

## LAYERS OF PROTECTION You NEED Them



### HERE'S WHAT HAPPENED.....

During a non-routine procedure, materials were transferred into a vessel. A number of items were present (i.e., “layers of protection”) to prevent vessel damage, including:

- A high pressure alarm (in this case, the alarm was acknowledged earlier when it was assumed to be caused by a faulty instrument)
- A pressure control system which allows pressure to be vented to another system in the area (in this case, this “second system” was out of service), and
- A pressure relief/vacuum system which vented to the atmosphere (this system contained a flame arrester which was found to be plugged).
- The net result of all these failures was a ruptured roof on the tank

### What do layers of protection accomplish?

- A well designed facility includes multiple items of protection for equipment;
- These frequently include a number of the following: operator monitoring, procedures, alarms, interlocks, pressure rated equipment and relief/vacuum valves, and
- In most cases, multiple systems must fail before vessel damage occurs

### What can I do to protect equipment?

- **NEVER** assume an alarm is functioning improperly -if an alarm becomes a nuisance, take immediate steps to have it repaired;
- Review alarm status for equipment early in your shift, understand why **ALL** alarms are present;
- Pressure/vacuum relief valves are often the **LAST** line of defense which prevents vessel damage, maintenance systems must be in place to properly test these devices;
- Pluggage in vent lines must be managed - if a line has a tendency to plug, cleaning frequencies should be adjusted to maintain the line in a “clean” state; and
- Non-routine operations often have fewer or weaker layers of protection when compared with “routine” operations, all items preventing equipment damage are especially critical.