SPS 310
Flammable, Combustible and Hazardous Liquid Code

Compendium

Including associated codes
SPS 302, SPS 305, SPS 348

September 25, 2013

This document will be periodically updated and available on the Internet

Internet URL:

http://dsps.wi.gov/er/pdf/bst/CommCodes10_5_2_48/ER-BST-Comm10CodeCompendium.pdf

Title "SPS 310 Code Compendium"

TABLE OF CONTENTS

INTRODUCTION TO THE SPS 310 CODE COMPENDIUM 5

SPS 310 – 40 CFR 280 COMPARISONS FOR USTS 7

SUBCHAPTER I – PURPOSE, APPLICATION AND DEFINITIONS 10

SPS 310.010 PURPOSE 10
SPS 310.020 SCOPE AND APPLICATION 10
TERMINOLOGY AND APPLICATIONS 13
Leak: 13
Class IIIB liquid storage tanks: 13
Credential / Certification / Qualified Person 14
Day tank 14
Hazardous substances: 14
Asphalt or similar substances: 14
Quarry sites 15
Military application: 15
Tank vehicles storing SPS 310 regulated product: 15
Transfer point containment: 16
Fixed versus portable tank storage: 17
Determining flammable/combustible classification: 17
When is flammable or combustible liquid not a regulated liquid? 18
Capacity thresholds 18
Labeling, Posting and Signage 18
Storage Tank Recertification 18
SPS 310.050 DEFINITIONS 19

SUBCHAPTER II – ADMINISTRATION AND ENFORCEMENT 27

SPS 310.100 PLAN REVIEW 27
Plan revision 27
Overview of Department of Safety & Professional Services plan submittal requirements 29
SPS 310.110 JURISDICTION OVER ENFORCEMENT 34
Authority to enter premises, perform inspections and review records 34
SPS 310.115 ENFORCEMENT AND INSPECTION 34
SPS 310 forms: 35
SPS 310.120 REVOCATION AND EXPIRATION OF APPROVAL 36
RESERVED 36
SPS 310.130 SPECIFIC APPROVAL OF MATERIALS, EQUIPMENT, CONCEPTS, TECHNOLOGY AND DEVICES. 37
Retroactivity and Effective Date of Material Approvals 37
SPS 310.140 TANK REGISTRATION 40
Definitions and explanations for completing the registration forms. 40
SPS 310.145 TANK PERMIT 44
SPS 310.150 CHANGE OF OWNERSHIP 44
SPS 310.160 FEES 44
SPS 310.170 PETITION FOR VARIANCE AND APPEALS. 44
SPS 310.180 PENALTIES 44
SPS 310.190 APPEALS AND HEARINGS ON ENFORCEMENT DECISIONS 44

SUBCHAPTER III – ADOPTED STANDARDS AND GENERAL REQUIREMENTS 45

SPS 310.200 AND 10.210 APPLICATION OF STANDARDS 45
Comments relating to specific standards 47
SPS 310.230 GENERAL REQUIREMENTS 47
SPS 310.240 CERTIFICATIONS AND ENFORCEMENT 48
SPS 310.250 TANK CONSTRUCTION AND MARKING 48
Tank Listing, tank labeling and tank marking 49

SUBCHAPTER IV – SPECIFIC TANK STORAGE APPLICATIONS 51

SPS 310.300 TANKS STORING USED MOTOR OIL 51

SPS 310.305 PUBLIC WASTE OIL COLLECTION POINTS 54
SPS 310.310 HEATING FUEL STORAGE 54
SPS 310.315 HEATING OIL TANKS THAT ARE REMOVED FROM SERVICE 54
SPS 310.320 FUEL STORAGE FOR STATIONARY COMBUSTION ENGINES AND GAS TURBINES 55
Gasoline Fuel Tank Inside Building 56
Diesel and Fuel Oil Tank Inside Building 56
Gasoline or Diesel Fuel Supply Tank Outside Aboveground 57
Fuel Supply Tank Construction 57
Outdoor Installations 58
Mushroom style vent 59
Horizontal Emergency Vent 60
Fuel System Hoses 60
Spill and Overfill 61
Collision Protection 61
Gasoline, Diesel, or Fuel Oil Underground Supply Tank 61
SPS 310.330 CONVERTED TANKS FOR THE STORAGE OF FLAMMABLE AND COMBUSTIBLE LIQUIDS 63
SPS 310.340 BULK PLANTS AND TERMINALS 64
Fire Valves 64
Loading a Bulk Delivery Truck from a Motor Vehicle Fueling Facility 64
SPS 310.350 HAZARDOUS SUBSTANCES 67
SPS 310.360 STORAGE OF CLASS IA FLAMMABLE LIQUIDS 69
Tank Design and Construction 70
Location with Respect to Property Lines, Public Ways, and Important Buildings on the Same Property. 71
Repairs and Alterations 71
Secondary Containment 71
Vacuum/Relief Valve Sizing and Discharge Location 71
SPS 310.370 EMERGENCY SHUT-OFF FOR TRANSFERS 72

SUBCHAPTER V – GENERAL AST STORAGE 73

SPS 310.400 GENERAL 73
Class IIIB liquid tanks 74
AST supplying a fire pump 77
Public Service Commission Regulation – Power line clearance 78
Intermediate Bulk Container (IBC) 80
Tank vehicle as storage 81
SPS 310.410 SPILL AND OVERFILL CONTROL 85
Spill and overfill for Class IIIB tanks 85
Typical SPS 310 complying overfill and spill prevention configurations for aboveground storage tanks: 86
SPS 310.425 TANK LINING OF ABOVEGROUND PETROLEUM STORAGE TANKS 91
SPS 310.430 VEHICLE COLLISION PROTECTION 91
SPS 310.440 ABOVEGROUND TANK INSPECTION 92
SPS 310.445 SELDOM-USED TANKS AND TEMPORARY OUT-OF-SERVICE TANKS 101
SPS 310.450 CHANGES IN SERVICE 101
SPS 310.460 CLOSURE OF ABOVEGROUND TANKS. 101
SPS 310.465 TANK CLOSURE ASSESSMENT 101
SPS 310.470 CONFIRMING AND RESPONDING TO A RELEASE. 101
Miscellaneous AST technical and regulatory items. 101

SUBCHAPTER VI – GENERAL UST STORAGE 102

SPS 310.500 GENERAL REQUIREMENTS 102
SPS 310.500 (1) Secondary Containment 103
Containment or double-wall construction 103
SPS 310.500 (9) Record keeping 104
SPS 310.503 PRODUCT INVENTORY VERIFICATION AT RETAIL FACILITIES 105
SPS 310.505 SPILL AND OVERFILL 105
Spill prevention for underground used oil tanks 108
Typical Waste Oil UST Configurations: 109
How To Assess System For Adequate Pipe Slope: 110
SPS 310.510 LEAK DETECTION REQUIREMENTS 111

SPS 310.515 LEAK DETECTION METHODS 112
SPS 310.517 AIRPORT HYDRANT LEAK DETECTION REQUIREMENTS 112
SPS 310.520 OPERATION AND MAINTENANCE OF CORROSION PROTECTION 112
Testing, Maintenance and Repair of CP Systems 112
Certifications for corrosion protection - SPS 310.520(c) 114
Wisconsin Certification Levels For UST Corrosion Protection 115
Anode Replacement and Addition Personnel Qualification Policy 118
Adding Impressed Current to Lined Tanks 119
SPS 310.530 TANK LINING OF UNDERGROUND PETROLEUM PRODUCT STORAGE TANKS 120
SPS 310.535 PERIODIC INSPECTION AND REPAIR OF PREVIOUSLY LINED TANKS 120
SPS 310.545 SELDOM USED AND TEMPORARY OUT-OF-SERVICE TANKS 121
SPS 310.550 CHANGES IN SERVICE 121
SPS 310.560 TANK SYSTEM CLOSURE 121
SPS 310.565 TANK CLOSURE ASSESSMENT 123
SPS 310.570 CONDITIONS INDICATING A RELEASE 123
SPS 310.575 INVESTIGATING SUSPECTED RELEASES 124
SPS 310.580 RESPONDING TO A RELEASE 124

SUBCHAPTER VI – DISPENSING OF MOTOR FUELS 125

SPS 310.600 GENERAL FUEL DISPENSING REQUIREMENTS 125
Point-Of-Sale Fuel Dispensing 125
Attended and Unattended Fueling 126
Emergency Shut-off 126
Solar power 127
SPS 310.610 FUEL DISPENSING USING ABOVEGROUND MOBILE TANKS 127
SPS 310.615 FUEL DISPENSING SYSTEMS USING ABOVEGROUND FIXED TANKS 132
SPS 310.620 PUBLIC ACCESS FUELING 133
SPS 310.630 FUEL DISPENSING AT FARMS AND CONSTRUCTION SITES 133
SPS 310.640 WATERCRAFT, SNOWMOBILE AND ATV FUELING 135
SPS 310.650 AIRCRAFT FUEL DISPENSING 137
SPS 310.660 RACETRACK AND AMUSEMENT PARK FUELING OPERATIONS 137
SPS 310.680 ETHANOL – BASED MOTOR FUELS. 138

SUBCHAPTER VIII – FINANCIAL RESPONSIBILITY 138

SPS 310.700 APPLICABILITY 138
SPS 310.715 INSURANCE AND RISK RETENTION GROUP COVERAGE 138

TEMPORARILY-OUT OF-SERVICE VERSUS TEMPORARILY CLOSED TANKS 139

LOCAL ORDINANCE FEES VS. STATE SPS 302 FEES 140
STATE FEE 140
Groundwater fee: 141

SPS 305 – CREDENTIALS 143

SPS 348 – PETROLEUM PRODUCTS 145

Labeling of Dispensers and Equipment 145
Multi-product dispensers: 146

NON STATIONARY TANK AND STORAGE TANK COMPARISON 147

SIGNAGE AND LABELING OVERVIEW 157

Introduction to the SPS 310 Code Compendium

SPS 310 provides a mechanism to bring together the numerous national standards that address the storage and handling of flammable, combustible and hazardous liquids. The requirements within the standards were developed as a result of, and to avoid a repeat of, someone being seriously injured or killed, extensive property damage, or significant environmental contamination. Over the past 15 years the fire safety codes and standards have expanded beyond the human and property element to include protection of our natural resources with the most significant natural resource being our groundwater.

Tank fabricators began to move from riveting tanks to welding tanks in the 1930s. A method to protect tanks against corrosion surfaced in the late 1960s, but was not a standard practice until 1985 with enactment of the federal Interim Prohibition rules. Fiberglass re-enforced plastic (FRP) USTs began to be used for petroleum around 1970. Over the past 15 years tank systems have changed in configuration, ancillary components and appurtenances. Current day systems have more holes, more screws and bolts, and more potential for vapor and liquid releases, or water intrusion. Tanks are under more internal pressure then they were 15 years ago from vapor assist Stage II, pressure / vacuum vent valves, acute delivery pressure, and product vapor pressure. Class I liquids such as gasoline or acetone expands 0.07 to 0.12 percent in volume for each 10°F increase in temperature. Systems at rest are frequently under potential release pressures, for example, a 12' tall pipe containing diesel fuel generates 4.6 psi pressure at its bottom. New alternative fuels, such as ethanol and biodiesel, have unique sensitivity to moisture and bacteria that have potential to pose both product quality and storage system corrosion problems. All of these factors pose a potential increase in the risk of a release, fire and environmental or product contamination. Blend these risks with trends in public fuel dispensing and facilities providing fueling to the public, safety and product quality concerns emerge that were not an issue in the past. When reading the SPS 310 code or any of the respective national standards it is important to think about the potential problem the code language is trying to correct or prevent.

This Code Compendium is intended to provide background and explain various SPS 310 Flammable, Combustible and Hazardous Liquids Code regulatory requirements in a format that will assist users of the code understand the fundamental theory and application surrounding specific SPS 310 requirements or subchapters. The Compendium is a valuable resource for tank system operators, contractors and inspectors resulting in improving the understanding of how the Department of Safety & Professional Services views and applies the regulations that the department is charged to enforce.

The vast majority of businesses, corporations and individuals who make up the "regulated public' want to do the right thing. However, code language is frequently interpreted many different ways, with conflicting opinions within the regulatory community as well. Some code language will always remain subjective, however, we are confident this compendium will reduce the subjective nature and increase consistency in interpretation and application.

Unfortunately, standards, codes and regulations cannot be written to address every situation and in a language that is always clear and concise in every application. This Compendium reference is structured to address specific Com 10 code subchapters and sections, not every code paragraph or requirement. Updates and revisions will take place periodically via an Internet version on the Department of Safety & Professional Services web site.

The SPS 310 Code is a combination of prescriptive and performance based requirements. Prescriptive requirements spell out what has to be provided and how you have to provide it to meet the requirement. Performance based requirements spell out what requirement must be provided, but the architect, engineer, contractor or operator determines how to meet the requirement. Many of the requirements or allowances are "risk based," based upon how Department of Safety & Professional Services or the standard writers view the level of risk. Risk based requirements have been determined with consideration of capacity, type and mechanics of operation, location and exposures, containment, class of product, frequency of transfer, public versus private, the impact of a catastrophic event, etc. In other words: "Risk" equals the likelihood of failure times the consequence of failure.

SPS 310 can also be characterized as an "exception" rule and therefore takes precedent over rule

requirements in adopted standards and in specific situations may pose language that is not as restrictive as an adopted standard, or it may be more restrictive than an adopted standard such as NFPA 30A.

When working with any standard or regulation it is important to understand the scope of the respective document. We often hear that SPS 310 is more restrictive than the federal regulations and there are those who believe that state rules should be no more restrictive than federal rule. Using the Federal SPCC regulation as an example, the scope of the SPCC rule is limited to catastrophic spill releases from aboveground tanks and the environmental impact on surface waters. SPCC does not directly address groundwater, fire safety or public safety issues associated with liquid and vapor releases from aboveground tanks as the department is charged with addressing in the Wisconsin State Statutes. However, the SPCC rule does require that where state or local regulations overlap with federal SPCC rules, the more restrictive regulation applies.

Also important is to realize the time period that a standard or regulation was written. Standards and regulations that have effective or publication dates many years in the past do not represent current day trends or technology, nor do they represent fire and environmental related issues and experiences that have occurred in the interim.

Photographs appearing in this compendium are for the purpose of illustration to support the respective topic or narrative. Any identification of a product, business, equipment or organization is not intended to promote, advertises, endorse, ridicule or embarrass associated companies or individuals.

SPS 310 – 40 CFR 280 Comparisons for USTs

The following table reflects the more restrictive SPS 310 requirements in relation to 40 CFR 280 "federally regulated" USTs. The table provides a general comparison and is not all inclusive.

Federal facilities must comply with state and local regulations (Sec 9007(a) of the Solid Waste Disposal Act). Tribal owned tanks are regulated by 40 CFR 280 and not under SPS 310 jurisdiction.

	40 CFR 280	SPS 310
Scope	USTs only	ASTs and USTs
	Petroleum & CERCLA hazardous liquids	• Flammable & combustible liquids • CERCLA hazardous liquids SPS 310.020
Application	UST > 110 gallon	• UST ≥ 60 gallon & AST ≥ 110 gallon • Includes heating fuel tanks for consumptive use • Includes emergency generator tanks • Defined de minimis as collectively ≥ 1% material of product • Does not defer airport hydrant systems, field erected USTs or emergency power generator tanks. SPS 310.020
Adopted standards	Federal EPA UST program policy states that "Industry codes and standards - although these are not themselves Federal regulations, compliance with these standard industry codes of practice is mandated." http://www.epa.gov/swerust1/cmplastc/standard.htm	SPS 310 adopts specific standard editions as code requirements. SPS 310.200, 10.210, 10.220 & 10.225
Design & performance standards	Refer to comment above.	• Adopted standards address design and performance. • Pre-installation plan submittal for approval. • Designated periodic regulatory inspection during installation. SPS 310.100
Registration & Permits	Notification to state of tank existence 40 CFR 280	• Tank registration more defined than CFR. • Annual Permit-to-Operate required for federally regulated USTs. SPS 310.140, 10.145 & 10.150
General operating requirements	Not clearly defined. Refer to Adopted Standards section above.	• Defined in SPS 310 and adopted standards. SPS 310.200, 10.230 & 10.500
Corrosion Protection	CP system test every three years	• Impressed current CP test annually • Anode CP every 3 yrs until 10 anniversary of UST then annually thereafter. • Lined tanks with CP are required to have internal inspections on a 5 yr. cycle.

		SPS 310.520

Spill prevention	40 CFR 280.20(c) & 280.30	• Spill bucket at fill. SPS 310.505
Overfill	Allow vent ball float.	• Require 90% visual and audible alert + 95% auto shut-off. SPS 310.505
Lined tanks	Pre 1998 allows internal lining as option to upgrading with CP.	• Internal lining inspection 5/5 cycle. • Specific requirements to repair lining. SPS 310.530 & 10.535
Leak detection	40 CFR 280.40; 280.43; 280.44	• All release detection methodologies must have Department of Safety & Professional Services Material Approval. • Must notify state via ERS-9 when changing leak detection methodologies. • Require annual functionality test on both mechanical and electronic flow restrictors. • Vapor monitoring and groundwater monitoring prohibited. SPS 310.510 & 10.515
Repair	40 CFR 280.33	• Require environmental assessment if a repaired component had a release. SPS 310.500(7)
Reporting & recordkeeping	40 CFR 280.34	• Require records to be maintained on site. • Defined weekly, monthly, yearly operator inspections of system SPS 310.500(9)
Investigation	40 CFR 280.50 – 280.53	SPS 310 prescriptive in relation to conditions indicating a release and the follow-up assessment requirements. SPS 310.570, 10.575, 10.580 & 10.585
Financial responsibility	40 CFR 280.90 – 281.115	Verified annually with PTO renewal. FR required for tanks beyond scope of CFR. SPS 310.145 10.700(1) & (2)
Tank closure	40 CFR 280.70 – 280.74	• Specific tank bed environmental assessment procedures. • Closure-in-place very restrictive and must be requested and authorized in writing. SPS 310.560
Additional	Energy Policy of 2005 requires all new systems to be double-wall and have pipe connection	• All existing dispenser pipe connections must have under

	containment.	dispenser containment by Dec 31, 2014. [10.500(5)(d)] • All existing tank top pipe connections must have containment by Dec 31, 2014. [10.500(5)(d)] • Inventory verification [10.503] • Flexible piping must have Department of Safety & Professional Services Material Approval. [10.130] • Temporary closure prohibited. [10.545] • Enforcement [10.115] • Contractors must be certified with Department of Safety & Professional Services in specific tank specialty areas [10.240]

Subchapter I – Purpose, Application and Definitions

SPS 310.010 Purpose

The Department of Safety & Professional Services is the agency designate by statute with the authorization to promulgate regulations associate with fire and workplace safety. In 1991 this authority was expanded to meet the groundwater protection requirements mandated by the Federal EPA.

The SPS 310 authority applies to storage, display, installation, operation, use, maintenance and transportation of flammable, combustible and hazardous liquids including the equipment, facilities and buildings that are used to store, transfer and dispense them. The regulatory application of SPS 310 covers residential occupancies, home business, members only facilities and is not limited to places-of-employment or buildings and facilities with public access.

The transportation aspect of the rule applies to loading and unloading transport vehicles and transportation on facility grounds. The rule does not apply to highway and vehicle requirements as traditionally enforced by the Department of Transportation.

SPS 310.020 Scope and Application

SPS 310 is a statewide flammable, combustible and hazardous liquid code. By SPS 310 definition a "liquid" means any material that has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5 at standard conditions of temperature (77° F) and pressure. Bunker fuels such as #5 and #6 oil typically do not meet the criteria for being classified as a liquid under the Code. SPS does not regulate tanks requiring a hazardous waste license under s. 291.25, stats. Under this criterion a tank may store product not regulated by SPS 310.

Local municipalities may enact local ordinances that are more restrictive. The City of Milwaukee, being a city of the 1st class, performs storage tank plan review, installation inspections and approval of Petition For Variance relating to tank systems located on property within the City of Milwaukee.

SPS 310 applies to new and existing facilities. The impact of the newly revised rule *does not retroactively apply* to facilities or tanks that were properly constructed under a former edition of the regulation, unless the code specifically states the new code requirement is retroactive or applies to existing facilities or tanks. Where existing facilities or tanks were unregulated under a former edition of the regulation, they may remain unchanged, unless the code specifically states the new code requirement is retroactive or applies to existing facilities or tanks.

Examples of application to existing facilities:
Example #1: A storage tank facility has multiple tanks within a containment dike that have been in compliance with the previous code. One of the tank systems within the facility must have the pipe replaced to a standard under this code that is more encompassing then previous codes. Only the pipe associated with the tank system that is having the pipe replaced must meet the current day regulation. The other tanks, pipe and the secondary containment would not be required to be upgraded to meet current day rules.

Example #2: Retrofitting a terminal tank with a floating roof would not require modifications to existing pipe or secondary containment.

Example #3: Tanks that met compliance with the 2001 SPS 310.345(2) AST upgrade requirements through the API 653 assessment variance or internal lining are considered to meet the secondary containment requirements.

Example #4: A facility is making a significant change in their processes. Several tanks that are currently used at the facility will have a different use.

- Tank #1 was approved for regulated product storage under a previous version of the code. It was approved for Class I flammable liquid storage and will now be used for Class IIIB liquid storage. No plan approval or modifications are required because Class I storage tank technical requirements are more stringent then technical requirements for a Class IIIB.
- Tank #2 has stored a Class IIIB liquid for years prior to the incorporation of Class IIIB liquids into SPS 310, and has not had a formal approval or tank registration because it was previously exempt from the code. No plan approval or modifications are required because the change of use has not been altered. However, the tank must be registered.
- Tank #3 was previously used to store a non regulated product such as a non combustible solvent.

The tank will now be utilized to store a regulated combustible liquid. Plan approval and subsequent technical requirements are required along with tank registration.

Example #5: An existing bulk plant is adding an additional tank to the facility to increase the facility's total storage capacity. There is no requirement to upgrade an existing dike when adding or altering a tank within an existing (construction approved pre April 1991)dike as long as:

1) the capacity of the code at the time the initial containment was constructed are still maintained (this was 100% of the largest tank prior to April 1991 and 125% on and after April 1991); and
2) the setback requirements of the code at the time the initial containment was constructed are still maintained.

Situations where additional storage is needed and the existing dike must be expanded because it is not adequate to maintain the capacity and setback requirements leads to environmental and engineering concerns such as:

- Breaching the existing containment and being able to maintain containment for the existing tanks while the containment/dike upgrade is taking place.
- Breaching the existing containment and being able to expand the existing dike without creating a seam that will pose a future conduit for water or product to migrate downward into the groundwater.
- Addressing existing contamination that may be observed when the existing containment is breached in the upgrade process.

For the reasons above many engineers are reluctant to tamper with or modify existing earthen containment and prefer to build a new independent containment dike for the additional storage. The new containment must comply with the current day code. If expanding the existing containment is the preferred option the plan submittal must include an engineer's assessment of the existing area where the expansion will take place and a detailed drawing of how the new containment area will be integrated into the existing area. The review expectation is that similar materials will be used or an explanation describing how the dissimilar materials are equivalent or better than the material used in the existing containment area. The reconstructed containment must provide the 125% capacity as required in the current-day code.

Example #6: A tank that has been used to store Class IIIB liquids is being converted to Class I, II or IIIA storage. The containment and construction rules and standards will apply requiring containment of 125% and verification by either UL (or similar listing agency) or a PE that the tank meets the UL or similar construction standard for Class I flammable liquids. If modifications to the tank are required the modifications must be performed and evaluated as required by the STI SP 031 standard.

Example #7: A tank storing Class IIIB liquids prior to the 2002 integration of Class IIIB liquid storage tanks into the code is being modified with an access way and an emergency vent. The modification must comply with the STI SP031 standard for repair of shop-built aboveground tanks.

Repair or modifications to tanks or piping in existing code compliant secondary containment dikes will not trigger an upgrade requirement for the dike.

The regulation excludes tanks or reservoirs containing an "accumulation" of regulated substances that are integral to the function or operation of the respective equipment. The term "accumulator tank/reservoir" comes from a 1991 NFPA interpretation on the scope of NFPA 30. Equipment and machinery that contain regulated substances for operational purposes, such as hydraulic lift or hydraulic operated equipment tanks and electrical equipment are excluded from the regulation if they meet two major criteria: the equipment or machinery contains small amounts of regulated substances solely for operational purposes; and a loss of regulated substance is accompanied by faulty operation of the equipment or machinery. Also included in this excluded application are tanks containing liquids used as coolants or lubricants in machining processes and stored in aboveground tanks where the storage and dispensing system is directly integral to the machining process. By meeting these criteria it is considered that the tanks are self-monitoring and the tank poses a minimal risk to human health and the environment. However, many of these products are Class II or IIIA combustible liquids and may pose a fire hazard, especially if the release under pressure results in a spray of fine combustible liquid particles. Because accumulation tanks show a leak incidence much lower than that for other types of tanks, such as those at service stations, a capacity threshold has not been established.

Because SPS 310 has a much broader UST and AST application to human health and fire and public safety then the federal EPA UST groundwater protection regulation or the EPA oil spill regulations, SPS

310 may not exclude tanks that contain mixtures of hazardous wastes and non-petroleum regulated substances that have a flashpoint that may be excluded by the federal rule. The exclusions posed by the Federal EPA regulation 40 CFR 280 (UST) and 40 CFR 112 (SPCC) are confusing and in many situations are debatable. Neither of these federal rules include fire code issues, which is one of the primary reasons for including Class IIIB liquids within the scope of SPS 310. This inclusion resolves a conflict between SPS 310 and the Department of Safety & Professional Services building and fire codes.

How to determine if your facility is subject to the USEPA SPCC Plan rule

To decide whether a facility is subject to the SPCC rule, the owner or operator must first identify whether there is a reasonable expectation of an oil discharge on the property migrating to navigable waters or adjoining shorelines from the facility. The owner or operator of a facility may consider the nature and flow properties of the oils handled at the facility to make this determination. Making this determination is more than just looking around your facility to see if there are ditches or waterways within view. For more information, see Chapter 2 of the SPCC Guidance for Regional Inspectors – **NOTE**: this is a 521 page document.

If there is a reasonable expectation that any oil at the facility may impact waters if discharged, then the next step is to determine the aboveground and completely buried storage capacity of all oil located at the facility (except for exempt containers). If the aboveground storage capacity is greater than 1,320 U.S. gallons or the completely buried capacity is greater than 42,000 U.S. gallons, then the facility is subject to the SPCC rule and the owner or operator must develop an SPCC Plan that describes oil handling operations, spill prevention practices, discharge or drainage controls, and the personnel, equipment and resources at the facility that are used to prevent oil spills from reaching navigable waters or adjoining shorelines. However, if the owner or operator of the facility determines there is not a reasonable expectation of discharge of oil to navigable waters or adjoining shorelines from all oils stored at the facility then the facility is not subject to the SPCC requirements. We recommend that the owner or operator document and date these determinations in the event that EPA challenges the determination following an incident or inspection. The SPCC rule is primarily a performance-based rule, therefore, the owner or operator may consider the properties of each oil product located at the facility to identify measures and procedures to prevent spills from the facility. Floor drains, storm sewers, retention ponds, etc., factor into the containment determination. For example, storage of an oil product inside a building without a floor drain may provide adequate secondary containment. Additionally, many SPCC rule provisions allow for environmentally equivalent alternatives to be used (except for secondary containment) provided they are documented in the Plan and certified by a Professional Engineer (see Chapter 3 of the SPCC Guidance for Regional Inspectors for more information).

Oil/water separators are not regulated under this chapter, however, separate storage tanks used for the storage of oil leaving the oil/water separator would be considered a used oil storage tank if the oil was held in the tank for longer than 96 hours. These storage tanks would then fall within the scope of the SPS 310 code. Oil/water separators and waste water treatment tanks may be regulated by the Department of Safety & Professional Services Safety and Buildings Division plumbing code.

Over the past years the manufacturing, business and service industry has improved waste collection and recycling efforts resulting in more frequent in-house storage of combustible liquids such as used hydraulic oils and fluids. Many of these “used” products maintain the Class II or IIIA and IIIB flashpoints posing a significant fire load if the facility is involved in a fire. While these products are not new to the regulatory scope of the code, this code revision addresses fire service concerns by placing some plan review or registration requirements on tanks that are a larger capacity posing a significant concern to firefighters that may performing fire suppression within the facility, such as used hydraulic oil greater than 1,100 gallon capacity.

Terminology and Applications

Leak:

The quantitative EPA leak detection performance standards have resulted in various perceptions of "when a leak is a leak?" The EPA performance standards or 0.2 gph and probabilities of 90% detection and 5% false alarm apply to the most allowable threshold for leak detection methodologies. While the system must, at a minimum, be capable of meeting the performance standard. Whenever the system is able to identify a smaller leak rate with the proper probabilities, it must. When a leak is suspected it must be investigated regardless of the leak rate.

Class IIIB liquid storage tanks:

Prior to 2002 tanks storing Class IIIB liquids were excluded from the code (at that time used oil was classified as a Class IIIA by the code). The Class IIIB requirements of the current code are not retroactive and for regulatory purposes existing Class IIIB tanks installed prior to July 2002 will be considered compliant with the code. However, modifications to the existing Class IIIB tank must be in compliance with the current code as the following examples demonstrate:

Example #1: (If you replace or modify a tank system component, only what you replace or modify needs to comply.) A storage tank facility has multiple tanks within a containment dike that have been in compliance with the previous code. One of the IIIB tank systems within the facility must have the pipe replaced to a standard under this code that is more encompassing then previous codes. Only the pipe that is being replaced must meet the current day regulation. The other tanks, pipe and the secondary containment would not be required to be upgraded to meet current day rules. The Class IIIB tank must be registered with the department (a requirement since 2002)

Example #2: (If you add a component, only what you add needs to comply.) A tank storing Class IIIB liquids prior to the 2002 integration of Class IIIB liquid storage tanks into the code is being modified with an access way and an emergency vent. The addition of the access way and an emergency vent must comply with the STI SP031 standard for repair of shop-built aboveground tanks. (The added components themselves must also comply with the code.

Example #3: A tank that has been used to store Class IIIB liquids is being converted to Class I, II or IIIA storage. The containment and construction rules and standards will apply requiring containment of 125% and verification by either UL (or similar listing agency) or a PE that the tank meets the UL or similar construction standard for Class I flammable liquids. If modifications to the tank are required the modifications must be performed and evaluated as required by the STI SP 031 standard.

Example #4: A facility is making a significant change in their processes. Several tanks that are currently used at the facility will have a different use.

- Tank #1 was approved for regulated product storage under a previous version of the code. It was approved for Class I flammable liquid storage and will now be used for Class IIIB liquid storage. No plan approval or modifications are required because Class I storage tank technical requirements are more stringent then technical requirements for a Class IIIB.
- Tank #2 has stored a Class IIIB liquid for years prior to the incorporation of Class IIIB liquids into SPS 310, and has not had a formal approval or tank registration because it was previously exempt from the code. No plan approval or modifications are required because the flammable/combustible class of the product has not changed. However, the tank must be registered.
- Tank #3 was previously used to store a non regulated product such as a non combustible solvent. The tank will now be utilized to store a regulated combustible liquid. Plan approval and subsequent technical requirements are required along with tank registration.

SPS 310 has more restrictive requirements for "<u>used</u> oil" beyond a class IIIB in two applications. 1.) SPS 310.300 addresses "used <u>motor</u> oil" that has a narrower and tighter regulatory requirement due to the potential contaminants and lower flashpoint that have been experienced in the variety of engine service facility generating used oil product. 2.) SPS 310.305 addresses used oil in relation to public collection points with a regulatory requirement based upon uncontrolled or limited control on who, what and how the do-it-yourselfer is transferring the oil into the collection point storage tank.

Used motor oil falls into two use categories - heating and recycling. Refer to section 10.300 in this

compendium for more detailed information. Used oil for heating has to comply with NFPA 31 and follows the same requirements as traditional heating fuel. Used motor oil for other purposes must follow the SPS 310.300 requirements. SPS 310 regulates used oil storage that is beyond the "public collection point" or outside the realm of "used motor oil" as any other NFPA 30 Class IIIB combustible liquid.

Companies marketing tanks for Class IIIB products, primarily used oil, frequently advertise the tank as complying with 40 CFR 279.22 Used Oil Storage. This promotion language is often misunderstood to represent that the tank meets design criteria, which it does not. The CFR 279.22 standard addresses labels and refers to the EPA SPCC regulations. The label requirement has no relationship to the various listing organization's construction standards and the SPCC regulations do not address design or construction. Many of the poly-material and fiberglass constructed tanks on the market for used oil do not meet the NFPA requirements for Class IIIB combustible liquids and are not acceptable for use in Wisconsin.

Credential / Certification / Qualified Person
The code and adopted standards use various terms in association with competency measures. The department typically does not assess as part of its regulatory oversight the depth of an individual's competency outside of the SPS 305 credential requirements.

The department expects that the Contractor or Subcontractor performing the work will have a work force that is qualified by the governing code (i.e., API generally for oil and gas, ASME Section IX for Pressure Vessels, AWS D1.1 for structural and water lines etc). Unfortunately some contractors are searching for opportunities in fields for which they are not particularly qualified, are often ill prepared to perform the specific work, and consequently provide substandard work.

Day tank
A *day tank* is a fuel supply tank located between the primary fuel storage tank and equipment consuming the fuel. Day tanks are typically used in process, emergency generator and used oil heating systems. The day tank may be hard piped from the supply tank similar to a closed system, or piped with broken connections requiring manual intervention to transfer product. A day tank less than 110 gallons, and often referred to as an "auxiliary" tank, is outside the scope of the SPS 310 code. However, if the day tank is hard piped between the primary tank and the equipment burning the fuel we consider the day tank to be part of the storage tank system and the day tank and associated valve configurations must be included in the plan submittal. A day tank less than 110 gallon capacity will not have to be registered or listed.

Hazardous substances:
In addition to liquids that have a flash point, SPS 310 regulates hazardous substances that are on the US EPA Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) List. While the US EPA has elected to exclude tanks with a "de minimus" concentration of products, but not define de minimus, SPS 310 has a threshold of 1%. Therefore, a tank with a liquid concentration of less than 1% of a CERCLA substance is not regulated within the scope of the code. SPS 310 does not include hazardous waste liquids, unless the product has a flash point.
The EPA has declared that tanks containing methanol such as gasohol motor fuels with 5% or more methanol to be considered and regulated as hazardous substance tanks. Ethanol, such as that in motor fuels is not considered a hazardous substance, therefore tanks containing E85 motor fuel are regulated as a petroleum tanks.

Mercaptan, the odor agent for LP and natural gas, is a class IA liquid. Mercaptan storage tanks are located along interstate pipelines and at gas utility facilities. Due to its characteristic unpleasant odor this liquid is stored in pressure vessel tanks which will withstand significant pressures before the vent mechanisms activate. Pipelines are regulated by the Public Service Commission and therefore mercaptan storage tanks connected directly to the pipeline fall under that authority. Tanks not connected directly to the pipeline fall under the scope of SPS 310/NFPA 30 and are required to be installed as Class IA flammable liquid tanks, which includes secondary containment.

Asphalt or similar substances:
Some sectors of industry use a generic term for a very broad range of products or product storage tanks, and some flammable/combustible products have unique characteristics that may place them outside the parameters of the traditional flammable or combustible liquid

requirements. The asphalt industry is an example where the term “asphalt tank” may apply to a range of products and a range of storage or processing practices. The Petroleum Equipment Institute’s (PEI) Lexicon is the dictionary reference for the petroleum equipment industry. The Lexicon defines “asphalt as: “In its natural state, asphalt is a solid, dark colored bituminous substance that can be found in the earth, like coal, at various locations around the world. From a chemical standpoint, asphalt is classified as a hydrocarbon. Much of the asphalt used in the U.S. is derived as a by-product from crude oil during the cracking process. When mixed with gravel or crushed rock, asphalt is used as a paving product.” In USA, the word asphalt is used as synonymous with bitumen; but asphalt is really a mixture of refinery bitumen with a substantial proportion of solid mineral matter. Manufacturers use bitumen in fuels, paints, paving and roofing materials, and in waterproofing and lining materials used in construction. They also make petroleum coke from bitumen. Bitumen as crude oil is slightly heavier than water and is removed from the ground by heating it to make it flow to a well.

The National Fire Prevention Associations (NFPA) defines a “liquid” as any material that is more fluid than 300 penetration asphalt using ASTM D 5 Standard Test Method for Penetration of Bituminous Materials. or by applying ASTM D 4359 Standard Test for Determining Whether a Material Is a Liquid or a Solid. The NFPA approach makes the definition of “liquid” very broad.

The department, acting as the authority having jurisdiction (AHJ), may determine the product storage to have less restrictive requirements than the code or standards generally express. For example, asphalt emulsion will generally meet the criteria to be classified as a Class IIIB liquid. Asphalt emulsion can have viscosity properties that range from water to syrup and typically consist of 65 - 70% asphalt, water, soaps, acid or base, and 1 to 21% fuel oil. When asphalt emulsion comes in contact with any aggregate (soil or ground) a “breaking” process results in the asphalt portion being adhered to the aggregate and solidifying as the remaining liquids evaporate. However, the variables in the makeup of the product and the fact that a release of the product will result in the release of vapors from a class II liquid prevent the department from making an across-the-board regulatory exclusion for these unique products such as asphalt emulsion. In order to maintain a record of the department’s actions associated with the respective site and product specific conditions the department will use the Petition For Variance process to formally address the determination of such liquids.

Some asphalt products may not be regulated by the code if the liquid state must be sustained with heat. Asphalt batching plants typically convert asphalt substances (e.g., asphalt cement) to a liquid form through the application of heat. At this stage asphalt would be considered a class IIIB liquid if it meets the definition of liquid. SPS 310 “Liquid” means any material that has both a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5 at standard conditions of temperature and pressure, and a vapor pressure of 40 pounds per square inch absolute (psia) or lower at 100°F as determined by ASTM D 323 or 4953. For materials outside the scope of the ASTM D 5 test, liquid means any material that both starts to melt at temperatures less than 100 F and has a vapor pressure of 40 psia or lower at 100 F. To put this in a context that is easily understood the tank program has taken the position that if a material must be heated to change the state of the material to a fluid that can be transferred via gravity flow or pumping it does not fall under the SPS 310 liquids code. This also includes the tank construction and removal requirements and subsequent SPS 305 credential requirements for contractors.

Quarry sites
Quarries that have facilities and equipment that pose a long term operation are considered to be commercial occupancies and the tanks regulated as such. Quarries that have equipment of a portable application that is set up for the duration of a specific project (i.e., highway reconstruction) or limited time period (i.e., 24 months) are considered construction site applications and the tanks regulated as such.

Military application:
Historically, mobile military operations have been exempt from most areas of the code. While storage tank and fuel transfers from storage tanks at military facilities would be considered to be under the scope of SPS 310, fuel transfers into and from portable containers or portable tanks under the responsibility of the military to support such operations would not fall under the scope of SPS 310.

Tank vehicles storing SPS 310 regulated product:
Frequently issues or inquiries arise involving situations with loaded bulk delivery or transport vehicles parked at a facility for a period of time. NFPA has rendered a formal interpretation that mobile tanks with product, including NFPA 385 transports with or without the motor unit, parked for days, weeks, or months

before being shipped or moved must be provided with the drainage, impounding and AST separation distances specified in NFPA 30. The practice of overnight parking of vehicles loaded for next day delivery is not as explicitly defined in NFPA or SPS 310. The Federal EPA SPCC program (40 CFR 112) has stated that vehicles loaded for next day delivery must be provided the same spill containment provisions as SPCC regulated storage tanks. Quoting EPA: "If at anytime product is being transferred from or to a highway tank transport or railcar its transport related status ends and it becomes a regulated storage tank. If it is parked on the site for some length of time (the length of time is not specifically identified in the regulation) then its intent is storage and it is regulated as a tank. All of this depends upon two criteria: a) reasonable chance of a discharge; and b) 1,320 threshold quantity limits including other ASTs on the property.

Generally, if the loaded highway transport is parked overnight, it appears that the transport is considered to be storage incidental to the transportation in Department of Safety & Professional Services and is not subject to the SPCC containment requirement. Trucks not licensed for over the highway and usually staying within the confines of an airport are regulated under 20 CFR 112.7(c).

Parking loaded delivery or transport vehicles inside a building is another frequent inquiry. This practice brings the fire and building codes into play, as well as the regulatory positions stated in the commentary above. Building use classification and construction will factor into the determination. Higher fire ratings and sprinkler systems may be required. Public Right To Know laws can also be a consideration, especially for the firefighters who may be responding to a fire in this building.

A fuel vendor or contractor can not use a bulk delivery truck or trailer as a stationary storage tank by parking the vehicle and making bulk fuel deliveries to the parked vehicle for dispensing into drive-up vehicles. A fuel vendor or contractor can not utilize a bulk transport by dropping the trailer with fuel at a site, allowing drive-up fuel dispensing, picking the trailer up when empty, transporting trailer to refill, and dropping the trailer back at the site to continue the cycle.

Transfer point containment:
SPS 310 adopts NFPA 30 which includes section 30-28.9 Containment, Drainage, and Spill Control. The 2008 edition of NFPA 30 includes a provision for spill containment at loading and unloading facilities. We apply the containment provisions of this section of the standard to facilities that have a storage tank that has a capacity of 5,000 gallons or more and which is involved in transfer operations at *facilities that refine, process, distribute or manufacture liquids* regulated under SPS 310. The intent of this section covers operations where the transfer frequency and throughput are significant resulting in a higher risk of occurrence.

Transfer containment is not required where dispensing is from a storage tank to a vehicle fuel tank. We do not apply this transfer containment requirement to the point of transfer between bulk deliveries into an underground or aboveground tank that supplies product to a vehicle fuel dispenser. We do not apply this containment requirement for transfers into heating fuel or used oil tanks used for heating or other burning purposes. In other words, the transfer containment application is in most applications applied to facilities up-stream from the end user. The capacity of the transfer containment area must be able to contain the maximum capacity of any single compartment of a tank car or tank vehicle loading or unloading at that transfer point.

Summary of transfer containment:
Bulk Plants and Terminals. (SPS 310 Code page 26) SPS 310.340 (5) Transfer Operations – In order to prevent a spill from moving beyond the loading or unloading area, any new or existing aboveground tank that has a capacity of 5,000 gallons or more shall be provided with a catchment basin or treatment facility to contain the maximum capacity of the largest compartment of a tank car or tank vehicle loaded or unloaded at the facility. *Existing tanks shall comply with this subsection within 2 years after February 1, 2009.*

Hazardous Substances. (SPS 310 Code page 26) SPS 310.350 (5) (b) Secondary containment systems for product transfers.
Transfer of hazardous substances shall take place within a secondary containment system that meets all of the following requirements:

- 1. a. For facilities that are designed on or after February 1, 2009 the system shall be capable of containing leaks and spills from the largest compartment of the vehicle being loaded or unloaded, including leaks or spills from connections, couplings, vents, pumps and valves, hose failure or overturning of a container.
- b. For facilities designed or installed before February 1, 2009, the system shall be capable of containing the volume of any leak or spill deemed likely to occur, in the professional judgment of a qualified engineer. Facility modification to meet this requirement shall be completed no later than December 31 of the fifth year following February 1, 2009.
- c. Open-ended fill lines shall be located within the secondary containment system.

Secondary Containment.. (SPS 310 Code page 26) SPS 310.420 (5) Transfer Operations.
In order to prevent a spill from moving beyond the loading or unloading area, any tank which has a capacity of 5,000 gallons or more and which is involved in transfer operations for bulk loading and unloading of tank cars or tank vehicles at *facilities that refine, process, distribute or manufacture liquids* regulated under this code shall be provided with a catchment basin or treatment facility to contain the maximum capacity of any single compartment of a tank car or tank vehicle loaded or unloaded at the facility.

Catch basin shall be sized (Length & Width) to allow the entire storage vessel (truck, trailer or rail car) to be contained.

NOTE: Federal SPCC requirements / 40 CFR 112 may apply to smaller transfer operations or facilities. If there are no ASTs at a facility, just USTs, this is not a SPCC AST regulated facility and therefore the loading/unloading does not fall under SPCC.

Fixed versus portable tank storage:
There is a trend in tank manufacturing to design smaller tanks for dual purpose service: stationary or fixed placement, or for portable use. This trend is primarily with Class II and III combustible liquids and many of these tanks are of poly type construction material. Some tanks are manufactured as Intermediate Bulk Containers (IBC) which is primarily designed for transportation related factors. Other tanks are small tanks considered portable due to their size and may be designed to accommodate fork lift relocation and placement. Unfortunately, the marketing side of this tank trend does not often understand the regulations as they apply to the end use of the tank and a compliance conflict often develops after the tank is in operation. Wisconsin requires that tanks be listed and subsequently be used within the scope of the listing.

While a tank with a manufacturer constructed lifting lug doesn't always mean the tank is for portable or movable use, a tank without such attachments is intended for fixed use. A tank with skids is not intended for p[portable or movable use unless it has lifting lugs or the lugs are designed for a forklift. The typical skid configuration is intended to support and elevate the tank above grade, not drag it from location to location or to be used as the frame support for a fork lift.

NFPA 30 Chapter 22 applies to tanks that are fixed and portable tanks and bulk containers above 660 gallon and IBCs above 793 gallon capacity. NFPA 30 Chapter 9 applies to portable tanks and containers up to 660 gallon capacity and IBCs up to 793 gallon capacity.

The three stacked portable containers in the photo at the right are less than 110 gallons and therefore not regulated by SPS 310.

If the individual portable containers in the photo were 120 gallons or greater and in a similar fixed configuration, they would be regulated by SPS 310 as NFPA 30 Chapter 9 storage tanks. A similar application would apply if the tanks were IBCs in a fixed configuration.

Determining flammable/combustible classification:
SPS 310 no longer has a regulatory limit based upon flashpoint. Class IIIB products may pose as significant environmental risks as Class I liquids. In a fire situation, Class IIIB products are significantly more of a challenge for the fire department to extinguish than Class I and Class II liquids due to the

intense heat units and products of combustion. Regulations, standards and product references utilize the NFPA flammable and combustible liquid classifications that are based upon the product's flash point. The product's Material Safety Data Sheet (MSDS) is the reference that will determine the product classification based upon flashpoint. Unless the MSDS states "no flash point" or flash point "not applicable (NA)" the product will be designated with the NFPA classification associated with the lowest flash point listed; e.g., > 100° F is a Class II, > 150° F is a Class IIIA > 300° F is a Class IIIB, and > 600° F is also Class IIIB.

If a substance has to be heated to maintain a liquids state, it is not regulated by SPS 310. If issues arise where the liquid versus sold state is in question the MSDS or references such as Hawley's Chemical Dictionary will determine the respective chemical state.

Because some OSHA rules do not apply to products with a flash point greater than 200° F some companies have identified the flash point on the MSDS as >200° F for OSHA regulatory purposes without determining the exact flashpoint or flashpoint range. For SPS 310 regulatory purposes, the product will be considered a Class IIIB unless the manufacture can verify that the product has no flash point.

When is flammable or combustible liquid not a *regulated* liquid?
That question has been presented to the Department to address products that technically exhibit a flashpoint, but in reality will not sustain burning or may actually extinguish a fire. Glass cleaners and polymer waxes are two examples of such products.

Regulatory codes and national standards use the characteristic flashpoint as the basis for classification because flashpoint has a direct relationship to volatility. Flashpoint is determined by laboratory testing using open-cup and closed-cup test methodologies in a confined space. While the traditional testing determines the flashpoint characteristics useful in classifying flammable and combustible liquids, it may not represent the true response of a substance in a non-laboratory – unconfined situation. NFPA 30–A-4-2.4 recognizes ASTM test methods that identify products that do not sustain combustion for a specified time at a specified temperature and are therefore considered to be non combustible.

Products evaluated by the following standards and successfully meeting the non combustible test criteria of the respective tests will not be subjected to the SPS 310 regulations as flammable or combustible liquids:

- ASTM D4206, Standard Test Method For Sustained Burning of Liquid Mixtures Using the Small Scale Open-Cup Apparatus. It is possible for a product to have a flash point listed on a MSDS, and also meet the ASTM D4206 standard.

A common occurrence is bulk storage of auto window washer fluid and the product may be produced by mixing, on site, a washer concentrate with water. Typically there is a winter blend and a summer blend, determined by the ratio of concentrated added to water. Unless there is reason to believe the product does not meet the ASTM D4206 standard, the mixed product is not regulated by SPS 310.

Capacity thresholds
Many of the standards adopted by SPS 310 have international application and reference liquid capacity in liters with a gallon equivalency. This frequently results in non-typical US gallon capacity tank equivalents, such as NFPA 30-9.1.1(3) of 3000 L (793 gallons). However, NFPA 30A-4.3.9.1 has an opposite relationship with the US gallon capacity being more typical in terms of tank size which is 454 L (120 gal). In the regulatory application, Department of Safety & Professional Services will recognize capacity thresholds that are more typical of tanks manufactured with US liquid units. Examples: 3000 L (793 gal) – 800 gallon, 450 L (119 gal) – 120 gallon, etc.

Labeling, Posting and Signage
SPS 310 and SPS 348 have numerous requirements for signage and labeling posting. Refer to the *Signage and Labeling Overview* table at the end of the Compendium. *Refer to the specific code or national standard section referenced for more detail.*

Storage Tank Recertification
Recertification of a UST can only be performed by a manufacturer's representative. Tanks must be moved aboveground for the assessment process to take place. Typically, the tank's warranty is maintained and not extended. USTs must be less than 20 years old to be recertified. There are no standards for a PE working independently to assess a UST for structural integrity and fitness for continued service.

SPS 310.050 Definitions

Terminology plays an important part in regulatory application and enforcement. The definition of a word may not be consistent between standard writers, organizations, Department of Safety & Professional Services and general industry jargon. For example, in tank system related standards NFPA uses the terms “opening” and “connection” interchangeably to a considerable extent. In technical application an opening has a broader meaning in that it may be a pipe connection opening or an access way for human entry. However, the term “connection” would not include an access way for human entry. The term “tank fill connection” applies to the fill point regardless of the fill being via a tight connect fitting or the traditional hand-held nozzle.

Likewise the standards often move back and forth between the terms “permitted” and “allowed.” The term “permitted” does not mean the same as “shall, but has the same meaning as the word “allowed.” The petroleum industry frequently uses the term “tankwagon” (one word) for small fuel delivery trucks delivering home heating oil as well as for two axle fuel delivery trailers, both generally capable of transporting less than 5,000 gallons. The Department of Safety & Professional Services tank program, for lack of a better descriptive term, uses the term “tank wagon” (two words) to characterize one or two axle chassis with tanks mounted on them to provide vehicle fueling at construction sites.

“Spill containment,” “spill prevention,” and “secondary containment” are terms also used interchangeable in many standards. “Spill prevention” for a UST is a spill bucket at the point of fill, but for an AST it may be a spill bucket at the point of fill or secondary containment, such as a dike. Secondary containment includes structures or devices sufficiently impermeable to contain released Regulated Substances for a period of time sufficient for the cleanup and removal of captured material including;

(1) dikes, berms or retaining walls;
(2) curbing;
(3) diversion ponds, holding tanks, sumps;
(4) vaults;
(5) double-walled tanks;
(6) liners external to the tanks.

“Overfill prevention” may be a mechanical device such as an electronic shut-off on a UST, or, on an AST it may be either mechanical or structural, such as secondary containment.

Various requirements, as well as some definitions, include the phrase “release barrier” or “release prevention barrier.” A release barrier is a physical method, such as a concrete or steel floor directly under the tanks (including gravel or rock containing rings on top of concrete, or horizontal tanks installed on saddles), synthetic liners and liquid tight secondary containment, that prevent the regulated product from contacting adjacent soil, ground or surface waters.

