

ENVIRONMENTAL MANAGEMENT
PROTOCOL
FOR
FUEL HANDLING SITES IN ONTARIO
TSSA EMP-2012
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APPENDICES

Appendix A: Site Condition Standards

Appendix B: Site Assessment and Environmental Restoration Process

1.0 Purpose

The purpose of the Environmental Management Protocol (herein referred to as the Protocol) is to provide direction for the reporting, assessment and management of petroleum products that have escaped to the environment or inside a building. This document addresses petroleum products used as either motive or appliance fuel such as gasoline, diesel and fuel oil at operational fuel handling sites such as, but not limited to, gasoline service stations, bulk plants, marinas, private fuel outlets, commercial facilities and residential properties. The Protocol applies only to operations governed by the Technical Standards and Safety Act (TSS Act), associated Regulations (O. Reg. 213/01 and 217/01), the Liquid Fuels Handling Code (LFHC) and Fuel Oil Code (FOC).

This Protocol replaces the Technical Standards & Safety Authority's (TSSA's) previous Environmental Management Protocol, dated May 2007. The information in this Protocol is consistent with that contained in the 2007 edition, and provides updated Ministry of Environment's (MOE) Site Condition Standards (SCS) consistent with O. Reg. 511/09 (which amended O. Reg. 153/04 - Records of Site Condition) and the values contained in the MOE document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" (MOE, April 15, 2011, effective July 1, 2011). For convenience only, the SCS are provided in Appendix A of this Protocol.

The Protocol will assist a proponent (the owner of the fuel handling equipment, or the property owner on which the fuel handling equipment is installed, or the licensee of the site) in determining whether the site is in compliance with the environmental requirements of the LFHC or the FOC. This document does not apply to refineries and petrochemical plants where petroleum is being used as a feedstock. Such sites, with the exception of a facility regulated under O. Reg. 217/01 operating within such a site, are not regulated under the TSS Act.

The TSSA has been designated as the sole authority for the purpose of administering the TSS Act, LFHC and FOC.

2.0 Background

Environmental matters at operating fuel handling sites are regulated by the TSS Act. They may also be regulated by other provincial legislation including, the Environmental Protection Act (EPA), the Ontario Water Resources Act (OWRA) and the Clean Water Act (CWA). Parties involved in the ownership and operation of fuel handling sites must be aware of all applicable legislation.

In the event of a spill, leak, or the discovery of a petroleum product that has escaped to the environment or inside a building (herein referred to as an "escape of product"), the LFHC or FOC, as applicable, obliges the proponent to take immediate corrective action including, but not necessarily limited to, reporting and recovering the escaped product. The LFHC and FOC require the provision of an environmental assessment report and, if necessary, the remediation or management of the environmental impact caused by the escape of a petroleum product(s).

The TSSA is the designated authority for environmental matters at sites regulated by the TSS Act, however, when an environmental site assessment is being carried out on a fuel handling site in Ontario, the TSSA strongly advises the proponent to refer to the following MOE documents (as amended, updated or new documents are published) for additional guidance:

- O. Reg. 153/04 – Records of Site Condition

- Soil, Groundwater and Sediment Standards For Use Under Part XV.1 of the Environmental Protection Act (April 2011 and as updated)

2.1 MOE/TSSA Jurisdiction

The reporting procedure for an escape of product requires the proponent to contact the Spills Action Centre (SAC), MOE. Where an escape of product occurrence has been reported to SAC, Fuels Safety Program (FSP) will be informed. A FSP inspector may conduct an on-site visit to supplement the investigation and an order to bring about compliance may also be issued. The TSSA and MOE work cooperatively to minimize the duplication of effort in responding to environmental matters at fuel handling sites. When the remediation or management of a petroleum impact is required at an operating fuel handling site, the regulatory lead is with the FSP, TSSA.

Where an environmental impact caused by the escape of product poses the likelihood of an off-site environmental impact or an adverse effect to any drinking water supply, the regulatory lead will be transferred to MOE, regardless of whether the site is “operational” or not. Provided the site remains under the jurisdiction of FSP, the process within this Protocol will apply. TSSA will retain jurisdiction where the off-site impacts are limited to municipally owned land. (i.e. roadways).

Upon permanent closure of a fuel handling site, refer to the direction provided in sections 2.4.2 (Permanent Closure) and 8.3 (Decommissioning of Sites) of the LFHC, or, as applicable, section 9 (Environmental Responsibilities) of the FOC. MOE is the regulatory lead for environmental matters following the permanent closure of a fuel handling site once the required reports have been submitted to the TSSA under the LFHC and FOC.

A fuel handling site is considered “operational” provided the fuel handling equipment remains installed on the property, even if such equipment is not in use. In such a case, the site is regulated by TSSA. The removal of all fuel handling equipment from a property and the completion of the applicable LFHC or FOC environmental requirements constitutes a permanent closure and as such, on-going environmental matters are regulated by the MOE.

