


Integrity Testing Aboveground Storage Tanks

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Regulations

- Federal Clean Water Act
 - 40 CFR 112 first promulgated in 1973
 - Companies have had to comply with SPCC for over 30 years
 - Revisions were proposed in '91, '93, and '97
 - Revisions were incorporated into rule that became effective August 16, 2002

Regulations, Cont'd

- August 16, 2002 rule is met with considerable opposition
 - Compliance with revised rule is extended two times for Plan Amending and Plan Implementation
 - For facilities in operation by August 16, 2002, first extension moved Plan Amending to August 17, 2004. Plan Implementation was moved to February 18, 2005.

Regulations, Cont'd

- Extensions
 - Second extension for additional 18 months
 - Moved Plan Amending to February 17, 2006
 - Plan Implementation was moved to August 18, 2006 (one year from today)

Regulations, Cont'd (Integrity Testing)

- Integrity Testing
 - SPCC regulations require that bulk storage containers are tested for integrity on a regular schedule
 - See 40 CFR 112.7(d) and 112.8(c)(6)
 - Test each aboveground container for integrity on a regular schedule...

Integrity Testing

- What is Integrity Testing?
 - Preamble to 40 CFR 112 -
 - “Integrity testing” is any means to measure the strength (structural soundness) of the container shell, bottom, and/or floor to contain oil and may include leak testing to determine whether the container will discharge oil. It includes, but is not limited to, testing foundations and supports of containers. Its scope includes both the inside and outside of the container. It also includes frequent observation of the outside of the container for signs of deterioration, leaks, or accumulation of oil inside diked areas.

Integrity Testing

- Integrity Testing must be conducted according to industry standards. What's that?
 - Preamble to 40 CFR 112
- *Industry standards.* Industry standards that may assist an owner or operator with integrity testing include: (1) API Standard 653, “Tank Inspection, Repair, Alteration, and Reconstruction”; (2) API Recommended Practice 575, “Inspection of Atmospheric and Low-Pressure Tanks;” and, (3) Steel Tank Institute Standard SP001–00, “Standard for Inspection of In-Service Shop Fabricated Aboveground Tanks for Storage of Combustible and Flammable Liquids.

Industry Standards

- Additionally, 40 CFR 112.3(d)(1)(iii) requires that SPCC Plans be prepared in accordance with good engineering practice, including consideration of applicable industry standards...
- Who's this industry and what's their standard?

Guidance

- Steel Tank Institute SP001-00
 - There were two previous editions written by STI Members. It was referenced in 2002 SPCC regulations.
 - Written to fulfill need for integrity testing small tanks (shop fabricated tanks).
 - Provides means for tank inspection by non-API certified personnel.

Guidance

- STI began an inspection class.
 - Currently over 350 certified STI inspectors.
 - Currently 3500 certified API inspectors.
 - Classes are held throughout United States (see www.steeltank.com).

Guidance

- Revised Standard
 - After a few years of use and the new rules promulgated, it became necessary to revise the standard.
 - Committee comprised of:
 - Federal and state regulators
 - Tank manufacturers
 - Tank users

Guidance

- The committee's charge was to make the existing standard more appropriate and useable.
 - Look at what really needs to be inspected and tested.
 - EPA relied on Industry to write the standard.
 - Applies to ASTs at atmospheric pressure that store stable flammable and combustible liquids at ambient temperature to 200 degrees F, and liquids have a specific gravity less than approx. 1.0.

Guidance

- Risk Based Inspection.
 - Idea is to move people to the left in the Inspection Schedule Table

TABLE 5.5 TABLE OF INSPECTION SCHEDULES

AST Type and Size (U.S. gallons)		Category 1	Category 2	Category 3
Shop-Fabricated ASTs	0 – 1100 (0-4164 liters)	P	P	P, E&L(10)
	1101 - 5,000 (4168-18,927 liters)	P	P, E&L(10)	[P, E&L(5), I(10)] or [P, L(2), E(5)]
	5,001 - 30,000 (18,931-113,562 liters)	P, E(20)	[P, E(10), I(20)] or [P, E(5), L(10)]	[P, E&L(5), I(10)] or [P, L(1), E(5)]
	30,001 - 50,000 (113,566-189,271 liters)	P, E(20)	P, E&L(5), I(15)	P, E&L(5), I(10)
Portable Containers		P	P	P**

