SPCC Regulation – Integrity and Leak Testing Methods

NISTM New England
December 3rd, 2015
Founded in 1988, Tanknology has grown to become one of the largest testing and inspection service companies in the world.

Our fleet of 150 vehicles provides service in all 50 states domestically, and we have a presence in more than 30 countries with international licensees.

We hold 22 patents covering our test equipment and various leak detection methodologies.
Headquartered in Austin, TX

8 Strategically Located Regional Offices:

- Southern California
- Northern California
- Georgia
- Illinois
- Minnesota
- Ohio
- Philadelphia
- Texas

Our regional operating structure empowers us to provide clients with the best customer experience.
Our Services

• **Compliance Testing**
  – Tank Line and Leak Detector
  – Helium Leak Pinpointing
  – Aboveground Tank Testing
  – Secondary Containment Testing

• **ATG Certifications**
  – System Installations
  – Operational Verifications

• **Cathodic Protection Services**
  – Impressed Current Systems
  – Sacrificial Anode
  – Design, Installation and Repair
  – PetroScope™ Video Inspection

• **Stage I and II Vapor Recovery**
  – Testing (A/L, PD, etc.)
  – PVVC
  – Owner/Operator Training

• **Tank Deflection Analysis**
  – Proprietary Method
Our Services (cont’d)

- **Fuel Pure™ Fuel Filtration**
- **TankCam™ / Tank Clean®**
  - Video Based
  - Water Injection and Removal
- **Site Inspection and Audit Services**
  - State Required Inspections
  - Customized Surveys
  - Periodic Compliance Inspections
  - Maintenance Assessments
- **Operator Training**
  - Outsource Class B Operator
  - Online Class C Operators
- **Site Upgrades/Light Construction**
  - Spill Bucket Replacement
  - Sump and UDC Repair
- **Meter Calibration**
Federal EPA Regulation – 40 CFR 112

- Titled “Oil Pollution Prevention”
- Regulated Substance
- Capacity – aggregate of 1320 gallons of AST equipment or 42000 gallons of UST equipment (exemption)
  - Tanks, Containers, Drums, Transformers, Oil-Filled Electrical Equip (hydraulic equip, lubricating systems etc.), Portable Totes
- Navigable Waterways
- Will require SPCC (Spill Prevention Control and Countermeasure) Plan – P.E. Certification
- The SPCC will dictate inspection, testing, and evaluation procedures
- Deadlines
Oil of any type and in any form is covered, including, but not limited to: petroleum; fuel oil; sludge; oil refuse; oil mixed with wastes other than dredged spoil; fats, oils or greases of animal, fish, or marine mammal origin; vegetable oils, including oil from seeds, nuts, fruits, or kernels; and other oils and greases, including synthetic oils and mineral oils.
DON’T FORGET THE SPCC

SORRY IT’S THE LAW
Tier I or II Qualified Facility

- May allow for self-certification
- Total AST Capacity of 10,000 US gallons or less
- No single AST with a capacity greater than 5,000 US gallons (Tier I)
- No discharges within 3 years of SPCC Plan being certified
  - Discharge being no one single discharge greater than 1,000 US gallons OR no two discharges greater than 42 gallons
- Farms – exempt if <2500 gallons, if aggregate capacity over 2500 and <6000 with no discharge history, can self certify up to 20k capacity as long as no single tank is greater than 10k
SPCC rule requires inspection and integrity testing of ASTs per an applicable industry standard. Typically reference API 653 or STI SP001 as the applicable industry standard.
Owner/Operator must conduct integrity testing and routinely inspect:

- Large Field Constructed or Field Erected & small shop built bulk storage containers
- Containers located on, partially in, and off the ground wherever located
- Double-walled containers
Inspection Schedule – per SP001

SP001 Standard Inspection Schedule

Here is the corresponding Table 5.5, “Table of Inspection Schedules” from SP001:

<table>
<thead>
<tr>
<th>AST Type and Size (U.S. gallons)</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop-Fabricated ASTs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 – 1100 (0-4164 liters)</td>
<td>P</td>
<td>P</td>
<td>P, E&amp;L(10)</td>
</tr>
<tr>
<td>1101 - 5,000 (4168-18,927 liters)</td>
<td>P</td>
<td>P, E&amp;L(10)</td>
<td>[P, E&amp;L(5), I(10)] or [P, L(2), E(5)]</td>
</tr>
<tr>
<td>5,001 - 30,000 (18,931-113,562 liters)</td>
<td>P, E(20)</td>
<td>[P, E(10), I(20)] or [P, E(5), L(10)]</td>
<td>[P, E&amp;L(5), I(10)] or [P, L(1), E(5)]</td>
</tr>
<tr>
<td>Portable Containers</td>
<td>P</td>
<td>P</td>
<td>P</td>
</tr>
</tbody>
</table>