The word “or” as well as the phrase “comply with one of the following:” give the user a choice of the options or items listed. The word “and’ as well as the phrase “comply with the following:” mean that the user has no choice and that all of the provisions or items apply toward meeting the regulatory requirements.

The SPS 310 code may intentionally have a different, broader or narrower definition than a national standard, federal rule or industry jargon. When a term or word is in debate the sequence used to determine the application is in the following priority: 1) SPS 310 definition section, 2) Applicable federal rule e.g., 40 CFR 280, 3) Applicable national standard definition, 4) PEI Lexicon, 5) Webster’s Dictionary.

The following are terms that frequently have more than one meaning or application within the various segments of industry or within the federal-state regulatory community. The terms are followed by a brief explanation of the Wisconsin tank program definition or application.

Compartmentalized tanks

Wisconsin’s approach to compartmentalized tanks is different than the EPA approach. The EPA views a compartmentalized tank and the piping connected to it as one tank system because the tank is manufactured, transported, installed, protected from corrosion and often equipped with leak detection as a single unit. Wisconsin views a compartmentalized tank as each compartment being a single tank because each compartment may hold a different class product, be equipped with individual (and many times product specific) leak detection equipment and likely have individual piping creating separate storage/dispensing systems.

Container
A “container” is generally a storage mechanism that is portable meaning it can be easily moved, but may have a stationary application such as a 100 gallon day-tank. Some OSHA standards include a bag or box in the definition of container. Various standards associated with liquids may classify a vessel under a specific capacity as a “container” and larger vessels classified as a “tote” or a “tank.” NFPA 58 defines any size vessel storing LP gas as a “container,” whereas NFPA 30 defines “container” as any vessel of 119 gallons or less capacity used for transporting or storing liquids. The line of demarcation in SPS 310 is storage vessel 110 gallon capacity or larger is a tank. From there the application may be as a tote or IBC, portable tank, stationary or fixed tank, etc.; although in situations where another standard may be the primary resource used to address the issue, that standard may have a different definition or threshold that takes precedence.

De minimis concentration
The federal rule, 40 CFR 280, has exemptions for tanks containing “de minimis” concentrations. The federal rule does not have a definition of de minimis, but the EPA has described de minimis as a volumetric quantity that would be 110 gallons or less of the regulated product. Example: a 2,000 gallon tank would be exempt at a concentration of 5.5% because the amount of the regulated product is 110 gallons; comparatively, a 1,000 gallon tank containing 11% regulated product would be exempt at a greater concentration level. As a means to provide continuity SPS 310 placed the regulatory exclusion at concentration of regulated substance at less than 1% (SPS 310.350).

Double-wall Tank
The term "double-wall" as it applies to a tank regulated under SPS 310 must have an interstitial or annular space that can be monitored for a breach in any area of the primary or secondary wall. Clad or composite USTs listed under UL 1746 – External Corrosion Protection Systems for Steel Underground Storage Tanks are not considered double-wall unless the construction facilitates interstitial monitoring. Clad or composite tanks manufactured with an interstitial space that is monitored are commonly referred to as “jacketed” tanks and meet the use application of a double-wall tank. Aboveground tanks manufactured to UL 2085 – Protected Aboveground Tanks for Flammable and Combustible Liquids require that all enclosed spaces that could contain leakage from the primary tank shall be evaluated as interstitial spaces for secondary containment, subsequently all UL 2085 listed tanks meet the use application of a double-wall tank.

Facility
The term “facility” may have several different applications within the tank program. In terms of general code and standard application the SPS 310.050 (45) definition of “facility” means a plot of land developed or designated to serve a particular function. However, in actual programmatic application a site may include several different facilities. For example, the loading rack area of a bulk plant is considered a different facility then the cluster of bulk storage tanks on the same site. A site such as a mall has numerous facilities. Additionally, the Department of Safety & Professional Services regulated objects database application distinguishes between a facility as “marketer” and “non-marketer.”

Federally Regulated
“Federally regulated” tank is a term used in the code and throughout this compendium. The term “federally regulated” is derived from the Federal EPA regulation 40 CFR 280 that all states are required to enforce. The federal rule is written from a minimal application perspective that would apply nationally and in many areas written with such that states have to make there own application interpretation. The Wisconsin enforcement mechanism for the federal rule is SPS 310. SPS 310 is written based upon Wisconsin definitions, safety and environmental concerns, and historical applications. Federally regulated tanks are tanks that store petroleum products and CERCLA hazardous substances. Tanks that store flammable or combustible products such as brake and transmission fluids would be considered “federally regulated” only if the product had a petroleum product as one of the ingredients, or if the product is listed on the CERCLA List. A tank storing transmission fluid that is comprised 100% of synthetic components is not a federally regulated tank.

Heating fuel tank under the federal rule:
The application of heating fuel tanks under the federal rule is very confusing. The federal rule (40 CFR 280.10(b)) does neither exclude nor does it defer (40 CFR 280.10(c)) heating fuel. The federal rule (40 CFR 280.12 Definitions) does exclude underground tanks storing heating oil for consumptive use on the premise where stored from the federal definition of underground tanks and applies the

“consumptive” application to heating, but does not elaborate on the terms “heat,” “heating fuel” or heating application. The Wisconsin tank program has for many years included heating oil tanks within the scope of the tank program and has taken the position that the only underground tanks to meet the exclusion of the federal definition in Wisconsin would be tanks that are solely for the purpose of providing energy to a furnace or burner for space heating. This would include fuel to a boiler providing hot water or steam for space heating.

The type of heating fuel and the type of fuel system significantly influence the capability of heating fuel systems to meet the technical requirements of the federal and the SPS 310 rule. As the type of fuel oil goes from #1 to #6 the characteristics change and current day leak detection devices and methodologies have less reliability with the heavier oils. Metering technology has not progressed to the point where reliable throughput monitoring of heating oil systems with variable input burners or return lines can provide leak detection that meets the reliability criteria. A threshold of heating fuel tanks greater than 4,000 gallons was established in the regulatory application of leak detection and corrosion protection requirements. Large heating fuel tanks (> 4,000 gallon capacity) are treated similar to federally regulated tanks, but may not require an annual permit-to-operate (PTO) as follows:

- Heating fuel tanks storing fuel for retail or wholesale markets are required to meet the technical requirements along with financial responsibility and require a PTO.
- Heating fuel tanks storing #1 - #4 heating fuel <u>for back-up</u> space heating are required to meet the technical requirements and are required to have a PTO. Heating fuels of #5 and 6 classification are often not stored in the traditional storage tank and leak detection technology has not progressed to equipment capable of reliably handling these heavy oils.
- Heating fuel tanks storing #1 - #4 heating fuel <u>for direct steam boiler or back-up boiler</u> heating where the steam is used to power equipment are required to meet the technical and financial responsibility requirements and are required to have a PTO.
- Heating oil tanks that serve a multi-purpose use of any of the above categories are required to comply with the most restrictive requirement.

Number 1 (#1) heating oil and diesel fuel have similar characteristics and may be used interchangeably in some applications. The technical requirements will be based upon the use and not the name of the product. Using a light #1 heating oil in an application that typically uses diesel fuel, such as an emergency generator, will not move that application out of the more technical requirement.

Marketer

The term “marketer” is a programmatic term for bureau administrative and operational purposes, which includes retailers, wholesalers and jobbers that provide SPS 310 regulated product to the general public, business or manufacturing. The terms “marketer“ and ”non marketer” do not appear in the code, but do appear in many policy related documents.

A hardware store that dispenses kerosene to the public is a marketer. Trucking fleets and truck leasing companies that allow independent owner/operators to purchase fuel from their storage tank either via POS or billing are considered a “marketer.” Car or equipment rental companies that charge for “top-off” fuel when the vehicle or equipment is returned are not considered a marketer. Government agencies, such as a municipal highway department that provides POS type dispensing for other area governmental agencies such as the Sheriff’s Department and subsequently bills for product dispensed is not considered a marketer.

New versus replacement

Many of the requirements or compliance dates apply to “new” systems or system components. Likewise many of the code requirements apply to ”replacement” components. A “replacement” is generally a new piece of equipment, the result of upgrading an existing piece of equipment such as a tank or pipe. The key factor is that the new piece of equipment is in the same “bed” or integral to an existing system configuration. A “new” piece of equipment as the code applies, such as a “new” tank, pipe or dispenser, is located in a new bed or configuration. A scenario example: the piping for an existing UST is being upgraded from steel to fiberglass between the tank and two dispenser islands and an additional (third) island is being installed. The existing steel pipe is being “replaced” with fiberglass pipe and the addition of a third island is being plumbed with “new” pipe.

Motor Vehicle

A regulatory issue brought into question the SPS 310 definition of *motor vehicle* and the department’s position that snowmobiles, ATVs and railroads are included in this designation.

SPS 310.050 Definitions
(73) "Motor Vehicle" means a self-propelled motor-driven vehicle which is used for moving people or products on land, water or air.

The basis for the issue is the definition of Motor Vehicle in s. 340.01(35), Stats., which includes the sentence “A snowmobile and an all-terrain vehicle shall only be considered motor vehicles for the purposes made specifically applicable by statute.” The issue being “How can the department designate snowmobiles and ATVs as motor vehicles and apply the technical requirements of the code to snowmobiles and ATVs?”

The Wisconsin Department of Transportation is the governmental agency which historically maintains the application and authority for Chapter 340. Section 340.01 Words and Phrases defined, includes a sentence which limits the scope of the definitions to twelve chapters of the statute.

In s. 23.33 and chs. 340 to 349 and 351, the following words and phrases have the designated meanings unless a different meaning is expressly provided or the context clearly indicates a different meaning.

Railroad trains and other motorized equipment which operate exclusively on a rail are specifically excluded in the s 340.01 (35) definition of Motor Vehicle.

The Table of Words and Phrases in the statute indicates that there are nineteen definitions of Motor Vehicle within the statute. Each definition is respective to a specific chapter(s) within the statutes. Chapter 101, which is the departmental statutory authority does not include a definition of Motor Vehicle. Therefore, the department’s interpretation and application of the SPS 310 definition as developed through rule promulgation is justified.

Excerpts from Section 340.01, Stats.:
340.01(29m)
(29m) "Moped" means any of the following motor vehicles capable of speeds of not more than 30 miles per hour with a 150-pound rider on a dry, level, hard surface with no wind, excluding a tractor, a power source as an integral part of the vehicle and a seat for the operator:
340.01(29m)(a)
(a) A bicycle-type vehicle with fully operative pedals for propulsion by human power and an engine certified by the manufacturer at not more than 50 cubic centimeters or an equivalent power unit.
340.01(29m)(b)
(b) A Type 1 motorcycle with an automatic transmission and an engine certified by the manufacturer at not more than 50 cubic centimeters or an equivalent power unit.

340.01(30)
(30) "Motor bicycle" means a bicycle to which a power unit not an integral part of the vehicle has been added to permit the vehicle to travel at a speed of not more than 30 miles per hour with a 150-pound rider on a dry, level, hard surface with no wind and having a seat for the operator.

340.01(31)
(31) "Motor bus" means a motor vehicle designed primarily for the transportation of persons rather than property and having a passenger-carrying capacity of 16 or more persons, including the operator. Passenger-carrying capacity shall be determined by dividing by 20 the total seating space measured in inches.

340.01(32)
(32) "Motorcycle" means a motor vehicle, excluding a tractor or an all-terrain vehicle, which is capable of speeds in excess of 30 miles per hour with a 150-pound rider on a dry, level, hard surface with no wind, with a power source as an integral part of the vehicle, and which meets the conditions under par. (a) or (b):
340.01(32)(a) (a) Type 1 is a motor vehicle which meets either of the following conditions:
340.01(32)(a)1.
1. Is designed and built with 2 wheels in tandem and a seat for the operator, and may be modified to have no more than 3 wheels by attaching a sidecar to one side of the wheels in tandem without changing the location of the power source.

340.01(32)(a)2.
2. Is designed and built to have no more than 3 wheels, seating for the operator and no more than 3 passengers, and does not have the operator area enclosed.
340.01(32)(b)
(b) Type 2 is a motor vehicle designed and built to have at least 3 wheels in contact with the ground, a curb weight of less than 1,500 pounds, and a passenger and operator area with sides permanently enclosed with rigid construction and a top which may be convertible.

340.01(33m)
(33m) "Motor home" means a motor vehicle designed to be operated upon a highway for use as a temporary or recreational dwelling and having the same internal characteristics and equipment as a mobile home.

340.01(34)
(34) "Motor truck" means every motor vehicle designed, used or maintained primarily for the transportation of property.

340.01(35)
(35) "Motor vehicle" means a vehicle, including a combination of 2 or more vehicles or an articulated vehicle, which is self-propelled, except a vehicle operated exclusively on a rail. "Motor vehicle" includes, without limitation, a commercial motor vehicle or a vehicle which is propelled by electric power obtained from overhead trolley wires but not operated on rails. A snowmobile and an all-terrain vehicle shall only be considered motor vehicles for purposes made specifically applicable by statute.

340.01(41)
(41) "Operator" means a person who drives or is in actual physical control of a vehicle.

340.01(42m)
(42m) "Park or parking" means the halting of a vehicle, whether occupied or not, except temporarily for the purpose of and while actually engaged in loading or unloading property or passengers.

340.01(46)
(46) "Private road or driveway" is every way or place in private ownership and used for vehicular travel only by the owner and those having express or implied permission from the owner and every road or driveway upon the grounds of public institutions other than public schools, as defined in s. 115.01 (1), and institutions under the jurisdiction of the county board of supervisors.

340.01(48)
(48) "Railroad train" means every device with or without engine or motor and whether or not coupled to other similar devices, operated upon rails for the transporting of persons or property.

Permit
The term “permit” has several different applications within the tank industry and nation-wide within the regulatory and construction sectors. The Department of Safety & Professional Services post plan review authorization to commence construction is frequently, but incorrectly, referred to as a “permit.” In terms of SPS 310 and Department of Safety & Professional Services tank program application the SPS 310.145 “permit” means a formal document issued annually after the owner or operator has provided the department with adequate verification of leak detection and financial responsibility authorizing the tank system to continue in operation. Refer to Compendium section 10.145 for more information on permit

Private versus public
Organizations requiring membership, such as flying or yacht clubs, may consider the organization "private" due to membership requirements, but this has no bearing on SPS 310 regulatory requirements. Neither NFPA 30A nor SPS 310 use the terms "private" and "public" to distinguish motor fueling, service stations or the subsequent regulations under the scope of SPS 310. NFPA uses the terms "automotive service station," ‘fleet vehicle service station" and "marine service station." SPS 310 uses terms: "service station," "marketer," "public" and "fleet." Private clubs are considered “public” in concert with the SPS 310 definitions of “Public Access” and Public Building.” Facilities under the

control of a private organization do not generally restrict access to only members. Members invite non-members and some facilities allow general public access, but grant members special privileges or access to areas off-limits to non-members.

Property that can be built upon
The SPS 310 code and several NFPA standards include distance setbacks of a tank from "property line that is or can be built upon." The distance setback language states the measure is from the tank to the "property line," not from the tank to a building. Property that is plotted out for development or within a developed area is generally considered to be potential for being built upon. In some situations property that cannot be built upon is obvious, such as the adjoining property being a wet-land under DNR control. However, aside from the previous example, considering current day land development practices a wet-land or a corn field does not assure that the property cannot or will not be built upon.

Adjacent property that can be built upon will be considered as such if the adjacent property is plotted for development or within a geographical area that has been established or proposed for development by the respective municipality.

A Petition For Variance is required for property that is built upon or can be built upon in situations where the building(s) is a significant distance from the property line or where a geological element such as a bluff or creek separate the property line from the building. Measurements are taken laterally, rather than as "the lay of the land" goes.

In situations where a tank has been authorized via plan approval to be placed in proximity to a property line of property that was not built upon or considered not to be built upon, for example a corn field, and years later the adjoining property is developed, the tank will not have to be relocated.

Public-way versus right-of-way versus easement
Tank setbacks distances in NFPA 30/30A and SPS 310 are associated with buildings and "public-way" corridors. A public-way is a pedestrian or vehicle traffic corridor where the public has unrestricted access, such as an alley, street or sidewalk. Highway and street "right-of-way" generally extend beyond the surfaced "public-way" traffic corridor. The actual line of demarcation for SPS 310 code setback of a public-way is the outside edge of the shoulder of a road or the edge of a sidewalk. However, local zoning ordinances may have greater setback distances from the public-way or the right-of-way boundary.

Easement corridors are not considered public-way because they are generally limited to specific purposes, such as utility maintenance, or limited to specific companies or individuals. Easement corridors do not factor into SPS 310 setback distances.

Spill versus leak versus discharge versus release
These terms are frequently used interchangeably, but regulatory programs and regulations may have specific definitions or applications. A "release" is generally a broader term associated with product escaping from the storage vessel, piping or spillage during the transfer activity. A "spill" is generally associated with a tank overfill or mishap during the transfer activity, such as off-loading a transport or at the dispenser. A 'leak" is generally associated with product escaping from the storage or transfer system as the result of a breach in the system. A "discharge" is generally a term used by the remedial side of the industry to characterize any of the other terms if the product release is not contained and impacts the environment.

Storage versus operational
Section 40 CFR 280.10(b)(3) – "Equipment or machinery that contains regulated substances for operational purposes such as hydraulic lift tanks and electrical equipment tanks" is often misinterpreted to suggest that any tank storing products such as hydraulic oil is not regulated. The determining element is that the product is used to "operate" the device and not power the device. The EPA position is based upon the presumption that if there was a leak in the tank containment vessel or attached piping the primary purpose of the tank would be quickly defeated. The operation of equipment such as hydraulic lifts would quickly fail and electrical cooling, such as transformers would over heat, thus bringing attention to a system failure.

Storage Tank System
SPS 310.050 Definitions: (115) "Tank system" includes the primary tank and pipe, *integral secondary*

containment, integral supports, leak detection, overfill prevention, spill containment, anti-siphon devices, and the necessary core components that allow the tank system to function as intended and in accordance with the installation requirements. Tank system configurations include on-shore underground storage tanks, on-shore aboveground storage tanks, and storage tanks over water that are integral with a stationary pier, floating vessel or floating structure for the purpose of storage or vehicle fueling.

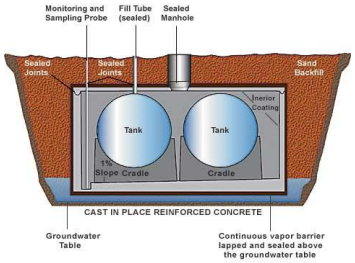
"Integral secondary containment" would be a component of a storage tank system such as the interstitial space of double-wall pipe or a double-wall tank. Secondary containment in the form of diking of an aboveground storage tank is not "integral" to the tank system and therefore diking is not considered a part of the AST system.

Underground tank / pipe

The EPA 40 CFR 280 defines an underground system as having 10% or more of the system is beneath the surface of the ground. This is confusing as the term does not apply to tanks or pipe in underground areas such as vaults or basements unless the tank or pipe is exposed to soil or water.

Left – tank is above grade, but exposed to soil and moisture therefore classified as a UST.

Right – tanks are below grade (beneath the surface of the ground) in and underground area and not classified as "underground" tanks.



Piping from an underground or an aboveground tank that is in a chase or race-way and not in contact with soil or water is not considered to be underground. However, leak detection may be required dependent upon configuration and how visually observable the piping is.

Left – product pipe from tank sump through a steel pipe chase way providing separation from the adjacent soil into the concrete chase.

Right – steel pipe chase from the tank sump exiting into concrete chase leading into the building.

During the review of Federal EPA storage tank language we asked the EPA to clarify the terms "adhesive" and "sealant" in relation to the verifying compatibility requirement The following is their paraphrased response:

"**Adhesives**," also commonly called "glues," are used to permanently bond pieces of fiberglass piping together, and are usually supplied by the manufacturer as part of the fiberglass piping installation. The ends of fiberglass piping are tapered, and then bonded with the adhesive, to another piece of fiberglass piping. Fiberglass piping adhesives are not an item that the installer can just grab off his or her truck and use, regardless of brand or specification -- the piping manufacturer provides it along with the piping the vendor specifies. Since the fiberglass piping and its adhesives are provided as a set, we (the EPA) think they are covered under the category, "piping." The two major fiberglass pipe manufacturers do include the adhesive as part of the UL 971 test. So, the bottom line is, if you have fiberglass piping that meets UL 971 and it is rated for use with "Motor Vehicle Fuels" (for up to 30% ethanol) or "Concentrated Fuels" (for up to 100% ethanol), that listing would cover both the pipe and the adhesives used to hold it together.

"**Sealants**" is a term we (the EPA) use to include "pipe dope" and "thread sealant." These products are designed to be removable, and are used to join threaded joints so they don't weep. They are used in

coupling both metals-to-metals, and metals-to-nonmetals. "Teflon tape" is another term that's used a lot, but the industry told us (the EPA) that it is a sub-category of "pipe dopes and sealants." According to a March 2011 report on material compatibility (see p. 40 at the link -- http://info.ornl.gov/sites/publications/files/Pub27766.pdf), certain sealants are not be compatible with ethanol-blended fuels. Therefore it is important for tank owners to verify what kinds of sealants are used in their UST system. While the EPA understand many tank owners won't have records of what sealants were used in various parts of the UST system, we understand they are typically accessible via sumps and can be easily replaced.

Subchapter II – Administration and Enforcement

SPS 310.100 Plan Review

SPS 310 does not designate who can submit a plan, whereas some codes require the submittal to be by an architect or a PE registered in the state.

Fees associated with storage tank plan submittal are included in SPS 302 – Fees. The fees for some plan submittals include a "groundwater fee." This fee is associated with plans submitted and reviewed by the Department in Madison or the City of Milwaukee for tank systems of 1,000 gallons or greater. The moneys collected under this subsection are credited to the environmental fund for environmental management.

Pre-installation plan review is required for the installation and some upgrade activities for storage tank systems as described in the code. Plan review involving a tank system with at least one tank 5,000 gallon capacity or greater is performed by the Department of Safety & Professional Services in Madison, Wisconsin. Plan review for a tank system that has no tank 5,000 gallon capacity or greater is performed by the designated LPO. The designated LPO for the jurisdiction where the tank is located will perform the installation inspection for both Department of Safety & Professional Services or LPO reviewed systems.

Plan review is required for the initial installation of a vapor recovery system. If the existing vapor recovery equipment is being upgraded with like equipment (including CARB approval) a plan submittal is not required.

Plan review is required anytime the configuration of a system is being changed. (The exception to this is systems associated with a process or research where the initial plan submittal includes the fact that the system may be altered to facilitate the process or research activity.) The plan submittal fee for such a submittal is based upon the capacity of the tank subject to the modification. If the modification involves breaking or eliminating a manifold between two tanks, the fee is the aggregate capacity of both tanks.

Article I. Plan review	
UST	**Article II. AST**
> 60 any	> 110 Class I – Class IIIA > 110 commercial heating fuel > 110 waste oil > 1,100 Class IIIB > 1,100 on farms (Ref: SPS 310.610(2))

The change to allow LPO's to review Card Readers is due to the fact that this is becoming such a common occurrence and the provisions of installation and operation listed in NFPA 30A rely considerably on the discretion of the AHJ. The LPO and the contractor benefit from this as review time is shortened and the fee structure is better utilized by the LPO for such an installation. Leak detection is returned to Madison for review due to the specifications and limitations of the various leak detection methodologies and equipment. As observed through the permitting process as well as the increasingly in depth material approvals, leak detection is becoming considerably more complex requiring additional scrutiny during review. There are essentially 3 M's to understand what and when plan review and approval is required for leak detection installation/upgrade; Make(Manufacturer), Model, and Methodology. Changes need to be verified to ascertain compatibility as well as capability between the leak detection equipment and the tank system components.

Plan revision:

The Department recognizes that construction or installation activities may be impacted by situations or influences that can not be reasonably assessed or determined prior to construction. In some situations determined by the LPO, a plan revision is acceptable, rather than a new plan submittal. Plan revisions will be acceptable for installation modifications resulting from:

- Conditions of nature (i.e. soil conditions, bed rock, etc.).
- Setback differences of 10% or less of actual.
- Tank or directional orientation that does not significantly modify system configuration or operations.
- Change of equipment, <u>other</u> than leak detection, when equipment is of equivalent design.

Revisions must be annotated and verified by the LPO inspector PRIOR to being re-submitted. The exception being revisions that are submitted to Madison and approved prior to commencement of the system installation.

A plan revision is not required for changes to tank top connections, such as swapping of vent and product openings.

Plan submittal as a result of system conversion:
System conversions are typically characterized in three categories:

- Change of service such as: non-regulated product to regulated product, non-public fuel dispensing to public dispensing, bulk storage to vehicle fueling, and expanding a system to multiple use beyond the original installation.
- Transition to ethanol or other alternative fuels, such as E85 or diesel fuel blends with greater than 5% bio diesel.
- Other product characteristics or system use that has the potential for significant compatibility, environmental, or equipment functionality concerns as determined by the Authority Having Jurisdiction (AHJ). Conversion of dispensers from attendant operated to point-of-sale (POS) is an example.

Dispenser Conversion to POS

Plan submittal to the LPO is required along with an inspection at the conclusion of the POS conversion. The POS conversion/installation is not required to be performed by a SPS 305 certified installer. This does not relieve the contractor or the O/O from fulfilling the communication (phone), emergency equipment placement, and dispenser and component color coding, labeling, and anchoring requirements.

Stage I or II add-on to existing system

Vapor recovery systems must be included on the plan submittal for new UST and AST installations. In regard to existing systems there is no specific language in the code that requires a plan submittal for adding either stage I or II to an existing AST system. SPS 310.100(1)(a)10 requires a plan submittal for the addition of any product or vent piping to existing UST systems. Because there are no significant review points for the addition of stage I vapor recovery connection we do not require a plan submittal; however, it is required for the addition of stage II vapor recovery.

Install versus maintenance or service versus repair

Replacement of spill and overfill prevention equipment, flow restrictors, flex connectors and fire valves do not require installation plan submittal as long as the replacement does not involve a change in the configuration of the system. Leak detection will most likely involve a change to configuration or of the methodology and require plan submittal. Pipe may be replaced without plan review if the length of pipe is minimal to accommodate the replacement of any of the components previously listed. Typically maintenance is replacing like with like (although the brand may be different) and plan submittal is not required.

A “repair” may or may not involve component modification. Plan submittal may be justified depending upon the component and the repair. Contact the department for site specific guidance.

Experimental

Occasionally a tank system application may arise that is either very unusual, innovative or where current day standards and regulations do not clearly or in some cases pose unnecessary or cumbersome regulatory requirements on the application. The department may elect to categorize a plan submittal as “experimental” in situations where there is a need to assess and modify the system as the specific operational application and human dynamics become better known as observations, use and experience with the system grow. Experimental approvals establish an agreement between the submitter/operator and the department that safeguards and requirements may be implemented to maintain the system in operation as fire safety and environmental issues and concerns surface as the system is used. An experimental plan submittal better fits some situations as Petitions For Variance (PFV) require that the submitter demonstrate equivalency; and both the PFV and Material Approval do not facilitate flexibility and require significantly more administrative activities to modify.

Experimental approvals are not precedent setting and may only be used at the installation site specified in the experimental approval letter. An experimental approval typically has a two year experimental period at which time the experimental condition is dropped and the approval is assumed granted. Experimental approvals may be modified or rescinded during the two year experimental period. Rescinded approvals take affect the day the rescission letter is issued.

Professional engineer acting as SPS 305 Certified Installer

With the exception of hazardous substance systems, the code does not specify the credentials of the individual designing the SPS 310 system or submitting the plan for approval. The code does specify that an installation be supervised by a SPS 305 Certified AST or UST Installer or a registered professional engineer expressed as the following:

(a) For aboveground tank systems, a person certified in accordance with ch. SPS 305 to install and repair aboveground storage tank systems – and for underground tank systems, a person certified in accordance with ch. SPS 305 to install and repair underground storage tank systems.

(b) A registered professional engineer who directly supervises an installation by being present during the activities specified in s. SPS 305.84 (5) or 5.85 (5), and who is competent in the engineering methods for designing and installing storage tank systems for flammable or combustible liquids, except the registration requirement does not apply where exempted under s. 443.14, Stats.

SPS 310.350(2)(c) and SPS 310.350(12) use terms that include "oversight of construction" and "direct supervision" of installation by a “Qualified Engineer.” The intent is a professional engineer qualified in the scope of the project with oversight responsibilities at the same milestones required of certified installers that is in SPS 305.84 and 10.85, which can be found at the following link:. http://www.legis.state.wi.us/rsb/code/comm/comm005.pdf

Because some corporations have their own engineers or contract with an engineering firm on a national scale the registered professional engineer does not have to be registered in Wisconsin, but must be able to provide registration documentation. To accommodate engineering specialties and engineering practices the engineer who designs the system does not have to be the engineer overseeing the installation activity at the site.

CERCLA hazardous substance tanks systems

Because many CERCLA hazardous liquids have unique toxic or compatibility characteristics the traditional NFPA 30 or national standards for flammable or combustible liquids may not be an appropriate standard to use in designing and constructing the tank system. For example, NFPA 30 allows the vent for class IIIB combustibles to terminate inside a building, which may pose significant human health risk for a toxic CERCLA substance. In fact, the vent configuration for some hazardous liquids is significantly different than for typical petroleum liquids. Tank to property line or building setbacks as established in NFPA 30 are in most cases adequate and may be reduced if the qualified designer can justify the reduced setback.

Overview of Department of Safety & Professional Services plan submittal requirements

This guidance is designed to assist the applicant in the preparation of a ERS-9 plan submittal for installation, upgrade, or conversion of aboveground or underground storage tank systems as required in SPS 310.100. Plan review and written approval from the authorized agent shall be obtained before the installation of any regulated components. If an installation is started prior to obtaining written approval, fees shall be doubled per SPS 302.10

Department Review – Installations in which one or more tanks for storage, handling or use of flammable or combustible liquid will have individual capacity of 5,000 gallons or larger, bio / alcohol alternative fuels conversions, leak detection upgrades, and cathodic protection installations / upgrades.

Local Program Operator Review – Installations in which the tanks for storage, handling or use of flammable or combustible liquids less than 5,000 gallons and Point of Sale upgrades.

The department and its agents shall review and make a determination on an application for installation approval and for plan review within 15 business days of receiving the required information and fees.

Equipment installation plan submittals: Plan submittal and review is required for storage systems that will contain flammable, combustible, and CERCLA listed products in quantities that exceed the minimum capacities that are listed in SPS 310.

All plan submittals for the installation of equipment must have the following:

1. **Installation Application**: Completed in full the ERS-9 installation application – forms are available online at http://Department of Safety & Professional Services.wi.gov/ER/ER-BST-FM-Comm10Forms.html
   All sections that apply to the proposed project must be marked / checked and the appropriate fees paid.
   - OWNER INFORMATION – Name - is the name of the contact person, Company Name is the name of the company that owns the property or equipment. Address is the mailing address of the owner.
   - CUSTOMER ID# - If the owner / company have other tanks currently registered on the state data base, the current ID number must be listed or the owner identification maybe duplicated in the registration system.
   - PROJECT INFORMATION – Facility Name applies to the site location / tank location. The tank location is not always the mailing address and is typically a street address and / or fire number and must be verified prior to the plan submittal. The property is also to be identified as a township, village, or city. If the site has been previously registered in the state data base, the site and facility ID numbers must be listed or the site maybe duplicated.
   - List the name and Fire Department Identification number (FDID) of the fire department that provides coverage of the tank location. This number is available on the internet at the following link - http://Department of Safety & Professional Services.wi.gov/php/er-lpolists/lpo_agency_list.php Noting the appropriate fire department is critical to determine which fire department is responsible for emergencies and assigning the LPO as the inspectors are assigned denoted by the FDID. If you cannot find the LPO for the site, it would indicate that the community does not have a local fire department. If the fire department is unknown, contact the surrounding area fire departments to confirm which department has jurisdiction. If one of the UST/AST Tankers is listed as the LPO, all plans are to be submitted to the Department of Safety & Professional Services in Madison and then contact these inspectors for notifications and scheduling inspections.
   - TANK / PIPING INSTALLATION OR UPGRADE. Check all boxes that apply. Spill, overfill, tank and line leak detection boxes do not need to be marked for new installations as they are required on all new installations. Mark those boxes only when upgrading a system. POS upgrades and Leak Detection upgrades have individual forms that can be printed from the internet and submitted individually without an ERS-9 Installation Application. POS form ERS-6294 POS should be submitted to the appropriate LPO and the Leak Detection form ERS-9LD is submitted to the Dept. of Department of Safety & Professional Services in Madison.
   - TANK SYSTEM OCCUPANCY – See page two of the AST / ERS-8731 or UST / ERS-7437 registration forms for descriptions.
   - TANK CONSTRUCTION – Check single wall or double wall and the type of tank. Note: Bare steel tanks apply to above ground painted tanks and coated steel refer to tanks that have special purpose coatings. An example would be an aboveground tank with heating insulation.
   - TANK SPECIFICATION – Check aboveground or underground and note burial depth for underground tanks. Determining the depth is important to determine proper burial to allow piping pitch. List tank manufacture, tank listing, (Examples are UL-142, API 650, UL-1316) dimensions, capacity, and contents to be stored.
   - OVERFILL PROTECTION - (Examples are whistle vent, electronic alarm, overfill valve)
   - SPILL CONTAINMENT – List brand and gallon size.
   - TANK LEAK DETECTION – (Primary method) (Double wall AST tanks are typically interstitial monitoring and single wall AST tanks typically have visual monitoring.) AST leak detection monitoring requires monthly inspections, logging this information, and maintaining these documentations on site and available for inspection. Examples of underground storage tanks are ATG-automatic tank gauging, continuous automatic leak detection, interstitial monitoring, etc….
   - PIPING CONSTRUCTION - Check underground or aboveground, type of piping, and single or double wall.
   - PIPING SYSTEM TYPE – Check type of system. In some cases the system can be considered suction and pressurized.
   - PIPING LEAK DETECTION METHOD – Check type of leak detection. Remember that underground piping must have some form of catastrophic leak prevention. Examples: Mechanical flow restrictors or line leak detectors for pressurized system.
   - Note: Above ground tanks must have anti-siphon prevention for piping and tank mounted pumps do not
   - have product piping but require anti-siphon prevention – check valves and pressure relief.

- VAPOR RECOVERY – Wisconsin DNR has select counties that mandate stage I and stage II vapor recovery for qualified above ground and underground facilities. Contact the Wisconsin DNR for clarification when applicable. The EPA requires stage I vapor recovery state wide on qualified flammable product bulk storage and dispensing facilities. Wisconsin has adopted California Air Research Boards executive orders of approved methods and components of vapor recovery which must be listed.
- FEES - The fee schedule is located on page two of the application. Fees are determined by the aggregate tank volumes.
- Revision applications must include the original plan approval number of the plan being revised. This number is to be noted on the application on the same line that the revision fee is indicated.
- Ground water surcharge is required in certain instances described on page two of the application.
- SIGNATURE – The application must be signed and submitted with the original signature of the plan submitter and dated as this is an official document.

2. **Scope of Work:** All submittals shall include a Scope of Work that that explains and describes what the project will consist of and should describe the who, when, what, where the proposed equipment will be located and the proposed use. The Scope of Work does not have to list all the equipment brands but shall describe how the equipment is being installed, how the equipment is to function, and what the purpose of the equipment is. In combination with the component list, the Scope of Work supplies the details and explanations of the project. Scopes of Work are especially important on plan revisions as old plans will not be pulled to determine the reason for the revision. Plans will be held for additional information and an additional fee will be charged if this information is missing.

3. **Component/Material List**: This section of the plan submittal lists the specifications of materials, equipment and devices used in the project that do not have material approval and the material approval numbers for those components that required material approval. If a component is not noted in the material list, the reviewer may question if it is being installed. SPS 310 adopts various standards by reference and these standards, e.g. NFPA, PEI, and API and may call for specific material and components to be installed based upon location and use of the proposed system. The submitter must ensure that the components required for proper system installation and operation is included in the material list and their location in the system noted on the plan. And only those components that are proposed to be used should be included on the material list or typical drawings. Contractors submitting installation typical / detail drawings with applications may include the required component information on the typical and will not be required to include the same information in a material list. This list shall include but is not limited to the following:
   - Storage tanks (s) AST/UST (each tank), mfg., U/L or const. standard, construction material, capacity, dimensions, configuration (single or double wall, multi compartment with single or double bulk head) and product to be contained.
   - Product supply / return piping - mfg., construction, configuration, size, material approval if required.
   - Siphon piping and systems - mfg., construction, size, and material approval if required.
   - Vent piping - mfg., construction, size, material approval if required termination location and height.
   - Submersible pump – mfg., model, and size (h.p.)
   - Tank & dispenser sumps with sump fittings and non discriminating sensors
   - Tank top check valve – mfg., model, size
   - Under suction pump - inspectable check valve / pressure regulating valves – mfg., model, size
   - Double poppet shear / emergency valve mfg., model, size
   - Fire valve (AST) – mfg., model, size, configuration (internal / external)
   - Piping valves – mfg., model, size, type (ball / gate) (differential / non-differential, pressure relief)
   - Tank leak detection / ATG – mfg., model, probe number, material approval
   - Pipe leak detection – mfg., model, material approval number
   - Flow restrictor / MLD – mfg., model, material approval number
   - Ball float / float check valve – mfg., model, length, height / limit set at.
   - Vent tee / extractor housing – mfg., model, configuration
   - Flex connectors and flex corrosion protection – mfg., model, length, diameter
   - Spill containment – mfg., model, size
   - Overfill prevention (two forms) – mfg., model, size, limit set at
   - Operating vent – mfg., model, size, cfh (pressure - vacuum / updraft)
   - Emergency vent – mfg., model, size, cfh.
   - Anti-siphon device – mfg., model, size and pressure regulating valve if possible head pressure.

- AST containment (pre-manufactured or fabricated on site) make, model, capacity, material approval number if required. 24" clearance between tank and containment walls is required and means of draining the containment must be listed. Tank grounding and anchoring shall be included.
- AST tank labels
- Dispenser / suction pump – Make, model, with or w/o card reader. How many hoses per side, products dispensed, blending or non-blending.
- Dispensing components – nozzle, swivel, breakaway, breakaway hose, hose size (Diam. & length), hose retractor / hose reel and collision protection
- Vapor Recovery (w/CARB Executive Order)
- Stage I vapor adapter - mfg., model, size.
- Vapor pipe – mfg, construction, size, material approval if required
- Stage II vapor shear valve – mfg., model, size
- Stage I / II pressure vent – mfg., model, size, cfh, WC
- Stage II dispenser (dispensing device) mfg., model, with or w/o card reader. How many hoses per side, products dispensed, blending or non-blending.
- Vapor dispensing components – nozzle, breakaway, breakaway hose, hose size (Diam. x length), hose retractor / hose reel and collision protection
- Cathodic Protection – Method of corrosion protection (sacrificial - galvanic anodes or impressed current)
- Anodes – mfg. type, size
- Anode conductor wire – size, classification
- Bonding wire – size, classification
- Permanent reference cell – mfg. model
- Clamps – mfg., type, size
- Coating – mfg., type size
- Coating – mfg, type
- Rectifier – mfg., model, enclosure, specification, U/L listing if available
- Calculations used to determine anode requirements, to include soil type, resistivity, pH etc.
- Anticipated current requirement for impressed current systems.
- UST / AST internal lining material – mfg., specifications.

1. Site Plans Guidelines – The plot plan is intended to reflect a representation of structures, services, and activities that may impact the system, influence operations and activities associated with the system, or be impacted from a release of product or vapors.

- Plot plans must indicate actual lot lines. If a lot is too large for a 1" = 20' scale then include a larger scale on one page indicating the proposed location and reference other pages that have the scaled drawings. Property lines that intersect or dissect the functional area that applies to the system must also be indicated.
- Submittals that are more than one page per packet must have the pages collated, attached, referenced, and numbered in order.
- Each packet must be the same so that the plan submittal retained by the state matches the ones returned and sent to the inspector.
- Put submitters name and the project location name on all pages of plans submitted; this will assist reorganization if the application and plans become separated.
- Plans shall reflect / show existing petroleum and LP / Propane tanks, street names, buildings, above ground & under ground utilities, water & sewer, traffic flow, and entrances / exits,
- Location of wells. WDNR has multiple well setbacks that may apply to any given site. Plans shall show any community / public wells located within 1200 feet and any private well located within 200 feet of a storage system on the proposed property and/or on neighboring properties. The submitter of the application has the responsibility of verifying all applicable set back distances. If no wells are located within the setback area, a statement must be documented on the plans. If the proposed installation locations are within the DNR setback, contact the local municipality to verify if a local well head protection plan has been designed and implemented.
- Class of building construction is required only when the plan submittal involves tank system components carrying or containing product inside of a building.

- In addition to the list above, UST plan submittals shall show buildings, tanks, flex connectors, product / vent / vapor piping, islands, collision protection, canopies, emergency shut off / fire extinguisher / means of emergency communication and all tank fitting locations.
- In addition to the list above, AST plan submittals shall show buildings, tanks, containments, piping, islands, collision protection, canopies, emergency shut off / fire extinguisher / means of emergency communication location, all tank component locations, and security fencing.

5. **Items that are commonly missed** that should be listed and / or described:
   - City and private well locations, equipment locations to property lines, users of the systems and equipment descriptions.
   - Emergency stop, fire extinguisher, and emergency means of communication locations compared to dispensers. (20' min. – 100' max.)
   - Dispensing equipment and listed components.
   - Corrosion protection information for tanks, piping, flex connectors.
   - Secondary containment / diking design and calculations. Include displacement calculations with manually operated and self closing drain valve descriptions.
   - Above ground tank foundation.
   - Collision protection, area lighting, and lockable "tank enclosure" – (6 foot tall chain link fencing around tank or property)
   - Vehicle fueling – attended or unattended / commercial - fleet or retail.
   - Means of communication for emergency purposes
   - Stage I or Stage II vapor recovery and list if operational or non-operational.
   - Burial depth, backfill materials, and anchoring if necessary
   - Piping installation – threaded, welded, high pressure piping. Pipe anchoring, supporting, corrosion and / or collision protection to be included.

Plan Review Lookup - Submitters of storage tank plan review submittals and petitions for variance may check on the status of the submittal by entering your Department of Safety & Professional Services assigned customer ID number at this web link http://Department of Safety & Professional Services.wi.gov/ER/ER-BST-Plan-Review-Lookup.html A report of all plan reviews associated with your number will be displayed. A status will appear for 60 days after approval and 60 days for any other status.

Request for Additional Information - The reviewer may send e-mail correspondence regarding the plan or petition submittal to you if you have an e-mail on file with the division or if you included an e-mail address on the application. Questions should be directed to the plan reviewer listed in the report.
Forms - As trends change across the industry, it is important to occasionally check the Storage Tank Regulation link for updated forms to address current trends. http://Department of Safety & Professional Services.wi.gov/ER/ER-BST-FM-Comm10Forms.html

Sign-up for e-mail lists
Periodically, program letters or other communications are developed reflecting technical, administrative and operational guidance or policy associate with the Department of Safety & Professional Services storage tank, petroleum product and motor fuels regulatory program. Distribution of such communications have been divided into four contractor related categories, plus a general code update category. You can un-subscribe at any time via a link from the bottom of each email you receive as part of the list. Be aware that email addresses gathered by state agencies may be subject to open records laws. Use the following link to add your email address to list. http://Department of Safety & Professional Services.wi.gov/ER/ER-BST-Signup.html

SPS 310.110 Jurisdiction over enforcement.

Some regulations within SPS 310 and the adopted standards may serve dual purpose roles addressing fire safety, environmental protection and storage system integrity. Fire safety concerns may be addressed by inspectors operating within the scope of local or state organizations with fire safety or fire prevention regulatory authority.

Individuals carrying out enforcement of SPS 310 storage tank and dispensing system related requirements or enforcement of non-compliance must be Department of Safety & Professional Services certified tank inspectors. Regulatory coverage is through Department of Safety & Professional Services employees and third party employees working for contract Local Program Operators (LPOs). The third party agent may be a municipal agency such as the local fire department or a private sector non government company. While all certified inspectors have the authority to address a non-compliance situation, the Department of Safety & Professional Services inspectors have been designated the primary responsibility for sites that wholesale or retail motor vehicle fuels to the public. The LPO inspectors have primary responsibility for non-wholesale or non-retail sites such as fleet or industrial applications.

Authority to enter premises, perform inspections and review records

Access to premises. A Department of Safety & Professional Services Deputy may enter any place of employment or public building at all reasonable hours for the purpose of collecting facts and statistics or to inspect/examine the provisions being made for the health safety and welfare of employees frequenters the public or tenants. No employer or owner may refuse to admit any Deputy to his or her place of employment or public building. Local law enforcement officers must render assistance if called upon to do so. Any person who intentionally causes bodily harm or threatens to cause bodily harm to any Deputy may be charged with a Class H felony.

Sections 101.02 (13) (b), 101.02 (15) (g), 101.055 (5) (b), 101.14 (1) (b) and (2) (b), 145.02 (3) (c) and 940.207 (2) Wisconsin Statutes.

Access to records. Every agent or employee of any railroad company or other transportation company and every person transporting gasoline, gasoline−alcohol fuel blends, kerosene, other refined oils, fuel oils and petroleum distillates, having the custody of books or records showing the shipment or receipt of gasoline, gasoline−alcohol fuel blends, kerosene, or other refined oils, fuel oils and petroleum distillates shall give and permit the department and the inspectors; and, in regard to the fee under s. 168.12 (1), shall give and permit the department of revenue; free access to such books and records for the purpose of determining the amount of petroleum products shipped and received. All clerks, bookkeepers, express agents, railroad agents or officials, employees, or common carriers, or other persons shall provide the department and the inspectors; and, in regard to the fee under s. 168.12 (1), shall provide the department of revenue; all information in their possession when so requested in tracing, finding, sampling and inspecting such shipments.

Section 168.10, Wisconsin Statutes.

Required records. Every person receiving petroleum products in this state shall keep books and records of all petroleum products so received, together with bills of lading, waybills and other pertinent documents. Such books and records and other papers and documents shall, at all times during business hours of the day, be subject to inspection by the department and its inspectors, and are subject to inspection by the department of revenue in regard to the fee under s. 168.12 (1). Such books, records and other papers and documents shall be preserved for not less than 4 years, unless the department, in writing, authorizes their destruction or disposal at an earlier date.

Section 168.13, Wisconsin Statutes.

SPS 310.115 Enforcement and inspection

Regulatory oversight and enforcement authority of SPS 310 is carried out by two groups of regulatory inspectors or code officials. Enforcement of general fire safety issues is under state and local inspectors who maintain the respective fire safety or fire prevention enforcement authority, as well as certified tank system inspectors. General fire safety may include transfer and handling practices. Enforcement of tank system regulation is under the authority of certified tank system inspectors. Tank system regulations include design, operation, maintenance, transfer, dispensing, permitting, repair, decommissioning, etc.

Issues of non-compliance are addressed through various informal and formal actions. These

actions range from verbal directive to a written order, to a red-tag attached to the system prohibiting product dispensing or adding product to the storage tank. An inspector with SPS 310 regulatory authority may take immediate system shut-down actions where the situation poses immediate danger to human safety, loss of property from the risk of fire, human or environmental exposure from an uncontrolled release, and systems that do not have the required spill prevention, leak detection, corrosion protection or financial responsibility components in place. SPS 310.115(3) addresses the various situations that may initiate regulatory action to shut down or restrict the operation of a storage or dispensing system regulated under this code. SPS 310.115(3)(a)2 applies to system components that are not installed. It does not apply to components that are found to of deficient functionality, unless the deficiency poses a life or fire safety issue.

SPS 310 forms:
Forms are an integral part of the regulatory process used by the department to communicate and receive specific informational needs, and in some situations the form is a legal document rather than just an administrative piece of paper. Over the past several years, especially with underground systems, documentation via various forms has gained importance in relation to liability. The table below reflects the primary forms associated with SPS 310 requirements.

Form Title	Form #	Purpose / Use	Signed by
Code or Statute Change Proposal	ERS-10503-A	Submit to the department a code or statute change proposal.	Submitter
Farm & Construction AST Installation Notification	ERS-10764	Plan review submittal by tank contractor and regulatory inspector installation checklist.	Cert AST Installer
API 653 Tank Inspection Summary	ERS-10737	Document completed by API 653 inspector summarizing key assessment areas and timelines.	API 653 Inspector
Underground Tank System Release & Leak Equipment Functionality Verification	ERS-10778	Annual equipment functionality assessment used by service technician and maintained by O/O.	Technician
Underground Tank System Corrosion Protection Test Summary Documentation	ERS-10785	Annual corrosion protection system functionality assessment used by service technician and maintained by O/O.	Technician
Pre-construction UST / Pipe Installation	ERS-6294 PCM	Form used to record project inspection milestones and expectations of the contractor and regulatory inspector during the pre-construction meeting associated with UST systems.	Cert Installer & inspector
Checklist for Underground Tank Installation	ERS-6294 UST	Verification document initiated by the contractor and utilized by the regulatory inspector for UST system (tank &/or piping) installation.	Cert Installer & inspector
Point-of-Sale Fueling Installation Notification	ERS-6294 POS	Plan review submittal by tank contractor and regulatory inspector installation checklist.	Submitter
Underground Flammable/Combustible/Hazardous Liquid Storage Tank Registration	ERS-7437	Form completed by owner and submitted to the department for registering underground tanks regulated by SPS 310.	Submitter
Permit To Operate	ERS-7658	Document issued annually by the department that recognizes a federally regulated underground tank system as meeting the permit requirements.	NA
Wisconsin Material Approval Application	ERS-8028A	Application submitted to the department for review and approval of specific methodology or application.	Submitter
Aboveground Flammable/Combustible/Hazardous Liquid Storage Tank Registration	ERS-8731	Form completed by owner and submitted to the department for registering aboveground tanks regulated by SPS 310.	Submitter
Checklist for Tank Closure	ERS-8951	Checklist completed by contractor documenting AST and UST closure procedures.	Cert Remover
Flammable/Combustible Liquid Tanks Installation Application	ERS-9	Application submitted by contractor or owner for department plan review and approval.	Submitter
Ethanol & Bio Diesel Blended Motor Fuel Conversion Application	ERS 9 Alternative Fuels	Application submitted by contractor or owner for department plan review and approval.	Cert Installer or PE , Operator
Leak Detection Installation or Upgrade Notification	ERS 9 LD	Application submitted by contractor or owner for department leak detection review and approval.	Technician
SPS 310 Notification Record	ERS-9198	Form used by contractor to record and submit pending tank system installation or closure.	Submitter
Checklist for Aboveground Tank Installation	ERS-9658	Verification document initiated by the contractor and utilized by the regulatory inspector for AST system installation.	Cert Installer & inspector
Petition For Variance	ERS-9890A	Application submitted by owner for variance to code requirement based upon an equivalency factor(s).	Submitter

SPS 310.120 Revocation and expiration of approval

Reserved

SPS 310.130 Specific approval of materials, equipment, concepts, technology and devices.

Section 10.130 requires specific Wisconsin approval of certain materials, equipment, concepts, technology and devices before they can be used in a storage tank system. These typically include various types of leak detection equipment such as Automatic Tank Gauges, Statistical Inventory Reconciliation, Electronic or Mechanical Line Leak Detection, Synthetic Dike Liners, flexible non-metallic piping, and any special service storage tank systems. Double wall tanks are no longer required to have a material approval as long as they are either listed and/or labeled.

The primary purpose of the Wisconsin Material Approval is to ensure that the appropriate national or international standards are being complied with in the manufacture and installation of specific products used in a storage tank system installed in Wisconsin. Each material approval is assigned a unique number that will be used by manufacturers, installers, and owners when corresponding with the department. Material Approvals are structured for the purpose of assisting owners, manufacturers, installers, plan reviewers, inspectors and permitting staff in determining whether the products are installed or are operating as intended. A material approval is valid for a period of three years, unless the functional performance capabilities of the equipment are revised, or a re-examination is deemed necessary by the department. A change to the equipment's functional performance capability would include, but not be limited to changes in configuration, software, hardware, or methodology.

