

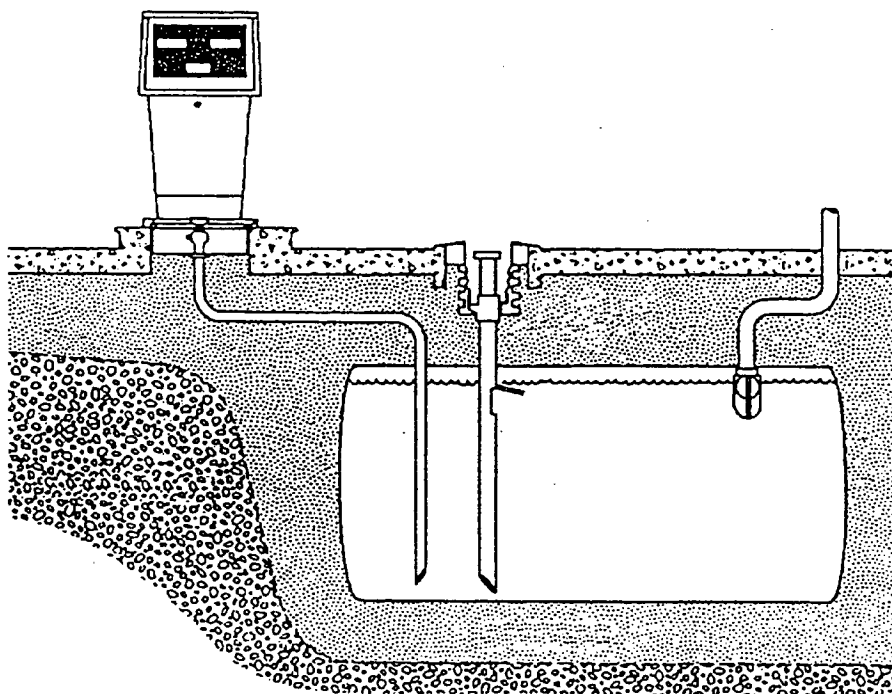
CCME

Canadian Council
of Ministers
of the Environment

Le Conseil canadien
des ministres
de l'environnement

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

1993 Edition



CCME EPC-LST-61E
March, 1993

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

1993 Edition

Published by the
National Task Force on Storage Tanks
for the Canadian Council of Ministers of the Environment (CCME)

CCME-EPC-LST-61E
March 1993

CANADIAN CATALOGUING IN PUBLICATION DATA

National Task Force on Storage Tanks
(Canada)

Environmental code of practice for underground
storage tank systems containing petroleum
products and allied petroleum products

1993 ed.

([Report] ; CCME-EPC-LST-61E)

"Revised edition 1993"--P.4

Issued also in French under title:

Code de recommandations techniques pour
la protection de l'environnement applicable
aux systèmes de stockage souterrains
de produits pétroliers et de produits
apparentés.

Includes an abstract in French.

ISBN 0-919074-17-0

DSS cat. no. EN108-3/1-61E

1. Petroleum -- Underground storage -- Safety
measures. 2. Petroleum products -- Underground
storage -- Safety measures. 3. Oil storage tanks --
Safety measures. I. Canadian Council of Ministers
of the Environment. II. Title. III. Series:
Report (Canadian Council of Ministers of the
Environment) ; CCME-EPC-LST-61E.

TP692.5.N37 1993

665.5'42

C93-099502-3

Canadian Council of Ministers of the Environment

The Canadian Council of Ministers of the Environment (CCME) is the major intergovernmental forum in Canada for discussion and joint action on environmental issues of national, international, and global concern. Environment ministers from each of the ten provinces, the two territories, and the federal government participate in CCME meetings at least twice a year. They discuss environmental issues, exchange information, make decisions, and establish policy for work to be carried out under the auspices of CCME. The presidency and other official posts of CCME are rotated annually among member governments.

Early in 1990, CCME began a major restructuring to more effectively address the many important environmental issues facing the country. A new, streamlined organization now enables member governments to respond quickly to emerging issues, set national environmental strategies, and develop long-term plans. Before this, the organization was known as the Canadian Council of Resource and Environment Ministers (CCREM).

Between meetings, the work of CCME is managed by a Deputy Ministers' Committee and a full-time Secretariat. The Secretariat, in Winnipeg, Manitoba, provides administrative, technical, and policy support to the Council of Ministers and various CCME committees. Two permanent intergovernmental steering committees provide ongoing advice to the Deputy Ministers' Committee and coordinate specific CCME projects assigned to intergovernmental task groups.

Revised Edition 1993

Cette publication est aussi disponible en français sous le titre *Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage souterrains de produits pétroliers et de produits apparentés*.

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Abstract

The CCME "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" has been prepared for *owners of storage tank systems*, the petroleum marketing and distribution industry, and provincial and territorial departments which have the authority to regulate *storage tanks* containing *petroleum products* and *allied petroleum products*.

The Code is a model set of technical requirements designed to protect the environment from leaking *underground storage tank systems*.

The CCME advocates that the recommendations in this Code be adopted by the various provincial and territorial regulatory authorities as minimum requirements. The Code provides recommendations concerning registration, *site* classification, design and installation of new systems, upgrading of *existing* systems, operation, maintenance, and the withdrawal from service of *storage tank systems*.

The first edition of this Code was published in 1988. This 1993 revised edition reflects the advances in technology and the experience gained by industry and government regulators in proactively managing *underground storage tanks* in recent years.

Résumé

Le «Code de recommandations techniques pour la protection de l'environnement applicable aux systèmes de stockage souterrains de produits pétroliers et de produits apparentés» a été préparé par le CCME à l'intention des *propriétaires de systèmes de stockage souterrains*, de l'industrie de la mise en marché et de la distribution du pétrole et des ministères provinciaux et territoriaux habilités à réglementer les *réservoirs de stockage de produits pétroliers* ou de *produits apparentés*.

Le Code est un ensemble type de règles techniques visant à protéger l'environnement contre les fuites dans les *systèmes de stockage souterrains*.

Le CCME souhaite vivement voir les autorités provinciales et territoriales appliquer à titre de conditions minimales les mesures recommandées dans le Code. Les recommandations concernent l'enregistrement, la classification des *emplacements*, la conception et l'installation des nouveaux systèmes de stockage souterrains, l'amélioration des systèmes *existants*, ainsi que l'exploitation, l'entretien et la mise hors service des *systèmes de stockage*.

La première édition du Code est parue en 1988. La présente édition (1993) a été revue à la lumière des récents progrès technologiques et de l'expérience acquise par l'industrie et les organismes de réglementation gouvernementaux qui ont pratiqué une gestion proactive des *réservoirs de stockage souterrains* au cours des dernières années.

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Preface

The "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" (hereafter referred to as "the Code") is published by the Canadian Council of Ministers of the Environment 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 *underground storage tanks* and *piping*. The Code is written in a form suitable for adoption by legislative authorities in Canada.

The Code of Practice has been developed with the voluntary assistance of many experts who have contributed to the work of the National Task Force on Storage Tanks. The membership of the National Task Force is representative of provincial, territorial, and federal agencies which have the authority to regulate *underground storage tanks* containing *petroleum products* and *allied petroleum products*. Major tank owner groups are also represented on the National Task Force.

The National Task Force is assisted in its work by the staff of the Oil, Gas and Energy Division, Industrial Programs Branch of Environment Canada who provide technical and secretarial support.

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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K1A 0H3
FAX: 819-953-8903

As Code revisions are developed in response to these submissions, they will be made available for public review and comment before inclusion in the next edition.

Acknowledgements

The National Task Force wishes to acknowledge the many individuals who have contributed to the production of this Code. In particular, appreciation is expressed to the Codes Section, Institute for Research in Construction for providing the National Fire Code of Canada as a useful organization and model format to those responsible for preparing this Code.

The Ontario Ministry of the Solicitor General, Office of the Fire Marshal chaired a task force which developed an environmental code of practice that addressed *underground storage tank systems* containing *allied petroleum products*. Because most of the provisions in the *allied petroleum product* code were identical to the *petroleum product* code, the two codes of practice were merged. Where there were differences between the requirements of the two codes, the specific *allied petroleum product* requirements are clearly identified in this Code.

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The National Task Force also wishes to acknowledge the generous efforts of non-member contributors who shared their technical expertise.

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B. Chouinard	Steel and Engine Products Limited
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A. Froussard	Consultant
M. Gorman	Petro-Viron Marketing Inc.
A. Graham	CAE Fiberglas Ltd.
R. Gummow	Corrosion Service Company Limited
H. Lloyd	Mid-West Pump Ltd.
A. Meyers	STAC Association of Canada
H. St. Onge	Duratron Systems Limited
S. Stewart	Petro-Viron Marketing Inc.
D. Tidy	Tidy Steel Fabricators Ltd.

Appreciation to:

J. Charles - text editing

H. Sheedy - legal editing

N. McKinney - desktop publishing

A special thank you to T. Palme for organizing the task force meetings, handling task force administration and communications, as well as the word processing.

Rationale for an Environmental Code of Practice

In recent years, there has been a tremendous increase in awareness and concern by Canadians about the environment. This awareness and concern translate into strong new demands that government and industry re-examine many aspects of government and human activities to prevent further environmental damage.

Historically, the National Fire Code (NFC) and Canadian Standards Association (CSA) requirements have been used in Canada for the installation and operation of *underground storage tanks* containing *petroleum products*. The first edition of the NFC was published in 1963 and the first edition of CSA Standard B139, "Installation Code for Oil Burning Equipment", was published in 1957. These codes were written from the viewpoint of fire prevention and primarily cover the elements of fire prevention and fire safety.

In many instances, measures adopted to prevent fires also serve to prevent product releases to the environment. During the 1970s and 1980s, however, significant increases in the number of incidents of leaking *underground storage tanks* caused environmental problems.

Contamination of groundwater supplies with products leaking from an *underground storage tank* can have serious social and economic effects on a community. Where a *petroleum product* has contaminated a municipal well-water supply, alternative water supply and/or cleanup costs can be extremely high. For example, in some cases a small *leak* from an underground heating oil tank or supply line, which may not create a significant fire threat, could contaminate a water supply that could cost millions of dollars to replace or clean up. In some areas, an alternative water supply may not be available.

Over the long term, prevention of product releases and early detection of releases when they do occur are presumed to be less disruptive socially and economically than paying for alternative water supplies and costly cleanups.

In 1984, the federal, provincial, and territorial ministers of the environment unanimously agreed that the "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products" should be developed to provide recommended practices that are beyond the scope of the National Fire Code of Canada and CSA Standard B139, "Installation Code for Oil Burning Appliances".

A Guide to the Use of this Code

Purpose

This "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" (hereafter referred to as "this Code") presents minimum requirements to protect the environment from *existing*, new, or proposed *underground storage tank systems* that contain *petroleum products* and *allied petroleum products*. Its primary purpose is the promotion of environmentally sound management of *underground petroleum product* 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 code only and must be adopted by a federal, provincial, or territorial *authority having jurisdiction* in order to come into effect.

Although all the federal, provincial, and territorial *authorities having jurisdiction* endorsed and participated in the development of this model code, in most cases, they did not make this Code a regulatory requirement by adopting it, in whole, into their regulations. In several provinces, the regulatory authorities have taken numerous concepts and recommendations from this Code and incorporated them into their own regulations. In such instances, only the provincial regulations should be followed and this Code does not apply.

Where this Code has been adopted by the *authority having jurisdiction*, it shall be followed 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 the addresses, telephone, and FAX numbers for the federal, provincial, and territorial *authorities having jurisdiction*.)

Relation to Other Codes

The "Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products" is written as a complementary document to the National Fire Code of Canada and to part of CAN/CSA B139, "Installation Code for Oil Burning Equipment".

