



Notification of Contamination Protocol

Adopted by the Minister of Environment

Pursuant to the Contaminated Sites Regulations

Adopted by the Minister of Environment,
Hon. Sterling Belliveau, on July 3, 2013, effective as of July 6, 2013

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1 OBJECTIVES

The *Notification of Contamination Protocol* provides requirements for notification when required under Section 8 and Section 9 of the *Contaminated Sites Regulations*. The protocol addresses two contamination situations:

- a) free product presence in soil or groundwater; and
- b) soil, sediment, surface water or groundwater contamination

The objectives of the protocol are to provide a consistent, science-based, and practical process for determining the type of contamination and under which situations the *Contaminated Sites Regulations* need to be followed. The protocol addresses both human health and ecological considerations.

The protocol includes a number of determination tools. Free product notification relies on field observations affected media. Notification of contamination relies on comparison of sample analytical results with tables of numerical standards and allows some specified exemptions.

The *Notification of Contamination Protocol* is intended for use by a site professional, the qualifications for which are as defined in Section 5 of the *Contaminated Sites Regulations*.

2 DEFINITIONS

- Atlantic RBCA:** means the current versions of Atlantic Risk Based Corrective Action guidance documents including the Petroleum Hydrocarbon Impacted Sites User Guidance and software modelling tool, Guidance for Soil Vapour and Indoor Air Monitoring Assessments from Atlantic RBCA and Guidelines for Laboratories as published by the Atlantic Partnership in RBCA Implementation committee.
- Contamination:** means a substance or substances present in soil, groundwater, sediment, or surface water at concentrations exceeding the Tier 1 Environmental Quality Standards in this *Notification of Contamination Protocol*.
- Potable:** means all groundwater in the Province outside of municipal water serviced areas, and as determined following Appendix 2, Figure 3 in this protocol. In addition, for the purposes of this protocol, potable means the groundwater is potentially potable and is not a statement of whether or not the groundwater meets drinking water or other water supply standards.
- Non-Potable:** means groundwater at municipal water serviced sites which is not used for drinking water supply purposes, and is non-potable according to determinations made following Appendix 2, Figure 3 in this protocol.

Tier 1 Environmental Quality Standards (EQS): means the comprehensive tables in the *Notification of Contamination Protocol* which provide substance generic environmental quality standards that may be used as both notification and remediation levels. These standards represent, based on available information, a standardized level of risk for contributing exposure pathways, using land use and other factors.

Tier 2 Pathway Specific Standards (PSS): means the comprehensive tables in protocol PRO-500, *Remediation Levels Protocol* with individual standards identified for assessing all contributions to substance risk in all applicable exposure pathways, based on land use and other factors. The Tier 2 PSS may be used as remediation levels for applicable pathways. The Tier 1 EQS are produced from the Tier 2 PSS. The Atlantic RBCA PSSL (Pathway Specific Screening Level) information for petroleum hydrocarbons is included in the Tier 2 PSS tables.

3 PERSONS REQUIRED TO PROVIDE NOTIFICATIONS

The *Contaminated Sites Regulations* require that a person responsible for a contaminated site provide notification of conditions with respect to:

- 1) free product presence in soil or groundwater; and
- 2) soil, sediment, surface water, or groundwater contamination

The following additional details apply to site professionals and their duty to notify requirements.

3.1 Site Professionals

A site professional, acting on behalf of an owner or other person responsible for the contaminated site, is considered to be a person responsible for the contaminated site with respect to the duty to notify requirements. If, during the course of their work, the site professional becomes aware that the site or property has conditions requiring notification, the site professional must provide notification to the Minister in accordance with the *Contaminated Sites Regulations* using form FRM-100, Notification of Free Product or Contamination, located in Appendix 1 of this protocol.

4 NOTIFICATION OF FREE PRODUCT IN SOIL OR GROUNDWATER

4.1 Releases of Substances under the *Environmental Emergency Regulations*

In instances where verbal notice is provided under the *Environmental Emergency Regulations*, then verbal notification under the *Contaminated Sites Regulations* (and this protocol) is not required. In such cases, however, it is required that the subsequent written notification process of the *Contaminated Sites Regulations* is followed.

4.2 Providing Notice of Free Product in Soil or Groundwater

Notice of a contaminated site where free product occurs in soil or groundwater must be provided within the time frames specified in Section 8 (1) of the *Contaminated Sites Regulations*.

Determining whether free product is present in soil or groundwater must be done by referring to Figure 1 in Appendix 2.

