Manitoba
Conservation and Water Stewardship

August 5, 2014

Cover Letter to the 2003 CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products PN 1326

The following 2003 CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products (CCME Code of Practice) has been redacted by Manitoba Conservation and Water Stewardship with the permission of the Canadian Council of Ministers of the Environment, and reflects the sections not adopted by the Storage and Handling of Petroleum Products and Allied Products Regulation M.R. 188/2001 (the Regulation).

The following is a description of additions the Regulation has made to the CCME Code of Practice, as per Section 2(3) of the Regulation:

- Part 5 of the CCME Code of Practice is amended by adding the following two (2) Sentences after Sentence 5.4.5(1):
    - 5.4.6 Rigid single-walled underground piping shall be designed and installed with sufficient flexibility to relieve stresses associated with ground settlement and tank movement.
    - 5.4.7 Flexibility shall be achieved through the piping configurations constructed to the piping manufacturer's specifications.
- Clause 8.3.2(1)(b) of the Code of Practice is amended by adding the following words at the beginning of the clause:
    - for and underground storage tank system

If there are any discrepancies in the information presented above and the Regulation, the Regulation takes precedence.

CCME

Canadian Council of Ministers of the Environment

Le Conseil canadien des ministres de l'environnement

Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products

THIS IS THE REDACTED VERSION SPECIFIC TO M.R. 188/2001

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PN 1326

CCME Canadian Council of Ministers of the Environment

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Aussi disponible en français

La présente publication est également offerte en francais sous le titre Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol et souterrains de produits pétroliers et de produits apparentés. PN 1327

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Abstract

The Canadian Council of Ministers of the Environment's (CCME) "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products" has been prepared for owners of storage tank systems, the petroleum marketing and distribution industry, and federal, provincial, and territorial departments which have the authority to regulate storage tanks containing petroleum or allied petroleum products.

The Code is a model set of technical requirements and only comes into effect if adopted, in whole or in part, by an authority having jurisdiction. It provides technical requirements for registration and approval of storage tank systems, design and installation of new storage tanks and piping, monitoring and leak detection, upgrading of existing systems, operation and maintenance, and the withdrawal from service of storage tank systems.

This publication updates, combines, and replaces CCME's 1993 "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" and the 1994 "Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products." It reflects the advances in technology and the experience gained by industry and government regulators in proactively managing storage tanks systems in the intervening years.

Résumé

Le document du Conseil canadien des ministres de l'environnement (CCME) intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol et souterrains de produits pétroliers et de produits apparentés a été préparé à l'intention des propriétaires de systèmes de stockage, de l'industrie de la commercialisation et de la distribution du pétrole ainsi que des ministères fédéraux, provinciaux et territoriaux qui ont le pouvoir de réglementer les systèmes de stockage contenant des produits pétroliers et des produits apparentés.

Le Code est un ensemble type d'exigences techniques; il n'entre en vigueur que s'il a été adopté, en tout ou en partie, par l'autorité compétente. Il formule des exigences techniques pour l'enregistrement et l'approbation des nouveaux systèmes de stockage; la conception et l'installation des nouveaux réservoirs de stockage et de la tuyauterie; la surveillance et la détection des fuites; l'amélioration des systèmes existants; l'exploitation et l'entretien; et la mise hors service des systèmes de stockage.

La présente publication met à jour, combine, et remplace le document du CCME de 1993 intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage souterrains de produits pétroliers et de produits apparentés et le document de 1994 intitulé Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage hors sol de produits pétroliers. Elle tient compte des progrès de la technologie et de l'expérience acquise par l'industrie et les organismes de réglementation gouvernementaux dans la gestion des systèmes de stockage depuis la parution des deux premiers codes.

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Preface

The "Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products" (hereafter referred to as "the Code") is published by the Canadian Council of Ministers of the Environment (CCME) through its National Task Force on Storage Tanks.

The Code comprises a model set of technical requirements designed to protect the environment by preventing product releases from aboveground and underground storage tank systems. The Code was written in a form suitable for adoption by legislative authorities in Canada.

The membership of the National Task Force was representative of provincial, territorial, and federal agencies which have the authority to regulate storage tank systems containing petroleum and allied petroleum products. The Code was developed with the voluntary assistance of many industry experts who have contributed to the work of the National Task Force on Storage Tanks. The National Task Force was assisted in its work by the staff of the CCME Secretariat.

The National Task Force recommends that the Code be reviewed by CCME within five years of its publication.

Comments and inquiries on the use of the Code and suggestions for its improvement are welcomed and should be sent to:

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Acknowledgements

The National Task Force on Storage Tanks acknowledges the many individuals and organizations that have contributed to the production of this Code.

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Rationale for an Environmental Code of Practice

Historically, the National Fire Code of Canada (NFCC) and Canadian Standards Association (CSA) requirements have been used in Canada for the installation and operation of underground storage tanks containing petroleum products. These codes were written from the viewpoint of fire prevention and primarily cover the elements of fire prevention and fire safety. In the late 1980s, the Canadian Council of the Ministers of the Environment (CCME) saw a need to provide recommended practices that went beyond the scope of these documents and provided an environmental perspective on the management of storage tanks containing petroleum and allied petroleum products.

As a result, CCME's "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" was first published in 1988 and revised in 1993. This was followed in 1994 with the publication of the "Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products."

Federal, provincial, and territorial jurisdictions agreed that the existing underground and aboveground codes of practice should be updated to keep pace with changes in the NFCC, reflect new CSA requirements, and take advantage of advances in technology. It was also decided to combine the existing aboveground and underground CCME codes into one comprehensive document.

A Guide to the Use of this Code

Purpose

This Code presents a model set of technical requirements to protect the environment from existing, new, or proposed storage tank systems that contain petroleum and allied petroleum products. Its primary purpose is the promotion of environmentally sound management of petroleum and allied petroleum product storage tank systems through the application of uniform performance standards throughout Canada.

Relation to Federal, Provincial, and Territorial Regulations

This Code is a model set of technical requirements and only comes into effect if adopted, in whole or in part, by an authority having jurisdiction. Where this Code has been adopted, in whole or in part, by an authority having jurisdiction, it shall be subject to any restrictions or conditions added by the regulatory authority. Readers of this Code are therefore advised to check with the federal, provincial, or territorial authority having jurisdiction to see whether this Code applies in their area of interest. (See Appendix A for contact information for federal, provincial, and territorial authorities having jurisdiction.)

Relation to Other Codes

This Code is written as a complementary document to the National Fire Code of Canada (NFCC) and to CAN/CSA B139, "Installation Code for Oil Burning Equipment".

National Fire Code of Canada

This Code has been developed in conjunction with the National Research Council, publisher of the National Fire Code of Canada (NFCC), to minimize the possibility of conflict between the respective contents of the two codes.

While this Code provides minimum requirements for the prevention of petroleum and allied petroleum product losses from storage tank systems that may lead to environmental problems (primarily groundwater contamination), the NFCC sets technical requirements for the storage and handling of flammable and combustible liquids from the point of view of preventing fires or explosions.

In order to ensure effective application, fire officials, environmental officials, or other authorities having the jurisdiction to regulate petroleum and allied petroleum product storage tanks should be fully conversant with the technical requirements in both codes. This is the only way to ensure that storage tanks are built, installed, operated, and removed in a manner that is acceptable from both a fire safety and environmental point of view.

CSA Standard B139, Installation Code for Oil-Burning Equipment

This Code was developed in cooperation with the Canadian Standards Association, publishers of CAN/CSA-B139. Storage tank systems that fall within the scope of CAN/CSA B139 are predominantly furnace oil tanks and storage tanks containing diesel fuel and connected to standby emergency power generators.

The CAN/CSA-B139 Code was revised and published in 2000. This Code provides additional requirements that address concerns, such as environmental sensitivity or upgrading of existing storage tank systems, which are beyond the scope of CAN/CSA-B139-00.

Regulatory authorities, owners, and installers of storage tanks should be fully conversant with the technical requirements of CAN/CSA-B139-00, this Code (where it is in force), and all federal/provincial/territorial regulations that apply.

Structure and Content

This Code is drafted in such a way that it may be adopted or enacted for legal use by any jurisdictional authority in Canada.

A decimal numbering system is used throughout this Code. The first number indicates the Part of the Code, the second the Section within the Part, the third the Article within the Section. An Article may be broken down further into Sentences, Clauses, and Subclauses, each of which is in brackets, as shown here:

4	Part
4.5	Section
4.5.1	Article
4.5.1 (1)	Sentence
4.5.1 (1)(a)	Clause
4.5.1 (1)(a)(i)	Subclause

Sentence 3.2.8(1) is an example of a requirement in which all three clauses must be met to be in conformance with the Code.

3.2.8(1) No person shall install an *aboveground storage tank* system unless:

(a) required permits or approvals have been obtained from the *authority having jurisdiction*;

(b) plans, drawings and specifications of the system or equipment have been examined by the *authority having jurisdiction*; **and**

(c) the plans, drawings and specifications referred to in Clause (b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.

Sentence 5.4.2(1) is an example of a requirement in which only one of the clauses must be met to be in conformance with the Code.

5.4.2(1) Underground *piping* larger than 75 mm in diameter shall be designed, installed and maintained to meet the requirements of:

(a) *secondary containment* in conformance with Sentence 5.4.4(1);

(b) *leak detection* in conformance with Part 6; **or**

(c) API RP 1632-96, "Cathodic Protection of Underground Storage Tank and Piping Systems" and API Std 2610-94, "Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities".

The following is a summary of the contents of this Code.

Part 1 Application and Definitions

Part 1 defines terms and stipulates to what the Code applies. It includes the necessary administrative details to ensure that the technical requirements can be applied with a minimum of difficulty.

Part 2 Registration and Approval of Storage Tank Systems

Part 2 contains the requirements for the registration and approval of storage tank systems. It includes the scope of the tank systems that are required to be registered as well as provisions regarding storage tank system identification.

Part 3 Design and Installation of New Aboveground Storage Tank Systems

The design and installation of new aboveground storage tank systems is covered in Part 3. The recommendations are intended to ensure that equipment is designed and installed properly in order to minimize the possibility of leaks and spills.

Part 4 Design and Installation of New Underground Storage Tank Systems

The design and installation of new underground storage tank systems are covered in Part 4. The recommendations are intended to ensure that equipment is designed and installed properly in order to minimize the possibility of leaks and spills.

Part 5 Design and Installation of New Piping Systems

Part 5 outlines the requirements for new piping systems for storage tank systems. It includes recommendations for product transfer, design standards, and installation.

Part 6 Monitoring and Leak Detection of Storage Tank Systems

The frequency and method of monitoring and leak detection for all new and existing storage tank systems are specified in Part 6. The recommendations are intended to prevent or minimize the environmental impact of spills or leaks.

Part 7 Upgrading of Existing Storage Tank Systems

Part 7 specifies how and when existing storage tank systems must be upgraded to be in conformance with this Code. It also defines those storage tank systems that are exempt from the upgrading requirement.

Part 8 Operation and Maintenance

Part 8 addresses the ongoing operation and maintenance of storage tank systems. The intention is to prevent product releases. When they do occur, however, the recommendations in this Part are designed to help operators of storage tank systems detect, terminate, and mitigate releases as quickly as possible.

Part 9 Withdrawal From Service of Underground Storage Tank Systems

Part 9 contains the requirements for the closure and withdrawal from service of storage tank systems, either temporarily or permanently. Provisions for tank removal and disposal are provided to ensure that abandoned storage tanks do not cause environmental problems.

Appendix A Authorities Having Jurisdiction

This Appendix lists the contact information for the various federal, provincial, and territorial authorities having jurisdiction.

Appendix B Explanatory Material

Appendix B contains explanations to assist the user in understanding these Code requirements. The numbering system used in the Appendix corresponds with the appropriate Article in this Code.

Appendix C Minimum Information Required for Registration of Storage Tank Systems

This appendix outlines the minimum information required by authorities having jurisdiction for the registration of storage tank systems.

Appendix D Spill Reporting

This Appendix lists the federal, provincial, and territorial environmental emergency reporting telephone numbers.

Part 1 Application and Definitions

Section 1.1 Application

1.1.1(1) Unless otherwise permitted by the *authority having jurisdiction*, the *owner* of a *storage tank system* shall comply with the provisions of this Code.

1.1.1(2) When additional environmental, public health, or safety concerns have been identified, the a*uthority having jurisdiction* may require measures above and beyond the provisions of this Code.

1.1.2 Except as provided in Article 1.1.3(1), this Code applies to *aboveground* and *underground storage tank* systems used for the storage of *petroleum* and *allied petroleum products*.

1.1.3(1) This Code does not apply to:

(a) a *storage tank system* containing raw production *petroleum and allied petroleum products*;

(b) a *storage tank system* located within the fence line of a refinery or in an area contiguous with the refinery process units;

(c) an *aboveground storage tank system* having a capacity of 2 500 L or less that is connected to a heating appliance or emergency generator; or

(d) a *mobile tank*.

1.1.4 Notwithstanding the requirements of Parts 7 and 8, an *owner* or *operator* shall not directly or indirectly cause or allow a *leak* or *spill* of *petroleum* or *allied petroleum products* from a *storage tank system* or vehicle.

Section 1.2 Equivalents

1.2.1 The provisions of this Code are not intended to limit the appropriate use of materials, systems, or equipment not specifically described herein.

1.2.2 Materials, systems, equipment, and procedures not specifically described herein, or that vary from the specific requirements in this Code, or for which no recognized test procedure has been established, may be used if it can be shown to the *authority having jurisdiction* that these alternatives are equivalent to those specifically described herein and will perform in an equivalent manner acceptable to the *authority having jurisdiction*.

Section 1.3 Alternatives

1.3.1 Alternatives to the materials, systems, equipment, and procedures or standards specified in this Code may be used if the *authority having jurisdiction* is satisfied that those alternatives provide a level of performance, public health, safety, or environmental protection that is equivalent to or exceeds the levels of performance or protection provided by this Code.

Section 1.4 Definitions

1.4.1 Words and phrases that are not included in the list of defined terms in this Part shall have the meanings that are commonly assigned to them in the context in which they are used in this Code, taking into account the specialized use of terms by various trades and professions to which the terminology applies.

1.4.2 The words and terms that are in *italics* in this Code shall have the following meanings unless otherwise indicated by the context:

Abandoned or ***abandonment*** means a *storage tank system* that has been *out-of-service* for more than one year.

Aboveground storage tank means a *storage tank* with all the *storage tank* volume above grade.

Aboveground storage tank system means one or more commonly connected *aboveground storage tanks* including all connected *piping*, both aboveground and underground, pumps, dispensing, and product transfer apparatus, dyking, *overfill protection devices*, and associated spill containment and collection apparatus.

Allied petroleum product means a mixture of hydrocarbons other than a *petroleum product* that may be water miscible and may have a density greater than water, and includes the following (See Appendix B, note B.1.4.2 *Allied Petroleum Product*):

(a) Thinners and solvents used by the paint and varnish industry specified under the Canadian General Standards Board (CGSB):

CAN/CGSB-1.124-99	Thinner for Vinyl Coatings
CAN/CGSB-1.136-92	Antiblush Thinner for Cellulose Nitrate Lacquer
CAN/CGSB-1.2-89	Boiled Linseed Oil
CAN/CGSB-1.4-2000	Petroleum Spirits Thinner
CAN/CGSB-1.70-99	High Solvency Thinner
CAN/CGSB-1.94-M89	Xylene Thinner (Xylol)
CAN/CGSB-1.110-M91	General Purpose Thinners for Lacquers
CAN/CGSB-1.164-92	Solvent for Vinyl Pretreatment Coating

(b) Solvents and chemicals used by chemical and manufacturing industry specified under CGSB (15), and benzene and toluene:

CAN/CGSB-15.50-92	Technical Grade Acetone
CAN/CGSB-15.52-92	Methyl Ethyl Ketone, Technical Grade

(c) Inks used by printing industry specified under CGSB (21):

CAN/CGSB-21.1-93	Offset Lithographic Printing Ink

(d) Products specified under CGSB (3):

3-GP-525Ma	Isopropanol
3-GP-531M	Methanol, Technical Grade
3-GP-855M	Ethylene Glycol, Uninhibited

Alter or ***alteration*** means to enlarge, reduce, refurbish, upgrade, or remove a *storage tank system*.

Approved means, when used in reference to a *storage tank*, component, or accessory, that the product has been investigated by a testing agency, accredited by the Standards Council of Canada, or is acceptable to the *authority having jurisdiction* and has been found to comply with specific requirements and is identified with an authorized marking of the testing agency, as appropriate.