National Fire Code of Canada (NFC)

This Code has been developed in conjunction with the National Research Council, publisher of the National Fire Code of Canada, 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 product* and *allied petroleum product* losses from *underground storage tank systems* that may lead to environmental problems (primarily groundwater contamination), the NFC 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 underground *petroleum product* 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 *underground 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 1991. The CCME Environmental Code refers to CAN/CSA B139 - 1991 edition for most of the technical requirements. 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.

Regulatory authorities, *owners*, and installers of *storage tanks* should be fully conversant with the technical requirements of CAN/CSA B139, this Code (where it is in force), and all provincial 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 has been 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

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 to Construct Underground Storage Tank Systems

Part 2 contains the requirements for the registration of *underground 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 Site Classification

Part 3 recognizes that *sites* for *underground storage tanks* have different sensitivities to the consequences of *underground storage tank system leaks* and *spills*. This Part contains recommendations that will enable the classification of *sites* and outlines factors that should be considered in classifying *sites*.

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 covering tanks, *pipings*, and associated equipment are intended to ensure that equipment is designed and installed properly in order to minimize the possibility of *leaks* and *spills*. A significant portion of this Part refers to the National Fire Code.

Part 5 Upgrading of Existing Underground Storage Tank Systems

Part 5 outlines the requirements for the upgrading of *existing underground storage tank systems*. This Part is provided to ensure that those *storage tank systems* that are currently considered to be inadequately *protected* from corrosion are replaced or upgraded within a reasonable period of time to *acceptable* standards.

Part 6 Operation and Maintenance

Part 6 addresses the ongoing operation and maintenance of *underground 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 7 Withdrawal From Service of Underground Storage Tank Systems

Part 7 contains the requirements for the closure and withdrawal from service of *underground 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 addresses, telephone, and FAX numbers 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 Underground Storage Tank Systems

With respect to tank registration, each *authority having jurisdiction* shall request, as a minimum, the information listed in this Appendix.

Appendix D Protected Storage Tank and Piping Failure Incident Report

This is a sample of the standardized form provided for reporting failures of *cathodically protected* steel or fibreglass-reinforced plastic *storage tanks* and *piping*.

Appendix E Spill Reporting Telephone Numbers

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 Unless otherwise specified, the *owner* of an *underground storage tank system* shall comply with the provisions of this Code.

1.1.2 This Code applies to all *underground storage tank systems* used for storage of *petroleum products* and *allied petroleum products*.

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 which vary from the specific requirements in this Code, or for which no recognized test procedure has been established, are permitted if it can be shown that they are suitable on the basis of past performance, or on the basis of *acceptable* tests or evaluation.

Section 1.3 Alternate Test Standards

1.3.1 The results of tests based on test standards other than described in this Code may be used provided such alternate test standards are comparable to those referenced and are *acceptable* to the *authority having jurisdiction*.

Section 1.4 Alternatives

1.4.1 (1) Alternatives to the requirements in this Code may be permitted provided the *authority having jurisdiction* is satisfied that:

- (a) the *existing underground storage tank systems* provide at least an equivalent degree of environmental protection; or
- (b) measures are taken to provide at least an equivalent degree of environmental protection.

Section 1.5 Definitions of Words and Phrases

1.5.1 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.

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

Abandoned or abandonment means a *storage tank system* that has not been used for more than two years for the purpose of *handling petroleum products* or *allied petroleum products*.

Acceptable means *acceptable* to the *authority having jurisdiction*.

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):

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

CGSB 1-GP-124	Thinner for Vinyl Coatings
CGSB 1-GP-136	Thinner, Antiblush, for Cellulose Nitrate Lacquer
CGSB CAN/CGSB-1.2-89	Boiled Linseed Oil
CGSB CAN/CGSB-1.4-92	Petroleum Spirits Thinner
CGSB CAN/CGSB-1.70-91	High Solvency Thinner
CGSB CAN/CGSB-1.94-89	Xylene Thinner (Xylol)
CGSB CAN/CGSB-1.110-91	General Purpose Thinners for Lacquers
CGSB CAN/CGSB-164-92	Solvent for Vinyl Pretreatment Coating
CGSB CAN/CGSB-1.197-92	Thinner for Epoxy Coatings

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

CGSB 15-GP-50	Acetone, Technical
CGSB 15-GP-52	Methyl Ethyl Ketone, Technical Grade

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

CGSB 21-GP-1	Ink Printing, Offset Lithographic (Offset Duplicator)
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- (d) Products specified under CGSB (3-GP):

CGSB 3-GP-525	Isopropanol
CGSB 3-GP-531	Methanol, Technical
CGSB 3-GP-855	Ethylene Glycol, Uninhibited

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

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

Body of water means a creek, stream, river estuary, ocean, pond, lake, reservoir, or other accumulation of water or conductor of water, and includes a dry watercourse.

Cathodic protection or cathodically protected means a method of preventing or reducing corrosion to a metal surface by making the metal a cathode by using either an impressed direct current or attaching sacrificial anodes.

Certified means, when used in reference to a *storage tank*, component, or accessory, that the product has been investigated by ULC and found to be in compliance with their requirements and is being produced under the ULC follow-up service program and identified with their authorized marking.

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

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

Day means any continuous 24-hour period.

Discharge means releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of *petroleum products* 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*.

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

Existing means that which has commenced operation before the effective date of this Code.

Flammable liquid 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.

Fuel oil means kerosine or any hydrocarbon oil as classified in CAN/CGSB-3.2-M89, "Fuel Oil, Heating" and CAN/CGSB-3.3-M89, "Kerosine".

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

Internal lining means a coating of a non-corrodible material bonded firmly to the interior surface of the tank and resistant to the *petroleum products* or *allied petroleum products* stored.

Interstitial space means the space between the two walls or barriers within a *secondary containment* system.

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

Leak detection means a device or method that is capable of detecting *leaks* in *storage tanks* and piping.

Level 1 leak detection means a device or method that is capable of detecting a *leak* of 0.38 L/h with a probability of detection of 0.95 and a probability of false alarm of 0.05.

Level 2 leak detection means a device or method that is capable of detecting a *leak* of 0.76 L/h with a probability of detection of 0.95 and a probability of false alarm of 0.05.

Level 3 leak detection means a device or method used in pressure *pipng* that operates whenever the submersible pump starts up, and that is capable of detecting a *leak* of 12 L/h with a probability of detection of 0.95 and a probability of false alarm of 0.05.

Level 4 leak detection means a device or method that is capable of detecting a *leak* with a probability of detection of 0.95 and a probability of false alarm of 0.05:

- (a) before the monitoring sump or interstitial space fills to 50% of its capacity by volume;
or
- (b) before 600 L has leaked; whichever comes first.

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

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

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

Operator means the person who is responsible for the day-to-day operation of an installation where *underground storage tanks* are located.

Out-of-service means that a facility or portion thereof is no longer intended for use.

Overfill-protection device means a mechanical and/or electrical device that is installed in an *underground storage tank*, fill tube, or *vent* and helps to prevent a *storage tank* from being overfilled while product is being delivered to the *storage tank*.

Owner means an institution, corporate entity, government department or agency, or a person who has legal ownership rights or has been assigned the custody to control, care for, manage, or dispose of the *underground storage tank systems*. For the purposes of this Code, the *owner* of the lands in or on which an *underground storage tank system* is located shall be deemed to be the *owner* of the *storage tank system*, unless the *owner* of the land satisfies the *authority having jurisdiction* to the contrary.

Partially buried tank means a *storage tank* that has 10% or more of its volume below adjacent ground level.

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

Pipng includes all pipes, fittings, and valves necessary for safe *handling* and storage of a *petroleum product* or *allied petroleum product* in an *underground storage tank system*.

Precision leak test means a *leak test* that meets the performance of *level 1 leak detection*, within a period of 24 hours.

Protected means having *acceptable* corrosion protection.

Secondary containment means containment that prevents *leaks* from the primary *storage tank system* from reaching outside the containment area. It includes double-wall *underground storage tanks* and *pipng*, and *liners*.

Service station means any premises at which *flammable* or *combustible liquids* are put into the fuel tanks of vehicles, aircraft, or vessels.

Site means a lot or property for which an application for *site* classification has been made or where there is one or more *underground storage tank system(s)* within 100 m of each other and all tanks on the property are owned by the same *owner(s)*.

Spill means any loss of *petroleum product* or *allied petroleum product* from an *underground storage tank system* during product transfer or maintenance.

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.

Storage tank means a closed container that has a capacity of more than 250 L and is designed to be installed in a fixed location.

Storage tank system means an *underground storage tank system*.

Underground storage tank means a *partially buried storage tank* or a *storage tank* that is completely buried by or covered with earth, backfill, or concrete.

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

Unprotected means without *acceptable* corrosion protection.

Used oil means an 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 nor does it include crude or *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):

- 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 pressure or vacuum on the *storage tank* without spillage of liquid *petroleum products* or *allied petroleum products*.

Section 1.6 Referenced Documents

1.6.1 Where a conflict exists between the provisions of this Code and those of a referenced document, the provisions of this Code shall apply.

1.6.2 Unless otherwise specified herein, the documents referenced in this Code shall include all subsequent amendments, revisions, and supplements.

1.6.3 When documents are referenced in this Code, they shall be the editions designated in Table 1.

Table 1 Referenced Documents

Issuing Agency/ Document Number	Title of Document
Canadian Council of Ministers of the Environment	
CCME-EPC/TRE-30E	Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks - 1991
Canadian General Standards Board	
1-GP-124	Thinner for Vinyl Coatings
1-GP-136	Thinner, Antiblush, for Cellulose Nitrate Lacquer
3-GP-525	Isopropanol
3-GP-531	Methanol, Technical
3-GP-855	Ethylene Glycol, Uninhibited
15-GP-50	Acetone, Technical
15-GP-52	Methyl Ethyl Ketone, Technical Grade
21-GP-1	Ink Printing, Offset Lithographic (Offset Duplicator)
CAN/CGSB-1.2-89	Boiled Linseed Oil
CAN/CGSB-1.4-92	Petroleum Spirits Thinner
CAN/CGSB-1.70-91	High Solvency Thinner
CAN/CGSB-1.94-89	Xylene Thinner (Xylol)
CAN/CGSB-1.110-91	General Purpose Thinners for Lacquers
CAN/CGSB-164-92	Solvent for Vinyl Pretreatment Coating
CAN/CGSB-1.197-92	Thinner for Epoxy Coatings
CAN/CGSB-3.2-M89	Fuel Oil, Heating
CAN/CGSB-3.3-M89	Kerosine
Canadian Petroleum Products Institute	
CPPI/PACE Report 87-1	Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks
CPPI First Edition January 1990	Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification
Canadian Standards Association	
CAN/CSA-B139-M91	Installation Code for Oil Burning Equipment

Table 1 Referenced Documents (cont.)

