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Messages for Manufacturing Personnel
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WHAT HAS YOUR STEAM UP

The Incident:
At first glance, this appears to be a traffic incident – but take a closer look! You are looking at a process safety event. The photos graphically explain what happens when HOT asphalt is added into a trailer that has been recently cleaned with water. Unfortunately, the excess water is not removed from the trailer before adding the asphalt - the water rapidly turns to steam and expands in volume about 1600 times. The result - significant damage. In this case it's a tanker, but it could just as easily have happened to a vessel or piping system. No injuries occurred.

Common Causes of failures like this:
This type of event has happened **MANY** times, often involving heat transfer fluids, mineral oils or other "heavy" organic materials (like the asphalt above). The event begins when a HOT material is added to a vessel or piping which contains materials with a boiling point under the temperature of the hot material. In general, the larger the difference between the temperature of the hot material and the boiling point of the lower boiling material, the more significant the damage. As heat is transferred from the hotter material, vaporization of the lower boiling material occurs and the pressure that results can cause lots of damage!

What Can I do?

- ☑ During **ANY** material transfer, if the liquid being transferred is hotter than 212F/100C – take steps to make certain there is no water in the downstream equipment.
- ☑ Water removal is often difficult in complex piping systems: Low point drains **MUST** be opened, piping must be carefully examined for "traps" and flanges may need to be opened in **MANY** locations.
- ☑ Shipping containers are frequently cleaned with water; any shipping container must be assumed to contain water unless steps have been taken to remove it.
- ☑ Proceed slowly when starting up processes following shutdowns, especially with fluids that are very hot.

HOT liquids have many hazards! Don't forget they can lead to significant pressure buildup if added to vessels containing water or other materials with boiling points lower than the temperature of the hot fluid.

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