Reporting to the “Director” of FSP is accomplished by contacting the MOE’s SAC at 1-800-268-6060.

3.0 Operational Fuel Handling Sites

Where a petroleum product has escaped at an operational site, certain reporting, investigative and corrective action is necessary. Appendix B of this Protocol provides a general outline of an acceptable process for conducting a site investigation. If contaminant concentrations at a site exceed those described below, corrective action acceptable to the Director must be completed.

The following explains the obligation and methodology to report, assess and manage or cleanup an escape of product:

3.1 Spills

Any spill of a petroleum product in excess of the following must be immediately reported to the Director, FSP, in accordance with the provisions of the LFHC or, where applicable, the FOC (similar to the requirements of MOE’s O. Reg. 675/98, EPA):

100 L at sites restricted from public access (i.e. bulk facility, residential properties)

25 L at sites with public access (i.e. retail service station)

Spills of lesser quantities need not be reported to FSP unless the spill could:

- create a hazard to public health or safety;
- contaminate any fresh water source or waterway;
- interfere with the rights of any person; or
- allow entry of product into a sewer system or underground stream or drainage system.

The implementation of appropriate investigative and mitigative actions per the LFHC or FOC, as applicable, and this Protocol are required to ensure any environmental impact is properly evaluated and, where necessary, mitigated.

3.2 Leaks

All confirmed leaks, regardless of quantity released, must be immediately reported to the Director, FSP. Where applicable, the implementation of mitigative actions per the LFHC or FOC, as applicable, and this Protocol is also required.

3.3 Discovery of a Petroleum Product that has Escaped to the Environment or Inside a Building

The discovery of a petroleum product that has escaped to the environment or inside a building must be addressed pursuant to the following protocols. The three scenarios described below discuss actions required to address environmental conditions on site, at the property boundary, and off-site:

3.3.1 Environmental Conditions On-Site (within the property boundaries)

Separate Phase Product Discovered in a Monitoring Well or Excavation:

- Where separate phase product is detected within a monitoring well, observation well or excavation, the initial discovery must be reported to the Director, FSP. A full delineation of the extent of separate phase product and related dissolved and residual contamination must then be completed. All practical efforts to recover the product must be employed. Findings of the delineation must be reported to the Director, FSP.

Discovery of Petroleum Product-Derived Vapour in an Enclosed Space, Excavation or Monitoring Well:

- Where petroleum product derived vapour is discovered in an enclosed space, excavation, observation well or monitoring well, an investigation of the cause of the vapours is necessary. This investigation may indicate that a leak or spill is the cause of the vapours. If the findings of the investigation reveal the potential for a fire or explosion hazard, the Director, FSP must be notified immediately. The potential for any explosion or fire hazards must be eliminated.

If the findings confirm a spill, leak or escape of product by any other means, the occurrence must be reported to the Director if environmental conditions contravene those found in Table A of this Protocol.

Discovery of Soil or Groundwater Impact Related to a Petroleum Product:

Where soil or groundwater quality has been altered due to impact from a petroleum product, but the soil or groundwater quality meets permissible SCS for an operational site (Table 4 or Table 5 SCS), as applicable), no reporting or mitigative actions are required provided that:

- Table 2 or Table 3 SCS, as applicable, are met at the property boundary;
- no immediate corrective action is required as per section 4.0 of this Protocol; and
- the property is not classified as an “environmentally sensitive area” as defined by the MOE regulations.

Where the aforementioned conditions are not met, the occurrence must be reported to the Director, FSP. A delineation of the full extent of the exceedance is required. Following the complete delineation, options available to mitigate such an occurrence include:

- restore the on-site environment to Table 4 or Table 5 SCS, as applicable;
- restore the property boundary environment to Table 2 or Table 3 SCS, as applicable; or
- implement a Contaminant Management Plan (CMP) as per section 4.1 of this Protocol.

An alternative measure acceptable to the Director to address situations where the site is classified as sensitive (as defined by MOE regulations) or where conditions exceed applicable criteria is the submission of a Risk Assessment (RA). The RA must be prepared in accordance with the process outlined in the MOE regulations. The RA must then be reviewed and accepted by the MOE. The TSSA does not review or approve RAs. A copy of the MOE’s acceptance must be provided to FSP.

In the case of an environmentally sensitive area, a proponent must either submit an RA to the MOE for their review and acceptance, or restore the environment to the applicable SCS.

3.3.2. Environmental Conditions at the Property Boundaries

Where soil or groundwater quality at the property boundary of the site meets Table 2 or Table 3 of the SCS, as applicable, no reporting or mitigative actions are required provided site conditions are acceptable (no exceedance of Table 4 or Table 5 SCS as applicable, and no immediate corrective action required).

