

Vacuum Truck Explosion

Safety Alert

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Enform

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Description of Incident:

A vacuum truck operator was in the process of unloading cold heavy crude when he noticed that the 6-inch rubber hose downstream of the blower was smoldering. The truck operator proceeded to discharge his fire extinguisher on the hose and then turned off the blower and closed the truck and tank valves. Shortly thereafter a loud popping sound was heard and then the truck operator was engulfed in flames. While the operator was running away from the area the rear door on the vacuum truck blew off hitting the production tank and platform. The vacuum truck was completely destroyed and some damage to the production platform was sustained. The operator was wearing fire retardant coveralls and a 4-head gas monitor and suffered third degree burns requiring a skin graft.



Destroyed Vacuum Truck



Vacuum Truck Lid Resting Against Production Tank

What Caused It?

The blower and associated rubber hose overheated igniting the residual hydrocarbons in the blower's associated hose and piping.

- An inspection revealed residual hydrocarbons were present in the blower's associated hose and piping on this vacuum truck as well as others.

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- The blower and associated hose and piping can overheat such as when the blower is operating at maximum for an extended time or when under a load. Testing conducted on other trucks identified temperatures beyond the manufacturer's maximum temperature for the rubber hose.
- A review of the blower manufacturer's documentation revealed that the blower was not designed for use with flammable liquids despite the integrated presence of a diesel flush system on this truck and similar trucks in the upstream oil and gas industry.

Contributing Factors Included:

- A temperature gauge was present on piping downstream of the blower, but it did not have a red zone. Operators were not aware of what constituted an unacceptable temperature.
- There was no engineering control device to keep the blower from overheating or to warn of an overheating condition.
- A build-up of flammable material was present in the blower's associated hose and piping.
- The operator did not use the emergency shutdown device (ESD) on the truck.

Corrective/Preventative Actions:

- A temperature sensor was installed on the hot side of the blower and the sensor was equipped with an audible and visual alarm.
- Operators were equipped with and trained on the use of infrared temperature meters.
- A procedure was instituted to cycle the blower on and off between 10 and 12 psi to reduce heating.
- A procedure for the inspection of the diesel flush line was created. This was not a contributing factor, but it was felt that this warranted additional focus.
- The inspection of internal piping and hoses for residual hydrocarbons was added to the regular maintenance schedule.
- Refresher training was given to operators on emergency response procedures.

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