

# Drinking Water Source Protection Background Document

## The handling and storage of fuel

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#### NOTE TO THE READER

This document is one of eighteen background reports now under development by staff at various Conservation Authorities and Conservation Ontario in support of Source Protection Plan development. The final set of reports will cover all nineteen prescribed water quality threat types. Each report looks at the nature of one or more types of drinking water threat, describes the local occurrence (“is” and “would be”) of those threats, assesses existing policies/programs, and introduces related ‘policy concepts’ for source protection planning. ***While every effort has been made to ensure the accuracy of the information in this document, it should not be construed as legal advice or relied on as a substitute for the legislation.***

This version is considered to be a ***working draft*** because it will be going through additional review by MOE and subject experts. SPA/SPRs can use these documents with the understanding that additional refinement will occur. Any questions on these reports can be directed to Nicole Barbato, Source Water Protection Liaison (via [nbarbato@conservationontario.ca](mailto:nbarbato@conservationontario.ca)). Thank you!

## 1. Definition

This paper provides background information for **prescribed drinking water threat 15 - the handling and storage of fuel**.

The main consideration to reduce or eliminate drinking water threats related the handling and storage of fuel is to prevent fuel spills that could enter surface water or groundwater. A primary objective is to eliminate or manage significant drinking water threats such that they cease to be significant.

This category of drinking water threat includes: i) the handling of liquid fuel in relation to its storage; and ii) the storage of liquid fuel. The types of storage facilities to be considered are defined in Ontario Regulation 213/01 (Fuel Oil) or Ontario Regulation 217/01 (Liquid Fuels). Both of these regulations are made under the *Technical Standards and Safety Act, 2000*. Although not part of the TSSA Regulations, facilities where fuel is manufactured or refined are also to be considered. The types of fuel storage facilities include:

- bulk plants or facilities where it is manufactured or refined;
- permanent or mobile retail outlets;
- marinas;
- cardlocks/keylocks;
- private outlets (e.g. public works yard, contractor yard);
- farms; and
- furnace oil tanks for home and business heating purposes.

The types of fuels considered include diesel, used oil when used as a fuel, kerosene and hydrocarbon fuel (e.g. gasoline)

## 2. What causes this activity to be a drinking water threat?

The Ontario Ministry of the Environment (MOE) has produced the Tables of Drinking Water Threats, herein referred to as the Threats Tables. The Threats Tables identify BTEX compounds and petroleum hydrocarbons (F1 to F4) as contaminants that could make their way into surface water or groundwater from spills associated with the handling of fuel (circumstances 112 to 191 in the Threats Tables) and the storage of fuel (circumstances 1289 to 1408 in the Threats Tables – Ontario Ministry of the Environment, 2009).

BTEX is an acronym for four compounds contained in fuels: benzene, toluene, ethylbenzene and xylene. The BTEX compounds have strong odours and tastes, which generally discourages accidental intake through drinking water. Benzene is a known carcinogen. Some research has also suggested that ethylbenzene may be carcinogenic and could produce birth defects. BTEX are highly water-soluble and can travel long distances in groundwater and surface water environments. Petroleum hydrocarbons (PHC) can cause an array of negative health effects to

the reproductive, respiratory, immune and nervous systems and can also harm the kidneys, liver, skin, eyes, and blood. PHC's may also affect the odour, taste, and appearance of water.

#### Ontario Drinking Water Standards and Objectives (Ontario Ministry of the Environment, 2006)

All the BTEX compounds have Ontario Drinking Water Standards or Objectives. The maximum acceptable concentration in drinking water for benzene is 0.005 mg/L. The aesthetic objectives for ethylbenzene, xylene and toluene are 0.0024 mg/L, 0.3 mg/L and 0.024 mg/L respectively. While there are no Ontario standards, objectives or guidelines specifically for PHCs, the four BTEX compounds noted above are typical components of petroleum hydrocarbons..

The circumstances within the Threats Tables are divided into categories based on the handling of liquid fuel in relation to the type of storage and the volume of fuel stored. The list below summarizes the circumstances related to the potential for fuel spills where BTEX or PHCs could enter groundwater or surface water.

