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# ***THE GAMGRAM***

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## **No. 73 REFUELER TRUCK INTERNAL VALVE RISKS MAR. 2022**

I'm sure many of you have seen the photo on the internet of two signs beside a pond in Florida. One sign reads "No Swimming" and the other one reads "Please Do Not Feed The Alligators."

Obviously, only the second sign should be necessary.

We have a similar situation with the NFPA-407 required (6.1.3.12.2.4 and 6.1.3.12.2.7) built-in refueler truck high level controls. Many people simply do not understand how they work and why they are there. They do not realize this pond has alligators.

Refer to GamGram #54 for more detailed operation of NFPA 407 overflow and spill prevention system.

The first reason we have high level controls is simple, to prevent us from over-filling a tank. But there is MUCH more to worry about. We can have an even more serious fuel spill when the truck is NOT being loaded, outside of spill containment. This can be from equipment failure, an accident that damages the trucks plumbing or vandalism. The NFPA-407 required on-board controls are the ONLY way to keep the contents of the cargo tank in the cargo tank.

**Importantly, a fuel rack-mounted electronic system does nothing to protect against this risk.**

Functions of the 407-mandated internal automatic shutdown system:

1. To open the tank's internal valve ("emergency valve") as the tank is loaded, and close it when the cargo tank is full.
2. To close before the refueler is moved and keep the contents in the tank. This is to prevent a significant spill if equipment fails or in the event of a collision. This is important because these valves WILL eventually stick and not fully close.
3. To open when pumping fuel to an aircraft. When the pump is engaged, the internal valve is sent compressed air (in some cases on small trucks, opening may be done by a manually operated cable). When loading is finished, the valve should return to the closed position.
4. To operate as a positive closing valve in an emergency.

So where does our reference to "No Swimming" and "Do Not Feed The Alligators" apply?

The problem is that people sometimes confuse over-the-road tractors with refuelers. But we have an alligator in our pond - and tractor trailers do not.



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The main differences are that the valve on a tractor trailer is used much less often and is never used as a high level control (See NFPA-30). It is a much simpler design that doesn't commonly stick open.

**TRACTOR TRAILERS ARE DIFFERENT** - When loading a tractor trailer, the tank is always empty. To prevent overflow at the fill stand you simply to have flow stop when you have put in the correct volume. So the PRIMARY high level control is a "meter preset". This is to NFPA-30. The internal valve is much simpler and cable operated. The tank and the fill stand are fitted with a system composed of a separate, electronic high level sensor to stop flow from the fill stand. This does not close the internal valve, it ONLY stops flow from the fill stand.

**REFUELER TRUCKS** - On a refueler truck, the tank is almost never empty. It is refilled when it is getting low, which can be many times a day, to make sure there is enough fuel for the next aircraft. So we do not stop loading a refueler when a specific volume is pumped, as with tractor trailers. Flow is stopped when the cargo tank is full.

In NFPA-407, we require a high level control COMPLETELY built into the refueler itself, THIS is our primary high level control. A meter preset is useless because you are never really sure of how much fuel the tank needs.

To make sure that the built-in overflow protection on a refueler truck works, as required in the USA by NFPA 407, the system on refueler trucks closes the internal valve when it is not needed to be open.

This system is purely on the refueler and not, in any way, connected to the fill stand. It is often based on a "jet level sensor" or a float, both of which are purely hydraulic. It stops flow from the fill stand when the tank is full by closing the internal valve on the cargo tank. This high level control is required by NFPA-407 to be fitted with a test mode. The pre-check can be either with a catch can or without, and you should test it every time that you fill the truck tank. This is the only way to be sure the internal valve closes completely. This pre-check "fools" the internal valve to close even though the tank is not full.

When (not if!) the internal valve sticks partly open, fuel is not kept in the tank. It will leak out. Flow will not stop until the cargo tank is completely empty.

If there is a fire, it will be constantly fed with more fuel, and even if there is no fire, the fuel is going into the ground or the nearest storm drain, which often means the nearest creek, river or wetlands, but a significant environmental problem.

Testing is simple. If you do not test, the risk for disaster is when an accident or leak takes place outside of the fill stand containment area, the entire load of fuel will escape.

The point of this GamGram is to educate people that an electronic system on the loading rack only protects you against overflow, which should be the LEAST of your worries. You have containment for an overflow, and it is away from aircraft or passengers.

People may come to think that the rack mounted high level control is all they need. Then they stop testing the built-in, NFPA-407 mandated high level control, and that means they stop testing the internal valve.

So make sure your people keep on testing the refueler truck's own built-in high level control every time the cargo tank is loaded, it is there to protect against MUCH more than an overflow!