Note the following:

- P – Periodic AST inspection
- E – Formal External Inspection by certified inspector
- I – Formal Internal Inspection by certified inspector
- L – leak test by owner or owner’s designee
- () indicates maximum inspection interval in years.
  For example, E (5) indicates formal external inspection every 5 years.
  and
- Category 1 - ASTs with spill control, and with CRDM
- Category 2 - ASTs with spill control and without CRDM
- Category 3 - ASTs without spill control and without CRDM
Methods of Integrity Inspection

• External Visual Inspection
• Non-destructive testing to evaluate integrity
  o Ultrasonic Testing
  o Magnetic Flux Leakage
  o Hydrostatic Testing
  o Radiographic Testing
  o Acoustic Emission Testing
  o Liquid Penetrant Testing
• Other evaluations to assess containers’ fitness for continued service
Establish a baseline

- From Office of Emergency Management Bulk Container Inspection Fact Sheet August 2013
  - Baseline and suitability evaluation will assess the existing condition at present
  - If no baseline evaluation is available, the owner/operator should schedule integrity testing as soon as possible and in accordance with good engineering practice
  - Prioritize containers based on age and existing
  - Have a documented integrity inspection schedule and implement it accordingly
UT Testing - utilizes high frequency waves to check the internal structure to measure its thickness. Readings are compared to a comparable standard, i.e. UL 142 for shop-built storage tanks.

A-Scan – point reading, commonly used for SP001
B-Scan – point to point reading – measures thickness over linear position
C-Scan - two dimensional imaging of tank walls
Magnetic Flux Leakage

- Magnetic method used to detect corrosion and pitting in steel structures.
- Magnetic detector is placed between two poles to detect the leakage field and determine depth of metal loss.
- Used on carbon steel floor plate in SP001.

Fig 1: Principle of Magnetic Flux Leakage for detection of wall loss
Typically through API 653, hydrostatic testing the entire tank.
Short wavelength of electromagnetic radiation is used to penetrate tank wall to find hidden flaws.
**Acoustic Emission Testing**

- “Stress” test of tank shell
- Structure is subjected to external stimulus (such as a change of load) and the energy released (stress waves) are measured by acoustic sensors
- Dynamic test – only active signals are measured
- Possibly challenging in high noise environment
Liquid Penetrant Testing

- Penetrant used to detect cracks not visible to the naked eye
- Clean surface and apply penetrant
- Remove excess penetrant
- Apply developer and inspect surface – utilize proper lighting based on dye penetrant
Other methods of inspection

Leak Testing – STI R912
Operability Testing
Any other methods assigned by P.E.
STI R912 - Leak Testing Guidelines

- Section 3.0 covers leak testing of single walled and double walled aboveground storage tanks
- Test pressures dependent on type of tank, i.e. horizontal cylinder, vertical, or rectangular tanks
- Soap tested – leak test solution applied to surfaces, fittings, welds, etc. to check for leaks
- Single walled tanks – should be pressure tested only, with soap solution
- Double walled tanks –
  - Can vacuum test the tank annular
  - When pressure testing, both the primary and secondary tanks must be under pressure (primary first)
Leak Testing

Why?
Point in time test – used to see if the tank is liquid tight

When?
Post- Installation
Change in service / product
Move the tank one location to another
Unusual operating condition
Post-repair

Leak testing is often requested by the local FD at the time of their inspection.
Operability Testing

- Periodic Inspections required by CFR (Code of Federal Regulations) and industry standards
- Periodic Inspection records should be kept for a minimum of 36 months
- Monthly Inspections visual only
- Annual inspection - EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility must regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v))
  Inventory, Overfill, Monitoring
STI SP001 Monthly Inspection Checklist

General Inspection Information:
- Inspection Date: 
- Retain Until Date: (6 months from inspection date)
- Prior Inspection Date: 
- Inspector Name: 
- Tanks Inspected (ID #s):

Inspection Guidance:
- For equipment not included in this Standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a Certified Inspector. It shall be performed by an owner's inspector who is familiar with the site and can identify changes and developing problems.
- Upon discovery of water in the primary tank, secondary containment area, interstice, or spill container, remove promptly or take other corrective action. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and dispose of it properly.
- (*) designates an item in a non-conformance status. This indicates that action is required to address a problem.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a Certified Inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- In the event of severe weather (snow, ice, wind storms) or maintenance (such as painting) that could affect the operation of critical components (normal and emergency vents, valves), an inspection of these components is required as soon as the equipment is safely accessible after the event.