Authority having jurisdiction means the federal, provincial, or territorial officer(s) with the legal authority to regulate storage tank systems in the area of interest. (See Appendix A.)

Cathodic protection or ***cathodically protected*** means a method of reducing or preventing *corrosion* of a metal surface by making that surface the cathode of an electrochemical cell.

Combustible liquid or ***product*** means any liquid having a closed cup *flash point* at or above 37.8 ˚C and below 93.3 ˚C.

Contingency plan means planned procedures for reporting, containing, removing, and cleaning up a *spill* or *leak*.

Construction means erection or installation.

Containment sump means a dispenser, pump, transition, or turbine sump.

Corrosion means the deterioration of a metal resulting from a reaction with its environment.

Corrosion expert means a person recognized by NACE International (formerly the National Association of Corrosion Engineers) as a *corrosion* specialist, *cathodic protection* specialist, or a registered professional engineer experienced in *corrosion protection*.

Corrosion protection means a method of reducing or preventing *corrosion* of a *storage tank system* through *cathodic protection*, the application of *protective coatings*, or the use of a non-corroding material in its construction.

Day means any continuous 24 hour period.

Discharge means releasing, *spilling*, *leaking*, pumping, pouring, emitting, *emptying*, or dumping of *petroleum* or *allied petroleum products* into the environment, whether intentional or unintentional.

Dispenser sump means a container located underneath or near a dispenser or self-contained suction pump that collects or contains *leaks*.

Effective date means the date this Code is adopted by an *authority having jurisdiction* or a date specified by an *authority having jurisdiction*.

Empty means to remove the contents of a *storage tank system* as far as is practicable by such means as draining, suction, pouring, or pumping.

Existing means that which was in place or commenced operation on or before the *effective date* of this Code.

Flammable liquid or ***product*** means any liquid having a closed cup *flash point* below 37.8 ˚C and a vapour pressure not exceeding 275.8 kPa (absolute) at 37.8 ˚C.

Flash point means the minimum temperature at which a liquid within a container gives off vapour in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.

Free oil means the non-soluble, non-emulsified *petroleum* and *allied petroleum* product layer that accumulates in an *oil-water separator*.

Fuel oil means kerosine or any hydrocarbon oil as classified in CAN/CGSB-3.2-99, "Fuel Oil, Heating" and CAN/CGSB-3.3-99, "Kerosine".

Handling means the storing, transmitting, transporting, or distributing of *petroleum* or *allied petroleum products* and includes putting *petroleum products* into a container or into the fuel tank of a motor vehicle, vessel, or aircraft.

Impermeable barrier means a secondary *storage tank* wall, synthetic membrane *liner*, or other equivalent material in conformance with this Code.

Internal coating means a coating or lining of a non-corrodible material bonded firmly to the interior surface of a *storage tank* that does not chemically or physically degrade when in contact with the *petroleum* or *allied petroleum products* stored therein.

Interstitial space means the space between the primary *storage tank* or *piping* wall and the *impermeable barrier* within a *secondary containment system*. (See Appendix B, note B.1.4.2 *Interstitial space*)

Leak means any loss of liquid *petroleum* or *allied petroleum products* because of a defect in a *storage tank system*.

Leak detection means a device or method that is capable of detecting *leaks* in a *storage tank system*.

Liner means a material used as the outer barrier of a *secondary containment system*, but does not include the outer wall of double-wall *piping or storage tanks*.

Line-leak detector means a device used in pressure *piping* systems to detect a *leak* in the *piping*.

Mobile tank means a mobile refueling tank as described by ORD-C142.13-1977, Mobile Refueling Tanks.

Motive fuel means any fuel used to power a vehicle, aircraft, or vessel.

Oil-water separator means a device for collecting and separating non-soluble, non-emulsified *petroleum* and *allied petroleum products* from water.

Operator means the person who is responsible for the day-to-day operation of an installation where an *aboveground* or *underground storage tank* is located or, when referring to a vehicle, the driver in charge of the vehicle.

Out-of-service means that a *storage tank system* or portion thereof is no longer serving its intended use.

Overfill protection device means a mechanical device, electrical device, or fill procedure system that is intended to prevent a *storage tank* from being overfilled.

Owner means the Crown, an institution, corporate entity, Indian band, government department or agency, or a person who has legal *owner*ship of the *storage tank system* or who has been assigned custody to control, care for, manage, or dispose of the *storage tank system.*

Petroleum product means a single product or mixture of at least 70% hydrocarbons, by volume, refined from crude oil, with or without additives, that is used, or could be used, as a fuel, lubricant, or power transmitter and without restricting the foregoing, such products include gasoline, diesel fuel, aviation fuel, kerosine, naphtha, lubricating oil, *fuel oil*, engine oil and *used oil*, and exclude propane, paint, and solvents.

Piping means fuel conduits, including fittings and valves that are necessary for the safe *handling* and storage of *petroleum products* and *allied petroleum products* and are specified by a nominal inside diameter.

Precision leak detection test means a test capable of detecting a *storage tank leak* as small as 0.38 L/h with a probability of detection of 0.95 or greater and a probability of false alarm of 0.05 or less, within a period of 24 hours, accounting for variables such as vapour pockets, thermal expansion of product, temperature stratification, groundwater level, evaporation, pressure and end deflection.

Pressure liquid media leak detection test means a test utilizing a device to pressurize *piping* with a suitable test liquid to determine the presence of *leaks.*

Product transfer area means the area around the connection point between a delivery truck, railcar, or vessel and a *storage tank system* with a capacity of 2 500 L or more.

Protected means having impact, projectile, and fire resistance qualities for an *aboveground storage tank system.*

Protective coating means a coating applied to a surface to protect the substrate from *corrosion.*

Secondary containment means an i*mpermeable barrier* that prevents *leaks* from the primary *storage tank system* from reaching outside the containment area.

Separated solid means the particulate material that settles at the bottom of an *oil-water separator*.

Site means a lot or property where there is one or more *underground storage tank systems* within 100 m of each other, or one or more *aboveground storage tank systems* within 200 m of each other, and all *storage tanks* on the property are owned by the same *owner(s)*.

Sludge means the *petroleum* or *allied petroleum product* residue or material that accumulates at the bottom of a *storage tank.*

Spill means any loss of liquid *petroleum* or *allied petroleum product* from a *storage tank system* that is not attributable to a *leak* in the *storage tank system.*

Spill containment device means a container fitted to the inlet of a *storage tank* or to the suction coupling of a used *oil storage tank* that helps prevent *spills* from entering the environment.

Static liquid media leak detection test means a *leak detection* test in which a suitable test liquid is placed into the containment device and is monitored for a change in the liquid level and the rate of change.

Storage tank means a closed container for the storage of *petroleum* or *allied petroleum products* with a capacity of more than 230 L that is designed to be installed in a fixed location.

Storage tank system means a system for the storage and dispensing of *petroleum* or *allied petroleum product* and is not limited to *storage tanks*, associated *piping*, *vents*, pumps, and dispensing equipment.

Tank bottom water means water that accumulates at the bottom of a *storage tank*.

Underground storage tank means a *storage tank* with all of the *storage tank* volume below grade and the primary tank or double-wall completely surrounded by or in intimate contact with backfill.

Underground storage tank system means one or more commonly connected *underground storage tank(s)*, including all underground and aboveground connections, *piping*, pumps, and dispensers.

Used oil means oil from industrial and non-industrial sources that has been acquired for lubricating or other purposes and has become unsuitable for its original purpose due to the presence of impurities or the loss of original properties. *Used oil* does not include oils derived from animal or vegetable fats, crude oil or recovered *fuel oils spilled* onto land or water and wastes from petroleum-refining operations. The following categories of *used oil* are covered by this Code (See Appendix B, note B.1.4.2 *Used Oil*):

a) lubricating oils (engine, turbine, or gear);
b) hydraulic fluids (including transmission fluids); and
c) insulating oils.

Vent means an opening in a *storage tank system* that is specifically designed to relieve excess internal pressure or vacuum within a *storage tank system*.

Section 1.5 Reference Documents

1.5.1 Where there is a conflict between the provisions of this Code and those of a reference document, the provisions of this Code shall apply.

1.5.2 Unless otherwise specified herein, the documents listed in Table 1 shall include the latest editions, amendments, revisions, and supplements ~~effective to December 31, 2002~~.

Table 1 - Reference Documents

Issuing Agency – American Petroleum Institute	
Document Number	**Title of Document**
API Spec 12B-95	Bolted Tanks for Storage of Production Liquids
API Spec 12D-94	Field Welded Tanks for Storage of Production Liquids
API Spec 12F-94	Shop Welded Tanks for Storage of Production Liquids
API 570-98	Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems
API Std 650-98	Welded Steel Tanks for Oil Storage
API RP 651-97	Cathodic Protection of Aboveground Petroleum Storage Tanks
API RP 652-97	Lining of Aboveground Petroleum Storage Tank Bottoms
API Std 653-01	Tank Inspection, Repair, Alteration, and Reconstruction
API RP 1632-96	Cathodic Protection of Underground Storage Tank and Piping Systems
API RP 2350-96	Overfill Protection for Storage Tanks in Petroleum Facilities
API Std 2610-94	Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities

Issuing Agency – Canadian Council of Ministers of the Environment	
Document Number	**Title of Document**
CCME PN 1057	Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks (1991)
CCME PN 1180	Environmental Guideline for Controlling Emissions of Volatile - Organic Compounds from Aboveground Storage Tanks (1995)
CCME PN 1299	Canadian Environmental Quality Guidelines (1999)
CCME CWS for PHC	Canada-wide Standards for Petroleum Hydrocarbons in Soil (2001)

Issuing Agency – Canadian General Standards Board	
Document Number	**Title of Document**
CAN/CGSB-1.124-99	Thinner for Vinyl Coatings
CAN/CGSB-1.136-92	Antiblush Thinner for Cellulose Nitrate Lacquer
3-GP-525M	Isopropanol
3-GP-531M	Methanol, Technical
3-GP-855M	Ethylene Glycol, Uninhibited
CAN/CGSB-15.50-92	Technical Grade Acetone
CAN/CGSB-15.52-92	Methyl Ethyl Ketone, Technical Grade
CAN/CGSB-21.1-93	Offset Lithographic Printing Ink
CAN/CGSB-1.2-89	Boiled Linseed Oil
CAN/CGSB-1.4-2000	Petroleum Spirits Thinner
CAN/CGSB-1.70-99	High Solvency Thinner
CAN/CGSB-1.94-M89	Xylene Thinner (Xylol)
CAN/CGSB-1.110-M91	General Purpose Thinners for Lacquers
CAN/CGSB-1.164-92	Solvent for Vinyl Pretreatment Coating
CAN/CGSB-3.2-99	Fuel Oil, Heating
CAN/CGSB-3.3-99	Kerosine

Issuing Agency – Canadian Petroleum Products Institute	
Document Number	**Title of Document**
CPPI/PACE Report 87-1	Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks
CPPI (1995)	Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles January 1990 for Product Identification
CPPI (1992)	Professional Driver's Manual
CPPI	Code of Practice for Management of Water Effluent Quality at Petroleum Storage and Distribution Facilities
CPPI (2000)	Recommended Practices: Operation of Shop-Fabricated Aboveground Petroleum Storage Tank Systems

Issuing Agency – Canadian Standards Association	
Document Number	**Title of Document**
CAN/CSA-B139-00	Installation Code for Oil Burning Equipment
CAN/CSA-Z245.1-98	Steel Line Pipe

Issuing Agency – Environmental Protection Agency	
Document Number	**Title of Document**
EPA/530/UST-90/007	Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods
EPA 510-B-95-009	Introduction to Statistical Inventory Reconciliation

Issuing Agency – NACE International	
Document Number	**Title of Document**
NACE RP0169-2002	Control of External Corrosion on Underground or Submerged Metallic Piping Systems
NACE RP0285-2002	Corrosion Control of Underground Storage Tank Systems by Cathodic Protection.
NACE RP0193-2001	External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms
NACE TM0101-2001	Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Tank Systems
NACE No. 10/SSPC-PA6	Fiberglass-Reinforced Plastic (FRP) Linings Applied to Bottoms of Carbon Steel Aboveground Storage Tanks

Issuing Agency – National Research Council	
Document Number	**Title of Document**
NRCC 38727	National Fire Code of Canada (NFCC) - 1995

Issuing Agency – Steel Tank Institute	
Document Number	**Title of Document**
STI SP001-00	Standard for Inspection of In-service Shop Fabricated Aboveground Tanks for the Storage of Flammable and Combustible Liquids.
STI R831-98	Optional Recommended Practice for Control of Localized Corrosion Within Underground Steel Petroleum Storage Tanks.
STI R893-89	Recommended Practice for External Corrosion Protection of Shop Fabricated Aboveground Tank Floors.
STI RP011-01	Recommended Practice for Anchoring of Steel Underground Storage Tanks.

Issuing Agency – Underwriters' Laboratories of Canada	
Document Number	**Title of Document**
ULC-S601-2000	Aboveground Horizontal Shop Fabricated Steel Tanks
ULC-S601(A)-2001	Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks
CAN/ULC-S602-1992	Aboveground Steel Tanks for Fuel Oil and Lubricating Oil
CAN/ULC-S603-1992	Underground Steel Tanks
CAN/ULC-S603.1-1992	Galvanic Corrosion Protection Systems for Underground Steel Tanks
ULC-S603(A)-2001	Refurbishing of Underground Steel Tanks
ULC-S615-1998	Underground Reinforced Plastic Tanks
ULC-S615(A)-1987	Refurbishing of Underground Reinforced Plastic Tanks
ULC-S618-2000	Magnesium and Zinc Anodes and Zinc and Copper/Copper Sulphate Reference Electrodes
ULC-S630-2000	Aboveground Vertical Shop Fabricated Steel Tanks
ULC-S630(A)-2001	Shop refurbishing of Aboveground Vertical Shop Fabricated Steel Tanks
CAN/ULC-S633-1999	Flexible Underground Hose Connectors
CAN/ULC-S643-2000	Aboveground Shop Fabricated Steel Utility Tanks
CAN/ULC-S651-2000	Emergency Valves
ULC-S652-1993	Tank Assemblies for Collection of Used Oil
ULC-S653-1994	Contained Aboveground Steel Tank Assembles
ULC-S655-1998	Aboveground Protected Tank Assemblies
ULC-S656-2000	Oil-Water Separators
ORD-C58.9-1997	Secondary Containment Liners for Underground and Aboveground Tanks
ORD-C58.10-1992	Underground Jacketed Steel Tanks
ORD-C58.12-1992	Leak Detection Devices (Volumetric Type) for Underground Storage Tanks
ORD-C58.14-1992	Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks
ORD-C58.15-1992	Overfill Protection Devices for Flammable Liquid Storage Tanks
ORD-C58.19-1992	Spill Containment Devices for Underground Tanks
ORD-C58.20-1996	Special Corrosion Protection Underground Tanks
ORD-C80.1-2000	Aboveground Non-Metallic Tanks for Fuel Oil
ORD-C107.4-1992	Ducted Flexible Underground Piping Systems
ORD-C107.7-1993	Glass-Fibre Reinforced Plastic Pipe and Fittings
ORD-C107.12-1992	Line Leak Detection Devices for Flammable Liquid Piping
ORD-C107.14-1992	Non Metallic Pipe and Fittings
ORD-C107.19-1992	Secondary Containment of Underground Piping
ORD-C107.21-1992	Under-Dispenser Sumps
ORD-C142.5-1992	Aboveground Concrete Encased Steel Tank Assemblies
ORD-C142.6-2000	Storage Vaults
ORD-C142.13-1997	Mobile Refueling Tanks
ORD-C142.15-2000	Precast Concrete Tanks
ORD-C142.17-1998	Aboveground Special Purpose Relocatable Vertical Tanks
ORD-C142.18-1995	Aboveground Rectangular Steel Tanks
ORD-C142.19-1994	Spill Containment Devices for Aboveground Tanks
ORD-C142.20-1995	Aboveground Secondary Containment Tanks
ORD-C142.21-1995	Aboveground Used Oil Systems
ORD-C142.22-1995	Contained Aboveground Vertical Steel Tank Assemblies
ORD-C142.23-1991	Aboveground Waste Oil Tanks
ORD-C536-1998	Flexible Metallic Hose

Section 1.6 Abbreviations

1.6.1 The abbreviations used in this Code for the names of associations or other codes shall have the meanings assigned to them in this Article. The addresses of the associations or code-sponsoring organizations are provided as follows:

API American Petroleum Institute
1220 L Street N.W.
Washington, D.C. 20005
Phone: 202-682-8375 FAX: 202-962-4776
E-mail: publications@api.org
Web Page: www.pei.org

CAN National Standards of Canada
1200-45 O'Connor Street
Ottawa, Ontario K1P 6N7
Phone: 613-238-3222 FAX: 613-995-4564
E-mail: info@scc.ca
Web Page: ww.scc.ca

CCME Canadian Council of Ministers
of the Environment
123 Main Street,
Winnipeg, Manitoba R3C 1A3
Phone: 204-948-2090 FAX: 204-948-2125
Web Page: www.ccme.ca

CGSB Canadian General Standards Board
1402 - 222 Queen Street
Ottawa, Ontario K1A 1G6
Phone: 819-956-0425 FAX: 819-956-5644
E-mail: CGSB@Piper.PWGSC.gc.ca
Web Page: www.pwgsc.gc.ca/cgsb

CPCA Canadian Petroleum
Contractors Association
PO Box 415 Markham, Ontario, L3P 3J8
Tel: 705 735-9437 Fax 705 735-9418
Web Page: www.CPCAonline.com

CPPI Canadian Petroleum Products Institute
1000 - 275 Slater Street
Ottawa, Ontario K1P 5H9
Phone: 613-232-3709 FAX: 613-236-4280

CSA Canadian Standards Association
178 Rexdale Blvd.
Toronto, Ontario M9W 1R3
Phone: 416-747-4000 FAX: 416-747-4149
E-mail: sales@csa.ca
Web Page: www.csa.ca

EPA U.S. Environmental Protection Agency,
Office of Underground Storage Tanks
401 M Street S. W., Mail Code 5401G
Washington, D.C., U.S.A. 20460
Phone: 703-603-9900 FAX: 703-603-9163
Web Page: www.epa.gov/swerust1/index.htm

NACE NACE International (formerly National
Association of Corrosion Engineers)
1440 South Creek Drive
Houston, Texas, USA 77084-4906
Phone: 281-228-6200 FAX: 281-228-6329
Web Page: www.nace.org

NFCC National Fire Code of Canada,
published under the auspices of the
National Research Council of Canada
National Research Council of Canada
Ottawa, Ontario K1A 0R6
Phone: 613-993-2463 FAX: 613-952-7673
E-mail: Irc.Client-Services@nrc.ca
Web Page: www.nrc.ca/irc/

STI Steel Tank Institute
570 Oakwood Road
Lake Zurich, Illinois 60047
Phone 847-438-8265 FAX 847-438-8766
E-mail: wgeyer@steeltank.com
Web Page: www.steeltank.com

ULC Underwriters' Laboratories of Canada
7 Crouse Road
Scarborough, Ontario M1R 3A9
Phone: 416-757-3611 FAX: 416-757-9540
E-mail: ulcinfo@ulc.ca
Web Page: www.ulc.ca/

1.6.2 Abbreviations of words and phrases in this Code shall have the following meanings:

cm centimetre(s)
˚C degree(s) Celsius
h hour(s)
kPa kilopascal(s)
L litre(s)
m metre(s)
min minute(s)
mL millilitres
mm millimetre(s)
mV millivolt(s)
s second(s)
µm micrometre(s) or micron(s)

Part 2 Registration and Approval of Storage Tank Systems

SECTION 2.1 Scope

2.1.1 This Part applies to the registration and approval to construct a *storage tank system*.

SECTION 2.2 Registration of Existing Storage Tank Systems

2.2.1 The *owner* of an *existing storage tank* system shall register all *storage tanks* of the system with the *authority having jurisdiction* in a manner and timeframe prescribed by the *authority having jurisdiction*.

2.2.2 Registration of an *existing storage tank system* shall be conducted by completing and filing a registration form in a manner specified by the *authority having jurisdiction*. (See Appendix C)

2.2.3 The *owner* of an existing *storage tank system* shall identify registered tanks in a manner and time frame specified by the a*uthority having jurisdiction*.

2.2.4 The *authority having jurisdiction* may deem the age of an *existing storage tank system* to be unknown unless the *owner* provides the *authority having jurisdiction* with either the date of installation and/or the date of manufacture.

SECTION 2.3 Approval of Storage Tank Systems

2.3.1 No person shall construct or cause to construct, install, *alter*, or operate a *storage tank system* unless all required permits and approvals have been obtained from the *authority having jurisdiction*.

SECTION 2.4 Registration of New Storage Tank Systems

2.4.1 The *owner* of a *new storage tank system* installed after a date specified by the *authority having jurisdiction* shall register the *storage tank system*.

2.4.2 The new *storage tank system* shall be registered by completing and filing a registration form as specified by the *authority having jurisdiction*.
(See Appendix C)

2.4.3 The *owner* of a new *storage tank system* shall identify registered tanks in a manner specified by the *authority having jurisdiction*.

SECTION 2.5 Product Supply and Registration

2.5.1 After a date specified by the *authority having jurisdiction*, no person shall transfer or cause to be transferred *petroleum* or *allied petroleum products* to a *storage tank system* unless the *storage tank system* has been registered with the *authority having jurisdiction*.

Part 3 Design and Installation of Aboveground Storage Tank Systems

Section 3.1 Scope

3.1.1(1) This Part applies to the design and installation of a new *aboveground storage tank system*.

3.1.1(2) A *storage tank* installed in a concrete vault located below grade with the interior of the vault not filled with backfill material shall be considered an *aboveground storage tank* for the purpose of this Code.

Section 3.2 General Requirements

3.2.1 Except as provided in this Part, the design, fabrication and installation of an *aboveground storage tank system* shall be in conformance with the NFCC.

3.2.2 Except as provided in this Part, the design and installation of an *aboveground storage tank system* connected to an oil-burning appliance and equipment that comes within the scope of CAN/CSA-B139-00, "Installation Code for Oil Burning Equipment" shall be in conformance with that Code.

3.2.3 An *aboveground storage tank*, components, and accessories, for which there is a recognized standard, shall be *approved* only for the uses indicated under the standard.

3.2.4 A company or individual that is authorized by the *authority having jurisdiction* shall verify that the design and installation of an *aboveground storage tank system* meets the requirements of this Code or other requirements as specified by the *authority having jurisdiction*.

3.2.5 An *aboveground storage tank system* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.

3.2.6 An *aboveground storage tank* shall be equipped to control emissions of volatile organic compounds in conformance with CCME PN 1180, "Environmental Guideline for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks". (See Appendix B, note B.3.2.6)

3.2.7(1) The *owner* of an *aboveground storage tank system* shall provide an as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction*.

3.2.7(2) As-built drawings for an *aboveground storage tank system* shall include, as a minimum:

(a) the outline of all *storage tanks*;
(b) the centerline of all *piping* or *piping* groups;
(c) the centerline of all underground electrical power and monitor sensor conduit;
(d) building foundation outlines;
(e) *secondary containmen*t systems; and
(f) property lines.

3.2.8(1) No person shall install an *aboveground storage tank system* unless:

(a) required permits or approvals have been obtained from the *authority having jurisdiction*;
(b) plans, drawings and specifications of the system or equipment have been examined by the *authority having jurisdiction*; and
(c) the plans, drawings and specifications referred to in Clause (b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.

3.2.9 An *aboveground storage tank system* shall be designed and installed in accordance with the manufacturer's instructions, the appropriate standards, and this Code.

Section 3.3 Field-erected Storage Tank Systems

3.3.1(1) A field-erected *storage tank system* shall:

(a) have *corrosion protection* in conformance with Section 3.8;

(b) have a *secondary containment* system in conformance with Section 3.9;

(c) have *leak detection* in conformance with Part 6;

(d) have *containment sumps*, as applicable;

(e) be provided with overfill protection:

(i) for pipeline delivery, in the form of an alarm system that will automatically alert pipeline or terminal personnel so that action can be taken to prevent the *storage tank* from being overfilled;

(ii) for truck, rail, ship, or barge delivery, in the form of a visual and audible alarm system for detecting a high level that will activate and alert personnel in enough time to terminate the flow of the product to the storage tank and prevent an overfill (See Appendix B, note B.3.3.1(1)(e)(ii)); or

(iii) in conformance with API RP 2350-96, "Overfill Protection for Storage Tanks in Petroleum Facilities"; and

(f) have *piping* in conformance with Part 5, as applicable

3.3.2 If vapour balancing or vapour recovery systems are required, they shall be designed and built in conformance with CCME PN 1057, "Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks".

Section 3.4 Shop-fabricated Storage Tank Systems

3.4.1(1) A shop-fabricated *storage tank* system shall:

(a) have *corrosion* protection in conformance with Section 3.8;

(b) have a *secondary containment* system in conformance with Section 3.9;

(c) have *leak detection* in conformance with Part 6;

(d) have *containment sumps*, as applicable;

(e) except as specified in Sentence 3.4.1(2), be provided with overfill protection:

(i) compatible with the intended method of filling;

(ii) designed, built, and approved in conformance with ORD-C58.15-1992, "Overfill Protection Devices for Flammable Liquid Storage Tanks," which will prevent filling the tank beyond 95% of the tank's capacity or activate an audible or combined audible/visual alarm at a product level of 90% of the tank's capacity; and

(iii) where a high-level alarm system is used, with audible and visual alarms located where personnel are constantly on duty during the product transfer operation and can promptly stop or divert delivery to the *tank*; and

(f) have *piping* in conformance with Part 5, as applicable.

3.4.1(2) A shop-fabricated *storage tank* system having a capacity of less than 5 000 L may be provided with overfill protection in the form of visual monitoring and gauging of the level in the *storage tank system* by trained employees in constant attendance throughout the transfer operation and who are located so as to be able to promptly shut down the flow, or communicate immediately with the person controlling the delivery so that the flow can be shut down promptly.

3.4.2 A horizontal *storage tank* shall be supported above grade level.

3.4.3 Where there is a dispenser, *leak detection* for the dispenser and related components shall be in conformance with Part 6.

Section 3.5 Aboveground Storage Tank Systems for Storing Used Oil

3.5.1(1) An *aboveground used oil storage tank* that is manually filled shall be designed, built, and approved in conformance with:

(a) ORD-C142.23-1991, "Aboveground Waste Oil Tanks"; or

(b) ULC-S652-1993, "Tank Assemblies for Collection of Used Oil".

3.5.1(2) A *used oil storage tank* that is not manually filled shall be designed, built, and *approved* in conformance with ULC-S652-1993, "Tank Assemblies for Collection of Used Oil". (See Appendix B, Note B.3.5.1(2))

Section 3.6 Design Standards

3.6.1(1) Based on the design, an *aboveground storage tank* shall be designed, built, and *approved* in conformance with the following, as applicable:

a) API Std 650-98, "Welded Steel Tanks for Oil Storage";

b) ULC-S601-2000, "Aboveground Horizontal Shop Fabricated Steel Tanks";

c) CAN/ULC-S602-1992, "Aboveground Steel Tanks for Fuel Oil and Lubricating Oil";

d) ULC-S630-2000, "Aboveground Vertical Shop Fabricated Steel Tanks";

e) CAN/ULC-S643-2000, "Aboveground Shop Fabricated Steel Utility Tanks";

f) ULC-S652-1993, "Tank Assemblies for Collection of Used Oil";

g) ULC-S653-1994, "Contained Aboveground Steel Tank Assemblies";

h) ORD-C142.5-1992, "Aboveground Concrete Encased Steel Tank Assemblies";

i) ORD-C142.18-1995, "Aboveground Rectangular Steel Tanks";

j) ORD-C142.21-1995, "Aboveground Used Oil Systems";

k) ORD-C142.22-1995, "Contained Aboveground Vertical Steel Tank Assemblies"; or

(l) ORD-C142.23-1991, "Aboveground Waste Oil Tanks".

3.6.2 An *overfill protection device* shall be designed, built, and *approved* in conformance with ORD-C58.15-1992, "Overfill Protection Devices for Flammable Liquid Storage Tanks".

3.6.3 A *containment sump* shall be designed, built, and *approved* in conformance with ORD-C107.21-1992, "Under-Dispenser Sumps".

3.6.4 A *liner* shall be designed, built, and *approved* in conformance with ORD-C58.9-1997, "Secondary Containment Liners for Underground and Aboveground Tanks".

3.6.5 An *aboveground storage tank* designed to contain an *allied petroleum product* shall be designed, built, and *approved* for use with that product.

3.6.6(1) An *aboveground storage tank* built in conformance with:

(a) API Spec 12B-95, "Bolted Tanks for Storage of Production Liquids";

(b) API Spec 12D-94, "Field Welded Tanks for Storage of Production Liquids"; or

(c) API Spec 12F-94, "Shop Welded Tanks for Storage of Production Liquids"

shall be used only for the storage of production *petroleum and allied petroleum products.*

Section 3.7 Repair, Alteration, Reconstruction, and Relocation

3.7.1(1) The repair, *alteration*, reconstruction, or relocation of an *aboveground storage tank system* shall be done in conformance with the technical requirements of, as applicable:

(a) ULC-S601(A)-2001, "Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks";

(b) ULC-S630(A)-2001, "Shop Refurbishing Aboveground Vertical Shop Fabricated Steel Tanks";

(c) API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction";

(d) STI SP001-00, "Standard for Inspection of In-service Shop Fabricated Aboveground Tanks for the Storage of Flammable and Combustible Liquids"; or

(e) the special acceptance procedures of ULC or API.

~~3.7.2 The *owner* of an *aboveground storage tank system* shall provide a revised as-built drawing in conformance with Sentence 3.2.7(2) to the *authority having jurisdiction* in a time frame specified by the *authority having jurisdiction* whenever new *construction*, *alteration*, or *site* upgrade occurs.~~

Section 3.8 Corrosion Protection of Aboveground Steel Storage Tank Systems

3.8.1(1) When *cathodic protection* is used, it shall be designed by a *corrosion expert* (See Appendix B, note B.3.8.1(1)) and be in conformance with:

(a) API RP 651-97, "Cathodic Protection of Aboveground Petroleum Storage Tanks";

(b) API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction";

(c) NACE RP0193-2001, "External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms"; or

(d) STI R893-89, "Recommended Practice for External Corrosion Protection of Shop Fabricated Aboveground Tank Floors."

3.8.2(1) Atmospheric *corrosion* of an *aboveground storage tank system* shall be controlled by:

(a) a *protective coating* applied in conformance with the coating manufacturer's instructions;

(b) a *corrosion* control program in accordance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction"; or

(c) the use of a non-corroding material in its construction.

Section 3.9 Secondary Containment Requirements

3.9.1(1) Subject to Sentences (2) and (3), a *secondary containment* system for an *aboveground storage tank* shall:

(1) for a *storage tank system* that consists of a single *storage tank*, have a volumetric capacity of not less than 110% of the capacity of the tank; or

(2) for a *storage tank system* that consists of more than one *storage tank*, have a volumetric capacity of not less than the sum of:

(a) the capacity of the largest *storage tank* located in the contained space; and

(b) 10% of the greater of:

(i) the capacity specified in Clause (a); or

(ii) the aggregate capacity of all other *storage tanks* located in the contained space.

3.9.1(2) A *secondary containment* system for a shop-fabricated *storage tank* shall be designed, built, and *approved* in conformance with:

(a) ULC-S653-1994, " Contained Aboveground Steel Tank Assemblies";

(b) ULC-S655-1998, "Aboveground Protected Tank Assemblies";

(c) ORD-C142.5-1992, "Aboveground Concrete Encased Steel Aboveground Tank Assemblies"; or

(d) a recognized standard for double-wall *tanks.*

3.9.1(3) A *secondary containmen*t system for a field-erected *aboveground storage tank* shall be:

(a) a single-wall and single-bottom *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls;

(b) a single-wall, double-bottom *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls, sealed to the perimeter of the *storage tank* or pad when the *liner* is not installed under the *tank*;

(c) a double-wall *storage tank* for a *storage tank* with a capacity of 50 000 L or less; or

(d) a double-wall *storage tank* placed entirely within a dyked area, with an *impermeable barrier* in the floor of the containment area and in the dyke walls, for a *storage tank* with a capacity of more than 50 000 L.

3.9.2(1) Except as provided in Sentence (2), a s*econdary containment impermeable barrier* shall be:

(a) designed, built, and *approved* in conformance with:

(i) ORD-C58.9-1997, "Secondary Containment Liners for Underground and Aboveground Tanks"; or

(ii) ORD-C142.20-1995, "Aboveground Secondary Containment Tanks"; and

(b) installed so that:

(i) the *liner* is sealed to the perimeter of the *storage tank* or pad when the *liner* is not installed under the *tank*;

(ii) the *liner* extends to the top of the dyke wall;

(iii) the *liner* is covered with a non-*combustible* material of such nature and thickness that it will not fail when the *secondary containment* is exposed to fire; and

(iv) *liners* that are intended to be exposed in service are listed for aboveground (exposed) use.