- Above or below grade handling
- Above, partially below or below grade storage
- Storage at a bulk plant or a facility that manufactures or refines fuel
- Storage where fuel is dispensed or used
- Volume ranges include:
  - Less than 25 litres;
  - At least 25 litres, but not more than 250 litres;
  - At least 250 litres, but not more than 2500 litres
  - More than 2500 litres.

#### Significant Drinking Water Threats

Significant drinking water threats associated with the handling or storage of fuel are only possible in wellhead protection areas or intake protection zones with vulnerability scores of 10. Many of the circumstances involving more than 2500 litres of fuel are significant. This large volume of fuel is something that is generally associated with a gas station, bulk plant, refinery or manufacturer. Volumes of more than 2500 litres may also occur on farms, works yards or other properties where one or more tanks are used for refueling vehicles or equipment. As well, volumes between 250 and 2500 litres which are stored below or partially below grade, can be significant drinking water threats. Home heating oil tanks are typically 900 litres; therefore any which are below grade or partially below grade and in an area with a vulnerability score of 10 may be significant drinking water threats.

#### Moderate Drinking Water Threats

Moderate drinking water threats are possible in: wellhead protection areas A, B and C with a vulnerability score of 8 or greater; and intake protection zones with a vulnerability score of 7 or higher.

### Low Drinking Water Threats

Low drinking water threats are possible in: wellhead protection area zones with a vulnerability score of 6 or higher; highly vulnerable aquifers and significant groundwater recharge areas with a vulnerability score of 6; and all intake protection zones with a vulnerability score of 4.8 or greater.

## **3. Understanding the nature of the drinking water threat?**

Activities related to fuel handling and storage can generally be thought of as those activities where fuel is: stored and used at that location; refined or manufactured; or stored and dispensed.

## **4. Applicable legislation, policies and programs**

This section identifies the legislation, policies and programs that apply to the fuel handling and storage circumstances as identified in the Threats Tables.

### **a) Federal**

#### Canadian Environmental Protection Act (Government of Canada, 1999)

The Canadian *Environmental Protection Act* (CEPA) does not designate fuels as toxic substances unless the “fuel contains toxic substances that are dangerous goods within the meaning of section 2 of the *Transportation of Dangerous Goods Act, 1992* and that

- a. are neither normal components of the fuel nor additives designed to improve the characteristics or the performance of the fuel; or
- b. are normal components of the fuel or additives designed to improve the characteristics or performance of the fuels, but are present in quantities or concentrations greater than those generally accepted by industry standards.”

As such, there are no special federal regulations, guidelines or codes of practice to be considered for this category of drinking water threat.

#### Canada Fisheries Act (Government of Canada, 1985).

In general, the *Fisheries Act* is enforced by Fisheries and Oceans Canada; however, the section that applies to contamination is under the authority of Environment Canada. The main objective of the *Act* is to protect fish including their habitat and other life requirements. The deposition of any deleterious substance (contaminant) is in contravention of the legislation.

Section 36(3) of the *Fisheries Act* states that: “... no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.”

Liquid fuels can be considered deleterious substances. As such the Act would apply to any spill from handling or storage of fuel to surface water frequented by fish.

## **b) Provincial**

There are three pieces of provincial legislation that deal specifically with the storage and handling of fuel. Two are regulations under the *Technical Standards and Safety Act* and one is the Ontario Fire Code Ontario Regulation 213/07. It must be noted that the Ontario Fire Code is superseded by the TSSA regulations where there is overlap.

The Technical Standards and Safety Authority (TSSA) is an independent, non-government, non-profit organization that has provincial jurisdiction over safe and responsible handling of petroleum products used as motor or appliance fuel (i.e. gasoline, diesel/fuel oil, natural gas and propane). The TSSA is responsible for enforcement of the *Technical Standards and Safety Act, 2000* and the related regulations. The specific areas of jurisdiction are retail outlets (gas station, marina, cardlock/keylock), private outlets (farm, business, residence), bulk plants (not refineries) and tank vehicles (trucks, not railcars).