5.4 **AST CATEGORIES USED IN TABLE 5.5**

5.4.1 Category 1 – ASTs with spill control and with CRDM

5.4.2 Category 2 – ASTs with spill control and without CRDM

5.4.3 Category 3 – ASTs without spill control and without CRDM

5.4.4 Table 5.4 shows some typical tank types and their corresponding AST category

TABLE 5.4 EXAMPLE TANK CONFIGURATION AND AST CATEGORY

TANK CONFIGURATION	TANK HAS CRDM?	AST CATEGORY
AST in contact with ground	no	2 or 3
Elevated tank with no part of AST in contact with ground (includes concrete encased tanks)	yes	1
Vertical tank with RPB and spill control	yes	1
Vertical tank with double bottom and spill control	yes	1
Vertical tank with RPB under tank and spill control	yes	1
Double-wall AST	yes	1
AST with secondary containment dike/berm	yes	1

Definitions

CONTINUOUS RELEASE DETECTION METHOD (CRDM) – a means of detecting a release of liquid through inherent design. It is passive because it does not require sensors or power to operate. Liquid releases are visually detected by facility operators. The system shall be designed in accordance with good engineering practice. Several acceptable and commonly used CRDM systems are as follows:

- Release prevention barrier (RPB) described in definition of release prevention barrier.
- Secondary containment AST including double-wall ASTs, double-bottom ASTs, or other ASTs described in definition of secondary containment.
- Elevated AST with release prevention barrier described in definitions of elevated AST and release prevention barrier.

Definitions, Cont'd

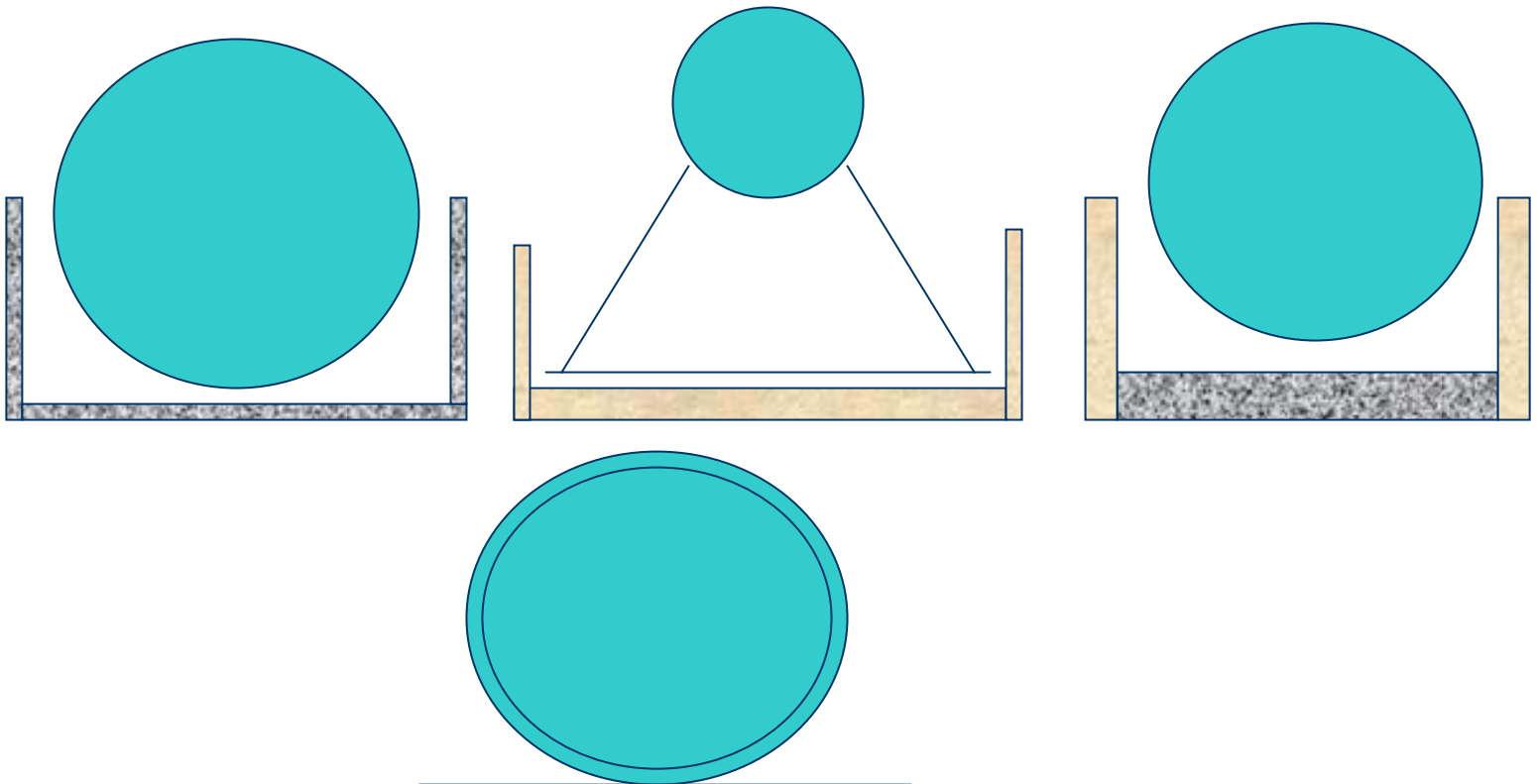
RELEASE PREVENTION BARRIER (RPB) – a liquid containment barrier that is sufficiently impervious to the liquid being stored and is installed under the AST. Its purpose is to divert leaks toward the perimeter of the AST where they can be easily detected as well as to prevent liquid from contaminating the environment. RPBs are composed of materials compatible with the liquid stored in the AST and meet proper engineering standards. Examples are steel (such as in steel double-bottom tanks), concrete, elastomeric liners, or other suitable materials provided the above criteria are met.