3.9.2(2) A *secondary containment impermeable barrier* that does not conform to Sentence (1) shall:

(a) use material compatible with the product being stored and acceptable to the *authority having jurisdiction* (See Appendix B, note 3.9.2(2)(a)); and

(b) be designed, constructed, and maintained to ensure a maximum hydraulic conductivity of 1×10^{-6} cm/s.

3.9.3(1) *Liner* penetrations shall be located at the high point or in a raised part of the dyke floor. (See Appendix B, note B.3.9.3(1))

3.9.3(2) All *liner* penetrations shall be sealed.

3.9.4 Monitoring of the *interstitial space* of the *secondary containment* system shall be provided in conformance with Part 6 of this Code.

Section 3.10 Spill Containment and Runoff Collection

3.10.1 *Spills*, overfills, and storm water from *product transfer areas* shall be contained, treated and disposed of in conformance with the applicable provincial or territorial regulations, guidelines or policies.

3.10.2 Containment area floors within dykes shall slope away from the tank base towards a sump at a slope greater than 1%.

3.10.3(1) An *oil-water separato*r used to treat storm water runoff, overfills, or a *spill* from the *product transfer area* shall be sized for a minimum hydraulic flow rate of a ten year return, one hour storm event, with the one hour rainfall intensity data obtained for the nearest weather station, and:

(a) be designed, built, and *approved* in conformance with ULC-S656-2000, "Oil-Water Separators"; or

(b) conform to the following:

(i) be designed to produce a *discharge* of water that does not contain more than 15 mg/L of *free oil* and grease as measured by the partition-gravimetric method or other protocol as defined by the *authority having jurisdiction* ;

(ii) be designed for an insoluble-in-water oil with a specific gravity of 0.875 ±0.025; and

(iii) be designed based on the hydraulic retention time required to separate oil with a particle droplet size of 60 microns from storm water.

Part 4 Design and Installation of Underground Storage Tank Systems

Section 4.1 Scope

4.1.1 This Part applies to the design and installation of a new *underground storage tank system*.

Section 4.2 General Requirements

4.2.1 Except as provided in this Part, the design, fabrication and installation of an *underground storage tank system* shall be in conformance with Part 4 of the NFCC.

4.2.2 An *underground storage tank*, components, and accessories, for which there is a recognized standard, shall be *approved* only for the uses indicated by the standard.

4.2.3 An *underground storage tank system* shall be designed and installed in accordance with the manufacturer's instructions, the appropriate standards, and this Code.

4.2.4(1) Except as specified in Sentence (2), an *underground storage tank system* shall be designed and installed to have:

(a) double-wall *tank(s)* with monitorable *interstitial space*;
(b) an *overfill protection device*;
(c) a fill pipe *spill containment device*;
(d) *containment sumps*, as applicable;
(e) *leak detection* in conformance with Part 6;
(f) except for *venting* purposes, liquid- and vapour-tight connections, caps and adapters; and
(g) *corrosion protection*, as applicable.

4.2.4(2) An *underground storage tank system* for storing *used oil* shall be designed and installed to have:

(a) double-wall *tank(s)* with monitorable *interstitial space*;
(b) *corrosion protection*;
(c) a 50 mm (2 in) Schedule 40 suction pipe, for product removal that can be removed for the purpose of clearing a blockage;
(d) product removal or transfer connections located within a *spill containment device*;
(e) an *overfill protection device* where the *storage tank* is filled by pump or remote manual fill;
(f) where the fill port is outside, it shall be fitted with a *spill containment device* having a capacity of at least 25 L and the *spill containment device* shall be fitted with:
  (i) a rain cover; and
  (ii) a screen to prevent nuts, bolts, rags, and other such objects from entering the *storage tank*;
(g) in-take *venting* with an open area at least twice the open area of the suction pipe as specified in 4.2.4(2)(c) to avoid vacuum collapse from high rate of product removal; and
(h) *leak detection* in conformance with Part 6.

4.2.5 A company or individual that is authorized by the *authority having jurisdiction* shall verify that the design and installation of an *underground storage tank system* meets the requirements of this Code or other requirements as prescribed by the *authority having jurisdiction*.

4.2.6 An *underground storage tank system* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.

4.2.7 An *underground storage tank* shall be located and maintained to permit the eventual removal of the *storage tanks* when the *storage tank system* is taken *out-of-service*. (See Appendix B, note B.4.2.7)

4.2.8(1) The *owner* of an *underground storage tank system* shall provide an as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction.*

4.2.8(2) As-built drawings for an *underground storage tank system* shall include, as a minimum:
- (a) the outline of all *storage tanks*;
- (c) the centerline of all *piping* or *piping* groups;
- (c) the centerline of all underground electrical power and monitor sensor conduit;
- (d) building foundation outlines;
- (e) *secondary containment systems*; and
- (f) property lines.

4.2.9(1) No person shall install an *underground storage tank system* unless:
- (a) required permits or approvals have been obtained from *the authority having jurisdiction*;
- (b) plans, drawings and specifications of the system or equipment have been examined by the a*uthority having jurisdiction*; and
- (c) the plans, drawings and specifications referred to in Clause 3.2.8(1)(b) bear the stamp and signature of a professional engineer licensed to practice in the province/territory.

Section 4.3 Design Standards

4.3.1(1) An *underground storage tank* shall be designed, built, and *approved* in conformance with the following:
- (a) CAN/ULC-S603-1992, "Underground Steel Tanks";
- (b) ULC-S615-1998, "Underground Reinforced Plastic Tanks";
- (c) ORD-C58.10-1992, "Underground Jacketed Steel Tanks";
- (d) ULC-S652-1993, "Tank Assemblies for Collection of Used Oil"; or
- (e) CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks".

4.3.2 An *overfill protection device* shall be designed, built, and *approved* in conformance with ORD-C58.15-1992, "Overfill Protection Devices for Flammable Liquid Storage Tanks".

4.3.3 A *spill containment device* shall be designed, built, and *approved* in conformance with ORD-C58.19-1992, "Spill Containment Devices for Underground Tanks".

4.3.4 A *dispenser sump* shall be designed, built, and *approved* in conformance with ORD-C107.21-1992, "Under-Dispenser Sumps".

4.3.5 A *Liner* shall be designed, built, and *approved* in conformance with ORD-C58.9-1997, "Secondary Containment Liners for Underground and Aboveground Tanks".

4.3.6(1) Subject to Part 6, a *leak detection* device shall be designed, built, and *approved* in conformance with one of the following:
- (a) ORD-C58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks"; or
- (b) ORD-C58.14-1992, "Leak Detection Devices (Nonvolumetric) for Underground Tanks".

4.3.6(2) Subject to Part 6, a *leak detection* method shall be in conformance with EPA/530/UST-90/007, "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods".

4.3.7(1) A *storage tank* designed to contain a*llied petroleum products* may be constructed of materials other than steel when necessitated by the properties of the liquid stored and *approved* for use with that liquid.

4.3.7(2) A *storage tank* shall:
- (a) be designed, built, and *approved* in conformance with:
  - (i) CAN/ULC-S603-1992, "Underground Steel Tanks";
  - (ii) CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks"; or
  - (iii) ORD-C58.10-1992, "Underground Jacketed Steel Tanks".

(b) be constructed of materials compatible with the liquid to be stored; and
(c) have *corrosion protection* in conformance with Section 4.5.

4.3.8(1) *Secondary containment* for *underground storage tanks* shall be designed, built, and *approved* in conformance with:
(a) for a double-wall steel *storage tank*, CAN/ULC-S603-1992, "Underground Steel Tanks;
(b) for a double-wall fibreglass-reinforced plastic *storage tank*, ULC-S615-1998, "Underground Reinforced Plastic Tanks"; or
(c) for a jacketed-steel *storage tank*, ORD-C58.10-1992 "Underground Jacketed Steel Tanks".

Section 4.4 Installation

4.4.1(1) *Petroleum* or *allied petroleum products* shall not be placed in an *underground storage tank* until:
(a) a fill pipe and *vent* line have been installed in the tank; and
(b) all other openings have been sealed or *piping* systems have been installed in accordance with their operational requirements.

Section 4.5 Corrosion Protection of Underground Steel Storage Tank Systems

4.5.1(1) A steel *underground storage tank system* shall be provided with *corrosion protection* in conformance with:
(a) CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks" including appendices;
(b) a *storage tank* built in conformance with CAN/ULC-S603-1992, "Underground Steel Tanks" and coated in conformance with CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks shall be provided with a *cathodic protection* system designed by a *corrosion expert* to conform with:
(i) CPPI/PACE Report 87-1, "Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks"; or
(ii) NACE RP0285-2002, "Corrosion Control of Underground Storage Tank Systems by Cathodic Protection";
(c) a *storage tank* with the entire primary tank surface encased in the interstice of a non-corrodible jacket built in conformance with ORD-C58.10-1992, "Underground Jacketed Steel Tanks"; or
(d) a *storage tank* with the entire primary tank surface encased in a non-corrodible jacket built in conformance with ORD-C58.20-1996 "Special Corrosion Protection Underground Tanks."

4.5.2(1) Except for a *storage tank* jacketed in conformance with ORD-C58.10-1992 "Underground Jacketed Steel Tanks" or ORD-C58.20-1996 "Special Corrosion Protection Underground Tanks" or installed in a vault with backfill, the *cathodic protection* system on all new installations of steel *underground storage tank system*s shall be tested for electrical isolation and system effectiveness after final backfilling in order to allow any corrective measures to be completed before final grading and placement of asphalt or concrete covers, as applicable.

4.5.2(2) A *cathodic protection* system shall meet the requirements of Section 8.6 of this Code.

4.5.2(3) When a *cathodic protection* system does not satisfy the requirements as specified in Section 8.6, the *owner* shall take corrective action in accordance with the recommendations of a *corrosion expert*.

4.5.2(4) The *owner* of a *underground storage tank system* shall, upon completion of the installation, ensure that the *cathodic*

protection system meets the requirements as specified in Section 8.6 and report in writing to the *authority having jurisdiction* the measured voltage potential(s) and whether or not *cathodic protection* has been achieved.

4.5.3(1) A new steel *storage tank* added to an *existing* system that already has an impressed current *cathodic protection* system shall:

(a) be in conformance with CAN/ULC-S603-1992, "Underground Steel Tanks"; and

(b) be electrically bonded into the impressed current *cathodic protection* system. (See Appendix B, note B.4.5.3(1)(b))

4.5.3(2) When a new *storage tank* built in conformance with CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks" is installed near an *existing* CAN/ULC S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks" *storage tank*, precautions shall be taken to ensure both the new and *existing* tanks are adequately *protected*. (See Appendix B, note B.4.5.3(2))

4.5.4(1) Impressed current *cathodic protection* shall be interlocked in such a manner that if the *cathodic-protection* system is turned off or bypassed either:

(a) power to the pump will be shut off; or

(b) audible and visual alarms will be turned on.

4.5.5 Impressed current *cathodic-protection* systems shall be equipped with a running time or a downtime totalizer. (See Appendix B, note B.4.5.5)

4.5.6(1) *Cathodically protected storage tanks* shall be installed with:

(a) test wires brought to the surface and fastened at an accessible location; or

(b) a permanent reference electrode and *approved* monitoring station, including test wires for each tank.

Part 5 Design and Installation of New Piping Systems

Section 5.1 Scope

5.1.1 This Part applies to the design and installation of *piping* associated with a *storage tank system*.

Section 5.2 General Requirements

5.2.1(1) *Piping* materials shall, as applicable, be designed, built, and *approved* in conformance with the following:

(a) ASTM A 53, "Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless";

(b) CAN/CSA Z245.1-98, "Steel Line Pipe";

(c) CAN/ULC-S633-1999, "Flexible Underground Hose Connectors";

(d) ORD-C107.7-1993, "Glass-Fibre Reinforced Plastic Pipe and Fittings";

(e) ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems";

(f) ORD-C107.14-1992, "Non-Metallic Pipe and Fittings"; or

(g) ORD-C536-1998, "Flexible Metallic Hose".

5.2.2 Except as provided in this Part, the design and installation of *piping* shall be in conformance with the NFCC.

5.2.3 Except as provided in this Part, the design and installation of *piping* connected to an oil-burning appliance and equipment that comes within the scope of CSA Standard B139, "Installation Code for Oil Burning Equipment" shall be in conformance with that Code.

5.2.4 *Piping* material shall be installed and maintained in accordance with an *approved* standard, code, or in a manner acceptable to the *authority having jurisdiction*.

5.2.5 Single-wall *piping* shall not have buried or concealed mechanical joints. (See Appendix B, note B.5.2.5)

5.2.6 *Leak detection* testing and monitoring of *piping* shall be in conformance with Part 6.

5.2.7 A thermal relief valve shall *discharge* into the low pressure side of the *piping*.

5.2.8(1) *Piping* located below the maximum product level in a tank shall be provided with a means to prevent the release of liquid from the tank by syphon flow.

5.2.8(2) Except as provided in Sentence 5.2.8(3), a manual shut-off valve shall be lockable or have a method of locking.

5.2.8(3) A manual shut-off valve on the *piping* connecting a *storage tank* and a heating appliance or a stationary combustion engine does not need to be lockable or have a method of locking.

Section 5.3 Product Transfer

5.3.1 The fill pipe on a *storage tank* with a capacity of 5 000 L or more shall be equipped for the attachment of a liquid and vapour-tight connection at the time of filling and shall be sealed with a liquid- and vapour-tight cap when not in use.

5.3.2 The suction tube of a *used oil* tank shall be equipped for the attachment of a liquid-tight fitting and shall be sealed with a liquid-tight cap when not in use.

Section 5.4 Design Standard for Underground Piping Systems

5.4.1 Underground *piping* up to and including 75 mm in diameter shall have se*condary containment* in accordance with Sentence 5.4.4(1).

5.4.2(1) Underground *piping* larger than 75 mm in diameter shall be designed, installed and maintained to meet the requirements of:
- (a) *secondary containmen*t in conformance with Sentence 5.4.4(1);
- (b) *leak detection* in conformance with Part 6; or
- (c) API RP 1632-96, "Cathodic Protection of Underground Storage Tank and Piping Systems" and API Std 2610-94, "Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities".

5.4.3(1) Non-metallic *piping* may be used for underground installations provided the *piping* and fittings are designed, built, and *approved* in conformance with the requirements of:
- (a) ORD-C107.7-1993, "Glass Fibre Reinforced Plastic Pipe and Fittings," or
- (b) ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems."

5.4.4(1) *Secondary containment* for underground *piping* shall:
- (a) be designed, built, and *approved* in conformance with ORD-C107.7-1993, "Glass-Fibre Reinforced Plastic Pipe and Fittings";
- (b) be designed, built, and *approved* in conformance with ORD-C107.4-1992, "Ducted Flexible Underground Piping Systems";
- (c) consist of a single-wall fibreglass-reinforced plastic, or single-wall steel *piping*, contained within a duct designed, built, and *approved* in conformance with ORD-C107.19-1992, "Secondary Containment of Underground Piping"; or
- (d) be double-wall steel *piping* provided with a *cathodic protection* system designed by a *corrosion expert*.

5.4.5(1) *Secondary containment* systems for *piping* shall be designed and installed such that *leaks*:
- (a) accumulate in a *containment sump* that is readily available for visual inspection; or
- (b) are detected by a monitoring system.

Section 5.5 Installation

5.5.1 *Piping* shall be installed by a company or individual that is authorized by the *authority having jurisdiction*.

5.5.2 *Piping* shall be located and maintained to permit the eventual removal of the *piping* when the *storage tank system* is permanently withdrawn from service.

5.5.3 *Piping* shall be located in a manner that will prevent allowable design stress from being exceeded.

5.5.4 *Piping* located aboveground shall be *protected* from physical damage due to impact.

Part 6 Monitoring and Leak Detection of Storage Tank Systems

Section 6.1 Scope

6.1.1 This Part applies to monitoring and *leak detection* for a *storage tank system*.

Section 6.2 General Requirements

6.2.1(1) A *storage tank system* shall be tested for *leaks* in conformance with Sections 6.2 and 6.3:

(a) at the time of final installation:

(i) for an *underground storage tank system*, final installation shall be when final surface materials have been installed and prior to being put into service; or

(ii) for an *aboveground storage tank system*, final installation shall be before the *storage tank system* is put into service; and

(b) whenever a *leak* is suspected in the primary or *secondary containment* of the *storage tanks, piping, containment sumps* or related components.