A Code of Adoption Document and associated Director's Orders have been produced for both O.Reg 213/01 (Fuel Oil) and O.Reg. 217/01 (Liquid Fuels). Neither of these regulations addresses waste oil not used as fuel or facilities that manufacture or refine fuel.

The Codes are an extension of the respective regulations and generally include information about:

- Aboveground and underground storage tank installation requirements
- Acceptable equipment storage
- Environmental responsibilities
- Licensing requirements
- Maintenance requirements and inspections

(TSSA presentation to Source Water Protection Managers and Chairs, September 2010)

### Ontario Regulation 213/01: Fuel Oil (Government of Ontario, 2001)

Section 2(1): "This Regulation applies to the installation, testing, maintenance, repair, removal, replacement, inspection and use of appliances, equipment, components and accessories where fuel oil is to be used as a fuel, but it does not apply to equipment referred to in Ontario Regulation 217/01 (Liquid Fuels) or to the transmission of fuel under Ontario Regulation 210/01 (Oil and Gas Pipeline Systems)."

(2) This Regulation applies to the maintenance, modification and specified upgrading of existing equipment and to all new equipment.

It applies specifically to:

- a. Appliances, equipment, components, and accessories where oil is used for fuel purposes such as
    - i. Forced-air furnaces;
    - ii. Boilers;
    - iii. Process furnaces;
    - iv. Water heaters;
    - v. Vehicle heaters; and
    - vi. Power supplies for buildings
  - b. All stationary and portable oil-burning equipment, including fuel supply equipment and piping; and
  - c. Aboveground and underground tanks.
- It requires licensing or certification for anyone who undertakes any of the activities noted above as well as for fuel delivery where fuel oil is used in an appliance for fuel.
  - Fuel oil cannot be delivered unless the situation complies with the Regulation, it has been inspected at least once in the last ten years and the tank has been registered, if it is underground.
  - No new appliances or equipment can be put into use until a satisfactory inspection is conducted by the distributor.
  - Depending on the severity of an unacceptable condition related to an appliance or tank system fuel, delivery will be refused and the fuel oil supply may be shut off.

The Code that goes along with O.Reg 213/01, Ontario installation code for oil-burning equipment, 2006, provides more detailed requirements and recommendations including items of interest for drinking water protection. The following list presents items of interest for drinking water protection.

- Inspections are required once every ten years (i.e. some fuel distributors do not have a policy to require annual inspections).
- Underground storage tanks cannot be located closer than 15 m to drilled wells and 30 m to dug wells or waterways
- Above ground storage tanks greater than 5000 L require secondary containment
- Above ground and underground storage tanks are allowed in flood prone areas if equipped to prevent uplift.
- The six inch gap between the drop tube and the bottom of underground storage tanks means that this fuel cannot be pumped out in instances where there is tank disuse or a leak.
- The minimum detection limits for underground storage leak detection are not zero and some do not include automated alarms; therefore, a month could pass before a leak is detected.

- Single –walled tanks are permitted (double bottom will be required 2011)
- Registration of underground storage tanks was not required until 2001 so any that have not been filled since that time are unknown and could be impacting drinking water sources.

Ontario Regulation 217/01: Liquid Fuels (Government of Ontario, 2001)

Section 2(1): “This Regulation applies to facilities where gasoline or an associated product is handled, loaded or dispensed to be used as a fuel in motor vehicles or as a fuel oil.”

(2) It doesn't apply to,

- a. Equipment or installations associated with standby generators or heating oil systems
- b. Any matter regulated under Ontario Regulation 213/01
- c. Any matter related to the subject matter of this regulation that is regulated by the Government of Canada – Federal Lands
- d. The storage, handling and use of equipment or installations for gaseous fuels
- e. Processing plants where the resulting product is not used as a fuel
- f. Petroleum refineries
- g. Equipment or installations at underground parts of an underground mine that are subject to the Occupational Health and Safety Act or fuels packaged consumer goods

This includes facilities where gasoline or an associated product is handled, loaded or dispensed to be used as a fuel in motor vehicles or as a fuel oil. This includes a permanent or mobile retail outlet, bulk plant, marina, cardlock/keylock, private outlet or farm where gasoline or an associated product is handled other than in portable containers.