A material approval is typically good for a period of three years at which time it must be renewed. The specific material approval requirements that were in effect at the time of equipment installation are still in effect unless a new material approval is issued that supersedes the previous approval. In this case the new approval requirements will be retroactive.

Retroactivity and Effective Date of Material Approvals

In the past there has been some confusion relating to the retroactivity and effective date involved with the use of leak detection material approvals. This prompted a review of the various reasons behind the issuance of a material approval; from this review it was determined that there are four basic categories of changes that would result in the issuance or change of a material approval:

- **I.** No Change to Material Approval- Renewal Only
- **II. (A)** Major change to Material Approval (with or without renewal)
    - Major change is defined as change that affects the functional criteria or capability of the previously installed components.
- **II. (B)** Minor change to Material Approval (with or without renewal)
    - Minor change is defined as a change that **does not** affect the functional criteria or capability of the previously installed components; for example, an address change.
- **III.** New Material Approval

Subsequently, future material approvals will identify and locate the scope (and category) of the change under the approval number.

The effect each type of change has on retroactivity and effective date is discussed below. A summary table is also provided at the end of this section for reference.

I. No Change to Material Approval - Renewal Only:

If a material approval is issued as a replacement for the expiring approval due to expiration only (no technical changes); all component requirements for systems installed under the renewed approval are the same as those applied to equipment installed under the expiring material approval (and vice-versa); therefore the renewed material approval requirements can be applied to both new and prior installations.

While the functional criteria will be the same as the expired material approval, the reviewer has the discretion of changing the format or adding clarifying language to enhance the use of the document. A new material approval number will be issued and will be identified (tagged) as a "renewal" for the old material approval.

Effective date for a renewal due to expiration of the previous approval will be January 1, of the year renewed. If a material approval is not issued prior to expiration, a temporary approval may be issued on a case-by-case basis, provided there are no changes in component capability in the new approval.

An example of the approval number designation for a renewal is:

Approval # 20030098
(Renewal for 99099-U)

II. Change to Material Approval (with or without renewal)- A) Major or B) Minor:
Material approvals in this category will fall into one of two sub-categories:

A) Major Change: If a material approval is issued as a replacement for the current one due to a change that affects the functional criteria or capability of the previously installed components, the new material approval will be "tagged" to alert the user to changes that may affect components installed under the previous approval(s).

"Tagging" has previously consisted of a text box note next to the name on the web site (for example; EBW). Material approvals revised under category 'A' will be issued a new number and have the word "Supersedes" preceding the old material number reference within the approval number block.

For the superseding of a prior material approval, the superseding material approval is effective (and becomes retroactive to the prior material approvals) the date of publication. An example of the approval number designation for a superseding approval is:

Approval # 20030098
(Supersedes 99099-U)

B) Minor Change: If a material approval is issued as a replacement for the current approval due to a change that **does not** affect the functional criteria or capability of the previously installed components, the new material approval will be "tagged" by using the word "Revised" in the approval number block. The requirements in the new material approval will not be retroactive to the prior material approvals.

For revisions of a previous material approval, the revised material approval is effective either the date of publication or date manufacturer states the change took effect.

An example of the approval number designation for a revised approval is:

Approval # 20030098
(Revised 99099-U)

Note: For either sub-category, if a component is not listed, then the component has been discontinued by the manufacturer and prior material approval requirements still apply to the discontinued component. For example: If product xyz is no longer manufactured or sold, it will not appear under the new material approval, the old material approval requirements that the component was installed under will still apply.

III. New Material Approval:

A new material approval by its nature will not be retroactive. There will be no additional designation under the approval number.

For new installations, the material approval is effective the date of publication or the date when a temporary pre-approval was given. A temporary pre-approval may be given when the department has received sufficient information from the manufacturer to make a determination that there is reasonable justification that the equipment functions as intended.

(a) Material Approval Application Summary Table

	No Change to Material Approval- Renewal Only: (Number block will state **"Renewal for"**)	**Change to Material Approval- with or without Renewal**		**New Material Approval** (New number only)
		("SUPERSEDES")	**("REVISED")**	
Retroactivity of New Approval (Note: If retroactivity applies, a material approval will only be considered retroactive to the prior material approval, if it applies to even earlier material approvals it will be noted within the new approval)	None	Applies to all components listed in new material approval. (If a product is not listed, then component is discontinued and prior material approval requirements still apply to that component)	None (If a product is not listed, then component is discontinued and prior material approval conditions still apply to that component)	None
Effective Date	January 1, of year in which renewed material approval is published. (Date will be provided on material approval. Temporary approvals may be issued on a case-by-case basis until replacement approval is published)	Date of Publication (Date will be provided on material approval.)	Date of Publication or date manufacturer states change took effect. (Date will be provided on material approval.)	Date of publication or date of temporary pre-approval. (Date will be provided on material approval)

SPS 310.140 Tank Registration

All aboveground and underground storage tanks must be registered except the following:

- ♦ Dedicated breakout tanks at pipeline facilities.
- ♦ Farm and construction project aboveground tanks of less than 1,100 gallon capacity.
- ♦ Aboveground tanks of less than 1,100 gallon capacity storing heating oil or used oil for consumptive use (such as heating fuel) on the premises.
- ♦ Aboveground tanks of 1,100 gallon capacity or less storing Class IIIB liquids other than used oil.
  Note: There is no exemption for used oil ASTs unless it is consumed on the premises where stored and connected directly to the burner. Therefore used oil storage tanks of 110 gallons or more must be registered.
- ♦ Aboveground tanks of less than 1,100 gallon capacity located inside a building and used to supply an industrial process. An “industrial process” is considered a production process through which a regulated product is introduced into a manufacturing, coating/plating or chemical process. The tank less than 1,100 gallon capacity located inside a building and supplying a product to an industrial process is not required to be registered.
- ♦ Aboveground storage tanks used to store federally regulated hazardous substances that have a capacity of less than 5,000 gallons that store hazardous substances in concentrations of less than 1% by volume, provided the liquid does not have a flash point.
  Note: The list of federally regulated hazardous substances covered under this subchapter, also known as the CERCLA List, is located in 40 CFR, part 302.4 of the Code of Federal Regulations.
- ♦ Tank vehicles.
- ♦ Tank wagons and movable tanks that are located on a property for less than 24 months.

Definitions and explanations for completing the registration forms.

The department has occasionally been asked the question regarding "who" can be the legitimate Tank Owner when completing the registration form (ER-8731 or ER-7437) for liquid storage tanks owned by a company. Is it the highest ranking company official, can it be the project manager of the tank installation, or can it be an individual such as the environmental manager for the facility? What are the legal implications for someone who signs this registration form? The "owner" is the company of the employee who the company designates the authority to sign the registration form. The individual signing the registration is doing so as respectively authorized by his/her employer.

Where there is a land contract, the purchaser becomes the legal owner. Sometimes land contracts are recorded with the register of deeds; there is however, no legal requirement to record land contracts.

In a receivership of a company that owns storage tanks, the company still exists and still owns the property (tanks). A receiver has stepped in to run the company in the interim to a financial resolution or property transfer. If the financial responsibility (pollution insurance) is in the company’s name, it is still valid and nothing should change until the property has been sold. If there is a lessee involved, that would be handled exactly like where there is an owner of the property and a lessee of the business.

“Tank Status” describes the operational status of the tank as declared by the owner / operator, or by the department through regulatory assessment. Some of these terms are not used today, but some tank registration information may still include them.

Tank Status	Description
In-use	The tank is actively in use for storage and functions within its intended purpose.
Temporarily-Out-of Service (TOS)	The tank is not being used, but is intended to be placed back into operation within the next annual registration period. SPS 310.545 addresses “seldom-used” and TOS tank system technical and administrative reporting requirements.
Close – Tank Removed	The tank has physically been closed and removed from the site, along with adequate documentation to support or verify the closure action.
Closed – Filled With Inert	The tank has been closed by cleaning and filling with an approved

Material	material, along with adequate documentation to support or verify the closure-in-place action.
Closed – Cleaned, Tank not removed	The aboveground tank (AST) has been cleaned, with product and residue removed, along with adequate documentation to support or verify the cleaning action. ASTs do not have to be removed from the site.
Abandon with Product	The tank with product is no longer in use and procedures to properly close the tank or place it in TOS status have not taken place.
Abandon Without Product	The tank with product is no longer in use and procedures to properly close the tank or place it in TOS status have not taken place.
Abandon With Water	The tank contains water of unknown origin and procedures and documentation to properly close the tank have not taken place.
Administrative Abandon	An administrative procedure use by the department to move a tank that is not "in-use" from the registration status of "in-use" to that of "abandon," when it is not known if the tank has been closed, or is known that the tank still exists on the site.
Administrative Closure	An administrative procedure use by the department to move a tank to a status of "closed" when circumstances will not produce the proper formal documentation, but an investigation or assessment by the department indicate that in all likelihood the tank no longer exists at the site.

"Land owner type" and "occupancy" are important identifiers in how the regulation is applied and who performs the facility inspection.

Land Owner Type - classifies the organization that owns the property the tank is located on.

Land Owner Description	Characteristics
County	Any county owned facility not included in "other government."
Federal Owned	Any federally owned facility not included in "other government."
Municipal	Any municipal owned facility not included in "other government."
Other Government	Public schools, quasi-public utility
Private	Residential, commercial, mercantile, industrial, farm, non-government owned public utility, private schools, churches, or other business organization.
State	Any state owned facility not included in "other government."
Tribal	Reservation and fee land.
Federal lease	Property owned by private sector, but leased to the federal government.

Occupancy Type – identifies the occupancy associated with the tank.

For tank program operational purposes some occupancies are categorized as "Marketer." A bulk plant or retail gasoline sales occupancy would be a "marketer" whereas a terminal would not.

Occupancy Description	Use Characteristic
Retail Fuel Sales	Tank is used to store any fuel product that is offered for sale in the retail market.
Bulk Storage	Tank is used to store any fuel product that is offered for sale in the wholesale market. Tanks supplying product for an industrial, manufacturing or repackaging process are NOT Bulk Storage

	occupancy.
Terminal Storage	Tank is associated with a distribution facility such as an interstate pipeline or tanks located at a refinery. These tanks are typically field erected structures of 500,000 + gallon capacity. A million gallon tank at an ethanol production site would is “industrial,” not “terminal storage” or “Bulk Plant.”
Industrial	Tank is used to store any regulated product associated with an industrial fleet, heating, industrial fabricating, manufacturing or processing.
Mercantile/Commercial	Tank is used to store any regulated product associated with a commercial business fleet, heating, processing or repackaging, e.g., service company, medical facility, freight, airport, apartment, etc.
Utility	Tank is used to store any regulated product associated with a public or private water or power utility fleet, heating, or processing.
Residential	Tank is used to store any regulated product for residential heating or residential automobile fueling.
School	Tank is used to store any regulated product at public or private primary, secondary or higher educational institution. This includes schools operated by religious organizations (church/parochial schools).
Agricultural	Tank is used to store any regulated product directly associated with crop or livestock production, meaning a “farm.” Refer to SPS 310.050(48)
Back-up or Emergency Generator	Tank is used to store any fuel used to power a backup or emergency generator; a fire pump or as back-up to a primary fuel source such as fuel oil back-up to a natural gas fired boiler.
Government Fleet	Tank is located at a facility owned and operated by a federal, state, county or local government entity. The tank may be used for vehicle fueling, waste oil or heating purposes.
Tribal Nation	Tank is located on property owned by a Tribal Nation
Other	Tank is located on property owned by a church or other type of occupancy not listed in the categories above.

Tank Contents describes the product in the tank. Content classifications of “Chemical” or “Other” require a name. A specific product name such as “10W-30 Oil” or an industry term such as “additive” may be used in the category “Other.” Updating the registration is not required when the concentration of the product is changed; i.e., from 25% Acetic Acid to 40% Acetic Acid.

Content	Use Description
Diesel	On or off-road diesel fuels.
Bio diesel	Bio diesel, typically diesel blended with more than 5% vegetable oils
Leaded	Leaded gasoline and leaded racing fuel.
Unleaded	Unleaded gasoline, including blends up to 10% ethanol, and unleaded racing fuel.
Gasohol	Methanol blended fuels and alcohol blended racing fuels
E-85	Gasoline blended with ethanol at greater than 10%, e.g., E15 or E85,
Aviation	Fuels dedicated to aircraft, e.g., JP-4.
Premix	Fuels pre-mixed with oils. Primarily blended for marine craft use.
Fuel Oil	Petroleum products that do not originate from recycling, for burning in a device for the purpose of heat generation. “Used oil” for space heating purposes <u>is not</u> “Fuel Oil.”
Kerosene	Kerosene products for any purpose.
New Oil	Motor vehicle oil or lubricating fluids; mineral oil; etc.

New oil – Low FP	New oils that have a flash point below 200^0F
Used oil	Used oils or fluids from equipment and motor vehicle repair and maintenance.
Hazardous waste/Interface	A waste classified as hazardous by the Wisconsin Department of Natural Resources; or “Interface” being a product collected in terminal “slop-tanks.”
Chemical	Chemicals on the U.S. EPA CERCLA list of hazardous substances.
Other	Mixtures without designated CAS numbers, base stock, additives, lube or virgin oil, mineral oil, vegetable oil, etc.
Unknown	
Empty	Description of tank that has been emptied of product and cleaned.

Changing tank content (chemical or product) or moving tank from TOS to In-use
Reserved

SPS 310.145 Tank Permit

SPS 310 regulates a very large population of storage tanks in Wisconsin. A lesser number of the regulated tanks are required to be registered. A small population of the registered tanks will have annual inspections performed by certified regulatory tank inspectors, and a population of the underground storage tanks inspected will be required to maintain a "permit-to-operate."

Permit-to-Operate (PTO) requirement	
UST	**AST**
All federally regulated	None

The permit-to-operate is authorized if the responsible party has demonstrated that corrosion protection, leak detection, and financial responsibility are in place.

SPS 310.150 Change of Ownership.

Reserved

SPS 310.160 Fees.

Refer to SPS 302 - Fees

SPS 310.170 Petition for variance and appeals.

In instances where alternative concepts, designs or technologies are desired, the Division has a petition for variance (PFV) process where it reviews and considers acceptance of alternatives which are not in strict conformance with the letter of the rule, but which meet the intent of the rule. A variance is not a waiver from a code requirement. To obtain a variance, the petitioner must provide fire safety and environmental *equivalency* that meets the intent of the rule petitioned. Equivalencies can be alternate materials, alternate methods, or alternate standards. Petition for variances are site specific. For complete details on the application procedure, refer to Chapter SPS 303, the petition for variance procedure.

SPS 303(2)(e) requires "a completed municipal recommendation on the PFV from the enforcement official of the municipality exercising jurisdiction." We consider the fire chief or his/her designee to be that enforcement official for SPS 310 PFV.

SPS 310.180 Penalties

The Department operates with a voluntary compliance opportunity philosophy. This is giving the responsible party an opportunity to bring the compliance deficient issue into code compliance within a reasonable period of time without a monetary penalty. The period to achieve voluntary compliance does not absolve the responsible party from liability should an accident or event result in injury, damage or other loss. Should voluntary compliance not be achieved within the period that the enforcement agency believes reasonable the enforcement effort will advance to another level. Many Local Program Operators (LPOs) have citation authority through local ordinance and may immediately pose a monetary penalty. Department of Safety & Professional Services may elect to channel the next level of enforcement through the County District Attorney or the Wisconsin Department of Justice.

SPS 310.190 Appeals and hearings on enforcement decisions

Reserved

Subchapter III – Adopted Standards and General Requirements

SPS 310.200 and 10.210 Application of standards

The following is very informative explanation of the application and importance of national standards is from an article in the October 2007 STI newsletter Tank Talk.

Standards and recommended practices exist in many industries and are used by many service organizations. These documents represent best practices through the sharing of experiences and knowledge from an assortment of qualified professionals. Such documents become part of a "body of knowledge" used by producers, distributors, installers, owners, regulators and service providers alike to achieve a certain goal or event in a satisfactory manner.

The petroleum industry has developed a widespread "body of knowledge." Some documents are applicable to the upstream side of the petroleum business, where oil is extracted from the ground and collected; similarly, some documents apply to the refining portion of the business. Other standards and recommended practices pertain to wholesale and retail operations - or the downstream sector.

Nationally recognized organizations such as the American Petroleum Institute (API), Petroleum Equipment Institute (PEI), Steel Tank Institute (STI) and Underwriters Laboratories (UL) are among groups that have developed documents that guide the downstream sector. Standards and recommended practices can be further classified by their specific function within such a sector. For example, some documents exist only to address how certain pieces of equipment are manufactured, such as pipes and tanks. Other documents focus on the installation of various components into a functional system - or the means to maintain and properly operate such systems.

Regulators and code officials often rely on such a body of knowledge to help develop regulations and fire or building codes. For example, the U.S. Environmental Protection Agency (EPA) references some standards and recommended practices in its regulations for underground storage tanks, 40 CFR Part 280, and the Spill Prevention Control and Countermeasure regulation for aboveground tanks under the Clean Water Act, (40 CFR 112). Fire codes, such as NFPA 30, the Flammable and Combustible Liquids Code, and the International Fire Code use this collection of wisdom and experience to create their own body of knowledge to assure safety. For example, UL 142 is a common reference that standardizes construction of shop-fabricated aboveground storage tanks.

A recent court case - in which an aboveground storage tank (AST) emergency-vent manufacturer was unsuccessfully sued in relation to the death of a fuel-delivery driver when an AST exploded - underscores the consequences of specifying storage tank system equipment or services that don't meet industry standards.

The vent manufacturer recently defeated a claim in court that an emergency vent contributed to the death of a driver when an AST caught fire and exploded in 2005 at a co-op facility in Missouri.

Testimony from the other defendant in the case - the welder who field retrofitted the AST with a new bottom - established that bulk tanks or other ASTs rehabbed, retrofitted or otherwise altered in the field without applying the body of knowledge of industry standards posed a risk for failure.

But, in a broader sense, it points out the significance of industry standards when installing, operating, maintaining or designing any storage tank system.

National standards are adopted by reference in SPS 310 in accordance with the general code development requirements expressed in chapter 227, Stats. Section 227.21, Stats., allows the department to avoid the unnecessary expense *(not to mention avoiding copyright issues and avoiding a code that is too heavy to lift)* of reproducing the national standards in full as part of the code, provided we get the permission of the Offices of the Attorney General and Reviser of Statutes. The guidelines these Offices must use in granting or withholding permission to adopt a standard are: 1) The standards must be of limited interest to the general public, and 2) The standards must be readily available in "published form".

Most codes, including chapter SPS 310, are required to adopt a specific edition of a national standard. Officially adopting a subsequent edition requires completion of the entire code change procedure with public hearings and legislative committee review.

(An exception to this general rule that some users are familiar with is chapter SPS 348, Petroleum Products. Chapter 168, Stats., is the enabling statute for chapter SPS 348 and it specifically requires that inspections of petroleum products be conducted in accordance with the latest revision of the ASTM standards.)

Once a standard or code is adopted, the SPS 310 code uses specific language within the different SPS 310 code sections on how that standard or code is to be used, specifically the sections of the adopted

standards or codes that apply. Some Standards or codes will be adopted in their entirety; for some standards or codes only specific sections will be adopted. In some situations a specific national standard (i.e., PEI XXX, NFPA XX, API XXXX, STI SPXXX, etc.) may be written by the standard writing origination to have to a narrower scope or application than how the national standard is intended to be adopted and applied by SPS 310 (formerly SPS 10). For example, "motor fuel dispensing" within SPS 310 applies to retail fueling, fleet fueling, aircraft fueling, marine craft fueling and the fueling of facility maintenance vehicles and equipment; all within the SPS 310 scope of "motor fuel dispensing equipment. This may be a broader application than the respective standard organization initially intended the standard to address based upon their organization's constituency or the background and purpose that initiated the development of that specific standard. The fact that fires, spills and releases, including PECFA claims, have occurred at all these types of motor fuel dispensing is justification for maintaining a broader SPS 310 regulatory oversight and application than the narrower standard's application. The state regulatory program determines how a national standard is going to be applied within the state regulatory program. The national standard organization does not direct how their standard is adopted or applied within a state's regulatory program.

References to other standards or codes from within the adopted standard or code only apply to the extent as specified within those documents. For example, NFPA 30A-2008 has the following requirement under Section 6.8 “Requirements for Fuel Delivery Nozzles”:

6.6.1 An automatic-closing-type hose nozzle valve, listed in accordance with UL 842, Standard for Valves for Flammable Fluids, with or without latch-open device, shall be provided on island-type dispensing devices used to dispense Class I or Class II liquids.

Therefore all of the requirements of the UL 842 standard for listing an automatic-closing-type hose nozzle valve with or without latch-open device as adopted by NFPA 30A-2008 becomes a SPS 310 code requirement.

Example 2: NFPA 30A-2008, Section 5.4 “Testing” has the following requirement:

5.4.1 General. *All piping and secondary containment piping shall be tested before being covered, enclosed, or placed in service in accordance with the requirements of Section 27.7 of NFPA 30, Flammable and Combustible Liquids Code.*

In this example, only Section 27.7 of the NFPA 30 code becomes a NFPA 30A code requirement as adopted by SPS 310.

Evolution timeline (since 1991) of the adoption of the primary storage tank standards

Version	NFPA 30/30A	PEI 100	PEI 200	API 650	STI (various)
ILHR 10 - 1991	1987	1990		1988	1990
ILHR 10 - 1993	1987	1990		1988	1990
SPS 10 - 1996	1987	1990		1988	1990
SPS 10 -1999	1987	1990		1988	1990
SPS 10 - 2002	2000	2000	1999	1998	2000
SPS 10 - 2008	2008	2005	2003	2007	2006
SPS 10 - 2009	2008	2005	2003	2007	2006
SPS 310 - 2011	2008	2005	2003	2007	2006

Federal Regulations – Scope

Several federal regulations address flammable, combustible and hazardous liquid storage and handling. Occasionally we have discussions or debates involving a SPS 310 requirement in relationship with a federal regulation, such as SPCC or OSHA. OSHA regulations (29 CFR 1910.106(g)), require dispensing equipment at service stations be approved/listed by a Nationally Recognized Testing Laboratory (NRTL) for the fuel being dispensed. This is a similar requirement to the NFPA 30A standard and SPS 310 with a strong focus on general public protection. The OSHA regulations are intended to ensure that workers have safe and healthful working places, and are not intended to directly protect members of the general public from workplace hazards. Service stations dispensing flammable liquids do present hazards for employees, but, to a much greater extent, expose members of the public to potentially very serious fire and explosion hazards

SPS 310.220 Secondary References

SPS 310.220 provides for the direct replacement of specific referenced standards within NFPA codes adopted in SPS 310.200 with Wisconsin administrative codes. The Wisconsin Administrative codes are used in lieu of the NFPA referenced standards. For example, NFPA 30A Section 7.4 "Repair Garages" has the following requirement:

7.4.3 Means of Egress. In a repair garage, the required number, location, and construction of means of egress shall meet all applicable requirements for special purpose industrial occupancies, as set forth in NFPA 101, Life Safety Code.

SPS 310.220 replaces NFPA 101 with Wisconsin Administrative Code Chapters 60 to 66, so in order to comply with the SPS 310 code the required number, location, and construction of means of egress from a repair garage would have to meet the requirements of Chapters 60 to 66 instead of NFPA 101.

SPS 310.225 Alternate Standards

We have language in all of our codes that allows the department to recognize standards that are no less strict than the adopted standard. We have used this language to allow, by mutual consent between the department and a regulated party, the use of a later edition of an adopted standard. The difference is, we could not unilaterally force the use of a later, non-adopted standard to be used until the code is officially updated. When both parties agree to use a newer edition of an adopted standard, the proviso is that the newer edition must be used in its entirety.

Some standards, such as PEI/RP 100, are written as "recommended practices." The Department of Safety & Professional Services recognizes all recommended practices adopted by SPS 310 to be code requirements, not recommendations. The term "should" as often used in national standards is applied as "shall" in the adoption of the standard. The justification is that SPS 310 has a statement that "the most restrictive requirement applies," and also the fact that resolving conflicting opinions as to when the "should" in the standard would apply is cumbersome requiring significant time, effort and possibly cost to resolve and move the project forward.

Cleaning of tanks for inspection services under API 650, STI SP001 or STI SP031 is not required to be performed by a SPS 305 credentialed Remover/Cleaner.

Comments relating to specific standards

SP001 and SP 031

Adoption of STI standards SP001 And SP031 fill a tank integrity assurance void. The two standards were written primarily for the petroleum industry and to provide tank owners with a mechanism satisfy a federal EPA SPCC requirement, but the concepts are not limited to petroleum product storage tanks and can be used for hazardous substance tanks as well. Product characteristics for petroleum or chemical products must be factored into the integrity testing methodology and structural influences. Prior to the STI standards, API 650 was the prominent standard for integrity testing of new or modified tanks. However, API 650 was designed for field erected tanks and performing many of the elements of this standard are extremely expensive for shop built tanks. API 650 does not cover horizontal tanks, but they are covered in the STI standards. STI also has options for tanks not in contact with the ground.

PEI 800

Relating the scope of PEI 800 to terms in the definition section an interpretation could be rendered that PEI 800 is limited to Class I and II liquids. However, PEI responded to our inquiry with the following: "PEI 800 scope - it includes "related products" that the committee did not define. Class I and II liquids are defined in Chapter 2 only because we reference them in Section 5.1.1 that relates to "Alternatives to Diking". So, in a nutshell, the definitions do not limit the scope of RP800 to Class I and II liquids."

SPS 310.230 General requirements

The following are the respective system components that we expect to be assessed by the petroleum equipment contractor for proper functionality on an UST or AST system prior to turning it over to the operator as installation complete and placing a storage tank / dispensing system into operation. A pre-operational functionality assessment involves the components

from the tank to the vent pipe termination point.

- Tank tightness, including ullage to test tank top connections / appurantances
- Pipe tightness (all connections and risers)
- Interstice tightness of double-wall tank/pipe
- P/V and AST emergency vent valve
- Drop-tube & shut-off
- Overfill alarms (visual & audible)
- Vapor recovery system
- Spill bucket tightness and drain functionality
- Tank leak detection
- Pipe flow-restrictor and/or leak detection
- Corrosion protection system
- Tank top and dispenser sump containment
- Sump sensors
- Interstitial sensors
- Dispenser shear valves (shear valve needs to be open when performing other tests)
- Dispenser break-away
- Dispenser nozzles
- Access covers and caps
- Emergency shut-off
- Communication device (i.e., phone)

SPS 310.240 Certifications and Enforcement

This section of SPS 310 is a stepping-stone to, and supports, SPS 305 credential enforcement actions. The Department may undertake such investigations, as it deems necessary to ensure compliance with the provisions of this Chapter. The Department may suspend or revoke the licenses of an individual or contractor on the grounds that the individual or contractor:

(1) Exercised fraud, misrepresentation or deception in obtaining or renewing a licenses;
(2) Exhibited gross incompetence or negligence in the performance of an installation, repair, upgrade or closure in accordance with the adopted standards of this Chapter;
(3) Was derelict in the performance of a duty or responsibility as a licensed individual or contractor;
(4) Knowingly violated any provision of this Chapter.

A frequent area of confusion is the SPS 305 installer credential relationship to activities that may be considered to be service or maintenance activities. The initial installation of a leak detection methodology, product pumps or dispensers must be performed under the supervision of a credential (certified) installer. Replacing a dispenser that has been pulled from the island or replacing or upgrading leak detection by replacing with a device within the same methodology does not have to be performed under the direct supervision of a credentialed installer. A rule of thumb is that if plan review is required, the activity must be under the direct supervision of a credentialed installer. CP repair, replacement or upgrade must be performed under the respective NACE or STI levels of proficiency as outlined in the SPS 305 CP credential.

SPS 310.250 Tank construction and marking

Tanks storing flammable and combustible liquids must maintain their integrity throughout a variety of physical and environmental influences such as loading and unloading pressures, operational and peripheral vibration, ambient temperature and pressure changes, fire exposure, etc. Due to the potential fire, environmental and human health risks posed from accidental release of a flammable, combustible or hazardous liquid the code prohibits storage in a tank that has not been constructed to an acceptable design and fabrication standard. We often find “home-built” tanks or commercially fabricated tanks of poly material used to store Class II, IIIA and IIIB combustible liquids. The acceptable design and material of construction begin with SPS 310.120(5) Products Requiring Listing and Labeling, and SPS 310.250 Tank Construction and Marking which is supported by the primary national standard NFPA 30 – Chapter 21 (2008 Edition). Over the years several standards have been developed and become recognized by industry that has proven reliable under the many situations and conditions where tanks are located. Department of Safety & Professional Services recognizes Underwriters Laboratory, Southwest Research Institute, Steel Tank Institute and the American Petroleum Institute tank design standards.

Construction design of tanks storing the respective flammable, combustible or hazardous substances

regulated by SPS 310 must be supported by a tank listing, listing label or tank marking (further explained below) or certified by a PE. A tank that has a UL 142 label is acceptable for any class flammable or combustible. It should be noted that the scope statement for UL 142 specifically states under section 1.1: “These requirements cover steel primary, secondary and diked type atmospheric storage tanks intended for noncorrosive, stable flammable and combustible liquids that have a specific gravity not exceeding 1.0 in aboveground applications.”, however, there are instances where UL has allowed the specific gravity to exceed 1.0. In those instances, UL provided approval to exceed the specific gravity limitation in the manufacturers Follow-up Service Listing. This deviation from the UL 142 standard is and has been acceptable to the department as long as UL permission is granted and documented thorough the Follow-up Service Listing documentation.

API Standard 650 section 1.3 delineates the tank manufacturer and purchaser responsibilities. Manufacturers are responsible for complying with all provisions of the standard, including providing for quality assurance and control including the inspections necessary to ensure compliance to the standard. The purchaser is responsible for providing on the Data Sheet the applicable jurisdictional regulations and owner requirements that may affect the design and construction of the tank; ultimately the owner/purchaser is responsible for ensuring that the tank design is appropriate for the intended use of the tank. The manufacturer has to ensure that the tank is constructed according to the standard specified by the purchaser.

A tank constructed of polyethylene type material for virgin or used oil is acceptable if the tank carries a listing, label, marking or a certification from a PE. The code however limits this class IIIB storage to areas protected by fire sprinklers.

Tank Listing, tank labeling and tank marking

National standards and SPS 310 require that the construction of tanks be identified in some manner to verify that the tank was fabricated to a recognized design standard and, in some cases, demonstrate that the design passed a recognized third party fire exposure integrity test. Third party testing organizations maintain a “listing” of tanks in categories by manufacturer and end use specific to the qualifying test procedure. (Confusion could arise where a product listing organization, e.g. STI, has licensing agreements with various manufacturers. It is the tank and not the manufacturer that is listed.) Underwriters Laboratory and Southwest Research Institute are two organizations providing third party testing and listing of tanks. A tank listing “label” is a label provided to the tank fabricator by the listing organization that is secured to each tank manufactured and marketed under the listing/labeling protocol. UL has two different kinds of markings or labels. The most common carries the “UL” in a circle symbol along with : 1) the word "Listed'; 2) the product identity e. g. "Secondary Containment Aboveground Tank for Flammable Liquids on Supports"; and 3) a control number assigned by UL, which is the file number found in the listing. A second UL marking is called an “engineering” marking, where UL recognizes the manufacturer’s label for specific applications. There is also field inspection, which is a post fabrication assessment and qualification.

Tank “marking” is information specific to a tank required by the construction standard, such as API 650 or UL 142. The respective standard states what information must be placed on the tank at the time the tank construction or manufacture is completed. This construction marking is typically used for custom fabricated or field constructed tanks and is provided by the manufacturer or the contractor responsible for the tank construction.

The following table expresses the listing, labeling or marking requirements for tanks regulated under SPS 310. A tank or tank use not in this table should not be considered to be excluded from listing or marking requirements.

Listed & labeled	• Public fueling ASTs - SPS 310.610(5)(c) • Fleet fueling ASTs - SPS 310.610(5)(c) • Farm & construction > 1,100 gallon capacity - SPS 310.610(5)(c)2c • Work top tank (used oil) • Tank use or construction requirement by associated national standard

Control No. 3120734

Examples of Listing Labels	
Listed (no label requirement)	• All USTs • Used oil burning (work top tanks require a label) • Class IIIB liquids - SPS 310.400(1)(c)
Marking (no listing requirement)	• Heating fuel • Shop built and field erected bulk storage • Chemical storage (non flammable or combustible) • SPS 310.610(3) movable tanks
Other:	
Tanks supplying stationary combustion engines (NFPA 37)	Listed or marked
Farm tanks	SPS 310.610
Tank wagons	SPS 310.610
Tank vehicles	NFPA 385
Intermediate Bulk Containers (IBC)	Listing or marking

Manufacturer's serial # label – Not a Listing label

Not a Listing label

The UL Listing requires that tanks built for flammable or combustible liquid storage have the provisions for an emergency vent. In other words, the tank has to be designed with an opening for an E-vent connection. Other standards apply to the requirement for an e-vent. NFPA 31 does not require an e-vent for tanks directly supplying the fuel to a burner, even if the tank is a UL 142 constructed tank.

Subchapter IV – Specific tank storage applications

SPS 310.300 Tanks storing used motor oil

Used oil/waste oil generation and handling is regulated by the WDNR. The storage containment of used/waste oil is regulated by SPS 310. A Used Oil Management guide published by the WDNR can be accessed at the following: http://dnr.wi.gov/org/aw/wm/publications/anewpub/WA233.pdf

Used oil typically means used motor engine oil. However, waste or used hydraulic oils and industrial lubricating oils are also regulated as "used oil" by the SPS 310 code. Used oil as such, does not include used cooking oils. A "used oil generator" is a business that is responsible for the initial collection of used oil. A service station changing customer vehicle engine oil, a firm which has a service technician change oil in the company's vehicles, and a small engine repair shop with a used oil tank are examples of used oil generators. The terms "used oil" and "waste oil" are used interchangeably.

Recognizing that owner/operators are becoming more conscientious of the recycling and fire safety need to segregate used oil from other products, (i.e., solvents and waste gasoline) Department of Safety & Professional Services has moved used oil from a Class IIIA designation to a Class IIIB. However, history and the risk of contamination from these combustible products is still a concern. The source of the contamination may be human error or careless commingling with a flammable or toxic product. A used oil storage system may be required to comply with the more restrictive Class I – IIIA requirements if an inspector determines that products within the Class I – IIIA range are being commingled in the tank. Underground tanks must be fabricated conforming to ASTM D 4021, UL 58, or UL 1316. Spill prevention for used oil USTs is addressed in the section Spill Prevention for Underground Used Oil tanks on page 91.

Aboveground tanks must conform to UL 80, UL 142, UL 2258, API 650 or other construction standards approved by the department. Used oil storage tanks on castors (photo to the right) are acceptable for wheeling around a service bay area if the tank as constructed with castors has a UL listing for that configuration. They would not be acceptable for public collection unless in a curbed area. Facilities that have fixed or wheeled used oil collection tanks are required to comply with the respective room fire rating and placement within the room (away from electrical utilities, etc.) as required for Class IIIB liquid storage. A plastic IBC can be used to temporarily store Class IIIB used oil until it is full, then it must be shipped out of the facility for disposal as is traditionally done with an IBC. If the plastic IBC is stored inside a building (4 walls and a roof) until shipment the building would have to be sprinklered. If the plastic IBC is stored outside in a containment area there would not be any sprinkler requirements. A plastic IBC that remains at the facility where the product is periodically pumped to a tanker truck would not be allowed and would have to be replaced with an approved tank.

The SPS 310 code requires that tanks demonstrate the listing via a listing label as authorized by the listing organization be permanently fixed to the tank. Authorized labels are both metal and adhesive backed material. Because the UL listing for UL 80 tanks was implemented years prior to the implementation of fixed labeling, the department will accept the conventional 275 gallon UL 80 heating fuel tank without the label fixed to the tank.

The code and subsequent technical requirements address used oil in three independent applications that have site-specific and application specific requirements:

- Storage for recycling
- Public collection for recycling
- Use for consumptive heating

Used oil may be collected and stored in barrels or tanks. Barrels must be DOT approved for a flammable

or combustible liquid. Barrel and portable container storage is addressed in NFPA 30 Chapter 4 and is within the scope of SPS 14, rather than SPS 310.

Underground tanks storing used motor oil are federally regulated tanks, even if connected to a heating device for consumptive use, and are required to have financial responsibility in addition to leak detection and corrosion protection.

Installation oversight of used oil collection tanks
Waste or used oil is a Class IIIB combustible liquid with fire, human health and environmental risks. To encourage recycling and safe storage waste oil collection tank systems have reduced regulatory and design requirements than other combustibles provided they have specific configurations and are installed properly. Tanks used to store waste oil for recycling and tanks connected to a waste oil burner must have pre-installation plan approval and be installed under the oversight of a SPS 305 Certified Tank Installer. An accidental release or spill from a non-complying tank can result in recovery, assessment and clean-up costs significantly more than the initial cost of installing the tank in compliance with the code.

Used oil collection tanks dedicated to supplying a heating device
Used oil tanks dedicated to supplying a heating device are to be installed as required by NFPA 31 – Standard for the Installation of Oil-burning Equipment and the Division of Safety and Buildings plan submittal for waste oil burning equipment. The plan submittal application is form SB 118 and must include a plan showing the tank, associated piping and combustion air calculations. If the waste oil burning equipment (furnace) and the waste oil supply tank are being installed at the same time the plan submittal for both are to be submitted to the authorized building plan approval agent.

Used or waste oils and the associated tank are considered “used oil,” not “heating fuel.” NFPA 31 requires that the fill and vent for heating oil tanks terminate outside the building. The risks of spillage from carrying small quantities of used oil through the building, to pour into a *fill* pipe on the outside of the building appear to be significant. Therefore, an exception is allowed and it is acceptable to have the *fill* point directly at the tank. The fill point must be sealed except when transfer is taking place. Tanks supplying used oil burning for consumptive use shall have vent pipes that terminate outside at least 24” above grade and be located or designed to avoid obstruction by snow or ice. A single vent can serve both normal and emergency venting if designed accordingly (typically 660 gallon and smaller). For the larger UL 142 tanks containing used oil supplying a heating device an independent emergency vent is required. This means that a UL 142 tank with a capacity of 660 gallons or less that contains used oil and directly supplies a waste oil burner is not required to have an independent emergency vent because the normal vent will handle both functions, even though the tank is manufactured with an emergency vent connection point.

Tanks storing used oil and connected to a used oil-burning device must follow the requirements of NFPA 31 Standard for the Installation of Oil-Burning Equipment and subsequent conditions of the oil-burner material approval. NFPA 31 (2006 edition) Chapter 7.5 addresses tanks inside buildings. Storage tanks greater than 1320 gallons is dictated by dedicated rooms / enclosures and recognized engineering practices for fire detection and containment. Tanks with individual capacity larger than 1320 gallon for a non-engineered system or 1375 gallon for an engineered system must have a dedicated room or enclosure of at least a 3 hour rating. Under the Wisconsin Building Code the room may be reduced to a 2 hour rating if the building is sprinklered. Tanks listed under UL 2085 have a 2 hour fire resistance rating and would be equivalent to the 2 hour fire resistance room rating acceptable in a sprinklered building.

Requirements for used oil tanks located inside buildings and not connected to a heating device.
Tanks collecting and storing used oil for recycling must follow the requirements of NFPA 30.

Venting requirements are dependent upon the design standard. A UL 80 tank is manufactured and designed for heating oil Class II and III combustible liquids and does not require an independent emergency vent. Whereas a UL 142 tank is manufactured for Class I flammable liquids with a port for an emergency vent should the regulatory code require an “E” vent. NFPA 30 requires an e-vent on class IIIB combustible liquid tanks up to 12,000 gallon capacity. Typically most storage tanks for used oil recycling are UL 142 and must have both normal/atmospheric and emergency vent provisions. UL 142 tanks of 660 gallon or less capacity may use a single vent for both atmospheric and emergency venting purposes if the vent is no less than 2 inches in diameter. This is based upon the calculation of emergency vent capacity requirements. Vents may terminate inside the building for class IIIB used oil.

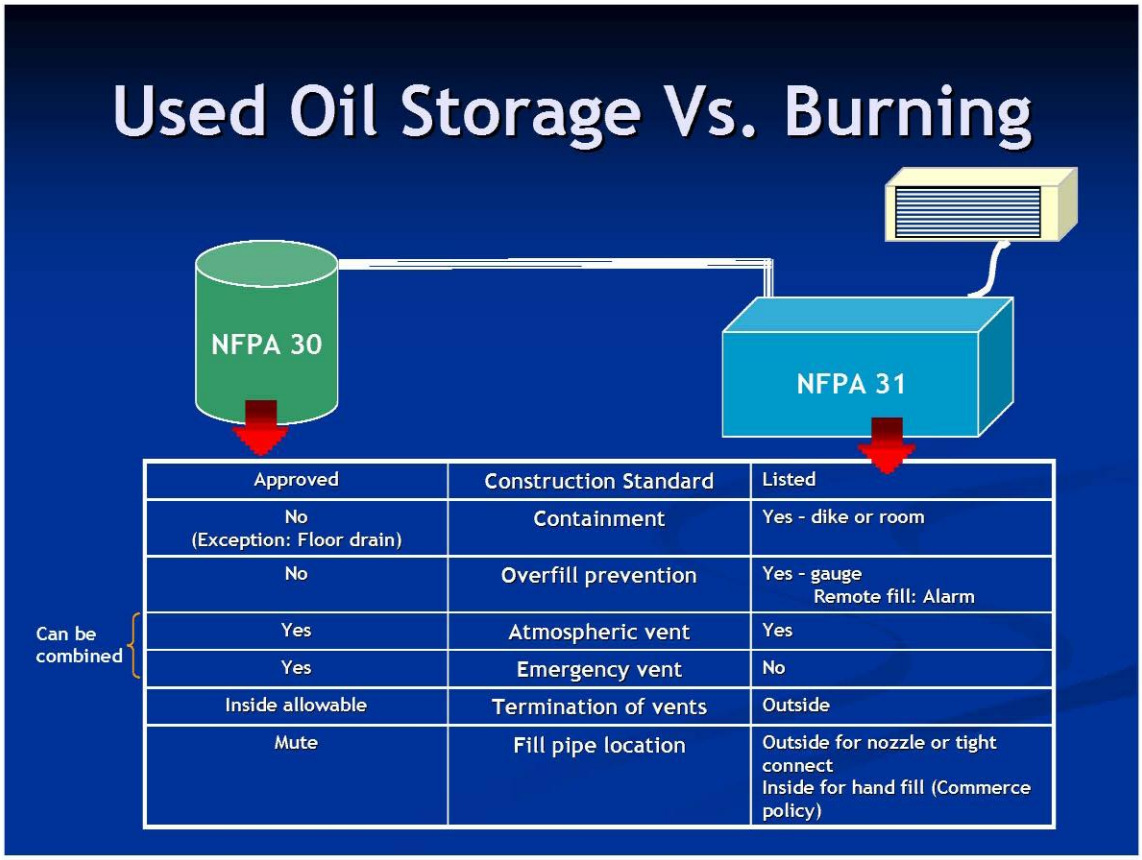
NFPA 30 does not have straight-forward language regarding venting and the type of vent required for used oil or other Class IIIB liquids. The department interprets the NFPA excerpts below to require closed vents for tanks inside buildings. The department does not interpret this to mandate pressure vacuum vents for Class IIIB tanks.

> *NFPA 30-21.4.3.6 Tanks and pressure vessels that store Class IA liquids shall be equipped with venting devices that are normally closed, except when venting under pressure or vacuum conditions.*
>
> *NFPA 30-21.4.3.8 Tanks of 126,000 gallon capacity or less that store crude petroleum in crude-producing areas and outside aboveground atmospheric tanks of less than 1,000 gallon capacity that contain other than Class IA liquids shall be permitted to have open vents.*

The department interprets NFPA 30-24.1.1 – 24.1.3 to exclude Class IIIB tanks from the requirement that the venting on tanks located inside a building terminate outside. Fusible emergency venting with an opening temperature of less than 300 F would be allowable as long as the tank was less than 660 gallons, otherwise a pressure vent would have to be utilized. A photo of a typical fusible vent is provided at right.

Secondary containment for tanks located inside buildings is required if a release could reach a floor drain, the exterior of the building, or an area, such as a room with a gas fired appliance, flame or spark generating service equipment or hot work that could pose an ignition hazard. Tanks located inside a building that require secondary containment must have containment at least 100% of tank capacity.

The following is a graphic summary of the different requirements for a used oil tank connected directly to a burner and a used oil storage tank that supplies the tank connected to the burner:



	Approved	Construction Standard	Listed
	No (Exception: Floor drain)	Containment	Yes - dike or room
	No	Overfill prevention	Yes - gauge Remote fill: Alarm
Can be combined	Yes	Atmospheric vent	Yes
Can be combined	Yes	Emergency vent	No
	Inside allowable	Termination of vents	Outside
	Mute	Fill pipe location	Outside for nozzle or tight connect Inside for hand fill (Commerce policy)

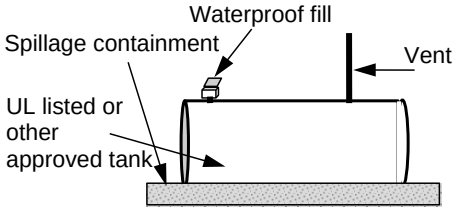
Compliance Cooperative Programs
The SPS 310 code includes specific exemptions for facilities in full compliance with Cooperative Compliance Programs (CCPs). This is an unusual partnership with a segment of business and trade that has implemented proactive formal regulatory assessment via a third party inspection and evaluation program.

Salvage and scrap recycler CCPs were developed through an industry working relationship with the WDNR as a mechanism to provide professional training, technical assistance and onsite verification of regulatory compliance with environmental regulations by adopting "best management" practices specific to the respective CCP. CCP members support the respective CCP through fees. Each CCP submits a year-end report to the WDNR.

Based upon the scope of the CCP oversight and compliance requirements the Department of Safety & Professional Services assessed risk in relation to both fire safety and environmental safety. Subsequently, the department codified a series of exemptions for salvage and recycle facilities that maintain compliance within their respective CCP. For example, the use of plastic totes (IBCs) is prohibited for storage of flammable and combustible liquids. Compliant CCP members are exempt from this prohibition and may store Class III combustible liquids outside and inside buildings that meets specific requirements. The exemption only applies as long as the CCP member maintains CCP compliance. CCP facilities will be assessed for compliance through the CCP's annual compliance report.

SPS 310.305 Public waste oil collection points

Wisconsin law requires facilities selling motor oil to "Do-it-yourselfers (DIY) to either collect used oil from DIY or provide directions to area public waste oil collection sites. A facility that receives DIY used oil, but only employees of the facility handle and dispose of the used oil are not considered public collection under SPS 310. Public waste oil collection sites are facilities that allow do-it-yourselfers to pour their used oil directly into the tank. Public collection tanks are also regulated under the Wisconsin Department of Natural Resources regulation NR 679.22. Used oil collection tanks have additional SPS 310 requirements such as



Public Used Oil Collection

- fill opening located in waterproof enclosure with screen to prevent passage of solid objects.
- aboveground tank setback requirements of NFPA 30 Table 22.4.1.6
- collection area shall be provided with secondary containment to contain spillage during handling and transfer.

It should be noted that for underground public waste oil collection tanks, automatic tank gauge (ATG) leak detection systems may not be approved for underground storage tank leak detection due to the ATG requirement that stored products must be pure oils and not mixtures of oil and gasoline or other solvents. The manufacturer of the ATG leak detection systems must be consulted concerning the applicability of their system to such use.

SPS 310.310 Heating fuel storage

The code associates "heating fuel storage" with tanks storing fuel that serves as the energy source for furnaces or boilers providing heat for occupied spaces or heat for processing. Tanks storing heating fuel used to produce steam for power generation such as electricity or emergency power are not included in the general heating fuel application. Heavy oils such as #5 and #6 used for heating do not meet the definition of "liquid" and therefore are outside the scope of SPS 310.

SPS 310.315 Heating oil tanks that are removed from service

Reserved

SPS 310.320 Fuel storage for stationary combustion engines and gas turbines

Fuel storage for permanently installed emergency generators is included in this section of the code. Stationary combustion engines include emergency generators and fire pumps, which are used to provide life safety support, have specific technical requirements. Emergency generators or auxiliary power units are combustion engines used to drive generators, alternators, or fire pumps and other essential equipment for emergency or backup purposes. Backup generators are occasionally referred to as emergency generators; however, a backup generator may not be considered as an emergency generator; however the storage tank is regulated the same for both. NFPA 37 is the national standard applying to stationary combustion engines (most commonly an emergency generator) and the engine fuel supply tank. *A recent communication from NFPA expressed that the adopted reference of NFPA 30 by NFPA 37 only applies to supply tanks located underground or outside. The reference to NFPA 30 does not apply to NFPA 37 systems located inside buildings.* The exception being the technical tank design and piping requirements in NFPA 30.

Tanks supplying fuel to stationary combustion engines must also meet specific requirements, including a fire rating meeting the standards established by a recognized testing laboratory. A common emergency generator and tank configuration installed today places the fuel storage tank directly under the generator engine unit. This configuration is referred to as “generator base” or “sub-base” tank. While the configuration of the power unit above the tank is acceptable, a concern is that contractors installing this equipment for emergency generator purposes are ignoring the fire rating requirement for the tank and many units being purchased and installed fail to comply with the fire code requirements, especially those installed inside buildings.

Sub base tanks have four configurations:

1. A single-wall tank, typically a UL 142 that does not have any secondary containment. Not commonly used today for generator base tanks.
2. Open-top diked tanks are often referred to as a "UL 142 open-top tank." This configuration has an integral open-topped steel dike, designed to contain liquids resulting from a spill, tank leak or rupture. *This tank configuration is for placement inside of a building only*.
3. Closed-top diked tanks are often referred to as a "UL 142 closed-top dike tank." This configuration is similar to the open-topped, but with an overlapped steel top to prevent precipitation, debris, or other objects from entering the outer tank or diked (interstitial) area. These tanks do not normally require additional vents on the secondary tank. This is due to the outer tank or interstitial space being open to the atmosphere via a gap designed to create a slot or opening between the top and the sides of the outer tank. These tanks have provisions for monitoring the interstitial space for leakage. *This tank configuration is for placement outside of a building only.*
4. Secondary-containment tanks are often referred to as a "double-wall" tank. This configuration of tank is constructed with an inner primary tank and a secondary outer tank. Double-wall tanks have provisions for monitoring the interstitial space for leakage. Because the design creates two tanks, both the outer tank and the inner tank require both atmospheric and emergency vents. The interstitial space may be filled with material to produce a specific fire rating for the tank resulting in reduced setback distances.

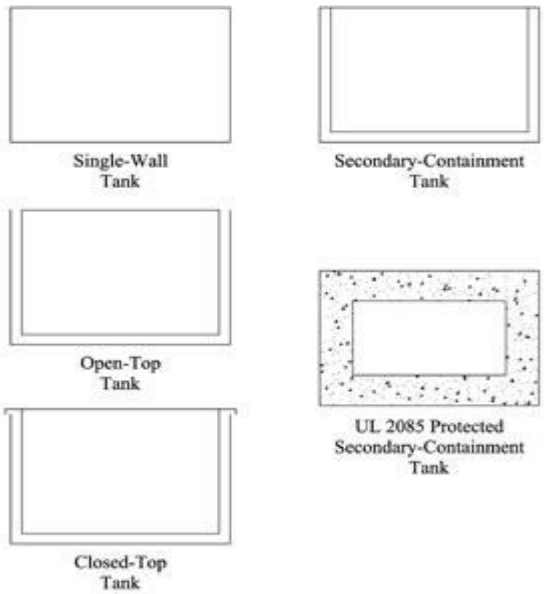


Figure 1

The following guidance applies to tanks supplying fuel to emergency generators and auxiliary power units. Specific and more detailed requirements relating to the location and isolation of emergency generators are contained in Chapter 6, NFPA 37 - Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, 2006 edition.