Issuing Agency/ Document Number	Title of Document
Environmental Protection Agency	
EPA 530/UST-90-007	Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods
National Research Council	
NRCC 30621	National Fire Code of Canada (NFC) - 1990
Underwriters' Laboratories of Canada	
CAN/ULC-S603-92	Standard for Steel Underground Tanks for Flammable and Combustible Liquids
CAN/ULC-S603.1-92	Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids
CAN/ULC-S603(A)-M92	Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids
CAN4-S615-M83	Standard for Reinforced Plastic Underground Tanks for Petroleum Products
CAN4-S615(A)-87	Refurbishing of Reinforced Plastic Underground Tanks for Petroleum Fuels
CAN/ULC-S616-M93	Standard for Liquid Protective Coating Materials for Steel Storage Tanks and Associated Equipment for Flammable and Combustible Liquids
CAN/ULC-S633-M90	Standard for Flexible Underground Hose Connectors for Flammable and Combustible Liquids
ULC/ORD-C58.9-1992	Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquids
ULC/ORD-C58.10-1992	Jacketed Steel Underground Tanks for Flammable and Combustible Liquids
ULC/ORD-C58.12-1992	Leak Detection Devices (Volumetric Type) for Underground Flammable Liquid Storage Tanks
ULC/ORD-C58.14-1992	Nonvolumetric Leak Detection Devices for Underground Flammable Liquid Storage Tanks
ULC/ORD-C58.15-1992	Overfill Protection Devices for Flammable Liquid Storage Tanks
ULC/ORD-C58.19-1992	Spill Containment Devices for Underground Flammable Liquid Storage Tanks
ULC/ORD-C107.4-1992	Ducted Flexible Piping Systems for Flammable and Combustible Liquids

Table 1 Referenced Documents (cont.)

Issuing Agency/ Document Number	Title of Document
ULC/ORD-C107.7-1992	Glass Fibre Reinforced Plastic Pipe and Fittings for Flammable Liquids
ULC/ORD-C107.12-1992	Line Leak Detection Devices - Flammable Liquid Piping
ULC/ORD-C107.19-1992	Secondary Containment of Underground Piping for Flammable and Combustible Liquids
ULC/ORD-C107.21-1992	Under-Dispenser Sumps

Section 1.7 Abbreviations

1.7.1 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 given in brackets.

- CAN** National Standards of Canada
- CCME** Canadian Council of Ministers of the Environment (326 Broadway, Suite 400, Winnipeg, Manitoba R3C 0S5. Phone: 204/948-2090 FAX: 204/948-2125)
- CGSB** Canadian General Standards Board (1402-222 Queen Street, Ottawa, Ontario K1A 1G6. Phone: 613/941-8640 FAX: 613/956-4716)
- CPPI** Canadian Petroleum Products Institute (1000 - 275 Slater Street, Ottawa, Ontario
(PACE) K1P 5H9. Phone: 613/232-3709 FAX: 613/236-4280) (Formerly known as **PACE** - Petroleum Association for Conservation of the Canadian Environment)
- CSA** Canadian Standards Association (178 Rexdale Blvd., Rexdale, Ontario M9W 1R3. Phone: 416/747-4363 FAX: 416/747-4149)
- EPA** U.S. Environmental Protection Agency, Office of Underground Storage Tanks (401 M Street S. W., Mailing Code - OS400WF, Washington, D.C., U.S.A. 20460. Phone: 703/308-8850 FAX: 703/308-8505)
- NACE** National Association of Corrosion Engineers (1440 South Creek Drive, P.O. Box 218340, Houston, Texas, U.S.A. 77218 Phone: 713/492-0535 FAX: 713/492-8254)
- NFC** 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: 613/954-5984)
- ULC** Underwriters' Laboratories of Canada (7 Crouse Road, Scarborough, Ontario M1R 3A9. Phone: 416/757-3611 FAX: 416/757-9540)

1.7.2 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)

Part 2

Registration and Approval to Construct Underground Storage Tank Systems

Section 2.1 Scope

2.1.1 This Part applies to the registration of all *underground storage tank systems* containing *petroleum products* and *allied petroleum products*.

Section 2.2 Registration of Existing Storage Tank Systems

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

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

2.2.3 The owner of an *existing underground storage tank system* shall identify registered tanks by an *acceptable* method and in an *acceptable* timeframe. (See Appendix B.)

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

Section 2.3 Approval to Construct Storage Tank Systems

2.3.1 No person shall construct or cause to construct, install, or operate a *storage tank system* without first completing and filing an application for approval to construct a *storage tank system* in a manner prescribed by the *authority having jurisdiction*. (See Appendix B and C.)

2.3.2 No person shall construct or cause to construct, install, or operate a *storage tank system* unless approval has been obtained from the *authority having jurisdiction*.

Section 2.4 Registration of Storage Tank Systems

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

2.4.2 The *storage tank system* shall be registered by completing and filing a registration form in a manner prescribed by the *authority having jurisdiction*. (See Appendix B and C.)

2.4.3 The owner of a *storage tank system* shall identify registered tanks by an *acceptable* method. (See Appendix B.)

Section 2.5 Product Supply and Registration

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

Part 3

Site Classification

Section 3.1 Scope

3.1.1 This Part applies to the classification of *existing* or proposed *sites* of all *underground storage tank systems* containing *motive fuels*.

Section 3.2 General Requirements

3.2.1 The *authority having jurisdiction* shall assess each proposed *site* for *underground storage tank systems* on a case-by-case basis and declare that the *site* be classified as Class A or Class B.

3.2.2 The *authority having jurisdiction* may also assess each *existing site* of *underground storage tank systems* and classify each *site* as Class A or Class B.

Section 3.3 Site Classification

3.3.1 When requested by the *authority having jurisdiction*, the *owner* of an *existing storage tank system* or applicant for a proposed *storage tank system* shall provide any information the *authority having jurisdiction* considers necessary in order to assess a *site* for purposes of classification.

3.3.2 (1) *Sites* shall be classified as Class A or Class B *sites* according to their sensitivity for potential impact on the environment or on human health and safety.

(2) Class A *sites* shall be considered more sensitive and Class B *sites* less sensitive.

3.3.3 If a *site* is not specifically assessed and classified, it will be assumed to be a Class A *site*.

3.3.4 (1) In classifying a *site*, the *authority having jurisdiction* may consider factors including, but not limited to:

- (a) the quality and quantity of the groundwater resource that could be affected by a *leak*;
- (b) the density and proximity of wells;
- (c) the local geology;
- (d) the proximity of *bodies of water*;
- (e) the proximity of densely populated areas;
- (f) the proximity of subsurface structures and subsurface utility corridors; and
- (g) the presence in the area of geological, hydrogeological, or environmental conditions, or animal, bird, aquatic, or plant life that necessitates the taking of additional precautions to prevent pollution of the environment.

Part 4

Design and Installation of New Underground Storage Tank Systems

Section 4.1 Scope

4.1.1 This Part applies to the design and installation of *underground storage tank systems* containing *petroleum products* and *allied petroleum products*.

Section 4.2 General Requirements

4.2.1 Except as provided in this Part, the design and installation of *underground storage tank systems* shall be in conformance with NFC, Part 4.

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

Section 4.3 Motive Fuel Storage Tank Systems

4.3.1 (1) Every *motive fuel underground storage tank system* at a Class A *site* shall be designed and installed to have (see Appendix B):

- (a) *secondary containment* with *interstitial space level 2* or *level 4 leak detection* for the *storage tank(s)*;
- (b) an *overflow-protection device*;
- (c) a *spill-containment device* around the fill pipe;
- (d) a *dispenser sump*;
- (e) *level 2* or *level 4 leak detection* for the *dispenser sump*;
- (f) a liquid- and vapour-tight connection on fill pipes of *the storage tank system*;
- (g) *all leak-detection* devices alarmed or interlocked in conformance with Section 4.11;
- (h) *secondary containment* for product *pipng* and transfer *pipe* between connected *storage tanks*;
- (i) *level 2* or *level 4 leak detection* for product suction *pipng*; and
- (j) *level 4 leak detection* or *level 2* and *level 3 leak detection* for product pressure *pipng*.

4.3.2 (1) Every *motive fuel underground storage tank system* at a Class B *site* shall be designed and installed to have:

- (a) a single-wall or double-wall *storage tank* with *level 2* or *level 4 leak detection*;
- (b) an *overflow-protection device*;
- (c) a *spill-containment device* around the fill pipe;

- (d) a *dispenser sump*;
- (e) *level 2 or level 4 leak detection* for the *dispenser sump*;
- (f) a liquid- and vapour-tight connection on fill pipes of *storage tank systems*;
- (g) all *leak-detection* devices alarmed or interlocked in conformance with Section 4.11;
- (h) subject to Sentence 4.3.3(1), *secondary containment* for product *piping*;
- (i) subject to Sentence 4.3.3(1), *level 2 or level 4 leak detection* for product suction *piping*; and
- (j) *level 4 leak detection* or *level 2 and level 3 leak detection* for product pressure *piping*.

4.3.3 (1) Suction *piping* at a Class B site is exempt from *secondary containment* and all levels of *leak detection*, provided that the suction *piping* is designed and installed to meet all the following requirements (see Appendix B):

- (a) the underground *piping* operates at less than atmospheric pressure;
- (b) the underground *piping* is sloped so that the contents of the *pipe* will drain back into the *storage tank* if the suction is released;
- (c) only one vertically installed check valve is included in the *piping*;
- (d) the check valve is located directly below and as close as practical to the suction pump;
- (e) a check valve is installed on the air eliminator to prevent air from entering the *piping*; and
- (f) a mechanism is provided that will readily enable the *authority having jurisdiction* to test, at the dispenser, for compliance with clauses (b), (c), and (d).

Section 4.4 Storage Tank Systems Connected to Oil-Burning Appliances and Equipment within the scope of CAN/CSA B139, "Installation Code for Oil Burning Equipment"

4.4.1 (1) Every *storage tank system* connected to an oil-burning appliance and equipment within the scope of CAN/CSA B139, "Installation Code for Oil Burning Equipment" (see Appendix B) shall be designed and installed with:

- (a) *secondary containment* with *interstitial space level 2 or level 4 leak detection* for the *storage tank(s)*;
- (b) an *overflow-protection device* or a vent alarm in conformance with CAN/CSA B139, "Installation Code for Oil Burning Equipment";
- (c) product return and supply *piping* within a *secondary containment* system; and
- (d) a *spill-containment device* around the fill pipe for grade level fills.

4.4.2 (1) To facilitate the detection of *piping leaks*:

- (a) a manhole or an access point shall be provided at the heating oil tank piping-to-tank connections; and
- (b) buried supply and return line *piping* connected to oil-burning appliances shall slope towards the *storage tank*, at a slope greater than 1%.

Section 4.5 Storage Tank Systems for Storing Used Oil

4.5.1 (1) Every *used oil storage tank system* shall be designed and installed to have:

- (a) *secondary containment* of the *storage tank*;
- (b) *level 2* or *level 4 leak detection* in the *interstitial space* of the *storage tank*;
- (c) a permanent suction *pipe* fitted with a liquid-tight coupling for connection to the product removal suction hose (on the *used oil haulers'* vehicle); and
- (d) product removal or transfer connections located within a *spill-containment device*.

(2) *Secondary containment* with *interstitial space level 2* or *level 4 leak detection* shall be required for remote fill *piping*.

4.5.2 Where a fill port is outside, it shall be fitted with a funnel having a capacity of at least 25 L.

4.5.3 (1) The funnel in Article 4.5.2 shall be fitted with:

- (a) a rain cover; and
- (b) a screen to prevent nuts, bolts, rags, and other such objects from entering the *storage tank*.

4.5.4 *Used oil storage tanks* shall be sufficiently vented to avoid vacuum collapse from high rate of product removal.

Section 4.6 Storage Tank Systems for Allied Petroleum Products

4.6.1 (1) Subject to Sentence 4.6.1(2), and where the *storage tank system* configuration allows, an *allied petroleum product underground storage tank system* shall be designed and installed to have:

- (a) *secondary containment* of the *storage tank*;
- (b) *level 2* or *level 4 leak detection* in the *interstitial space* of the *storage tank*;
- (c) an *overflow-protection device*;
- (d) a *spill-containment device* around the fill pipe;
- (e) a *dispenser sump*;
- (f) *level 2* or *level 4 leak detection* for the *dispenser sump*;
- (g) a liquid- and vapour-tight connection on fill pipes of the *storage tank system*;
- (h) *all leak-detection* devices alarmed or interlocked in conformance with Section 4.11;
- (i) *secondary containment* for product *piping* and transfer *pipe* between connected *storage tanks*;
- (j) *level 2* or *level 4 leak detection* for product suction *piping*; and
- (k) *level 4 leak detection* or *level 2* and *level 3 leak detection* for product pressure *piping*.

