



INDIANAPOLIS FIRE DEPARTMENT

Joseph Krebsbach
Deputy Chief
Bureau of Operations
955 Fort Wayne Avenue
Indianapolis, IN 46202

Overview

On 27 January 2015, 05:33 hours, the Indianapolis Fire Department responded to a reported trash compartment fire in a garbage truck. The incident location was 1498 E 86th Street. The vehicle contained Type 4 compressed natural gas (CNG) cylinders¹. These cylinders were located directly above the body of the vehicle (hopper) and were used to power the vehicle in lieu of fossil fuel. The fire was located immediately below the storage bin of the tanks.

The first arriving unit, Engine Co. 6, received information the fire involved compressed gas cylinders and requested additional resources at 05:45 hours. An elevated water stream was deployed to cool the tanks and contain the fire. The tank explosion occurred at 06:06 hours. The resulting debris field extended approximately three-quarter miles (1.2 kilometers) from the explosion site, with one CNG cylinder landing in front of a nearby school. Although firefighters were struck by debris, the only injury noted was a muscle strain. The vehicle involved sustained significant damage, with only minor damage to nearby structures.

Weather conditions at the time of this incident was cloudy, an air temperature of 20° F (-6° C) and a trace amount of snow. Wind was approximately 5 mph (8 kph) from the NNE.

Findings

As mentioned, this vehicle was equipped with Type-4 CNG tanks. Attached to each end of a cylinder is a thermally-activated pressure relief device (PRD), designed to operate between 212° F and 220° F (100° C and 104° C). The PRD is designed to relieve pressure in CNG containers in the event of a fire. It is important to note the PRD may not always activate in time to prevent any chance of a cylinder rupture in a fire. If the heat transferred to a cylinder is localized, intensive and remote to the relief device, or when fire builds rapidly, such as in an explosion, and is of very high intensity, the cylinder can weaken sufficiently to rupture before the relief device operates, or while it is operating².

Against normal procedure for fires involving in such vehicles, the driver was unable to “dump” the burning debris. This resulted in a the heat build-up directly under the cylinders. A contributing factor was a protective cover over the tanks. The cover likely hindered cooling the tanks and may have inadvertently caused the pressure reducing devices (PRD) to be cooled by the water stream and prevented their activation. It is speculated the water spray applied may have kept the PRDs below their intended trigger temperature.

From a tactical perspective, if a vehicle is known to be equipped with CNG cylinders and is well involved with fire, firefighters should maintain a safe perimeter and not approach the vehicle, unless there is a significant life hazard, i.e. let the vehicle burn. A minimum evacuation radius of 300 feet (90 meters) should be maintained in such incident types. As experienced in this event, a tank landed approximately

4,000 feet (1,200 meters) away. Do not approach from either the front or the side of the vehicle. If necessary, approach a CNG vehicle fire from a 45° angle.

If the PRD(s) have activated, do not apply water spray, but rather allow the fire to burn.

References

¹ A Type-4 CNG cylinder is manufactured using a plastic gas-tight liner reinforced by a full composite wrap around the entire tank. The entire strength of the tank is composed of composite reinforcement tape. This cylinder is rated to a maximum pressure of 4,500 psi and a temperature range of -40 Fahrenheit to 180 Fahrenheit.

² American National Standards Institute (ANSI) PRD 1-2013

Garbage truck explosion in Indianapolis 27 January 2015