Gasoline Fuel Tank Inside Building		**NFPA 37 reference**
Capacity	Maximum 25 gallon capacity (integral tank).	6.2
Tank Listing	Yes	6.1
Containment	Yes (room, dike, double-wall)	6.2
Diesel and Fuel Oil Tank Inside Building		
Capacity	A single tank not exceeding 660 gallon capacity can be placed with other equipment (the generator and associated equipment) in the same room. This includes sub-base tanks such as those on genset units. If the tank exceeds 660 gallons you have one of two options; the 6.3.2.2 exception (below) with all its requirements (fire detection, suppression, and containment) or enclose the tank in a room by itself using either the requirements in NFPA 37-6.3.5 or 6.3.6 dependant on tank aggregate capacity. *Exception: Fuel tanks of any size shall be permitted within engine rooms or mechanical spaces, provided the engine or mechanical room is designed using recognized engineering practices with suitable fire detection, fire suppression, and containment means to prevent the spread of fire beyond the room of origin.* The largest tank that can be directly connected to a stationary combustion engine is 660 gal. If the fuel storage tank is larger than	6.3.2

	660 gal., then it must supply a day-tank no greater capacity than 660 gallons, which then feeds the engine. This applies even if the tank(s) greater than 660 gallon capacity is in a separate room or located outside. For example: a 1,000 gallon tank in a separate room would have to supply a “day tank” that is connected directly to the engine. In the situation where a room houses only the fuel supply tank, NFPA 37-6.3.5.1.2 and 6.3.6.1.2 require at least 15 inch clearance around each tank for the purpose of inspection and repair. *This requirement does not apply for the tank located in the same room as the generator*. Rooms housing only fuel supply tanks must be a minimum 1 hr fire rating for tank aggregate capacity of 1320 or less and 3 hr fire rating for greater than 1320 aggregate capacity.	
Fire rating	Supply tank greater than 1,320 aggregate must be isolated in room with 3 hour fire rating.	6.3.6
Tank Listing	Integral tanks – No (Tank with maximum capacity of 25 gallon mounted on the engine with supply by gravity feed.) Day tanks - Yes (SPS 310.250(2)) Supply tanks - Yes (SPS 310.250(2))	6.2
Containment	Yes	6.3.2.4
Vent Piping	In accordance with tank listing and NFPA 30	6.7
Setbacks	Tanks located in rooms shall have minimum 15 inch clearance around the tank for inspection.	6.3.5.1.2 6.3.6.1.2
Leak detection	No	
Plan review	Yes -day tanks and supply tanks > 110 gallons (SPS 310.100).	
Installation	Supervised by SPS 310 AST Installer (SPS 310.320(1)(b)).	
Registration	Registration required for tanks greater than 110 gallon capacity. (SPS 310.140)	
Tank inspection	Periodic inspections required for shop-built tanks > 5,000 gallons and all field fabricated tanks. (SPS 310.440)	
Spill/Overfill	Refer to SPS 310.410	
Tank closure	Yes- (SPS 310.460 – 10.470)	

Gasoline or Diesel Fuel Supply Tank Outside Aboveground - NFPA 37 references NFPA 30

Capacity	No limit.
Tank Listing	Yes (SPS 310.250(2))
Containment	Yes - NFPA 30-22.11 and SPS 310.420 = 125%
Setbacks	NFPA 30 Table 22.4.1.1(b) **Note**: 5 ft. is minimum distance from a building
Leak detection	No
Registration	Registration required for tanks greater than 110 gallon capacity. (SPS 310.140)
Plan review	Yes- day tanks, supply tanks > 110 gallons (SPS 310.100).
Installation	Supervised by SPS 310 AST Installer (SPS 310.320(1)(b))
Tanks on roofs	Refer to NFPA 37-6.3.4
Tank inspection	Periodic inspections required for shop-built tanks > 1,100 gallons and all field fabricated tanks covered under the scope of API 653. (SPS 310.440)
Spill/Overfill	Refer to SPS 310.410
Tank Closure	Yes- (SPS 310.460 – 10.470)
Collision protection	Yes- (SPS 310.430)

Fuel Supply Tank Construction

Generator fuel supply tanks are required to have a UL (single wall UL 142, UL 80, or UL 2080; double-wall UL 2080, or UL 2085) or other recognized testing laboratory listing mark or label; or be constructed in accordance with API 650 or API 620.

Two recent innovations and trends are the “sub-base” tank and the “fire protected” or “fire resistant” tank.

A sub-base configuration consists of the generator placed directly on top of the fuel supply tank. This configuration is also referred to as a “pedestal” or “GenSet” tank. In many situations the tank is either secondarily contained (diked) or of double-wall design. Most of the sub-base generator units are secured to the tank at the manufacturing facility and shipped to the customer with the generator and tank as one unit. Tank manufacturers require a pre-operational integrity test of the tank and these tanks frequently carry a sticker with testing instructions.

The fire resistant tank is an aboveground tank that is listed to provide fire-resistive protection from exposures to a high-intensity liquid pool fire. Fire resistive tanks must have the UL 2080 Listing label or SwRI 97 -04, which is generally designated, as a two-hour fire rating. Secondary containment is optional.

The fire protected tank is a double-wall configuration with the interstitial space filled with an insulation material allowing the tank to withstand exposure to fire and maintain its integrity within the respective fire rating standards. Fire protected tanks must have the UL 2085 Listing label or SwRI 93-01, which is generally designated as a two-hour fire rating.

Generator and Fuel Supply Tank Installation

Emergency and auxiliary generators are installed in both outdoor and indoor locations. The biggest difference between these types of installations is in regard to tank venting.

Outdoor Installations

Many generator manufacturers are fabricating generator units for use outdoors with a weather protection housing or enclosure. Typically generators with a sub-base tank, pictured to the right, located outside a building have a louvered weather enclosure protecting the generator. It is the department’s position that venting to the outside of the protective enclosure is not required because natural ventilation for these units located outside is adequate.

The unit in the top photo to the right has ventilation louvers cut in the side-wall doors, just above the top of the sub-base tank providing gravity flow ventilation.

The unit in the bottom photo to the right has louvers along most of the surface of the side-wall doors, ends and roof providing gravity flow ventilation.

NOTE: The weather enclosure is not to be considered a room or a building.

Indoor Installations

A generator tank system that is installed in either a building or non-vented weather enclosure requires not only a specific type of tank, but also the capability to vent the primary and emergency tank vents to the outside atmosphere. For example, the venting for the generator and tank contained within the modular weather enclosure in the photo on the left is required to terminate outside the enclosure housing. This includes the venting for the primary tank and secondary containment tank. In this case, justification for remote termination is; a confined space environment, with the potential for combustible vapor buildup just above the floor resulting from changing ambient temperature; and a lack of ability to easily identify equipment within the enclosure.

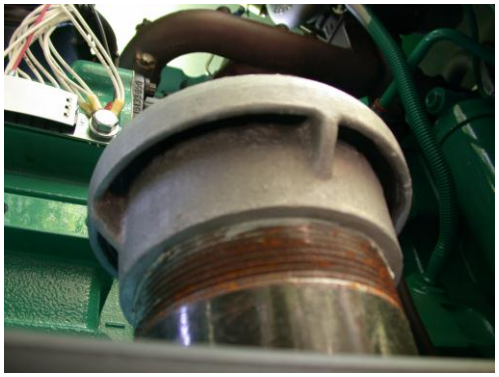
It cannot be emphasized enough that any tank installation within a building or non-vented weather enclosure requires a style of tank that allows for venting of the primary (normal/emergency) and secondary (emergency) tank vents to the outside atmosphere only. Typically, generator tanks that are installed in enclosures or buildings are built to the UL 142 standard. The UL standard allows for several

Venting for “Closed –Top” Diked Tank

styles of tanks that have different venting configurations, open-top diked, closed-top diked, and secondary containment. For all indoor applications, either within a building or non-vented enclosure, the only acceptable tank style would be the open-top diked or secondary containment. As seen in the photo on the left, a closed-top tank would vent to the room, which could cause over-pressurization and collapse of the room.
Local municipal regulations are the authority for classifying the modular weather enclosure as a building or a structure.

Mushroom style vent
With the increase in the number of emergency generators located outside buildings that are being installed with a combined normal/emergency vent and mushroom style vent protector, the question has come up whether or not this is allowable per NFPA 30.
NFPA 30 allows normal (working) vents to be open to the atmosphere for class II and III products.
Class II and III products can have a combined normal and emergency vent with the opening size determined by the minimum relief capacity in CFH required to vent the tank under emergency conditions. The minimum relief capacity required can be affected by:

- Tank configuration (rectangular; horizontal cylindrical; vertical cylindrical)
- Tank size
- Product stored



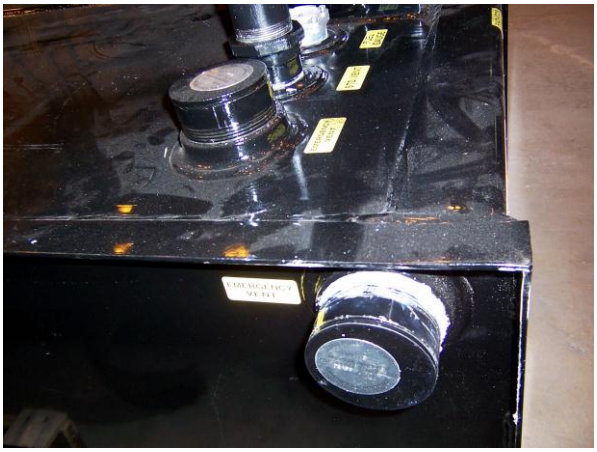
Class II or III products do not require closed emergency vents due to the lack of vapor evolution concerns.
The combined vent can be open to atmosphere and the mushroom style cap is acceptable as long as the open portion of the vent is sized for the minimum required emergency relief capacity in CFH as established in NFPA 30-2008 section 22.7.

Some recommended precautions with the use of the open mushroom style vent:

- The height of the combined vent on the primary tank shall be higher than the fill opening.
- To avoid flame impingement concerns, height of the combined vent on the secondary tank shall kept at least 6-inches away from any tank surface.

Horizontal Emergency Vent

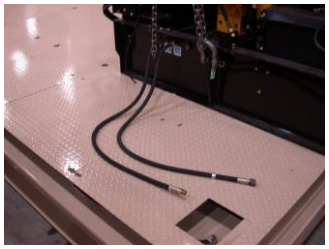
A recent trend with some of the generator base tank manufacturers has been to position the secondary containment emergency vents on the vertical surface of the tank, which results in the e-vent discharging into a horizontal direction instead of the more common vertical direction. The horizontal vents are spring-loaded so they maintain a normally closed configuration. The photo to the right shows what typically is observed in the field.



When the horizontal vents were first reviewed by the department, several concerns were identified. Chief among them, the possibility that if there was a leak to the secondary containment and the tank was involved in a pool fire, would product spray or be released from the horizontal vent and feed the fire? After discussions and a visit with a major tank manufacturer that uses this style of vent, it was determined that the horizontal vent is installed in a portion of the secondary containment tank, refer to as an “alternate vent box,” that is isolated from any liquid that may have accumulated and would only discharge vapor. The tank is also listed with UL for the horizontal vent configuration.

Fuel System Hoses

Typically, generator-fueling systems use flexible pipe and/or tubing rather than the traditional hard-pipe for the final few feet of the connection to and from the generator engine. The flexible pipe may have less risk of vibration induced fracture than the hard-pipe and is acceptable as long as the material is qualified for petroleum product use.



Spill and Overfill

Fill opening spill control depends significantly on three factors:

1. the type of tank that is used in the installation,
2. the type of fill connection; and
3. the location of the tank.

For those tanks located outdoors that use the open top diked style of tank, the dike usually serves as both the fill opening and primary tank spill containment. For the closed-top diked tank and the secondary containment tanks, additional fill opening spill containment may be needed.

Fill point spill control for outdoor or indoor tanks with a *tight-fill connection* can be accomplished by methods similar to the first two photos at the right. The generator tank in the top photo is located within a totally contained enclosure and has a spill bucket with delivery tank fill connection placed within a cabinet mounted to the outside of the enclosure with an overfill alarm. We have also observed this arrangement located just inside the doors of the enclosure. The generator tank in second photo on the right has a spill bucket with delivery connection piped from the outside, through the enclosure, to the tank with an overfill alarm.

For outdoor tanks filled by a *manual nozzle* without a latch open device, additional spill containment is not needed at the fill opening if the fill opening and site gauge are visible to the operator filling the tank, such as shown in the third photo.

For indoor tanks with a remote fill location, an audible and visual overfill alarm is required.

In all cases, the fill opening shall be separate from the vent opening and sized no larger than the normal vent size.

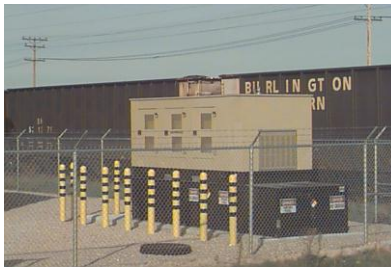
Fill & spill in cabinet

Spill bucket piped to tank

Fill and product level gauge

Collision Protection

Supplemental collision protection is required for units adjacent to traffic and parking areas even if the manufacturer has demonstrated that the sub-base unit has been impact tested, e.g., 12,000 lb. vehicle at 10 mph. Emergency generator units located outside are often installed in a location frequented by larger vehicles. It is the department's position that supplemental collision protection adds a necessary margin of safety to a critical component of the facility's life-safety measures. Mandating the requirement for supplemental collision protection involves inspector discretion, logic, vehicle traffic patterns and operation (backing, turning, setbacks, etc.) and degree of risk.



Gasoline, Diesel, or Fuel Oil Underground Supply Tank

NFPA 37 6.3.3

Capacity	No Limit
Tank Listing	Yes - SPS 310.250(2); NFPA 37, 6.2
Leak detection	Yes - SPS Subchapter VI
Spill & overfill protection.	Yes - SPS Subchapter VI PER-RP 100 –7.3.3 issues the warning that "A vent restriction device should not be installed on emergency generator or heating oil tanks." Therefore a ball float valve or vent restrictor shut-off device must not be used.
Corrosion protection	Yes - SPS Subchapter VI
Permit/Registration	Permit and registration required for tanks in excess of 60 gallon capacity. (SPS 310.140 and 10.145)
Plan Review	Yes- SPS 310.100
Installation	Supervised by SPS 310 UST Installer (SPS 310.320(1)(b))

Tank closure Yes- SPS 310.560 – 10.580

Fuel Gas Other Than Liquid or Vapor Phase LPG with Serv. Pres. 125 psig or less 5.1.1(1)
Installed in accordance with NFPA 54.

Fuel Gas Other Than Liquid or Vapor Phase LPG in excess of 125 psig Serv. Pres. 5.1.1(2)
Installed in accordance with ANSI/ASME B31.1 process piping.

LP Gas in Liquid or Vapor Phase 5.1.1(3)
Installed in accordance with NFPA 58.

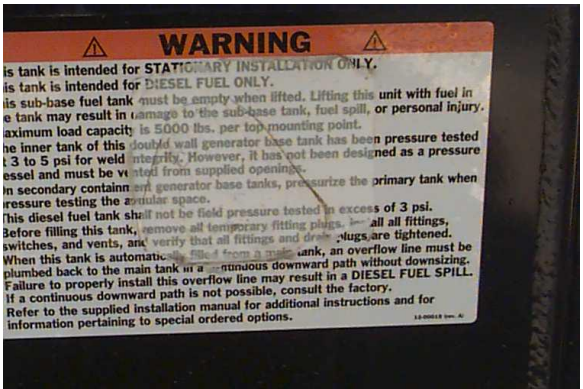
Note #1: The installation of emergency generator tanks is required to be under the oversight of a certified tank installer for the concerns of properly installed leak detection, spill protection, overfill prevention and tank registration.

Note #2: The Federal EPA groundwater rules exclude underground storage tanks storing heating fuel for consumptive use on the premises. The department recognizes this exclusion for storage tanks that *are exclusively used to store fuel oil for heating purposes*. *Tanks storing fuel oil to power emergency generators are not recognized by the department as meeting the EPA exclusion*. The EPA has deferred the leak detection requirements (40 CFR 280.10(d) deferral of Subpart D) for emergency generators located at remote locations. The reasoning behind the EPA deferral does not apply to the typical emergency generator use and associated emergency generator regulations applied in Wisconsin *because the location of these tanks are typically not remote in terms of access*. USTs supplying emergency generators and the associated underground piping are required to maintain the respective leak detection and use permit requirements.

Note #3: A *supply tank* is a fuel tank for supplying fuel directly to the engine or to a separate auxiliary *day tank* that feeds the engine. When the supply tank is remote from the generator system, a day tank is often an operational necessity. A *day tank* is a fuel tank located inside a structure, but connected to a supply tank. This configuration provides enough fuel storage capacity to the engine of the generator for a specified period of time. A day tank can also serve to eliminate the risk of high capacity storage on-board the gen-set or storage indoors by providing access to a larger volume of fuel stored in a remote supply tank.

Note #4: Chapter 4 of NFPA 37 addresses the requirements for the emergency generator engine that the supply tank is providing fuel for. The most restrictive requirement will apply in rooms that house the engine and the fuel storage tank.

Note #5: Allowing the atmospheric and emergency vent to terminate inside the weather housing is a concept difficult for some fire code enforcement personnel to accept. The department's position accepting this configuration is based upon the nature of the ambient environment, mechanics of the emergency generator, configuration and degree of risk. The department believes that there is little if any ignition and fire risk associated with vapors venting within the immediate housing because both the right fuel/air mixture and ignition source are necessary to start a fire. Emergency generator units are required by code to be located or isolated a distance from potential adjacent fire exposure. An electrical system provides start-up power to the engine and power for the gauges when the generator is not in operation. Gravity flow ventilation associated with the outdoor environment, through the weather housing, will dilute and dissipate vapors exiting the atmospheric vent to a safe level. The fuel is supplied to the engine via a vacuum type pump. Therefore, a breach in the fuel system would not likely pose a leak or provide a source of fuel to feed a fire, especially since the tank is located below the engine and pump. The ignition source is limited to the generator's electrical system or friction sparks. Emergency generator engines are not subject to the grease and grime environment of other engines thereby reducing the combustible material that may potentially ignite and burn. Air movement caused by the cooling fan, when the generator is operating will dilute any vapors that may exist to a level that will not allow vapor ignition. In the event that an ignition would occur within the weather housing, it is the department's belief that solid, liquid or vapor fuel would not be adequate to sustain a fire long enough to cause the tank to vent introducing significant vapors to enhance the fire. It is unlikely that any fire in the generator unit will provide sufficient heat to cause the product in the supply tank to vaporize to the point of activating the emergency vent, however if it did, the louver opening should be sufficient to safely vent the tanks emergency vent discharge.



Note #6: A pre-operational tank system tightness test

must be performed on the tank and piping. Some tank manufactures have a label on the tank stating such with maximum test pressure thresholds. In some situations the engineer designing the system will have specific test requirements in the project specs. In the absence of tank manufacturer or engineer test criteria NFPA 30-21.5.2 must be followed for ASTs. In either case the test must be documented. The person performing the pre-operational test is not required to be SPS 305 Tightness Tester credentialed.

SPS 310.330 Converted tanks for the storage of flammable and combustible liquids

This section is primarily for the conversion of ASME pressure vessels and DOT transport tanks that are being converted for use as stationary flammable and combustible liquid tanks.

The Department of Safety & Professional Services has on occasion received from the public inquiries as to whether a pressure vessel can be used for the storage of Class IB, IC, II, III, flammable and combustible liquids at atmospheric conditions. NFPA 30 allows for the use of low-pressure tanks and pressure vessels as atmospheric tanks as long as the liquid is stored at a temperature below its boiling point.[1] In converting the tanks from pressurized service to atmospheric service, the following items should be addressed.

- Vacuum/Relief Valve Sizing and Discharge Location
- Location and setback distances
- Secondary Containment
- Inspections
- Installation Testing
- Vehicular Protection
- Fill and Overfill
- Indoor Storage Tank Facility Design
- Support Design
- Piping System Design.

[1] Reference NFPA 30- 2008 edition, Sections 21.4.2.1.5 and 21.4.2.1.6

SPS 310.340 Bulk plants and terminals

This section applies to aboveground and underground storage tank facilities where flammable or combustible liquids are stored or blended, prior to further distribution of these products in bulk volume.

Examples of facilities that would be considered bulk plants or terminals:

- Ethanol / Biodiesel production facility. Product is produced, stored for distribution.
- Product distribution facility. Product is delivered via pipeline, truck or rail and stored for distribution down stream.
- Blending facility. Individual products are delivered via pipeline, truck or rail, mixed or blended to create additional liquid products for distribution.
- Facility that collects flammable or combustible liquid products from other facilities and stores them for refining, processing, distribution or manufacturing.

Examples of facilities that would not be considered bulk plants or terminals but may fall under other SPS 310 requirements:

- Industrial facility that creates a flammable or combustible bi-product from a process and this product is stored on site until a large volume has accumulated and pumped out by a transit company and recycled or sold.
- Automotive facility that generates waste oil that is stored on site until a large volume has accumulated and then pumped out by a transit company and recycled or sold.

SPS 310.340 (6) General Requirements
(b) Underground tanks at existing bulk plant facilities.
Underground tank systems at existing bulk plants and terminals shall comply with subch. V. This includes catastrophic leak detection on aboveground pipe from the submersible pump. The reason is that aboveground pipe located at a bulk plant or terminal is typically located within secondary containment; therefore a release from the piping is going to be contained. Bulk plants with underground tanks typically do not have piping that is located within secondary containment. Flow restrictors are subject to the annual functionality verification.

(c) New facilities.
Bulk plants and terminals can be designed and configured in several ways to store multiple products both indoors and outdoors. Several of these products may have different flashpoints and classifications that may require additional safety components. To clarify what components and system designs are necessary, SPS 310 has adopted the Petroleum Equipment Institute RP800 - Recommended Practices for Installation of Bulk Storage Plants. The scope of RP800 is applicable to facilities that store Class I, II and III liquids.

PEI 800 will apply to the following:

- New facilities
- The new tank / containment section of an existing facility undergoing expansion.

PEI 800 will not apply to:

- Replacement of a tank or piping in existing containment where containment reconstruction is not required. Moving pipe aboveground and filling in the excavation is not considered reconstruction.
- The addition of a new tank in existing containment (containment constructed pre Feb 1, 2009) where containment reconstruction is not required.

Fire Valves

Effective with the December 2011 edition of SPS 310 ASTs installed at a bulk plant under the PEI 800 standard (PEI 800-8.3.1) shall have a fire valve installed at the tank – pipe connection. Previously this requirement only applied to ASTs located inside a building.

Loading a Bulk Delivery Truck from a Motor Vehicle Fueling Facility

The department has experienced this practice via two means of transfer:

1) The most common of the two, loading of bulk delivery trucks via a suction stub pulling fuel from an underground tank at a retail facility for the purpose of off-site wholesale or retail delivery. The subject transfer involves a pump on the delivery vehicle that uses suction pressure on the UST side of the

pump and positive pressure on the opposite side of the pump pushing fuel through the delivery hose/nozzle into the delivery truck's compartment tank(s); or

2) Loading the delivery truck via the island dispenser hose and nozzle.

The national standards and codes address the practice of loading product into a delivery truck at a bulk plant loading rack at a facility dedicated to bulk transfer operations. Terminal and bulk plant transfer operations typically occur into or from ASTs, not USTs. The national standards and codes do not address the practice of bulk transfer into delivery vehicles at motor vehicle fueling facilities because it is not a safe practice.

The EPA SPCC regulations and subsequently SPS 310 only exempt transfer containment at retail motor fueling facilities where the traditional fuel transfer is a gravity drop from a transport into an UST or transfer from an UST into a motor vehicle. The setback and containment requirements associated with loading a delivery vehicle for further distribution down the market stream would apply.

NFPA 30-28.4 has setback and containment language for loading and unloading facilities which has a broader scope than Comm 10.340 because the scope of chapter 28 is not specific to bulk plants and terminals.

> **NFPA 30-28.4.1** Tank vehicle and tank car loading and unloading facilities shall be separated from aboveground tanks, warehouses, *other plant buildings, or the nearest line of adjoining property that can be built upon by a distance of at least 25 ft for Class I liquids* and at least 15 ft for Class II and Class III liquids, measured from the nearest fill spout or transfer connection.
>
> **NFPA 30- 28.9** Containment, Drainage, and Spill Control. Loading and unloading facilities shall be provided with drainage systems or other means to contain spills.

The emergency shut-off requirement applies to the typical pumping product from a storage tank into a delivery truck. NFPA 385 vehicles are required to have an emergency shut-off mechanism which would meet this requirement when using the truck mounted pump to fill the tank compartment.

> **Comm 10.370** Emergency shut-off for transfers. An emergency electrical shut-off shall be installed in accordance with NFPA 30A section 6.7 on any new or existing system that provides for the transfer of product from a fixed storage tank system to a tank vehicle, rail tank car or vehicle fuel tank.

Loading a delivery truck from a bulk plant loading rack has different mechanics, dynamics and exposures than the subject practice at a public retail motor vehicle fueling facility.

> **NFPA 30A-9.2.5.1 Sources of Ignition.** Smoking materials, including matches and lighters, shall not be used within 20 ft of areas used for fueling, servicing fuel systems of internal combustion engines, or receiving or dispensing of Class I and Class II liquids. *The motors of all equipment being fueled shall be shut off during the fueling operation except for emergency generators, pumps, and so forth, where continuing operation is essential.*
>
> **NFPA 30-28.11.1.5** Filling through open domes into tank vehicles that contain vapor-air mixtures within the flammable range or where the liquid being filled can form such a mixture shall be by means of a *downspout that extends to within 6 in. of the bottom of the tank* unless the liquid is not an accumulator of static electric charges.

The subject practice has two points of vapor generation: 1) open storage tank and 2) open truck compartment tank. The driver is either on the ground away from the nozzle or on top of the truck and away from the shut-off controls. The pressure side of the transfer operation generally is not under constant direct manual control with use of a nozzle latch hold open device. Gasoline has the potential for producing a static charge. Loading and unloading operations at bulk plant loading racks with aboveground tanks have integral bonding connections which are not likely to be in place for loading a delivery truck from an underground service station tank. There is a strong argument that because the truck is loading a delivery tank from a storage tank associated with motor vehicle fueling the delivery truck must comply with the engine shut-off requirement and subsequently not be able to transfer product via the onboard transfer pump. The NFPA 30A requirement that engines must be shut-off is related to the vehicle and exposure risk in the proximity to public dispensing operations.

The facility at which the loading of bulk delivery trucks from underground tanks for the purpose of off-site wholesale or retail delivery is primarily a public fueling retail facility, not a bulk plant at which a bulk plant transfer operation is taking place. The safety requirements for public motor vehicle fueling will trump the requirements for bulk plant operations, in other words "the most restrictive will apply." A NFPA 30A requirement calls for a separation between a bulk plant operation and motor fuel dispensing. The

separation is intended to prevent patrons from inadvertently driving into or interfering with the bulk transfer operation.

> **NFPA 30A-4.2.2** *A motor fuel dispensing facility located at a bulk plant shall be separated from areas in which bulk plant operations are conducted by a fence or other approved barrier.* Dispensing devices at the motor fuel dispensing facility shall not be supplied by aboveground tanks located in the bulk plant. Storage tanks at motor fuel dispensing facilities shall not be connected by piping to aboveground tanks located in the bulk plant.

The practice of delivery truck loading fuel from underground storage tanks at a public motor vehicle fueling facility is prohibited, unless piping and a transfer loading rack type system is added to the existing UST and located at least 25 feet beyond the motor fueling and traffic pattern associated with the motor vehicle fueling islands. The loading rack arrangement must meet the bonding, containment and emergency shut-off requirements.

SPS 310.350 Hazardous substances

SPS 310.350 takes precedence over other sections of the code for storage tank systems that only contain a non-flammable or non- combustible CERCLA liquid. If the CERCLA liquid has a flammable or combustible characteristic then the additional requirements for flammable or combustible liquids would also apply. An example would be the requirement for an emergency vent in addition to the typical normal or atmospheric vent.

This section of the code does not apply to CERCLA product ASTs that are less than 5,000 gallon capacity. However, *all tanks storing CERCLA products with flammable or combustible characteristics would be regulated in accordance with the respective SPS 310 / NFPA 30 requirements.* A 4,000 gallon tank storing sulfuric acid is excluded from the code, including storage and transfer containment, but a 4,000 gallon tank storing Triethylamine would have to comply with the SPS 310 / NFPA 30 requirements for a flammable liquid.

CERCLA listed substance at a concentration of 1% or greater will bring the product into the scope of the SPS 310 regulation. Products that contain a number of CERCLA substances individually less than 1%, but adding up to 1% or greater, will not be within the scope of the SPS 310 rule unless the product, as such, is on the CERCLA list. In most cases, MSDS are not required to identify materials present at less than 1% concentration, therefore, as a practical matter it may be quite difficult and an unnecessary burden on the tank operator to obtain such information.

For many of the substances on the CERCLA list, acceptable tank designs include horizontal or vertical dished-head vessels designed to ASME Boiler and Pressure Vessel codes (Section VIII Division 1 or 2), or vertical tanks designed to American Petroleum Institute standards (API 620 or 650). Other equivalent international standards such as the United Nations (UN) standards may also be appropriate.

For all UST systems storing hazardous substances, a qualified engineer shall develop system plans in accordance with good engineering practices. The installation of the hazardous substance storage system shall be under the direction of a qualified engineer.

For AST systems storing hazardous substances in which the substance is not also a flammable or combustible liquid, plan review is not required, however, the system design, installation, and construction must be supervised by a qualified engineer. For AST systems that contain a hazardous substance that is both hazardous and flammable or combustible, a qualified engineer shall develop system plans and submit for department review and approval per SPS 310.100 prior to installation. A certified installer under the direction of the qualified engineer must perform the installation.

In some cases, due to the unique characteristics of the substances regulated under this section of the code, tank systems are custom-engineered specific to the chemical and the related industrial or manufacturing process. For these installations, design and construction is required to be under the supervision of a qualified engineer. The following is a reprint of the pertinent subsections of section 443.14, Stats., listing situations in which a person is not required to be a registered architect or professional engineer. To comply with SPS 310.350(2) an individual designing or supervising construction of a hazardous substance storage tank system regulated under SPS 310.350 must be a registered architect or professional engineer, unless they meet any of the following exemptions:

> **443.14 Exempt persons.** The following persons, while practicing within the scope of their respective exemptions, shall be exempt from this chapter:
>
> **(1)** An employee of a person holding a certificate of registration in this state who is engaged in the practice of architecture or professional engineering and an employee of a person temporarily exempted from registration, if the practice does not include responsible charge of architecture or professional engineering practice.
>
> **(2)** Officers and employees of the federal government while engaged within this state in the practice of architecture, landscape architecture or professional engineering for the federal government.
>
> **(3)** A public service company and its regular employees acting in its behalf where the professional engineering services rendered are in connection with its facilities which are subject to regulation, supervision and control by a commission of this state or of the federal government.
>
> **(4)** Any person who practices architecture or professional engineering, exclusively as a regular employee of a private company or corporation, by rendering to the company or corporation

architectural or professional engineering services in connection with its operations, so long as the person is thus actually and exclusively employed and no longer, if the company or corporation has at least one architect or professional engineer who is registered under this chapter in responsible charge of the company's or corporation's architectural or professional engineering work in this state.

(5) A person engaged in the manufacture of a product or unit, including laboratory research affiliates of the person, where the services performed are the design, assembly, manufacture, sale or installation of that product or unit. "Product or unit" does not include any building.

(6) Notwithstanding any other provision of this chapter, contractors, subcontractors or construction material or equipment suppliers are not required to register under this chapter to perform or undertake those activities which historically and customarily have been performed by them in their respective trades and specialties, including, but not limited to, the preparation and use of drawings, specifications or layouts within a construction firm or in construction operations, superintending of construction, installation and alteration of equipment, cost estimating, consultation with architects, professional engineers or owners concerning materials, equipment, methods and techniques, and investigations or consultation with respect to construction sites, provided all such activities are performed solely with respect to the performance of their work on buildings or with respect to supplies or materials furnished by them for buildings or structures or their appurtenances which are, or which are to be, erected, enlarged or materially altered in accordance with plans and specifications prepared by architects or professional engineers, or by persons exempt under subs. (1) to (5) while practicing within the scope of their exemption.

(7) This chapter does not require manufacturers or their material or equipment suppliers to register under this chapter in order to enable them to perform engineering in the design, assembly, manufacture, sale or installation of their respective products.

(8) A professional engineer who, while engaged in the practice of professional engineering in accordance with this chapter, collects, investigates, interprets or evaluates data relating to soil, rock, groundwater, surface water, gases or other earth conditions, or uses that data for analysis, consultation, planning, design or construction.

(9) A person who, while engaged in the practice of professional geology, hydrology or soil science as defined in s. 470.01 (2), (3) or (4), practices professional engineering, if the acts that involve the

practice of professional engineering are also part of the practice of professional geology, hydrology or soil science.

Some hazardous substance storage tanks, specifically corrosive products, have a service life after which the tank is replaced with a new vessel. If the replacement tank is an AST of the same size and the pipe configuration significantly the same, plan review for the replacement tank is not required. However, the tank being replaced must be “closed” using the tank registration form and the new tank registered. This administrative process also applies if the tank construction material of the two tanks is different. Underground tanks are required to be treated as a new installation.

<u>SPS 310.350(3) General Requirements</u>

Subdivision (j)2 applies to ASTs that are not within *acceptable* secondary containment. Acceptable secondary containment is:

- ✳Dike containment capable of containing 100% or more of the capacity of the largest tank.
- ✳Remote impounding of a catastrophic release

SPS 350(5) Secondary containment
Secondary containment specific to non flammable or non combustible CERCLA hazardous liquids went into effect with the November 2008 Comm 10 code. The Comm 10.350(5) Secondary containment language does not include a retroactive requirement. Compliance with the SPS 310.350(5) requirement would apply to new facilities or to new additional storage being added to existing facilities.

A catastrophic release is typically the result of a tank overfill, tank rupture or a break in the product piping. It is assumed that good engineering practices will include a method of release management controls. The characteristics of some hazardous liquids are such that remote impounding provides a greater element of safety than containment around the tank. During the code development discussions the industry advised that due to the nature of hazardous liquids and the capabilities and preplanning of some facilities, the secondary containment options should be performance based rather than prescriptive; and therefore determined by the engineering in designing the system and the facility.

The requirements of SPS 310.350(5)(b)1 are different depending upon the date of design / construction. Facilities designed prior to Feb 1, 2009 can use a smaller portable containment with no capacity threshold such as the photo center and right. A facility designed on or after Feb 1, 2009 must use a portable containment that will be at least the capacity of the largest compartment on the transport, such as the photo on the left. Subdivision paragraph (b)4a address a temporary containment at the point of product transfer (photos below). The code does not prescribe a minimum capacity.

Inspection Requirements for Hazardous Substance Storage Tanks

The code requires that inspectors conducting API 653 or STI SP001 inspections be credentialed under the respective organization. API 653 is written from the petroleum industry perspective; STI is written from the steel tank manufacturer's perspective. Both standards are written for routine maintenance inspections, with the primary focus on the petroleum liquids storage in steel tanks. Both organizations have a process to qualify individuals for competency under their respective inspection standard. We expect that individuals performing API or STI inspections to carry the respective credential.

In the hazardous liquids industry the storage tanks may be steel, fiberglass or a poly type construction and may have an internal lining to suit the chemical stored. In situations where the liquid is stored in a tank with a compatible lining material the inspection protocol and the cycle may be based on the lining rather than the tank. We expect that individuals performing an inspection to a standard or protocol other than the API or STI standard have competency on the respective inspection protocol. We are very much aware that the major manufactures of tank lining materials have training and testing to qualify individuals to perform routine integrity assessments of the lining product they manufacture. Our regulatory inspectors do not routinely ask for the tank or lining inspector's credentials, but they would likely become important if an "event" occurred.

The department's position in regard to periodic inspections of hazardous material storage tanks, is that due to the varied properties of the hazardous materials regulated under this code section, a qualified engineer, as previously defined, who is knowledgeable about the hazards associated with the storage of a particular hazardous material is the most qualified person to determine monitoring, inspection, and testing requirements specific to the product stored. The expectation is that periodic inspection schedules and type would be determined during the system design stage and implemented immediately following installation.

SPS 310.360 Storage of Class IA flammable liquids

The majority of common flammable and combustible liquids that are contained in storage tanks or vessels can be classified as Class IB, IC, II or III. Some examples of these types of liquids are gasoline, diesel, fuel oil, and petroleum based lubricants. These liquids are primarily stored in storage tanks designed for atmospheric conditions. However, one class of flammable liquids, Class IA, due to their higher vapor pressure, are typically stored at pressures greater than atmospheric.

Examples of these types of liquids include:
Ethyl Mercaptan: used as an odorant in propane and natural gas systems
(Vp = 1.4 psig at 100° F);
Pentane: used as a blowing agent in various manufacturing operations
(Vp = 1.3 psig at 100° F).

Due to the higher vapor pressure, storage requirements for Class IA liquids are slightly different, particularly in the areas of tank design, construction, venting and initial testing. In order to understand why the storage requirements are different, a brief review of some definitions is necessary.

Class IA flammable liquids[2] are liquids that have a flash point below 73° F, a boiling point below 100° F, and a Reid vapor pressure not exceeding 40 psia (≈25.3 psig) at 100° F. A vapor pressure of 40 psia at 100° F is the accepted dividing line between gases and liquids.

Boiling point[3] is the temperature at which the vapor pressure of a liquid equals the surrounding atmospheric pressure, thereby causing the vapor to be expelled into the atmosphere, i.e., boiling occurs. As a liquid approaches its boiling point, an increasing amount of vapor is given off, and the evaporation rate and volatility increase. Class IA flammable liquids typically have a vapor pressure greater than 1.0 psig at 100° F (≈15.7 psia at 100° F), but less than 25.3 psig at 100° F (≈40 psia at 100° F).

Vapor pressure[4] is a measure of the pressure that the liquid exerts against the atmosphere above it. Just as the atmosphere exerts pressure on the surface of the liquid, the liquid pushes back. Vapor pressure is normally less than atmospheric pressure and is a measure of the liquid's tendency to evaporate (i.e., to move from the liquid to the gaseous state). This tendency is also referred to as volatility, thus the use of the term volatile to describe liquids that evaporate very easily. The higher the vapor pressure, the greater the rate of evaporation and the lower the boiling point. Simply put, this means more vapors and increased fire risk.

Tank Design and Construction

Due to their relatively low vapor pressures and high boiling points, tank storage for Class IB, IC, II, and III flammable and combustible liquids is typically done at atmospheric pressure (≈14.7 psia). For Class IA products that have high vapor pressures and low boiling points, such as odorants and blowing agents, storage is performed at pressures greater than atmospheric; necessitating the use of either low-pressure storage tanks or pressure vessels. This is due to the fact that the higher vapor pressure products would leak from any normally open vents on atmospheric tanks and pose not only a safety risk, but also result in loss of product. Low pressure storage tanks and pressure vessels, unlike atmospheric storage tanks (UL, API), do not contain normally open vents; pressure is relieved through a relief valve only under upset conditions (a pressure rise above normal operating pressure).

NFPA 30 contains the requirements for tank design and construction for flammable and combustible liquids. For atmospheric storage tanks, design and construction is performed to the UL 58, 80, 142, 2080, 2085, 1316, 1746 standards or API 12B, 12D, 12F, 650 standards. Maximum pressure for these tanks is limited to 1.0 psig (≈15.7 psia) only if in the horizontal or rectangular configuration. Vertical configurations of these tanks are limited to 0.5 psig (15.7 psia). API 650 tanks are allowed a maximum pressure of 0.5 psig (≈15.7 psia) unless built to Appendix F of the API 650 standard. Reference NFPA 30-2008 21.4.2

Tank design and construction for low pressure storage tanks should be performed to API 620 Recommended Rules for the Design and Construction of Large, Welded, Low-Pressure Storage Tanks or the ASME Code for Unfired Pressure Vessels, Section VIII - Division 1 or 2.[5]

Therefore, based on the NFPA 30 requirements, tank design and construction for storage of the Class IA flammable liquids should be performed to the either API 620 Standard (Vp<15 psig at 100° F) or ASME Section VIII Pressure Vessel Code- Division 1 or 2 for unfired pressure vessels (Vp ≥15 psig at 100° F).[6]

Electrical Equipment

Follow the requirements of NFPA 30 and NFPA 70, *National Electrical Code*.

In-service Inspections

ASME pressure vessels containing Class IA products, with an internal or external operating pressure of greater than 15 psig (≈29.7 psia), are required to have periodic inspections per SPS 41.

ASME pressure vessels containing Class IA products, with an internal or external operating pressure of less than 15 psig (≈29.7 psia) with no limitation on size, are recommended to have periodic inspections per API 510 and RP 575.

---

[2] Reference NFPA 30- 2008 edition, Section 3.3.30.2
[3] Reference NFPA 30- 2008 edition, Section 3.3.4*
[4] Reference NFPA 30- 2008 edition, Section A.4.2.6
[5, 4] Reference NFPA 30- 2008 edition, Section 21.4.2, "Design Standards for Storage Tank"

API 620 vessels shall have periodic inspections performed based on API 653 and API RP 575.

Installation Testing
Shall be performed per the tank or vessel code of construction.

Location with Respect to Property Lines, Public Ways, and Important Buildings on the Same Property.
API 620 low-pressure tanks or ASME Section VIII pressure vessels containing Class I, Class II, or Class IIIA stable liquids and operating at pressures that exceed 2.5 psig, or are equipped with emergency venting that will permit pressures to exceed 2.5 psig, shall be located in accordance with NFPA 30-2008 Tables 22.4.1.3 and 22.4.1.1(b).[7]

In addition to meeting the setback distances above, where end failure of a horizontal pressure tank or vessel can expose property, the tank or vessel shall be placed with its longitudinal axis parallel to the nearest important exposure.[8]

Repairs and Alterations
ASME pressure vessels containing Class IA products, with an internal or external operating pressure of greater than 15 psig (≈29.7 psia), are required to have repairs and alterations performed per SPS 41.

ASME pressure vessels containing Class IA products, with an internal or external operating pressure of less than 15 psig (≈29.7 psia) with no limitation on size, are recommended to have repairs and alterations performed per API 510.

API 620 vessels may have repairs and alterations performed based on the design, welding examination and testing provisions of API 653, in proper conformance with the stresses, joint efficiencies, material and other provisions in API 620.

Secondary Containment
Aboveground tanks located outdoors shall have secondary containment that complies with s. SPS 310.420.

If the fill opening is located outdoors, the opening shall be located in a watertight enclosure of noncombustible construction.

Secondary containment is required for tanks located inside a building if a release from the storage tank could reach a floor drain, the exterior of the building or areas that pose an ignition hazard.

Supports
The design and construction of supports shall be performed in accordance with the requirements as detailed in the tank or vessel code of construction, except the height of the supports shall be no greater than 12-inches high.

Vacuum/Relief Valve Sizing and Discharge Location
Relief valves for emergency venting of liquids shall be sized per NFPA 30 and the code of construction. Emergency Venting capacity shall be not be less than the values from NFPA 30-2008, s. 22.7, "Emergency Relief Venting for Fire Exposure for Aboveground Tanks", Table 22.7.3.2.
The highest required emergency venting capacity from either NFPA 30-2008 or the code of construction shall be used in order to avoid over-pressurization of the vessel.

Design **pressure relief** setting shall be determined in accordance with the applicable code of construction, either API 620 or ASME Section VIII.

Discharge of the relief valves shall be configured per NFPA 30-2008, ss. 22.7.3.9, and 22.6, "Vent Piping for Aboveground Tanks". In addition, it is recommended that the termination for the relief piping either have a rain cover installed on the end of the piping or an acceptable termination configuration in order to prevent water or debris collecting in the discharge piping. Weep holes may also be allowed. These devices should not restrict the discharge flow or cause a collection of liquid.

[7] Reference NFPA 30-2008, Chapter 22
[8] Reference NFPA 30-2008, Section 22.4.1.8

A separate **vacuum breaking** device may be required on API 620 tanks unless the vapor pressure of the stored product, under all conditions of storage, is high enough to overcome the suction (pressure drop) in the tank at maximum withdrawal rate. ASME pressure vessels can typically withstand full vacuum conditions, so a vacuum breaker will probably not be necessary.

Vehicle Collision Protection

Vehicle collision protection shall be provided for aboveground tanks in accordance with s. SPS 310.430 unless the authorized agent determines the tank system is not subject to vehicle collision.

Other Requirements

All other requirements for storage of flammable liquids as required by SPS 310 and NFPA 30-2008, shall be followed. This includes, but is not limited to, Shell-to-Shell Spacing, Spill and Overfill, Indoor Storage Tank Facility Design, and Piping System Design.

SPS 310.370 Emergency shut-off for transfers

Emergency shut-off requirements were promulgated in consideration of the various storage and transfer system configurations, point of transfer, and determining that the logistics of the location of emergency controls at many existing facilities do not provide adequate accessibility or may be located within the proximity of an incident. New and existing facilities that provide for the transfer of product between storage tank systems to tank vehicles and rail cars shall have an emergency electrical disconnect device. This shut off switch will be in addition to the operators controls, shall cut off the power to all associated transfer equipment and shutdown all product flow in the event of an emergency. Locate the switch where it is easily accessible to the operator but not less than 20 feet or more than 100 feet from the transfer operation area and clearly identify the switch.

Resetting an emergency shutoff switch shall require manual intervention and should not be resumed until facility personnel have rectified whatever emergency condition might exist.

Facilities that have all transfers between the storage tank to the transport via a truck mounted pump shall provide product piping isolation valves easily accessible to stop the flow of product in the event of an emergency.

Subchapter V – General AST storage

SPS 310.400 General

"Storage tanks" situated upon or above the surface of the floor in an underground area such as a basement, cellar, mine working, drift, shaft, or tunnel are technically underground, but are, in a practical sense, no different from aboveground tanks. They are situated so that, to the same extent as tanks aboveground, physical inspection for leaks is possible. The requirement to be able to physically inspect the tank for leaks is consistent with the oversight and regulation for aboveground tanks. The AST application would also apply to a tank located in a below-grade structural vault if there is sufficient space to enable physical inspection of the tank, but not necessarily the tank bottom. The AST application would apply because the underground tank has a secondary containment system that allows physical detection of a leaking tank.

Tank Shape/Type	Description
Cone roof	This tank has vertical sides and is equipped with a fixed, cone-shaped roof that is welded to its sides.
Open top-floating roof	This tank is similar to the cone roof tank in construction but has no fixed roof. A pontoon-type roof floats directly on the liquid surface.
Internal floating roof/ Covered floating roof	This tank is a combination of both the cone roof and the open top-floating roof tank. It has a cone roof but with the addition of an internal floating roof or pan that floats directly on the fuel surface.
Horizontal	This tank is commonly cylindrical in shape with flat ends. It is usually mounted on legs or steel or concrete support structures.
Spherical or spheroid	This tank is commonly used as a pressure tank or pressure vessel where vapor capture is important, especially with high vapor pressure liquids such as methyl chloride, propane or butane.
Rectangular	This tank is a six-sided vessel with sides, top and bottom consisting of flat planes.

Care should be taken in the placement of aboveground horizontal cylindrical and rectangular tanks so that a visual inspection for leakage can be performed. Typically, most tank manufacturers design their horizontal cylindrical tanks supported on saddles that provide a minimum clearance of 3-inches above grade, more than enough room for leakage inspection. However, many rectangular tanks are used as generator base tanks, these tanks typically have only 1-2 inches of clearance. While it would be desirable for more room for inspection of the tank bottom, this is probably enough clearance for detection of leakage. In most instances a tank should not be placed directly on grade, some tank designs use specialized coatings that would allow such placement; the suitability of these coatings for such service will have to be addressed prior to installation with the AHJ. It should be noted that NFPA 30 requires additional protection for tank supports if they extend 12-inches or higher above grade. Placement of supports should be on a prepared smooth flat surface such as crushed stone or gravel (roadbed), asphalt or concrete.

The department frequently addresses issues where UL 80 tanks are incorrectly used in place of code requirements for UL 142 tanks. The design standards are significantly different, with the venting provision being the most critical. Normal vents are intended to equalize tank pressures under normal conditions (fill/withdraw). Emergency vents are intended to relieve tank pressure under abnormal conditions (fires).

The basic differences between UL 80 and UL 142 tanks with respect to venting are:

- UL 80 tanks are listed and limited to 660 gal only for storage of heating oil (#2 fuel oil) whereas UL 142 tanks can be up to 50,000 gal for storage of any flammable/combustible liquids (alcohol & gasoline).
- UL 80 tanks are provided with a 2.0" opening for combined normal and emergency venting based on the tank capacity and Class IIIB liquid limitations. The vent may be further reduced to min 1.25" per NFPA 31 and has been proved adequate to relieve tank pressures in a full scale fire tests with fuel oil.
- UL 142 tanks require separate normal and emergency venting (except weak shell/roof constructions and venting manways), which vary on the tank capacity and wetted surface area. The e-vent size and cfm ratings are based on NFPA 30 requirements that assume the worst case scenario of a

Class I liquid in a pool fire.

- In residential or light commercial heating oil applications, a UL 80 and UL 142 tank of 330 gal or less may be similar in design and construction (typical "obround" shape), yet the UL 142 tank requires a 3" vent vs. a 2" vent for the UL 80 tank, simply because of the differences in the allowable liquids stored and their associated hazards in fire conditions.

Class IIIB liquid tanks

Class IIIB liquids pose a lesser fire risk than Class I, II and IIA, but pose a more significant fire suppression challenge than Class I, II and IIIA liquids. The family of Class IIIB liquids includes a broader range of non-hydrocarbon products resulting in more flexibility of tank construction. Tanks that do not carry listing label, but are "approved by the department in accordance with SPS 310.400(1)(c) will be recognized through the plan review process through the judgment and discretion of the individual performing the regulatory plan review. "Acceptable to the department" means a standard or documented engineered design that in the engineering provides measurable integrity elements to safely store combustibles if the tank is subjected to a fire environment.

Class IIIB tank construction material

Class IIIB tanks may be constructed of combustible material, such as plastic or fiberglass under the following NFPA 30 conditions;
NFPA 30-21.4.1 Materials of Construction.
Tanks shall be designed and built in accordance with recognized good engineering standards for the material of construction being used. Tanks shall be of steel or other approved noncombustible material, with the following limitations and exceptions:

1. The materials of construction for tanks and their appurtenances shall be compatible with the liquid to be stored. In case of doubt about the properties of the liquid to be stored, the supplier, producer of the liquid, or other competent authority shall be consulted.
2. Tanks shall be permitted to be constructed of combustible materials only when approved by the authority having jurisdiction. Tanks constructed of combustible materials shall be limited to any of the following:
   a) Underground installation
   b) Use where required by the properties of the liquid stored
   c) Aboveground storage of Class IIIB liquids in areas not exposed to a spill or leak of Class I or Class II liquid
   d) Storage of Class IIIB liquids inside a building protected by an approved automatic fire-extinguishing system

Class IIIB Construction material of valves

NFPA 30-27.4.3.1 Valves at storage tanks shall be permitted to be other than steel or ductile iron where the chemical characteristics of the liquid stored are not compatible with steel or where the valves are installed internally to the tank. Valves installed externally to the tank shall be permitted to be other than steel or ductile iron if the material of construction has a ductility and melting point comparable to steel or ductile iron and is capable of withstanding the stresses and temperatures involved in fire exposure or the valves are otherwise protected from fire exposures, such as by materials having a fire resistance rating of not less than 2 hours.

