SPCC Plans: Regulatory Burden or Effective Risk Management Tool?

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Many Regulations...

- Government agencies have established regulations to mitigate the most egregious and unacceptable risks to the public and environment
  - Worker Safety (OSHA)
  - Clean Water (SPCC)
  - NYSDEC PBS/CBS Regulations
  - Local Fire and DOH Code
Industry has developed standards for the safe installation and operation of bulk storage tanks

- API 653 – *Tank Inspection, Repair, Alteration and Reconstruction*
- STI SP001 – *Standard for the Inspection of Aboveground Storage Tanks*
- NFPA 30 – *Flammable and Combustible Liquids Code*
Promulgated to Reduce “Risk”

What is Risk?

Risk is defined as the possibility of loss, injury, or other adverse or unwelcome circumstance.
Some “Unwelcome Circumstances”

- Overflow/overfill
- Piping / Fitting Failure
- Internal Corrosion
- Alarm Failures
- Structural Failure
- Secondary Containment Failure
- Fire
- Lightning / Earthquakes / Hurricanes
From the STI August 2015 “Tank and Petroleum Use Mishaps”

- USA, TX, JULY 18 2015. 1 KILLED, 2 INJURED IN SAGINAW STORAGE TANK EXPLOSION

- USA, N.Y, BEACON AUGUST 7 2015. MANHOLE GASOLINE EXPLOSION IN BEACON; NO INJURIES REPORTED

- USA, AKA, SITKA AUGUST 18 2015. UP TO 7,000 GALLONS OF DIESEL SPILLED FROM SITKA POWER PLANT

http://www.steeltank.com/Portals/0/tank_use_mishaps/news%20815.pdf
Potential Impacts

- Loss of Inventory
- Loss of Equipment Use / Revenue Generation
- Administrative Hassle
- Financial Penalties
- Loss of Reputation
- Natural Resource Damages
- Loss of Business
- Criminal Penalties
- Loss of Life
Where does SPCC Fit in?

- SPCC Plans are typically treated as low priority and/or are superficially implemented.

- Arguably, SPCC Plans should be cornerstone of your risk management program.

- The SPCC Plan has inspection, testing, maintenance and training elements that help reduce risk.
Risk Analysis-Bulk Petroleum Facility

Spill Prevention & Countermeasure

Probability

Very High

High

Medium

Low

Very Low

External Corrosion

Leaking Pipe/Fitting

Tank Settling/Foundation

Tank Overfill

Lightning Strike / Explosion

Fire

Business Impact

No

Minor

Medium

Serious

Catastrophic
EPA Says: “Be Prepared”

News Release from EPA Region 3: Major Oil Company to Pay $210,000 for Spill Response Violations (September 2012)

"Being prepared to respond to an oil spill can be the difference between dealing with a small, contained event or a full-blown environmental disaster"

-Cynthia Giles, assistant administrator for EPA’s Office of Enforcement and Compliance Assurance
Anatomy of an SPCC Plan

- **PREVENTION** (your brain)
- **CONTROL** (your organs)
- **COUNTERMEASURES** (medical intervention)

- As I tell my kids: “Use your head!!!!”
SPCC = Spill PREVENTION, Control & Countermeasure

- Prevention is the primary goal of your spill plan
- How do you prevent spills from occurring?
  - Proper Design
  - Frequent Inspections
  - Regular Maintenance
  - Training
Florida Leak Autopsy (2008)

Sources of Discharges - Field-Erected AST Systems

122 Discharges
Nov 08

- Bulk Product Piping 45%
- Hydrant Piping & Pits 3%
- Fill pipes & Transfer Hoses 2%
- Field-Erected Tanks 27%
- Small Diameter Piping 2%
- Vehicles 3%
- Valves 13%
- Pumps 4%
- Day Tanks & Fuel Filters 2%

Tanks are only 17% if overfills and other external factors are excluded

Source: Mott-Smith Group, 2008
Florida Leak Autopsy (2008)