The Regulation requires:

- Annual licenses for facilities and registration for contractors
- reporting for an occurrence, spill or accident
- depending on the severity of an unacceptable condition the supply of gasoline may be stopped and orders given to fix the situation
- locations of wells must be included in applications for a license

The Code that goes along with Ontario Regulation 217/01, Liquid Fuels Handling Code, 2007, provides more detailed requirements and recommendations including items of interest for drinking water protection. The following list presents items of interest for drinking water protection.

- All tanks must be double-walled
- Underground storage tanks cannot be located closer than 15 m to drilled wells and 30 m to dug wells or waterways
- Above ground and underground storage tanks are allowed in flood prone areas.

- Storage tanks at marinas must be located no closer than 5 m horizontally from the normal annual high-water mark
- It is the responsibility of the facility owner to report spills and leaks
- The six inch gap between the drop tube and the bottom of underground storage tanks means that this fuel cannot be pumped out in instances where there is tank disuse or a leak.
- Under Ontario Regulation 217/01 a license is not required if gasoline is used to ballast an underground storage tank

### Environmental Management Protocol (EMP) for Fuel Handling Sites in Ontario

The “Environmental Management Protocol (EMP) for Fuel Handling Sites in Ontario” (Technical Standards and Safety Association, 2007) includes requirements under Ontario Regulation 153/04, Records of Site Condition, made pursuant to the Ontario *Environmental Protection Act*. It includes reporting, investigation and cleanup management for leaks, spills and discoveries (i.e. historical contaminants) at operating sites.

Enforcement of fuel release requirements (i.e. reporting and cleanup) is shared by TSSA and MOE. A memorandum of understanding between the two organizations was established in 1997 for all operational sites (i.e. fuel equipment is on site) as defined in the Liquid Fuels and Fuel Oil Regulations. TSSA is the lead except where a drinking water supply is affected or off-site migration is likely to occur, other than to municipally owned properties (e.g. roadways).

Once the fuel handling equipment (i.e. tanks, dispensers, lines) is removed and the environmental requirements from the Codes are implemented, the site is considered permanently closed and any outstanding environmental matters are MOE’s responsibility. In cases where tanks are abandoned, TSSA tries to find the owner and order removal of the equipment, but TSSA can not take care of any environmental issues, such as removing fuel from the tanks.

The following is a summary of information contained in the Environmental Management Protocol that is relevant to source water protection.

**Spill reporting:** Spills that must be reported include more than 100 litres of product where there is no public access (i.e. bulk plants, private outlets and residences) and more than 25 litres where there is public access. All leaks must be reported since this is a result of equipment failure. Sites where there are spills less than the minimums must be reported if it could: create a public health or safety hazard; contaminate a fresh water source or a waterway; interfere with the rights of any person; or enter into a sewer system, underground stream or drainage system.

**Discovery within property boundary:** Reporting and actions are required if a separate phase product or vapour is found in a monitoring well, excavation or vapour is found in an enclosed space.

Soil Condition Standards (SCS): Determining the applicable SCS depends on a number of considerations including: groundwater potability; land use classification; soil texture; depth of overburden; soil pH; and whether a full depth or stratified remediation will be completed. Non-potable criteria are applied if the drinking water supply to the site and the surrounding area is not groundwater and also where groundwater is considered potable, but where a risk assessment has been accepted by the MOE to use the non-potable criteria. The acceptable levels of contaminants in potable water are the same as the Ontario Drinking Water Standards noted above in Section 2 and also include concentrations for some hydrocarbon fractions. The acceptable levels for non-potable water are much higher and would apply to areas within IPZ1.

Applying the SCS: No reporting or action is required as long as the SCS are met at the property boundary. If the SCS are exceeded, the area that exceeds must be delineated and mitigated through remediation.