27.4.3.3 Cast iron, brass, copper, aluminum, malleable iron, and similar materials shall be permitted to be used on tanks described in 22.4.1.1 or on tanks storing Class IIIB liquids where the tanks are located outdoors and not within a diked area or drainage path of a tank storing a Class I, Class II, or Class IIIA liquid.

Class IIIB vent requirements

A UL 142 tank is designed and intended for aboveground storage of non-corrosive, stable flammable and combustible liquids. The UL standard specifies adequate venting requirements for both normal and emergency venting without regard for product classification. Subsequently NFPA 30 also provides the associated vent termination requirements for a Class I ,II, IIIA, and IIIB flammable/combustible liquid. If a UL 142 tank is used to store a Class IIIB, the NFPA vent requirements for a Class IIIB liquid would apply, which differ only slightly from the requirements associated with a Class I, II, or IIIA liquid.

NFPA 30 21.4.3 Normal Venting for Storage Tanks. Atmospheric storage tanks shall be vented to

prevent the development of vacuum or pressure that can distort the roof of a cone roof tank or that exceeds the design pressure of other atmospheric tanks when filling or emptying the tank or because of atmospheric temperature changes.

NFPA 30 ***21.4.3.2*** *Normal vents shall be sized in accordance with either API Standard 2000, Venting Atmospheric and Low-Pressure Storage Tanks, or another approved standard. Alternatively, the normal vent shall be at least as large as the largest filling or withdrawal connection but in no case shall it be less than 1.25 in. (32 mm) nominal inside diameter.*

As stated above, the tank's normal "working" vent is designed to equalize the internal and external pressures during these *normal* operations. Whereas, an emergency vent is designed to relieve the excessive internal pressures due to fire exposure.

NFPA 30 22.7.1.1 Every aboveground storage tank shall have emergency relief venting in the form of construction or a device or devices that will relieve excessive internal pressure caused by an exposure fire. ***22.7.1.1.1*** *This requirement shall apply to each compartment of a compartmented tank, the interstitial space (annulus) of a secondary containment–type tank, and the enclosed space of tanks of closed-top dike construction*. **22.7.1.1.2** *This requirement* shall also apply to spaces or enclosed volumes, *such as those intended for insulation, membranes, or weather shields, that are capable of containing liquid because of a leak from the primary vessel. The insulation, membrane, or weather shield shall not interfere with emergency venting.* ***22.7.1.1.3*** *Tanks storing Class IIIB liquids that are larger than 12,000 gal (45,400 L) capacity and are not within the diked area or the drainage path of tanks storing Class I or Class II liquids shall not be required to meet the requirements of 22.7.1.1.*

Class IIIB liquids typically have such low vapor pressures and high boiling points that, there is less likely the chance for excessive internal pressures to develop.

Some Class IIIB aboveground tanks might not be installed with the typical independently piped emergency vent. *An oversized normal vent that provides the required excess venting may accomplish both normal and emergency vent functions. A UL 142 tank storing waste oil may have the emergency vent opening plugged* **only** *if the normal vent is oversized and provides adequate venting for both normal and emergency venting capacities. API 2000 states that* Emergency venting may be accomplished with larger or additional open vents or larger or additional PV valves, as well as several other methods, *provided it provides adequate venting for both normal and emergency venting capacities.*

Many facilities have Class IIIB products stored within their facility buildings. This aspect of storage is where the differences appear regarding venting and vent termination points.

Summarizing Class IIIB vent requirements:

- Class IIIB storage tanks must have normal venting and the vent may terminate inside the building
- Class IIIB storage tanks must have emergency venting based on tank construction. Provisions via a traditional emergency vent, combined vent or other recognized construction (i.e. UL 80) are acceptable. The emergency vent provision may also terminate inside the building.
- Class IIIB storage tanks used for the purposes of heating shall meet the requirements of SPS 310 and NFPA 31-7.5.11. Each tank or tank system shall be equipped with fill and vent pipes, both of which shall terminate outside the building.

Class IIIB Location setback

NFPA 30-22.4.1.6 Tanks storing Class IIIB stable liquids shall be located in accordance with Table 22.4.1.6.
Exception: If located within the same diked area as, or within the drainage path of, a tank storing a Class I or Class II liquid, the tank storing Class IIIB liquid shall be located in accordance with 22.4.1.1.

Article III. Table 22.4.1.6 Class IIIB Liquids		
Tank Capacity (gal)	Minimum Distance from Property Line that Is or Can Be Built Upon, Including the Opposite Side of a Public Way (ft)	Minimum Distance from Nearest Side of Any Public Way or from Nearest Important Building on the Same Property (ft)
12,000 or less	5	5
12,001 to 30,000	10	5
30,001 to 50,000	10	10
50,001 to 100,000	15	10
100,001 or more	15	15
For SI units, 1 ft = 0.3 m; 1 gal = 3.8 L		

Class IIIB storage tank plan review

SPS 310.100(1)(b)3 exempts aboveground tanks which have a capacity of less than 1,100 gallons from the plan submittal and review requirement. This exemption does not apply to used oil tanks.

Class IIIB storage tank registration

SPS 310.140(1)(a)3 exempts aboveground tanks which have a capacity of less than 1,100 gallons from the tank registration requirement. This exemption does not apply to used oil tanks.

Class IIIB lubricating fluids

Most lubricating fluids are in the Class IIIB designation; however we have experience with specialty motor oils that have a Class II flashpoint.. The Petroleum Equipment Institute has developed a national standard PEI/RP700 Recommended Practices for the Design and Maintenance of Fluid-Distribution Systems at Vehicle Maintenance Facilities. At the time of this writing SPS 310 has not yet adopted the PEI 700 standard, but the department will recognize systems designed under this national standard for Class IIIB lubricant fluids, which has less restrictive requirements than the SPS 310 code.

Shell-to-Shell Spacing Between Any Two Adjacent Aboveground Tanks Located Outside.

NFPA 30-22.4.2.1 Tanks storing Class I, Class II, or Class III stable liquids shall be separated by the distances given in Table 22.4.2.1.

22.4.2.1.1 Tanks that store crude petroleum, have individual capacities not exceeding 3000 bbl 126,000 gal or 480 m^3), and are located at production facilities in isolated locations shall not be required to be separated by more than 3 ft (0.9 m).

22.4.2.1.2 Tanks used only for storing Class IIIB liquids shall not be required to be separated by more than 3 ft (0.9 m) provided they are not within the same diked area as, or within the drainage path of, a tank storing a Class I or Class II liquid. If located within the same diked area as, or within the drainage path of, a tank storing a Class I or Class II liquid, the tank storing Class IIIB liquid shall be spaced in accordance with the requirements for Class IIIA liquids in Table 22.4.2.1.

Shell-to-Shell Spacing Between Any Two Adjacent Aboveground Tanks Located in a Building.

NFPA 30 does not do a very good job of clearly describing the requirements for Class IIIB liquids, especially those in buildings. NFPA 30 (2008 edition) 22.4.1.1 addresses location/setback of tanks, but this section appears to focus on tanks located outside of a building. Section 22.4.2 addresses the spacing with an exception for class IIIB tanks within a diked area containing Class I & II liquids. To further complicate NFPA 30 understanding, section 22.11 - Control of spills, does not include Class IIIB tanks in the impounding requirement.

For tanks located inside buildings Department of Safety & Professional Services refers to NFPA 30 – ch. 24 Storage Tank Buildings. This section refers to table 24.4.2 for location and setbacks, so the tables referred by this section to section 22.4 are mute for a tank located inside a building. In other words, it is our opinion that if a tank is located inside a building ch. 24 is the NFPA 30 section that applies. This section does not include spacing between tanks, nor does it refer back to 22.4.1.3. However, when reviewing plans the reviewer does consider the size of tank, type of product stored, fire suppression and tank system maintenance in determining if the applicant has adequate distance between tanks. One foot may be adequate is some situations while three feet needed in other situations. Additionally, ch. 24 Storage Tank Buildings excludes Class IIIB liquids that are not heated up to or above their flash point from the requirements of that section. In summary, most Class IIIB tanks inside buildings have minimal technical requirements.

AST supplying a fire pump

Fuel supply tanks supplying fire pumps have specific requirements as addressed in NFPA 20-11.4 Fuel Supply and Arrangement. NFPA 20 is not directly adopted by SPS 310, but it is adopted in the Safety and Buildings International Fire Code, Section 913. The Building Code and Fire Code as governed by the Division of Safety and Buildings defer the installation and regulatory oversight of flammable, combustible and hazardous liquid storage tanks to SPS 310. NFPA 20 (2010 edition) shall be referenced for the fuel storage requirements associated with a fire pump. A condensed portion of the requirements are:

- Before any fuel system is installed, plans shall be prepared and submitted to the authority having jurisdiction.
- Tanks used in accordance with the rules of this standard shall be limited in size to 1320 gal (4996 L). For situations where fuel tanks in excess of 1320 gal (4996 L) are being used, the rules of NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*, shall apply.
- Fuel tanks shall be enclosed with a wall, curb, or dike sufficient to hold the entire capacity of the tank.
- Each tank shall have suitable fill, drain, and vent connections.
- Fill pipes that enter the top of the tank shall terminate within 6 in. (152 mm) of the bottom of the tank and shall be installed or arranged so that vibration is minimized.
- The fuel tank shall have one 2 in. (50.8 mm) NPT threaded port in the top, near the center, of the tank to accommodate the low fuel level switch.
- Vent piping shall be arranged so that the vapors are discharged upward or horizontally away from adjacent walls and so that vapors will not be trapped by eaves or other obstructions. Outlets shall terminate at least 5 ft (1.5 m) from building openings.
- The fuel supply pipe connection shall be located on a side of the tank.
- The engine fuel supply (suction) pipe connection shall be located on the tank so that 5 percent of the tank volume provides a sump volume not usable by the engine.

- Fuel supply tank(s) shall have a capacity at least equal to 1 gal per hp (5.07 L per kW), plus 5 percent volume for expansion and 5 percent volume for sump.
- The fuel supply tank and fuel shall be reserved exclusively for the fire pump diesel engine.
- A means shall be provided within the tank for low fuel level signal initiation.
- There shall be a separate fuel line and separate fuel supply tank for each engine.
- Means other than sight tubes for continuous indicating of the amount of fuel in each storage tank shall be provided.
- A fuel level indicator shall be provided to activate at the two-thirds tank level.
- Diesel fuel supply tanks shall be located above ground.
- The supply tank shall be located so the fuel supply pipe connection to the engine is no lower than the level of the engine fuel transfer pump.
- The engine manufacturer's fuel pump static head pressure limits shall not be exceeded when the level of fuel in the tank is at a maximum.
- If a double-wall tank is installed, the interstitial space between the shells of the diesel fuel storage tank shall be monitored for leakage and annunciated by the engine drive controller. The signal shall be of the supervisory type.
- Flame-resistant reinforced flexible hose listed for this service with threaded connections shall be provided at the engine for connection to fuel system piping.
- Fuel piping shall not be galvanized steel or copper.
- The fuel return line shall be installed according to the engine manufacturer's recommendation.
- There shall be no shutoff valve in the fuel return line to the tank.
- A guard, pipe protection, or approved double-walled pipe shall be provided for all exposed fuel lines.
- Where an electric solenoid valve is used to control the engine fuel supply, it shall be capable of manual mechanical operation or of being manually bypassed in the event of a control circuit failure.

Double-wall ASTs

For ASTs 1320 gallon capacity and less NFPA 20 recognizes a double-wall tank with connections below product level as providing adequate secondary containment. This clearly conflicts with NFPA 30, although NFPA 20 does not adopt or refer to NFPA 30. The following excerpt is from Ken Isman representing the National Fire Sprinkler Association who was responsible for writing NFPA 20. The bracketed language is inserted for tank program emphasis.

> "The fuel connection requirements in NFPA 20 are a necessary safety feature of a fire pump. The fuel needs to be fed to the engine at a positive pressure under gravity conditions so that the fuel feed to the engine is continuous. The number of connections below the liquid level *[of a double-wall tank]* has no bearing on the committee's concern for a dike. The NFPA 20 committee is of the opinion that dikes are not necessary in pump rooms with double wall tanks. Given the space that architects give us in pump rooms, dikes take up valuable space and cause safety concerns for workers trying to move around a pump room. In the more than 50 year history of the use of diesel driven fire pumps, there is no evidence that dikes would provide any significant increase in protection. We have had this rule for more than 50 years *[double-wall tanks have only been around since the mid 1990s]* and nobody involved with NFPA 30 or NFPA 37 has had a problem with it or recommended that we change it. The demand for good fire protection trumps spill concerns. We are not aware of any significant spill from a diesel tank for a fire pump that complies with NFPA 20.
>
> Diesel fire pumps are required to be inspected and tested weekly. We expect to be able to find small problems before they become big problems. A large-scale release from one of the connections below the fuel line is not expected and containment has not been considered mandatory. "

Based upon the background behind the current NFPA 20 requirements and allowances the tank program will not be more restrictive in the interpretation or application of NFPA 20. However, this does not absolve an entity from environmental liability if a release from a NFPA 20 single or double-wall fuel supply tank impacts the environment.

Tanks associated with fire pumps shall be registered as "emergency generator" tanks.

Public Service Commission Regulation – Power line clearance

The Public Service Commission (PSC) has a regulation that restricts the clearance between storage tanks and aboveground power lines that fall under PSC jurisdiction:

PSC 114.234C7 Clearance of lines near fuel storage tanks. [Follows NESC 234C5, p. 113]
(Addition) Add the following paragraph 7 and exceptions 1 and 2:
7. Clearance of Supply Lines Near Fuel Storage Tanks
Supply lines shall not be run over above ground flammable liquids and liquefied petroleum gas (LPG) storage tanks. A horizontal clearance of not less than 2.45 m (8 ft) with cables at rest, and not less than 1.80 m (6 ft) with cables displaced by wind according to Rule 234A2, shall be maintained between aboveground flammable liquids and liquefied petroleum gas storage tanks and supply cables of all voltages meeting Rule 230C. A horizontal clearance of not less than 4.6 m (15 ft) with conductors at rest, and not less than 3.0 m (10 ft) with conductors displaced by wind according to Rule 234A2, shall be maintained between such fuel storage tanks and all other supply conductors.

Exception 1: These requirements do not apply to liquefied petroleum gas tanks with a capacity of 1,000 gallons or less.

Exception 2: These requirements do not apply to tanks enclosed in a building or fully covered by a roof or canopy capable of preventing falling overhead supply conductors from directly contacting the tank. In this case, the vertical and horizontal clearance requirements of conductors from buildings apply. See Rule 234C.

History: CR 07−021: cr. Register January 2008 No. 625, eff. 2−1−08.

Intermediate Bulk Container (IBC)

IBC's were originally developed as shipping containers and are often referred as "totes" and "mini-bulks". The use of plastic and composite IBCs is increasing because the material of construction is generally resistant to corrosion, their space utilization is much better than drums, ease of moving by forklift and most IBCs are fitted with a valve near the bottom for ease of liquid transfer.

IBC's are used to transport flammable and combustible liquids and other types of hazardous materials. Construction material may be metal, plastic, polyethylene and composites of a metal mesh external supporting frame around a plastic or poly vessel. A large percentage of IBC are constructed of high-density polyethylene (HDPE) which has a limited compatibility with organic solvents and some hydrocarbons.

While IBC are gaining in use, the use is often in conflict with the fire safety codes. These containers are addressed in NFPA 30 Chapter 4 Container and Portable Tank Storage. The following three applications are excluded from this regulatory oversight:

- "Containers, intermediate bulk containers, and portable tanks that are used in process areas, as covered by NFPA 30 Chapter 17 – Processing Facilities."
- Liquids that have no fire point when tested by ASTM D 92, *Standard Test Method for Flash and Fire Points by Cleveland Open Cup*, up to the boiling point of the liquid or up to a temperature at which the sample being tested shows an obvious physical change.
- Liquids with a flash point greater than 35°C (95°F) in a water-miscible solution or in dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion when tested using the "Method of Testing for Sustained Combustibility," per 49 CFR 173, Appendix H, or the UN *Recommendations on the Transport of Dangerous Goods.* Window cleaning solutions are a common example.

IBC are designed and intended for shipment, not for storage. IBCs are approved and regulated by the UN and the U.S. DOT. Many users do not understand that the DOT approvals are for transportation only and not relate to building and workplace fire code approval. There are some designs and materials that are approved for sea and highway shipping that do not meet NFPA 30 for safe warehousing. Many of the designs are intended for one-time shipment of Class IC, II and III liquids; such as rigid nonmetallic intermediate bulk containers that meet the requirements of and containing products authorized by the U. S. Department of Transportation Hazardous Materials Regulations, 49 CFR, or by Part 6 of the UN *Recommendations on the Transport of Dangerous Goods* for Classes 31H1, 31H2, and 31HZ1. Rigid nonmetallic intermediate bulk containers of the fore mentioned classifications will be acceptable for inside storage if listed and labeled and stored in a fire sprinkler protected storage area. IBC design and construction that passed the tests reflected the respective IBC's ability to maintain integrity to a point of a fire involving the IBC(s) not overwhelming the sprinkler system.

A certification process is utilized to identify units that are capable of complying with established fire test criteria. NFPA 30 allows the use of IBCs for the storage of Class II and III combustible liquids provided that the storage vessels are subjected to standardized fire tests as described in UL 2368. The more restrictive NFPA 30 requirements, such as filling an IBC in the process area (NFPA 30-18.3.9) do not apply to IBC containing Class IIIB liquids.

IBC's have not received specific approval for any purpose other than for transportation (DOT) by any recognized national testing or standards agency. UL 2386 is the fire exposure test standard for IBC rated or approved for flammable or combustible liquid handling. The UL mark statement includes: "These requirements cover intermediate bulk containers (IBC's) intended for the storage of flammable and combustible liquids within warehouses and other storage areas protected with automatic wet-pipe sprinkler systems." IBC's, based on their current approvals, may be used in "off-site" transportation conditions regulated by DOT and UN. However, IBC's are regulated "on-site" by SPS 310 regulations for storage, use, dispensing, and/or handling.

Fire tests have demonstrated that plastic and composite IBC in a fire have the following experiences:

- Plastic valves, corner protectors and the base are often easily ignited,
- The rapid degradation of the container resulting in leaks will lead to spreading pool fires,
- Release all liquid in a period of 5 – 10 minutes,

- May experience an ullage explosion.

Electrostatic charges can be easily generated and accumulated on the plastic surfaces of IBCs when materials in fluid, pellet or powder form are moved along plastic parts such as bulk container walls, filling ducts, outlets, etc. Friction is the source for electrostatic charging during filling or emptying of IBC. Alternatively, induction can cause charge separation resulting in charging of an IBC surface when it is moved closely to a charged body. This effect occurs, for example, in warehouses or filling areas. Separated/generated charges, by friction or induction, will remain on the surface until grounding. Electrostatic discharge (ESD) could lead to spark induced fire or explosion, when the charged IBC is grounded accidentally or bonded to equipment at a different potential.

IBC's can be classified into one of three code categories, based on their capacity.

1. Container: a vessel with a volume of 60 gallons or less capacity.
2. Portable Tank: a vessel with a volume of more than 60 gallons that is typically designed to be loaded into or upon or temporarily attached to a transport vehicle.
3. Stationary Tank: a vessel packaged or designed primarily for stationary installations not intended for loading, unloading or attachment to a transport vehicle.

The type, design and construction of IBC's are as follows:

- IBC's containing flammable/combustible liquids or other hazardous materials intermixed with flammable and/or combustible liquid hazards shall conform to NFPA 30, section 9.4.1(2) & (3) for the construction of IBC's. NFPA 30 requires that non-metallic IBCs (i.e. plastic and composite) be listed and labeled for use.
- Metal constructed IBCs are not allowed to be used for more than 793 gallons of any Class I, II or III liquid.
- Plastic or composite constructed IBCs are not allowed to be used for Class I flammable liquids and to a maximum 793 gallons of Class II or Class III combustible liquids.
- When products are classified for hazards other than flammable or combustible liquids, IBC's of any size may be used.
- Depending on the products in storage or use and the size of IBC's, an occupancy could be required to comply with Group H occupancy requirements as a result of maximum allowable quantity criteria. This may require an occupancy change through the building department for existing occupancies.

Vehicle fueling from an IBC is restricted to IBCs rated for the respective Class II or III combustible product, and in compliance with NFPA 30 and 30A. The photo to the right depicts an IBC with combustible liquid certification.

Tank vehicle as storage

Occasionally the issue of flammable/combustible liquid transfer between tank vehicles arises. In general, the transfer of product from a vehicle to a storage tank has regulations providing considerable safe-guards and reduced risk. Transfer of product from the tank on one vehicle to the tank on another has few safe guards and significantly greater risk. The fire safety principle of the practice in question is the same as for fixed storage tanks:

- the site must be an approved transfer location with a setback to protect exposures, (If a stationary tank were involved the transfer location and corresponding setbacks would be assessed through the plan submittal/approval process.)
- the transfer process must address vapor emissions and vapor control,
- the system and transfer process must address the potential for the development of static electricity,
- the transfer location must be provided with spill protection and containment, while maintaining the fire safety and spill risk of motorized mobile equipment:
- exposure to electrical components that are not intrinsically safe,
- transfer and storage components that are not fixed in place,
- potential ignition from static electrical charge,
- inadequate spill containment.

NFPA was posed the question regarding how NFPA 30 and 385 dealt with that issue and responded with the following:

Regarding the use of a tank vehicle as a storage tank, all of the requirements of NFPA 385 and NFPA

30 assume that there is a fixed storage tank involved. Either the liquid is being pumped from a storage tank to the tank vehicle or vice versa. The intent and the impact of 1996 NFPA 30 Formal Interpretation 84-4 is this: if a person decides to use a tank vehicle as a fixed storage tank, then that vehicle must meet all of the requirements for a fixed storage tank, including:

- Adequate separation distance from property lines, etc. , per NFPA 30-22.4 & 22.5; and 30-28.4
- Spill control, per NFPA 30-22
- A properly sized normal vent and sufficient emergency venting capacity, per NFPA 30-22.6
- Supports and anchorage, per NFPA 30-22
- Loading and unloading facilities, per NFPA 30-28.4, 28.9 - 10

An SPCC regulated facility comes under the SPCC Regulation determined by volume threshold of 660+ gallons in a single AST or 1320+ total AST capacity on site. Transport tanks greater than 660 gal. must meet the SPCC Regulation (containment and response plan) since they are considered to be AST's. This means that secondary containment is required where these transport tanks are parked with product and secondary containment is required when product is transferred.

Tank trucks are generally regulated at a facility under 40 CFR 112 when that facility is required to have an SPCC plan and the tank trucks are used to store oil. These would be considered portable storage tanks and would make no difference whether they were connected to a tractor when parked. The 1320 gallon rule applies and the tank trucks' volume needs to be included in the threshold volume calculation in determining the applicability of the SPCC Regulation.

When tank trucks are being used solely for delivery purposes and not for storing oil while in a facility, we generally look to DOT as the regulator, not US EPA. In this case, the volumes of the tank truck(s) are not included in threshold volume determination. These tank trucks would not be permitted to contain oil at any time except when they were being brought in for filling the storage tanks or are being filled for the purpose of making a delivery outside the facility. Such tank trucks must be kept emptied of all oil while being parked in the facility to escape being regulated by SPCC.

Department of Safety & Professional Services will accept non routine transfers from vehicle to vehicle cargo tank, such as accident mitigation, failure of transport power unit or other conditions of emergency.

SPS 310.400(1)(c)

National standards and codes typically only recognize UL, SwRI, API or similar organization developed tank construction standards. The department has relaxed the standards for Class IIIB liquids by recognizing a non-listed tank as long as the tank manufacturer or fabricator can provide an engineering statement that supports the design and construction maintaining tank integrity for a reasonable period of time based upon the product stored and venting capacity.

SPS 310.400(3)

If the pipe is underground (covered with earth), but located within an engineered secondary containment barrier, no additional secondary containment is required because the barrier meets the containment requirement.

SPS 310.400(4)

Underground piping connected to an AST is now required to have the same leak detection capability as underground piping connected to a UST. There are installations where underground piping systems from aboveground storage tanks which due to large line capacity, high/low operating pressure, or other equipment configuration or operating limitations cannot use permanently installed leak detection devices. Since the SPS 310.400(4) requirement is not currently mandated by Federal Regulation, the department has some flexibility in developing acceptable alternatives to using the typical off-the-shelf leak detection devices in installations where they cannot function correctly (such as those stated previously). After several discussions with industry stakeholders the department has formulated the following policy:

<u>For rigid piping (steel or fiberglass):</u>

- Follow API 570 Section 9- Inspection of Buried Piping:
    - Section *9.2.7 Leak Testing Intervals* is mandatory with the following exception:
        - Acoustic emission examination cannot be used in place of pressure or tracer testing.

For Semi-rigid or Flexible piping (must be double-wall):

- Follow API 570 Section *9.2.7 Leak Testing Intervals* with the following exceptions:
    - The primary portion of the product line shall be pressure tested periodically per a Wisconsin approved line tightness testing method (Tracer, Petro Tite, TLD-1, Ezy Chek, Acurite) versus the API 570 pressure test requirement of 110% of maximum operating pressure. The secondary carrier pipe interstitial space shall be tested per manufacturer recommendations (typically 5-8 psi for 1 hour).
    - Pressure testing shall be conducted a minimum of every 5 years.
    - Inspection of the aboveground piping and transition sumps on a regularly scheduled basis, minimum of every 6 months.
    - Installation of sump sensors in transition sumps by February 2014. Remote sump sensor monitoring shall be provided on a 24/7 basis.
    - Annual inspection of transition sump pipe penetration seals.
    - Acoustic emission examination cannot be used in place of pressure or tracer testing.

This policy shall apply for underground piping under pressure from pump or gravity head and suction lines where permanently installed leak detection devices cannot be used. While this policy application is less restrictive than the typical leak detection requirements for underground piping, it can be justified for limited application based on installations with relatively low operating pressure and minimum operating cycles or in cases where pump high pressure or flow do not allow the use of conventional devices.

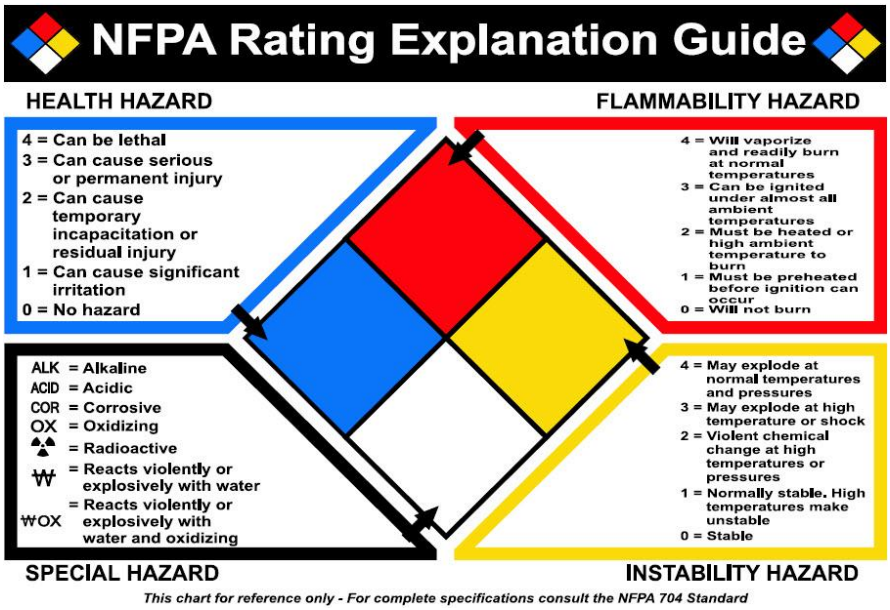
SPS 310.400(5)(c)

This requirement is very much performance based. Tanks, such as those located in bulk plants or at terminals, will be in compliance by maintaining the respective STI SP001 or API 653 standard. Tanks not managed under the STI or API standards must lend the ability for visual inspection of the outer shell. Visual inspection may be with the aid of a mirror or other optical devise. A single-wall tank with a double-bottom where the interstitial space can be monitored is also excluded.

SPS 310.400(7) Aboveground Tank Marking

The origin behind including the 10.400(7) NFPA 704 requirement in SPS 310 rests with industry's post 9/11 desire to move away from specific product labeling on tanks and the fire service's need for some information or knowledge of what hazards they may be dealing with in the event of an incident. Code revision discussion involved establishing tank capacity thresholds, but there were too many variables between products in which establishing tank capacity thresholds became too complicated, so there is no tank capacity threshold established in the code.

Requiring the NFPA 704 label was with the assumption and expectation that this requirement would not place an unnecessary burden on small business or small generators. The NFPA 704 hazard system is dependent upon knowing the characteristics of the product and 704 labeling guides have been developed to reflect acceptable 704 labeling for various unadulterated products used in industry. Used oil doesn't easily fit the mold for determining the equivalent NFPA 704 requirement; however, there are some companies that routinely store and ship used oil that have developed MSDSs.



Reviewing the code language we have determined that the SPS 310.300(4) tanks storing used oil signage requirement meets SPS 310.020 (7)(b) and trumps SPS 310.400 (7). Therefore, the NFPA 704 requirement is not necessary to be placed on used oil tanks, provide the required SPS 310.300 markings are in place.

The table below reflects typical NFPA numbering for various fuels, oils and vehicle service related products. *This table is not intended to trump individual MSDSs provided by the respective product vendor.*

Product	Health	Flammability	Reactivity	Special
Unleaded Gas	1	3	0	-
Diesel (#2)	0	2	0	-
Fuel Oil (#2)	0	2	0	-
Used Oil	1	1	0	-
New Oil (10W30)	0	1	0	-
Jet Fuel (JP-4)	1	3	0	-
Windshield wash concentrate (25°F flash point)	1	3	0	-
Transmission fluid	0	1	0	-
Racing gas	3	3	0	-
Ethanol	2	3	0	-
Methanol	1	3	0	-

SPS 310.410 Spill and overfill control

"Spill prevention" or "spill control" are terms used interchangeable and often taken out of context with the scope of the specific code or standard application. The term "controls" in section 10.410(6)(d) may be something other than a mechanical device. In other words, they are anything that will reliable prevent a loss of product at the fill point from reaching the environment.

The 1996 NFPA 30 Handbook (page 73) has narratives explaining the intent of the NFPA 30-22.11 spill control requirement. The focus is on overfills or a major break in a connecting pipe. There is not any reference to controlling releases from the nozzle. SPS 310 requires spill containment at the fill point for the following aboveground tanks:

- SPS 310.300(3) - requires used motor oil collection tanks to have screened spill containment at the fill opening.
- SPS 310.320 - required for stationary combustion engine tanks unless filled with hand nozzle that does not have a hold open devise.
- NFPA 30A - 4.3.2.8 - Aboveground tanks shall be provided with spill control that meets the requirements of 22.11 of NFPA 30. Tank fill connections shall be provided with a noncombustible spill containment device. SPS 310.410(7)(d) exempts tanks filled with a manual shutoff nozzle that does not have a latch-open device, and tanks filled with a tight-connect that has either a dry-break or shutoff valve at the tank connection. **Note**: With exception of used oil tanks, a dike or remote impounding is considered "spill containment." Spill containment may be the same as "secondary containment," but not in the case of a double-wall tank.

Federal and state laws prohibit filling a tank beyond 95% (alarm at 90% and shut-off at 95%) as a measure to prevent overfills that may result in a fire or environmental incident. Topping a tank off also has a risk of liquid moving into connections and devices not intended for liquid contact, possibly over-riding or damaging leak detection, safety devices or vapor recovery features. Unfortunately, some of the individuals representing the tank operator and ordering product exceeding the 90% capacity do not understand the risks or the mechanics of storage tank equipment.

Over-riding a shut-off or overfill prevention device is considered "tampering" and the department will pursue such actions through legal process.

In providing for overfill protection for storage tanks, the objective is to prevent product overflows that can result in environmental and fire safety losses. Because the level of risk varies from methodology to methodology, certain redundant features are required to maintain a minimum amount of risk. As alarms are only a warning of the impending overfill and do not provide a positive method of prevention, the requirement for automatic shut-down may apply. Consideration is given to the methodology that recognizes equivalent protection and oversight.

Type of Tank	Class of product	Spill control impounding	Overfill prevention
Field erected AST	Class I, II, IIIA	Yes	
Field erected located at terminal	Class I	Yes	Yes
Field erected Class IIIB	Class IIIB	No	Yes
Shop built single wall	Class I, II, IIIA	Yes	Yes
Shop built Class IIIB	Class IIIB	No	Yes
Double-wall AST ≤ 12,000 gal.	Class I, II, IIIA	No	Yes
Double-wall AST > 12,000 gal.	Class I, II, IIIA	Yes	Yes
UST	All	Spill bucket	Yes

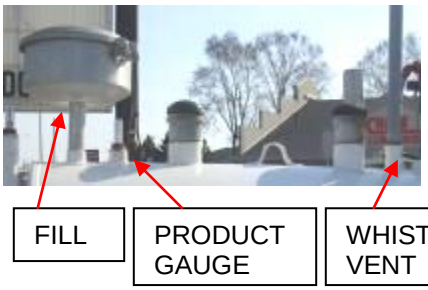
Spill and overfill for Class IIIB tanks

NFPA 30-22.11* does not include Class IIIB tanks in the spill control requirement. NFPA 30-21.7.1* does not exclude any class storage of a shop-fabricated AST from the overfill requirements.

SPS 310.410 lists the overfill requirements for the different types of fuel deliveries however does not distinguish these requirements for specific aboveground storage tank applications. The following examples are to be used as a reference guide for the overfill requirements on systems installed before or after August 1, 2009 and how they apply to the different types of fuel deliveries and storage tank applications.

Typical SPS 310 complying overfill and spill prevention configurations for aboveground storage tanks:

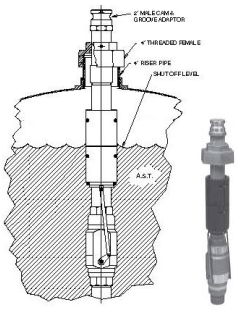
CONFIGURATION A: VEHICLE FUELING TANKS



APPLICATION: New & Existing S/W or D/W AST with tank top fill, filled with a manual-shutoff nozzle without latching device.

REQUIREMENT: Whistle vent or visual signal at 90% tank capacity.
Comm. 10.410 (7) and Comm. 10.615 (5)(m) if the AST is used for vehicle fueling.

CONFIGURATION B: VEHICLE FUELING TANKS



APPLICATION: New S/W or D/W AST tank for "vehicle fuel dispensing" with tank mounted tight connect.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95% tank capacity.
SPS 310.615 (5)(m) & NFPA 30A 4.3.6.3

APPLICATION: Existing S/W AST tank for "vehicle fuel dispensing" with tank mounted tight connect.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95% tank capacity.
SPS 310.615 (5)(m) & NFPA 30A 4.3.6.3 unless fill point is located in secondary containment.

CONFIGURATION C: DOUBLE WALL TANKS

APPLICATION: Existing & New D/W AST filled with tight connect or remote fill point using a delivery nozzle with latch-open devices.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95%.
SPS 310.410 (9) & NFPA 30 22.11.4.5

CONFIGURATION D: GENERATOR AND FUEL OIL SYSTEMS

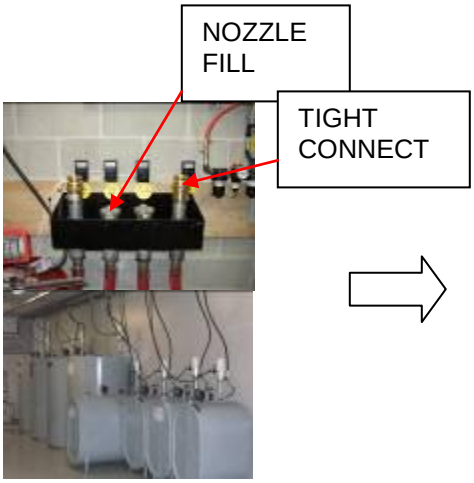
APPLICATION: New S/W or D/W AST with remote fill, filled with a manual-shutoff nozzle without latching device.
EXAMPLES:
- Generator tank in a building or structure – NFPA 37 Installation
- Fuel oil or waste oil tank in a building for heating purposes – NFPA 31 Installation.

REQUIREMENT: Audible & visual signal at 90% tank capacity. SPS 310.410 (8)

APPLICATION: New S/W or D/W AST with remote fill, filled with a tight connect or remote fill point using a delivery nozzle with latch-open devices.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95% tank capacity. SPS 310.410

CONFIGURATION E: LUBE OIL AND WASTE OIL PRODUCTS



APPLICATION: New S/W or D/W AST inside a building that stores **IIIB products** with tight connect or remote fill point using a delivery nozzle with latch-open devices.
EXAMPLES:
- "New motor oil" storage tank in a building.
- Waste oil tank in a building for heating purposes – NFPA 31 Installation.

REQUIREMENT: Audible & visual signal at 90% tank capacity.

EXISTING AST TANKS: If reviewed and approved under a former code; no additional overfill devices required.

Substantiation: Current industry overfill valves may not work properly with heavy weight oils or waste oils.

CONFIGURATION F: LUBE OIL AND WASTE OIL PRODUCTS

APPLICATION: New IIIB product AST with tight connect or remote fill point using a delivery nozzle with latch-open devices.
EXAMPLE:
- Waste oil tank at asphalt plant

REQUIREMENT: Audible & visual signal at 90% tank capacity.

Substantiation: Current industry overfill valves may not work properly with heavy weight oils or waste oils.

EXISTING AST TANKS: If reviewed and approved under a former code; no additional overfill devices required.

Substantiation: Current industry overfill valves may not work properly with heavy weight oils or waste oils.

CONFIGURATION G: BULK STORAGE FACILITIES

REMOTE FILL IN TRANSFER CONTAINMENT

APPLICATION: Existing bulk plant with S/W AST tanks with tight connect or remote fill point using a delivery nozzle with latch-open devices, with fill point located in a transfer containment or diked area.

REQUIREMENT: No additional overfill components required if the fill point is located in the transfer or tank. containment.

APPLICATION: New bulk plant with S/W AST tanks with tight connect or remote fill point using a delivery nozzle with latch-open devices, with fill point located in a transfer containment.

REQUIREMENT: SPS 310.340 & PEI RP-800

CONFIGURATION H: INDUSTRIAL FACILITIES

TIGHT CONNECT IN CONTAINMENT

APPLICATION: New S/W AST with secondary containment with tight connect or remote fill point using a delivery nozzle with latch-open devices, with fill point located in a transfer / diked containment.

REQUIREMENT: Audible and visual signal at 90% tank capacity. NFPA 30 28.4.1 requires a separation of 15 ft. for combustible liquids and 25 ft. for flammable liquids from tank to transfer connection.

APPLICATION: New S/W AST with secondary containment with tight connect or remote fill point using delivery nozzles with latch-open devices.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95% tank capacity. SPS 310.410 (9)(a)

CONFIGURATION I: INDUSTRIAL FACILITIES

APPLICATION: Existing S/W AST with secondary containment with tight connect or remote fill point using delivery nozzles with latch-open devices located in a transfer or tank containment.

REQUIREMENT: If reviewed and approved under a former code; no additional overfill devices required.

APPLICATION: Existing S/W AST with secondary containment with tight connect or remote fill point using delivery nozzles with latch-open devices.

REQUIREMENT: Audible & visual signal at 90% tank capacity and automatic shutoff at 95% tank capacity. SPS 310.410 (9)(a)

Conclusion: It is the application of the storage tank and how the tank will be filled that will determine the required overfill method for each specific condition and use.

Where a visual signal is required we allow the gauge if the gauge can be distinctly read from the immediate transfer area the delivery person is attending. If for example, the delivery driver has to move away from the immediate transfer area or climb over a dike wall to get closer to the gauge to read it, the visual signal must be a light.

Some ASTs are required only to have a high level alarm at 90% capacity. In situations of very large tanks this may leave ullage of 4,000 gallons or more. Operators or contractors have asked for approval to raise the high level alarm activation level in order to accommodate more product transferred into the storage tank reducing what is considered excessive ullage space. The high level alarm is an alerting mechanism intended to signal at the 90% capacity level subsequently alerting the operator that steps need to be taken to control the transfer of product into the tank. NFPA 30-21.7 Prevention of Overfilling of Storage Tanks implies that with procedures there is some “wiggle-room” to manage product transfer into the storage tank. Putting this in regulatory application, product level above 90% capacity is not a violation. Since the accepted threshold for auto shutoff in most storage transfer situations is 95% we would consider capacity above 95% in non compliance with the code.

SPS 310.420 Secondary containment

Secondary containment may be a double-wall tank, a dike or remote impounding. An underground holding tank would be considered remote impounding.

Concrete containment must be poured; block and mortar is prohibited. Any seams, joints or stress relief cuts for concrete or steel containment must be visible for inspection. Joints, seams and relief cuts that can not be visibly inspected due to the placement of tanks, appurtenances, equipment or structures must be sealed with a product compatible liquid-proof spray coating. Caulk alone is not sufficient. The width or area of the spray coating does not have to cover the entire foot-print area of the tank, etc., but must be sufficient to maintain adhesion and provide long term integrity from stress and aging.

The seams of synthetic liners are pliable; do not pose the degree of cracking from expansion and contraction and therefore excluded from the requirement that they be visible for inspection. In fact, most synthetic dike liners require covering with clay or other suitable material that has been approved by the liner manufacturer and are not inspectable. For any portion of a synthetic liner that is not covered, the department's expectation is for annual owner/operator visual inspection for evidence of liner tears, blistering, and seam delamination; unless the manufacturer has other written requirements, in which case those should be followed.

NFPA 30 currently limits the size of secondary containment tanks to 12,000 gallons for Class I products and 20,000 for Class II and Class III products. SPS 310.420(3) allows for the use of secondary containment tanks up to the UL 142 or API design capacity limits.

Containment for existing storage facility containment does not have to be upgraded to current rule for the following:

- Increasing the size of an existing tank, as long as the existing dike capacity with the increased tank capacity and tank setback meets the code requirement.
- Replacing an existing tank with a tank of similar size and configuration, as long as the dike capacity and setback requirements are maintained with current code requirements.
- Replacement of piping associated with the tanks in the containment area.
- Replacement of existing dike wall due to deterioration

Containment for existing storage facility must be upgraded to current rule 125% capacity requirement for the following:

- Addition of a tank to the containment area.

Prior to the SPS 310- 2002 code revision, the previous editions (April 1991; August 1999) of the code under s. SPS 310.345(2)(c) allowed as an upgrade/equivalency option for existing tanks that were not in secondary containment or of double wall construction the addition of an internal lining. The internal lining was credited for providing an equivalent protection to a secondary containment system. As part of this requirement the lining had to be inspected within 10 years after installation and every 5 years thereafter to ensure the lining maintained structural integrity and is performing in accordance with the original design specifications. For tanks that were upgraded under this equivalency option, the inspection schedule was to continue to remain in effect for the life of the tank as long as the lining was being credited for providing secondary containment. However, due to the need for tank emptying, cleaning, and entry to perform the lining inspection, the department has decided to coincide the lining inspection intervals with the required internal inspections as specified by either the API 653 or STI SP001 standards as applicable. API 652-2005 as adopted provides the recommended inspection parameters for lined aboveground tanks and the requirements for qualification of personnel as follows; "All lining inspectors should be either NACE or SPCC certified, or persons who have demonstrated a thorough knowledge of coating and lining practices."

In an attempt to parallel the application requirements of the US EPA SPCC 40 CFR 112 regulations, containment for the area associated with the transfer of product from the transport to storage tank (referred to as "Transfer Operations" in SPS 310.420(5)) is made more visible in the code. The objective

of this revision is to resolve the past federal SPCC enforcement problems many owners had after installing a system or upgrading a system to comply with SPS 310 and then face reconstruction costs and potential high penalties for failing to meet the federal SPCC transfer containment requirements. Mistakenly, many believe that the transfer point containment requirement only applies to bulk plants or terminal operations when in fact the EPA rule applies to a much broader population of tanks. Providing transfer operations containment by engineered design to direct the flow of a release from the transport vehicle to the tank containment is allowable provided the liquid pools in a corner of the containment dike or around the containment wall rather than around the tanks.

According to the US EPA SPCC , tank trucks are generally regulated under SPCC at a facility when that facility is required to have an SPCC plan and the tank trucks are used to store a SPCC regulated (or SPS 310) product. These would be considered portable storage tanks and would make no difference whether they were connected to or separated from a tractor when parked. The 1,320 gallon SPCC threshold applies and the tank truck's volume needs to be included in the threshold volume calculation in determining the applicability of the SPCC Regulation. When tank trucks are being used solely for delivery purposes and not for storing oil while in a facility, DOT is considered the regulator, not US EPA or SPS 310. In this case, the volume of the tank truck(s) is not included in SPCC threshold volume determination. These tank trucks would not be permitted to contain oil at any time except when they were on site for the purpose of filling the storage tanks or are being filled for the purpose of making a delivery outside the facility. Such tank trucks must be kept emptied of all oil while being parked in the facility (e.g., all day or over-night) to escape being regulated by SPCC.

NFPA 30 and SPCC do not require self-closing valves on secondary containment. However, both organizations expect the activity of draining a dike to be physically monitored while the dike is open and at all other times the secondary containment to be tight. The SPS 310 requirement for a self-closing valve was incorporated as the result of numerous experiences with open drain valves on secondary containment. Add the fact, as the DNR has pointed out to us, that a significant number of bulk storage facilities are located adjacent to creeks, drainage ditches and wet-lands.

Remote impounding for tanks inside buildings
The International Building Code (2009) Section 414.5.5 discusses that rooms, buildings or areas occupied for the storage of liquid hazardous materials shall be provided with a means to control spillage and to contain or drain off spillage and fire protection water discharged in the storage area in accordance with the International Fire Code (IFC). IFC Section 2704 applies to the storage of hazardous materials. You can view this section online from this link

SPS 310.425 Tank lining of aboveground petroleum storage tanks

Department policy will be to accept lining of aboveground tanks only if they have been inspected and repaired prior to lining in accordance with the following:

- For **Field fabricated tanks**: inspected and repaired per the latest edition of API 653 as adopted in the current edition of SPS 310. (See below for exception)
- For **Shop-fabricated tanks**: inspected per STI SP001 and repaired per the latest edition of STI SP031 as adopted in the current edition of SPS 310.

The department recognizes the STI SP001 standard allows for the inspection of small field-fabricated tanks as defined within the scope of the SP001 Appendix B, therefore, STI SP001 Appendix B can be used for inspections of that category of tank. However, repairs for the small field-fabricated tanks will have to be performed per API 653 requirements.

SPS 310.430 Vehicle collision protection

Tanks that are located inside and outside of buildings are required to have collision protection if they are located adjacent to vehicle traffic lanes. Setbacks from public ways are defined in NFPA 30 and 30A. Traffic lanes on private property are not defined so reason and logic must be applied. Like wise the method and integrity of the form of collision protection must be related to the vehicles that frequent the site. Collision protection designed for protection against an automobile traveling at 15 miles per hour would not be adequate for larger construction industry related vehicles.

Tanks, such as those used for motor oil storage, located in vehicle service areas adjacent to the service bay are not considered to be in a traffic area. Vehicles driving into traffic bays are moving at very slow controlled speeds where turning and backing is very restricted and generally supervised.

In many situations the secondary containment may be approved as providing adequate collision protection. UL 2085 listed tanks may have such an approval if they have passed the optional vehicle impact test.

SPS 310.440 Aboveground tank inspection

Over the past 10 years Wisconsin has experienced environmental contamination and the subsequent cleanup costs from aboveground storage tanks that to a significant degree could have been prevented if adequate leak detection or periodic inspection requirements would have been in place. Tank bottoms are not visible and PECFA history reflects a significant number of leaks from AST bottoms. A 2001 AST upgrade requirement did not impact the complete population of ASTs and API 653 management programs became an equivalency trade-off for some field-erected tanks. Additionally, some public concerns advocate the need for leak detection requirements on ASTs, similar to USTs and/or mandating double bottom tanks with interstitial monitoring. Current day leak detection for ASTs has not been perfected to the accuracy of UST leak detection. Accurate inventory control (IC) is based on accurate volume measurements reconciled with accurate throughput measurements. Two major problems with aboveground tank IC hinder its usefulness as an economical form of leak detection: 1) the impact of ambient temperature on tank volume measurement, and 2) inaccurate throughput measurements. The constant fluctuation of ambient temperature causes the product temperature to fluctuate which in turn causes the liquid to expand or contract, which results in the measured tank volume to fluctuate without any actual loss/gain of mass. The accuracy of meters is frequently questionable, they are seldom correctly positioned at the tank or in adequate number (2) for accurate leak detection; and like tank volume are affected by the temperature of the product coming in. The larger the tank capacity and throughput, the greater the inaccuracy of any IC method.

Rather than require a daily leak detection method that has known deficiencies, the code requires a leak detection methodology via periodic inspection that is reliable and over the long term provides more trouble free management. The code requirement for periodic internal integrity inspection for aboveground tanks is incorporated in the rule via adoption of the API 653 and Steel Tank Institute STI SP001 standards as a preventative measure and an equivalent measure that also is recognized by the Federal EPA SPCC as meeting federal requirements. This SPS 310 requirement applies to tanks 1,100 gallon capacity and greater. The API 653 standard does not prohibit its application to shop-fabricated tanks, as long as consideration is given to the specific tank construction and operating details, the standard may apply to any steel tank constructed in accordance with a tank specification. It is advised however, that the wholesale application of the API 653 standard to shop-fabricated tanks should be used with some care. The STI standard addresses inspection issues with double wall; horizontal-cylindrical; and rectangular tanks in a very comprehensive, clear, concise way, while the API 653 standard leaves many of the inspection points and techniques up to the judgment of the individual inspector. Recognizing that the API 653 Standard was developed primarily for large storage tanks in a vertical configuration, and the fact that individual inspectors would apply the API 653 standard in varying degrees of comprehensiveness, it is encouraged that inspections of shop-fabricated tanks be performed to the STI standard, particularly for double wall; horizontal-cylindrical; or rectangular tanks.

The July 2006 revison to the STI SP001 standard was developed using the principles of risk analysis to develop an inspection schedule matrix. The key tenant behind the matrix development was that those tank systems that were by design able to better protect the environment from the consequence of a spill were specified fewer and less rigorous inspection requirements. The matrix itself is divided by size of tank and category. Category 1 tank systems have spill control and a release prevention barrier (RPB) which can be double wall, double bottom tanks, or steel, concrete, lined dikes. Category 2 tank systems have spill control without an RPB. An example of a category 2 tank would be a tank in an earthen dike. A category 3 tank has no spill control or RPB. An example of a category 3 tank would be a tank sitting on the ground in an open field.

Development and implementation of the inspection schedules for the API 653 standard must begin within one year after the effective date of the SPS 310 rule revision, February 1, 2009. The inspection intervals required under the API 653 standard shall be based on the tanks initial service date.

For tanks using the STI SP001 standard that were placed in service prior to February 1, 2009, development and implementation of the certified inspection schedules must begin within four years. However, the department's intent is that monthly and annual owner inspections would begin for these existing tanks immediately after the code effective date of February 1, 2009. The certified inspection intervals required under the STI SP001 standard shall be based on the tank's time in service. For example; a double wall tank (STI SP001 category 1) tank that is greater than 5,000-gallons capacity and has been in service for 20 years or greater, shall have a Formal External Inspection (FEI) performed by a certified inspector prior to the implementation deadline of February 1, 2013. A similar tank that is only 15 years old would require a FEI performed within 5 years based on the tank age, however the inspection schedule would have to be developed and documented by February, 1 2013. Again, for both tanks, the monthly and annual owner inspections would begin immediately.

For tanks using the STI SP001 standard that are placed in service after the February 1, 2009, development and implementation of the inspection schedules must begin immediately.