Causes of Discharges from All Sources

- Corrosion: 21%
- Loose Component: 12%
- Material Failure: 10%
- Weather: 2%
- Other: 2%
- Mechanical Damage: 7%
- Spill: 4%
- Physical Damage: 6%
- Overfill: 8%
- Unknown: 18%
- Human Error: 4%
- Component Failure: 7%

Nov 08
Pennsylvania Inspection Results (2013)

- 1,237 Aboveground Storage Tank Integrity Inspections in PA (performed by 3rd party DEP certified inspectors)
  - 129 Monthly Maintenance Check Violations (performed by owners/operators)
  - 553 Performance/Design Standards Violations (paint, label, vents, etc.)
  - 104 AST Containment Violations
Case Study: Prevention

- During annual inspection of AST facility, it was determined that one of the tanks was due for an in service STI SP001 inspection.
- That test (completed in 2004) indicated thinning of the steel on the tank bottom.
Why do I need testing?

- Rationale for not testing: If the tank leaks, the operator will see it, throw a mag patch on it and then fix the tank when time allows. From his intuitive risk analysis, this was not a high priority.

- From a risk management perspective, there are several potential outcomes to consider:
  
  - A pinhole leak is one possibility
  - A rupture is also a possibility if internal corrosion is extensive.
UT Tester – Don’t Leave Home without it!
The Result?

- Wall thickness below acceptable limits
- Tank was taken out of service after evaluating the need for storage vs. costs of repair

Was this a good outcome?

- Adequate storage available with reduced maintenance requirements
- Any type of failure would have put everything to the test. Worth the risk?
  - undetected problems with the containment
  - Contamination of water in the dike increases costs
Primary CONTROL is Secondary Containment
  • provides temporary containment of discharged oil until the appropriate actions are taken to abate the source of the discharge and remove oil from areas where it has accumulated to prevent it from reaching navigable waters or adjoining shorelines.

Two types of containment
  • General
  • Specific (sized)
General Secondary Containment

- Intended to address the **most likely** oil discharges from areas or containers such as mobile refuelers and other non-transportation-related tank trucks; oil-filled operational or process equipment; (non-rack) transfer areas; or piping.

- Only the typical failure mode needs to be considered.

- Spill kits, boom deployment, temporary berms, etc.
Sized Secondary Containment

- Required for bulk storage containers
- Must be “sufficiently impervious”
  - so that any discharge from a primary containment system will not escape the secondary containment system before cleanup occurs and before the oil reaches navigable waters or adjoining shorelines
- Must have sufficient “freeboard” for precipitation
  - 110% often cited
  - 25 year, 24 hour storm event preferred
- Ultimately, up to owner and certifying PE
If Secondary Containment is “Impracticable”

- Periodic integrity testing of containers, piping, valves
- Oil Contingency Plan
- Written commitment of manpower, equipment and materials

A VERY high bar for bulk storage containers
May also be applied to “eligible” oil filled operational equipment

- No single discharge > 1,000 gallons
- No two discharges > 42 gallons
- Within 3 year period prior to certifying plan

Oil Filled Operation equipment includes:

- Hydraulic systems
- Lubricating systems
- Gear boxes
- Transformers
Case Study – Piping Release at Bulk Plant (2007)

- 615 gallons fuel oil released at a rural New England bulk facility
The “Good”

- Tanks on concrete pads
- Written SPCC Plan in place (but not implemented)
The “Bad”

- Excessive “flex” of a flex coupling
- Stress fracture in piping
- Potable water valve used for petroleum service
The “Ugly”

- 615 gallons released to “containment”
- Containment floor “insufficiently impervious”
Forensic Analysis

- Improper design of piping, valve and containment
- SPCC plan not fully implemented
- Customer responded to spill once detected, but...not before sheen was detected on stream
- This was the 2nd spill reported to EPA in a 4 year period...

