Indianapolis CNG Refuse Truck Fire Update

On January 27, 2015, two CNG cylinders ruptured while firefighters in Indianapolis, Indiana were fighting a refuse truck fire that appears to have started in the truck’s hopper. The CNG cylinders on this truck were located in the area above the hopper. While the investigation is far from complete, the Clean Vehicle Education Foundation (CVEF) wishes to alert operators of CNG vehicles and first responders to some important facts.

A common procedure in such trash fires is to dump the load so that it can be extinguished on the pavement. This was not done in the Indianapolis incident, but it should always be considered wherever possible.

The fire in the trash hopper exposed the CNG fuel system mounted above the hopper roof to intense heat. Prolonged, direct, and intense heat can damage the structural integrity of CNG cylinders, ultimately resulting in a rupture if pressure is not relieved.

The fuel system was equipped with pressure relief devices (PRDs) mounted at both ends of each cylinder. The PRDs are designed to relieve pressure in CNG containers in the event of a fire threat. The fire continued for more than 30 minutes from initial detection prior to a cylinder rupture. There is no evidence so far that these temperature-activated devices experienced sufficient heat input to trigger and relieve the gas pressure. The PRDs were designed and qualified in accordance with the ANSI PRD1 standard for CNG PRDs.

It has been recognized that PRDs cannot always activate in time to prevent any chance of a cylinder rupture in a fire. ANSI PRD1 contains the following quote from the older CGA S-1.1 standard for industrial gas PRDs.

CGA S-1.1, Pressure Relief Device Standards Part 1-Cylinders for Compressed Gases states: “relief devices may not prevent burst of a cylinder under all conditions of fire exposure. When the heat transferred to the cylinder is localized, intensive, and remote to the relief device, or when the 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 operating.”

CNG cylinders are almost always equipped with protective covers that make it difficult to spray water directly on the cylinders. Direct or indirect water sprayed on the system in Indianapolis may have kept the PRDs below their intended trigger temperature. Another recent and very similar refuse truck fire resulted in relief of pressure through the PRDs as intended, but in that case the firefighters cleared the area and allowed the truck to burn without attempting to cool the cylinder package, possibly changing the outcome.
**Recommendations:**

Drivers and first responders should receive specific training for handling a CNG vehicle fire.

If the burning cargo can be dumped or a burning trailer can be disconnected, that should be done as soon as the fire department is summoned.

Since in most CNG vehicle fires it is too late to save the vehicle by the time the cylinders are threatened, fire fighters should clear a safe perimeter and not try to approach the vehicle to fight a fire that is threatening the cylinders unless there are injured people to evacuate.

The cylinder enclosure should not be sprayed with water unless the PRDs will not be cooled or the gas has already been vented through PRDs.

Based on previous fires, firefighters should not approach a burning CNG vehicle directly from either end or side. They should approach on about a 45-degree angle.

Specific instructions should be obtained from the vehicle manufacturer, upfitter, or converter when dealing with the aftermath of a CNG vehicle fire. Some of the cylinders may have been relieved during the fire but others might remain full and will require following special procedures to empty them.

The Clean Vehicle Education Foundation will participate in the ongoing investigation and report on additional findings and recommendations as needed. Contact John Dimmick at jdimmick.cvef@gmail.com or Doug Horne at dbhorne1@gmail.com if you have any questions.