6.2.2 A *line-leak detector* shall be designed, built, and *approved* in conformance with ORD-C107.12-1992, "Line Leak Detection Devices for Flammable Liquid Piping."

6.2.3 Manual or electronic dip or inventory reconciliation shall be in conformance with Section 8.3.

6.2.4(1) Statistical inventory reconciliation shall be in conformance with:

(a) EPA/530/UST-90/007, "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods"; and

(b) EPA 510-B-95-009, "Statistical Inventory Reconciliation."

6.2.5 An automatic tank gauge system with a precision *leak detection* capability shall be designed, built, and *approved* in conformance with ORD-C58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks".

6.2.6 A continuous in-tank *leak detection* system shall conform to good engineering practice and shall meet the requirements of a *precision leak detection test*. (See Appendix B, Note B6.2.6.)

6.2.7(1) High-technology *secondary containment* monitoring shall continuously monitor the *interstitial space* and include the use of an automatic device designed, built, and *approved* in conformance with:

(a) ORD-58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks", or

(b) ORD-58.14-1992, "Leak Detection Devices (Nonvolumetric Type) for Underground Storage Tanks",.

6.2.8 Visual *leak detection* procedures shall be performed in conformance with Sentence 8.4.1(3).

6.2.9(1) A *pressure liquid media leak detection* test shall be in conformance with the requirements of a *precision leak detection test* and:

(a) the test device shall be third-party performance certified; and

(b) testing technicians shall be trained in the care and use of the test device

6.2.10(1) A *static liquid media leak detection* test shall be in conformance with the following requirements:

(a) leak rate shall not exceed 0.38 L/h;

(b) the duration of the test shall be a minimum of 1 hour;

(c) there shall be no visual evidence of a *leak*; and

(d) the test fluid shall exceed the elevation of *piping* and electrical conduit openings installed in sumps at the time of the *leak detection* test.

6.2.11(1) A high-pressure inert gas or vacuum *leak detection* test for *piping* shall be in conformance with the following procedures, as applicable:

(a) a high-pressure decline test using an inert gas or a vacuum test may be used as a *leak detection* test for *piping* systems that are in use and that have a volume of less than 1,000 L;

(b) whenever permitted by the equipment design and installation, product contained in the *piping* system shall be drained prior to conducting the high-pressure inert gas or vacuum test procedure;

(c) pumps, dispensers or other auxiliary equipment connected to the *piping* that cannot be subjected to the pressure of the test shall be isolated from the test procedures to prevent equipment damage;

(d) a test pressure or vacuum shall, as applicable:

(i) be more than 350 kPa (gauge) or 1.5 times the maximum operating pressure, whichever is greater;

(ii) not exceed 700 kPa (gauge), except when the *piping* system is designed for such pressures; and

(iii not exceed the equipment manufacturer's design limitations.

(e) stabilization is required after pressurization or vacuum is achieved;

(f) a *piping* system with a volume of less than or equal to 500 L shall have the pressure or vacuum maintained for a period of at least 60 min after stabilization;

(g) a *piping* system with a volume of greater than 500 L but less than or equal to 1,000 L shall have the test pressure or vacuum maintained for a period of at least two hours after stabilization;

(h) a *piping* system with a volume greater than 1000 L shall be tested using a procedure acceptable to the *authority having jurisdiction* (See Appendix B, Note B6.2.11 (1) (h); and

(i) a *piping* system shall be considered to be *leaking* when pressure variations that occur after stabilization and within the test time period are greater than two percent of the test pressure or vacuum.

6.2.12(1) A low-pressure inert gas or vacuum *leak detection* test for *piping* shall be conducted in conformance with the following procedures, as applicable:

(a) a low-pressure decline test using an inert gas or a vacuum test may be used to conduct a *leak detection* test on the *secondary containment* of double-wall tanks and double-wall pipe;

(b) product contained in the *secondary containment* system shall be drained prior to conducting the low-pressure decline or vacuum test procedure;

(c) a test pressure or vacuum shall, as applicable:

(i) be between 20 kPa and 35 kPa; and

(ii) not exceed the equipment manufacturer's design limitations;

(d) stabilization is required after pressurization or vacuum is achieved;

(e) *secondary containment* shall have the test pressure or vacuum maintained for a period of at least two hours after stabilization; and

(f) a *piping* system shall be considered to be *leaking* when pressure variations that occur after stabilization and within the test time period are greater than two percent of the test pressure or vacuum.

6.2.13(1) A *precision leak detection* test shall be in conformance with (See Appendix B, note B.6.2.13(1)):

(a) ORD-C58.12-1992, "Leak Detection Devices (Volumetric Type) for Underground Storage Tanks;" or

(b) ORD-58.14-1992, "Leak Detection Devices (Nonvolumetric Type) for Underground Tanks."

Section 6.3 Leak Detection Interlocks and Alarms

6.3.1(1) Subject to Sentence (2), an automatic *leak detection* device, including a high-technology *secondary containment* monitoring device and precision line *leak detection* device, shall be electrically interlocked in such a manner that:

(a) when the automatic *leak detection* device is activated, product flow shall be shut off; and

(b) except for on-*site* maintenance activities, when the automatic *leak detection* device is turned off or bypassed for more than one minute, product flow shall be terminated.

6.3.1(2) When an electrical interlock as specified in Sentence (1) is not possible, the *authority having jurisdiction* shall be notified whenever the *leak detection* device or method indicates a *leak*. (See Appendix B, note B.6.3.1(2))

6.3.2 A suction pump shall be equipped with a single check valve installed directly below the suction pump and *piping* shall slope so the contents of the pipe will drain back to the storage tank if the suction is broken.

6.3.3 A *leak detection* alarm shall be located where the staff routinely work and in a place where such alarms can be readily heard and seen.

Section 6.4 Monitoring Wells

6.4.1 When more than one monitoring well is necessary to monitor an installation effectively, the monitoring wells shall be numbered so that all monitoring and testing results can be easily correlated to a specific monitoring location.

6.4.2 A monitoring well shall be equipped with a liquid-proof cap.

6.4.3 A monitoring well shall be distinguished from a fill pipe and marked in conformance with CPPI (1995), "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification"

6.4.4 A monitoring well shall be secured to prevent unauthorized access and tampering.

6.4.5 A monitoring well located in a traffic area shall be cut off at ground level and/or properly *protected* from vehicles.

6.4.6 A monitoring well installed within the *interstitial space* shall not penetrate the *liner*.

6.4.7 A damaged monitoring well shall be repaired or replaced within 30 *days* after discovery of the damage.

6.4.8 A monitoring well shall be checked for liquid product and/or vapours at least monthly.

Section 6.5 Groundwater Monitoring Wells

6.5.1(1) When a vertical groundwater monitoring well is to be used, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall:

(a) assess the *site* and establish the number and positioning of the monitoring wells so that product releases from any portion of the *storage tank system* that routinely contains a *petroleum* or *allied petroleum product* will be detected; and

(b) ensure compliance with the requirements of this Section.

6.5.2 The product stored in a *storage tank* shall be immiscible in water and shall have a specific gravity of less than one.

6.5.3 The hydraulic conductivity of the soil between a *storage tank system* and the monitoring wells shall not be less than 0.01 cm/s. (See Appendix B, note B 6.5.3)

6.5.4 The monitoring wells shall intercept the excavation zone of an *underground storage tank* or be as close as technically possible.

6.5.5 A monitoring well shall be a minimum of 50 mm in diameter.

6.5.6 Subject to Sentence 6.5.11(1), if a monitoring well is to be used as a recovery well, the screened zone shall extend at least 1.5 m into the water table and at least 1.5 m above the groundwater surface, as determined at the time of installation.

6.5.7 Subject to Sentence 6.5.11(1), the screened portion of a monitoring well shall be a minimum of 3.0 m in length and shall be factory slotted with a slot size of 0.25 mm or as *approved* by the *authority having jurisdiction*.

6.5.8 The area around the screened portion of a monitoring well shall be surrounded by a filter pack. (See Appendix B, note B.6.5.8)

6.5.9 Subject to Sentence 6.5.11(1), the filter pack shall extend to 0.5 m above the top of the screened portion of monitoring wells.

6.5.10 Subject to Sentence 6.5.11(1), the outside of a monitoring well shall be sealed from the ground surface to the top of the filter pack using bentonite, grout, or other material with equivalent performance.

6.5.11(1) Where the groundwater surface is less than 2.5 m from the ground surface, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall determine the length and position of:
(a) the screened portion of a well;
(b) the filter pack; and
(c) the bentonite, grout, or other material with equivalent performance seal.

6.5.12 A monitoring well shall be installed with a cap or plug at the bottom of the screened section of the well.

6.5.13 A monitoring well shall be constructed of flush joint, threaded, or bell and spigot Schedule 40 PVC or equivalent. (See Appendix B, note B.6.5.13)

6.5.14 A continuous monitoring device or a manual method shall detect a minimum of 3 mm of free product on top of the groundwater surface in the monitoring well.

Section 6.6 Vapour Monitoring Wells

6.6.1(1) Where vapour monitoring is to be used, a professional hydrogeologist or other person authorized by the *authority having jurisdiction* shall:
(a) assess the *site* and establish the number and positioning of the monitoring wells so that product releases from any portion of the *storage tank system* that routinely contains a *petroleum* or *allied petroleum product* will be detected; and
(b) ensure compliance with the requirements of this Section.

6.6.2 The product stored or tracer compound placed in the *storage tank system* shall be sufficiently volatile to result in a vapour level that is detectable by the monitoring devices.

6.6.3 The measurement of vapours by the monitoring device shall not be rendered inoperative by the groundwater, rainfall, soil moisture, or other known interferences so that a *leak* could go undetected for more than 30 *days*.

6.6.4 The level of background contamination shall not interfere with the method used to detect *leaks* from the *storage tank system*.

6.6.5 A vapour monitor shall have its performance validated by a third-party testing organization in conformance with ORD-C58.14-1992, “Leak Detection Devices (Nonvolumetric) for Underground Tanks”.

6.6.6(1) A vapour monitor shall be designed and installed to detect any significant increase in concentration above the background level of:

(a) the *petroleum* or *allied petroleum product* stored;

(b) a component or components of the *petroleum* or *allied petroleum product*; or

(c) a tracer compound placed in the *storage tank system*.

Section 6.7 Frequency and Method

6.7.1 The reference letters in Table 2 represent the *leak detection* and monitoring methods specified in Tables 3 through 9.

6.7.2(1) Tables 3 through 9 specify the frequencies and methods of *leak detection* and monitoring that shall be used upon installation and, as applicable (See Appendix B, note B.6.7.2(1)):

(a) for in-service monitoring;

(b) for periodic *leak detection* testing; or

(c) if a leak is suspected.

Table 2 - Leak Detection and Monitoring Methods

Abbreviation	Leak detection and Monitoring Method Description[1][2]
ATG	Automatic tank gauge with monthly *precision leak detection* test
CITLD	Continuous in-tank *leak detection* system with monthly *leak detection* test (results are limited to an evaluation of the *storage tank* only)
CITLDS	Continuous in-tank *leak detection* system with monthly *leak detection* test (results provide an evaluation of the *storage tank* and *piping* system)
ELLD	Electronic line *leak detection* device
HPVLDT	High-pressure inert gas or vacuum *leak detection* test
HTSCM	High-technology *secondary containment* monitoring
IR	Manual dip and inventory reconciliation; electronic dip and electronic inventory reconciliation; or electronic dip and manual inventory reconciliation in conformance with Section 8.3
LPVLDT	Low-pressure inert gas or vacuum *leak detection* test
MLLD	Mechanical line *leak detection* device
OWM	Observation well vapour or groundwater monitoring (monthly)
PLDT	*Precision leak detection test of a storage tank* (See Appendix B, note B.6.2.13(1))
PLMLDT	*Pressure liquid media leak detection test*
SIR	Statistical inventory reconciliation (monthly reporting)
SLMLDT	*Static liquid media leak detection test*
SVCV	Single, vertical check valve
VLD	Visual *leak detection* (weekly)

[1]See Section 6.2 for definition and performance requirements of the prescribed methods.
[2]See Appendix B, note B.6.3.2(1)

Table 3 – New Underground Storage Tanks

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Double-wall tanks	PLDT	SIR; VLD; ATG; HTSCM; CITLDS; or CITLD	Not required	PLDT

Table 4 – Aboveground Storage Tanks

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Double-wall tanks	VLD	HTSCM; or VLD	Not required	VLD[1]; PLDT; or LPVLDT[1]
API Std 650-98 *(within approved secondary containment)*	API 650 standard	IR and VLD; or HTSCM	API 653	PLDT; or API 653
API Std 650-98 *(within non-approved secondary containment)*		IR and VLD	API Std 653-01; or PLDT (annually)	PLDT; or API Std 653-01
Single wall vertical tanks *(within approved secondary containment)*	VLD	IR and VLD ; or HTSCM	API Std 653-01	PLDT; or API Std 653-01
Single-wall vertical tanks *(within non-approved secondary containment)*		IR and VLD	API Std 653-01; or PLDT (annually)	PLDT; or API Std 653-01
Horizontal tanks	VLD	IR and VLD	Not required	VLD[2]; or PLDT

[1]on the interstice only
[2]where entire system including *piping* is visible

Table 5 - Underground Piping

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Single-wall (greater than 75mm)	PLMLDT; or HPVLDT	OWM	PLMLDT; or HPVLDT (every year)	PLMLDT; or HPVLDT
		CITLDS; or ELLD	Not required	
Double-wall	PLMLDT; or HPVLDT and LPVLDT	ELLD; Sensor; CITLDS; or SVCV[1]	Not required	PLMLDT; or HPVLDT

[1]Suction style system only

Table 6 - Aboveground Piping

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
All types	PLMLDT; or HPVLDT	VLD	Not required	PLMLDT; or HPVLDT

Table 7 – Turbine, Transition and Dispenser Sumps

Containment	Final Installation Leak Detection	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Dispenser Sumps	SLMLDT	HTSCM; or VLD	Not required	SLMLDT
Turbine and transition sumps	SLMLDT		VLD (annually) [1]	SLMLDT

[1]In conformance with Clause 8.4.1(4)(g)

Table 8 - Existing Single-Wall Underground Storage Tanks

Type	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Steel without CP[1]	IR; and OWM or SIR	PLDT (annually)	PLDT
Steel with CP[1]; or FRP[2];	IR	PLDT (every 2 years)	
	IR; and OWM or SIR	PLDT (every 5 years)	
	ATG; or CITLDS	Not required	
	OWM and SIR	Not required	

[1]CP - *Cathodic protection*
[2]FRP - Fibreglass-reinforced-plastic

Table 9 – Existing Single-Wall Underground Piping

Type	In-service Monitoring	Periodic Leak Detection	Leak Suspected
Steel without CP[1]	IR; and OWM or SIR	PLMDT; or HPVLDT (annually)	PLMDT; or HPVLDT
Steel with CP[1], plastic, or FRP[2]	IR; and OWM or SIR	PLMDT; or HPVLDT (every 2 years)	
	CITLDS; or OWM and SIR	Not required	
	SVCV[3]; or ELLD[4]	Not required	

[1]CP - *Cathodic protection*
[2]FRP - Fibreglass reinforced plastic
[3]Suction style system only
[4]Pressure Piping

Part 7 Upgrading of Existing Storage Tank Systems

Section 7.1 Scope

7.1.1 This Part applies to an *existing storage tank system*.

Section 7.2 General Requirements

7.2.1 No person shall upgrade, or cause to be upgraded, an existing *storage tank system* unless approval has been obtained from the *authority having jurisdiction*.

7.2.2(1) Where an *existing storage tank system* is upgraded to be in conformance with this Code, the *owner* shall provide a revised as-built drawing to the *authority having jurisdiction* in the manner and time frame as specified by the *authority having jurisdiction*.

7.2.2(2) A revised as-built drawing shall be in conformance with Sentence 3.2.7(2) or 4.2.8(2), as applicable.

7.2.3 A partially buried *storage tank* is considered neither an *aboveground* nor *underground storage tank* and shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

Section 7.3 Aboveground Storage Tank Systems

7.3.1 An *existing aboveground storage tank* system not in conformance with Section 3.6 shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

7.3.2(1) Where underground *piping* connected to an *aboveground storage tank* has *corrosion protection* in conformance with Section 4.5 at the *effective date* of this Code, the *piping* may continue in service.