Overview of STI SP001
Standard for the Inspection of Aboveground Storage Tanks

The Steel Tank Institute (STI) SP001 Standard for the Inspection of Aboveground Storage Tanks was developed to meet the federal SPCC periodic tank assessment requirement and was adopted by the 2002 edition of SPS 310. The adoption of the STI SP001 inspection standard within SPS 310 provides many benefits to the regulated community; the prime benefit being the reduction in the number of catastrophic equipment failures that lead to costly environmental damage and immediate and long-term human health consequences. The Wisconsin regulated community also benefits by the ability to use one document to meet both state and federal regulatory code requirements.

As part of the 2008 SPS 310 code revision many of the adopted standards have been updated to their latest revision. The Steel Tank Institute's SP001- 4th edition was revised and reissued in July of 2006. The STI standard revision committee was a part of an industry collaborative effort, with members composed of an equal number of stakeholders representing the Petroleum Marketers of America Association, Steel Tank Institute tank manufacturers, and State and Federal regulatory agencies. The scope of the revised standard states it applies to the inspection of aboveground storage tanks storing stable, flammable and combustible liquids at atmospheric pressure with a specific gravity of less than approximately 1.0 and operating temperatures of between ambient and 200 degrees F. As adopted within the proposed 2008 SPS 310 code revision, sub-section 10.440(3)(a), the standard applies to all shop-fabricated metallic aboveground tanks except to tanks with a capacity less than 1,100 gallons, heating oil tanks, and tanks at farms and construction sites. The owner's inspector is responsible for performing the periodic AST inspections and documenting the results using checklists provided within the standard or by the department. The owner of the tank can also develop their own checklists provided they include, at a minimum, all of the checklist items from the standard.

The main purpose of this SP001 revision was to address the federal SPPC requirements and expectations relating to the inspection, integrity testing, and environmental equivalence (40CFR112.8(c)(6) and 112.7(a)(2)) as it relates to on-shore aboveground bulk storage containers. This latest revision was a complete rewrite from the previous edition and encompassed a number of the "risk-based" inspection concepts that have been used successfully in many industries over the last decade. All of these requirements and concepts are addressed within the SP001-4th edition document. Several examples where these requirements and concepts have been included within the SP001 document are provided in the following narrative.

The main idea behind risk-based inspections is that equipment with the highest potential for failure that will result in the worst consequence are inspected for failure mechanisms more often than the equipment that has neither the highest potential for failure nor the worst consequence. This benefits all stakeholders; regulators, equipment owners and the community at large by reducing the number of catastrophic equipment failures that lead to costly environmental damage and immediate and long-term human health consequences. Typically a risk-based approach develops an inspection matrix table which accounts for the probability of occurrence and consequence. The SP001 Standard is a hybrid approach which uses a matrix approach to develop inspection schedules that balances tank size (consequence- or quantity potentially released) with the type of containment and Continuous Release Detection Method (probability of occurrence- will it be released to the environment). Before a discussion of the matrix itself, it is beneficial to understand the following SP001 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 AST or double-bottom AST
- Elevated AST with release prevention barrier described in the definitions of elevated AST and release prevention barrier.

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.

SPILL CONTROL - a means of preventing a release of liquid to the environment including adjoining property and waterways. Methods include the following:

- Remote impounding
- Secondary containment dike/berm (concrete, clay, steel, geosynthetic and synthetic liners)
- Secondary containment AST
- Secondary containment system (as defined in 40 CFR 112)

A simple test for what is adequate spill control is to refer to the saying: “If it doesn’t hold water, it should not be considered adequate for spill containment.”

The inspection matrix within SP001, formally designated as **Table 5.5 Table of Inspection Schedules**, was developed by categorizing different types of tank installations into 3 main categories based on whether or not the tank had spill control and a CRDM. AST categories used in Table 5.5:

- 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

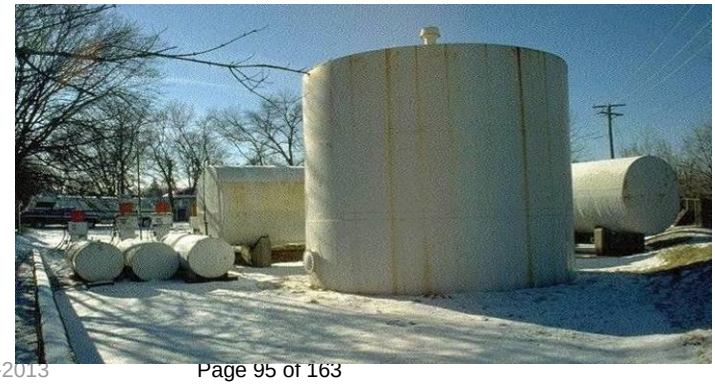
An example of each of the tank categories follows:

(a) Category 1 - ASTs with spill control, and with CRDM

Double-wall tank: serves as both a method of spill control and as the CRDM

Double-bottom tank (CRDM) **in a concrete dike** (spill control)

(b) Category 2 - ASTs with spill control and without CRDM



Single-wall tanks with spill control, but no CRDM (set on an earthen floor)

(c) Category 3 - ASTs without spill control and without CRDM

Single-wall tank directly on soil (no CRDM)
and without spill control

As discussed previously, the key to the SP001 document is the risk-based inspection matrix shown below; **Table 5.5 Table of Inspection Schedules**. Understanding of how this table should be interpreted is vital to proper implementation of the standard.

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**

** Owner shall either discontinue use of portable container for storage or have the portable container DOT (Department of Transportation) tested and recertified per the following schedule (refer to Section 9.0):

- Plastic portable container - every 7 years
- Steel portable container - every 12 years
- Stainless Steel portable container - every 17 year

Table 5.5 Table of Inspection Schedules uses the following designations for inspection type and interval:

- 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.

Periodic inspections (P) are conducted by the owner's inspector and consist of monthly and annual visual inspections. Checklists for those inspections are provided within the standard.

Formal external inspections (E) are conducted either by a STI Certified SP001 AST Tank System Inspector or an API Standard 653 Authorized Inspector with STI SP001 Adjunct Certification. A formal external inspection would normally consist of a comprehensive visual inspection and spot ultrasonic thickness measurements. For a formal external inspection if a tank does not have an entry manway none would be required to be added since tank entry is not required nor expected to complete the inspection. It should be noted that double-wall tanks do not require spot ultrasonic thickness measurements.

Formal internal inspections (I) are also conducted by the same certified inspectors as the formal external inspections, and include the same requirements, with the addition of an internal examination that includes both visual and NDE examinations. Elevated ASTs where all external surfaces of an AST are accessible may be examined externally in lieu of an internal exam.

Leak testing (L) consists of either a vacuum or pressure test.

Note that the majority of tanks within Wisconsin will fall within category 1 due to the comprehensive Wisconsin secondary containment requirements. Tanks that are stored inside buildings would also be in category 1 with the inspection type and intervals following the category 1 requirements. To help illustrate the categorization of various tank configurations and the use of Table 5.5, the SP001 standard provides a table of examples illustrating some typical tank types and their corresponding AST categories.

TANK CONFIGURATION	TANK HAS CRDM?	TANK HAS SPILL CONTROL?	AST CATEGORY
Single wall AST in contact with ground	no	no	3
Single wall AST in contact with ground	no	yes	2
Elevated tank	yes	yes	1
AST with RPB	yes	yes	1
AST with double bottom	yes	yes	1
Double-wall AST with overfill prevention	yes	yes	1
Double-wall AST without overfill protection	yes	no	3
Vertical tank resting on concrete (conforms with definition of RPB)	yes	yes	1
Vertical tank resting on concrete (conforms with definition of RPB)	yes	no	3

In the first example using the table above, a single wall tank would be placed in category 2 or 3 depending on whether or not it had a method of spill control (approved secondary containment or remote impoundment- see photo). As determined from the SP001 Table 5.5 Table of Inspection Schedules, a shift in classification from category 3 tank systems to a higher classification can have a significant impact on inspection requirements, while at the same time, reducing probability of a spill, consequences of a spill, and ultimately tank system life-cycle costs. The benefit to the owner increases as the tank system is upgraded with the most benefit attained by moving into the category 1 classification.

Category 2 tank system: 30,000 gallon AST in contact with the ground (earthen floor) and with spill containment (concrete dike walls). Inspection requirements: Monthly and annual owner inspections; formal external inspection by certified inspector every 10 years; and formal internal inspection by certified inspector every 20 years.

Category 3 tank system: 30,000 gallon AST in contact with the ground- no spill containment. Inspection requirements: Monthly and annual owner inspections; formal external inspection and leak test by certified inspector every 5 years; and formal internal inspection by certified inspector every 10 years.

In the next example using the table above, a single wall tank up to 5,000-gallon capacity elevated aboveground (CRDM) and in an approved secondary containment dike or with remote impounding would be placed in category 1 and require only monthly and annual periodic inspections for the life of the tank. A single wall tank from 5,000 to 50,000-gallon capacity elevated aboveground (CRDM) and in an approved secondary containment dike or with remote impounding would require monthly and annual periodic inspections for the life of the tank, plus a formal external inspection every 20 years. These intervals would apply for the rest of the category 1 tank examples; in fact it applies for any tank that is in category 1. Note again that the majority of Wisconsin tanks will fall within category 1. The 20 year interval for a certified formal external inspection was determined by the committee to be a reasonable timeframe for an enhanced inspection based on industry operating experience from the tank manufacturers, tank owners, and the regulators.

Category 1 tank system: 5,000 gallon or less double-wall tank. Inspection requirements: Monthly and annual owner inspections for life of the tank.

Category 1 tank system: 5,001- 50,000 gallon double-wall tank. Inspection requirements: Monthly and annual owner inspections; formal external inspection every 20 years.

Category 1 tank system: 5,000 gallon or less single-wall tank in a dike. Inspection requirements: Monthly and annual owner inspections for life of the tank.

Category 1 tank system: 5,001- 50,000 gallon single-wall tank in a dike. Inspection requirements: Monthly and annual owner inspections; formal external inspection every 20 years.

Category 1 tank system: 5,001- 50,000 gallon single-wall elevated tank with spill control. Inspection requirements: Monthly and annual owner inspections; formal external inspection every 20 years.

One item to note is that the scope statement for STI SP001 specifically states under section 1.5.2: "This standard applies to ASTs storing stable, flammable and combustible liquids at atmospheric pressure with a specific gravity less than approximately 1.0." Since the STI standard was developed for the inspection of shop-fabricated tanks which are constructed primarily to the UL 142 standard, the specific gravity limitation of both standards is the same. However, there are instances where UL has allowed the specific gravity to exceed 1.0 for a UL 142 listed tank. In those instances, UL provided approval to exceed the specific gravity limitation in the manufacturers Follow-up Service Listing. This deviation from the UL 142 standard is and has been acceptable to the department as long as UL permission is granted and documented thorough the Follow-up Service Listing documentation. Even though the STI standard limits the scope to a tank containing products with a specific gravity to 1.0 or less, since UL does allow some tanks to exceed a specific gravity of 1.0, the department would allow the application of the STI standard to a UL listed tank approved to store products that exceed a specific gravity of 1.0. The return to service criteria would apply dependant on the tank category as specified by the STI standard with no changes.

With the publication of the 5th Edition of the STI SP001 standard in September 2011, additional inspection items were added to the monthly and annual inspection checklists to more thoroughly cover the inspection of tank components that are added to the tank as part of the tank installation such as, vent, flame arrestors, overfill devices, etc.

This document is provided as a brief overview of the STI SP001 requirements for steel shop-fabricated aboveground storage tanks. This is only an overview of the standard requirements, for full regulatory compliance purposes it is expected that the standard would be reviewed and implemented in its entirety. The standard can be purchased by contacting STI at:

847/438-8265
info@steeltank.com
https://www.steeltank.com/Publications/PublicationsIndex/tabid/108/Default.aspx

Use of alternative inspection procedures

SPS 310.440(3)(a)2.a. allows for the use of an alternative inspection procedure that provides equivalent environmental and fire safety protection if submitted to and accepted in writing by the department. In addition, site-specific integrity inspection plans that were developed by a certifying engineer in accordance with the federal spill prevention, control, and countermeasures regulations (SPCC) in 40CFR112 may be allowable on a case-by-case basis. In either case, these alternatives would be acceptable only if written justification was provided for not using the API or STI standards and the proposed alternative was determined by the department to be at least as comprehensive and rigorous.

Inspection of API 620 tanks and ASME Pressure Vessels

The majority of flammable and combustible liquids and hazardous liquids are stored under atmospheric conditions and are contained in either shop-fabricated or field-fabricated storage tanks. Some examples of these types of liquids are gasoline, diesel, fuel oil, petroleum based lubricants and some hazardous chemicals. There are other liquids that fall within the scope of SPS 310 that are typically stored in tanks at pressures greater than atmospheric. For these types of storage tanks the following inspection guidance has been developed dependant on the design basis of the storage tank:

ASME pressure vessels with an internal or external operating pressure of greater than 15 psig (≈29.7 psia), are required to have periodic inspections per SPS 41.

ASME pressure vessels with an internal or external operating pressure of less than 15 psig (≈29.7 psia) are to have periodic inspections per API 510 and RP 575.

API 620 vessels are to have periodic inspections performed based on API 653 and API RP 575

Non-metallic Aboveground Tanks

Chemical incompatibility with steel tanks generally results in chemical storage tanks constructed of fiberglass or plastic type material. Due to the variety of chemical products and chemical tank construction materials the industry has not yet developed specific tank integrity testing standards. As a result, the industry relies heavily on inspector's experience and expertise along with the manufacturer's predictions of the tank's expected performance based on the product that is stored. Due to the inherent material characteristics of plastic and Fiberglass Reinforced tanks (FRP), ultrasonic thickness testing is generally not considered a valid method for inspection of these types of tanks. For FRP tanks, a common testing methodology is to employ acoustic emission testing such as ASTM E 1067, Standard Practice for Acoustic Emission Examination of Fiberglass Reinforced Resin Plastic (FRP) Tanks/Vessels. For plastic tanks, a static head test in conjunction with either a Barcol hardness of the tank internal surface or an external visual inspection; either of which should be able to detect embrittlement, has been successfully used in determining suitability for continued service. In all cases, the inspector conducting the inspection should be knowledgeable of the characteristics of the product being stored, the tank material under inspection, and the typical failure scenarios.

It is also important to note that most plastic or FRP tank manufacturers use materials with a limited life span, so plastic and FRP tanks should be replaced once past the manufacturer time limits. Plastic tanks should not be repaired once damaged is evident (cracks, blisters, distortion, swelling); unlike steel tanks, structural damage cannot be repaired.

Submittal of periodic assessment records

SPS 310.440(6) requires that API 653 or STI SP001 periodic assessment reports be submitted to the department for tanks that have walls or floor constructed of earth or masonry. Clay is considered earth and block and mortar are considered masonry. Submitting inspection reports to the department for walls

or floors constructed with an earthen material and a synthetic liner or constructed of poured concrete is not required. Concrete is not considered “masonry.”

SPS 310.445 Seldom-used tanks and temporary out-of-service tanks

Reserved

SPS 310.450 Changes in service

Refer to the definition section of SPS 310.

SPS 310.460 Closure of aboveground tanks.

Refer to Compendium section SPS 310.560.

SPS 310.465 Tank closure assessment

Refer to Compendium section SPS 310.565.

SPS 310.470 Confirming and responding to a release.

Refer to Compendium section SPS 310.570, 10.575 and 10.580.

Miscellaneous AST technical and regulatory items.

Fire valves on tanks

With the exception of bulk plants, the only reference (including API 2610, IFC 3403.6.7 & 3404.2.7.5.1, NFPA 31 and NFPA 37) to a fire actuated valve requirement is in NFPA 30-24.14 (Tank Openings Other than Vents for Tanks inside Buildings).

NFPA 24.14.3 Each liquid transfer connection on any tank storing Class I or Class II liquids inside buildings shall be provided with one of the following:

(1) A normally closed remotely activated valve
(2) An automatic-closing, heat-activated valve
(3) Another approved device

Exception: Connections used for emergency disposal or to provide for quick cutoff of flow in the event of fire in the vicinity of the tank need not meet this requirement.

NFPA 30-22.13.1 Tank openings other than vents for aboveground tanks. Each connection to an aboveground tank which liquid can normally flow **shall** be provided with an internal or an external valve located as close as practical to the shell of the tank." applies to the typical gate or butterfly valve. It does not state or apply to an "automatic/fire or heat actuated valve." Also the code commentary expresses the liabilities of using such a valve. Please refer to the commentary in the hard cover 1996 version of NFPA 2-3.8.1 (page 106).

Since NFPA 30-22.13.1 and 24.14.5 includes similar language: "Each connection through which liquid can gravity flow from a tank inside a building shall be provided with an internal or an external valve located as close as practical to the shell of the tank.", it is our opinion that the additional and specific requirements of paragraph 24.14.3 for tanks inside buildings are not inclusive to all ASTs.

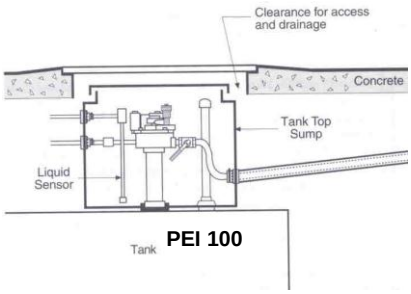
SPS 310.200 adopts PEI RP 800 - Recommended Practice for Installation of Bulk Plants. Newly installed bulk plants tanks, installed after October 2008 are required to have fire valves.

Subchapter VI – General UST storage

SPS 310.500 General requirements

Subchapter VI applies to underground storage tanks and underground pipe associated with both underground or aboveground tank storage systems.

The SPS 310 code and associated standards require a means of access to inspect, maintain and repair underground components, such as valves, and equipment that is located within containment, such as pipe connections, submersible pumps and leak monitoring devices. Due to the range of configurations and equipment options, the code and standards approach this in a performance-based fashion, rather than prescriptive based with specific dimensions. The performance concept is that the access way and associated cover will provide adequate room to accommodate installation, repair activities, sufficient mobility with tools within the containment area, and ease of access for inspections; along with providing a liquid tight seal or placement to prevent intrusion of groundwater or surface water. Heaving, settling and lateral movement of the surrounding concrete slab must be factored into the containment equipment and design. PEI/RP 100-2005, Chapter 8 Secondary Containment provides a performance-based schematic to emphasize the point.



PEI 100

No clearance

Adequate clearance

Pipe construction materials for underground piping typically are of two types: rigid, traditionally steel or fiberglass material, and flexible, typically a polymer and/or nylon material. Each type has an advantage in specific situations. Each has specific installation and site specific advantages and disadvantages. Each has installation standards or conditions that if not followed have the potential for releases and costly response and repair actions. While flexible pipe has an advantage over rigid pipe with ease of installation and no buried connections, flex piping has experienced pipe elongation as reflected in the adjacent photo. The cause is not always specifically known, but believed to be a combination of installation practices and exposure to hydrocarbon liquids or vapors.

Flex pipe elongation

The PEI RP 100 standard continues to maintain the traditional burial depth and trench slope dimensions. Section 10 specifically addresses piping systems and continues to require the 1/8 inch per foot slope for all piping back towards the underground storage tank. The standard however, does not require that the entire product piping run always drain toward the tank. Section 10.11-3 allows configurations of piping to drain into dispenser sumps for secondarily contained or double walled systems and depending on the distance between dispenser sumps and the tank sumps, an intermediate sump may be needed to maintain a 1/8 inch per foot slope between connecting sumps.

The following facts and observations associated with double walled piping are used in the development and support of this requirement.

- A consistent piping slope permits any vapors trapped within the system, which can adversely affect the operation of the leak detection system, to be purged from the high end of the piping, Thermal contraction of trapped vapor can simulate a leak, causing a higher probability of false alarm.
- Sloping of the pipe enhances testing and leak detection, improves performance of check valves, and facilitates the draining of the pipe system for maintenance, repair, removal or abandonment. The historical perspective of the slope requirement will also help prevent unnecessary problems during the previously mentioned operations or activities.
- If piping is installed level (primarily with flexible piping), the earth/backfill may settle unevenly causing traps, which can adversely affect the operation of the system (venting, leak detection, etc.). When utilizing interstitial monitoring, traps in the secondary piping could result in a delay in detecting the leak.

In an effort to address our concerns, as well as recognize the PEI/RP 100 standard and manufacturer's installation requirements, the Department will maintain the following requirements:

- The pipe run between the tank and the first dispenser must be sloped to drain a minimum 1/8 inch per foot back to the tank sump. The tank sump must also include a *non-discriminating electronic* sensor.
- *All* new dispenser sumps must include *non-discriminating electronic* sensors even if the pipe configuration allows for pipe drainage to the succeeding sumps.
- All new dispenser sumps must include *non-discriminating electronic* sensors even if the pipe configuration allows for pipe drainage to the submersible sump via a connecting flow tube.
- All new piping transition sumps must include *non-discriminating electronic sensors*.
- When piping systems are unable to maintain the required piping pitch back to the underground storage tank and requires the installation of a solenoid valve immediately downstream of the submersible pump to prevent siphoning of the tank contents, additional leak detection devices maybe required and the leak detection manufacturer shall be contacted to determine the proper location for the line-leak detector.
- The requirement for single wall systems remains unchanged with regard to burial depth, pipe slope and leak detection requirements.

Section 3.01
Section 3.02Plan review submittal
Unless specific information is provided, the reviewer will address the plan as a flat site with system design maintaining a constant slope from the furthest dispenser to the tank. To convey the topography, dispenser and pipe logistics to the reviewer, the Scope of Work should include a description of the unique characteristics of the facility for which the alternative pipe configuration is warranted.

SPS 310.500 (1) Secondary Containment
(a) General. All new and replacement underground storage tanks and piping systems shall be provided with secondary containment and continuous electronic interstitial monitoring, except as provided in par. (b).

SPS 310.500 (5) Secondary Containment For Piping
(a) 1. When any underground product piping is installed as part of a new tank system or when 50 percent or more of a run is replaced, the piping shall be provided with approved secondary containment with non-discriminating electronic interstitial monitoring, except as specified in subd. 2.

- Existing submersible sumps and dispenser sumps will not require non-discriminating interstitial monitoring until December 31 2020
- All existing pipe connections at the top of the tank and beneath all freestanding pumps and dispensers that routinely contain product shall be placed within secondary containment sumps by (12/31/2020) Sump upgrades during this five year period will not require non-discriminating interstitial monitoring at the completion of the sump upgrade until 12/31/2020.
- Any existing dispenser that shows visible contamination shall have a liquid-tight secondary containment sump installed under it by December 31 of the next calendar year. Non-discriminating electronic interstitial monitoring shall be installed by 12/31/2014.
- Replacement islands / sumps will require secondary containment and non-discriminating interstitial monitoring at the time of the replacement or addition as required in SPS 310.500.

Containment or double-wall construction
Section SPS 310.500(5) and SPS 310.615(5) require all dispenser and tank sumps and underground pipe that is new or replaced to be provided with secondary containment. This requirement includes additional fire safety and environmental safeguards resulting from shortcomings of the previous code requirements.

Earthen sump walls collapsing and migrating around the fire valve.

Present day experiences and observations reflect that the area and components under the dispenser and at connection with the tank are posing continued leaks and potential contamination. PECFA Site Review staff are experiencing spikes of increased contamination levels of sites under remediation with the suspect source being product migrating from sumps lacking containment. The configuration of the dispenser makes it likely that a simple maintenance activity such as in-line filter change will result in a product spill. Under the dispenser releases are common occurrences from service or maintenance activities. Some O/O have not taken the initiative to provide a means to prevent soil contamination. Another problem with sump areas that lack a rigid supporting wall and floor is earthen material falling into the open sump area and interfering with the monitoring and control mechanisms in the sump area.

All freestanding dispensers and tank sumps are required to have liquid-tight containment within the specified period of time. Retrofitting or replacing existing dispensers, sumps or islands to meet compliance with this section will not move the system into a pipe upgrade under SPS 310.500(5) unless pipe work involves more than necessary for the connections. Fabricated sump containment boxes, dispenser pans and linings are acceptable means of compliance.

Contaminated soil in tank sump area.

If 50% or more of a piping run is replaced the entire length of the run must be replaces with double-wall pipe. A pipe run is considered the length of pipe from the dispenser connection to the tank connection. The dimensions are calculated on only the subject pipe run not the aggregate of all pipe runs.

Component material in sumps

NFPA requires components in sumps to be constructed of material that will maintain structural integrity if exposed to heat or flame.

> NFPA 30A-3.3.10 Low Melting Point Materials. Ductile materials such as aluminum, copper, and brass, nonductile materials such as cast iron, and rigid and nonrigid polymeric materials such as plastic and fiberglass-reinforced plastic that soften on exposure to fire and that are partially or completely consumed by fire.

Many of the current day components do not meet the literal performance criteria of the standard. However, the standard recognizes installation options:

> NFPA 30A-5.2.7 Piping components made of low melting point materials shall be permitted to be used without backfill with the following sumps:
> (1) Below grade underground tank sumps that are fitted with a cover
> (2) Below grade piping connection sumps that are fitted with a cover
> (3) Containment sumps, under the following conditions:
> (a) The sump is monitored to detect any leaks.
> (b) Any leaks can be controlled.
> (4) Containment sumps, provided the piping components can successfully pass the test procedures described in API 607, Fire Test for Soft-Seated Quarter-Turn Valves

A dispenser mounted over the dispenser sump does not meet the test of a sump “fitted with a cover.” The department will recognize a double-poppeted shear valve (a.k.a. emergency shut-off or fire valve) as providing additional prevention in the event of a dispenser accident by restricting fuel from draining into the sump from both the pipeline and the dispenser plumbing. Previously the code required that no more than 3 inches of low-melting point material be exposed in a sump; based on a departmental review of that policy and a lack of any history of sump fire incidents, that restriction is no longer in effect.

SPS 310.500 (9) Record keeping

Why records are required to be maintained on site

A Division goal in ERS is for consistency of enforcement statewide. This is particularly important at the retail level. Customers are inspected on a regular basis and have a certain expectation of their right to be treated fairly, with all sites being treated alike. This has become a significant issue that has been raised by legislators in the past. Onsite records give the inspectors an important tool not only in ensuring individual site compliance, but also in doing so in a consistent and fair manner between customers

There is a definite cost associated with maintaining compliance. The O/O (Owner/Operators), who illegally extend their operational time between tests simply by not doing them, acquires a noticeable monetary advantage over the O/Os who operate within the scope of the law. Large and small business owners both have had incidences where compliance dates were missed, some from oversight but others have deliberately not performed the required tests. It concerns the Bureau when a reputable O/O has spent money on a method or equipment to comply with tank and line leak detection and corrosion protection, are maintaining those systems but the business next door is not. Onsite records are a major tool used in correcting the compliance illusion.

Records need to be reviewed on site, matching paperwork when not on site impairs a quality inspection. When an inspector makes a site inspection, the inspector can see the records and verify compliance with leak detection, corrosion protection, maintenance, etc. They can easily match the record type to the leak detection capabilities. Timely response to requests for compliance reports are

important to performing an accurate inspection. Owners of multiple stations may receive requests from several inspectors at the same time. This may add congestion to an owner's office operation. Inspectors many times are faxed a test and the inspection checklist is completed but too many times they receive incomplete records or just promises which extend a sites non-compliance time frame.

There are instances where falsified or manufactured documents/records have been sent in to the inspector. If the inspector can check records immediately while doing the inspection, the ability of the O/O to falsify records after the fact becomes much harder. The inspector can also compare records that may have been sent in to the Permit section with records on site. Simply mandating that all necessary records are kept on site can circumvent all of these possible problems.

The Bureau policy has always been that these records remain on site and be immediately accessible to the inspector. Electronic records that can be reviewed by the inspector at the site are acceptable as on-site records. Electronic records need to be printed if an inspector requests a copy to check possible discrepancies.

Unattended sites

If the site is a remote, unmanned fueling facility or bulk plant, owners will need to maintain a compliance manual or folder for each tank system. Inspectors shall give prior notice of an annual inspection no less than 64-hours to an owner/operator for these unmanned sites. This notification will give operators 48 hours or two working days for scheduling time and gathering necessary records. (Discretion between owners and inspectors may be used to deal with mitigating circumstances.)

At unattended sites verifying operability of equipment for line and tank leak detection, corrosion protection and dispensing equipment is identical to an attended site. Access to the equipment building will be necessary to check equipment functions. Compliance records can be exchanged or reviewed at this time. Activation of dispensers is also required in order to sample product in storage. Complete compliance records can be faxed to the office **prior** to the inspection. If electronic records are available that have name and address on each sheet they may be e-mailed to the office **prior** to the inspection.

SPS 310.500(9) (a) *General*. Operators of new and existing underground storage tank systems shall maintain all of the following records:

1. Documentation of any system repairs, alterations or upgrades, including software and hardware upgrades, and any inspections required under this chapter.

SPS 310.500(9) (c)10. Any tank or pipe system modification or repair — the life of the system. The replacement of a hose, break-away or nozzle is not considered a "repair;" this is typically routine maintenance. The SPS 310 recordkeeping requirements for "repair" address a repair to the tank or pipe system, which must be documented and maintained for the life of the system. This requirement applies to the tank through the fire valve only, components that are typically underground. Repair or replacement of components down stream from the fire valve does not have to be documented.

SPS 310.503 Product inventory verification at retail facilities

Inventory verification is a daily product inventory requirement at motor vehicle fueling facilities that are also regulated by SPS 348. Inventory verification is not a primary leak detection method, but may be useful in determining if an ATG is functioning properly. The records generated through the daily inventory verification area extremely helpful to Department of Safety & Professional Services inspectors pursuing product complaints or following-up on off-spec product. Inventory verification records must be maintained on site and kept for ten (10) years.

SPS 310.505 Spill and overfill

Overfill prevention

Federal and state regulations prohibit filling a tank beyond 95% (alarm at 90% and shut-off at 95%) as a measure to prevent overfills that may result in a fire or environmental incident. Topping a tank off also has a risk of liquid moving into connections and devices not intended for liquid contact, possibly over-riding or damaging leak detection, safety devices or vapor recovery features. Unfortunately, some of the individuals representing the tank operator and ordering product exceeding the 90% capacity do not understand the risks or the mechanics of storage tank equipment.

Over-riding a shut-off or overfill prevention device is considered "tampering" and the department will pursue such actions through legal process. Examples of “tampering:

Stick in drop tube over-riding auto shut-off

Tape over overfill alarm

The objectives of overfill protection for underground storage tanks is to prevent product delivery overflows that can result in environmental and fire safety incidents. The level of risk varies from methodology to methodology along with maintenance factors. As a result of incidents over the past few years, redundant features are now required to minimize the risk. Ball floats and automatic shutoff devices are not failsafe under certain situations. The ball from floats has been discovered floating in the tank and dipsticks have been discovered over-riding the automatic shutoffs. The operating ability of both can be countered if the spill bucket drain or other system appurtenances are faulty and not tight. Several catastrophic incidents during transport unloading operations have occurred across the nation over the past few years from failures of the overfill device. The path of the releases is frequently into and across the public dispensing area with significant ignition and human exposures. Alarms are only a warning of the impending overfill and do not provide a positive method of prevention, therefore the requirement of both an (audible and visual) alarms and automatic shutoff is now mandatory. The alarm must alert the operator (transport driver) when the tank reaches 90% capacity and restrict the flow prior to overflow. The automatic shut-off must shut off the flow from the transport into the tank at 95% capacity.

Tanks without a tight connect fill

An Official Code Interpretation (OCI) was issued March 2010 addressing tanks without a tight connect fitting or tanks that are taking delivery via a hand held nozzle. For underground tanks without tight connect fill and taking product via a hand-held nozzle, compliance with the PEI RP 100 chapter 7 requirement for 90% visual and audible alerting alone will provide acceptable overfill protection to the environment as compliant with both NFPA 30 section 21.7.1.5 **and** PEI RP100 chapter 7 as referenced under SPS 310.505(2). The 90% visual and audible alerting is doable and practical in all situations and supported by NFPA 30-21.7.1.5 (3) “other approved methods. The OCI link: http://www.Department of Safety & Professional Services.state.wi.us/ER/pdf/bst/ProgramLetters_PL/ER-BST-PL-OCI_10_505_2_OverfillPreventionForTanksWOTtightConnect.pdf

Tank with non traditional gravity delivery

Fuel delivery that is gravity fed to a filter/pump assembly, such as an airport or aircraft fuel storage system is non typical. The product is then pumped at low pressure through a filter assembly before being dropped into the tank. The 95% auto shut-off requirement would be waived, but the 90% audible/visual alerting mechanism is required.

Tight-connect pressure delivery

Underground storage tank systems with a tight-connect fill that must take product via a pressure delivery are not required to have the 95% auto shut-off installed for the following reasons:

- PEI 100-7.3.2 stating that auto shut-off devices should be used on gravity deliveries only.
- At the time of this writing manufacture’s literature has not expressed use of their respective auto shut-off drop tubes for pump pressure delivery.

Spill prevention

The federal underground storage tank regulations initiate the requirement for spill control in the form of a

“spill bucket” at the fill point on federally regulated underground tanks. SPS 310 expands the spill bucket requirement to heating fuel USTs greater than 4,000 gallon capacity.

The objective of spill prevention is to contain product that may spill from the delivery hose during the connection – disconnection with the transport. Spill buckets commonly in use in Wisconsin have a drain mechanism allowing product collected to be drained into the tank. However, the drain mechanism does require periodic cleaning and maintenance to assure a tight seal. If the seal is not tight air and vapors from the tank can be forced out through the spill bucket drain which will result in the potential for failure of the overfill device, and vapors to by-pass the Stage II vapor recovery system. Therefore, spill buckets installed or replaced after the effective date of the code must have be equipped with a drain system that directs spilled product into the tank, or a mechanism to pump product out of the basin.

Spill prevention for underground used oil tanks

The federal EPA rules do not have exceptions or modifications to the technical upgrade requirements for waste oil USTs. Department of Safety & Professional Services, along with the Department of Natural Resources, is concerned that adequate waste oil collection points are maintained across the state; and that these collection points provide the groundwater protection safeguards intended by the implementation of the federal UST regulations.

A typical waste oil collection UST (not for public collection) has the following characteristics:

- Periodic transfer of used oil into the tank of 5 quarts to 5 gallon at a time.
- A short run of piping from transfer point to tank.
- Tank is located under building floor or located adjacent to building.
- Tank emptied of stored product by suction draw into tank truck.
- Systems that do not transfer product by pump or are not maintained under pressure if pump is used.
- Tank leak detection provided by manual tank gauging.
- Piping sloped at an angle of at least 30 degrees from horizontal between the point at which it enters the ground and then tank, to allow for the free flow of oil and prohibits product from collecting in pipe.

The spill prevention requirement in the rule is intended to provide collection of excess product released from the transport hose after product has been delivered to the tank. The typical waste oil collection tanks are filled by periodic manual transfers. Spill prevention at the point of *suction transfer from the tank* to the truck will serve no significant purpose.

Overfill protection is designed to alert the transport driver that the transfer of product into the tank is nearing the threshold level. Common overfill protection devices designed for use on fresh product petroleum tanks will have a very low level of functionality on waste oil tanks. Manual tank gauging and routine scheduled waste oil pickup for recycle appears to be adequate to prevent overfill.

The threat of leakage from pipe corrosion appears to be minimal on the typical UST waste oil collection system installed with a significant pipe slope to the tank. The *waste oil tank* must be provided with corrosion protection and many owners are providing existing USTs with CP protection by impressed current systems, which will also protect the piping.

The Wisconsin UST program has made an upgrade provision for non-public waste oil tanks:

- Tank receiving product in 25 gallon or less quantities by manual transfer into the tank and suction transfer from the tank, will be excluded from spill and overfill requirements.
- Tank receiving product in 25 gallon or less quantities by manual transfer, having underground piping that is sloped at least a 30 degree angle, will be excluded from corrosion protection on the pipe. (Refer to diagrams at end of article.)
- *Individual waste oil storage tank system management and system design may dictate a more restrictive approach to the provisions mentioned.*

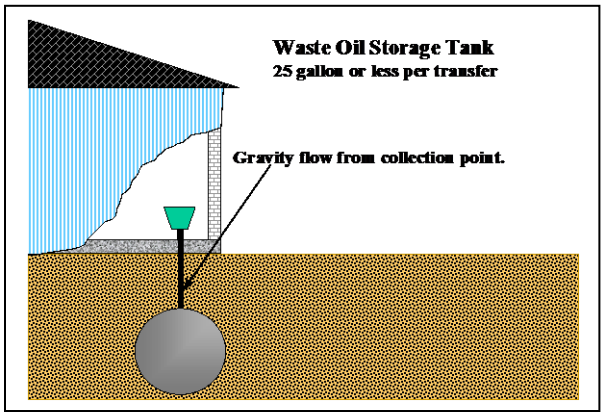
These provisions were developed after considering industry's discussion relating to the typical differences between waste oil collection systems and fuel transfer systems. The discussions included the logic of need in relation to functionality, cost, and intent of the federal rule. This provision *does not* reduce the UST owner's liability or responsibility in the event of a leak and subsequent environmental contamination resulting from spillage or leakage.

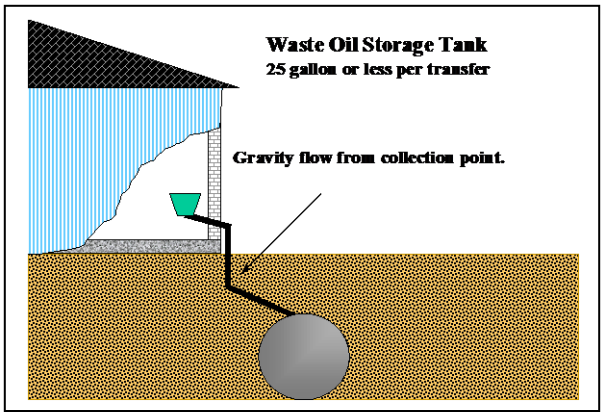
The database and subsequent compliance inquiry has a default which does not recognize characteristics for waste oil tanks which are Wisconsin specific programmatic provisions. Unless some documentation or information is provided, the database will treat all waste oil tanks the same. The database has been modified to reflect the provisions, as documentation and UST inspections provide the necessary information. Documentation can be provided by the owner in the form of a letter on company stationary, that:

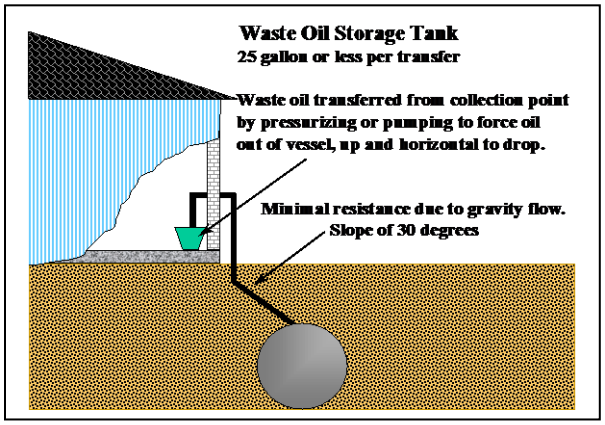
- describes how waste oil is introduced into the tank,
- includes the measurement from the underground transition point to the point the pipe enters the tank, and
- includes the burial depth measurement from grade to the top of the tank.

Tanks that are recorded as meeting these provisions, but determined not to meet these provisions through inspection by a Department or LPO inspector will be ordered to be immediately closed.

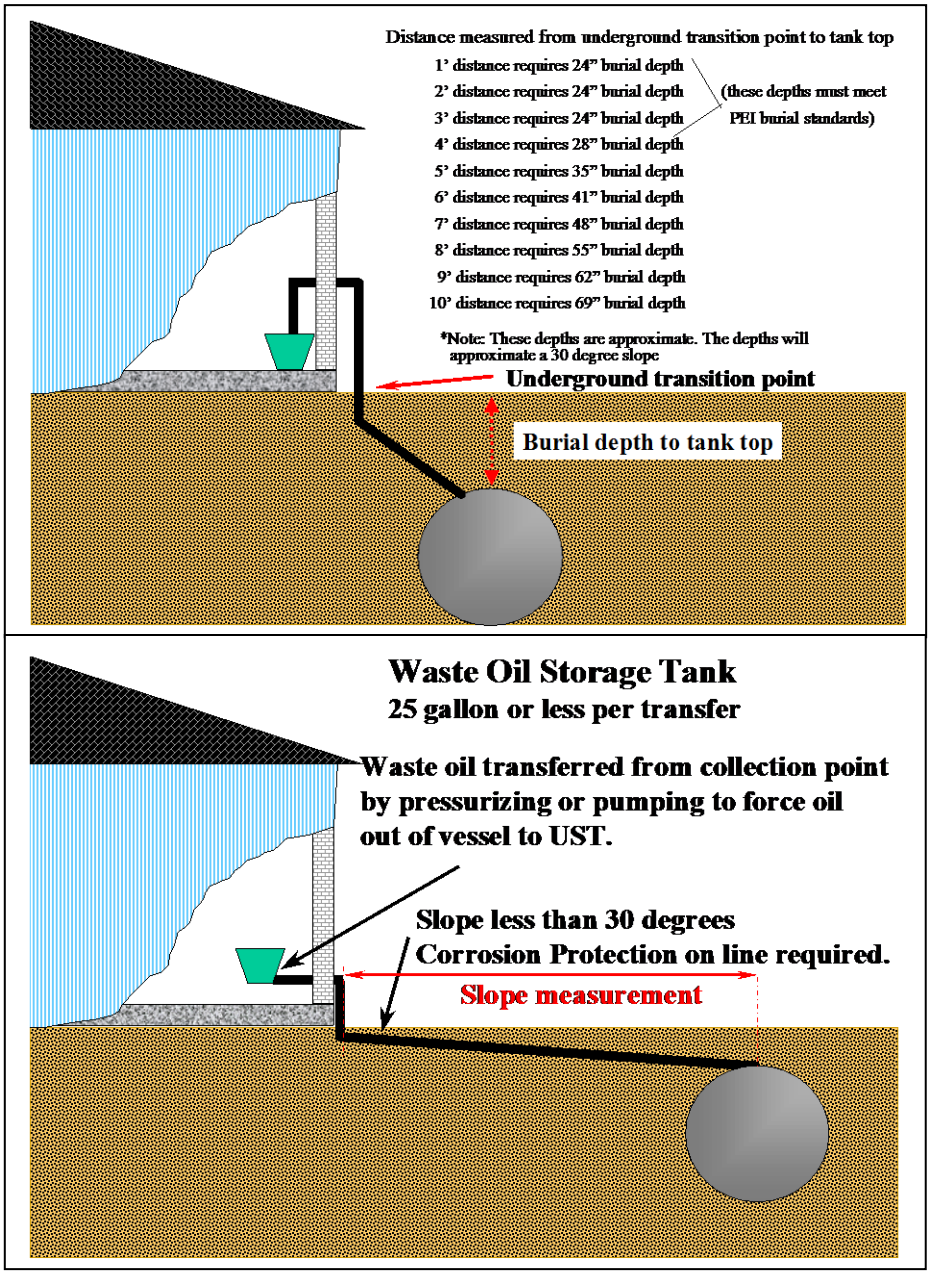
Typical Waste Oil UST Configurations:







How To Assess System For Adequate Pipe Slope:
The following guidelines are approximate dimensions for a 30 degree slope. This equates to a burial depth of at least 1 inch for every 1.75 inches of horizontal measurement from the transition point to the point where the pipe enters the tank. It is believed a margin of difference of 10% will still provide adequate drainage from the piping and meet the intent of the technical provisions of this program letter.



SPS 310.510 Leak detection requirements

Leak detection equipment can be a reliable form of leak detection only when the equipment is properly installed, programmed, operated and maintained. To maintain the effectiveness and accuracy of this equipment, annual verification and calibration of the leak detection equipment is required. There is a common misconception that most of the electronic leak detection equipment have the ability to perform "self-diagnostics" testing. The misconception is that the equipment is testing and verifying the leak alarm trigger threshold. The fact is that (only two exceptions) the self-diagnostic test is on the communication element of the device and not assessing the accuracy of the devise. Wisconsin, as well as many other states, is experiencing releases from upgraded systems of which the line leak detection equipment did not indicate a release. This is adequate justification for the requirement that leak detection equipment be checked annually for performance functionality, that is, functionality testing that determines whether of not the device is installed and adjusted to perform within applicable tolerance limits. Failure to meet functionality requirements typically indicates that the device is not adjusted or installed properly. The manufacturers of the electronic leak detection equipment do have a procedure independent of the self-diagnostic test that will verify the leak alarm threshold, e.g., line leak detector and flow restrictors. To facilitate the requirement and to maintain consistency in reporting, the Underground Tank System Leak Detection Monitoring Test Verification form ERS-10778 was developed.

The Federal EPA rule 40 CFR 280 requires that all acceptable underground storage tank system leak detection methodologies meet the 95/5 performance standard. The "stick and a rag" method for leak detection of the interstitial space in double wall systems does not meet the performance standard for underground systems and is therefore not acceptable for monthly monitoring of underground systems.

SPS 310.510(3)(c) slightly modifies the NFPA 30A-9.2.1 Inventory Control (IC) which states:

> Accurate daily inventory records shall be maintained and reconciled for all liquid fuel storage tanks for indication of possible leakage from tanks or piping. The records shall be kept on the premises or shall be made available to the authority having jurisdiction for inspection within 24 hours of a written or verbal request. The records shall include, as a minimum and by product, daily reconciliation between sales, use, receipts, and inventory on hand. If there is more than one storage system serving an individual pump or dispensing device for any product, the reconciliation shall be maintained separately for each system.

Inventory control is required at marketer and non marketer facilities to compliment SIR, ATG, GWM, and VM. It is not required to compliment manual tank gauging. The modification recognizes technology and excludes systems where the tank and pipe leak detection is continuous and capable of printing a monthly history report, or the tank and pipe double-wall with continuous leak monitoring, from the complimenting IC leak detection requirement.

Suction piping:

A configuration frequently encountered with USTs at farms or fleet facilities is a pedestal type pump

located directly above the tank and connected to the tank by a vertical pipe riser. Since a section of the pipe is below grade a question often occurs if this is a "safe suction" or "non safe suction" system for leak detection methodology purposes. SPS 310.510(4)(d)2 states: *Leak detection may be omitted for suction piping that meets all of the following requirements:*

a. The below-grade piping operates at less than atmospheric pressure.

b. The below-grade piping is sloped so that the contents of the pipe will drain back into the storage tank if the suction is released.

c. Only 1 check valve is included in each suction line.

d. The check valve is visibly located directly below and as close as practical to the suction pump.

e. A method is provided that allows compliance with subd. 2. b. to d. to be readily observed or otherwise determined.

Assuming that the pedestal pump is installed correctly according to the manufacturer, we believe that

pedestal pumps meet the criteria and classify these pumps as “safe suction systems.

SPS 310.515 Leak detection methods

All leak detection methodology must be recognized through the Department of Safety & Professional Services Material Approval process. Leak detection methodologies via groundwater monitoring and vapor monitoring are now restricted because their leak detection functionality occurs after a release has migrated into the soil or groundwater. In many situations this detection will occur after significant environmental contamination has taken place. Vapor and groundwater monitoring methods that were place prior to the effective date of this rule revision will be allowed to continue until the equipment is not functioning as it should or the operator falls out of compliance with the respective methodology requirements.

SPS 310.517 Airport hydrant leak detection requirements

Reserved

SPS 310.520 Operation and maintenance of corrosion protection

The former CP requirement for vent lines has been unclear. Over the past years the department has become aware of situations where the source of water intrusion into a tank was through a corrosion point in the vent line. SPS 310.520(1)(a) includes vent lines in the CP requirement.

UST/Pipe Construction Material	Description	Acceptable Corrosion Protection	Periodic CP Test Required
Bare Steel	No external or internal coating or lining	Impressed Current	Yes
Coated Steel	Fabricated STI P3	Impressed Current Sacrificial Anodes	Yes
Lined Steel	Internal lining	Impressed Current Sacrificial Anodes	Yes
Fiberglass - Poly	Fiberglass or poly-type material	NA	No
Steel – FRP Comp	Fabricated Steel with FRP exterior lining	NA Impressed Current Sacrificial Anodes	If IC or SA
Other		Impressed Current Sacrificial Anodes Situation specific	Yes
Unknown			
Stainless Steel		Impressed Current Sacrificial Anodes	Yes
Copper		NA	No
Flexible		NA	No

Testing, Maintenance and Repair of CP Systems

Circumstances of abandonment, bankruptcy, disaster, remodeling activities, ownership or operational changes, and operator/owner error have resulted in impressed current cathodic protection systems that were inoperative for extended periods of time beyond 60 days. Galvanic systems protecting the tank or the piping have been discovered to be inoperative or significantly below the -850 millivolt protection level. The Federal EPA developed the three year periodic CP testing cycle based upon averaging two industry test thresholds. The impressed current standard was annual testing and the sacrificial anode test period was every five years. Both thresholds were based on the presumption that the systems were maintained functional with no break in operation.

The Department has experienced two factors involving considerable discretion and a lack of restoration uniformity among CP technicians or "experts," as well as our regulatory inspector’s acceptance, on how to

address getting the system back into compliance when the corrosion protection system was found to be outside acceptable tolerances or the system was shut-off entirely. 1) CP designs are developed by a NACE engineer commonly based upon information provided by someone else. The installing contractor or individual will often make arbitrary changes to the design, such as increasing the number of anodes, changing anode type or location, reducing the number of test stations or changing the components of the system. 2) There is no regulatory guidance or industry standard for restoration of the impressed current systems following a period of non-operation. STI Standard R-972-01 addresses the addition of anodes to galvanic systems that require no more than 30 milliamps to bring the system into the -850 millivolt protection level. There is no guidance about how long the cathodic protection system on a UST system could be inoperative before the integrity of the USTs is at risk. Furthermore, corrosion protection system testers are experiencing a significant drop in anode systems at 10 years of age.

For both the galvanic and the impressed current systems the approach to restoration varied from technician assumptions based upon the age of the tank to more substantial assessment by performing an internal inspection and/or internal shell integrity scan. There was a consensus attitude that the longer the CP system was inoperative, the greater the potential for corrosion damage. Likewise, the longer the CP system was inoperative, the more expertise needed to direct or conduct repairs, startup, and testing of the CP system. Due to a lack of consensus among experts, primarily the result of variations in technician experience along with individual site characteristics and situations, the Department was unable to develop a concise regulatory prescription that could be applied as a specific regulatory application. To narrow the realm of speculation and accommodate individual technician discretion, the Department reduced the periodic integrity assessment inspection period from 3 years to yearly from the approach that corrosion potential over a 12-month period is significantly less than the corrosion that may occur over a 36 month period. Therefore a lesser degree of internal and external integrity evaluation is necessary to correct the problem and bring the deficient system into compliance.

During the period of time that the Department addressed corrosion protection problems and resolutions in the field the Department found that moving to the annual assessment period would not result in increased maintenance costs. For a three tank system the Department found that CP integrity assessment was costing around $150 - $450 ($50 to $150 per tank) for operators having this performed independent of other tank compliance activities taking place at the same time. The CP testing was costing approximately $75 ($25 per tank) for an operator incorporating this function into an annual maintenance and compliance service contract. Industry wide the trend is moving to annual preventive maintenance and compliance inspections by a contracted service company. This should result in reducing the overall cost of the various system integrity testing activities.

The maximum testing period time lines associated with SPS 310.520(1)(d)

(d) Testing periods. 1. Except as allowed under subd. 2.and 3., all corrosion protection for UST systems shall be tested within 6 months of installation or repair and at least annually thereafter.

3. Tanks designated as StiP3® equipped with a pre-installed sacrificial anode system and test station shall be tested in accordance with all of the following:

a. Testing shall occur within 6 months of installation and at least every 3 years thereafter until the tank is 10 years old.

b. Testing shall occur annually in accordance with subpar. 1. after the tank is 10 years old.