<table>
<thead>
<tr>
<th>Item</th>
<th>Task</th>
<th>Status</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 Tank Containment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Containment structure</td>
<td>Check for water, debris, cracks or fire hazard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2 Primary tank</td>
<td>Check for water</td>
<td>Yes* No N/A</td>
<td></td>
</tr>
<tr>
<td>1.3 Containment drain valves</td>
<td>Operable and in a closed position</td>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>1.4 Pathways and entry</td>
<td>Clear and gates/doors operable</td>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>2.0 Leak Detection</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Tank</td>
<td>Visible signs of leakage</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>2.2 Secondary Containment</td>
<td>Visible signs of leakage from tank into secondary containment</td>
<td>Yes No</td>
<td></td>
</tr>
<tr>
<td>2.3 Surrounding soil</td>
<td>Visible signs of leakage</td>
<td>Yes No N/A</td>
<td></td>
</tr>
<tr>
<td>2.4 Intercise</td>
<td>Visible signs of leakage</td>
<td>Yes No N/A</td>
<td></td>
</tr>
</tbody>
</table>
STI SP001 Annual Inspection Checklist

General Inspection Information:

<table>
<thead>
<tr>
<th>Inspection Date:</th>
<th>Retain Until Date:</th>
<th>(36 months from inspection date)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Inspection Date:</td>
<td>Inspector Name:</td>
<td></td>
</tr>
<tr>
<td>Tanks Inspected (ID #’s):</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Inspection Guidance:

- For equipment not included in this standard, follow the manufacturer recommended inspection/testing schedules and procedures.
- The periodic AST Inspection is intended for monitoring the external AST condition and its containment structure. This visual inspection does not require a certified inspector. It shall be performed by an owner’s inspector who is familiar with the site and can identify changes and developing problems.
- Inspect the AST shell and associated piping, valves, and pumps including inspection of the coating for Paint Failure.
- Inspect:
  1. Earthen containment structures including examination for holes, washout, and cracking in addition to liner degradation and tank settling.
  2. Concrete containment structures and tank foundations/supports including examination for holes, washout, settling, paint failure, in addition to examination for corrosion and leakage.
  3. Steel containment structures and tank foundations/supports including examination for washout, settling, cracking, and for paint failure, in addition to examination for corrosion and leakage.
- Inspection of cathodic protection system, if applicable, includes the wire connections for galvanic systems and visual inspection of the operational components (power switch, meters, and alarms) of impressed current systems.
- Remove promptly upon discovery standing water or liquid in the primary tank, secondary containment area, interstice, or spill container. Before discharge to the environment, inspect the liquid for regulated products or other contaminants and disposed of it properly.
- In order to comply with EPA SPCC (Spill Prevention, Control and Countermeasure) rules, a facility must regularly test liquid level sensing devices to ensure proper operation (40 CFR 112.8(c)(8)(v)).
- (*) designates an item in a non-conformance status. This indicates that action is required to address a problem.
- Non-conforming items important to tank or containment integrity require evaluation by an engineer experienced in AST design, a certified inspector, or a tank manufacturer who will determine the corrective action. Note the non-conformance and corresponding corrective action in the comment section.
- Retain the completed checklists for 36 months.
- Complete this checklist on an annual basis supplemental to the owner monthly-performed inspection checklists.
- Note: If a change has occurred to the tank system or containment that may affect the SPCC plan, the condition should be evaluated against the current plan requirement by a Professional Engineer knowledgeable in SPCC development and implementation.
• Valves: Fire; Solenoid; Anti-Siphon
• Venting: Normal and Emergency Vent
• Liquid Measurement and Overfill Prevention
• Spill Prevention
• Labeling
• Grounding
• Water related issues
Interstitial inspection port with a cracked weld
Long-bolt Man way Bolted Down
Emergency venting on both primary and secondary not installed
Labeling/Containment
Secondary Containment
Wet Containments
Wet Containments
Integrity Testing and Leak Testing – this terminology is often intermixed in the UST arena, however have dramatically different meanings on ASTs

Integrity Testing must be performed by certified personnel to the applicable standard(s) referenced in the SPCC plan

Work with your P.E. to establish the most meaningful and cost-effective integrity testing schedule

Leak testing may be an important periodic piece to detect leaks at the earliest possible interval
Thank you ...

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