Where soil or groundwater quality at the property boundary of the site exceeds Table 2 or Table 3 of the SCS, as applicable, report the findings to the Director. A delineation of the full extent of the exceedance is required. Off-site migration of petroleum product derived impacts above applicable full depth SCS must be mitigated through remediation, or evaluated through the implementation of a CMP. Written acknowledgement from the affected property owner(s) or their respective agent is required for FSP’s approval to implement a CMP. Failure to address the environmental management of an off-site impact will result in the transfer of jurisdiction to MOE.

3.3.3. Environmental Conditions Off-Site (beyond the property boundaries)

Where soil or groundwater quality beyond the property boundary of the site meets Table 2 or Table 3 of the SCS, as applicable, no reporting or mitigative actions are required, provided on-site and

property boundary conditions are acceptable.

Where soil or groundwater quality beyond the property boundary of the site exceeds Table 2 or Table 3 of the SCS, as applicable, and where it is reasonable to conclude that the exceedance has been caused by the migration of petroleum related contaminants from the site, report the findings to the Director. A delineation of the full extent of the exceedance may be necessary.

Where off-site impacts to a municipal roadway exist, on a case-by-case basis and in consultation with the TSSA, the proponent may notify the municipality, in writing (with copy to TSSA), of the impacts, and providing the municipality concurs, further delineation on the roadway may not be required.

Where off-site migration of petroleum product derived impacts above applicable full depth SCS has occurred, a full depth remediation of the impacted soil and/or groundwater to Table 2 or Table 3 SCS, as applicable, on the impacted property(s) and at the property boundary of the fuel handling site may be required. The implementation of a CMP may only be acceptable if the owner(s) of the impacted off-site property(s) has been apprised of the situation, provided written concurrence to the use of a CMP, and where FSP has accepted the use of the CMP.

The CMP must ensure that further migration and/or accumulation of petroleum related contamination does not occur, and that site conditions remain safe for continued operation (see section 4.1 for details on the CMP).

Table A summarizes the reporting and investigative obligations of a proponent where there has been an escape of product at a site.

Reporting to the "Director" of FSP is accomplished by contacting the MOE's SAC at 1-800-268-6060.

Table A
SUMMARY OF REPORTING AND INVESTIGATIVE OBLIGATIONS

Situation	Reporting Obligations	Investigative Obligations
On the Property		
<u>3.1 Spills</u>	<p>Report to FSP as per the LFHC or FOC, as applicable, if one of the following conditions exist:</p> <ul style="list-style-type: none"> ➤ >100 litres at sites restricted from public access (bulk plant); ➤ >25 litres at sites with public access (retail operation); or ➤ where reporting exemptions as approved by the Director have been contravened. 	<p>Recover escaped product. Determine extent of contamination as necessary.</p>
<u>3.2 Leaks</u>	Report all confirmed leaks to	Investigate all suspected leaks.

Situation	Reporting Obligations	Investigative Obligations
	FSP.	Recover escaped product from confirmed leaks. Determine extent of contamination as necessary.
<u>3.3 Discovery of a Petroleum Product that has Escaped to the Environment or Inside a Building</u>		
<u>3.3.1 Environmental Conditions On Site (within the property boundaries):</u>		
<u>Discovery of liquid product in a monitoring well or excavation</u>	Report all such occurrences to FSP.	Recover product and determine extent of product and related contamination.
<u>Petroleum vapours in an enclosed space, excavation or monitoring well</u> <u>Discovery of petroleum related soil or groundwater contamination</u>	Report if source is confirmed to be from a leak, spill (as per spill section above), or if related contamination exceeds reportable levels.	Determine source and extent of vapours.
Conditions meet Table 3/5 (non potable)	No reporting required provided that environmental conditions at the property boundary meet Table 3.	
Conditions exceed Table 5 (non potable)	Report to FSP.	Determine the extent of contamination and either restore to applicable levels or implement a CMP.
Conditions exceed Table 2/4 (potable)	Report to FSP.	Determine the extent of contamination and either restore to applicable levels or implement a CMP.
<u>3.3.2 Environmental Conditions at the Property Boundaries</u>		
Conditions meet Table 2 or 3, as applicable:	Report to FSP only if environmental conditions on property exceed Table 4 or 5,	

Situation	Reporting Obligations	Investigative Obligations
Conditions exceed Table 2 or 3, as applicable:	as applicable. Report to FSP.	Determine the extent of contamination and either restore to applicable levels or implement a CMP.
<u>3.3.3 Environmental Conditions Off-Site (beyond the property boundaries)</u>		
Conditions meet Table 2 or 3, as applicable:	No Reporting.	
Conditions exceed Tables 2 or 3, as applicable:	Report to FSP.	Determine the extent of contamination. If restricted to non-sensitive, municipally owned receptors, communicate with affected owners and restore to applicable levels or implement a CMP. If contamination has migrated to any other property, contact FSP and the MOE.