For a *StiP3*® tank installed on January 1, 1994 the time-lines would be:

- June 30, 1994 for the 6 month installation assessment
- June 30, 1997 for the first 3-year assessment
- June 30, 2000 for the second 3-year assessment,
- June 30, 2003 for the third 3-year assessment, and
- annually after January 1, 2004 with the annual inspection to be performed no later than Dec 31, 2004.

The rule allowed an exemption from the requirement of corrosion protection if an UST system is located

at a site having a soil resistivity measured at 12,000 ohms/cm or greater.

CP repairs are typically performed due to a failing test or rectifier. The precision leak detection test requirement applies to repairs that are structural in nature on the tank or pipe. A rectifier repair may be simply an equipment or component replacement and thus not require a leak detection test.

A test of the CP system must be performed within 6 months of a repair. A test that the technician performs on the same day that a repair is completed would meet the Federal EPA 40 CFR 280.33 requirement and the SPS 310 requirement as long as the criteria used to determine adequate cathodic protection are specified in a standard and the technician is a qualified cathodic protection tester.

Due to concerns with interference to other buried structures, impressed current systems shall be designed to prevent stray current conditions that may negatively impact other underground structures, utility lines, or cable anchors, or any impressed current systems protecting those items. Local utilities shall also be notified by the contractor when impressed current systems are installed, repaired or adjusted, including where an increase in rectifier amperage or voltage output occurs.

Certifications for corrosion protection - SPS 310.520(c)
The Federal US EPA, the Steel Tank Institute (STI) and the National Association of Corrosion Engineers (NACE) organizations have recognized concerns of proficiency and have issued information and policy letters on the need to maintain technical competence and proficiency when installing, starting up (commissioning), and maintaining cathodic protection systems. Because impressed current cathodic protection is engineered based upon the site, the installation and energizing of the system must be under the supervision of a trained and qualified individual to ensure that the installation is done in accordance with specifications, adequate protection is attained efficiently, and more importantly does not interfere with other systems. The general petroleum equipment contractor typically is not qualified to determine whether or not supplementing a system is practical. Likewise, the maintenance of such systems requires proper assessment of the existing system's performance. Proper recordkeeping and testing by a qualified individual is vital in determining continuance of effective corrosion control or through test data interpretation, an indicator of potential problems. Also, because no standard can account for every situation and site specific environmental and soil conditions, experience and training in corrosion control is warranted.

To safely protect what is currently in the ground, to prevent interference with other adjacent CP systems, and to prevent any negative potentials in new impressed current system installations, at a minimum, a registered NACE professional holding NACE *Senior Corrosion Technologist* credentials must verify proper installation operation and perform impressed current corrosion protection system start-up. An individual possessing NACE *Corrosion Technician* certification is acceptable to conduct ongoing system maintenance if directly supervised by a *Corrosion Technologist, Senior Corrosion Technologist, Cathodic Protection Specialist,* or *Corrosion Specialist*.

The Department has continued to implement the guidelines set forth by the Federal EPA by recognizing the Steel Tank Institute (STI) and the NACE International credentials for CP testing. 40 CFR 280.12 EPA definition of "Cathodic protection tester" means

> *a person who can demonstrate an understanding of the principles and measurements of all common types of cathodic protection systems as applied to buried or submerged metal piping and tank systems. At a minimum, such persons must have education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of buried metal piping and tank systems.*

Cathodic protection testers must maintain and provide either the associated STI *Certification for UST System Cathodic Protection Monitoring* certification or the NACE *Cathodic Protection Tester* or *Corrosion Technician,* or higher level certification to be certified in accordance with SPS 305 Credentialing. A corrosion expert can perform CP testing without maintaining the SPS 305 CP tester credential. The following two tables express the roll that the respective STI and NACE credentialed individuals may take in cathodic corrosion protection system work.

Wisconsin Certification Levels For UST Corrosion Protection

EPA Definition *(40 CFR) 280.12*	***NACE Certification***	***Expertise/Qualifications in corrosion control of USTs***
Corrosion Expert (The EPA definition requires NACE certification unless the person is a registered PE with certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.)	Corrosion Specialist	• Cathodic protection (includes all areas of expertise under Cathodic Protection Specialist) • Coatings and linings • Metallurgy • Plastics (non-metallic materials) • Inhibitors (environmental treatment) • Corrosion assessment • Stray current or cathodic interference testing and analysis • Corrosion site surveys • Corrosion control designs and recommendations • Work/education is the same as for Cathodic Protection Specialist plus a Specialty Area Certification.
	Level 4 – Cathodic Protection (CP) Specialist	• System design and specifications • Installation supervision • System testing/commissioning • Stray current/cathodic interference testing and analysis • System maintenance • Cathodic protection assessment • Cathodic protection recommendations • Analysis of cathodic protection feasibility • Cathodic protection installation permits/licenses • 12 years CP work experience plus 2 years post-high school training in math or science from an approved technical/trade school plus CP level 2 certification or equivalent training • 6 years CP work experience plus 4-year engineering or physical science degree plus CP level 2 certification or equivalent training • 4 years CP work experience in responsible charge plus CP level 2 certification or equivalent training plus one of the following: • Engineer-in-training (EIT) registration or equivalent. • Professional engineer (PE or P. Eng) or equivalent registration. • Bachelor's degree in engineering or physical sciences and an advanced degree in engineering or physical science that required a qualification exam.

<u>Cathodic Protection Tester</u> (The EPA definition of cathodic protection tester does not require any certification; however, persons holding these NACE certification levels are viewed by EPA as fully meeting regulatory requirements.)	Level 3 – Cathodic Protection Technologist	• Understand activation, concentration and resistance polarization and the mathematical expressions of these concepts • Understand the factors that affect polarization (area, temperature, relative movement, ion concentration, oxygen concentration) • Understand the NACE criteria for CP and be able to apply the criteria and make adjustments as necessary to CP systems in order to comply with the criteria defined by the company where the technologist is employed • Understand the concept of current distribution and be able to determine ideal current distribution for a CP system taking into account the factors affecting current distribution (anode-to-cathode separation distance, electrolyte and structure resistivity variation, current attenuation) • Perform advanced cathodic protection testing using correct measurement techniques to monitor CP system performance and accurately interpret the data collected to ensure optimum CP system performance. Based on data collected, determine if correction/modifications to system components are necessary • Identify errors in data collection/CP measurements including contact resistance errors, voltage drop errors and, reference electrode errors • Conduct and document interference tests where stray currents are suspected to determine if interference exists and identify the source of the interference • Upon determination of interference, identify and implement a method of control that will mitigate the effects of the stray current • Design and install simplistic forms of galvanic and impressed current cathodic protection facilities and perform the necessary mathematical calculations • Eight years CP work experience plus high school diploma or GED plus CP level 2 certification or equivalent training –or– Three years CP work experience plus 4-year physical science or engineering degree plus CP level 2 certification or equivalent training –or– Six years CP work experience plus 2-year post high school training from an approved math or science technical/trade school plus CP level 2 certification or equivalent training

	Level 2 – Cathodic Protection Technician	• Perform advanced field tests and evaluate the results • Verify stray current interference • Understand AC voltage and its mitigation • Maintain advanced documentation and records, including data plotting • Conduct and understand the importance of periodical surveys, including IR Free readings and polarization decay tests • Install, repair, modify and test rectifiers and component parts such as circuits • Collect data on ER probes • Three years CP work experience plus high school diploma or GED plus CP level 1 certification or equivalent training –or– One year CP work experience plus 4-year physical science or engineering degree plus CP level 1 certification or equivalent training –or– Two years CP work experience plus 2-year post high school training from an approved math or science technical/trade school plus CP level 1 certification or equivalent training
	Level 1 – Cathodic Protection Tester	• Perform atmospheric corrosion inspections • Understand the basics of corrosion and cathodic protection theory • Conduct insulator tests and identify shorts in CP systems • Use test instruments to perform a variety of field tests and take rectifier readings • Install galvanic anodes and test • Read shunts and understand their use in rectifiers, bonds, and anodes • Perform the periodic surveys such as structure to soil, soil resistivity, coupon tests, offshore platform and riser surveys, rectifier readings, and surveys of bonds and diodes • Knowledge of reference cells and their installation, testing • and safety requirements • Basic location mapping, report preparation and record keeping • Six months cathodic protection work experience plus high school diploma or GED

	Senior Corrosion Technologist	• Installation supervision • System testing and commissioning • System maintenance • Evaluation of system performance • Eight years corrosion work experience, including four years in responsible charge -or- Bachelor's Degree in Physical Science or Engineering plus four years corrosion work experience in responsible charge.
	Corrosion Technologist	• Installation supervision • System testing • System maintenance • Installation work • Routine inspections • Preliminary data analysis • Minimum of four years corrosion work expedience.
	Corrosion Technician*	• Routine system testing • System maintenance • Installation work • Routine inspections • Installation work • Minimum of two years corrosion work expedience
	* NACE requires a *Corrosion Technician* performing as a CATHODIC PROTECTION TESTER be directly supervised by a *Corrosion Technologist, Senior Corrosion Technologist, Cathodic Protection Specialist,* or *Corrosion Specialist*.	
	STI Certification	***Expertise/Qualifications***
		♦ Understand the basics of corrosion and cathodic protection theory ♦ Conduct insulator tests and identify shorts in CP systems ♦ Use test instruments to perform a variety of field tests and take rectifier readings ♦ Determine the quantity of anodes required to upgrade an sti-P3 system using STI R972-01. ♦ Perform the periodic surveys such as structure to soil (including IR free readings), soil resistivity, coupon tests, continuity and isolation testing and rectifier readings. ♦ Knowledge of reference cells and their installation and testing. ♦ Safety requirements ♦ Basic location mapping, report preparation, and record keeping (including EPA)

Anode Replacement and Addition Personnel Qualification Policy

Qualifications necessary for addition or replacement of sacrificial anodes in corrosion protection systems are as follows. Department policy has been formulated based on National Association of Corrosion Engineers (NACE), Steel Tank Institute (STI) and Petroleum Equipment Institute (PEI) documents and consultation. Three main scenarios were reviewed:

1. Replacement or addition of anodes on a sti-P3 tank;
2. Replacement or addition of anodes on a field-installed sacrificial anode corrosion protection system for a steel tank and/or piping, and;
3. Addition of anodes for the purpose of ensuring the sacrificial anode corrosion protection system will provide sufficient protection through the anticipated life of the tank system.

Sti-P3 Tank

Sti-P3 tanks are designed and manufactured with factory-installed sacrificial anode corrosion protection systems. SPS 310.520 requires the periodic testing of corrosion protection systems with a sacrificial anode system protection criterion of -850 millivolts (CSE) or more negative; testing can be performed by either an individual holding an STI Cathodic Protection Tester certification or a NACE CP 1- Cathodic Protection Tester or higher certification. If the protection criterion is not met, STI allows for the addition of supplemental anodes through the use of STI's Recommended Practice R-972-01 (Recommended Practice for the Addition of Supplemental Anodes to STI-P3 USTs). The RP has some pre-qualifiers for use however;

- It must be an sti-P3 tank;
- Have a current requirement of no more than 30 milliamps to bring the tank to a protected level, and;
- The installation and testing of the system shall be performed by a qualified CP installer and tester as defined by applicable Federal, State, and Local regulations.

If the RP pre-qualification criterion is met, then the additional anodes can be added using the RP under the direction of either an individual holding an STI Cathodic Protection Tester certification or a NACE CP 1- Cathodic Protection Tester or higher certification. If the STI Recommended Practice R-972-01 cannot be used; for instance, the current requirement is greater than 30 milliamps; then an individual with a NACE CP 3- Cathodic Protection Technologist or higher certification shall investigate the cause of system failure and repair the tank cathodic protection system in compliance with SPS 310.520(2) (b). The repair could include, but not be limited to, the addition of supplemental anodes.

While anodes are not normally replaced on a sti-p3 tank (supplemental anodes are added), replacement of an anode on a like-for-like basis can performed by either an individual holding an STI Cathodic Protection Tester certification or a NACE CP 1- Cathodic Protection Tester or higher certification.

Field-installed Sacrificial Anode System

For sacrificial anode cathodic protection systems that were added to a tank and/or piping after the tank system was already installed, testing can be performed by either an individual holding an STI Cathodic Protection Tester certification or a NACE CP 1- Cathodic Protection Tester or higher certification. Replacement of an anode on a like-for-like basis can performed by either an individual holding the STI Cathodic Protection Tester certification or a NACE CP 1- Cathodic Protection Tester or higher certification.

For the addition of supplemental anodes or design/repair activities an individual with a NACE CP 3- Cathodic Protection Technologist or higher certification must be employed.

Addition of Anodes to a Non-failing System

With some tank owners, it has become common practice to add anodes to their sacrificial anode cathodic protection system for increasing the cp system life cycle or as some have termed, "insurance". While this practice is neither encouraged nor discouraged, with recognition that the addition of supplemental anodes under this scenario is not related to meeting a SPS 310 cathodic protection requirement, the Department maintains the position that the CP system installer shall be certified per the requirements of SPS 305.89.

Adding Impressed Current to Lined Tanks

At the request of the EPA, API 1631, "Interior Lining and Periodic Inspection of Underground Storage Tanks," was revised in June 2001 to include a new chapter 10, titled, Periodic Inspections of Previously Lined Steel Tanks. The revision was initiated to bring the requirement of the standard in line with the intent of 40 CFR 280. Section 10.1.2 of the API 1631 standard states that: Regulatory Requirements of EPA CFR Part 280, 21 (b) (1) (ii) requires that lined tanks without cathodic

protection be internally inspected to ensure that the lined tank is structurally sound and that the lining is still performing according to original design specifications. Inspections shall be conducted within 10 years after installing the lining and every 5 years thereafter. (Note SPS 310 requires 5/5 year inspections.) When combining interior lining with cathodic protection at the same time, in accordance with EPA 40 CFR Part 280.21 (b) (3), no future tank inspections are required. If a cathodic protection system is installed on a tank that has been previously lined, and inspected thereby ensuring that the tank has been determined to be structurally sound and free of corrosion holes, no further internal inspections are required. Therefore, eliminating the periodic internal lining inspections can be accomplished only if:

a) The internal lining and addition of impressed current occurred simultaneously, or
b) The lining received an internal inspection in accordance with API 1631.

Next is the issue of the “what” assessment” and the “when” timeline. The EPA guidance states: “if adding impressed current to a previously lined tank without assessing the integrity of the UST, periodic integrity testing must be maintained for both systems for the life of the tank.” The EPA regulation is rather vague on timeline stating that tanks must be assessed "prior to" installation of impressed current. The EPA statement strongly suggests that the tank is already lined and an assessment of the lining integrity is required at that time. While some argue that the requirement has no time constraints Department of Safety & Professional Services views “prior” as a reasonable time in relation to the likely environmental factors that are impacting the tank. Many states have a one-year timeline to accommodate contractor delays and paperwork to get both up and running. Generally within one year, an assessment of a tank is not going to change significantly. However, interior lining poses no protection for the exterior wall where the corrosion is most invasive and most of the present day lined tanks were lined as a quick-fix to meet the December 1998 CP deadline. As stated in the SPS 310 code justification to move from the 10/5 year assessment to every 5 years after installation, contractors performing internal inspections are commenting to us the high percentage of lining failures that occur around the 5 year anniversary. Department of Safety & Professional Services will accept an internal lining assessment prior to adding CP, which is no more than 5 years old.

The department views the “internal lining and addition of impressed current occurred simultaneously” requirement as being within a 6 month period of each other.

SPS 310.530 Tank lining of underground petroleum product storage tanks

Internal lining does not reduce the corrosion potential of the tank shell exterior. Only if the lining is applied properly will it inhibit corrosion of the internal wall. Corrosion induced UST failure statistics commonly referenced are:

- 10% from internal corrosion
- 19% from internal and external corrosion, and
- 71% from external corrosion.

These statistics imply that even with interior lining, the tank shell is very likely to erode from external corrosion

If rust plugs or holes are evident during the initial or any of the periodic assessments, an environmental assessment must be performed under 10.575(20(b).

SPS 310.535 Periodic inspection and repair of previously lined tanks

The periodic inspection period for underground tanks is accelerated from a 10/5 year cycle to a 5/5 year cycle due to the number of tanks experiencing lining failures or defects. From information that we are able to collect it appears that the 5 year assessment period is critical in response to a lining defect or failure. At the five year threshold defects or failures are discovered at a point where the potential for correction and continued use of the tank is greatest, and still within the warranty period of most linings. Wisconsin recognizes both the human entry and the video camera for periodic assessment. The cost of a video assessment at each 5 year period is less than the cost of a human entry assessment at the 10 year period.

Lined USTs with impressed current CP are required to maintain 5 year internal inspections. Tanks that are between the 5 and 10 year anniversary of the lining date at the February 1, 2009 date the rule was implemented will not have to have the internal inspection until the 10 year anniversary and every 5 years thereafter. The modification in the rule from the previous exemption of a lined tank with impressed current from internal inspection is the result of a significant number of such tanks that have experienced lining delamination where holes and rust plugs have been exposed. The impressed current will not prevent product migration through the rust plugs or holes.

SPS 310.545 Seldom used and temporary out-of-service tanks

Temporarily-out-of-service (TOS) tanks no longer have the one-year limitation. All federally regulated tank systems are required to be monitored for releases weekly and or monthly (depending upon the leak detection methodology implemented) when in-use or in TOS status. Federally regulated UST systems, which are not monitored as required, will be considered to be non-compliant and subject to closure. Other UST systems will be considered to be non-compliant, and therefore, subject to closure unless product transfers are made to and from the system periodically. For private motor vehicle fuel tanks, transfers must be made a least once in any ninety-day period. For heating fuel tanks, transfers must be made at least once in any six-month period. Heating fuel systems are those which are connected to oil-burning appliances. Inventory records, shipping manifests or paid receipts for product received will be acceptable to the department as proof that transfers are being made. Tank owners and operators may request approval from the department for a less frequent use if it justified as a part of the tank's purpose. Underground tanks being used primarily for emergency and/or back-up fuel are classified as federally regulated under SPS 310 and must comply with leak and corrosion monitoring requirements.

SPS 310.550 Changes in service

Refer to the definition section of the SPS 310 code.

SPS 310.560 Tank system closure

All aboveground and underground tanks regulated by SPS 310 are required to be rendered safe in some manner when no longer in use. Prior to December 1960 the code (IND 8) allowed "abandonment" of underground tanks in place by filling with water. Between December 1960 and August 1971 the code allowed "abandonment" in place by filling with an inert solid. Since April 1991 the code has prohibited "closure in place" with very limited exceptions (refer to SPS 310.560(2)(f)).

"Closure" is a term initially used in the Federal EPA underground storage tank regulations. "Decommissioning" and "removal" are two words used in various standards or references with similar meaning. Tank closure requirements for ASTs are SPS 310.460 and SPS 310.560 for USTs.. The following table is a brief summary of tank closure requirements:

Tank	Certified Remover	Tank removed from site
Underground	Yes	Yes
Shop built AST	Yes	No
Field erected AST	No	No
Basement heating oil	No	No
Residential heating oil AST	No	No
Residential heating oil UST	Yes	Yes
Chemical UST	Yes	Yes
Chemical AST	No	No

SPS 310 recognizes tank closure practices as described in API 1604 Closure of Underground Petroleum

Storage Tanks. Inerting or purging the vapor space are the two methods recognized by API 1604 section 4.4 for rendering the tank interior free of hazardous vapors. The standard recognizes a level of 10% of the lower-explosive-limit (LEL) as the threshold for safe work. However, the standard also states that combustible gas indicator readings may be misleading in oxygen deficient atmospheres such as tanks inerted with CO_2 or N_2. The standard goes on to state that it is desirable to use an oxygen indicator to assess oxygen concentration when an inert gas has been used to vapor-free a tank. Therefore, the department will accept either an LEL of 10% or less, or an oxygen level of 0% by instrument reading when determining the safety threshold to begin tank closure activities. Once the tank decommissioning operation progresses to a point where oxygen could be introduced into the tank, such as opening access ways or cutting openings, the contractor will need a combustible gas meter to monitor the LEL until the tank is cleaned and rendered free of residue and flammable vapors.

Closure in place

SPS 310.560(2)(e) recognizes closure in place for specific situations as listed in the code paragraph subsections. Closure in place requires that a closure in place be requested in writing to the authorized agent (LPO) or the department. Because some municipalities do not want or do not allow a closure in place the municipality should be consulted. The request should include a schematic or photos to reflect the location of the tank in relation to buildings, utilities and public-way.

Contractors

All SPS 310 tank closures must be under the oversight of a contractor certified under SPS 305 to close tanks. The exception is residential ASTs and field erected ASTs. Another exception is closures dealing with tanks that contain a hazardous substance that requires specialized training and equipment. In this situation a waiver to the SPS 305 certification may be granted upon a written request from the owner that confirms the special needs and identifies the company that will be performing the work.

The following web site is a search application for SPS 305 certified contractors relating to the various SPS 310 tank specialties:
http://apps.Department of Safety & Professional Services.state.wi.us/SB_Credential/SB_CredentialApp/SearchByCredType

Re-use of former SPS 310 storage tank

> SPS 310.560**(2)** CLOSURE PROCEDURES. (a) To permanently close an underground tank system, the owner or operator shall have the tank and piping emptied and cleaned, by removing all liquids and accumulated sludge, and shall remove the tank and piping from the site unless allowed otherwise under par. (e). *Tanks that are removed shall be scrapped unless reused in accordance with s. SPS 310.350 (3) (i) or 10.500 (3) (c).*

SPS 310 specifically states that USTs that are being closed "shall be scrapped" unless being certified for continued use as a SPS 310 regulated hazardous liquid. The prohibition against a second life use does not apply to ASTs; however regulations associated with other regulatory programs may prohibit or limit use. This brings up the issue of "perpetual liability" as a tank that stored hazardous liquid moves to a second life. If a contractor is closing an aboveground storage tank on your property by removing it, do you know where it is going, what it will be used for and if it will be properly installed for its second use?

SPS 310.560(4) Applicability to previously closed systems addresses underground storage tanks that were taken out or service prior to December 22, 1988, the date the federal regulations relating to tank closure became effective. Prior to September 1971 underground tanks were allowed to be closed by overfilling with water. Subsequently, many of these tanks have holes caused by corrosion allowing the water to escape. The empty tank now has become an underground cavity. Property owners of such tank closures have experienced sink-hole type cave-in resulting in a significant safety hazard. The intent of this paragraph is to provide the department or it's agents with authority to requirement that tanks fitting this

potential safety hazard be removed or be closed in place by filling the tank with an inert material. A closure soil assessment is not required unless there is obvious or suspected contamination. USTs that were closed in place by filling with an inert material prior to December 1998 are not required to be removed.

SPS 310.565 Tank closure assessment

Industry terminology and application have posed confusion with the specific requirements for closure assessment and soil sampling. The terms "closure assessment," "site assessment" and "soil sampling" are often used interchangeably, but may have different applications with significantly different standards of application by industry professionals. Frequently, ASTM standards for site assessment are used for tank closure, exceeding the original intent of the closure assessment requirement. The code revision rectifies the confusion by using terms that reflect the activity. The activity of collecting soil samples is called "sampling," rather than "assessment."

Department of Safety & Professional Services for ERS-8951 Tank System Service and Closure Assessment Report is the form that must be completed for all tank system repair or closure assessments. Part A of the form addresses the closure and is maintained in the Department of Safety & Professional Services tank closure records; Part B addresses the soil assessment and is submitted to the WDNR.

Tanks that require soil sampling at closure are all federally regulated USTs and heating oil USTs greater than 4,000 gallon capacity. All other USTs require "confirmation" soil sampling if during the removal contamination is suspected due to discoloration of the soil, odor of released product, holes in the tank wall or free product.

Tank bed assessment for contamination is required for some tanks. Refer to SPS 310.465 for ASTs and SPS 310.565 for USTs.

The technical guidance for SPS 310 storage tank closure assessment has been transferred from the WDNR to Department of Safety & Professional Services. The guide is available on the Internet at: http://Department of Safety & Professional Services.wi.gov/ERpdf/bst/ProgramLetters_PL/ER-BST-PL-TankClosureAssessGuide.pdf

The guide will be updated and modified over a period of time, but made available as the revisions are in-progress. Many of the DNR references or associations will remain and some will change as the document is revised. Sheldon Schall is the primary contact for inquiries associated with the technical nature of this document.

Sheldon Schall
E-mail: sheldon.schall@Wisconsin.gov
Telephone: 608.266.0956

Closure in place may be authorized if requested in writing and the conditions of SPS 310.560(2)(f) exist. Closure in place will not be authorized for the following:

- Financial
- Underground utilities
- Overhead residential utilities
- Removal of fence for access
- Sidewalk, patio, deck, or driveway
- Gardens, flower beds, landscape or shrubs
- Encroachment to public right-of-way, unless requested by municipality

SPS 310.570 Conditions indicating a release

Because UST systems are hidden from direct observation, suspected releases must be investigated to identify, or confirm, that an UST system is the source of a release. Monitoring results and other indicators in the environment are the only suggestions of a release. In general, corrective action cannot be started until the UST system and UST site are investigated and a release is confirmed.

Suspected releases included: positive monitoring results from testing, monitoring and sampling, unusual operating conditions, and the discovery of regulated substances in the environment. All suspected releases had to be immediately investigated, unless the owner and operator elected to proceed directly to corrective action.

SPS 310.575 Investigating suspected releases

Some mechanical situations may result in alarms or leak reports that subsequently are determined to be false. For example, the erratic behavior of dispensing equipment may warrant further investigation before reporting a release because this behavior can be caused by more than just a leak in the line. The investigation requirement is intended to allow owners or operators to verify the proper operation of their equipment before reporting a suspected release. If the faulty equipment is immediately repaired or replaced and further inspection fails to confirm the initial result, the incident does not need to be reported. In the case of inventory control, the requirement allows a second month of data to be collected to verify the possibility of a release before reporting. This does not mean that all inventory discrepancies must be confirmed by a second month's data. Under some conditions, it may be necessary for owners and operators to immediately report an inventory discrepancy. What level constitutes a suspected loss from a leaking system is determined on the logic supported by the size of the tank, monthly throughput, and other operating practices. Other situations such as the physical presence of the regulated substance or unusual concentrations of vapor still require immediate reporting. Failure to determine that an operational problem is caused by faulty equipment will also require reporting. The requirement requires the owners and operators to report off-site conditions that might indicate a release has occurred and that are brought to their attention by a third party.

Tank and/or line tightness testing is the most prevalent technique now in use to determine if a suspect system is in fact leaking. Thus, tightness testing may be a key confirmatory step in the release investigation, unless they choose to immediately conduct an initial site investigation instead

Release Reporting

NR 706, Subchapter III. covers reporting for USTs. Specifically, NR 706.11(1)(a) states; Owners or operators of UST systems shall immediately notify the department of a spill, overfill or other discharge or suspected discharge of a hazardous substance to the environment that is related to the UST system, except as provided in s. NR 706.15(2) and (4).

SPS 310.580 Responding to a release

Failure to determine that a leak detection alarm or failed/inconclusive test is caused by faulty equipment or specific site related influences requires an action or response to prevent the potential reoccurring release of product from the system. The most logical response is shutting-down the system until a resolution occurs.

The responsible party shall report the release to the DNR and take action to reduce the environmental and fire potential threat from the release of product.

Subchapter VI – Dispensing of Motor Fuels

SPS 310.600 General fuel dispensing requirements

Fuel dispensing is categorized by codes, standards and industry jargon in many ways, e.g., marketer/non marketer, public/private, public/fleet, retail/non retail, retail/private, commercial/residential, etc. SPS 310 expresses motor vehicle fueling as "public access" and "fleet." Public access fueling is any attended or unattended site that allows the general public to drive up and dispense fuel. Typically, "public access" fueling is conducted at "marketer" facilities, another term used in the regulatory administrative process. Fleet fueling in a general application is everything else, however, specific requirements will vary for applications such as residential, fleet, farm or construction sites. There are some fueling activities or sites that fall outside of these descriptions, such as race tracks where the vehicles being fueled are not considered to be a fleet and the vehicle owners pay the fuel supplier for the fuel dispensed into their race vehicles. Some applications, such as we experience in the paper industry, fall between "farm" and "construction" sites." Logging operations typically have a construction equipment manner to them in association with a farm or timber harvesting operation. Logging and similar forestry applications are treated as construction sites, although project timelines do not apply as logging activity may commence and cease periodically over an extended period of time.

Subsection VII does not apply to the dispensing of fuel into test or research engines that are secured or mounted in a fashion that allows very limited mobility.

Point-Of-Sale Fuel Dispensing

Changing business practices, such as expanding fuel-dispensing accommodations, have resulted in a significant increase in sites wishing to provide Point of Sale (POS) and unattended fueling. Service stations can provide this additional service via key, card, cash or code control dispensers.

While there may not be any physical changes to the piping configuration, an operational change does take place when a conversion to POS is completed. A POS system can be programmed to be authorized by a cashier or attendant, although the vast majority of the time it is not configured in this manner. The dispenser is typically configured or programmed to authorize dispensing by a customer at the dispenser *without* communication to the attendant on duty. It therefore is an "unattended" self service dispenser.

Unattended self service facilities are permitted by NFPA 30A-9-5 (2008 Edition), subject to the required components being in place **and the approval of the authority having jurisdiction.** An "attended" service station as required by NFPA 30A shall have at least one attendant on duty to supervise, observe, and control the dispensing of Class 1 liquids while fuels are actually being dispensed. Several observations are made regarding operational practices experienced when "attended self-service" dispensers are modified to key, card, cash or code operation:

- The dispenser(s) modified for POS are frequently the furthest distance from the attendant station.
- Attendants do not maintain the oversight expected.
- The dispensers are utilized more frequently during periods when the attendant is absent.
- Many of the dispensers are located in areas where it is questionable whether an attendant, if available, could provide adequate oversight.
- After a period of time, service stations with attended key, cash or card control systems frequently implement unattended self-service operation.
- The increase in static discharge related fires during dispensing have recently elevated the importance of both safety and communication issues.

Technology and the trend toward POS dispensers allows an owner/operator to convert from attended to unattended fueling without implementing the life-safety features required in the national standard. The Department believes that life-safety and environmental concerns are multiplied with the variation and number of people utilizing a POS system, especially when no employees are on site. The configurations at retail facilities will also vary with facility and jobber branding, thus increasing the potential risk for an uncontrolled population of users. Therefore, all POS dispensing systems (attended and unattended self-service) must maintain consistency with the NFPA 30A-9-5 regulatory

requirements for unattended self-service stations, including:

- An accessible non-resettable emergency shut-off device with proper emergency instructions and signage.
- Outside emergency control located more than 20 ft., but less than 100 ft. from dispensers and proper signage.
- Telephone or other approved means to notify the fire department must be located on the facility property. If POS operation of the dispensers is provided during periods when the retail facility is closed for business, a telephone or other approved means to notify the fire department shall be located outside the business, readily accessible to the public. If POS operation of the dispensers is not functional during periods when the retail facility is closed for business a means of communication is not required. However, at any point in time when the POS function is operational (intentional or not) at a station that is closed for business, a means of communication must be immediately installed.
- Required fire extinguisher and placement.

Attended and Unattended Fueling

To be considered as attended fueling, there shall be at least one attendant on duty to supervise, observe and control the actual dispensing of Class I liquids. The term "control" has generated considerable discussion and debate relating how that function is interpreted in real world application. In theory attendant control means that, at a minimum, an attendant acknowledges the request for fuel and activates the dispenser mechanism. In real world application most public fuel dispensing facilities have the dispensers programmed to dispense without any interaction from an attendant. An attendant will re-activate the dispenser for the next sale during the customer payment transaction for the fuel. POS dispenser either re-activate automatically after the nozzle is placed back in its holder or the dispenser is activated by the next customer pushing a button, with no interaction by facility employees. Facilities with dispensers operating in the POS mode are considered "unattended."

Emergency Shut-off

The NFPA requirement for emergency shut-off or emergency controls generates frequent questions in the intent and application of this requirement.

NFPA 30A-6.7 Emergency Electrical Disconnects states: Fuel dispensing systems shall be provided with one or more clearly identified emergency shutoff devices or electrical disconnects. Such devices or disconnects shall be installed in approved locations but not less than 20 ft or more than 100 ft from the fuel dispensing devices that they serve. Emergency shutoff devices or electrical disconnects shall disconnect power to all dispensing devices; to all remote pumps serving the dispensing devices; to all associated power, control, and signal circuits; and to all other electrical equipment in the hazardous (classified) locations surrounding the fuel dispensing devices.

When more than one emergency shutoff device or electrical disconnect is provided, all devices shall be interconnected. Resetting from an emergency shutoff condition shall require manual intervention and the manner of resetting shall be approved by the authority having jurisdiction.

Exception: Intrinsically safe electrical equipment need not meet this requirement.

6.7.1 At attended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to the attendant.

6.7.2 At unattended motor fuel dispensing facilities, the devices or disconnects shall be readily accessible to patrons and at least one device or disconnect shall be readily accessible to each group of dispensing devices on an individual island.

Questions frequently arise on what island and facility electrical systems must be shut-down when the emergency control is activated. The department's position is that the requirement applies to electrical systems for equipment on the island(s) and systems associated with equipment providing fuel to the dispensers. The requirement does not apply to canopy or similar lighting. The justification for not cutting the power to the lighting system is that putting the area in darkness may increase life-safety risks significantly more than the risk of the lighting system causing ignition of vapors.

The NFPA requirement has an exception for intrinsically safe electrical equipment. The fueling zone

is 20 ft. around the dispenser. The only equipment or components within the fueling zone required to be intrinsically safe is the dispenser and electrical components within 18 inches of the dispenser. The department will recognize the exception if all electrical components within the 20 ft. fueling zone are installed to the intrinsically safe Class I Division I classification.
Section 6.7.2 requires that the shut-off at unattended sites be located and accessible to each group of dispensers on an individual island. This does not mean that each island must have an individual shut-off. It means that a shut-off may serve multiple islands as long as the devise is located within the 20 to 100 ft. distance.
Consideration of human "fright and flight" reactions, traffic patterns and overall facility operational characteristics must be factored into determining the location of the shut-off device. Under no circumstances will the department accept the device located closer than 20 feet to the dispenser, but there may be reason and logic to the location being more than 100 feet. The device cannot be mounted on a collision prone free standing post located in a parking or traffic area, or located where it is visually obscured by parked vehicles, merchandise or landscaping.

Solar power

The battery, and solar panel battery recharging system, shall be located a minimum of 20 ft. from the tank system and shall be installed per the requirements of the pump manufacturers installation instructions.

The emergency electrical disconnect does not have to be in the same location as the battery/charging system, however, it shall be located a minimum of 20-ft. and a maximum of 100-ft. from the dispensing device(s) it serves. From a logistical standpoint this would probably be in the same location as the battery/charging system. The disconnect can be any device (push-button or any other type of switch/disconnect) that cuts off the power to all dispensing devices; to all remote pumps serving the dispensing devices; to all associated power, control, and signal circuits; and to all other electrical equipment in the hazardous (classified) locations surrounding the fuel dispensing devices. In addition, all other requirements of NFPA 30A-2008 section 6.7 shall be met.

SPS 310.610 Fuel dispensing using aboveground mobile tanks

Over the past years trends and industry practices have often resulted in vehicle fueling activities that were not in compliance with the code. This section of the code addresses traditional fueling practices as well as provides requirements that will allow and authorize fuel dispensing and vehicle fueling activities that are not typical or otherwise prohibited.

The code now includes tank wagons and "wet-hose" fueling that previously were prohibited activities as commonly performed. Federal SPCC regulations do not apply to most fuel delivery activities. Tank wagons of 1360 gallon capacity are marginally covered under the federal SPCC regulations (surface water protection), but wet-hose fueling is not. Including both practices in the SPS 310 rule recognizes the activity within reasonable conditions and criteria that reduce the potential environmental and public fire safety risk. The current edition of the code allows for wet-hose fueling of fleet vehicles and locomotives but only on a temporary basis. Due to an inquiry from a railway operator, the department reviewed its policy on the temporary basis limitation for wet-hose fueling of locomotives. As part of that review the definition of "motor vehicle" as defined in SPS 310 and other state regulatory documents was compared. The following is the Wisconsin Department of Transportation (WDOT) statutory definition of motor vehicle (ref. Section 340.01(35), Stats.)

(35) "Motor vehicle" means a vehicle, including a combination of 2 or more vehicles or an articulated vehicle, which is self-propelled, except a vehicle operated exclusively on a rail. "Motor vehicle" includes, without limitation, a commercial motor vehicle or a vehicle which is propelled by electric power obtained from overhead trolley wires but not operated on rails. A snowmobile and an all terrain vehicle shall only be considered motor vehicles for purposes made specifically applicable by statute.

Of note within the definition is the exemption of vehicles operated on rails. For the purposes of providing consistency within the regulated community and Wisconsin regulations, the department will recognize the exemption of vehicles operated on rails from the definition of a motor vehicle and the associated SPS 310

code requirements for motor vehicle fueling. Therefore, wet-hose locomotive fueling will be exempt from the temporary basis limitation of ss. 10.610(3)(c)3. This code exemption will be reflected in the next revision of the SPS 310 code.

SPS 310 considers water-craft to be motor vehicles. However, the statute appears to address only motorized vehicles that are on land. Almost every year the department becomes involved with issues of pleasure or charter boats being refueled by delivery trucks. These situations often present additional concerns that must be factored into an approval.

A facility maintaining a petroleum product delivery type vehicle to fuel facility fleet vehicles is not considered “wet-hose” fueling. Wet-hose fueling is performed by a petroleum jobber type business and the transport vehicle is on the premises only for the duration of the refueling activity. A company that maintains a vehicle for fueling company fleet equipment must maintain DOT licensing and NFPA 385 vehicle requirements for the transport vehicle. In addition, the vehicle must be located in secondary containment when parked with product in the transport tank.

The photos below express several wet-hose fueling configurations that have been brought to our attention:

SPS 310.100 Plan review exempts specific “tanks” from the traditional Department of Safety & Professional Services or LPO plan review in (1) (b). Subdivision 5 exempts tank wagons, tank vehicles or movable tanks for vehicle fueling that are regulated under subch VI. This would be SPS 310.610(1) Tank wagons, (2) Movable tanks, and (3) Tank vehicles; all of which are exempt from plan review if in use under the specific conditions specified in each paragraph, which includes the type of occupancy where the respective tanks may be used (not necessarily just farm or construction project). SPS 310.100(1) (b) subdivision 5 does not include a capacity requirement; however SPS 310.610 has a capacity limit of 1,100 gallons for tank wagons and movable tanks and 5,500 for tank vehicles.

The subdivision under tank wagons and movable tanks which addresses tank placement refers to SPS

310.630 for setback only. This does not mean that a simplified plan submittal is required unless department approval is required because the placement setbacks cannot be met.

The plan submittal requirement in SPS 310.630 Fuel dispensing at farms and construction projects applies to fixed tanks or SPS 310.610 tanks that exceed the "duration of use" period for the respective tank.

Responsibilities of a Certified Installer are in SPS 305.84 Aboveground tank system installers. The responsibilities are associated with specific code and standard requirements which are typically addressed during the plan review and approval process. Logic would be that if a plan review is not required the installation can be performed by an individual who is not a certified Installer. This is supported by SPS 310.400(5)(f) Upon completion of any installation of new or replacement shop-built tanks or piping, or any modification or upgrade thereto that requires plan approval or registration, the certified installer shall provide the authorized agent or the department with a completed tank installation checklist, form ERS-9658.

General Summary of Fuel Dispensing From Aboveground Tanks - This table presents a very brief overview of requirements. Chapter SPS 310 must be consulted in all cases. In the event of conflicts, the code language in chapter SPS 310 shall be followed. Please refer to individual sections of Subchapter VII – Dispensing of Motor Fuels, which follow this table.

	Tank Wagon	**Farm Tank**	**Movable Tank**	**Tank Vehicle**	**Public Access Fueling System**
Max Size (Gallons)	1,100	1,100 (larger w/ conditions)	1,100 (larger w/ conditions)	5,500	Per NFPA 30A (now 12,000) (vaulted 15,000)
Time on Customer Property	2 Years	Unlimited w/ code compliance	2 Years	5 days (longer w/ conditions)	Unlimited w/ code compliance
Setbacks	SPS 310.630 (2) (a) or max allowed	SPS 310.630 (2) (a) 1.	SPS 310.630 (2) (a) or max allowed	SPS 310.610 (4) (f) (Operations)	Table SPS 310.610 and aircraft, boat sec.
Secondary Containment	No	No	No	No (Federal SPCC applies if > 1320 gal.)	Yes, per NFPA 30 & SPS 310.420
Listing Required for Tank	No (comply w/ SPS 310)	No (comply w/ NFPA 30A)	No (comply w/ NFPA 30-21.4.2)	No (mfr's. certificate to NFPA 385)	Yes
Inspection	No	Yes, Initial	No	No	Yes, Initial & Ongoing
Financial Responsibility	Yes	No	No	Yes	On boat or non-solid fill pier, Yes
Certified Installer	No	Yes	No	No	Yes
Pre-Installation Plan Review	No	≤ 1,100 gallons, No	≤ 1,100 gallons, No	No	Yes
Tank Registration	No	No	No	No	Yes

- "Tank wagon" means a tank and trailer system that has at least one axle and is constructed in accordance with s. SPS 310.610 (1).
- "Farm tank" means a tank that is constructed in accordance with (at least) NFPA 30A and installed on a farm premises, as defined under s. 102.04 (3), WI Stats.
- "Movable tank" means a tank that is designed and constructed to one of the standards under NFPA 30-2.2.3 (does not include NFPA 30A) and is supported on skids, wheels without axles, or other means and is intended for temporary use at an individual site.
- "Tank vehicle" means a tank system constructed in accordance with NFPA 385 that is permanently affixed to, and transported on, either a trailer or a truck.
- "Public access fueling system" is a tank system designed, installed, used and maintained in accordance with NFPA 30, NFPA 30A and s. SPS 310.620.

Comparison:

	Tank Wagon 10.610(1)	Movable Tanks 10.610(2)	Tank Vehicles 10.610(3)
Duration of use	A tank wagon may stay on the customer's premises for a maximum of 24 months.	A movable tank may be used on the customer's property for a maximum of 24 months.	Tank vehicles may remain on the customer's property for a maximum of 5 days unless any of the following conditions apply: 1. The tank vehicle is used to fill aircraft in accordance with s. SPS 310.650, or aircraft support equipment. 2. Prior to the tank vehicle arriving at the customer's property, the local fire department has approved conditional use for more than 5 days. 3. The tank vehicle is converted to a stationary tank in accordance with s. SPS 310.330.
Location and type of use	The use of tank wagons is limited to the fueling of vehicles and equipment in the following operations: 1. Landfill and mine, pit and quarry operations. 2. Highway or runway construction, including associated material processing sites. 3. Construction projects for buildings, structures and utilities. 4. Logging and woodcutting operations. 5. De-watering operations. 6. Farming operations included under the definition of farming. 7. Trail grooming. 8. Fueling of heating or cooling units on semi-trailers	Movable tanks may be used only for fueling of vehicles and equipment in the following situations: 1. In accordance with sub. (1) (c) 1. to 7. 2. At recycling centers and refuse centers. 3. At power generating stations. 4. For short-term use during fuel storage equipment changeovers.	Tank vehicles may be used only for transferring fuel into a fixed-tank system, or for fueling of vehicles and equipment in the following situations: 1. With the expressed permission of the local fire department. 2. Fueling of vehicles and equipment on the customer's premises and in connection with the business, for the uses listed in subs. (1) (c) 1. to 7. and (2) (c) 2. 3. Fueling of fleet vehicles or locomotives in accordance with this subsection. 4. Fueling of watercraft under emergency conditions in accordance with s. SPS 310.640 (5) or as allowed under NFPA 30A section 9.6. **Note**: NFPA 30A section 11.9 allows fueling of Class II fuels directly from a tank vehicle, for commercial or governmental watercraft used in connection with the business. 5. Fueling of aircraft in accordance with s. SPS 310.650.
Limitations on location and type of use.	1. Tank wagons may not be used for fueling vehicles unless the vehicles are dedicated to the operation of the specific project or facility. 2. Tank wagons may not be used for general fueling of fleet vehicles or any retail sales.	Movable tanks may not be used for any retail sales, or for fueling vehicles unless the vehicles are dedicated to the operation of the specific project or facility.	

SPS 310.615 Fuel dispensing systems using aboveground fixed tanks

SPS 310.615(5) of this section includes additional fire safety and environmental safeguards resulting from deficiencies in the previous code requirements. Present day experiences and observations reflect that

the area and components under the dispenser and at connection with the tank are posing continued leaks and potential contamination. The configuration of the dispenser makes it likely that a simple maintenance activity such as in-line filter change will result in a product spill. Under the dispenser releases are common service call activities. Some O/O have not taken the initiative to provide a means to prevent soil contamination. All freestanding dispensers and tank sumps are required to have liquid-tight containment within the specified period of time. Retrofitting or replacing existing dispensers, sumps or islands to meet compliance with this section will not move the system into a pipe upgrade under SPS 310.500(5) unless pipe work involves more than necessary for the connections.

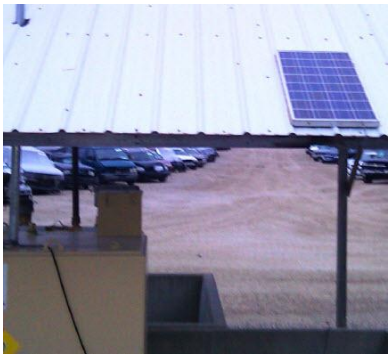
SPS 310.615(5)(a) applies to “free-standing” dispensers, which is a dispenser independent of the tank. A typical free-standing dispenser is located 30 feet from an aboveground tank or adjacent to underground tanks and connected by underground piping that extends laterally underground from the tank to the dispenser. A dispenser supported by a riser located directly above an underground tank or a dispenser mounted on an aboveground tank is not considered a “free-standing” dispenser.

Dispensers are required to have shear valves installed in the product line below the base of the dispenser to prevent the release of gasoline in the event the product line is damaged from an impact. Some current day dispenser configurations and installation techniques have resulted in the failure of fire valves to close properly when the dispenser was hit or partially pulled from its base, resulting in fires. New and replacement fire valves must be replaced with double –poppet valves that add an additional margin of fire safety.

Table 10.615-A provides setback distances for public access fueling that are slightly modified from the table in NFPA 30A. A vaulted tank as stated in our code and a tank in a vault as stated in NFPA 30A is one and the same. The key is both have to be designed in accordance with UL 2245, *Standard for Below-grade Vaults for Flammable and Combustible Liquid Storage Tanks*, in order to be defined as a vaulted tank or a tank in a vault.

A Convault type tank (photo to right), which has a cement outer shell, is normally listed as a UL 2085 protected tank, not a vaulted tank.

Table SPS 310.615-B apples to fleet applications. A fleet application can not sell fuel by the unit. An equipment rental facility that includes the fuel as part of the rental is considered fleet fueling, as is a golf course. The setback requirements in this table are significantly reduced from Table SPS 310.615-A because the people performing the fueling are employees of the facility dispensing fuel into company owned and/or operated equipment. Trucking companies with truck fueling systems, which allow lease operators to fuel at their facility and charge the lease operator for the fuel, are considered retail operations and Table SPS 310.615-A applies.



<u>Solar electric power source</u>

Solar power may be used as either a primary or a secondary energy source for the dispensing pump. If the use is a motor fuel dispensing facility (stationary tank or mobile tank) the electrical application is covered by Article 514 of the National Electrical Code (NEC). If the fuel is diesel fuel or other Class II or III only Section 514.3 (A) of the NEC would leave it as an unclassified area since the combustible

liquid being transferred do not have a flash point below 100 degrees F. This allows any NEC Chapter 3 wiring method as well as that allowed by Article 690 for Solar Photovoltaic Systems. That being said, a stationary tank is still a Motor fuel Dispensing Facility and NFPA 30 A as well as the NEC require the emergency disconnect for power to the dispensing device; this would include disconnection of the battery.

SPS 310.620 Public access fueling

Public access fueling pose significant more hazards and risks than private or fleet facilities since individual of various ages, physical abilities and varying understanding of the risks of flammable and combustible liquids, frequent the site. Over the past fifteen years there has been a significant change to the businesses and locations of these business where the public purchases automobile fuels. Service stations have made a transition from attendant operated fuel dispensing at businesses that only dealt with automobile related services to self-service at business that also market items such as grocery and landscape goods. Additionally, we have 24/7 point of sale dispensing at business that do not have 24/7 staffing. Mercantile responsibilities and customer traffic patterns has resulted in less visual oversight of the fueling area. Current day clothing and vehicle materials have resulted in a significant number of static induced fires during automobile fueling. In the interest of maintaining an element of fire safety the code includes two new restrictions. Public access service stations are prohibited from placing certain equipment on a dispenser island in order to allow visual observation of the fueling areas. The age of children allowed to operate a fuel dispenser is restricted to children 14 years of age and older.

SPS 310.630 Fuel dispensing at farms and construction sites

NFPA 30A, which is adopted by the code, now incorporates farm and construction site storage tank requirements that were previously in NFPA 395. Over time the farm and construction site environment and demographics have changed resulting in the requirements changing to provide more public and fire safety elements. The NFPA 30A 2008 Edition of the standard now requires the following:

- Emergency vent on all tanks
- Minimum metal thickness 12 gauge tank construction
- Tanks shall not be manifolded
- Tanks shall be separated by at least 3 feet.

NFPA 395, the former national standard for fuel dispensing at farms and construction sites has been withdrawn and incorporated into the 2008 edition of NFPA 30A. In exchange for not having to provide spill control and not having to meet other normally applicable requirements of NFPA 30, tanks at farm and construction sites that are not constructed to UL 142 are prohibited from the use of bottom drains.

<u>Tank Setback</u>

SPS 310.630 has a table of setback distances that is significantly different than setback distances for tanks at other occupancies. The setback is from buildings. Grain bins and silos are structures, not buildings.

<u>Irrigation Systems</u>

Combustion engines powering irrigation systems must comply with SPS 310.630(2). Unfortunately this subsection is not clear. The DNR has passed fuel supply tank concerns on to us and our inspectors have experiences with fuel spills as the result of varmints chewing the fuel supply line. In the interim of definitive code language the following is required:

- Tanks that supply irrigation systems shall be located on shore or on a pier of the solid-fill type.
- The tank shall be mounted to maintain stability against vibration, wind, water saturated ground and high water.

- Where a tank is at an elevation that may produces a gravity head-pressure or siphon pressure, the tank outlet shall be equipped with a device, such as a normally closed solenoid valve, that will prevent gravity or siphon flow from the tank to the engine. This device shall be located adjacent to and downstream of the tank outlet valve. The device shall be installed and adjusted so that liquid cannot flow by gravity or siphon from the tank to the engine if the fuel piping, tubing or hose (herewith referred to as fuel piping) fails when the engine is not in use.
- The fuel piping shall be compatible with the fuel.
- Fuel piping systems shall be constructed, supported and protected against physical damage and stresses arising from impact, settlement, vibration, expansion, contraction, tidal action and wildlife.
- Means shall be provided to ensure flexibility of the fuel piping system in the event of motion of the engine or the pier. Fuel piping shall be of a type designed to withstand the forces and pressures exerted upon the fuel piping.
- A valve to shut off the liquid supply from the tank shall be provided in each fuel piping line at the tank.
- Secondary containment is required; a listed tank is not required; plan submittal is not required; installation by a certified contractor is not required and registration is not required.

SPS 310.640 Watercraft, snowmobile and ATV fueling

The code now provides environmental safety requirements for dispensing systems located over water, such as drip-less nozzles, spill containment under freestanding dispensers and pressure relief provisions to compensate for thermal expansion of product in exposed piping.

Many of the former fire safety requirements associated with systems dedicated to fueling recreational equipment, such as snowmobiles and ATVs, have been reduced to a level more appropriate for the fueling activity.