7.3.2(2) Where underground *piping* connected to an *aboveground storage tank* does not have *corrosion protection* in conformance with Section 4.5 at the *effective date* of this Code:

(a) the *piping* must be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code; or

(b) best management practices shall be implemented within two years of the *effective date* of this Code in conformance with:

i) API Std 2610-94, “Design, Construction, Operation, Maintenance and Inspection of Terminal and Tank Facilities”; and

ii) API 570-98, “Piping Inspection Code: Inspection, Repair, Alteration, and Rerating of In-Service Piping Systems”.

7.3.3(1) Except as specified in Sentence (2), an *aboveground storage tank system* shall be upgraded within two years of the *effective date* of this Code to include, as applicable:

(a) liquid and vapour-tight connections, caps and adapters for a *storage tank* with a capacity of 5 000 L or more;

(b) *overfill protection* in conformance with Article 3.6.2 for a *storage tank* with a capacity of 5 000 L or more;

(c) underground *piping* in conformance with Section 5.4;

(d) *dispenser sumps* in conformance with Article 3.6.3, where an underground *piping* run terminates under a dispenser; and

(e) *secondary containment* in conformance with Section 3.9 and Sentences 7.3.4(1) and (2).

7.3.3(2) *Where secondary containment* is not upgraded as provided in Clause (1)(e), an annual *precision leak detection* test shall be performed.

7.3.4(1) Except as provided in Sentence (2), an *existing* field-erected *aboveground storage tank* not upgraded to be in conformance with Section 3.3 shall be withdrawn from service and removed in conformance with Part 9 within five years of the *effective date* of this Code.

7.3.4(2) Where authorized by the *authority having jurisdiction*, an *existing* field-erected *aboveground storage tank* may be exempt from adding an *impermeable barrier* under the tank to meet the *secondary containment* requirements of Section 3.9 provided that within two years of the *effective date* of this Code:

(a) best management practices are followed in conformance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction"; or

(b) if inspection requires replacing or lining the tank bottom, then 3.9.2(1)(b) shall apply (See Appendix B, note B.7.3.4(2)(b)).

7.3.4(3) In the event that a *storage tank owner* chooses the exemption provided in Clause 7.3.4(2)(b) and the *storage tank* bottom or shell becomes perforated, then all other *storage tanks* with equal or more years of similar service at that *site* that are being managed under API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction", shall be:

(a) inspected within one year; or

(b) re-evaluated within the time frame specified by the new corrosion rate.

7.3.5 An *existing aboveground storage tank* not upgraded with *spill* containment and runoff collection in conformance with Section 3.10 shall be withdrawn from service and removed in conformance with Part 9 within five years of the *effective date* of this Code.

7.3.6 An *existing* shop fabricated *aboveground storage tank system* not upgraded to be in conformance with Sections 3.4, 3.5, and this Section shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

Section 7.4 Underground Storage Tank Systems

7.4.1 An *existing underground storage tank* system that does not have *corrosion protection* shall be withdrawn from service and removed in conformance with Part 9 within 2 years of the *effective date* of this Code.

7.4.2 Where an existing *underground storage tank* system with *corrosion protection* is not upgraded in conformance with Sentences 7.4.3(1) or (2), it shall be withdrawn from service and removed in conformance with Part 9 within two years of the *effective date* of this Code.

7.4.3(1) Except as provided in Sentence 7.4.3(2), an *existing underground storage tank system* with *corrosion protection* must be upgraded to include:

(a) liquid and vapour-tight connections, caps and adapters;

(b) an *overfill protection device*;

(c) a fill pipe *spill containment device*;

(d) *dispenser sumps*; and

(e *leak detection* in conformance with Part 6.

7.4.3(2) An *existing underground storage tank system* with *corrosion protection* that is used for storing *used oil* shall be upgraded to include:

(a) liquid-tight connections, caps and adapters;

(b) a suction pipe in conformance with Clause 4.2.4.(2)(c)

(c) a *spill containment device* in conformance with Clauses 4.2.4(2)(d) and (f);

(d) an *overfill protection device* in conformance with Clause 4.2.4.(2)(e);

(e) *venting* in conformance with Clause 4.2.4(2)(g); and

(f) *leak detection* in conformance with Part 6.

Part 8 Operation and Maintenance

~~Section 8.1 Scope~~

~~8.1.1 This Part applies to the operation and maintenance of a *storage tank system*.~~

~~Section 8.2 General Requirements~~

~~8.2.1 Except as provided in this Part, the operation and maintenance of a *storage tank system* shall be in conformance with the NFCC.~~

Section 8.3 Inventory Control

8.3.1(1) Except as provided in Sentence 8.3.1(2), the *owner of a storage tank system* shall ensure that inventory control and reconciliation is conducted in conformance with this Section.

8.3.1(2) Subject to Sentence 8.3.2(1), inventory control and reconciliation is not required where:

(a) a *storage tank system* has been temporarily withdrawn from service and the tanks have been emptied; or

(b) all components designed to contain liquids are secondarily contained and have an *interstitial space* monitored:

(i) manually on any *day* the storage system is available for use; or

(ii) continuously using electronic sensing that provides a visual or auditory indication of the integrity of the interstice being compromised.

8.3.2(1) The *owner* of a *motive fuel storage tank* shall ensure that:

(a) the product level is measured and reconciled (See Appendix B, note B.8.3.2(1)(a)) in conformance with Sentence 8.3.2(2):

(i) each *day* that product is added or removed from an *underground storage tank*; or

(ii) at least weekly where product is added to or removed from an *aboveground storage tank system*; and

(b) the water level shall be measured and included in all reconciliation computations in conformance with Clause (a).

8.3.2(2) *Storage tank* inventory control measurements shall be reconciled by comparing product and water level measurements with dispenser meter readings, shipments, deliveries and internal transfers.

8.3.2(3) The computation of any gain or loss of product shall be recorded and included with a monthly summary of cumulative losses or gains of product.

8.3.3 Inventory control and reconciliation records shall be kept in a manner and format as prescribed by the *authority having jurisdiction*.

8.3.4(1) For an *underground storage tank*, the *authority having jurisdiction* shall be notified immediately, in conformance with Section 8.9, in the event of:

(a) any unexplained loss in excess of the greater of:

(i) 0.5% of the throughput in one month from the *tank* system, as indicated by the recording and reconciliation of inventory records over a month recording period done in conformance with Article 8.3.2; or

(ii) 0.5% of the *storage tank system* capacity;

(b) inventory reconciliation showing five or more consecutive *days* of unexplained product losses;

(c) inventory reconciliation showing 18 or more *days* of unexplained losses in one calendar month; or

(d) the level of water at the bottom of the tank exceeds 50 mm.

8.3.4(2) For an *aboveground storage tank*, the *authority having jurisdiction* shall be notified immediately, in conformance with Section 8.9, in the event of:

(a) any unexplained loss in excess of the greater of:

(i) 1% of the throughput in one month from the *storage tank system* as indicated by the recording and reconciliation of inventory records done in conformance with Article 8.3.2; or

(ii) 1% of the *storage tank system* capacity.

(b) inventory reconciliation showing five or more consecutive weeks of unexplained product losses; or

(c) inventory reconciliation showing an unexplained loss in one calendar month.

Section 8.4 Inspections and Maintenance of Storage Tank Systems

8.4.1(1) Routine in-service inspections shall be conducted in conformance with this Section.

8.4.1(2) Visual inspection of a *storage tank* facility to ensure that there has not been a *leak* or deterioration of the facility that could result in a *leak* shall be conducted and documented either:

(a) each day the facility is in operation; or

(b) at a frequency specified by the *authority having jurisdiction*. (See Appendix B, note B.8.4.1(2)(b))

8.4.1(3) Visual inspection of a *storage tank* facility to ensure that there has not been a *leak* or equipment failure shall be conducted weekly and documented for:

(a) foundations, tank walls, roof, and tank attachments;

(b) dyke capacity, condition of the dyke wall and floor, and water removal systems;

(c) pumps and product-*handling* equipment;

(d) tank gauging equipment;

(e) mechanical and automatic electronic *leak detection* equipment;

(f) *dispenser sumps* and *spill containment devices*; and

(g) *overfill protection devices*.

8.4.1(4) Inspection and performance testing in conformance with the manufacturer's requirements and procedures to ensure satisfactory equipment performance and operation of a *storage tank* facility shall be conducted annually and documented by a company or individual that is authorized by the *authority having jurisdiction* for:

(a) automatic tank gauges and monitoring systems;

(b) high-technology sensors;

(c) electronic or mechanical *leak detection* equipment;

(d) *corrosion protection* equipment;

(e) pressurized *piping* emergency valves;

(f) emergency shut-down devices;

(g) containment sumps including dispenser, turbine and transition containment devices; and

(h) *overfill protection devices*.

8.4.1(5) In addition to Sentence (4), a *storage tank* not in service at the time of the inspection shall be noted on the inspection report stating:

(a) date taken *out-of-service*; and

(b) whether the tanks:

(i) will be *out-of-service* for less than 180 *days*;

(ii) will be *out-of-service* for a period exceeding 180 *days*; or

(iii) are operated on a seasonal basis.

8.4.2 Where required by Part 6, an *aboveground storage tank system* installed in conformance with API Std 650-98, "Welded Steel Tanks for Oil Storage" shall be inspected in conformance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction".

8.4.3 Any deficiencies in a *storage tank system* identified as a result of the inspections specified in this Section shall be documented and corrected to be in conformance with this Code by a company or individual that is authorized by the *authority having jurisdiction*.

Section 8.5 Product Transfer Operations

8.5.1 A person responsible for transferring *petroleum* or *allied petroleum product* to a *storage tank system* shall take all reasonable steps to prevent *spills*.

8.5.2(1) When a tank vehicle is being unloaded, the vehicle *operator* shall remain:
(a) in constant view of the fill pipe; and
(b) in constant attendance at the delivery control valve. (See Appendix B, note B.8.5.2(1)(b))

8.5.3(1) Transfer of *petroleum* or *allied petroleum product* into and out of a *storage tank system* shall be in conformance with procedures outlined in:
(a) the NFCC;
(b) API Std 2610-94, "Design, Construction, Operation, Maintenance, and Inspection of Terminal and Tank Facilities"; and
(c) CPPI (1992), "Professional Driver's Manual".

8.5.3(2) Standard procedures for normal operation, as well as for emergencies, shall be given to an *operator* and posted in printed form for convenient reference. An employee involved with the transfer of *petroleum* or *allied petroleum product* shall be trained in the correct operating procedures for all equipment and shut-down devices. (See Appendix B, note B.8.5.3(2))

8.5.4 The *owner* of a *storage tank system* shall ensure that filler ports, monitoring wells, and vapour recovery connections are colour-coded in conformance with CPPI (1995), "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification".

8.5.5 A *used oil storage tank* shall be fitted with a suction tube and *liquid- and vapour*-tight coupling and shall not have suction hoses dropped or inserted into the *used oil storage tank* during the product removal process.

8.5.6 No person shall transfer *used oi*l from a *storage tank* unless a connection is made to the coupling at the end of the *storage tank* suction tube.

8.5.7(1) Subject to Sentence (2), no person shall transfer *petroleum* or *allied petroleum product* to an *aboveground storage tank* with a capacity of 5 000 L or more unless a liquid- and vapour-tight fill connection is made to the *storage tank*.

8.5.7(2) No person shall transfer *petroleum* or *allied petroleum product* to an *underground storage tank* unless a liquid- and vapour-tight fill connection is made to the *underground storage tank*.

8.5.8 No person shall cause an *allied petroleum product* to be transferred into a *storage tank* unless the product being transferred is compatible with the internal surface of the *storage tank*.

Section 8.6 Cathodic Protection Monitoring

8.6.1(1) Except as provided in Sentence (2), maintenance checks on the operation of a *cathodic protection* system shall be conducted in conformance with:
(a) CAN/ULC-S603.1-1992, "Galvanic Corrosion Protection Systems for Underground Steel Tanks" for sacrificial anode systems;
(b) NACE RP0169-2002, "Control of Corrosion on Underground or Submerged Metallic Piping Systems";

(c) NACE RP0285-2002, "Corrosion Control of Underground Storage Tank Systems by Cathodic Protection";
(d) NACE RP0193-2001, "External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms";
(e) NACE TM0101-2001, "Measurement Techniques Related to Criteria for Cathodic Protection on Underground or Submerged Metallic Tank Systems";
(f) CPPI/PACE Report No. 87-1, "Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks" Clause 5.55(c) and Part 6.0 for impressed current systems; or
(g) API RP 651-97, "Cathodic Protection of Aboveground Petroleum Storage Tanks".

8.6.1(2) *Cathodic protection* measurements for a *storage tank system* shall be conducted by a person with NACE CP Level 1 (CP tester minimum certification) or otherwise as authorized by the *authority having jurisdiction*, at commissioning, within one year of commissioning, and annually thereafter.

Section 8.7 Oil-water Separators

(see Appendix B, note B.8.7)

8.7.1 An *oil-water separator* intended to collect and separate *free oil* from water shall be designed and installed in conformance with Sentence 3.10.3(1).

8.7.2 An *oil-water separator* shall be equipped with a *spill containment device* at the point of oil removal in conformance with:
(a) ORD-C58.19-1992, "Spill Containment Devices for Underground Tanks"; or
(b) ORD-C142.19-1994, "Spill Containment Devices for Aboveground Tanks".

8.7.3 The operation, maintenance and inspection of an *oil-water separator* shall be in conformance with the requirements of the manufacturer's instructions or as prescribed by the *authority having jurisdiction*.

8.7.4(1) Subject to Sentence (2), the depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be checked and recorded monthly.

8.7.4(2) If a monthly inspection is not possible, an *oil-water separator* shall be electronically monitored.

8.7.4(3) The depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be measured as close to the baffle as possible.

8.7.4(4) An *oil-water separator* shall have the *free oil* layer removed:
(a) continuously by an automatic skimmer; or
(b) at a maximum depth of 50 mm.

8.7.4(5) After a *spill* or *leak*, the depth of the *free oil* layer and *separated solids* accumulation in an *oil-water separator* shall be checked and recorded.

8.7.5 No person shall *discharge tank bottom water* or gasoline, solvents, *used oil*, glycol, detergents, or *sludges* from outside the *storage tank system* directly to an *oil-water separator*. (See Appendix B, note B.8.7.5)

8.7.6 The amount of solids entering an *oil-water separator* shall be minimized.

8.7.7(1) An *oil-water separator* shall have the *separated solids* removed:
(a) at a maximum depth of 150 mm; or
(b) at the maximum depth allowed by an automatic removal device.

8.7.8 *Free oil*, *separated solids*, and water from an *oil-water separator* shall be disposed of in a manner prescribed by the *authority having jurisdiction*.

Section 8.8 Transfer of Ownership

8.8.1 The new *owner* of a *storage tank system* shall notify the *authority having jurisdiction* in writing within 30 days of the transfer of ownership and provide the information specified by the *authority having jurisdiction*.

8.8.2 When the ownership of a *storage tank system* is transferred, all as-built drawings and records, or copies thereof required by this Code shall be transferred to the new *owner* of the *storage tank system*.

8.8.3 The *owner* of real property on which *underground storage tank*s are located shall inform the purchaser of the real property, in writing, of the existence of any *underground storage tank*s on the real property before the sale is closed. (See Appendix B, note B.8.8.3)

Section 8.9 Leak and Spill Response

8.9.1 The *owner* of each registered *storage tank system* shall prepare and maintain an emergency response *contingency plan*.

8.9.2(1) The *owner* or *operator* of a *storage tank system* shall immediately notify the *authority having jurisdiction* (See Appendix D- Spill Reporting) and provide the information requested when the *owner* or *operator* discovers, suspects, or is notified by any person of:

(a) any *leak* from a *storage tank system*;

(b) any *spill* or overfill that is 100 L or more; or

(c) any *spill* or overfill that could threaten fresh water supplies, groundwater, or the health and safety of the public.

8.9.3(1) The *owner* of a *storage tank system* where a *leak* or *spill* is known or suspected shall, in consultation with the *authority having jurisdiction*, take such actions as the *authority having jurisdiction* requires to verify, stop, clean up, and mitigate the impact of the *leak* or *spill*, including but not limited to:

(a) isolating *leaking* components of the *storage tank system*;

(b) arranging for immediate removal of the *petroleum* or *allied petroleum product* from the isolated *leaking* components of the *storage tank system*;

(c) inspecting the *storage tank* or *piping* and:

(i) arranging for a *leak* test in conformance with this Code; or

(ii) removing the suspected *leaking storage tank* or *piping*;

(d) taking all reasonable steps to establish the extent of the contamination (including vapours), contain the *leaked* or *spilled petroleum* or *allied petroleum product*, and prevent its further migration; and

(e) taking all reasonable steps to recover or remove escaped *petroleum* or *allied petroleum product* in conformance with Sentence 9.4.2(2).

