

Preventing Fires & Spills from Tank Overflow



International Society of Automation

Denver Section

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Overfill Has Caused Great Fires with Great Loss of Life & Property

- Molassas & Alcohol Boston, 1919
 - Overfilled
 - Killed 21



- Hi Alarm & Gauging Failure
- 8 firemen killed, Closed for a year
- Buncefield terminal, 2005
 - Gauge & Alarm Failure
 - Resulted in revised Codes





Philadelphia Gulf Refinery Fire

- Tanker filling crude tank under bridge; overflowed into bunker
 - Vapors flowed over bunker to boiler 300 ft away
 - Flashed Back
 - Burned about a week
- Budget didn't permit purchase of a remote gauging/alarm interlock system in 1974
- Procedures were violated
 - Gauger did not observe procedures
 - Float alarms didn't interlock & shut off flow
- Results
 - 8 firemen lost
 - Primary highway entrance to Phila closed for several months
 - Refinery closed months with lost production

Buncefield UK - 2005

- Unattended product terminal
- Overfill for hours from pipeline
- Gauge failed to indicate level rise for 2 hours
- Hi alarm switch failed
- Vapor cloud flowed over bunkers to ignition
- Triggered revised standards for independent level measurement & shutdown systems
 - NFPA 30
 - API 2350



Which Standard

- NFPA-30 when
 - Tanks have 1320 gallons or less
 - Single tank
 - Indoor



- Tanks contain more than 1320 gallons
- Tanks are filled from a pipeline
- Multiple tanks in close proximity





API 2350

Management System Overfill Prevention Process

- Formal Risk Assessment: Individual & Overall
- Formal written operating procedures and practices with safety and emergency response
- Trained & qualified personnel
- Functional equipment
- Scheduled inspection and maintenance programs for instrumentation
- Systems to address both normal and abnormal conditions
- Management of change process
- A system to deal with overfill near misses and incidents
- A system to share lessons learned

API 2350 Detail

Categorize each vessel's overflow risk

Category 1 Manual





- Category 2 Sensor + Alarms Notify Operator
- Category 3 Redundant Sensors & Alarm
 - Notifies Operators
 - Shuts Off Flow



Category 4 Automatic Shutoff



More Fuel Tanks in Buildings for Backup Power

- Often in basements or on rooftops
 - Some have overflowed
- NFPA 30 21.7 calls for
 - Audible & visual alarm at 90% full
 - Shutoff at 95%
- System strategy:
 - Monitor continuous level
 - Shutoff w/monitor + Independent

Fuel Tanks in Buildings for Backup Power

- Often in basements or on rooftops
 - Some have overflowed
- NFPA 30 for >1320 Gal Tanks
 - Independent sensor/alarms
 - Audible & visual alarm at 90% full
 - Shutoff at 95%
- System strategy:
 - Monitor continuous level
 - Shutoff w/monitor + Independent





Types of Level Shutoff Point Level

- Capacitance/RF
- Displacement
- Float
- Pressure
- RADAR
- Thermal
- Ultrasonic







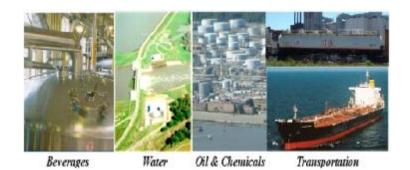






Overflow Is Easy To Prevent

- Pays for itself in lower insurance rates
- Follow standards
- Plan protection
- Use Reliable, Redundant Sensing
- Integrate into a reliable interlock system



Prevent This

