

Letter from a Certified Fire Inspector (CFI)

February 13, 2003

Dan Parker
IRST
PO Box 7427
Louisville, Kentucky 40257-0427

Dear Mr. Parker,

Two questions were asked by Mr. Terry Masters, will the CIAgent pillows buried under six inches of gravel burn as the result of a fire from a transformer failure? The second question asked was, would the fire be accelerated by the burning mineral oil absorbed into the pillows that had escaped from the transformer casing?

The damaged caused to the buried pillows results from a theory that reasons, since heat raises, in a fire the floor, or in this case the ground would be cooler, while the temperatures would be elevated directly above the area on fire. Since a liquid accelerant (mineral oil) burns very hot, at floor or ground level, it causes the floor or ground to be much hotter than normal. Heat sensitive materials on or just below ground level will be more affected than they would be in a nonaccelerated fire.

Over the years many test, have been conducted to prove this theory by such testing laboratories as Fire Finding and Dr. John Dehan, author of Kirks Fire Investigator. The test results have raised questions about this theory and all but proved the theory incorrect. The actual test results clearly indicate that a distinctive, less-burned area showed in the area where the accelerant was poured. The reason the area directly below the burning pool of ignitable liquids is cooler is easily explained, once a proper understanding of exactly what occurs during the course of the fire incident.

First of all it is incorrect to assume the ignitable liquid is actually on fire. The area above the pool where the vapors form is where the fire is actually occurring. The radiant heat is being absorbed by the pool while the surface area of the floor or ground at the edges of the pool are absorbing the radiant heat and are not protected by the pool. The liquid does not really cool the floor or ground, rather it can protect it because the temperature cannot exceed the boiling point of the liquid. Upon ignition, the flames are established everywhere the vapors can diffuse into the surrounding air. In a porous surface area the diameter of the pools can be smaller, localized burning can take place for longer periods of time, however flames are established only where the vapors can diffuse into the surrounding air.

Going one step further, we have all seen on the news, an underground natural gas pipeline on fire. People assume the natural gas is burning under ground. However the exact opposite is actually occurring. In order for the natural gas or other flammable liquids to actually catch on fire the proper mixture of oxygen must be present. The normal oxygen concentration in surrounding air is 21%. When the oxygen level drops below 15% the combustion rate of ordinary combustibles begins to decrease. Natural gas

has a lower explosive limit of 4.5 % oxygen and an upper explosive limit of 15%, concentrations above or below these limits will not sustain ignition. The natural gas must migrate to the surface before the gas can be ignited.

In conclusion it is my opinion that the pillows buried under six inches of gravel will not become involved in the fire under normal fire conditions. The pillows are not in an oxygen-rich environment sufficient to sustain ignition.

Sincerely,
G. Lynn Nobles, C.F.I.
Senior Investigator