Guidance

- Category 1
 - Double-walled tanks
 - Tanks in secondary containment and on RPB.
- Category 2
 - Tank on ground within “sufficiently impervious” berm/dike.
- Category 3
 - Single-wall tank on soil.

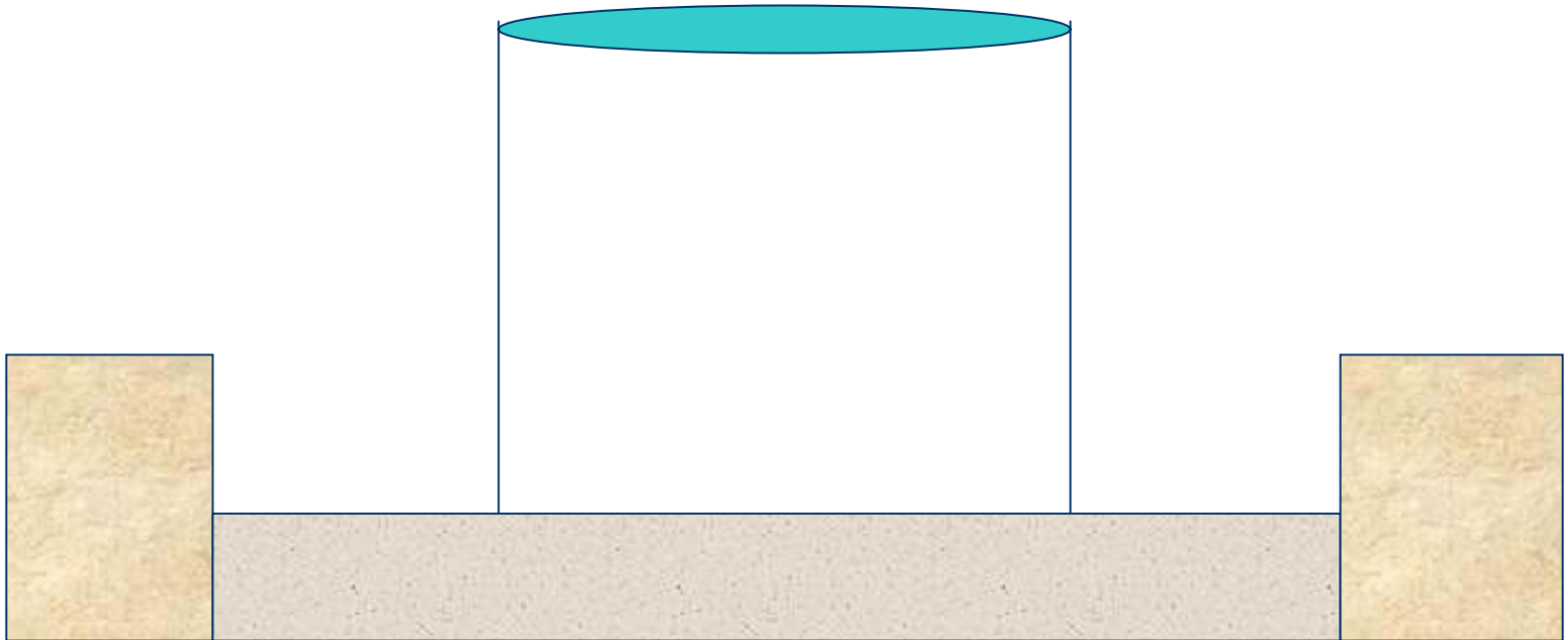
Category Examples

Category 1



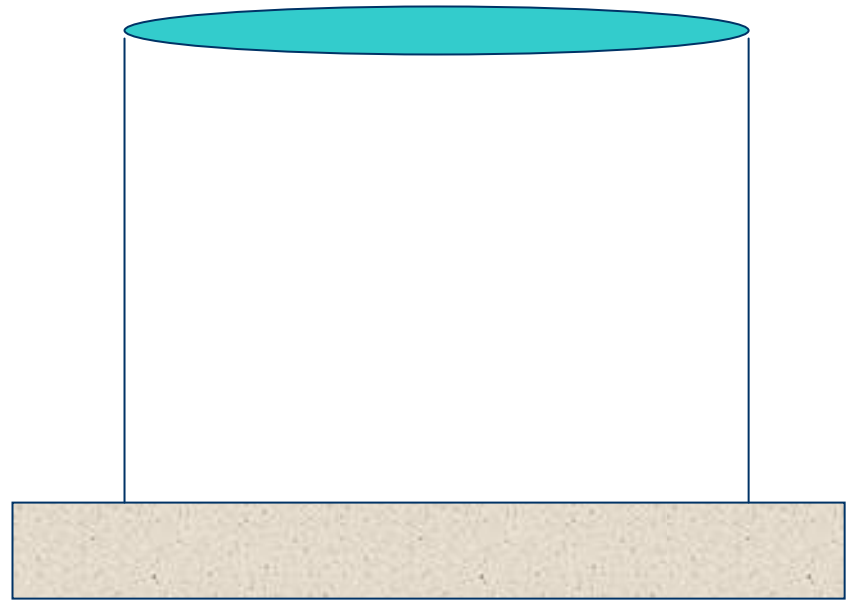
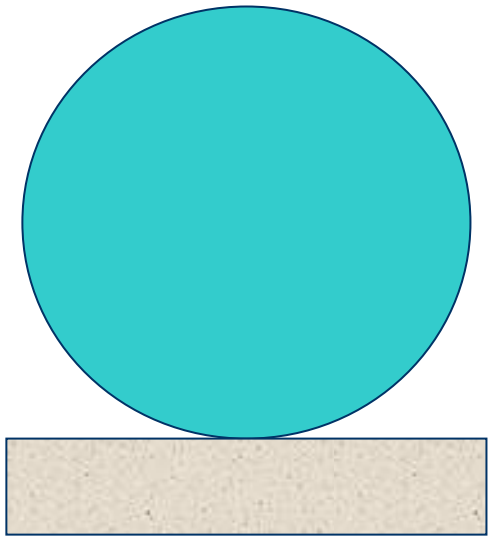
Categories, Cont'd

- Category 2, spill control, single wall on soil.



