

SP001 Standard for Inspection of Aboveground Storage Tanks

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Dana Schmidt, Project Engineer, Steel Tank Institute, Illinois, USA

In 1973, the United States Environmental Protection Agency (USEPA) first promulgated the Federal Clean Water Act as 40 CFR 112. The Clean Water Act requires that facilities covered under the USEPA's SPCC regulations develop and submit a "Spill Prevention, Control and Countermeasure (SPCC) Plan" that is certified by a professional engineer. The purpose of this regulation is to prevent the discharge of oil into the United States navigable waters. Because the SPCC Rule includes facilities which may discharge oil into groundwater or storm run-off which in turn may flow into navigable waters, nearly all facilities that store or use oil products are affected.

Each year about 14,000 oil spills are reported. It is estimated that there are 400,000 facilities that are regulated under the SPCC Rule, with many not having SPCC Plans prepared.

Revisions to the SPCC Rule were proposed in 1991, 1993, and 1997 and were incorporated into the Final Rule that became effective on August 16, 2002. The full SPCC rule can be found at www.epa.gov/oilspill/pdfs/0703_40cfr112.pdf.

Extensions of deadlines have followed the promulgation of the Final Rule. Now, facilities must amend an existing SPCC Plan by February 17, 2006, and must implement it by August 18, 2006. Affected facilities that start operations between August 16, 2002 and August 18, 2006, must prepare and implement an SPCC Plan by August 18, 2006. Affected facilities that become operational after August 18, 2006 must prepare and implement an SPCC Plan before starting operations.

Among the changes are the following:

- Facilities with an aggregate capacity of 1,320 gallons in containers 55 gallons and larger are required to prepare SPCC Plans.
- Storage containers must be tested for integrity on a regular schedule.

Per the 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 encompasses 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 must be conducted according to industry standards."

Further, 40 CFR 112 states: "Industry standards that may assist an owner or operator with integrity testing include: (1) American Petroleum Institute (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 (STI) Standard SP001-00, "Standard for Inspection of In-Service Shop Fabricated Aboveground Tanks for Storage of Combustible and Flammable Liquids."

Prior to the issuance of STI Standard SP001, only the API Standard, API 653, "Tank Inspection, Repair, Alteration and



Typical shop-fabricated tank.

Reconstruction," addressed inspection of aboveground storage tanks for flammable and combustible fluids. The emphasis of this API 653 Standard is the large, field fabricated tanks that are fabricated to the API Standard, API 650, "Welded Steel Tanks for Oil Storage."

The extensive inspection requirements of API 653 are needed for large tanks because of the large volumes and pressures encountered. API 650 includes equations for calculating the steel thickness needed for a particular tank. These equations take into account the pressure encountered, the type of steel used, the weld joints used, and the weld inspection testing used.

The construction and installation of the smaller shop-fabricated tanks differs greatly from these large, field-fabricated tanks. Shop fabricated tanks are commonly manufactured to other standards, such as UL 142 or UL 2085. These Underwriters Laboratories standards include tables that specify the steel thickness based on tank diameter and capacity.

Shop fabricated tanks have smaller capacities and therefore smaller hydrostatic pressures are encountered at the tank bottom. These tanks are manufactured in controlled shop environments and the capacity is typically up to 50,000 gallons. In addition, shop fabricated tanks are commonly horizontal cylindrical.

API 650 tanks are strictly vertical tanks which rest on the ground. The inspection of horizontal cylindrical tanks, as well as elevated vertical tanks, includes very different requirements. The inspection of these tanks differ because the bottom of the tank is visible, and as a result, the tank supports must be inspected. Thus, a standard for inspection of shop fabricated tanks was needed.

The SP001 Standard includes inspection techniques for all types of shop-fabricated tanks, including those which are horizontal cylindrical, vertical, and rectangular. Also included are tanks that rest directly on the ground, tanks that are elevated on supports, and tanks that are single or double wall.

Third edition announced

After a year of study and revisions by a broad-based committee of experts, STI is announcing the newest edition of standard SP001, which is now known as "Standard for the Inspection of Aboveground Storage Tanks."

Further details on the third edition of the SP001 standard can be obtained by contacting STI by phone or by visiting the STI website.