Verbal and written notice of the presence of free product in soil or groundwater must be provided using form FRM-100, Notification of Free Product or Contamination, located in Appendix 1 of this protocol. Additional information about form FRM-100 is provided in A1-1 of Appendix 1 of this protocol.

5 NOTIFICATION OF CONTAMINATION

The process for determining whether notification of soil, sediment, surface water, or groundwater contamination is required involves a two-step process.

The first step is to determine if a Tier 1 Environmental Quality Standard (EQS) for the applicable media / land use has been exceeded by comparing sample results to numerical values shown in the tables in Appendix 3. This is described in more detail in Section 5.1 of this protocol. Substances with potential risks that are discovered on a site that are not included in the list of substances in the Tier 1 EQS tables will require research by site professionals to determine appropriate notification and clean-up levels.

The second step is to determine if an exemption from notification can be applied. This is described in Section 5.2 of this protocol.

Contamination exceeding a Tier 1 EQS value or substances with potential risks determined to exceed appropriate notification levels by a Site Professional must be present before notification is required. If there is an exceedance of a Tier 1 EQS or other substance above an appropriate notification level and an exemption condition is not present, the *Contaminated Sites Regulations* must be followed. Figure 2 in Appendix 2 summarizes the notification process. Details of the process steps are provided in the following sections. Figure 2 in Appendix 2 summarizes the process.

5.1 Determination of Tier 1 Environmental Quality Standards (EQS)

Soil, sediment, groundwater, and surface water sample analytical results are compared to established criteria for the prescribed substances presented in the Tier 1 EQS tables within Appendix 3.

The Tier 1 EQS tables include selection factors that are determined prior to use. The appropriate factors must be selected from the categories listed below.

Categories

- Potential contaminants of concern
- Environmental media (soil, sediment, groundwater, surface water)
- Land use classification (agricultural, residential/parkland, commercial, industrial)
- Soil texture classification (coarse-grained/fine-grained)
- Groundwater use (potable/non-potable)

An explanation of the tables and these categories is provided in Section 6 of this protocol.

5.2 Exemptions to Notification of Contamination

Notification of contamination is not required under any of the following circumstances:

5.2.1 Evidence of Minor Contamination

Subject to the conditions in Section 5.2.3, soil or sediment sample results in excess of Tier 1 EQS that meet all of the following criteria are considered to be minor and exempt from the requirement for notification:

- i) an impacted area less than 3 m²
- ii) thickness of impacts less than 0.3 m
- iii) volume of impacts less than 1 m³

5.2.2 30-Day Clean-up Exemptions

Subject to conditions in Section 5.2.3, if a release of petroleum hydrocarbons, glycols, or automotive fluids occurs and is cleaned up to Tier 1 EQS levels (see Appendix 3) or unconditional Tier 2 levels (see Appendix 2 in the PRO-500 *Remediation Levels Protocol*) within 30 days of the release date, and under the supervision of a site professional, then written notification for free product in soil or related contamination is not required. In such cases, form FRM-101, Verification of 30-day Cleanup Exemption, (located in

Appendix 1 of this protocol) verifying the completion of cleanup within 30 days must be submitted to the Minister within 90 days (otherwise Notification FRM-100 must be submitted). Additional information about form FRM-101 is provided in A1-2 of Appendix 1 of this protocol.

5.2.3 Exemption Conditions

For notification of contamination exemptions in Sections 5.2.1 and 5.2.2 to be allowed there must be no indication of the following conditions:

- 1) groundwater impacts exceeding Tier 1 EQS
- 2) presence of:
 - i) Polychlorinated Biphenyls (PCB's)
 - ii) Tetrachloroethylene (also known as Perchloroethene, PCE)
 - iii) Trichloroethylene (TCE)
 - iv) cis – 1,2- Dichloroethylene (cis-DCE)
 - v) Vinyl Chloride
 - vi) Total Mercury, or
 - vii) Dioxins and Furans (non-background as determined in Section 5.2.4)

5.2.4 Exemption for Substances Considered as Background Occurrences

Some substances that occur naturally in the environment and not as a result of human activity can cause contamination that exceeds Tier 1 EQS. In addition, historical practices or activities, such as fires or atmospheric emissions, may have resulted in concentrations of other substances that exceed Tier 1 EQS over localized or widespread areas. Table 5, Appendix 3 provides a list of substances that are potentially considered as acceptable background occurrences by the Minister for the purposes of this protocol.