Section 8.10 Precision Leak Detection Test

8.10.1 In addition to the requirements of Part 6, the *owner* of a *storage tank system* shall conduct a *precision leak detection test* when required by the *authority having jurisdiction*.

8.10.2(1) A *precision leak detection test* shall be conducted by a company or individual authorized by the *authority having jurisdiction* and shall be conducted by an individual that has been trained in the proper care and use of the test equipment and it's operating procedures.

8.10.2(2) When a *precision leak detection test* has been required by Part 6 or the *authority having jurisdiction*, a *precision leak test* report shall be forwarded by the *owner* to the *authority having jurisdiction* within ten *days* of the test.

8.10.2(3) A *precision leak detection test* report shall contain as a minimum:
(a) *storage tank* and *piping* identification number and product type;
(b) *owner's* name and mailing address;
(c) facility address;
(d) test date;
(e) test results;
(f) test methods;
(g) test technician certification number provided by the test equipment manufacturer to verify satisfactory completion of applicable training and certification requirements; and
(h) name and address of testing company or technician.

8.10.4 Where a *precision leak detection test* or inspection indicates a *leak*, the company or individual performing the test shall immediately notify the *owner* or *operator* of the *storage tank system* and the *authority having jurisdiction*.

Section 8.11 Records

8.11.1(1) The *owner* of a *storage tank system* shall maintain records for at least seven years of all:
(a) inventory control and reconciliation as required by Section 8.3;
(b) inspections and maintenance as required by Section 8.4;
(c) *cathodic protection* monitoring as required by Section 8.6;
(d) *precision leak detection tests* as required by Section 8.10;
(f) maintenance and repairs;
(g) monitoring well results;
(h) construction, *alterations*, or upgrades;
(i) as-built drawings; and
(j) excavation or nearby *construction* that could affect the integrity of the *storage tank system*.

8.11.1(2) Subject to Sentence (3), the *owner* of a *storage tank system* shall maintain records required by this Code on-*site*.

8.11.1(3) The *authority having jurisdiction* may allow computerized records to be stored off-*site*.

8.11.2(1) The *owner* of an *oil-water separator* shall maintain records of:
(a) the *free oil layer* in the separator;
(b) the *separated solids* level, measured at a point where the maximum buildup can be expected;
(c) the date and quantity of oil removed;
(d) the date and quantity of s*eparated solids* removed;
(e) the name of the contractor; and
(f) all inspections and maintenance.

Section 8.12 Tank Bottom Water

8.12.1(1) *Tank bottom water* shall:
(a) not be drained onto the ground or into an *oil-water separator* (See Appendix B, note B8.12.1(1)(a); and
(b) be segregated from rainwater and disposed of in conformance with the applicable provincial or territorial regulations, guidelines and policies.

Section 8.13 Storage

8.13.1 In an *aboveground storage tank system*, the space created by *secondary containment* shall not be used for storage purposes.

Section 8.14 Transfer of Oil-contaminated Water

8.14.1 Centrifugal-type pumps shall not be used to transfer oil-contaminated water from dykes or sumps to the *oil-water separator*.

Part 9 Withdrawal from Service of Storage Tank Systems

Section 9.1 Scope

9.1.1 This Part applies to procedures to be followed when a *storage tank system* is removed, relocated, *abandoned*, disposed of, refurbished, or temporarily taken *out-of-service*.

Section 9.2 General Requirements

9.2.1 Except as provided in this Part, the withdrawal from service and removal of a *storage tank system* shall be in conformance with the NFCC and with any other requirements of the *authority having jurisdiction*.

9.2.2(1) A *storage tank system* shall be removed by a company or individual that is authorized by the *authority having jurisdiction*.

9.2.2(2) A company or individual removing a *storage tank system* shall ensure that the system is removed in conformance with the requirements of this Part.

Section 9.3 Temporary Withdrawal from Service

9.3.1 If a *cathodic protection* system is provided, it shall be maintained and operated while the *storage tank system* is temporarily withdrawn from service (See Appendix B, note B.9.3.1).

9.3.2(1) A shop-fabricated *aboveground storage tank system* shall pass an annual inspection in conformance with Sentence 8.4.1(4) before the *storage tank system* is returned to service.

9.3.2(2) A field-erected *aboveground storage tank* that has been *out-of-service* for more than one year shall, before being returned to service:

(a) pass an internal inspection conducted by an individual authorized by the *authority having jurisdiction* in conformance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction"; or

(b) pass a *precision leak detection test*.

9.3.2(3) For a field-erected *aboveground storage tank* that has been returned to service as specified in Sentence (2), the next internal inspection shall be the earlier of:

(a) within ten years of the most recent internal inspection; or

(b) at the date specified by API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction".

9.3.3(1) Except for a *storage tank system* that has been registered with the *authority having jurisdiction* as operating on a seasonal basis, when a *storage tank system* is to be *out-of-service* for more than 180 *days*, the *owner* or *operator* shall notify the *authority having jurisdiction* in writing, within seven *days* after the *storage tank system* goes out-of-service, providing:

(a) the name and mailing address of the *owner*;

(b) the name and mailing address of the *operator*;

(c) the location of the *storage tank system*;

(d) a description of the nature and quantity of the contents; and

(e) the registration number of the *storage tank*.

Section 9.4 Removal from Service

9.4.1 The *owner* of a *storage tank system* shall notify the *authority having jurisdiction* within 30 *days* of a decision to remove a *storage tank system* and provide the information requested by the *authority having jurisdiction*.

9.4.2(1) When a *storage tank system* has been permanently removed from service, the *owner* of a *storage tank system* shall ensure that:

(a) *petroleum* and *allied petroleum products* are removed and vapours purged from the *storage tank*, *piping*, dispensing, and transfer equipment; and

(b) the *storage tank*, *piping*, dispensing, and transfer equipment are removed.

9.4.2(2) If the *site* is contaminated with *petroleum* or *allied petroleum products*, the *site* shall be remediated to the criteria defined by:

(a) CCME PN 1299, "Canadian Environmental Quality Guidelines";

(b) CCME CWS for PHC, "Canada-wide Standards for Petroleum Hydrocarbons in Soil"; or

(c) other criteria prescribed by the *authority having jurisdiction*.

Section 9.5 Abandonment In-place

9.5.1 An aboveground *storage tank system* shall not be *abandoned* in-place.

9.5.2(1) In accordance with Articles 4.2.7 and 5.5.2, an *underground storage tank system* installed after the *effective date* of the Code shall not be *abandoned* in-place

9.5.2(2) Subject to Sentence 9.5.3(1), and Article 9.5.4, an existing *underground storage tank system* shall not be abandoned in-place.

9.5.3(1) An *owner* of an existing *underground storage tank system* may apply to the *authority having jurisdiction* for approval to *abandon* a *storage tank system* in-place by:

(a) describing fully in the application, the circumstances relating to the *storage tank system* location that would justify *abandoning* the *storage tank system* in-place;

(b) satisfying the *authority having jurisdiction* that the soil under and around the *storage tank system* has not been contaminated with a *petroleum* or *allied petroleum* product (see Appendix, note B9.5.3(1)); and

(c) providing confirmation that the *owner* of the property is aware and in agreement with the plan and procedures to *abandon* the *storage tank system* in-place.

9.5.4 When the *authority having jurisdiction* considers it impractical to remove an *underground storage tank system*, approval in writing may be granted to the *owner* to *abandon* the system in-place (See Appendix B, note B.9.5.4).

9.5.5(1) When the *authority having jurisdiction* has granted approval in writing to an *owner* to *abandon* an *underground storage tank system* in-place, the *abandonment* procedures shall ensure that:

(a) any liquid or sludge in the *underground storage tank system* is removed and disposed of by an acceptable method;

(b) the *underground storage tank system* is purged of vapours to less than 10% of the lower flammable limit and that the presence of vapours is checked with a *combustible* gas meter;

(c) sufficient holes are cut along the top of the *underground storage tank* to enable the complete filling of the storage tank with an inert material acceptable to the *authority having jurisdiction* (See Appendix B, Note B9.5.5(1));

(d) the *underground storage tank* is completely filled with an inert material acceptable to the *authority having jurisdiction* (See Appendix B, Note B9.5.5(1));

(e) a record of the size, description, and location of the *underground storage tank* is;

(i) permanently appended to the deed of the property;

(ii) submitted to the *authority having jurisdiction*; and

(f) associated *piping* not *abandoned* in place is removed from service in conformance with the NFCC.

Section 9.6 Disposal of Storage Tank Systems

9.6.1(1) When a *storage tank system* is to be disposed of:

(a) liquid *petroleum* or *allied petroleum product* shall be removed from the *storage tank system*;

(b) *sludge* in the *storage tanks* shall be removed and disposed of in a manner prescribed by the *authority having jurisdiction*;

(c) the *storage tank* shall be purged of vapours to less than 10% of the lower *flammable* limit and the presence of vapours shall be checked with a *combustible* gas meter;

(d) sufficient openings shall be cut in the *storage tank* to render it unfit for further use;

(e) the *storage tank* shall be transported in conformance with the Transportation of Dangerous Goods Act and in a manner prescribed by the *authority having jurisdiction* to an *approved* disposal facility; and

(f) an affidavit of destruction shall be provided by the *approved* disposal facility and shall be forwarded by the *owner* or by an authorized company or individual to the *authority having jurisdiction*.

Section 9.7 Reuse of Storage Tanks

9.7.1(1) A *cathodically protected* steel *underground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products* after being:

(a) refurbished in accordance with ULC-S603(A)-2001, "Refurbishing of Underground Steel Tanks"; or

(b) inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.

9.7.2(1) A fibreglass-reinforced plastic *underground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products* after being:

(a) refurbished in accordance with ULC-S615(A)-1987, "Refurbishing of Reinforced Plastic Underground Tanks"; or

(b) inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.

9.7.2(2) A shop-fabricated *aboveground storage tank* may be reused for the storage of *petroleum* or *allied petroleum products*:

(a) for a vertical *aboveground storage tank*, after being refurbished in accordance with ULC-S630(A)-2001, "Shop Refurbishing of Aboveground Vertical Shop Fabricated Steel Tanks";

(b) for a horizontal *aboveground storage tank*, after being refurbished in accordance with ULC-S601(A)-2001, "Shop Refurbishing of Aboveground Horizontal Shop Fabricated Steel Tanks"; or

(c) after being inspected and relabeled in accordance with the Special Acceptance Program of Underwriters Laboratories of Canada.

9.7.3 A field-erected *aboveground storage tank* may only be reused for the storage of *petroleum* or *allied petroleum products* after being refurbished in accordance with API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction."

9.7.4 An *underground storage tank* removed from service shall not be reused as an *aboveground storage tank*.

APPENDIX A Authorities Having Jurisdiction

Federal Government

ENVIRONMENT CANADA
Oil, Gas and Energy Division
Conservation and Protection
Industrial Programs Branch
Environment Canada
10th Floor, Place Vincent Massey
Ottawa, Ontario K1A 0H3
Phone: 819-997-1221
FAX: 819-953-8903

Provincial and Territorial Authorities

BRITISH COLUMBIA
Ministry of Water, Land and Air Protection
Environmental Management Branch
Industry and Business Section
P.O. Box 9342 Stn Prov Govt
Victoria, BC V8W 9M1
Phone: 250-387-9950
FAX: 250-953-3856

Office of the Fire Commissioner
Ministry of Community,
Aboriginal and Women's Services
PO Box 9491 Stn Prov Gov't
Victoria, BC V8W 9N7
Phone: 250-356-9000
FAX: 250-356-9019
E-mail: firecomm@hq.marh.gov.bc.ca

ALBERTA
Alberta Municipal Affairs
Building & Fire Safety
16th Floor, 10155-102 Street
Edmonton, Alberta T5J 4L4
Phone: 780-427-8256
FAX: 780-422-3562

Petroleum Tank Management
Association of Alberta
980, 10303 Jasper Avenue
Edmonton, Alberta T5J 3N4
Phone: 780-425-8265
FAX: 780-425-4722

SASKATCHEWAN
Saskatchewan Environment
Environmental Protection Branch
3211 Albert Street
Regina, Saskatchewan S4S 5W6
Phone: 306-787-6168
FAX: 306-787-0197

Corrections and Public Safety Office
of the Fire Commissioner
310 – 1855 Victoria Avenue
Regina, Saskatchewan S4P 3V7
Phone: 306-787-3774
FAX: 306-787-9273

MANITOBA
Manitoba Conservation Headquarters
200 Saulteaux Crescent
Winnipeg, Manitoba R3J 3W3
Phone: 204-945-7110
FAX: 204-948-2420

ONTARIO
Technical Standards & Safety
Authority Fuels Safety Program
Clarica Centre, West Tower
4th Floor 3300 Bloor Street West
Etobicoke, Ontario M8X 2X4
Phone: 416-325-1615
FAX: 416-326-8248

QUÉBEC
Ministère des Ressources Naturelles
Direction du Développement des Hydrocarbures
5700, 4e avenue Ouest, bureau A-401
Charlesbourg, Quebec G1H 6R1
Phone: 418-627-6385
FAX: 418-528-0690

NEW BRUNSWICK
Environmental Management Division
Department of the Environment
and Local Government
P.O. Box 6000
20 McGloin St.
Fredericton, New Brunswick E3B 5H1
Phone: 506-444-5955
FAX: 506-457-7333

NOVA SCOTIA
Petroleum Storage Tank Systems
Nova Scotia Department of Environment and Labour
P.O. Box 697
5th Floor, 5151 Terminal Road
Halifax, Nova Scotia B3J 2T8
Phone: 902-424-5300
FAX: 902-424-0503

NEWFOUNDLAND and LABRADOR
Pollution Prevention Division
Department of Environment
P.O. Box 8700
St. John's, NL A1B 4J6
Phone: 709-729-2561
FAX: 709-729-6969

PRINCE EDWARD ISLAND
Pollution Prevention Division
Department of Fisheries, Aquaculture
& Environment
P.O. Box 2000
Charlottetown, P.E.I. C1A 7N8
Phone: 902-368-5057
FAX: 902-368-5830

YUKON
Community Services
Protective Services Branch.
P.O. Box 2703
Whitehorse, Yukon Y1A 2C6
Phone 867-667 5217 or 5230
Fax 867-393 6249

NORTHWEST TERRITORIES
Office of the Fire Marshall
Department of Municipal and Community Affairs
Government of the Northwest Territories
600 – 5201 50 Avenue
Yellowknife, N.W.T. X1A 3S9
Phone: 867-873-7469
FAX: 867-873-0260

NUNAVUT
Fire Marshal
Department of Community Government
& Transportation
Government of Nunavut
P.O. Box 1000, Station 700
Iqaluit, Nunavut X0A 0H0
Phone: 867 975 5310
FAX: 867 979 4221

Appendix B Explanatory Material

B.1.4.2 *Allied petroleum product* - It is understood that a number of chemicals not included in this definition may be stored in *underground storage tanks*. This definition, however, represents *combustible* and *flammable* products that are directly petroleum-based and are the most widely used *petroleum products* in the manufacturing sector.

B.1.4.2 *Interstitial space* includes the following space:

(a) outside the *storage tank* bottom and above a synthetic membrane *liner* or prepared soil layer;

(b) between the *storage tank* bottom and a secondary bottom creating a *leak*-containment space;

(c) between two pipes of a double-wall *piping* system;

(d) between a pipe and a synthetic membrane *liner*; or

(e) space between a *storage tank* and a *secondary containment* system.

B.1.4.2 *Used oil* - The definition of *used oil* was taken from the 1989 CCME publication, PN 1042, "Code of Practice for Used Oil Management in Canada" with the following modifications.

(a) the category of "metal-working fluids" has been removed as this product class is considered to be sufficiently different from the definition of *petroleum products*. Since metal-working fluids may include a substantial amount of water, further consideration would have to be given to the need to line steel tanks.

(b) the category of "insulating fluids or coolant" has been modified for similar reasons, and now reads as "insulating oils".

Used oil contains primarily hydrocarbons; however, it may also contain additives (e.g., a total of 14% by volume of detergents and viscosity-improvers in lubricating oils for gasoline engines). It contains physical and chemical impurities (e.g., solids, metals, and chlorinated organics) due to physical contamination and chemical reactions occurring during its use. Contamination of *used oil* may also occur from mixing with other oily fluids or fluid wastes when it is collected for recycling.