Contaminant Management Plan (CMP): A CMP allows SCS to be exceeded on site with regular reporting to TSSA and agreement from any affected property owners to implement the CMP if off-site impact has occurred. A CMP cannot be applied if immediate corrective action is required (i.e. there is presence of a separate phase product, explosive levels of vapour are accumulating, there is a potential for off-site migration or there is any other situation that is unsafe for continued use).

Permanent Closures: Closures require compliance with the Liquid Fuel Handling Code (permanent tank closure and environmental restoration).

Qualifications: All reports (site investigations, site assessments, site remediation and CMPs) must be completed by a qualified person.

Property Owner Responsibilities: Property owners are responsible for investigation and mitigation of petroleum impacts as follows:

- Spills: investigate the extent and remediate as required
- Leaks: fix the leak, investigate the extent and remediate or manage via a Contaminant Management Plan
- Discovery: determine that it is not a result of an active leak, investigate the extent and remediate or manage as per CMP

#### Ontario Regulation 213/07: Fire Code (Government of Ontario, 2007)

Part 4 of the Fire Code made under the *Fire Protection and Prevention Act, 1997* deals with flammable and combustible liquids; however, it is superceded by the TSSA regulations, except where fire prevention, fire protection and spill containment are concerned.

#### Ontario Environmental Protection Act, 1990 (Government of Ontario, 1990)

Under the Ontario *Environmental Protection Act*, fuel cannot be released to the environment where it could cause an adverse effect. As well, spills must be reported.

Section 14 of the Ontario *Environmental Protection Act* prohibits the discharge of a contaminant into the natural environment if the discharge causes or may cause an adverse effect. This term is defined by Ontario Regulation 339:

“Adverse effect means one or more of:

- (a) impairment of the quality of the natural environment for any use that can be made of it,
- (b) injury or damage to property or to plant or animal life,
- (c) harm or material discomfort to any person,
- (d) an adverse effect on the health of any person,
- (e) impairment of the safety of any person,
- (f) rendering any property or plant or animal life unfit for human use,
- (g) loss of enjoyment of normal use of property, and
- (h) interference with the normal conduct of business”.

Section 92(1) of the EPA requires any person with control of a pollutant that is spilled or who notices a spill to notify the Ministry, the applicable municipality, the owner of the pollutant and the person with control of the pollutant of the spill.

There is a Spills Action Centre run by the Ontario Ministry of the Environment where people can call to report a spill so that a response can be coordinated.

#### Ontario Water Resources Act (Government of Ontario, 1990)

Section 30 of the *Ontario Water Resources Act* prohibits the discharge of any material such as fuel into the water that may impair the quality of the water.

Oil refineries are required to have certificates of approval under Section 53 of the *Ontario Water Resources Act* for treatment of effluent.

#### Ontario Regulation 537/93 (Effluent Monitoring Limits for Petroleum Industries)

This regulation is made under the *Ontario Environmental Protection Act* and is to monitor and control the quality of effluent discharged from particular plants in Ontario.

#### Clean Marine Program

The Ontario Marine Operators Association and its partners have a voluntary program for environmental best management practices. The idea is that marina operators need to protect their biggest asset – waterways (see link to website in Appendix C).

Every marina that is a Clean Marine member must pass an environmental audit by a third party firm licensed by Environment Canada. The end result is a comprehensive review and an “Eco-rating”. Over 200 environmental practices including fueling are considered. The rating ranges from 1 to 5 anchors and now an additional 12 criteria may bring them to gold, diamond or platinum status. There are more than 600 marinas, marine dealers, yacht clubs and associated companies that belong to the Ontario Marine Association of Ontario and currently there are 100 marinas with five anchors (Ontario Marine Association of Ontario, Nov 2010).

One of the perks of the program is that insurance discounts are possible and generally in proportion to the eco-rating since it is recognized that the level of risk is reduced via program participation.