HINT: It all went “downhill” from here
EPA Enforcement Action

- RFI covered 5 facilities
- Multiple violations resulted in $157,500 penalty
- PLUS, structural and administrative upgrades over $350,000 spent within 9 months
  - Million gallon tank with inadequate containment and no FRP dismantled
  - Containment upgrades at 2 facilities
  - SPCC Plans revised at all facilities
  - Contaminated soil uncovered during upgrades
SPCC=Spill Prevention, Control, & COUNTERMEASURE

- When Prevention and Control fail
- Countermeasures taken to minimize impacts to receptors
  - Short term: spill kits/boom deployment, containment pumpout, excavation
  - Long term: remediation and monitoring of surface water, groundwater and soil
Case Study – Overfill of Bulk Tank on Pipeline (May 2000)

- Bulk Storage Tank connected to Pipeline
- Operator thought that he would have time to go to the bar across the street for a quick beer
- Bartender points to diesel shooting out tank vent
- Operator runs back to terminal to close valve
Stage 1: Prevention Fails

4.5.3 Overfill Prevention Systems [40 CFR 112.8 (c)(8)(i-iv)]

Containers are fail-safe engineered by having at least one of the following items.

- High liquid level alarms with audible or visual signal. ☑ YES ☐ NO
- Automatic high-liquid level pump cutoff devices. ☐ YES ☑ NO
- A direct signal between the container gauger and pumping station. ☐ YES ☑ NO
- A fast response system to detect oil level of each storage container with a person present to monitor gauges. ☑ YES ☐ NO

- Operator on site, not drinking beer? ☐ YES ☑ NO
Stage 2: Containment Fails

- 23,000 gallons diesel released to containment (steel sides, soil bottom)
- 14,000 gallons recovered by vac truck
- 9,000 gallons lost to subsurface
  - Containment – steel sides, soil bottom
  - Groundwater at 23 feet
  - 3.9 feet of LNAPL in 14 monitoring wells within 2 weeks
Release Schematic
Stage 3: Countermeasures

- Vac trucks and pumps were able to recover 60% of the release within 24 hours
- But 40% of the release exited the bottom of the containment
- Required long term cleanup over several years with total bill exceeding $350,000
  - With 2000 gallons recovered, the cost of cleanup was $175 per gallon of fuel
It Won’t Happen to Me…

- Nearly every one of my clients has had a major spill in the past 10 years
- Causes ranged from massive overfill of an AST to a dime sized hole in the tank bottom
- Nearly all of them were preventable
- In every case, operating changes were made to prevent reoccurrence
Costs of Non-compliance - EPA Penalties

Pursuant to 40 C.F.R. Part 19 (Adjustments of Civil Penalties for Inflation) ........the maximum civil penalties that may be administratively assessed have been increased as follows: For violations occurring after January 12, 2009, up to $16,000 per violation per day for each day during which the violation continues, up to a maximum of $187,500.
EPA Enforcement Actions

- Transportation Company in MA
  - failure to prepare SPCC and submit MSGP
  - RFI covered 7 facilities
  - Multiple violations resulted in $237,000 penalty
  - PLUS, structural and administrative upgrades

- Bulk Fuel Distributor in VT
  - Oil released to river in 2003
  - Second release in 2007
  - RFI covered 5 facilities
  - Multiple violations resulted in $157,500 penalty
  - PLUS, structural and administrative upgrades over $250,000
Cleanup is only part of the cost...

- Loss of Inventory
- Loss of Equipment Use / Revenue Generation
- Administrative Hassle
- Financial Penalties
- Loss of Reputation
- Natural Resource Damages
- Loss of Business
- Criminal Penalties
- Loss of Life
Strategic Planning

- Your best defense is a good offense
  - Be proactive with your SPCC plan
  - During or after a spill is NOT the time to start your compliance program!

- Collaborate with the regulators
  - Their main objective is to prevent releases
  - They will help you if asked
  - A cooperative attitude and quick response goes a long way

- There are many ways to achieve compliance
  - Evaluate your options
Key Word is PREVENTION

- Inspections
  - Daily, monthly, yearly
  - Address issues promptly
- Testing
  - UT and internal inspections are invaluable
- Training
  - An educated employee is your best defense
- Maintenance
  - A stitch in time saves nine
- Documentation
  - If it’s not documented, it never happened!
Questions???