Category 3

- Single-wall tank on soil



Inspections

- Periodic
- Formal External Inspection (FEI)
- Formal Internal Inspection (FII)

Inspections, Cont'd

- Periodic
 - Performed by site owner/operator
 - No need to be certified, just knowledgeable
 - Conducted monthly (unless otherwise noted by PE in SPCC Plan)
 - Checklist is included in STI standard

Inspections, Cont'd

- Formal External Inspection
 - Conducted by Certified Inspector
 - Frequency based on Table 5.5
 - Inspector should review previous periodic inspection checklists and previous FEIs/FIIs
 - Includes ultrasonic thickness testing (UTT)
 - Must determine original shell thickness and establish current shell thickness
 - UTT can lead to ultrasonic testing scan (UTS)

Inspections, Cont'd

- FEI
 - Vertical tanks – check roof
 - Horizontal tanks – check heads
 - Insulated tanks – check under insulation
 - Inspection Report must be completed
 - Include unacceptable conditions
 - Recommended corrective actions
 - Suitability for Continued Service
 - Next recommended FEI

Inspections, Cont'd

- Formal Internal Inspections
 - Includes the requirements of an FEI
 - You must get in the tanks except if:
 - Double-walled or secondary containment tank and you can check interstice
 - Elevated tank and you can conduct UTS
 - Getting in the tank means taking it out of service (remove the contents and clean the inside)
 - Inspect welds
 - Vacuum box questionable welds
 - Conduct UTS (preferably)

Inspections, Cont'd

- Formal Internal Inspections
 - UTS may lead to other NDT methods
 - Inspection Report must be completed
 - Include unacceptable conditions
 - Recommended corrective actions
 - Suitability for Continued Service
 - Next recommended FII

Inspections, Cont'd

- Leak Testing Methods
 - Point in time test
 - May include the following:
 - Tracers
 - Mass measurement
 - Level measurement
 - Hydrostatic test
 - Pressure test

Inspections, Cont'd

- Suitability for Continued Service
 - The Certified Inspector must evaluate the tanks and state that the AST condition is adequate for continued use
 - Based upon shell thickness
 - Presence of microbial influenced corrosion (MIC)
 - Tank category
 - Corrosion rates based on previous inspections
 - Other tank damage (fire, settlement, natural disaster damage, over-pressurization damage, weld cracking)

Field-Erected ASTs

- ASTs less than 265,000 gallons separated out because brittle fracture does not occur in smaller tanks (both field-erected and shop fabricated)
- Limited to ASTs 30-foot diameter and 50 feet high
- Limited to shells that are less than $\frac{1}{2}$ inch thick

Field-Erected ASTs, Cont'd

- Generally follow guidance for FEIs and FIIs
- Inspection schedule:

TABLE B2.1 TABLE OF INSPECTION SCHEDULES

AST Type and Size	Category 1	Category 2	Category 3
Field-erected AST	P, E(5), I(10)	P, E&L(5), I(10)	P, E&L(5), I(10)

Field-Erected ASTs, Cont'd

- Subsequent internal inspection schedules can be extended based upon corrosion rates
 - Category 1 up to 30 years
 - Category 2 up to 20 years
 - Category 3 can only be decreased

What To Do?

- Amend and Implement your SPCC Plans
- Purchase and Read SP001.
- Provide Comment

Amend and Implement

- You can include SP001 guidelines in your SPCC Plan.
- You can deviate from them as determined by PE
- You can do something completely different, based upon the PE

Purchase and Read

- Available at www.steeltank.com
- \$175; includes revisions up to August '06
- Read
 - Issuing re-revision in January. If what you read does not meet with your approval, then provide comment to STI.

Comments

- Comment forms must be submitted to STI by September 1, 2005.
- The forms must be used as detailed in the instructions.
- Comments such as, “This isn’t good” will not be regarded. We need constructive feedback. i.e., “This isn’t good because...a), b), c). And I propose...d), e), f).

Public Comments

- **LaQuinta Inn & Suites Convention Center**
303 Blum

San Antonio, TX 78205

The public forum times are Wed. 9/21, 10:00 to 5:00 and Thurs. 9/22, 9:00 to 5:00.

Re-Revised Standard

- Based upon the public comments, we will revise the standard and produce a new one by January '06.

Questions, Comments, Concerns?