(2) When an *allied petroleum product* has additional environmental, public health, or safety concerns, the *authority having jurisdiction* may require that:

- (a) the *storage tank* and *piping* be double-walled; and
- (b) the *interstitial space leak-detection device* produces an audible and visual alarm when a *leak* is detected.

Section 4.7 Design Standards

4.7.1 *Overfill-protection devices* shall be designed, built, and *certified* in conformance with ULC/ORD-C58.15, "Overfill Protection Devices for Flammable Liquid Storage Tanks".

4.7.2 *Spill-containment devices* shall be designed, built, and *certified* in conformance with ULC/ORD-C58.19, "Spill Containment Devices for Underground Flammable Liquid Storage Tanks".

4.7.3 *Dispenser sumps* shall be designed, built, and *certified* in conformance with ULC/ORD-C107.21, "Under-Dispenser Sumps".

4.7.4 *Liners* shall be designed, built, and *certified* in conformance with ULC/ORD-C58.9, "Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquids".

4.7.5 (1) Subject to Section 4.10, *leak-detection* devices or methods shall be designed, built, *certified*, and operated in conformance with one of the following (see Appendix B):

- (a) ULC/ORD-C58.12, "Leak Detection Devices (Volumetric Type) for Underground Flammable Liquid Storage Tanks";
- (b) ULC/ORD-C58.14, "Nonvolumetric Leak Detection Devices for Underground Flammable Liquid Storage Tanks"; or
- (c) EPA/530/UST/-90-007, "Standard Test Procedures for Evaluating Leak Detection Methods: Statistical Inventory Reconciliation Methods".

4.7.6 *Line-leak detectors* shall be designed, built, and *certified* in conformance with ULC/ORD-C107.12, "Line Leak Detection Devices - Flammable Liquid Piping" and, as a minimum, provide *level 3 or level 4 leak detection*.

4.7.7 (1) *Storage tanks* designed to contain *allied petroleum products* may be constructed of materials other than steel when necessitated by the properties of the liquid stored and *certified* for use with that liquid.

(2) *Storage tanks* permitted in Sentence 4.7.7(1) shall be:

- (a) designed to a performance level equivalent to CAN/ULC-S603, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids" or CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids";
- (b) constructed of materials compatible with the liquid to be stored; and
- (c) *protected* against external corrosion to a performance level equivalent to that required under Section 4.9.

4.7.8 Fiberglass-reinforced plastic *pipe* and fittings shall be designed, constructed, and *certified* in conformance with ULC/ORD-C107.7, "Glass Fibre Reinforced Plastic Pipe and Fittings for Flammable Liquids".

Section 4.8 Installation

4.8.1 *Underground storage tank systems* shall be installed by installers approved by the *authority having jurisdiction*. (See Appendix B.)

4.8.2 Installers of all *underground storage tank systems* shall ensure that the system is installed in conformance with all requirements of this Part. (See Appendix B.)

4.8.3 When a *storage tank* has structural shell damage, it shall not be accepted for installation unless it has been repaired in conformance with Sentence 4.8.4 (1).

4.8.4 (1) An *underground storage tank* that is structurally damaged shall not be repaired and used for storage of a *petroleum product* or *allied petroleum product* unless:

- (a) the repair is completed by the manufacturer in accordance with the appropriate ULC refurbishing specifications CAN/ULC-S603(A), "Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids" or CAN4-S615(A), "Refurbishing of Reinforced Plastic Underground Tanks for Petroleum Fuels";
- (b) the *storage tank* to be reused for the storage of *petroleum product* or *allied petroleum product* is *recertified* by the ULC-listed tank manufacturer before being put back into service; and
- (c) proof of recertification is given to the *authority having jurisdiction* before the installation of the tanks.

4.8.5 A single-wall *underground storage tank system* shall be *precision leak tested* in conformance with Section 6.8 as a complete system after final grading.

4.8.6 *Storage tanks* shall be located to permit the eventual removal of the *storage tanks* when the *storage tank system* is permanently withdrawn from service. (See Appendix B.)

4.8.7 (1) The *owner* shall supply an as-built drawing to the *authority having jurisdiction* in an *acceptable* manner and timeframe.

(2) New installations, additions, and *site* upgrades shall include the preparation of an as-built *site* survey drawing that shows:

- (a) the outline of all *storage tanks*;
- (b) the centrelines of all *piping* (or pipe groups) to dispensers;
- (c) the centreline of all underground electrical power and monitor sensor conduit;
- (d) building foundation outlines; and
- (e) property lines.

Section 4.9 Corrosion Protection of Steel Underground Storage Tank Systems

4.9.1 (1) All steel *underground storage tanks* and *piping* shall be provided with corrosion protection in conformance with one of the following:

- (a) CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" including appendices;

- (b) a *storage tank* built in conformance with CAN/ULC-S603, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids" and coated in conformance with CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" and corrosion protection:
 - (i) designed in conformance with CPPI/PACE Report 87-1, "Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks"; or
 - (ii) designed by a *corrosion expert*; or
- (c) a *storage tank* with the entire primary tank surface encased in the interstice of a non-corrodible jacket built in conformance with ULC/ORD-C58.10, "Jacketed Steel Underground Tanks for Flammable and Combustible Liquids".

4.9.2 (1) Except for *storage tanks* jacketed in conformance with ULC/ORD-C58.10, all new installations of steel *underground storage tank systems* shall be tested for corrosion protection after the backfill is filled in to the top of the *storage tank*, but before the excavation is closed in and paved over.

(2) *Acceptable cathodic protection* is achieved when the measured voltage is equal to or greater than 850 mV negative using a copper/copper sulphate reference electrode.

(3) When the *cathodic protection* potential is less than 850 mV negative to a copper/copper sulphate reference electrode, the installer shall take corrective action to bring the *cathodic protection* potentials within the requirements of Sentence 4.9.2(2).

(4) The installer of the *underground storage tank system* shall, upon completion of the installation and when the *cathodic protection* potential is in accordance with Sentence 4.9.2(2), certify in writing to the *owner* what the measured voltage potentials are and that *acceptable cathodic protection* has been achieved.

4.9.3 (1) A new *storage tank*, added to an *existing* system that is already *protected* by an impressed current *cathodic protection* system, shall be of the CAN/ULC-S603, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids" design and shall be electrically bonded into the impressed current *cathodic protection* system and have anodes to protect it. (See Appendix B.)

(2) When an *existing underground storage tank system*, which contains one or more sacrificial anode *protected* tanks, is to be upgraded with an impressed current *cathodic protection* system, all *storage tanks* shall be bonded into the impressed current *cathodic protection* system as described in CPPI/PACE Report 87-1, "Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks".

(3) When a new *storage tank* built in conformance with CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" is installed near an *existing unprotected* or another CAN/ULC-S603.1 *storage tank*, the new *storage tank* shall be electrically isolated from all new and *existing* tanks, *piping*, electrical conduit, and other electrically conductive material. (See Appendix B.)

4.9.4 (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.

4.9.5 Impressed current *cathodic-protection* systems shall be equipped with a running time or a downtime totalizer.

4.9.6 (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 zinc reference electrode and monitoring station.

4.9.7 Copper tubing connected to a heating appliance does not need to be *cathodically protected*.

Section 4.10 Leak Detection

4.10.1 Except as provided in this Section, *leak-detection* devices and methods shall be *certified*.

4.10.2 The certification organization shall specify whether the evaluated *leak-detection* device or method meets the performance of *level 1*, *level 2*, *level 3*, or *level 4 leak detection*, or a *precision leak test*, or any combination thereof.

4.10.3 Groundwater monitoring wells designed and installed in conformance with Section 4.12 shall be considered to provide *level 2 leak detection*.

4.10.4 Vapour monitoring systems designed and installed in conformance with Section 4.13 shall be considered to provide *level 2 leak detection*.

4.10.5 When the *interstitial space* of a *storage tank system* is vacuum monitored by a vacuum of at least 300 mm of mercury, it shall be considered to provide *level 2 leak detection*.

4.10.6 Inventory control conducted in conformance with Section 6.3, shall be considered to provide *level 2 leak detection* for *motive fuel storage tanks* that have a capacity of less than or equal to 5000 L. (See Appendix B.)

4.10.7 A manual fill pipe test conducted for 36 hours shall be considered to provide *level 2 leak detection* for *storage tanks* with a capacity of less than 5000 L, when the test is conducted at least once a month.

4.10.8 When *level 2 leak detection*, other than inventory control, is used, it shall be conducted at least monthly.

4.10.9 When *level 3 or 4 leak detection* is used, it shall be conducted continuously.

Section 4.11 Leak Detection Interlocks and Alarms

4.11.1 (1) Subject to Sentence 4.11.1(2), *level 2* and *level 4 leak detection* shall be electrically interlocked in such a manner that:

- (a) when the *leak-detection* device is activated, an audible and visual alarm shall be activated; and
- (b) when the *leak-detection* device is turned off or bypassed for more than one minute, product flow shall be shut off; or
- (c) when the *leak-detection* device is activated, product flow shall be shut off.

(2) When electrical interlocks required in Sentence 4.11.1(1) are not possible, the *authority having jurisdiction* shall be notified whenever the *leak-detection* device or method indicates a *leak*. (See Appendix B.)

4.11.2 *Level 3 leak-detection* equipment shall be interlocked so that product flow to the dispenser or self-contained suction pump is shut off or reduced to less than 12 L/min. (See Appendix B.)

4.11.3 *Leak-detection* alarms shall be located where the staff routinely work and in a place where such alarms can be readily heard and seen.

Section 4.12 Groundwater Monitoring

4.12.1 (1) When groundwater monitoring is to be *level 2 leak detection*, a hydrogeologist or other *acceptable person* 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 product* or *allied petroleum product* will be detected; and
- (b) ensure compliance with the requirements of this Section.

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

4.12.3 The groundwater shall never be more than 7 m from the ground surface.

4.12.4 (1) The hydraulic conductivity of the soil between the *underground storage tank system* and the monitoring well shall not be less than 0.01 cm/s. (See Appendix B.)

(2) The monitoring wells shall intercept the excavation zone or be as close as technically feasible.

4.12.5 Monitoring wells shall be a minimum of 50 mm in diameter.

4.12.6 (1) Subject to Sentence 4.12.8(1), if the monitoring well is eventually 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.

(2) Subject to Sentence 4.12.8(1), the screened portion of the 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*.

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

(2) Subject to Sentence 4.12.8(1), the filter pack shall extend to 0.5 m above the top of the screened portion of the well.

(3) The outside of the monitoring wells shall be sealed from the ground surface to the top of the filter pack using bentonite, grout, or other *acceptable seal*.

4.12.8 (1) Where the groundwater surface is less than 2.5 m from the ground surface, a hydrogeologist or other *acceptable person* shall determine the length and position of:

- (a) the screened portion of the well;
- (b) the filter pack; and

(c) the bentonite or other *acceptable* seal.

4.12.9 Monitoring wells shall be installed with a cap or plug at the bottom of the screened section of the well.

4.12.10 Monitoring wells shall be constructed of flush joint, threaded, or bell and spigot Schedule 40 PVC or other brands of PVC with equivalent or greater wall thickness. (See Appendix B.)

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

4.12.12 (1) Monitoring wells shall be equipped with liquid-proof caps.

(2) Monitoring wells shall be distinguished from fill pipes and marked in conformance with CPPI "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification".