4.0 Site Restoration at Operational Fuel Handling Sites

The intent of site remediation at an operational site is to return petroleum-impacted soils and groundwater to conditions such that there will be no likelihood of the following:

- off-site migration of petroleum related contaminants exceeding the applicable SCS; or
- unacceptable safety conditions for continued operation.

A proponent-driven (voluntary) remediation may be conducted at any time at a site. An environmental remediation will be required by FSP if immediate corrective action is deemed necessary based on the site conditions.

FSP encourages communication with our Environmental Office to discuss proposed remediation programs to facilitate compliance with legislative requirements. It is the responsibility of the proponent and their consultant to ensure the applicability and effectiveness of the selected program. When performing assessments and remedial programs FSP requires the use of personnel meeting the requirements of a “Qualified Person” as defined under O.Reg 153/04.

Immediate corrective action is necessary to eliminate:

- the presence of liquid phase-separated product evident on the surface or in the subsurface, and/or migrating off-site;

- any potential explosion hazards caused by petroleum vapour accumulation in enclosed spaces; and
- the potential for off-site migration of a petroleum product and related contaminants.

As per the LFHC or FOC, or where required by the Director, the proponent shall submit an environmental assessment report acceptable to the Director documenting the full extent and severity of a petroleum product release, and that the resulting impact does not require immediate or additional remediation.

Numerous technologies are available to utilize throughout a site remediation project. The use of certain technologies may require obtaining approvals from other regulatory bodies. FSP encourages the use of alternative solutions, so long as all applicable approvals and certificates have been obtained.

The SCS for soil and groundwater are reproduced in Appendix A of this Protocol. The selection of applicable SCS for a specific site is the same as for MOE regulations. Classification considerations include whether the groundwater is potable or non-potable, land use classification, soil texture, depth of overburden, soil pH, site sensitivity, and whether a full depth or stratified remediation will be completed.

Non-potable groundwater criteria (Table 3 for full depth remediation or Table 5 for stratified remediation) may be used at a site only if drinking water supply to the site and the surrounding area is not obtained from groundwater and the groundwater directly underlying the subject site is not currently used as a drinking water source. Non-potable criteria may also be applied at a site where local groundwater is considered potable only through the development of a RA that has been accepted by the MOE. In such a case, the proponent must provide FSP with a copy the MOE's acceptance of the RA.

The Tables in Appendix A of this Protocol reproduce selected provincial SCS for petroleum fuel related contaminants in both potable and non-potable groundwater environments. The Tables represent the minimum standard for contaminant testing at a fuel handling site, but do not reflect a complete list of the contaminants that may be of interest at such a site. Please refer to the document entitled "Soil, Groundwater and Sediment Standards For Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) for a complete list of contaminant SCS. TSSA will refer to O. Reg 153/04 (as amended) for guidance when considering whether the site is an environmentally sensitive site.

4.1 Contaminant Management Plan

While a site remains operational, it may be permissible to manage on-site petroleum related contaminant(s) exceeding the applicable SCS (i.e. Tables 4 or 5, as applicable) provided it is demonstrated that contaminant concentrations at the property boundary meet applicable full depth cleanup criteria (Table 2 or 3, as applicable), and that environmental conditions on-site do not require immediate corrective action (see section 4.0).

As such, the proponent may elect to defer remediation until permanent closure of the fuel handling site. An option offered by FSP to accommodate this is the CMP. The intent of a CMP is to provide a formal mechanism for on-going monitoring of petroleum related contaminant(s) rather than the proponent completing an environmental remediation at the time of discovery.

The proponent must submit the proposed CMP in the form of a signed, technical report, which

concludes that no immediate corrective action is required. The report must be submitted to FSP within 90 days of the discovery of the escape of product (unless otherwise directed). The proponent may implement a CMP at its discretion; however, FSP will review submitted CMPs and will provide a written response indicating whether or not the proposal is considered acceptable. FSP may require revisions to the proposed CMP.

At a minimum, a CMP must address and ensure the following:

- The extent and severity of the petroleum-related contamination
- The contaminants do not pose a threat to on-site or off-site receptors, including drinking water supplies
- The concentration of the petroleum related contaminant(s) should not increase or migrate significantly over time
- A proposed contaminant monitoring schedule for the documentation of environmental conditions over time while the petroleum related contaminant(s) of concern remains and for providing status reports to FSP
- A written acknowledgement of the proposal to implement the CMP by all affected off-site property owner(s)
- A written commitment to provide immediate reporting to FSP should conditions at the site degrade to where immediate corrective action is required and to notify FSP in writing as to when the monitoring program is to be revised or is no longer necessary
- Any changes to a CMP must be submitted in writing to the TSSA prior to implementation.