This Code does not treat *used oil* exclusively as a hazardous waste. *Used oil* may or may not be designated as a hazardous waste depending on the types and amounts of chemical impurities it contains. For example, *used oil* containing 50 ppm or more of PCBs is designated as a hazardous waste in most Canadian jurisdictions. If the *used oil* is designated as a hazardous waste, other requirements for its storage may apply. Consult the *authority having jurisdiction*.

B.3.2.6 The CCME "Guideline for Controlling Emissions of Volatile Organic Compounds from Aboveground Storage Tanks" applies to *storage tanks* having a capacity of more than 4 000 L, designed to contain a *petroleum product* that has a vapour pressure of 10 kPa or greater. The published document is available from Manitoba Statutory Publications.

B.3.3.1(1)(e)(ii) The overfill alarm system required shall be in addition to the alarm or gauging system that is routinely used. This system shall be used as a back-up system when the primary means of detecting a high level has failed.

B.3.5.1(2) It is important to note that the requirements of the fire authorities must be met if any *used oil* collection tank is considered for use indoors.

B.3.8.1(1) The use of certain *secondary containment* techniques may preclude the use of *cathodic protection* and in some cases cause accelerated *corrosion* of the *storage tank* bottom. A *corrosion expert* shall be consulted.

B3.9.2 (2)(a) The *authority having jurisdiction* may specify an acceptable material for a *secondary containment impermeable barrier* based on local conditions or previous experience. Regardless of material, proper installation and ongoing maintenance of a *secondary containment impermeable barrier* is important.

B.3.9.3 (1) The installer shall advise the electrical contractor that synthetic membrane *liners* have been used and ensure that the *liner* is not punctured by grounding rods. It is recommended that grounding rods not be inserted within the dyked areas where a synthetic membrane or clay *liner* has been used for *secondary containment.* If penetrations are required, locating the penetrations at a high point reduces the likelihood of *leaks*.

B.4.2.7 *Abandonment* in-place of an *out-of-service storage tank* is not normally an acceptable practice. *Storage tanks* shall not be located near or under building foundations or in locations where the ultimate removal of the *storage tank* would be impractical.

B.4.5.3 (1)(b) Stray current from an impressed current system can cause *corrosion* to *storage tank systems* that are *cathodically protected* by sacrificial anodes.

B.4.5.3 (2) The anodes on a *cathodically protected storage tank* that conforms with CAN/ULC-S603.1, “Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks”, are designed to protect the tank only. Inadequate *corrosion protection* of such *cathodically protected storage tanks* can occur if the *storage tank* is not electrically isolated from the *piping* or other *storage tanks*.

B.4.5. Rectifier shall have a non-resettable 115V. AC elapsed time indicator with 99,999 hour capacity. A battery powered downtime counter of the same hour capacity is an optional alternative.

B.5.2.5 Mechanical joints, such as flanged joints or couplers, shall not be used below ground. Additionally, it is good practice to minimize the use of threaded joints below ground.

B.6.2.6 CITLDS method combines use of an Automatic Tank Gauge probe to collect data and sophisticated data analysis used in Statistical Inventory Reconciliation (SIR) techniques. An *underground storage tank* is monitored continuously without interfering with normal tank operations. These systems are designed to meet the monthly monitoring performance standard of detecting a *leak* of 0.76 L/hr or 567 L per month with 95% probability and 5% false alarm.

B6.2.11. (1)(h) The determination of an appropriate procedure for a *leak detection test* of piping with a volume greater than 1000 L is based on several variables, including the ability to drain and isolate the line, line volume, product characteristics, the availability of test equipment, and the reliability of procedures to detect *leaks*. The best results will be generated when the product is drained from the line, the line is blinded or isolated at each end, and the line is pressurized with an inert gas. The length of time that the line is pressurized should be consistent with its volume. Industry’s best practices should also be taken into consideration. Typically, refineries and terminals will use an inert gas to pressurize a line at one and one half times normal operating pressure and monitor the pressure for four or more hours.

B6.2.13

(1) Numerous technologies are available to conduct a *precision leak detection test* and determine the presence of *leaks* in a *storage tank*, associated connections, risers, connected equipment and the *vent* system. Commonly used methods include vacutech, mass measurement, volumetric, and acoustics. The various test systems have specific preparation requirements, operating procedures, and technical limitations. These requirements have been determined by the equipment manufacturer and are based on the design of the technology. Failure to follow the procedures or operate within these parameters can impact the accuracy of results and scope of the evaluation.

The test equipment has also been designed to evaluate various areas of the *storage tank* and associated equipment. In some cases, more than one test must be competed in order to evaluate the underfill area (below the fluid level) and the ullage space (above the fluid level). For example, a mass measurement or volumetric test could be used to evaluate the area below the fluid level. An acoustics test would be used in conjunction with the underfill test to evaluate the ullage space, risers and *vent* system. However, in some cases a test procedure can be used in more than one application. An ullage test could also be used to test an *empty* tank.

Various factors, including *tank* type – *aboveground*, *underground*, single-wall or double-wall, – interstice space design, and product level, must be considered and will influence the selection of an appropriate test. *Underground storage tanks* require an evaluation of the primary containment, connections, risers, connected equipment and the *vent* system. An aboveground *storage tank* requires an evaluation of the floor or any area of the *tank* that cannot be visually inspected for *leaks*. *Tank* components and *leak detection test* requirements are outlined in Table 10:

Table 10 - Tank Components and Leak Detection Test Requirements

Tank description	Product level	Test type
Single-wall *underground tank*	*Empty*	Ullage test
Single-wall *underground tank*	With product	Complete *tank* test
Double-wall *underground tank*	*Empty*	Ullage test
Double-wall *underground tank*	With product	Ullage test and LPVLDT on the interstice; or complete *tank* test
Double-wall *underground tank* with brine or vacuum interstice monitor	*Empty*	Ullage test
Double-wall *underground tank* with brine or vacuum interstice monitor	With product	Ullage test; or complete *tank* test
Single-wall *aboveground tank*	With product	Underfill test
Double-wall *aboveground tank*	*Empty*	Ullage test
		Ullage test and LPVLDT on the interstice
Double-wall *aboveground tank*	With product	Underfill test
		Underfill and LPVLDT on the interstice

B.6.3.1
(2) When the *leak detection* device is not an electrical device (such as a monitoring well or statistical inventory reconciliation), electrical interlocks may not be possible.

B.6.3.2 Even with the present mechanical type of *line-leak detectors*, a line *leak* within a submersible pump system can result in large volumes of product being pumped into the ground. *Leaks* from submersible pump systems have been the cause of some of the largest environmental and safety incidents. Where *line-leak detectors* are used, they shall not be bypassed when problems are encountered while dispensing the product.

The *authority having jurisdiction* may choose to prohibit the use of remote or submersible pump systems unless the pipes and pumps are within an acceptable *secondary containment* system.

B.6.5.3 The soil shall consist of gravels, coarse or medium sands, coarse silts, or other permeable material.

B.6.5.8 A filter pack is a porous medium usually consisting of sand or pea gravel.

B.6.5.13 Monitoring wells shall **not** be constructed of Schedule 20 PVC "sewer" or leach field *piping*.

B.6.7.2
(1) A mechanical line *leak* detector (MLLD) is unable to reliably detect small *leaks*. From the *effective date* of this Code and at the discretion of the *authority having jurisdiction*, an MMLD is not recognized as a method of detecting *leaks* in pressurized *piping*. Additional methods of *leak detection* may be used, or alternatively, the MLLD can be replaced by an *electronic line leak detector* (ELLD).

Inventory control for a *storage tank* is a form of inventory monitoring for *motive fuel storage tanks*. However, inventory control by itself is not an acceptable form of *leak detection*. Inventory control combined with acceptable statistical inventory reconciliation is an acceptable form of *leak detection* for the entire *storage tank system*.

An under-pump check valve is located directly below the pump of a suction system and is the only check valve installed on the system. With continuous slope back to the tank, a *leak* in the pipe will cause product to drain into the tank.

B.7.3.4
(2)(b) Allows a field-erected *storage tank* to simply follow the requirements of API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction." Strict adherence to API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction." is required. API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction." requires periodic *corrosion* monitoring. Once a *corrosion* rate is established, subsequent *corrosion* monitoring and repairs to the tank bottom can be performed prior to the occurrence of any perforations. If perforations do occur, it can be assumed that the provisions of API Std 653-01, "Tank Inspection, Repair, Alteration, and Reconstruction." have not been strictly followed. If this occurs, stronger preventive steps are specified.

B.8.3.2
(1)(a) To facilitate early detection of *leakage* from an *underground storage tank system*, proper inventory records must be developed, maintained, and reviewed continuously for any developing trends that may signify a loss of product. The traditional method of doing this has been to "dip" the *storage tanks*. Dipping is the actual measurement of the liquid contents of the *storage tank* with a graduated stick (dip stick). This measurement combined with the *storage tank* chart (suitable for use with the specific tank) can be converted to the liquid volume of the *storage tank*. A measuring device (generally a recording type of pump) that will measure the amount of product

withdrawn from the *storage tank* is also an integral part of the inventory control system. Finally, it is necessary to reconcile the product in storage with the amount recorded (daily/weekly) as having been withdrawn. Any continuous discrepancy (shortage) must be investigated as a possible *leak* from the *underground storage tank system*.

B.8.4.1
(2)(b) Frequent visual inspections of an *aboveground storage tank system* is required to provide early detection of equipment failures and product *spills*. The *authority having jurisdiction* may decide that *operators* of tanks of 5000 L and less capacity do not have to do daily checks. In addition, it may not be possible or practical to inspect a *storage tank* at unattended remote *sites*.

B.8.5.2
(1)(b) The NFCC requires that a vehicle *operator* remain in close proximity to the *discharge* control valve. There is concern that a vehicle *operator* may interpret 'close proximity' to include sitting in the cab of the tank vehicle, out of sight of the delivery point. Many overfills occur because the tank vehicle *operator* is not observing the filling operation and is unaware that the *storage tank* is overfilling. Therefore Sentence 8.5.2(1)(b) is more specific and requires a vehicle *operator* to be more attentive.

B.8.5.3
(2) A significant number of the *spills* that occur at *aboveground storage tank* facilities result from improper procedures during routine activities. These accidents can be reduced or eliminated if operating personnel are properly trained about correct safety procedures and the importance of following them to prevent injury and environmental incidents. Training must be periodically followed up to ensure that proper procedures are being followed.

B.8.6.1
(1) *Cathodically protected* potentials are required on all parts of the tank bottom in order for it to be considered to be *cathodically protected*. When a perimeter anode type *cathodic protection* system is used, the potential at the tank centre can be much different than that measured at the tank perimeter and a *corrosion expert* should be consulted

B.8.7 The CPPI "Code of Practice for Management of Water Effluent Quality at Petroleum Storage and Distribution Facilities" may be useful for anyone who *owns* or operates an *oil-water separator*.

An *oil-water separator* does not remove the soluble fraction of oil that is in the water or storm runoff. Therefore, it shall be noted that even if an *oil-water separator* produces an effluent that has an oil and grease or hydrocarbon content that is below provincial or territorial *discharge* limits, the effluent may still be acutely toxic to fish.

It is recommended that the designer shall ensure that when an *oil-water separator* is to be installed that a proper design basis is used. The *owner* shall control sources to the separator and remove the *free oil* layer and accumulated *separated solids* as required by the manufacturer's operating instructions.

B.8.7.5 Detergents and cleaning solutions cause oil to emulsify in water and prevent effective separation. Never wash trucks with such products in areas that drain to an *oil-water separator*.

B.8.8.3 At the time of a change of ownership, an environmental assessment or investigation of site contamination shall be conducted on real property on which *storage tanks* are located.

B.8.12.1

(1) The *tank bottom water* from the bottom of a *storage tank* normally contains water, insoluble hydrocarbon, and dissolved hydrocarbons. The concentration of dissolved or soluble hydrocarbons is often sufficiently high that the *tank bottom water* would be considered toxic if a biological toxicity test were conducted. Since *oil-water separators*, such as an API separator, only separate insoluble oil from water, the *tank bottom water* shall be segregated in a holding tank and sent to a wastewater treatment facility either on-*site* or off-*site* (and not directly to an *oil-water separator*).

B.9.3.1 *Corrosion* is the major factor which limits the life of a *steel storage tank system* and *corrosion* can be controlled for an indefinite period of time if *corrosion protection* is maintained. When *cathodic protection* system is used it is only effective when the system is "on". Therefore, the *cathodic protection* system must be maintained and operated continuously.

B.9.5.3

(1) The *authority having jurisdiction* could consider any of the following as reasonable conditions for allowing the *owner* to *abandon* a *storage tank* in place:

(a) located in whole or in part beneath a permanent building or other facility so that excavation of the *storage tank* is not practicable;

(b) so large or of a type of *construction* that the excavation of the *storage tank* is not practicable;

(c) inaccessible to the heavy equipment necessary for removal of the *storage tank*; or

(d) situated so that removal of the *storage tank* would endanger the structural integrity of nearby buildings or other facilities.

B.9.5.5

(1) Sand, gravel, or concrete are examples of what is considered acceptable inert material. Foam shall not be considered an acceptable inert material.

B.9.5.4 A *precision leak detection test* conducted in conformance with Section 8.10, or borehole sampling of the soil may be required to satisfy the *authority having jurisdiction* that the soil under and around the *storage tank* has not been contaminated by a *petroleum product* or *allied petroleum product*.

APPENDIX C Minimum Information Required for Registration of Storage Tank Systems

The registration form prescribed by the *authority having jurisdiction* shall require, as a minimum, the following information:

(a) name of *owner*;

(b) address *of owne*r;

(c) type of facility;

(d) location of *storage tanks* (if different than address of *owner*);

(e) storage capacity of tank;

(f) type of product stored;

(g) year of installation;

(h) ULC standard of tank

(i) type of *storage tank* material;

(j) type of *piping* material;

(k) *corrosion protection* provided (if applicable);

(l) type of pump;

(m) type of *leak detection*;

(n) type of *secondary containment* (if applicable);

(o) name of *operator* (if different than *storage tank owner*);

(p) name of land owner (if different than *storage tank owner*);

(q) name of installer; and

(r) manufacturer of *storage tank.*

APPENDIX D Spill Reporting

The *owner* or *operator* of a *storage tank system* who discovers, suspects, or is notified by any person of a *leak* or possible *leak* shall immediately notify the *authority having jurisdiction* by telephone and provide the information requested by the *authority having jurisdiction*.

Listed below are the emergency phone numbers of the federal, provincial, and territorial authorities. Either of the two listed numbers can be called.

PROVINCE / TERRITORY	FEDERAL AUTHORITY	PROVINCIAL / TERRITORIAL AUTHORITY
Newfoundland and Labrador	**1-800-563-2444** **709-772-2083** Coast Guard	**1-800-563-2444** **709-772-2083** Coast Guard
Prince Edward Island	**1-800-565-1633** Coast Guard (in Maritimes only)	**1-800-565-1633** Coast Guard (in Maritimes only)
Nova Scotia	**1-800-565-1633** Coast Guard (in Maritimes only)	**1-800-565-1633** Coast Guard (in Maritimes only)
New Brunswick	**1-800-565-1633** Coast Guard (in Maritimes only)	**1-800-565-1633** Coast Guard (in Maritimes only)
Québec	**514-283-2333** Environment Canada Emergency Answering Service	**514-873-3454** Dept. of Environment Environmental Emergency
Ontario	**613-239-6065** Environment Canada Environmental Emergencies	**1-800-268-6060** Ministry of the Environment Spills Action Centre
Manitoba	**403-468-8020** Environment Canada Environmental Emergencies	**204-944-4888** Manitoba Conservation Environmental Emergency Line
Saskatchewan	**403-468-8020** Environment Canada Environmental Emergencies	**1-800-667-7525** Spill Report Centre Saskatchewan Environment
Alberta	**403-499-2432** Environment Canada Spill Reporting	**1-800-222-6514** Alberta Environment and Local Fire Department
Nunavut	**867-920-8130** Spill Report Line	**867-920-8130** Spill Report Line
Northwest Territories	**867-920-8130** Spill Report Line	**867-920-8130** Spill Report Line
British Columbia	**604-666-6100** Environment Canada Environmental Emergencies **604-666-6011** CanadaCoast Guard	**1-800-663-3456** Provincial Emergency Program
Yukon	**403-667-7244** Environmental Protection Services	**403-667-7244** Environmental Protection Services