The Clean Marine Practices Handbook, 1997 as amended, notes legislation and best management practices that apply to fuel handling and storage. In general, the handbook indicates that any handling of fuel near water must be done with extreme caution. It offers specific measures that either must or could be implemented to prevent fuel from entering the water including spill prevention, reporting and storage tank management.

### **c) Municipal**

Through the *Planning Act* municipalities may be able to require that any new residential development only be permitted if a source of heat other than oil is implemented or that all tanks for any type of use be above ground and double walled.

## **5. Gaps in existing legislation, policies, programs and points of interest**

- Waste oil not used as a fuel is not considered in the Tables of Drinking Water Threats
- Replacement of piping systems is not required after a certain time frame and they are often the points of product loss.
- Contamination at gas stations is common. It is generally contained within 100 m from the point of release unless an extensive fracture network is encountered.
- Fuel oil tank inspections are only required every ten years by the TSSA Regulation. However, fuel distributors often require annual inspections for insurance purposes.
- Single-walled tanks for fuel oil are permitted in some circumstances

- Underground storage tanks for fuel oil are not prohibited; however, increased installation, monitoring and insurance costs discourage their use.
- No certification is required for people delivering fuel
- Storage tanks are allowed in areas subject to flooding if certain measures are followed.
- TSSA inspects public outlets every three years, but they do not inspect private outlets unless they are invited by the owner/operator. This is because they are not licensed as the other facilities are.
- Tank design generally prevents the bottom six inches of fuel from being pumped from unused storage tanks.

## 6. Policy considerations

- REMINDER: The main consideration for reducing or eliminating drinking water threats related to fuel handling and storage is to prevent spills or have appropriate spill response.
- There is widespread storage and handling of fuels in the Thames-Sydenham Source Protection Area.
- Larger volumes of fuel storage and underground storage tanks are greater drinking water threats.
- All policy tools other than prescribed instruments are available to address this drinking water threat with the caveat that risk management plans, prohibition and the related restricted land use options only apply to significant drinking water threats.
- The source protection plan will need to include a high-level policy approach (“a catch-all policy”) to address those “would be” drinking water threats that are unlikely to occur in a given vulnerable area so that they would be eliminated (e.g. oil refineries).
- Small, volunteer-run fire departments generally did not have the capacity to enforce Part 4 of the Code prior to the TSSA regulations coming into force in 2001 (personal communication R. Burke, Chief Fire Prevention Officer, November 2010). This suggests that they still may not have the ability to enforce the three provisions for which they are still responsible.

### **Examples of risk management measures and policy ideas**

For discussion purposes, this section of the report provides examples of risk management measures and policy ideas that could be applicable to fuel handling and storage. It is not an exhaustive list.

The examples are categorized by the types of policy tools that can be used to meet the source protection plan objectives. The MOE Risk Management Measures Catalogue (see weblink in

Appendix C) was reviewed as part of this exercise and measures were incorporated where appropriate; many of the measures in the catalogue are required by applicable legislation.