People have difficulty recognizing the inherent fire safety issues of marine craft fueling that differ from automobile fueling. There are numerous web sites addressing marine craft fueling safety and it is key part of many boat operator courses and certifications. The marine craft fuel dispensing fire safety concerns are based upon experiences with:

- fuel spillage or vapors migrating into the craft,
- static potential and combustible material of the craft,
- fuel spillage or leakage going into the water,
- limited escape routes - people that can run can not necessarily swim,
- potential static charge ignition,
- exposure of craft occupants to explosion deflagration,
- craft or pier movement during fuel transfer subject to waves or wakes,
- access limitations by emergency response fire/rescue, etc.,
- liberal regulations and attitude toward alcohol use by marine craft occupants.

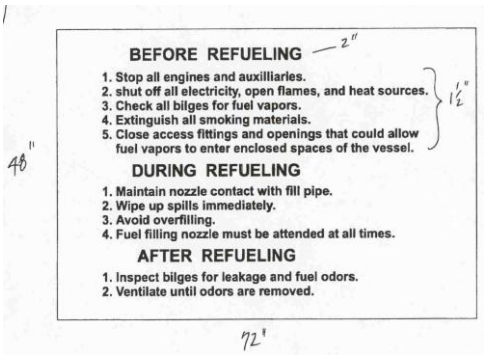
The marine craft fueling environment is very susceptible to static related accidents. Static is generated when liquids move in contact with other materials. This occurs commonly in operations such as hydrocarbon substances flowing through pipes and in mixing, pouring, pumping, filtering, or agitating. Under certain conditions, particularly with liquid hydrocarbons, static can accumulate in the liquid. If the accumulation is sufficient, a static spark can occur. If the spark occurs in the presence of a flammable vapor-air mixture, an ignition can result. Therefore, steps should be taken to prevent the simultaneous occurrence of these two conditions.

The marina fueling environment also poses considerable differences from highway vehicle fueling in terms of craft/structure stability, increasing the potential for an accidental spill from craft or pier movement. The location of the vessel fuel tank also increased the risk that a spill will result in the fuel entering the occupant compartment. Probability of a spill and contamination is much higher for marine craft due to the mechanics of fuel transfer and dispensing, and the site characteristics.

The marine dispensing area has very limited access for emergency operations, whether by marina staff or emergency responders. Exiting a boat and escaping the immediate fuel dispensing area is considerably more challenging for individuals exiting a marine craft than for individuals exiting an automobile. Likewise, fire department staging at a vehicle service station is much more accommodating than marine service stations.

For the past fifteen years the National Fire Protection Association has included restrictions and requirements in the national standard NFPA 30A to address the concerns mentioned in the pervious paragraphs.

- Public fueling facilities must have an attendant on duty at all times when fuel may be dispensed. POS type dispensing systems (e.g., credit card activated fueling) are not allowed unless an attendant is on duty. The attendant does not have to perform the refueling function, but is responsible for public and fire safety oversight. Refer to NFPA 30A-11.10 for the specific requirements,



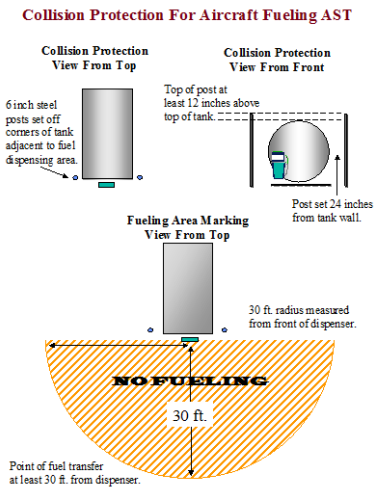
responsibilities and expectations.

- Public fueling facilities must have a sign posting specific operational instructions. The NFPA 30A-11.10.8 signage requirement frequently poses controversy regarding what is acceptable in meeting the rule. “Conspicuously” posted means the sign must be located so that a boater is able to read the sign from a distance of 30’ from the dispensing area. The instructional headings in 2” letters and the instructions in 1 ½” letters on a 48” X 72” backing are acceptable.

Periodically we have inquiries or complaints relating to fueling a marine craft directly from a delivery truck. The only application where direct fueling of a vehicle (automobiles, boats and aircraft are all considered vehicles) is allowed is for emergencies, for vehicles or equipment located at construction sites/projects, or “marine craft used in connection with the business” as allowed in NFPA 30A-11.9 (2008 edition).

Occasionally situations arise where local municipalities have concerns about the logistical placement of fuel tanks, fueling area or the movement of larger craft in harbor waters that may pose risks (draft depth, berthing of craft, etc.) and staging issues with other activities in the area. In relation to such municipal concerns, marine fleet craft, such as commercial fishing or excursion boats, are allowed to refuel with Class II product (diesel fuel) from an NFPA 385 tank vehicle provided the requirements in NFPA 30A-11.9.1 to 11.9.7 are met and they have written approval from the local fire department. In all other situations an application for a Petition For Variance must be submitted to Department of Safety & Professional Services. Department of Safety & Professional Services will review the application for fire and environmental safety, fuel transfer practices and local jurisdiction approval (typically the fire department).

SPS 310.650 Aircraft fuel dispensing



This code edition has expanded the regulatory requirements for aircraft fueling, primarily to fulfill the s. 101.02 public safety requirements, and to address trends and to satisfy some of the concerns associated with aircraft fuel quality, self-service and fire safety. Fuel quality problems in a highway vehicle may result in the vehicle rolling to a stop along the side of the road. An aircraft's response to a fuel quality problem may be much more dramatic and catastrophic. Similarly, aircraft fueling incidents pose a significantly higher risk to aircraft passengers since exiting an aircraft in an emergency is considerably more difficult and time consuming than exiting an automobile or building.

Non attendant self-service refueling for aircraft has increased significantly over the past five years. The diagram to the right reflects an acceptable system configuration, which includes collision protection and a 30-foot aircraft setback from the tank. The aircraft dispensing setback is measured from the point of fuel intake on the aircraft to the tank or to the dispenser if the dispenser is located adjacent to the tank.

Collision protection for tank/dispensing configurations that are typical with self-service aircraft refueling is required to protect the tank and dispenser from direct impact collision with the aircraft body as well as the wings. Protection is required along the sides and corners of the tank adjacent to traffic (taxi) routes or parking areas. Collision protection is required to extend at least one foot above the top of the tank thereby protecting most of the appurtenances that may be fixed to the top of the tank.

SPS 310.660 Racetrack and amusement park fueling operations

This section of the code applies to storage and refueling operations at competitive race track facilities and recreational or amusement facilities such as go-cart tracks and bumper boats

Race track fueling practices are significantly different from conventional vehicle fueling. NFPA 30A does not address race track fueling and SPS 310 provides general fire safety requirements. Fortunately, some race tracks have a policy that governs race car fueling practices.

Fuels designed for some race vehicles may have characteristics that vary from the typical automobile fuels. Therefore race tracks may bring in the fuel bulk via transport or delivery trucks or in 55 gallon barrels and dispense from the trucks or barrels into portable containers or fuel carts.

Amusement facilities such as go cart tracks and bumper boat generally do not have the quantity of fuel on site or transferred to a vehicle in the quantities that are experienced at race tracks. However, the typical site demographics (age of participants and site layout) are such that a significant risk is present and therefore regulatory safeguards must be in-place.

This section of SPS 310 will apply to amusement or recreational rides that are not the typical carnival amusement ride powered by generators filled from NFPA 385 complying vehicles, stationary combustion engines or covered in other areas of the code.

SPS 310.680 Ethanol – based motor fuels.

Reserved

Subchapter VIII – Financial Responsibility

SPS 310.700 Applicability

Financial responsibility (FR) requirements only apply to five types of tank installations or uses:

1. Federally regulated underground tanks. Federally regulated underground tanks that contain CERCLA non-petroleum products are excluded from the FR requirement.
2. Petroleum product aboveground tanks located on piers that are not of a solid fill. This means tanks that are located over water.
3. Petroleum product tanks located on vessels for the purpose of supplying other craft or equipment with motor fuel.
4. Mobile tanks or tanks on wagons that vendors move from site to site.
5. Aboveground storage tank systems 5,000 gallons capacity or greater that are not located in diked secondary containment and double-bottom tanks without interstitial monitoring located outside of diked containment.

An AST in a dike with single-wall piping extending over the dike wall and going underground will be required to have financial responsibility. If the piping is double-wall underground the system is not required to have FR.

SPS 310.700(2)(e) FR exemption applies only to temporarily-out of-service (TOS) tanks of which at the time of moving the tank to TOS status an environmental assessment was performed and provided to the department that confirms that the system bed is free of contamination as a result of spills or releases from the system.

SPS 310.715 Insurance and risk retention group coverage

<u>Beneficiary</u>

SPS 310.715(5) (a) The owner of the property on which tanks are located has ultimate responsibility under this chapter and shall be listed as a co-beneficiary of any policy issued.
(b) This subsection shall take effect on the first policy renewal date or issuance date following February 1, 2009.

<u>Notice of termination</u>

(6) (a) If the insurer or group terminates coverage for any reason, the insurer or group shall notify the department of such termination at the same time the insured is notified.
(b) If the insured allows coverage to lapse or changes insurers or groups, the insured shall notify the department within 10 days.

This section requires that the insurer notify the department of any lapse or termination of insurance coverage at the same time the insured is notified. The inured must notify the department within 10 days of any lapse of change in insurer. The code language does not define "insurer" as just the company who issues the policies, so technically an agent is responsible to notify us of termination. However, it appears as if the onus is on the insurance company, especially since typically the company would have knowledge of a policy lapse or insurer termination long before the agent. However, if an owner comes to an agent and terminates the policy himself or changes insurers, the department would expect notification from the

agent, as that agent would be the first to know. Also, if there is any indication that the insurance company has not notified the department of a termination, the department would rather be over-notified of a termination in insurance than not at all, so would expect the agent to notify the department of the termination in that case. Ultimately, responsibility rests with any part of the insurance policy team as the "insurer", but we anticipate that the majority of the time, the insurance company would have the best, most up-to-date knowledge and therefore the greater responsibility to keep the department notified of any terminations.

While the code requires notification to the department within 10 days, the department has agreed to accept a monthly notification from the FR provider that consolidates all terminated and nonrenewal policies into one comprehensive report. We would like to have reported to us:

- The name and address of the insured
- Facilities and addresses of those facilities impacted by the change in coverage.
- Policy number

Temporarily-Out of-Service versus Temporarily Closed tanks

Wisconsin does not recognize the “temporarily closed” terminology used in the Federal EPA rule 40 CFR 280. In Wisconsin a tank is either “in-use,” “temporarily-out of-service (TOS),” abandon” or “closed.” An “abandon” tank is an illegal tank. In Wisconsin tanks that are TOS must comply with the same requirements as “in-use” tanks. A TOS tank is subject to annual inspections and requires a “Permit To Operate (PTO).” A TOS tank is required to maintain corrosion protection, and also leak detection if it contains product. During the annual inspection the inspector will verify if the tank is empty or contains product, verify that the tank has CP if it not a fiberglass tank, and verify that any periodic tests and inspections, such as CP or internal lining, are performed as required. The permit renewal process likewise verifies leak detection if the tank has product and verifies that financial responsibility is in place for the tank. If any of the requirements are not met the tank is ordered to be closed.

Few TOS tanks in Wisconsin will contain product because inspectors are many times requiring the tank be empty, including blow back of the lines, before they will allow the tank to move to TOS status.

SPS 302 - Fees

Local Ordinance Fees vs. State SPS 302 Fees

The SPS 302 fee is the fee allowed to be charged by the state program. Local ordinances can be more restrictive - meaning charge a higher fee. Conflicts arise when the local ordinance is not clear. Examples are:

- The local jurisdiction wants to charge the fee in their local ordinance plus the SPS 302 fee (fee on the ERS - 9 application).
- The local ordinance has a fee schedule that has both higher and lower fees than SPS 302, so the local wants to charge the higher of the two depending upon which fee schedule (state or local) has the higher fee.
- Local ordinance does not have fees that specifically or clearly address tanks and the local wants to apply review and inspection fees that are in place for buildings.

Experience is that an attorney is going to say that the local ordinance fee language prevails. The local ordinance fee language would have to have something to the effect ". . . in addition to the fee charged in SPS 302)" in order to charge anything more.

In a situation where a local ordinance does not have fees that specifically or clearly address tanks we would advise that the SPS 302 fee is designed for the regulatory oversight relationship with tanks and not buildings.

The LPO contract language is meant to express that unless a local LPO agent has an ordinance with a fee schedule the LPO must charge the SPS 302 fee.

State Fee

Effective November 1, 2005 the fee for underground and aboveground storage tanks has a significant format modification, basing the fee on aggregate capacity. The submittal fee will be calculated on the total capacity of the tanks subject to the work being submitted in the application. Examples below:

Example #1:

New facility with five 12,000 gallon tanks, stage II and POS dispensers. Fee is $150 review, $300 inspection, $100 groundwater. Because the stage II and POS systems are part of the complete installation no individual fees are required.

Aggregate Tank Capacity: 60,000 gallons **Number of tanks:** 5

Fee: (Fee table on reverse side)	**Plan Examination**	**Install Inspection**	**Subtotal**
a) Tank/Pipe System Installation	$ 150 (7636)	$ 300 (8253)	$ 450
b) Addition OR Upgrade for corrosion protection	$_____(7636)	$_____(8253)	$_____
c) Conversion to Key - Card - Code - POS	$_____(7636)	$_____(8253)	$_____
d) Addition OR Upgrade for leak detection	$_____(7636)	$_____(8253)	$_____
e) Interior Lining of Tanks	$_____(7636)	$_____(8253)	$_____
f) Addition OR Upgrade of Stage II Vapor Recovery	$_____(7636)	$_____(8253)	$_____
g) REVISION Previous Approved Plan #_____	$_____(7636)		$_____
h) **GROUNDWATER SURCHARGE $100** (WI Stat. 101.14(5)) (Required for items: a, b, d, e and f)			$ 100
		TOTAL FEE:	$ 550

I certify by signature that provisions of the current Flammable and Combustible Liquids Code, 40 CFR Part 280, and all required well setbacks (DNR) listed or not listed on this document, will be

Example #2:

Existing facility with four 12,000 gallon USTs. Submittal is for an additional island and piping constructed from one 12,000 gallon UST and conversion of all dispensers to POS. Fee is $125 review, $250 inspection, $35 for additional POS and $100 groundwater. Because POS for the entire facility can be inspected in association with the piping installation, no additional POS inspection fee is required. The fee on the ERS-9 POS application is applied when POS conversion is independent from any other installation

activity. The POS application form is submitted along with the piping submittal application, but the fee is included on the primary installation application.

Aggregate Tank Capacity: 12,000 gallons **Number of tanks:** 1

Fee: (Fee table on reverse side)	**Plan Examination**	**Install Inspection**	**Subtotal**
a) Tank/Pipe System Installation	$ 125 (7636)	$ 250 (8253)	$ 375
b) Addition OR Upgrade for corrosion protection	$ (7636)	$ (8253)	$
c) Conversion to Key - Card - Code - POS	$ 35 (7636)	$ NA (8253)	$ 35
d) Addition OR Upgrade for leak detection	$ (7636)	$ (8253)	$
e) Interior Lining of Tanks	$ (7636)	$ (8253)	$
f) Addition OR Upgrade of Stage II Vapor Recovery	$ (7636)	$ (8253)	$
g) REVISION Previous Approved Plan #	$ (7636)		$
h) **GROUNDWATER SURCHARGE $100** (WI Stat. 101.14(5)) (Required for items: a, b, d, e and f)			$ 100 (7637)
		TOTAL FEE:	$ 510

I certify by [illegible] current Flammable and Combustible Liquids Code, 40 [illegible]

Example #3:
New facility with four 12,000 gallon tanks being installed. Fee is $125 review, $250 inspection, $100 groundwater. Plan is approved and installation under-way. During installation operator decides that POS dispensers are wanted and POS form is submitted for review and approval. Submit as a plan revision, include the ERS-9 Install Application and the ERS-6294 POS Application and a plan revision fee of $100.

Groundwater fee:
SPS 302.43(2) Groundwater fee as stated in Wisconsin Statute 101.14(5) is collected on plan review performed by the Department of Safety & Professional Services and the City of Milwaukee for tank system installation, pipe system installation, installation or upgrade of corrosion protection, installation or upgrade of leak detection, Stage II vapor recovery installation or upgrade, and interior UST lining. This fee applies to initial and replacement installations and relining of tanks and piping.

SPS 302.43 states:
(2) GROUNDWATER FEE. Pursuant to s. 101.14 (5), Stats., the department shall, in addition to any other fee charged for plan examination and approval for the construction of a new or additional installation or change in operation of a previously approved installation for the storage, handling or use of combustible or flammable liquids as specified in sub. (1), collect a groundwater fee of $100.00.

Three submittals are for the purpose of regulatory oversight of existing systems and they do not have a formal plan review activity such as that of a proposed new or replacement system. The following submittals, independent of any other plan submittal, are excludes from the groundwater fee.

- ERS-9 LD Leak Detection Installation or Upgrade
- ERS-9 Ethanol Conversion
- ERS-6294 POS Point of Sale Fueling

> **S. 101.14(5)** (a) Subject to par. (b), in addition to any fee charged by the department by rule for plan review and approval for the construction of a new or additional installation or change in operation of a previously approved installation for the storage, handling or use of a liquid that is flammable or combustible or a federally regulated hazardous substance, as defined in s. 101.09 (1) (am), the department shall collect a groundwater fee of $100 for each plan review submittal. The moneys collected under this subsection shall be credited to the environmental fund for environmental management.
> (b) Notwithstanding par. (a), an installation for the storage, handling or use of a liquid that is flammable or combustible or a federally regulated hazardous substance, as defined in s. 101.09 (1) (am), that has a capacity of less than 1,000 gallons is not subject to the groundwater fee under par. (a).

The above statute exempts the groundwater fee from tank systems less than 1,000 gallon capacity.

While the SPS 302 plan review fee schedule is based upon aggregate capacity, the ground water fee will not be charged if the individual capacity of each of the tanks involved in the plan submittal is less than 1,000.

As the Department of Safety & Professional Services program brings areas, such as plan review that were previously under LPO oversight, into the Department of Safety & Professional Services administrative process, the groundwater fee and subsequent dollars may be a new cost to the public that they did not have when the LPO reviewed the plans. Unfortunately the groundwater fee in some situations may be significantly higher than the plan submittal fee.

Form Title	Form #	Review fee	Inspection fee	Groundwater fee
Farm & Construction AST Installation Notification	ERS-10764	No	Yes	No
Point-of-Sale Fueling Installation Notification	ERS-6294 POS	Yes	Yes	No
Wisconsin Material Approval Application	ERS-8028A	Yes	No	No
Flammable / Combustible Liquid Tanks Installation Application	ERS-9	Yes	Yes	Yes
Ethanol Blended Motor Fuel Conversion Application	ERS 9 Ethanol Conversion	Yes	No	No
Leak Detection Installation or Upgrade Notification	ERS 9 LD	Yes	No	No
Petition For Variance	ERS-9890A	Yes	No	No

Plan review is required anytime the configuration of a system is being changed. (The exception to this is systems associated with a process or research where the initial plan submittal includes the fact that the system may be altered to facilitate the process or research activity.) The plan submittal fee for such a submittal is based upon the capacity of the tank subject to the modification. If the modification involves breaking or eliminating a manifold between two tanks, the fee is the aggregate capacity of both tanks.

SPS 305 – Credentials

Credential applications requires that the applicant provides his/her social security or in the case of a company the federal employer identification number. This is supported by the following statute:

> S. 101.02(20)(b) Except as provided in para (e) the Department of Safety & Professional Services may not issue or renew a license unless each applicant who is an individual provides the Department of Safety & Professional Services with his or her social security number and each applicant that is not an individual provides the Department of Safety & Professional Services with its federal employer identification number. The Department of Safety & Professional Services may not disclose the social security number or the federal employer identification number of an applicant for a license renewal except to the Department of Revenue for the sole purpose of requesting certifications under s. 73.0301.

Continuing education course application

The department will no longer approve a course for SPS 305 credits unless the subject is directly related to the technical or professional contractor proficiencies required in the SPS 310 code. Courses such as HAZWOPER, confined entry, etc. will not be approved or renewed. Implementation of this will occur as existing approvals expire.

The requirements to offer credits are expressed on the application form which can be accessed at the link below.
http://Department of Safety & Professional Services.wi.gov/ER/pdf/bst/Forms_FM/ER-BST-CE-9156CECApplication.pdf

Specific criteria relating to what classes are acceptable is not in a formal written document other than the language in SPS 305.08(1)(d) "Courses, programs and seminars to be considered for approval towards continuing education credit shall relate to the skills and knowledge of one or more license, certification or registration categories." We interpret this to mean the specific skills and knowledge related to the respective SPS 310 code and adopted national standards.

SPS 305.68 Tank System Inspector

This section of the code applies to inspectors performing regulatory inspections as state government employees or contractors with the state. This language does not preclude a local government fire inspector from addressing and enforcing fire safety or fire code related issues.

Inspectors providing API 653 or STI tank integrity inspections are not required to be credentialed with the department. However, they are expected to maintain current the respective API or STI inspection credential.

SPS 305.84 Aboveground Tank System Installer

This credential applies to the individual in the primary on-site supervisory or lead role in the installation of the aboveground tank system. The credentialed installer requirement would not be carried over to post installation activities such as replacing a failed pump, leak detector or upgrading to a newer model dispenser.

The installation and testing responsibility in (5)(d) applies to aboveground and/or underground piping that is connected to the aboveground tank system. **NOTE**: Service technicians who are connecting piping to a heating device by extending or connecting piping inside a building for the purpose of connecting a tank installation and piping installed by another contractor are not required to be SPS 305 certified.

> <u>Field erected AST / terminal facilities</u>
> Field erected tanks are typically constructed under the design and oversight of a professional engineer (PE). Companies or individuals with specific skills may be contracted to perform various stages of the construction, but still under the oversight of a general contractor PE. Due to the PE oversight of field erected tank projects the SPS 305 Aboveground Installer credential is not required. This also carries

over to piping modifications for pipe and equipment connected to the pipeline or field erected tanks that may take place over time. SPS 305 AST installer credentials would be required for shop built AST systems at terminals that are free standing For example, an additive tank that is connected to the loading rack.

SPS 305.85 Underground Tank System Installer
This credential applies to the individual in the primary on-site supervisory or lead role in the installation of the underground tank system. The credentialed installer requirement would not be carried over to post installation activities such as replacing a failed pump, leak detector or upgrading to a newer model dispenser.

The installation and testing responsibility in (5)(f) applies to aboveground and/or underground piping that is connected to the underground tank system.

SPS 305 Certified Contractor versus Professional Engineer
In system installation and closure situations where a SPS 305 credentialed person is required to supervise the activity the department will recognize a licensed profession engineer (PE) as equivalent credential. The PE must be on site with the same administrative and operational responsibilities supervising the activities as expected of the SPS 305 credential perform the respective sign-offs and be responsive to the regulatory authority in the same manner as a SPS 305 credentialed individual.

SPS 305.88 Tank System Tightness Testers
The SPS 305 conflict of interest provision applies to individuals conducting the periodic leak detection (i.e., precision testing) and/or CP testing and site assessment. It does not apply to individuals performing the Comm10.510(2) equipment functionality testing. However, individuals such as technicians performing the functionality tests must be qualified to conduct the respective tests. For example, as that applies to an ATG, the technician must be able to demonstrate that he/she has been trained and qualified as having the manufacturer's qualification of competency for performing trouble-shooting and service work on the respective models of equipment. This proficiency is often reflected in a certificate or certification number.

Department of Safety & Professional Services has a web page that allows people to search by tank contractor specialty for contractors registered to perform the various tank related work in Wisconsin.
http://apps.Department of Safety & Professional Services.state.wi.us/SB_Credential/SB_CredentialApp/SearchByCredType

SPS 348 – Petroleum Products

http://www.legis.state.wi.us/rsb/code/comm/comm048.pdf

Comm. 48 does not prohibit the marketing of fuels for which the rule has not adopted national specification standards. However, products may not be marketed that are not within the respective specification standard adopted by the code. For example, motor fuel marketed as gasoline must meet the ASTM D4814 standard.

Labeling of Dispensers and Equipment

SPS 348.10 provides dispenser labeling requirements beyond the requirements of SPS 310, for equipment dispensing product for sale. The purpose of the SPS 348 dispenser-labeling requirement is to provide product identification to the consumer. Neither SPS 310 nor SPS 348 dispenser labeling requirements address public safety warnings such as labels for health or static warnings. Such labeling is at the discretion of the owner / operator. The SPS 348 requirement is as follows:

> SPS 348.10 (1) DISPENSING EQUIPMENT. (a) *General.* All devices dispensing petroleum products at filling stations, garages or other places where petroleum products are sold or offered for sale shall be marked with a conspicuous label visible on both faces of the dispensing device indicating the automotive fuel rating of the petroleum product. No label may be placed so that the text is side-ways or upside down.
> (b) *Oxygenated gasoline dispensing device labels.* 1. A device that dispenses a gasoline–ethanol fuel blend of more than 2% by volume of ethanol shall be labeled with the maximum volume per-cent of ethanol at all times the product is offered for retail sale.
> 2. A device that dispenses a reformulated gasoline, as defined in s. 285.37 (1), Stats., that contains an oxygenate other than ethanol shall be labeled with the identity of the oxygenate at all times the product is offered for retail sale. If the reformulated gasoline contains multiple oxygenates, the label shall identify the predominate oxygenate based upon volume percent.
> 3. The label shall be placed on the face of the dispenser next to the name and grade of the product being dispensed. No label may be placed so that the text is sideways or upside down.
> 4. The label shall be contrasting in color to the dispenser and have lettering using not less than one–half inch high letters with a stroke of not less than one eighth inch in width.
> 5. The label shall identify the oxygenate as either “Ethanol”, “Methyl Tertiary Butyl Ether (MTBE)”, “Ethyl Tertiary Butyl Ether (ETBE)”, “Tertiary Amyl Methyl Ether (TAME)”, “Tertiary Butyl Alcohol (TBA)”, or as an other oxygenate name approved by the department.
> 6. A label shall state that the product being dispensed “Contains” followed by the approved name for the oxygenate.
> 7. A label shall be conspicuous and legible to a customer when viewed from the driver’s seat of a motor vehicle that is located within 6 feet of the dispensing device.

Paragraph SPS 348.10(1)(b)3 requires that the label describing the % oxygenate be placed *next to the name and grade of the product* being dispensed. Because Wisconsin does not standardize product grades, such as premium or super the “grade of the product” is the octane posting as required for all automotive gasoline products in SPS 348.08. The code intent is that oxygenate labeling be placed as close to the product identifier as possible.

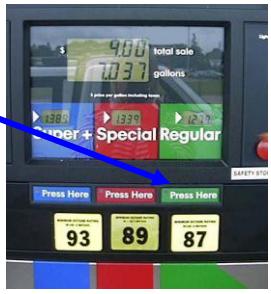
Current day dispensing equipment and practices have moved outside of the rectangular box type multi-product dispenser that was the “typical” practice when the rule was written. Today dispenser style and configuration, along with the various other labeling appearing on dispensers, require a need to reassess and clarify the acceptable specific label application within the rule as it applies to the various dispenser configurations.

Single product dispensers:
Single product dispensers dispensing fuels containing ethanol have minimal potential

for product confusion as long as they identify the name, grade of product and % of ethanol on the face or working side of the dispenser. The octane label must also be predominantly located on the face of the dispenser. E-85 motor fuel dispensers must also have labeling that states “For Flex Fuel Vehicles Only.”

Multi-product dispensers:
The practice of labeling multi-product dispensers includes a label color and uniform size configuration minimizing customer confusion relating to the respective products. The ethanol or biodiesel label complying with SPS 348.10 (1)(b) may be fixed to the multiple product dispenser in addition to, but shall not take the place of, the product specific label located next to the grade of the petroleum product. The label must be aligned with the nozzle or product button.

If dispenser configuration is such that the configuration will not accommodate an ethanol or biodiesel label next to the product name or grade the label may be placed in the most conspicuous location easily viewable by the individual performing the motor fuel dispensing activity.



The Octane number is intended to represent the “finished” product as dispensed, should the product source be from a single product, a pre- blended product such as gasoline-ethanol, or the dispenser blending of two products.

The SPS 348 labeling requirements for oxygenated gasoline specify: identification of oxygenate and percent, general placement on the dispenser, contrasting color, and weather resistance. The code does not specify colors or specific dimensional placement on the face of the dispenser.

Not acceptable

- Not on face of dispenser
- Not conspicuous
- Not aligned with product grade

Non stationary tank and storage tank comparison

This document describes the various storage tank applications experienced within the Department of Safety & Professional Services, industry and construction sector. The purpose of this document is to associated tank or tank vehicle terminology with code application. SPS 310 has and continues to adopt NFPA 385 – Standard for Tank Vehicles for Flammable and Combustible Liquids. Tanks and the respective vehicle or chassis that are defined in the NFPA 385 standard are assumed to be constructed properly under the respective NFPA 385 standard criteria.

Reference	Definition	Example
Scope of NFPA 385-1-1.1	This standard shall apply to tank vehicles to be used for the transportation of asphalt or normally stable flammable and combustible liquids with a flash point below 200°F (93.4°C). It shall provide minimum requirements for the design and construction of cargo tanks and their appurtenances and shall set forth certain matters pertaining to tank vehicles.	
Cargo Tank NFPA 385-1-2.4	Any tank having a liquid capacity in excess of 110 gal (418 L) used for carrying flammable and combustible liquids or asphalt and mounted permanently or otherwise upon a tank vehicle. The term cargo tank does not apply to any container used solely for the purpose of supplying fuel for the propulsion of the tank vehicle upon which it is mounted.	

Tank, Full-Trailer
NFPA 385-1-2.13

Any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable and combustible liquids or asphalt, and so constructed that practically all of its weight and load rests on its own wheels.

Tank, Semi-Trailer
NFPA 385-1-2.14

Any vehicle with or without auxiliary motive power, equipped with a cargo tank mounted thereon or built as an integral part thereof, used for the transportation of flammable and combustible liquid or asphalt, and so constructed that, when drawn by a tractor by means of a *fifth wheel connection*, some part of its load and weight rests upon the towing vehicle.

Tank Truck NFPA 385-1-2.15	Any single self-propelled motor vehicle equipped with a cargo tank mounted thereon and used for the transportation of flammable and combustible liquids or asphalt. The industry refers to these vehicles as “Tank wagons,” which is not the same as the SPS 310 “Tank Wagon.”	
Tank Vehicle NFPA 385-1-2.16	Any tank truck, tank full-trailer, or tractor and tank semi-trailer combination.	

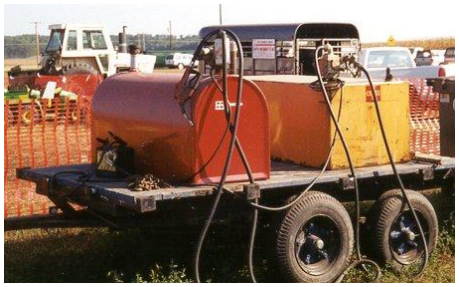
Portable Tank

"Portable tank" means an aboveground closed vessel that has a liquid capacity of 110 gallons or more, is not otherwise defined under this chapter, and is not intended for fixed installation or for vehicle fueling, and includes intermediate bulk containers.

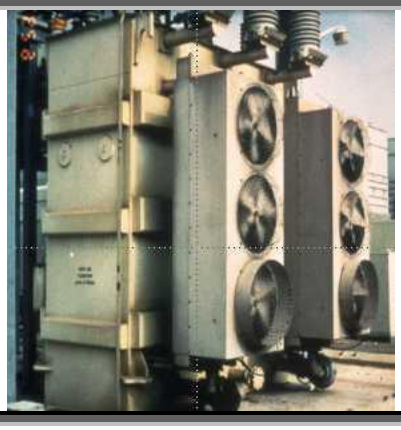
NFPA 30A-3.3.15.3 Portable Tank. Any vessel having a liquid capacity over 60 gal (230 L) intended for storing liquids and not intended for fixed installation.

NFPA 30-3.3.10.2 Intermediate Bulk Container. Any closed vessel having a liquid capacity not exceeding 3000 L (793 gal) and intended for storing and transporting liquids, as defined in Title 49, Code of Federal Regulations, Parts 100 through 199 or in Part 6 of the United Nations' *Recommendations on the Transport of Dangerous Goods*.

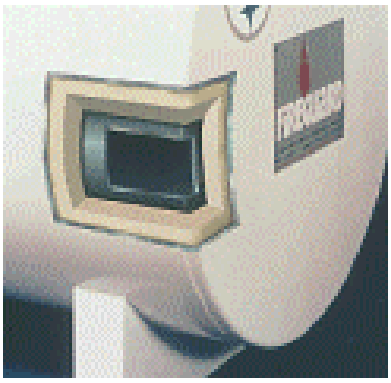
NFPA 30-9.1.1 maximum capacity of IBC is 793 gallons.



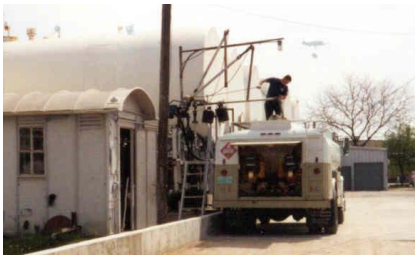
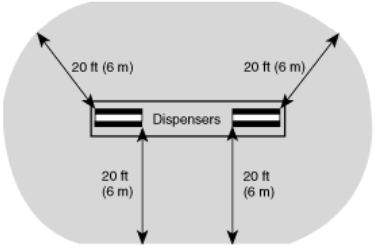
Mobile Tank	Any tank having a liquid capacity in 110 gal or more used for storing flammable and combustible liquids and <u>not</u> mounted permanently or otherwise upon a tank vehicle or chassis capable of road travel, and not intended for fixed placement. This tank storage concept is acceptable for construction sites, farms, and locations where it is practical to move the tank (typically by lifting equipment) to off-road motorized equipment for dispensing, rather than drive the motorized equipment to the tank. A mobile tank must meet NFPA 30 or NFPA 395 requirements.	
Tank Wagon	Any tank or multiple tanks mounted permanently or otherwise upon a chassis having a liquid capacity 110 gal or more but no more than 1,100 gallon total capacity, used for carrying flammable and combustible liquid while located at a site for fueling equipment used on the site. The tank wagon is not designed and constructed under NFPA 385 criteria and therefore must be towed empty on the road for transport and placement.	
Service tank	Service tank means a tank used for a limited period of time during the servicing of liquid filled equipment to temporarily hold liquids during the servicing or	

	relocation of the equipment. Product in the service tank is transferred back into the equipment or determined unsuitable for use and moved to disposal. Service tanks are outside the scope of SPS 310.	
Accumulator reservoirs	Accumulator reservoirs mean a tank or vessel used to receive or supply a fluid that is integral to the operation of equipment, such as, but not limited to tanks supplying oil to hydraulic lifts or used to cool electric power transmission equipment. Accumulator reservoirs are outside the scope of SPS 310.	
Asphalt AC tank	Asphalt AC tanks are used as burner or material supply tanks in the process of making asphalt. Tank configurations may be single-wall, double-wall, and with or without heating coils. The products stored in the tank may be Class II or III combustibles ranging from heating oil to used oil, to # 4 or #5 heavy oils. Because the asphalt process equipment and the respective tank is typically located at isolated locations such as quarries and generally relocated from year to year or every couple of years these tanks are not regulated by SPS 310.	
Pick-up mounted refueling tank.	A commercially manufactured single or double compartment tank designed to fit across the bed of a pickup truck. Tanks are typically 60 to 120 gallon capacities. The SPS 310 does not regulate this application.	

Marine craft tank vehicle	Any tank having a liquid capacity in excess of 60 gal used for carrying flammable or combustible liquids and mounted permanently or otherwise upon a vessel or barge capable of water transportation. The tank is not solely for the purpose of supplying fuel for the propulsion of, or support of equipment on, the vessel upon which it is mounted. Marine craft tank vehicles must receive Department of Safety & Professional Services Material Approval prior to being placed into service.	
Transport truck to delivery truck transfer	Prohibited by SPS 310 code.	
Underground Tank	"Underground storage tank system" or "UST" means any one or combination of tanks, including connected pipes, that is used to contain an accumulation of regulated substances, and the volume of which, including the volume of connected underground pipes, is 10 percent or more beneath the surface of the ground.	

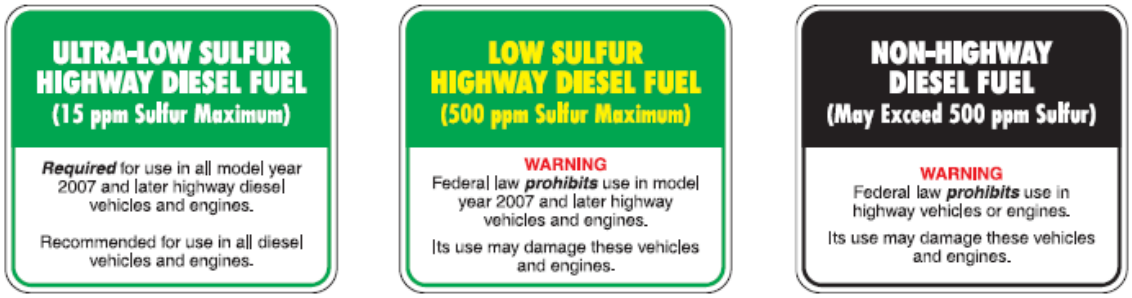
Fire-Resistant Tank	A Fire-Resistant Tank is an atmospheric aboveground tank provided with fire-resistive protection for the tank structure and its supports from exposures to a high intensity liquid pool fire, which is listed in accordance with the provisions contained in UL 2080, Standard for Fire Resistant Tanks for Flammable and Combustible Liquids, or an equivalent standard.	
Protected Aboveground Tank.	A Protected Aboveground Tank is An atmospheric aboveground tank provided with integral secondary containment, protection from physical damage, and an insulation system intended to reduce the heat transferred to the primary tank when the tank is exposed to a high intensity liquid pool fire, which is listed in accordance with UL 2085, Standard for Protected Aboveground Tanks for Flammable and Combustible Liquids, or an equivalent standard. Tanks built to this standard typically have an insulating material in the interstitial space that provides the higher fire exposure rating.	
Open-top Tank	An open top tank has the surface of the product exposed to the ambient atmosphere. Open top tanks are common within the manufacturing sector where dipping and coating of materials take place. Below grade open-top tanks must have leak detection ad corrosion protection as required for traditional underground storage tanks.	

Bulk Plant	"Bulk plant" means a facility used for temporary bulk storage of gasoline, diesel fuel, and similar liquid products, prior to the distribution of these products by tank vehicle to retail, commercial, or consumer outlets.	
Terminal Facility	A large facility for storing and handling petroleum products. A terminal is usually located adjacent to a petroleum product pipeline, a refinery, a railroad, or a waterfront ship-berthing area. A distinguishing characteristic of a terminal is multiple field erected storage tanks, however the facility may have a combination of aboveground and underground tanks.	
Loading Rack	A structure at a terminal or bulk plant, consisting of a grade level or elevated platform, loading arms, controls, bonding devices etc., designed for use in loading compartments of a tank vehicle. Loading racks may have both top and bottom loading capability.	

Transfer Point	The location on property where product is transferred between a storage tank and a delivery vehicle. 	
Fuel Dispensing Area	The “dispensing area" is a zone around or from the stationary or mobile dispenser that extends a distance of 20 feet horizontally from the corners of the dispenser body, exclusive of the length of the hose and nozzle. 	

Signage and Labeling Overview

The following is an overview of the SPS 310 signage or labeling requirements for SPS 310 related storage and dispensing systems. Consult the code, federal regulation or national standard for the more specific details. There may be additional labeling requirements under federal regulations not covered in this overview.

System component:	Reference & excerpt:
Dispensers – Public motor fueling	
Octane label	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft	SPS 348.300(1)(a) . . shall be marked with a conspicuous label visible on both faces of the dispensing device indicating the automotive fuel rating of the fuel product.
Ethanol fuel dispensing label	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft	SPS 348.300(1)(b) 1 A device that dispenses a gasoline − ethanol fuel blend of more than 2% by volume of ethanol shall be labeled with the maximum volume percent of ethanol.
	Federal EPA E15 dispenser label
Ultra low sulfur diesel dispensing labels	
40 CFR 80.570, 80.571, 80.572, 80.573, & 80.574 (Enforcement is by the federal EPA)  "Off-road Diesel Fuel" labels are common on fleet tanks, but they are not a regulatory requirement.	

Class I Storage label	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft ☒Fleet operations ☒Farm & construction project ☒Emergency generator / backup ☒Bulk plant/terminal operations ☒Hazardous substance	**SPS 310.400(7)** **(7)** ABOVEGROUND TANK MARKING. (a) 1. All aboveground tanks, whether new or existing, that store Class I liquids, other than at refineries or at marine, pipeline or transport terminals shall have attached, the wording "FLAMMABLE—KEEP FIRE AWAY." 2. The wording shall be clearly visible and written in letters of a contrasting color at least 5 inches high with a minimum stroke width of 1 inch.
Class I, II, IIIA, IIIB storage label	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft ☒Fleet operations ☒Farm & construction project ☒Emergency generator / backup ☒Bulk plant/terminal operations ☒Hazardous substance 	**NFPA 30-21.7.2.1 Identification for Emergency Responders.** A sign or marking that meets the requirements of NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, or another approved system, shall be applied to storage tanks containing liquids. The marking shall be located where it can be seen, such as on the side of the tank, the shoulder of an accessway or walkway to the tank or tanks, or on the piping outside of the diked area. If more than one tank is involved, the markings shall be so located that each tank can be identified. **SPS 310.400(7)** (b) 1. All aboveground tanks, whether new or existing, that store flammable or combustible liquids shall be labeled in accordance with NFPA 704. 2. The visibility and size of the label shall be in accordance with Table 10.400.
Motor fuel dispensing instructions, label or signage	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft	**NFPA 30A-9.2.5.4* Signs and 9.5.3** Warning signs shall be conspicuously posted in the dispensing area and shall incorporate the following or equivalent wording: REFER TO NFPA 30A. **NFPA 30A-9.5.2** Operating instructions shall be conspicuously posted in the dispensing area. The instructions shall include location of emergency controls and a requirement that the user stay outside of his/her vehicle and in view of the fueling nozzle during dispensing. **NFPA 30A-9.5.3** In addition to the warning signs specified in 9.2.5.4, emergency instructions shall be conspicuously posted in the dispenser area. The instructions shall incorporate the following or equivalent wording: **Emergency Instructions** In case of fire or spill (1) Use emergency stop button. (2) Report accident by calling (*specify local fire number*). Report location. **NFPA 30A- 9.4.4 & 9.5.2** Operating instructions shall be conspicuously posted in the dispensing area. 9.5.2 Operating instructions shall be conspicuously posted in the dispensing area. The instructions shall include location of emergency controls and a requirement that the user stay outside of his/her vehicle and in view of the fueling nozzle during dispensing. **SPS 310.230(12)** All fill pipe caps and manhole covers for underground fuel tanks s shall be identified by the API 1637 color and symbol coding. **SPS 310.615(5)(k)3** AST fill pipes labeled and color coded as API 1637
Marina dispensing instruction label or signage	

	NFPA 30A-11.5.3 Clearly identified emergency electrical disconnects that are readily accessible in case of fire or physical damage at any dispensing unit shall be provided on each marine wharf. The disconnects shall be interlocked to shut off power to all pump motors from any individual location and shall be manually reset only from a master switch. Each such disconnect shall be identified by an approved sign stating EMERGENCY PUMP SHUTOFF in 2 in. red capital letters. **NFPA 30A-11.5.5** Smoking materials, including matches and lighters, shall not be used within 6 m (20 ft) of areas used for fueling, servicing fuel systems for internal combustion engines, or receiving or dispensing of Class I liquids. Conspicuous NO SMOKING signs shall be posted within sight of the customer being served. **NFPA 30A-11.10 Operating Requirements.** *A sign* with the following legends printed in 50 mm (2 in Before Fueling: (1) Stop all engines and auxiliaries. (2) Shut off all electricity, open flames, and heat sources. (3) Check all bilges for fuel vapors. (4) Extinguish all smoking materials. (5) Close access fittings and openings that could allow fuel vapors to enter enclosed spaces of the vessel. During Fueling: (1) Maintain nozzle contact with fill pipe. (2) Wipe up spills immediately. (3) Avoid overfilling. (4) Fuel filling nozzle must be attended at all times. After Fueling: (1) Inspect bilges for leakage and fuel odors. (2) Ventilate until odors are removed.
Farm & Construction project tank label	
	NFPA 30A-13.3 Marking of Tanks and Containers Tanks and containers shall be conspicuously marked with the name of the product contained and with the following marking: FLAMMABLE — KEEP FIRE AND FLAME AWAY
UST Fueling facility contact information	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft ☒Fleet operations ☒Emergency generator / backup ☒Bulk plant/terminal operations ☒Hazardous substance UST	**SPS 310.830(2)(f)2a** For fueling facilities which are attended as specified in s. SPS 310.605 (5) (a) and which include hours of operation when no attendant is on duty, a sign shall be posted in a conspicuous place, stating the emergency shut-off procedures and the name, address and telephone number of the Class B operator, along with the name and telephone number of the local emergency responders, including 911 personnel. b. For fueling facilities that are not attended as specified in s. SPS 310.605 (5) (a), signage shall be posted in accordance with the location and information requirements in subd. 2. a. c. For facilities which are not addressed in subd. 2. a. or b. and which typically are unmanned, such as emergency generators, signage shall be posted in accordance with the location and information requirements in subd. 2. a.

Monitoring well label	
	SPS 310.230(12)(a)4a & b a. Observation and monitoring wells shall be marked with a black triangle on a white background. b. The well shall be provided with a durable label warning against the introduction of petroleum products into the well.
Alerts & Alarms	
UST Overfill	**PEI 100-7.3.1** Clearly labeled as “Tank Overfill Alarm” so that delivery person will recognize the device as an overfill alarm.
AST Overfill	**SPS 310.410 Spill and overfill prevention.** **(3)** Equipment shall be clearly marked so visual and audible warning signals are recognizable to the delivery person.
Used Oil AST	
	SPS 310.300(4) (a) “NO SMOKING.” (b) “USED-OIL COLLECTION ONLY.” (c) “DEPOSITING OTHER MATERIAL IS PROHIBITED.” **SPS 310.300(3)(c)3** All overfill alarms shall be labeled as such
Hazardous substances AST	
	SPS 310.350(10) IDENTIFICATION AND LABELING (a) Transfer points shall be labeled with the name of the substance transferred. (b) Aboveground tanks storing hazardous substances within the scope of this section shall be identified and labeled in accordance with s. SPS 310.400 (7).
Aircraft fueling signage	
All aircraft fueling systems 	**SPS 310.650(4) PRODUCT IDENTIFICATION.** (a) All fuel handling equipment and installations within the scope of API 1542, whether new or existing, shall be marked as referenced in the standard. (b) All aboveground tanks and fill pipes for underground tanks, whether new or existing, shall be labeled or otherwise marked using the identification scheme in API 1542.
Aircraft attended fueling	**NFPA 407-5.8.1** Entrances to fueling areas shall be posted with “no smoking” signs. **NFPA 407-4.4.5.7** Each emergency fuel shutoff station shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 2 in. high. The method of operation shall be indicated by an arrow or by the word PUSH or PULL, as appropriate. Any action necessary to gain access to the shutoff device (e.g., BREAK GLASS) shall be shown clearly. Lettering shall be of a color contrasting sharply with the placard background for visibility. Placards shall be weather resistant, shall be located at least 7 ft above grade, and shall be positioned so that they can be seen readily from a distance of at least 25 ft. Valves used to shut off a hydrant for maintenance purposes shall not have placards that could create confusion in an emergency.
Aircraft self-service fueling	**NFPA 407-4.4.5.7** Each emergency fuel shutoff station shall be placarded EMERGENCY FUEL SHUTOFF in letters at least 2 in. high. The method of operation shall be indicated by an arrow or by the word PUSH or PULL, as appropriate. Any action necessary to gain access to the shutoff device (e.g., BREAK GLASS) shall be shown clearly. Lettering shall be of a color contrasting sharply with the placard background for visibility. Placards shall

	be weather resistant, shall be located at least (7 ft above grade, and shall be positioned so that they can be seen readily from a distance of at least 25 ft. Valves used to shut off a hydrant for maintenance purposes shall not have placards that could create confusion in an emergency. **NFPA 407-4.6.9** In addition to the warning signs specified in 4.4.5.7 and 5.8.1, emergency instructions shall be conspicuously posted in the dispensing area and at the emergency fuel shutoff control and shall provide the address of the site and shall incorporate the following or equivalent wording: EMERGENCY INSTRUCTIONS: In case of fire or spill: (1) Use emergency fuel shutoff (2) Report accident by calling (specify local fire emergency reporting number) on phone (3) Report address of site (list address of site here) **NFPA 407-4.6.10 Operating Instructions.** Operating instructions shall be posted. The instructions shall include the proper operation and use of all equipment, correct bonding procedures, the procedures that are to be employed to dispense fuel safely, the location and use of the emergency fuel shutoff controls, the use of the available fire extinguishers, and the procedures to be used in the event of an emergency. **NFPA 407-5.8.1** Entrances to fueling areas shall be posted with “no smoking” signs.
Stationary combustion engines label	
 ☒Emergency generator / backup	**SPS 310.320(1)(c)** 1 Aboveground tanks with the fill point remote from the tank and all new and existing underground storage tanks used to store fuel for stationary combustion engines and gas turbines shall have the fill point labeled with the type of fuel. 2. Aboveground storage tanks used to store fuel for stationary combustion engines and gas turbines shall have the tank labeled with the type of fuel.
Bulk plants & terminals label	
	SPS 310.230(12) All fill pipe caps and manhole covers for underground fuel tanks s shall be identified by the API 1637 color and symbol coding. **SPS 310.340(1) (b)** ***Type of identification*** The product identification scheme in API 1637 shall be accomplished by one of the following methods: 1. A disc tag of non-sparking material. 2. A label using minimum 1-inch block letters. 3. Painted sections at least 12 inches long **SPS 310.370** Emergency shut-off clearly identified
Motor fueling system piping label	
☒Highway vehicle ☒Marine craft ☒Recreational vehicle ☒Aircraft	**SPS 310.650(4)(b)** All aboveground tanks and fill pipes for underground tanks, whether new or existing, shall be labeled or otherwise marked using the identification scheme in API 1542 **SPS 310.615(5)(k)3** All fill pipes). for aboveground fueling tanks shall be locked, and shall be labeled and color coded as specified in s. SPS 310.230 (12)
Transfer area piping marking	

 ☒Bulk plant operations	**NFPA 30-27.10** Identification and Marking of Piping Systems Each loading and unloading riser shall be marked to identify the product for which it is to be used.
Race track and amusement vehicle fueling	
	SPS 310.660(4) Fueling areas shall be posted with signs that read as follows: “NO SMOKING OR OPEN FLAMES”

Temporary fueling from a tank vehicle - Sign	
	SPS 310.610(3)(f)11.c "No Smoking" "Fueling In Progress" "Authorized Personnel Only"
Closure	
All USTs	**NFPA 30-21.7.4.3.4 Removal and Disposal.** Underground tanks and piping shall be removed in accordance with the following requirements: (6) The tank shall be labeled with its former contents, present vapor state, vapor-freeing method, and a warning against reuse.
All ASTs	**(3)** MARKINGS. (a) All aboveground tanks closed before, on or after February 1, 2009, and not immediately removed from the site shall have the word "CLOSED" and the date of permanent closure permanently marked on the exterior tank wall, at least 3 feet above grade, with lettering at least 3 inches in height.