(3) Monitoring wells shall be secured to prevent unauthorised access and tampering.

4.12.13 *Acceptable* continuous monitoring devices or manual methods shall be able to detect at least 3 mm of free product on top of the groundwater surface in the monitoring well.

4.12.14 Monitoring wells that are located in traffic areas shall be cut off at ground level and/or properly protected from vehicles.

4.12.15 Monitoring wells installed within the *interstitial space* shall not penetrate the *liner*.

4.12.16 Any damaged monitoring well shall be repaired or replaced as soon as possible after discovery of the damage.

Section 4.13 Vapour Monitoring

4.13.1 (1) Where vapour monitoring is to be *level 2 leak detection*, a hydrogeologist or other *acceptable* person 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 product* or *allied petroleum product* will be detected; and

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

4.13.2 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.

4.13.3 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.

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

4.13.5 The vapour monitors shall have their performance validated by an *acceptable* third party testing organization in conformance with the applicable protocol listed in Sentence 4.7.5(1).

4.13.6 (1) The vapour monitors shall be designed and operated to detect any significant increase in concentration above the background level of:

- (a) the *petroleum product* stored;
- (b) the *allied petroleum product* stored;
- (c) a component or components of the *petroleum product* or *allied petroleum product* stored; or
- (d) a tracer compound placed in the *storage tank system*.

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

4.13.8 (1) Monitoring wells shall be equipped with liquid-proof caps.

(2) Monitoring wells shall be distinguished from fill pipes and marked in conformance with CPPI "Using the CPPI Colour-Symbol System to Mark Equipment and Vehicles for Product Identification".

(3) Monitoring wells shall be secured to prevent unauthorised access and tampering.

4.13.9 Monitoring wells that are located in traffic areas shall be cut off at ground level and/or properly protected from vehicles.

4.13.10 Monitoring wells installed within the *interstitial space* shall not penetrate the *liner*.

4.13.11 Any damaged monitoring well shall be repaired or replaced as soon as possible after discovery of the damage.

Section 4.14 Secondary Containment Requirements

4.14.1 (1) *Secondary containment* for *storage tanks* shall be designed, built, and installed in conformance with at least one of the following:

- (a) double-wall steel *storage tank* constructed in conformance with CAN/ULC-S603, "Standard for Steel Underground Tanks for Flammable and Combustible Liquids" and corrosion protection in conformance with CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids";
- (b) double-wall fibreglass-reinforced plastic *storage tank* constructed in conformance with CAN/ULC-S615, "Standard for Reinforced Plastic Underground Tanks for Petroleum Liquids";
- (c) jacketed-steel *storage tank* constructed in conformance with ULC/ORD-C58.10, "Jacketed Steel Underground Tanks for Flammable and Combustible Liquids";
- (d) single-wall *storage tank* contained within a *liner* provided that:
 - (i) the *liner* is manufactured and installed in conformance with ULC/ORD-C58.9, "Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquid Tanks";
 - (ii) the *liner* extends to the surface and at least 300 mm beyond the sides and ends of the tank and shall have a slope of at least 20 mm per metre;

- (iii) surface waters shall be drained from the *site* using good engineering practices. This may include capping the *site* with asphalt, concrete, or other impervious cover that is sloped to drain away from the storage tanks; and
 - (iv) a monitoring well is designed and installed in the *interstitial space* in conformance with Section 4.12; or
 - (v) a vapour monitoring system is designed and installed in conformance with Section 4.13; or
- (e) concrete vaults shall:
- (i) be watertight and impervious to *leakage* of the *petroleum product* or *allied petroleum product* stored;
 - (ii) be able to withstand chemical deterioration and structural stresses from internal and external causes (including frost);
 - (iii) be continuous structures with a petroleum-resistant waterstop and joint;
 - (iv) have the enclosed *storage tanks* supported, encased, or bedded in a manner consistent with good engineering practice; and
 - (v) have *interstitial space level 2* or *level 4 leak detection*.

4.14.2 The *secondary containment* system shall have *interstitial space leak detection* designed and installed in conformance with Section 4.10.

4.14.3 (1) *Secondary containment piping* shall:

- (a) be constructed and installed in conformance with ULC/ORD- C107.7, "Glass Fibre Reinforced Plastic Pipe and Fittings for Flammable Liquids";
- (b) be constructed and installed in conformance with ULC/ORD-C107.4, "Ducted Flexible Underground Piping Systems for Flammable and Combustible Liquids";
- (c) consist of single-wall *piping* contained within a *liner* manufactured and installed in conformance with ULC/ORD-C58.9, "Secondary Containment Liners for Underground and Aboveground Flammable and Combustible Liquids"; or
- (d) consist of single-wall fibreglass-reinforced plastic, or single-wall steel *piping* contained within a duct designed, constructed, and installed in conformance with ULC/ORD-C107.19, "Secondary Containment of Underground Piping for Flammable and Combustible Liquids".

Section 4.15 Vents and Vapour Return Piping for Underground Storage Tank Systems

4.15.1 Vapour return *piping* shall be designed and installed in accordance with CCME-EPC/TRE-30E, "Environmental Code of Practice for Vapour Recovery in Gasoline Distribution Networks - 1991".

4.15.2 *Vent* and vapour return *piping* does not need to be located within a *secondary containment* system.

Part 5

Upgrading of Existing Underground Storage Tank Systems

Section 5.1 Scope

5.1.1 This Part applies to all *underground storage tank systems* containing *petroleum product* and *allied petroleum product* installed before the date this Code is adopted by the *authority having jurisdiction*.

Section 5.2 General Requirements

5.2.1 No person shall *alter* or cause to *alter* a *storage tank system* unless written approval has been obtained from the *authority having jurisdiction*.

Section 5.3 Underground Storage Tanks

5.3.1 Except as provided in Article 5.3.2, *existing unprotected steel storage tank systems* shall be upgraded subject to Section 5.5 or removed in conformance with Part 7 in accordance with the terms outlined in Table 2 (see Appendix B).

Table 2 Schedule for Upgrading Underground Storage Tank Systems

Age of tank system in years from date of installation	Remove, replace, or upgrade storage tanks and piping and add acceptable leak-detection, spill-containment, and overfill-protection device (time in years after a date specified by the authority having jurisdiction)	
	Motive fuels at Class A sites	All other storage tank systems
25 and more or unknown	2	5
20 to 24	3	6
10 to 19	4	7
0 to 9	5	8

5.3.2 *Existing single-wall steel storage tank systems* of capacity less than 50,000 L, 25 years old or more, or of unknown age, not *cathodically protected*, at all *sites* shall be withdrawn from service and removed in conformance with Part 7.

5.3.3 Unless otherwise *acceptable* to the *authority having jurisdiction*, when an owner upgrades, replaces, or removes an *underground storage tank system*, all the owner's remaining *unprotected storage tanks* and *piping* on the property or lot shall be upgraded, replaced, or removed within 180 days.

5.3.4 (1) All *existing steel underground storage tanks* and *piping* that are *cathodically protected* by sacrificial anodes (CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids") shall be individually tested for surface potentials within two years of the date the *authority having jurisdiction* adopts this Code (see Appendix B).

(2) If the measured surface potential is less than 850 mV negative to a copper/copper sulphate reference electrode, then upgrading or other corrective action in conformance with Section 4.9 is necessary (see Appendix B).

5.3.5 All *existing storage tanks* at Class A and Class B sites shall have *acceptable leak detection* installed and operational in conformance with the requirements for *leak detection* in Part 4 and within the timeframe indicated in Table 2.

5.3.6 All *leak-detection* devices shall be alarmed or interlocked in conformance with Section 4.11, within the timeframe indicated in Table 2.

Section 5.4 Piping

5.4.1 (1) All *existing steel piping* shall be *leak-tested* whenever the associated *storage tanks* are *leak-tested*.

(2) All *existing steel piping* shall be upgraded or replaced whenever the associated *storage tanks* are upgraded or replaced, in conformance with Table 2.

5.4.2 (1) Within the timeframe specified in Table 2, where *existing unprotected steel* or *galvanized pipe* is connected to an *existing cathodically protected storage tank* (CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids") or *fibreglass-reinforced plastic storage tank* (CAN/ULC-S615, "Standard for Reinforced Plastic Underground Tanks for Petroleum Products"), the *piping* shall be:

- (a) replaced; or
- (b) *precision leak-tested* and upgraded by the addition of *cathodic protection* in conformance with Section 4.9 of this Code.

Section 5.5 Upgrading

5.5.1 (1) When required by Section 5.3, upgrading of *underground storage tanks* shall be by:

- (a) replacement of *storage tanks* in conformance with Part 4 of this Code; or
- (b) installation of a *cathodic protection* system designed and installed according to the specifications and instruction of a *corrosion expert* or designed and installed in conformance with CPPI/PACE Report 87-1, "Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks" or other *acceptable* standards; or

- (c) the addition of sacrificial anodes, in conformance with Section 4.9, to *existing storage tanks* that:
 - (i) have been designed and built in conformance with CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids"; and
 - (ii) have *cathodic protection* measurements of less than 850 mV negative to a copper/copper sulphate reference electrode (see Appendix B).

5.5.2 (1) When required by Section 5.4, upgrading of *storage tank system piping* shall be by:

- (a) replacement of *existing piping* with new *piping* in conformance with Part 4 of this Code; or
- (b) addition of a *cathodic protection* system (sacrificial anodes or impressed current) designed and installed in conformance with Section 4.9.

5.5.3 When a *storage tank system* upgrade involves subsurface excavation and/or *alterations* to the product-handling pipe, a *precision leak test* shall be conducted, in conformance with Section 6.8, within 30 days of completion of the upgrade.

5.5.4 When a *storage tank system* upgrade involves subsurface excavation, the *owner* shall submit a revised as-built drawing to the *authority having jurisdiction* in conformance with Sentences 4.8.7 (1) and (2).

Section 5.6 Internal Lining

5.6.1 (1) Where permitted by the *authority having jurisdiction*, an *internal lining* may be installed as a means of preventing internal corrosion of an *underground storage tank*, provided that (see Appendix B):

- (a) after internal sand blast cleaning, the *storage tank* is not perforated;
- (b) the installation of the *internal lining* is under the direction of the lining manufacturer or a *certified* representative;
- (c) the coating material shall meet the requirements of CAN/ULC-S616, "Standard for Liquid Protective Coating Materials for Steel Storage Tanks and Equipment for Flammable and Combustible Liquids", and its application shall be in compliance with the manufacturer's application instructions;
- (d) corrosion protection is also provided in conformance with Section 4.9 and 5.5; and
- (e) following an internal inspection, the tank lining company informs the *authority having jurisdiction* of all inspection results and perforated *storage tanks*.

Section 5.7 Overfill and Spill Protection

5.7.1 *Motive fuel storage tank systems* shall have an *overflow-protection device* added to the *storage tank* within the timeframe provided in Table 2.

5.7.2 *Motive fuel* and *used oil storage tank systems* shall have a *spill-containment device* added to the fill pipe within the timeframe provided in Table 2.

5.7.3 *Motive fuel storage tank systems* shall have a *dispenser sump* added beneath the dispenser whenever the product supply *piping* or pump islands are replaced or relocated.

5.7.4 (1) *Used oil storage tanks* shall have suction tubes installed within five years of the date that the *authority having jurisdiction* adopts this Code (see Appendix B).

(2) Suction tubes, as required in Sentence 5.7.4 (1), shall be fitted with liquid-tight couplings for connection to the product removal suction hose (on the *used oil* haulers' vehicle) (see Appendix B).

5.7.5 A liquid- and vapour-tight connection shall be installed on fill pipes where flammable products are delivered to a *storage tank*, as of a date specified by the *authority having jurisdiction* (see Appendix B).