The management of off-site petroleum related contaminant(s) may only be considered when it has been determined that the impacts are completely delineated and immediate corrective action is not necessary and when consent to implement the CMP has been received in writing from the affected property owner(s).

Note: Should environmental conditions at a site under a CMP degrade such that immediate corrective actions become necessary, FSP may rescind the approval for the CMP, and may require immediate implementation of a contingency plan. Further, should the site be permanently closed, the jurisdiction over environmental matters will revert to the MOE.

5.0 Upgrading of Equipment at Fuel Handling Sites

When fuel storage equipment (aboveground or underground) at liquid fuels handling sites regulated under the LFHC are upgraded (fuel handling equipment is replaced and the site continues to handle fuel), the site proponent is obliged to complete the procedures as outlined in the LFHC. FSP recommends the proponent refer to Section 2.4.2 (Permanent Closure) and Section 8 (Environmental Restoration) in the LFHC to ensure they understand and fulfil their obligations.

When fuel oil storage equipment (aboveground or underground) at sites regulated under the FOC are upgraded (fuel handling equipment is replaced and the site continues to handle fuel), the site proponent is obliged to complete the necessary procedures as outlined in Section 9 (Environmental Responsibilities) of the FOC. FSP recommends the proponent refer to the applicable Section 9 clause depending on the size and type of tank to ensure they understand and fulfil their obligations.

6.0 Permanent Closure of Fuel Handling Sites

Where a liquid fuel handling facility regulated under the LFHC is to be permanently closed (i.e. all fuel handling equipment will be permanently removed and the facility will no longer handle fuel), the site proponent is obliged to complete the requirements outlined in Section 8 (Environmental Restoration) of the LFHC, which includes:

- removal of all fuel handling equipment;
- notification to the FSD, MOE and local municipality in writing within 90 days after the removal of the fuel handling equipment;
- completion of an investigation and submission of a site closure report which identifies the full extent and severity of all surface and subsurface contaminant(s) related to the fuels handling operations within and where necessary and practical, beyond the property; and
- notifying MOE as required by the EPA and/or OWRA.

Where there is a permanent removal of either the aboveground or underground storage tank systems at fuel oil handling sites regulated under the FOC, the site proponent must comply with Section 9 (Environmental Responsibilities) of the FOC. FSP recommends the proponent refer to the applicable Section 9 clause depending on the size and type of tank to ensure they understand and fulfil their obligations.

Where the aboveground or underground storage tank systems at a fuel oil handling facility are being permanently removed, Section 9 (Environmental Restoration) of the FOC obliges the following:

- completion of an investigation which identifies the full extent and severity of all surface and subsurface contaminant(s) related to the fuels handling operations within and where necessary and practical, beyond the property;
- notifying TSSA of the removal of the tank(s) removal and
- notifying MOE as required by the EPA and/or OWRA.

In addition, FSP recommends the proponent refer to the MOE regulations for further guidance during permanent closure. Any questions related to environmental remediation obligations following the permanent closure should be directed to the local District Office, MOE.

7.0 Documentation Requirements

With respect to site investigations, site assessments, site remediation and CMPs, all information collected should be kept in a concise, well-organized technical report format and made available to FSP upon request. A "Qualified Person" as defined by O.Reg 153/04 must sign submissions of technical content and these reports must include sufficient information to adequately evaluate the location, nature, extent and severity of the petroleum related contaminant(s) and the remediation efforts proposed to mitigate the issue.

APPENDIX A
SITE CONDITION STANDARDS

The following tables reproduce the values found in the Ministry of Environment document entitled "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011 (SCS). In the event of a conflict between the following tables and the SCS, the SCS value shall take precedence.

Technical Standards & Safety Authority

TABLE 1 - FULL DEPTH BACKGROUND SITE CONDITION STANDARDS

TABLE 1 CONTAMINANT	SOIL (other than sediment) ug/g		GROUND WATER (ug/l)
	AGRICULTURAL OR OTHER PROPERTY USE	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL/INDUSTRIAL /COMMERCIAL/COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USES
BENZENE	0.02	0.02	0.5
ETHYLBENZENE	0.05	0.05	0.5
TOLUENE	0.2	0.2	0.8
XYLENE MIXTURE	0.05	0.05	72
PETROLEUM HYDROCARBONS F1*	17	25	420
PETROLEUM HYDROCARBONS F2	10	10	150
PETROLEUM HYDROCARBONS F3	240	240	500
PETROLEUM HYDROCARBONS F4	120	120	500
LEAD	45	120	1.9
METHYL TERT BUTYL ETHER	0.05	0.05	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.
N/V = No value derived.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