**Table 6.1 – Risk Management Measures for Fuel Handling and Storage**

<b>Policy Tool</b>	<b>Example</b>
Education and Outreach	<ul style="list-style-type: none"> <li>• Put stickers on home heating oil tanks with a spill response number and an indication that the tank is located within a specific vulnerable area.</li> <li>• Inform fuel distributors about spill cleanup, vulnerable areas, and encourage annual inspections where companies are not already doing so</li> <li>• Support/encourage participation in the Clean Marine Program</li> <li>• Provide letters to gas companies and franchise owners informing about the vulnerable areas and promoting BMPs and training of staff</li> </ul>
Incentive Programs	<ul style="list-style-type: none"> <li>• Replace underground storage tanks with above ground storage tanks for heating oil and private fuel outlets</li> <li>• Address underground storage tanks at abandoned gas stations</li> </ul>
Land Use Planning	<ul style="list-style-type: none"> <li>• No new fuel related activities in WHPAs (change zoning and tie to subdivision agreements or site plans)</li> <li>• Include a requirement for spill containment in site plan control agreements for new gas stations</li> <li>• Encourage prohibition of bulk plants and fuel distributors in WHPAs and IPZs</li> </ul>
Prescribed Provincial Instruments	<ul style="list-style-type: none"> <li>• Impose measures as part of applicable prescribed instruments.</li> </ul>
Municipal Operations / Infrastructure	<ul style="list-style-type: none"> <li>• Include fuel appliance and equipment reviews in annual infrastructure inspections (employ a certified technician for this aspect)</li> <li>• Ensure proper staff training for fuel pumps</li> <li>• Hire fire prevention officers to in part educate residents and business owners about spill containment</li> <li>• Do not locate new marinas near municipal drinking water intakes</li> <li>• Participate in the Clean Marine Program (strive for the highest ratings)</li> </ul>
Land Securement	<ul style="list-style-type: none"> <li>• Purchase or place an easement on lands in WHPAs A and B</li> </ul>
Risk Management Plans	<ul style="list-style-type: none"> <li>• Require an annual inspection and maintenance for any fuel-related significant drinking water threat by a certified technician with a report submitted to the risk management official</li> </ul>
Prohibition	<ul style="list-style-type: none"> <li>• Prohibit new refineries, manufacturers, gas stations, bulk plants, fuel distributors from establishing in WHPA A and B</li> </ul>
Restricted Land Uses	<ul style="list-style-type: none"> <li>• Flag all types of land use that could store fuel.</li> </ul>
Monitoring without Action	<ul style="list-style-type: none"> <li>• TSSA to monitor the effectiveness of their program.</li> <li>• Keep track of the number of “Clean Marines” in the Source Protection Area</li> <li>• Water treatment plants to test for marina-related parameters when one is close by</li> <li>• Prioritize abandoned/decommissioned gas stations for monitoring (e.g. any located in WHPAs)</li> </ul>
Other	<ul style="list-style-type: none"> <li>• Encourage MOE to decrease the minimum volume spill reporting requirements in areas where fuel threats are significant</li> </ul>

## Appendix A – Local Information on Drinking Water Threats

### 1. Local scale of significant drinking water threats.

SPA	System	Type	Number of Locations	WHPA	Vulnerability Score	
UTR	Birr	Chemical	12	A	10	back-up generator at well field, residential fuel tanks
UTR	Dorchester	Chemical	56	A, B	10, 6	back-up generators, communication tower fuel oil tanks at farms
UTR	Kilworth-Komoka	Chemical	2	A	10	back-up generator at wellhead, aggregate potential,...fuel oil spill occurred at back-up generator (condition)
UTR	City of London-Fanshawe	Chemical	6	A,B	10	fuel storage at aggregate, backup generator at well-field, residential properties
UTR	City of London-Hyde Park	Chemical	1	A	10	well field back-up generator
UTR	Melrose	Chemical	24	A,B	10	residential fuel tanks, back-up generator at well-head, maintenance garage
UTR	Embro	Chemical	1	A	10	
UTR	Ingersoll	Chemical	4	A, B	10, 8, 6	
UTR	Mount Elgin	Chemical	13	A	10	
UTR	Tavistock	Chemical	2	A	10	
UTR	Woodstock-urban	Chemical	3	A	10	
UTR	Woodstock-rural	Chemical	12	A, B	6, 10	
UTR	Mitchell	Chemical	3	A,B	10,6	
UTR	St.Marys	Chemical	6	B	8, 10	6 handling, 6 storage
LTV	Ridgetown	Chemical	25	A	10	residential fuel tanks, tanks for back-up generators at well heads
LTV	Highgate	Chemical	24	A	10	gas station, residential fuel tank
Total Number of Locations			194			

## Appendix B – Reference List

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## **Appendix C – Additional Resources**

1. Ontario Marine Operators Association. Clean Marine Program.  
[www.boatingontario.ca/industry/CleanMarine.aspx](http://www.boatingontario.ca/industry/CleanMarine.aspx)
2. The MOE Water Quality Risk Management Measures Catalogue (Version 2, 09/07/2010)  
<http://maps.thamesriver.on.ca/swpCAMaps/rmc/disclaimer.aspx>