Section 5.8 Allied Petroleum Products

5.8.1 (1) Within two years of the adoption of this Code, *existing unprotected steel allied petroleum product storage tank systems* shall:

- (a) where more than 25 years old, or of unknown age, be removed; and
- (b) where less than 25 years old:
 - (i) be removed; or
 - (ii) *precision leak tested* and, if tight, then upgraded in conformance with Section 5.5, provided that the other components of the *storage tank system* are designed and installed in conformance with Section 4.6.

5.8.2 (1) *Existing cathodically protected, single-wall steel allied petroleum product storage tanks and piping* shall be *acceptable* for continued service provided that, within two years of the date that the *authority having jurisdiction* adopts this Code:

- (a) *cathodic-protection* system monitoring confirms the acceptability of the corrosion-protection system of the *storage tank and piping*;
- (b) a *corrosion expert* certifies in writing, the acceptability of the *cathodic-protection system* of the *storage tank and piping*;
- (c) *leak detection* in conformance with Section 4.6 and 4.10 is installed; and
- (d) the other components of the *storage tank system* are designed and installed in conformance with Section 4.6.

5.8.3 (1) *Existing fibreglass-reinforced plastic allied petroleum product storage tanks and piping certified* for use with *allied petroleum products* shall be *acceptable* for continued service provided that, within two years of the date that the *authority having jurisdiction* adopts this Code:

- (a) *leak detection* in conformance with Section 4.6 and 4.10 is installed; and
- (b) the other components of the *storage tank system* are designed and installed in conformance with Section 4.6.

Part 6

Operation and Maintenance

Section 6.1 Scope

6.1.1 This Part applies to the operation and maintenance of *underground storage tank systems* containing *petroleum products* and *allied petroleum products*.

Section 6.2 General Requirements

6.2.1 Except as provided in this Part, the operation and maintenance of *underground storage tank systems* shall be in conformance with the NFC, Part 4.

Section 6.3 Inventory Control

6.3.1 (1) The *owner* of an *underground storage tank* or the *owner's* designated representative shall ensure that:

- (a) the product level in an *underground storage tank* containing *motive fuels* is measured and reconciled (see Appendix B) in conformance with Sentence 6.3.2 (1):
 - (i) each *day* that product is added or removed from the *storage tank*, or
 - (ii) at least weekly where product is added or removed on a less frequent basis; and
- (b) the water level in an *underground storage tank* shall be measured in accordance with NFC Subsection 4.3.17 and included in all reconciliation computations in conformance with Sentence 6.3.2 (1).

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

(2) 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.

6.3.3 (1) Subject to Sentence 6.3.3(2), the *owner* of an *underground storage tank system* or the *owner's* designated representative shall maintain inventory control records and reconciliation data on-site.

(2) When computerized inventory reconciliation is conducted, the *authority having jurisdiction* may allow inventory control and reconciliation records to be stored off-site.

(3) Inventory control and reconciliation records shall be kept in an *acceptable* manner and format.

(4) Inventory control and reconciliation records shall be maintained for a period of at least two years for examination by the *authority having jurisdiction*.

6.3.4 When the *operator* of an *underground storage tank system* changes, the departing *operator* shall transfer the inventory control records and reconciliation data required under Sentence 6.3.3 (1) to the incoming *operator*.

6.3.5 (1) The *authority having jurisdiction* shall be notified immediately, in conformance with Section 6.7, when a *leak* or *discharge* is indicated by any one of the following:

- (a) any unexplained loss of 0.5% or more of the throughput in one month from an *underground storage tank* as indicated by the recording and reconciliation of inventory records over a monthly recording period, done in conformance with Article 6.3.2;
- (b) inventory reconciliations showing five or more consecutive *days* of unexplained product losses;
- (c) inventory reconciliations showing 18 or more *days* of unexplained losses in one calendar month (when the product level is measured every *day*);
- (d) inventory reconciliations showing 15 or more *days* of unexplained losses in one calendar month (when the product level is measured 6 *days* a week); and
- (e) the level of water at the bottom of an *underground storage tank* exceeds 50 mm.

Section 6.4 Corrosion Protection Monitoring

6.4.1 (1) Except as provided in Sentence 6.4.1(2), maintenance checks on the operation of *cathodic-protection* systems shall be conducted in conformance with:

- (a) CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" for sacrificial anode systems; or
- (b) CPPI/PACE Report No. 87-1, "Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks", Clause 5.5(c) and Part 6.0, for impressed current systems.

(2) *Cathodic protection* measurements for all sacrificial anode *protected underground storage tank systems* (CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids") shall be conducted at least annually.

6.4.2 *Cathodic protection* measurements conducted in conformance with CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" or CPPI/PACE Report 87.1, "Guidelines Specification for the Impressed Current Method of Cathodic Protection of Underground Petroleum Storage Tanks" shall be considered satisfactory if the measured surface potential is equal to or greater than 850 mV negative using a copper/copper sulphate reference electrode.

6.4.3 When corrosion protection monitoring conducted in conformance with this Section indicates inadequate corrosion-protection, immediate corrective measures shall be taken in conformance with Section 4.9.

Section 6.5 Product Transferring Operations

6.5.1 A person responsible for transferring product to an *underground storage tank* shall take all reasonable steps to prevent spillage.

6.5.2 (1) When tank vehicles are being unloaded, vehicle *operators* shall remain:

- (a) in constant view of the fill pipe; and

(b) in constant attendance at the delivery control valve. (See Appendix B.)

6.5.3 *Used oil storage tanks* fitted with a suction tube and leak-tight coupling in conformance with Sentences 5.7.4 (1) and 5.7.4 (2) shall not have suction hoses dropped or inserted into the *used oil storage tank* during the product removal process.

6.5.4 Removal of product from a *used oil storage tank* after a date specified by the *authority having jurisdiction* shall require making a connection to the coupling at the end of the suction tube that is inserted in the *used oil storage tank*.

6.5.5 Within a timeframe specified by the *authority having jurisdiction*, no person shall transfer *motive fuels* unless a liquid- and vapour-tight fill connection is made to the *underground storage tank*.

6.5.6 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*.

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

Section 6.6 Transfer of Ownership

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

6.6.2 The *owner* of real property on which *underground storage tanks* 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.)

6.6.3 When the ownership of a *storage tank system* is transferred, all as-built drawings shall be transferred to the new *owner* of the *storage tank system*.

Section 6.7 Leak and Spill Response

6.7.1 The *owner* or *operator* of an *underground storage tank system* who discovers, suspects, or is notified by any person of possible leakage shall immediately notify the *authority having jurisdiction* by telephone and provide the information requested by the *authority having jurisdiction*. (See Appendix E.)

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

(a) at the *owner's* expense:

- (i) remove the suspected leaking *storage tank* or *piping*; or
- (ii) arrange for a *precision leak test* to be conducted in conformance with Section 6.8;

- (b) arrange for immediate removal of the *petroleum product* or *allied petroleum product* from components of the *storage tank system* and the removal of the affected system within a reasonable timeframe;
- (c) take all reasonable steps to establish the extent of the contamination (including vapours), contain the *leaked petroleum product* or *allied petroleum product*, and prevent its further migration; and
- (d) take all reasonable steps to recover or remove escaped *petroleum product* or *allied petroleum product*.

Section 6.8 Precision Leak Test

6.8.1 (1) The owner of an *underground storage tank system* shall conduct a *precision leak test* on any *existing unprotected steel storage tanks* when required by the *authority having jurisdiction*.

(2) When a *precision leak test* is required by the *authority having jurisdiction*, it shall be conducted and reported in conformance with Section 6.8.

6.8.2 A *precision leak test* shall be conducted by an *acceptable* testing company or individual.

6.8.3 (1) When a *precision leak test* has been required by the *authority having jurisdiction*, a *precision leak test* report shall be forwarded to the *authority having jurisdiction* within ten days of the test.

(2) The *precision leak test* report shall contain as a minimum the following information:

- (a) *storage tank* registration number;
- (b) location of test;
- (c) date of test;
- (d) results of test;
- (e) test methods;
- (f) certification by testing company or individual that the test complies with *certified* procedures for conducting a *precision leak test*; and
- (g) name and address of testing company or individual.

6.8.4 Pneumatic pressure testing of *storage tanks* shall not be considered to be a *precision leak test*. (See Appendix B.)

6.8.5 Pneumatic and hydraulic pressure testing of *piping* shall be considered as a *precision leak test* provided the testing is conducted in conformance with the NFC Section 4.4.6. (See Appendix B.)

Section 6.9 Leak Detection Maintenance

6.9.1 All electronic or mechanical *leak-detection* equipment shall be inspected and tested for satisfactory operation at least annually in conformance with the manufacturer's instructions.

Section 6.10 Records Other Than Inventory Control

6.10.1 (1) The *owner* of a *petroleum product* or *allied petroleum product storage tank system* shall maintain records of all:

- (a) *cathodic protection* measurements;
- (b) impressed current system checks;
- (c) line *leak-detection* system tests;
- (d) *leak-detection* equipment tests and checks;
- (e) *precision leak test* results;
- (f) excavation or nearby construction that could affect the integrity of the *storage tank system*;
- (g) inspections, tests, or maintenance checks of the *storage tank system*; and
- (h) installation of an *internal lining*.

(2) The *owner* shall retain the records required in Sentence 6.10.1 (1) for examination by the *authority having jurisdiction* for a period of at least five years.

6.10.2 The *owner* of a *petroleum product* or *allied petroleum product storage tank system* shall maintain a record of all *alterations* and upgrading for the life of the *storage tank system* for examination by the *authority having jurisdiction*.

6.10.3 When there is a change in the *storage tank system owner*, the *owner* of records required under Sentences 6.3.3 (1) and 6.10.1 (1) shall transfer all such records to the new *owner*.

6.10.4 The *owner*, installer, and manufacturer of a *cathodically protected* steel or fibreglass-reinforced plastic *storage tank* or *piping* system that has failed, shall jointly or independently complete and submit a "Protected Storage Tank and Piping Failure Incident Report" (see Appendix D) in an *acceptable* manner and timeframe.

Part 7

Withdrawal from Service of Underground Storage Tank Systems

Section 7.1 Scope

7.1.1 This Part sets out the procedures to be followed when *storage tank systems* for *petroleum products* or *allied petroleum products* are removed, relocated, *abandoned*, disposed of, refurbished, or temporarily taken out of service.

Section 7.2 General Requirements

7.2.1 Except as provided in this Part, the withdrawal from service and removal of *underground storage tank systems* shall be in conformance with the NFC, Section 4.10.

7.2.2 *Underground storage tank systems* shall be removed by an *acceptable* company or individual.

7.2.3 A company or individual removing *underground storage tank systems* shall ensure that the system is removed in conformance with all requirements of this Part.

Section 7.3 Temporary Withdrawal from Service

7.3.1 When the *storage tank system* uses an impressed current *cathodic protection* system, the *cathodic protection* system shall be maintained and operated throughout all periods when the *storage tank system* is withdrawn from service. (See Appendix B.)

7.3.2 (1) Except for *storage tank systems* that have 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 a period of more than 180 days, the *owner* or the *operator* shall notify the *authority having jurisdiction* in writing within seven days after the *storage tank system* goes out of service, providing the following information:

- (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 *storage tank* registration number.

7.3.3 (1) Except for *storage tank systems* that have been registered with the *authority having jurisdiction* as operating on a seasonal basis, when a *storage tank system* that has been withdrawn from service for a period of more than 180 days is to be reactivated for the storage of *petroleum products* or *allied petroleum products*, the *authority having jurisdiction* shall be notified in writing at least seven days before the *storage tank system* is being reactivated, and provided with the following information:

- (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*; and
- (d) the intended date of reactivation.