The effort completes a cycle of standard-making revisions. The process started in 2004 when STI announced a request for public proposals to modify the standard.

The revised standard incorporates key changes such as:

- A risk-based inspection schedule. Tanks with a means of detecting a release of product are inspected less frequently. A system must be capable of diverting leaked product and/or incorporating a release-prevention barrier while providing for prompt detection through periodic inspection by the owner. Single-wall tanks sitting directly on soil pose the greatest risk for an incident and therefore require more frequent inspections.
- Inspection of field-erected tanks up to a maximum 30-foot (9.14 metres) diameter and a maximum shell height of 50 feet (15.24 metres). This would equate to a capacity of about 265,000 gallons (1,002,840 litres). During the most recent standard revision cycle, the Committee established that such smaller field-erected tanks have properties similar to steel shop-fabricated tanks as neither are affected by brittle fracture, whereas large field-erected tanks at oil terminals may be.
- Unlike the large oil terminals, many industrial facilities often have a number of small shop-fabricated tanks and several small field-erect tanks on location. The latest edition of the SP001 standard now enables all such tanks to be inspected by one inspector.

Other significant changes include sections on safety considerations, inspection of containers, suitability-for-continued-service guidance, and expanded periodic inspection checklists.

In addition, the STI AST Inspection Standards Review Committee has solicited public comment through September 1, 2005 for a possible fourth edition in early 2006. The fourth edition will become available in 2006 after the next review cycle is completed.

The STI committee, which unanimously approved the new edition after a year's worth of meetings and teleconferences, was formed last year to reshape the SP001 standard and clarify issues that resulted from trying to provide the owner/operator with a method of SPCC compliance.

"The members and Board of Directors of STI thank the committee members for the remarkable amount of time and



Many aboveground tanks will undergo inspection for the first time.

energy that they put into revision of the standard," said Chuck Travelstead, committee chairman. "It is clear that the SP001 standard will provide valuable guidance to AST owners, managers, installers, inspectors and regulators."

A balanced number of representatives from major oil companies, engineers and regulators participated in the committee. For a list of committee members, see www.steeltank.com/library/pubs/sp001/sp001.pdf

Issues were discussed, and re-discussed, several times to assure that the committee formed a consensus on each individual topic. Comments from industry were also reviewed by the committee and acted upon, either as approved, approved with modification or denied. The committee was formally balloted upon the final version and the standard approved by minimum two-thirds affirmative vote.

STI also certifies aboveground storage tank inspectors in accordance with the requirements of the SP001 Standard. Information about this program can be found on the STI website. The SP001 committee anticipates adaptations in 2006 to STI's AST Inspector Certification program. New procedures will address certification requirements of both existing SP001 inspectors and API 653 inspectors.

ABOUT THE AUTHOR AND THE ORGANISATION

Dana Schmidt, P.E. is a Steel Tank Institute (STI) Project Engineer. Her main responsibilities are serving as staff liaison to STI's technical and sub-committees. With these committees, she develops specifications, conducts research, and develops new and improved aboveground and underground tank technologies. Dana has also had extensive experience working with Underwriters Laboratories in maintaining STI's Listings and the development of new designs.

Most recently, Dana is the staff liaison for the STI AST Inspection Standards Committee which worked with various STI committees, the Federal EPA, and state EPA representatives and other industry representatives in the revision of the STI Standard SP001, "Standard for Inspection of Aboveground Storage Tanks."

Dana graduated from Northwestern University in Evanston, Illinois with a Bachelors Degree in Mechanical Engineering. She is a registered Professional Engineer in the state of Illinois. Before joining STI in 1998, she worked for a manufacturer of pre-fabricated underground piping systems.

The **Steel Tank Institute** is a division of STI/SPFA. Its members manufacture a variety of aboveground storage tanks including shop-fabricated and field-erected designs. The organisation has served the water, food, petroleum and chemical markets since 1916 as developers of standards and certification programmes for quality, safety, and reliability in the manufacture, installation, and testing of steel tanks, piping and pressure vessels.

ENQUIRIES

Steel Tank Institute
570 Oakwood Road, Lake Zurich, IL
USA, 60047

Tel: +1 (847) 438-8265
Website: www.steeltank.com