TABLE 2 - FULL DEPTH GENERIC SITE CONDITION STANDARDS IN A POTABLE GROUND WATER CONDITION

TABLE 2 CONTAMINANT	SOIL (other than sediment) ug/g			POTABLE GROUNDWATER (ug/l)
	AGRICULTURAL OR OTHER PROPERTY USE	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE	INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	5
ETHYLBENZENE	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
TOLUENE	(6) 2.3	(6) 2.3	(9)6.4	24
XYLENE MIXTURE	(25) 3.1	(25) 3.1	(30) 26	300
PETROLEUM HYDROCARBONS F1 *	(65) 55	(65) 55	(65) 55	750
PETROLEUM HYDROCARBONS F2	(150) 98	(150) 98	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(1300) 300	(2500) 1700	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(5600) 2800	(6600) 3300	500
LEAD	45	120	120	10
METHYL TERT BUTYL ETHER	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.

* F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result

A property does not meet an applicable site condition standard in relation to a petroleum hydrocarbon unless the qualified person has determined that there is no evidence of free product, including but not limited to, any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples. O. Reg. 153/04, s. 49 (1).

A property does not meet an applicable potable ground water site condition standard unless the qualified person has determined that there is no indication of objectionable petroleum hydrocarbon odour and taste associated with the ground water. . O. Reg. 511/09, s. 49 (2)

**TABLE 3 - FULL DEPTH GENERIC SITE CONDITION STANDARDS IN
A NON POTABLE GROUND WATER CONDITION**

TABLE 3 CONTAMINANT	SOIL (other than sediment) ug/g		NON-POTABLE GROUNDWATER (ug/l)
	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE	INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	(0.17) 0.21	(0.4) 0.32	(430) 44
ETHYLBENZENE	(15) 2	(19) 9.5	2300
TOLUENE	(6) 2.3	(78) 68	18000
XYLENE MIXTURE	(25) 3.1	(30) 26	4200
PETROLEUM HYDROCARBONS F1 *	(65) 55	(65) 55	750
PETROLEUM HYDROCARBONS F2	(150) 98	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(2500) 1700	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(6600) 3300	500
LEAD	120	120	25
METHYL TERT BUTYL ETHER	(1.4) 0.75	(3.2) 11	(1400) 190

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.

* -F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result

A property does not meet an applicable site condition standard in relation to a petroleum hydrocarbon unless the qualified person has determined that there is no evidence of free product, including but not limited to, any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples. O. Reg. 153/04, s. 49 (1).

TABLE 4 - STRATIFIED SITE CONDITION STANDARDS IN A POTABLE GROUND WATER CONDITION

TABLE 4 CONTAMINANT	SOIL (other than sediment) ug/g				POTABLE GROUNDWATER (ug/l)
	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE		INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE		ALL TYPES OF PROPERTY USE
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
BENZENE	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	(1.3) 0.92	5
ETHYLBENZENE	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
TOLUENE	(6) 2.3	(9) 6.2	(9) 6.4	(9) 6.4	24
XYLENE MIXTURE	(25) 3.1	(25) 3.1	(30) 26	(30) 26	300
PETROLEUM HYDROCARBONS F1 *	(65) 55	(65) 55	(65) 55	(65) 55	750
PETROLEUM HYDROCARBONS F2	(150) 98	(150) 98	(250) 230	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(7200) 5800	(2500) 1700	(7200) 5800	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(8000) 6900	(6600) 3300	(8000) 6900	500
LEAD	120	1000	120	1000	10
METHYL TERT BUTYL ETHER	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	(2.3) 1.6	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

A property does not meet an applicable site condition standard in relation to a petroleum hydrocarbon unless the qualified person has determined that there is no evidence of free product, including but not limited to, any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples. O. Reg. 153/04, s. 49 (1).

A property does not meet an applicable potable ground water site condition standard unless the qualified person has determined that there is no indication of objectionable petroleum hydrocarbon odour and taste associated with the ground water. . O. Reg. 511/09, s. 49 (2)

TABLE 5 - STRATIFIED SITE CONDITION STANDARDS IN A NON-POTABLE GROUND WATER CONDITION

TABLE 5 CONTAMINANT	SOIL (other than sediment) ug/g				NON-POTABLE GROUNDWATER (ug/l)
	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE		INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE		ALL TYPES OF PROPERTY USE
	Surface Soil	Subsurface Soil	Surface Soil	Subsurface Soil	
BENZENE	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	(4.4) 6.1	(430) 44
ETHYLBENZENE	(15) 2	(16) 2	(19) 9.5	(19) 17	2300
TOLUENE	(6) 2.3	(50) 6.2	(78) 68	(78) 68	18000
XYLENE MIXTURE	(25) 3.1	(25) 3.1	(30) 26	(30) 26	4200
PETROLEUM HYDROCARBONS *F1	(65) 55	(65) 55	(65) 55	(65) 55	750
PETROLEUM HYDROCARBONS F2	(150) 98	(150) 98	(250) 230	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(7200) 5800	(2500) 1700	(7200) 5800	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(8000) 6900	(6600) 3300	(8000) 6900	500
LEAD	120	1000	120	1000	25
METHYL TERT BUTYL ETHER	(1.4) 0.75	(1.4) 0.75	(3.2) 11	(3.4) 14	(1400) 190

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.

