DANGEROUS INCIDENT

Fuel service truck catches fire at coal mine

Incident date: 24 November 2018

Event: Diesel flowing from a tank breather assembly causes fire on a service truck

Location: Maules Creek Mine, Boggabri, NSW

Overview

A fuel service truck caught fire at an open cut coal mine. Diesel fuel from a breather assembly on top of the fuel tank flowed directly onto hot engine surfaces. The onboard fire suppression systems on the truck were unable to extinguish the fire. The operator escaped from the truck without injury.

Circumstances

A fuel service truck with a full diesel storage tank (33,400 litres calculated) reversed and parked on a ramp to access an excavator. The excavator had run out of fuel and could not be moved for refuelling.

The fuel truck operator exited the cabin and saw diesel flowing from underneath the filter on the front diesel breather assembly. Due to the incline of the truck 11.9° (survey estimate) the diesel flowed from the breather vent directly onto hot surfaces on the engine.

Back on ground level the operator saw flames around the engine turbo and unsuccessfully tried to extinguish the fire with a dry chemical fire extinguisher. Another worker activated the truck's onboard fire suppression system, which failed to extinguish the fire, that had spread to the cabin and tank. Several water carts were used to extinguish the fire. After the fire was extinguished, diesel was seen to continue to flow from the check valve on the breather assembly.

Figure 1: View of the fuel service truck on the ramp after the fire. (Photograph courtesy of the mine)

Investigation

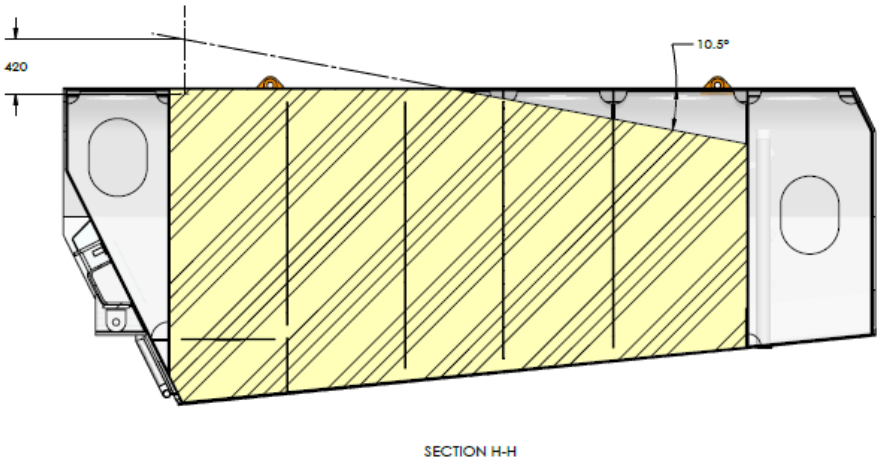
The NSW Resources Regulator conducted an investigation and identified:

- the diesel tank ball float had been raised to the top position on the support bracket to increase the capacity of the diesel tank from 30,000 litres to 33,400 litres (calculated).
- the breather assembly was designed to allow air to ventilate during filling and discharge of the diesel tank. The breather paper filter base was 420 mm above the top of the tank. The breather assembly components had been replaced and were not as originally designed.

Figure 2: View of burnt breather vent and the setting of the diesel ball float valve in the support bracket (Photographs by Resources Regulator)

- when the tank was filled to 33,400 litres, the angle of inclination for fuel to run out through the breather assembly filter base (420 mm above the tank) was 10.5° (OEM calculated)

Figure 3: Side view of the tank at inclination of 10.5° and filled to 33,400 litres will cause fuel to flow through the base of the filter on the breather assembly (OEM-supplied drawing)



→ the roll over adapter on the breather assembly consists of a steel ball locating onto a metal seat and relies on gravity to close fuel flow in a roll over. The rollover adapter was not designed to shut off fuel flow on a low incline. Fuel continued to flow through the roll over adapter at the 11.9° angle on the ramp.

Figure 4: View of steel ball in the roll over adapter. (Photograph by Resources Regulator)

→ Fuel was initially observed to flow from the base of the paper filter on the breather assembly. The original design was a desiccant-type filter that would have reduced the volume of diesel flow.

Figure 5: View of paper filter breather assembly. (Photographs by Resources Regulator)

Figure 6: View of desiccant filter used in original design.

→ Fuel was later seen to flow through the check valve on the breather assembly after the fire was extinguished. Testing of the check valve confirmed the observation that diesel would continue to flow through the fire-damaged check valve.

Figure 7: View of testing the check valve showing fluid running through the fire damaged check valve. (Photograph by Resources Regulator)

Recommendations

Mine operators must review:

1. the principal hazard management plan (fire and explosion) and mechanical engineering control plan risk assessments for fuel service trucks to ensure control measures are effective to contain and redirect flammable liquids spilled from the top of the tank away from hot surfaces
2. the design arrangements of the ball float and breather vent settings on fuel service trucks to ensure that they meet OEM specifications
3. controls to manage the hazard of fuel venting through breathers during fuelling and roll-over event are effective
4. the operating gradients of fuel service trucks are within OEM design specifications
5. maintenance practices of ball float and breather vent settings on fuel service trucks to ensure life cycle inspections and maintenance programs are effectively performed
6. change management systems to ensure modifications of fuel storage and delivery systems on fuel service trucks are appropriately assessed and include consultation with OEM.

About this information release

The NSW Resources Regulator has issued this information to draw attention to the occurrence of a dangerous incident in the mining industry. Investigations are ongoing and further information may be published as it becomes available.

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