accident and describe corrective actions that could have prevented this incident. The similarity between this incident and other recent flammable liquid releases is discussed with an emphasis on lessons learned.

Keywords: Fire, accident investigation, refinery, overflow, flammable liquid