* F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

A property does not meet an applicable site condition standard in relation to a petroleum hydrocarbon unless the qualified person has determined that there is no evidence of free product, including but not limited to, any visible petroleum hydrocarbon film or sheen present in the ground water or surface water or in any ground water or surface water samples.
O. Reg. 153/04, s. 49 (1).

TABLE 6 – GENERIC SITE CONDITION STANDARDS FOR SHALLOW SOILS IN POTABLE GROUND WATER CONDITION

TABLE 6	SOIL (other than sediment) ug/g			POTABLE GROUND WATER (ug/L)
	AGRICULTURAL OR OTHER PROPERTY USE	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE	INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	(0.17) 0.21	(0.17) 0.21	(0.4) 0.32	0.5
ETHYLBENZENE	(1.6) 1.1	(1.6) 1.1	(1.6) 1.1	2.4
TOLUENE	(6) 2.3	(6) 2.3	(9) 6.4	24
XYLENE MIXTURE	(25) 3.1	(25) 3.1	(30) 26	72
PETROLEUM HYDROCARBONS F1*	(65) 55	(65) 55	(65) 55	420
PETROLEUM HYDROCARBONS F2	(150) 98	(150) 98	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(1300) 300	(2500) 1700	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(5600) 2800	(6600) 3300	500
LEAD	45	120	120	10
METHYL TERT BUTYL ETHER	(1.4) 0.75	(1.4) 0.75	(2.3) 1.6	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.
N/V = No value derived.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not to subtract BTEX from the analytical result

**TABLE 7 – GENERIC SITE CONDITION STANDARDS FOR SHALLOW SOILS IN A
NON-POTABLE GROUND WATER CONDITION**

TABLE 7	SOIL (other than sediment) ug/g		NON - POTABLE GROUND WATER (ug/l)
CONTAMINANT	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL PROPERTY USE	INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	(0.17) 0.21	(0.4) 0.32	0.5
ETHYLBENZENE	(15) 2	(19) 9.5	54
TOLUENE	(6) 2.3	(78) 68	320
XYLENE MIXTURE	(25) 3.1	(30) 26	72
PETROLEUM HYDROCARBONS F1*	(65) 55	(65) 55	420
PETROLEUM HYDROCARBONS F2	(150) 98	(250) 230	150
PETROLEUM HYDROCARBONS F3	(1300) 300	(2500) 1700	500
PETROLEUM HYDROCARBONS F4	(5600) 2800	(6600) 3300	500
LEAD	120	120	20
METHYL TERT BUTYL ETHER	(1.4) 0.75	(3.2) 11	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.
N/V = No value derived.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

TABLE 8 – GENERIC SITE CONDITION STANDARDS FOR USE WITHIN 30 M OF A WATER BODY IN A POTABLE GROUND WATER CONDITION

TABLE 8 CONTAMINANT	SOIL STANDARDS (other than sediment)		GROUND WATER (ug/L)
	AGRICULTURAL OR OTHER PROPERTY USE	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL/ INDUSTRIAL/ COMMERCIAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	0.02	0.02	5
ETHYLBENZENE	0.05	0.05	2.4
TOLUENE	0.2	0.2	22
XYLENE MIXTURE	0.05	0.05	300
PETROLEUM HYDROCARBONS F1*	17	25	420
PETROLEUM HYDROCARBONS F2	10	10	150
PETROLEUM HYDROCARBONS F3	240	240	500
PETROLEUM HYDROCARBONS F4	120	120	500
LEAD	45	120	10
METHYL TERT BUTYL ETHER	0.05	0.05	15

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.
N/V = No value derived.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

TABLE 9 – GENERIC SITE CONDITION STANDARDS FOR USE WITHIN 30 M OF A WATER BODY IN A NON-POTABLE GROUND WATER CONDITION

TABLE 9	SOIL STANDARDS (other than sediment) ug/g	GROUND WATER (ug/L)
CONTAMINANT	RESIDENTIAL/ PARKLAND/ INSTITUTIONAL/ INDUSTRIAL/ COMMERICAL/ COMMUNITY PROPERTY USE	ALL TYPES OF PROPERTY USE
BENZENE	0.02	44
ETHYLBENZENE	0.05	1800
TOLUENE	0.2	14000
XYLENE MIXTURE	0.05	3300
PETROLEUM HYDROCARBONS F1*	25	420
PETROLEUM HYDROCARBONS F2	10	150
PETROLEUM HYDROCARBONS F3	240	500
PETROLEUM HYDROCARBONS F4	120	500
LEAD	120	20
METHYL TERT BUTYL ETHER	0.05	190

NOTES:

() - Standard value in brackets applies to medium and fine textured soils.
N/V = No value derived.