7.3.4 *Storage tanks out of service* for more than one year shall pass a *precision leak test* in conformance with Section 6.8 of this Code before the *storage tank system* is returned to service.

Section 7.4 Removal and Abandonment In-place

7.4.1 The *owner* of a *storage tank system* shall notify the *authority having jurisdiction* before removing an *underground storage tank* and provide the information requested by the *authority having jurisdiction*.

7.4.2 Subject to Sentences 7.4.3 (1), 7.4.5 (1), and Article 7.4.4, an *underground storage tank* shall not be *abandoned* in the place where it is installed.

7.4.3 (1) An *owner* of a *storage tank system* shall apply to the *authority having jurisdiction* for approval to abandon a *storage tank system* permanently in the place in which it is installed by:

- (a) describing fully in the application, the circumstances relating to the *storage tank* location that the *owner* feels would justify abandoning the *storage tank* in-place; and
- (b) satisfying the *authority having jurisdiction* that the soil under and around the *storage tank* has not been contaminated with a *petroleum product* or *allied petroleum product* (see Appendix B); 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* in-place.

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

7.4.5 (1) When the *authority having jurisdiction* has granted approval, in writing, to abandon a *storage tank system* in-place, the *abandonment* procedures shall comply with the following:

- (a) any liquid or sludge in the *storage tank* shall be removed and disposed of by an *acceptable* method;
- (b) *storage tanks* shall be purged of vapours to less than 10% of the lower flammable limit; the presence of vapours shall be checked with a combustible gas meter;
- (c) sufficient holes shall be cut along the top of the *storage tank* to enable the complete filling of the *storage tank* with an *acceptable* inert material;
- (d) the *storage tank* shall be completely filled with *acceptable* inert material (see Appendix B);
- (e) a record of the size, description, and location of the *storage tank* shall be:
 - (i) permanently appended to the deed of the property;
 - (ii) submitted to the *authority having jurisdiction*; and
- (f) associated *piping* shall be removed from service in conformance with the NFC, Section 4.10.3.

Section 7.5 Reuse and Disposal of Underground Storage Tanks

7.5.1 (1) *Cathodically protected steel underground storage tanks* may be reused for the storage of *petroleum products* or *allied petroleum products*:

- (a) after being refurbished in accordance with CAN/ULC-S603(A), "Refurbishing of Steel Underground Tanks for Flammable and Combustible Liquids"; or
- (b) after being inspected and relabelled in accordance with the Special Acceptance Program of Underwriters' Laboratories of Canada.

(2) Fibreglass-reinforced plastic *underground storage tanks* may be reused for the storage of *petroleum products* or *allied petroleum products*:

- (a) after being refurbished in accordance with CAN4-S615(A), "Refurbishing of Reinforced Plastic Underground Tanks for Petroleum Fuels"; or
- (b) after being inspected and relabelled in accordance with the Special Acceptance Program of Underwriters' Laboratories of Canada.

7.5.2(1) When *underground storage tanks* are to be disposed of:

- (a) all liquid *petroleum product* or *allied petroleum product* shall be removed from the *storage tanks*;
- (b) sludge in the *storage tanks* shall be removed and disposed of in an *acceptable* manner;
- (c) the *storage tanks* shall be purged of vapours to less than 10% of the lower flammable limit; the presence of vapours shall be checked with a combustible gas meter; and
- (d) sufficient openings shall be cut in the *storage tanks* to render them unfit for further use.

7.5.3 An affidavit of destruction shall be forwarded to the *authority having jurisdiction*.

The Appendices of this document are included for explanatory and information purposes only. They do not form part of the Code requirements unless specifically identified as such.

Appendix A

Authorities Having Jurisdiction

Federal Contacts

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

Listed below are the addresses, phone numbers, and FAX numbers of the provincial and territorial authorities that have jurisdiction on the regulation of *underground storage tank systems* as it applies to this Code, its adoption in some form, or their own particular Code.

Provincial Authorities

British Columbia

Mining and Chemical Industries
 Environmental Protection Division
 B. C. Ministry of Environment
 777 Broughton Street
 Victoria, British Columbia
 V8V 1X5

Phone: 604-387-9952
 FAX: 604-356-7297

Office of the Fire Commissioner
 Ministry of Municipal Affairs,
 Recreation and Culture
 3rd Floor, 800 Johnson Street
 Victoria, British Columbia
 V8V 1X4

Phone: 604-356-9000
 FAX: 604-356-9019

Alberta

Alberta Environment
 5th Floor, Oxbridge Place
 9820 - 106 Street
 Edmonton, Alberta
 T5K 2J6

Phone: 403-427-6182
 FAX: 403-422-5120

Client Services Division
 Alberta Labour
 705, 10808 - 99 Avenue
 Edmonton, Alberta
 T5K 0G5

Phone: 403-427-8265
 FAX: 403-422-3562

Saskatchewan

Chemical Management Section
 Air and Land Protection Branch
 Saskatchewan Environment and Public Safety
 3085 Albert Street
 Regina, Saskatchewan
 S4S 0B1

Phone: 306-787-6185
 FAX: 306-787-0197

Department of Community Services
 Fire Commissioner's Office
 1870 Albert Street
 Regina, Saskatchewan
 S4P 3V7

Phone: 306-787-4516
 FAX: 306-787-9273

Manitoba

Operations, Winnipeg Region
 Department of Environment
 Building 2
 139 Tuxedo Avenue
 Winnipeg, Manitoba
 R3N 0N6

Phone: 204-945-7110
 FAX: 204-945-5229

Ontario

Fuels Safety Branch
 Ministry of Consumer and
 Commercial Relations
 Mutual Group Centre, West Tower
 4th Floor
 3300 Bloor Street West
 Etobicoke, Ontario
 M8X 2X4

Phone: 416-234-6030
 FAX: 416-234-6037

Ministry of Environment
 North Eastern Region
 Sudbury Regional Office
 199 Larch Street, 11th Floor
 Sudbury, Ontario
 P3E 5P9

Phone: 705-675-4501
 FAX: 705-675-4180

Quebec

Petroleum Products Branch
 Department of Energy & Resources
 5700 - 4th Avenue West
 Room B405
 Charlesbourg, Quebec
 G1H 6R1

Phone: 418-643-3327
 FAX: 418-643-8337

New Brunswick

Industrial Programs Section
 Department of the Environment
 P.O. Box 6000
 364 Argyle Street
 Fredericton, New Brunswick
 E3B 5H1

Phone: 506-457-4848
 FAX: 506-453-2265

Nova Scotia

Petroleum Storage Tank Systems
 Department of the Environment
 P.O. Box 2107
 5th Floor, 5151 Terminal Road
 Halifax, Nova Scotia
 B3J 3B7

Phone: 902-424-5300
 FAX: 902-424-0503

Newfoundland and Labrador

Industrial Environmental Engineering Division
 Department of Environment and Lands
 P.O. Box 8700
 St. John's, Newfoundland
 A1B 4J6

Phone: 709-729-2561
 FAX: 709-729-1930

Prince Edward Island

Director, Environmental Protection Branch
 Department of the Environment
 P.O. Box 2000
 Charlottetown, P.E.I.
 C1A 7N8

Phone: 902-368-5057
 FAX: 902-368-5830

Territorial Authorities**Yukon**

Public Safety Branch
 Department of Community and
 Transportation Services
 Box 2703, 2nd Avenue
 Whitehorse, Yukon
 Y1A 2C6

Phone: 403-667-5824
 FAX: 403-667-7209

Northwest Territories

Office of the Fire Marshal
Department of Safety and Public Services
Government of Northwest Territories
Main Floor, Northway Building
Box 1302, 49th Avenue
Yellowknife, N.W.T.
X1A 2L9

Phone: 403-873-7472
FAX: 403-873-0117

Appendix B

Explanatory Material

The explanatory notes in this Appendix are intended to clarify the requirements of this Code or to provide additional relevant information. The **bold-face** reference numbers that introduce each item correspond to the applicable Article or Sentence in this Code.

B.1.5.2 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.1.5.2 Used oil - The definition for *used oil* was taken from the 1989 CCME publication "Code of Practice for Used Oil Management in Canada" with the following modifications:

- (1) The category of "metal-working fluids" has been removed because this product class is considered to be sufficiently different from the definition of *petroleum products*. Metal-working fluids may include a substantial amount of water and further consideration would have to be given to the need to line steel tanks.
- (2) The category of "insulating fluids or coolant" has been modified for similar reasons, and now reads as "insulating oils".

Used oil primarily contains hydrocarbons; however, it may contain additives (e.g., a total of 14% by volume of detergents and viscosity-improvers in lube 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, if *used oil* contains 50 ppm or more PCBs, it is designated a hazardous waste in most Canadian jurisdictions.

B.2.2.2 The registration form prescribed by the *authority having jurisdiction* will require as a minimum the information outlined in Appendix C. However, the *authority having jurisdiction* may require additional information with respect to a *storage tank system*, *owner*, or *operator* as it sees fit.

B.2.2.3 The *authority having jurisdiction* may require that the *owner* of a *storage tank system* attach identification tags to the fill pipe or vent to enable an inspector to match a *storage tank* in the field with the information provided on the registration form.

B.2.3.1 See B.2.2.2.

B.2.4.2 See B.2.2.2.

B.2.4.3 See B.2.2.3.

B.4.3.1 (1) Readers may notice that *level 1 leak detection* is defined in Section 1.5 but *level 1 leak detection* is not specified in the body of the Code. In addition, the National Task Force members believe that an annual test is too infrequent to provide effective monitoring. Therefore, *level 1 leak detection* was deleted as an ongoing *leak-detection* method. However, the definition remains so

that jurisdictions may add it back if they wish. Also, the performance of *level 1 leak detection* equals the performance of a *precision leak test*.

B.4.3.3 (1) If a single-wall vertical check valve is installed immediately beneath the pump in a suction system, then if there is a line *leak* or check valve leakage, the pump should not work very well and there should be minimal product loss. From an environmental perspective, this design is considered intrinsically safe. If there is more than one check valve on the line, or the check valve is located above the *storage tank*, then a *leak* can result in much more product loss, and therefore, *secondary containment* is required.

B.4.4.1 (1) *Storage tanks* that are used to supply fuel (usually diesel) to an emergency power generator are within the scope of CAN/CSA-B139, "Installation Code for Oil Burning Equipment"; therefore, they are subject to Section 4.4.

B.4.7.5 (1) The protocol for validating statistical inventory reconciliation is under review. Check with the *authority having jurisdiction* for the appropriate validation protocol.

B.4.8.1 Improper installation has been a major cause of *underground storage tank system* failures (*leaks*). By requiring approved installers, the tank owner and the *authority having jurisdiction* can expect an *acceptable* quality of installation.

B.4.8.2 The approved installer should bear responsibility for the quality of the installation. Installers who do not follow regulations may be prohibited from operating within the jurisdiction by the *authority having jurisdiction*.

B.4.8.6 *Abandonment* in-place of *out-of-service storage tanks* is not normally an *acceptable* practice. *Storage tanks* should not be located near or under building foundations or in locations where the ultimate removal of the *storage tank* would be impractical.

B.4.9.3 (1) Stray current from an impressed current system can cause corrosion to *storage tanks* protected by sacrificial anodes. Consequently, bonding of sacrificial anode protected *storage tanks* and *pipings* into the impressed current system is necessary.

B.4.9.3 (3) 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 for Flammable and Combustible Liquids", 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 *pipings* or other *storage tanks*. This appears to be a commonly encountered fault and needs to be emphasized to installers.

B.4.10.6 Inventory control for *storage tanks* with a capacity of greater than 5000 L 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*.

B.4.11.1 (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.4.11.2 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.4.12.4 (1) The soil should consist of gravels, coarse or medium sands, coarse silts, or other permeable material.

B.4.12.7 (1) A filter pack is a porous medium usually consisting of sand or pea gravel.

B.4.12.10 Monitoring wells shall not be constructed of Schedule 20 PVC "sewer" or leach field piping.

B.5.3.1 In Table 2, the term "all other *storage tank systems*" includes *motive fuel* at Class B sites, *used oil*, *allied petroleum product*, and *storage tank systems* within the scope of CSA-B139, "Installation Code for Oil Burning Equipment".

B.5.3.4 (1) Recent surveys indicate that 20 to 30% of the *existing storage tanks* designed to meet CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" may not meet the currently accepted corrosion protection criteria for various reasons essentially related to installation problems. Therefore, *existing CAN/ULC-S603.1 storage tanks* shall be tested for adequate *cathodic protection*. Where adequate protection is not indicated, corrective action in conformance with Section 4.9 is required.

B.5.3.4 (2) The addition of sacrificial anodes to *existing unprotected* and uncoated steel tanks is not an *acceptable* upgrading method because of the high current requirements for such *storage tanks*. However, *existing storage tanks* designed to meet CAN/ULC-S603.1, "Standard for Galvanic Corrosion Protection Systems for Steel Underground Tanks for Flammable and Combustible Liquids" may be upgraded by the addition of sacrificial anodes. This is *acceptable* because of the low current requirement due to the *storage tank* coating and the electrical isolation.

B.5.5.1 (1)(c) The upgrading of *existing steel storage tanks* by the addition of *cathodic protection* should reduce external corrosion. However, water in the bottom of a *storage tank* can continue to cause internal corrosion. Although not required (because the CCME National Task Force does not yet have evidence that internal corrosion is a major problem), *owners* might consider a *storage tank* lining or *storage tank* replacement for older (more than 20 years) *unprotected steel storage tanks*. Also see B.5.3.4(2).

B.5.6.1(1) The use of *internal lining* is permitted, but *storage tank* lining by itself is not considered to be an *acceptable* upgrade because the *storage tank* will continue to corrode on the exterior to the point that the structural integrity of the *storage tank* may be lost. *Cathodic protection* is required when *storage tanks* are upgraded with a lining.

Provisions are included to ensure that *internal linings* are installed to a satisfactory standard. A *storage tank* shell that is perforated cannot be lined because the *storage tank* may have lost product and the structural strength of the *storage tank* is unknown. A perforated *storage tank* shall be removed.

B.5.7.4 (1)(2) Haulers of *used oil* for recycle or disposal at present insert a suction hose into the tank to pump out the liquid. This practice can potentially damage fibreglass-reinforced plastic tanks and can lead to *spills* when the suction hose is removed. To avoid this, *used oil storage tanks* shall be fitted with a fixed suction tube and a leak-tight coupling. *Used oil* haulers should find this method preferable because it is less messy.

B.5.7.5 Liquid- and vapour-tight connections reduce the possibility of large *spills* occurring when a *storage tank* is incorrectly dipped immediately before dropping product in the *storage tank*. In such an overflow situation, the amount of spilled product can be confined to the amount contained in the delivery hose. Vapour-tight connections also reduce the amount of volatile hydrocarbons given off to the atmosphere. This is desirable from a health, safety, and environmental perspective.

B.6.3.1 (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 content, gallons/litres 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.6.5.2 (1)(b) The NFC requires that vehicle *operators* shall remain in close proximity to the discharge control valve. There is concern that vehicle *operators* 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 6.5.2 (1) is more specific and requires the vehicle *operator* to be more attentive.

B.6.6.2 At the time of a change of ownership, it is recommended that an environmental assessment or investigation of *site* contamination be conducted on real property on which *storage tanks* are located.

B.6.8.4 Air and nitrogen pressure tests shall not be considered *acceptable* for testing *existing storage tanks* once the *storage tank* has contained product. This is because such pressure tests are too inaccurate to reliably detect small *leaks* using the maximum allowable pressure for the *storage tank* of 35 kPa (5 psi). There is also risk of an explosion.

B.6.8.5 Nitrogen gas pressure testing of *piping* is sufficiently accurate because the pipe is of smaller volume and higher pressures are used.

B.7.3.1 An impressed current *cathodic protection* system only provides protection against corrosion when it is on and maintained. To avoid corrosion problems on unoperational *storage tanks*, the impressed current system should be left on and maintained monthly.

B.7.4.3 (1)(b) A *precision leak test* conducted in conformance with Section 6.8, or bore hole 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*.

B.7.4.4 The *authority having jurisdiction* would 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.7.4.5 (1)(d) Sand, gravel, or concrete are examples of what is considered *acceptable* inert material. Foam should not be considered an *acceptable* inert material.

Appendix C

Minimum Information Required for Registration of Underground Storage Tank Systems

C.1 The registration form prescribed by the *authority having jurisdiction* shall require, as a minimum, the following information:

- (a) name of *owner*;
- (b) address of *owner*;
- (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) type of *storage tank* material;
- (i) type of *pipng* material;
- (j) corrosion protection provided (if applicable);
- (k) type of pump;
- (l) type of *leak detection*;
- (m) type of *secondary containment* (if applicable);
- (n) name of *operator* (if different than *storage tank owner*);
- (o) name of land *owner* (if different than *storage tank owner*); and
- (p) manufacturer of *storage tank*.

Appendix D

Protected Storage Tank and Piping Failure Incident Report

PROTECTED STORAGE TANK AND PIPING FAILURE

INCIDENT REPORT

SEND or FAX completed forms to:

UST Incident Database, Oil and Gas Section
Environment Canada
10th Floor, Place Vincent Massey
Ottawa, Ontario K1A 0H3

Phone: 819-997-1120

FAX: 819-953-8903

OBJECTIVES and JUSTIFICATION:

In recent years, Canadian regulatory authorities have adopted new underground storage tank regulations. These regulations generally require that old unprotected steel tanks and piping be upgraded or replaced with either cathodically protected steel or fibreglass reinforced plastic (FRP) tanks and piping. Consequently, Canadians are investing considerable financial resources in these systems with the expectation that they will provide better environmental protection.

It is recognized that cathodically protected steel and FRP tanks and piping are less subject to failure than the traditional unprotected steel systems. However, occasionally regulators hear anecdotes of cathodically protected steel and FRP tank and piping failures. The expected lifespan of these systems is really unknown at the present. Given the immense investments into these systems, it would be prudent to identify as early as possible any increases in the failure rates and the causes of such incidents.

Environment Canada would like to compile information on the frequency and causes of incidents involving cathodically protected steel, internally lined steel tanks, or FRP tanks and piping. The objective is to identify any disturbing failure trends and find solutions to prevent future occurrences. Consequently, this INCIDENT REPORT form has been created.

Since it is not the purpose to pursue individual owners, installers or manufacturers, the names of individuals or companies will not be released. The names and phone numbers of the tank owner, installer or manufacturer are required only to enable a follow-up, if necessary, to obtain more details and a concurrence as to the cause of the incident. Where there are differences of opinion concerning the cause of an incident, the data will be separated from the main database and described as such.

Summary reports providing overview statistics will periodically be released. The summary reports will be subject to a peer review by provincial regulatory authorities and Underwriters' Laboratories of Canada prior to publication. If you submit a completed Incident Report, you will automatically be added to the mailing list to receive any summary reports that are published.

The name of the tank owner, installer or equipment manufacturer is for incident investigation/verification purposes only - the information will not go into the data base.

OWNER OF TANK/PIPING: _____

Phone: _____ FAX: _____

CONTRACTOR/INSTALLER: _____

Phone: _____ FAX: _____

EQUIPMENT MANUFACTURER: _____

Phone: _____ FAX: _____

TYPE OF EQUIPMENT INVOLVED IN INCIDENT: Check ALL that apply on this form.

Steel tank zinc sacrificial anode ULC S603.1
 Steel tank magnesium sacrificial anode
 Steel tank impressed current (has power supply)
 Fibreglass reinforced plastic tank (FRP) ULC S615
 Internally lined tank

☐ Steel piping - sacrificial anodes
☐ Steel piping - impressed current
☐ Fibreglass piping
☐ Single wall tank
☐ Single wall piping
☐ Double wall tank
☐ Double wall piping

ADDITIONAL INFORMATION:

Location of Incident (city/town): _____

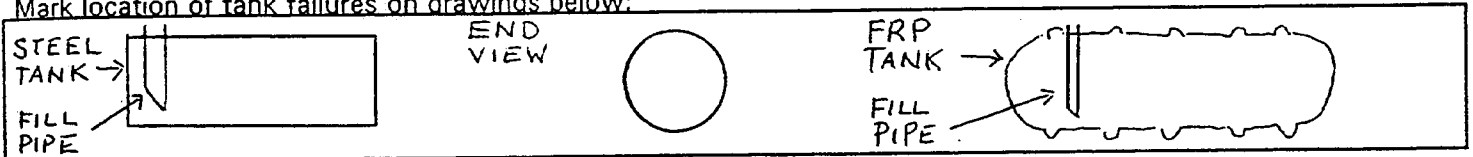
Date of Installation: _____
 (yy/mm/dd)

Date of Incident: _____
 (yy/mm/dd)

Latest Corrosion Monitoring Results: None ☐ Date: _____ Reading: _____ MV
 Latest FRP Deflection Monitoring: None ☐ Date: _____ Reading: _____
 Latest Leak Test Results: None ☐ Date: _____ Results: _____

Backfill: Sand ☐ Pea Gravel/Crushed Stone ☐ Native soil, clay, rocks ☐
 Type of Failure: External Corrosion ☐ Tank Lining ☐ Single Hole ☐
 Internal Corrosion ☐ Crack ☐ Multiple Holes ☐

Mark location of tank failures on drawings below:



Describe the failure: _____

By asking the question WHY several times, try to establish the intermediate and root causes of the incident. Please describe: _____

Material defect/failure ☐ Accident during alterations ☐ Excessive settlement ☐
 Installation not following standards ☐ Accident during operations ☐ Poor backfill compaction ☐
 Coating failure ☐ Accident during installation ☐ High groundwater/flotation ☐
 Poor electrical bonding ☐ Inadequate electrical isolation ☐ Unknown ☐

Is there agreement between owner, installer and equipment manufacturer as to the cause of failure?

Yes ☐ Describe: _____
 No ☐ _____

Recommendations on how to avoid the incident in the future: _____

Additional Information/Comments: _____

Appendix E

Spill Reporting Telephone Numbers

The *owner* or *operator* of an *underground storage tank system* who discovers, suspects, or is notified by any person of possible leakage 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 and provincial authorities. Either of the two listed numbers can be called.

PROVINCE/TERRITORY	FEDERAL AUTHORITY	PROVINCIAL/TERRITORIAL AUTHORITY
Newfoundland	709-772-2083 Coast Guard	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)
Quebec	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 Spill Reporting Centre
Manitoba	403-468-8020 Environment Canada Environmental Emergencies	204-944-4888 Manitoba Environment Environmental Emergency Line
Saskatchewan	403-468-8020 Environment Canada Environmental Emergencies	1-800-667-7525 Spill Report Centre Environment and Public Safety

Alberta	403-499-2432 Environment Canada Spill Reporting	1-800-222-6514 Alberta Environment Pollution Control (in Alberta only)
Northwest Territories	403-468-8020 Environment Canada Environmental Emergencies	403-920-8130 Spill Report Line
British Columbia	604-666-6100 Environment Canada Environmental Emergencies	604-666-6011 Coast Guard 1-800-663-3456 Provincial Emergency Program
Yukon	403-667-7244 Environmental Protection Services	403-667-7244 Environmental Protection Services