*F1 Fraction does not include BTEX, however, the proponent has the choice as to whether or not subtract BTEX from an analytical result

APPENDIX B

SITE ASSESSMENT AND ENVIRONMENTAL RESTORATION PROCESS

Where a spill or leak of a petroleum product is suspected or known to have occurred, or where a petroleum product has escaped to the environment or inside a building where the cause of the escape is unknown, the proponent may be obliged by the LFHC and FOC to fulfil certain reporting and environmental assessment and remediation actions (see section 3.0 of this document). Measures to address such occurrences acceptable to the Director include remediation of the petroleum related contaminant(s) to applicable SCS, the submission of a RA to MOE, or the development and implementation of a CMP. These options are discussed in detail in section 3.0 of the Protocol.

To make an informed decision regarding available options, an assessment of the full extent and severity of the petroleum related contaminant(s) must be completed (both on-site and where if required, off-site). An assessment must be completed whether an adverse effect has or is likely to occur, and if potential off-site migration of contaminant(s) of concern has or is likely to occur.

An environmental assessment must be completed by personnel meeting the requirements of a "Qualified Person" as defined by O.Reg 153/04 (as amended) and typically utilizes a series of strategically placed test pits and/or boreholes along with the installation of groundwater and/or vapour monitoring wells onsite and if necessary, off-site. Results of a soil and groundwater sampling and analysis program will assist in determining the extent and severity of the petroleum related contaminant(s). Impacts to soil and, if encountered, groundwater must be assessed in determining the severity of the environmental impact (it is necessary to assess groundwater quality if petroleum related contaminant concentrations identified within the soils suggest that impact to groundwater is likely).

The following is a list of information which may be required by FSP to assess the appropriateness of site remediation efforts, or whether the site is candidate for a CMP or other measure acceptable to the Director:

- a historic review of the type of equipment and petroleum fuels and related compounds handled on-site;
- a general site location plan (ideally scaled at about 1:10,000 showing a minimum one kilometre radius around the subject site) and a detailed site plan illustrating, as a minimum, the location of buildings, service conduits (both on-site and adjacent to the site), underground/ aboveground storage tanks, pumps and lines, etc;
- a cursory assessment of adjacent sites, including an assessment of the likelihood of adverse effect at those sites. (i.e. proximity of sensitive land uses and subsurface structures, water wells, surface water courses, etc.);
- an assessment of the full extent and severity (both on- and if necessary, off-site) of all phases of petroleum related contaminant(s) (i.e. separate phase product, dissolved phase in groundwater, residual in soil, vapour phase, etc.). This should include a detailed, scaled site plan illustrating the location and extent of such contaminant(s);
- an assessment of the local use of groundwater (i.e. potable or non-potable). This should include a discussion of the susceptibility of on- and off-site water wells to petroleum related contaminant(s); and,

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- where necessary and to the extent possible, a detailed assessment of the hydrogeology of the site (i.e. depth to and flow direction of groundwater, permeability of site soils, flow velocity, etc.).

Storage Tank Removal/Excavation Programs

As outlined in the LFHC and the FOC a report must be submitted to the TSSA under a number of circumstances following the removal of an underground or aboveground storage tank. We advise you verify the requirements based on the type of tank system being removed.

The report must present the analytical findings of laboratory testing from an accredited laboratory for the presence of petroleum hydrocarbon compounds from an appropriate number of samples as outlined in the following table.

Upon completion of the tank removal or the remediation of the petroleum impacted property, a verification sampling program is required to ensure that the restorative program has been completed adequately. Please refer to Ministry of Environments (MOE) guidance documents for detailed information. For quick reference with regard to excavation following a tank removal/remedial work on a property, the following table is provided. The number of samples to be submitted for analytical testing is determined based on the size of the excavation in accordance with the following table:

Minimum Confirmation Sampling		
Floor Area (m ²)	Floor Samples	Side Wall Samples ³
<25	2	2
25-50	2	3
50-100	3	3
100-250	3	5
250-500	4	6
500-750	4	7
750-1000	5	8

The soil analyses must include, as a minimum, benzene, toluene, ethylbenzene, xylenes (BTEX) and petroleum hydrocarbons (PHC F1-F4) and. If groundwater is encountered and there is evidence of soil contamination, an assessment of the potential impact to groundwater quality shall also be considered. Groundwater analysis shall include as a minimum BTEX and petroleum hydrocarbons PHC F1-F4.