During the process of following the *Contaminated Sites Regulations*, if a background substance is identified on a site, notification of these substances is not required, if all of the following conditions are met:

- i) The background substance identified must be listed in Table 5, Appendix 3
- ii) The background substance must not have resulted from the movement of soil to the site by human activity.
- iii) There must be no release of a substance potentially considered as background in excess of Tier 1 EQS from a point source on the site.

- iv) There must be no environmental health risks to the public identified due to the presence of the background substance on or from the site, considering the current public use.

Although there may be no regulatory requirements to address acceptable background substances, these substances may present a risk to human health or the environment. A site owner with concern may contact a site professional to request advice on possible voluntary mitigation measures.

5.3 Providing Notice of Soil, Sediment, Surface Water and Groundwater Contamination

Notice of a contaminated site where Tier 1 EQS is exceeded, and there are no identified exemptions, must be provided within the time frames specified in Section 9 of the *Contaminated Sites Regulations*.

The form for written notice of sites with soil, sediment, surface water, and groundwater contamination is provided in Appendix 1, form FRM-100, Notification of Free Product or Contamination. Additional information about form FRM-100 is provided in A1-1 of Appendix 1 of this protocol.

6 ABOUT THE TABLES

6.1 Introduction

The Nova Scotia Tier 1 EQS provide numerical criteria that are used along with exemption conditions to determine the need for regulatory notification. The tables can also be used as Tier 1 clean-up criteria during the process of remediation.

Although the Nova Scotia Tier 1 EQS are derived from the Atlantic RBCA Tier 1 EQS, the Notification of Contamination protocol provide the specific Tier 1 EQS that may be used as both notification and remediation levels within the Nova Scotia Contaminated Sites Regulations. Any numerical values, wording, information or requirements specified in the Contaminated Sites Regulations and Ministerial Protocols take precedence over the Atlantic RBCA EQS/PSS tables and guidance document(s).

The criteria are set out in a series of tables, provided in Appendix 3:

Table 1A	Tier 1 EQS for Soil at a Potable Site
Table 1B	Tier 1 EQS for Soil at a Non-Potable Site
Table 2	Tier 1 EQS for Sediment
Table 3	Tier 1 EQS for Surface Water

Table 4A	Tier 1 EQS for Groundwater at Potable Site
Table 4B	Tier 1 EQS for Groundwater at Non-Potable Site
Table 5	Substances Potentially Considered as Background Occurrences

6.2 How to Use the Tables

The tables contain a number of variables which need to be determined during application to a particular site. Section 5.1 summarizes the process for the use of the tables in assessing Tier 1 EQS exceedances. The key variables are described in more detail below.

6.2.1 Potential Contaminants of Concern

The Tier 1 EQS tables provide a comprehensive list of substances. Any of these substances are potential contaminants of concern when discovered on a site. They become subject to the *Contaminated Sites Regulations* after they are verified by a laboratory analytical result to exceed the Tier 1 EQS tables, and no exemptions apply.

Substances with unknown risk that are discovered on a site that are not included in the list of substances in the Tier 1 EQS tables will require research by site professionals to determine appropriate notification and clean-up levels.

6.2.2 Environmental Media

The Tier 1 EQS tables are divided into four environmental media: soil, sediment, surface water, and groundwater. In addition, Table 5 is included to assist in determining what may be considered as potential background substances in the four media.

6.2.3 Land Use Classification

The applicable land use for selection of Tier 1 EQS is to be determined based on an evaluation that takes both of the following into consideration:

- the current municipal land use zoning, if one exists; and
- the actual land use and site activities

The more sensitive land use must be used if there is a difference between the zoned and actual land use.

The Tier 1 EQS tables make a distinction between four (4) different land uses for a site.

For the purposes of the *Contaminated Sites Regulations* and this protocol, undeveloped, wild or natural land uses that are not otherwise classified as residential/parkland, commercial or industrial use shall follow agricultural land use criteria.

The agricultural land use Tier 1 EQS for soils are the only Tier 1 land use that includes direct ecological pathways, in addition to human health exposure pathways in the derivation of criteria.

The applicable land uses are agricultural, residential/parkland, commercial, and industrial. These are described in more detail below.

Agricultural The primary land use/activity is growing crops or tending livestock. This category also includes agricultural lands that provide habitat for resident and transitory wildlife and native flora. Agricultural land may also include a farm residence.

Agricultural land encompasses a wide range of activities including dairy, livestock and/or crop production. Most farms include a homestead, so the possible presence of an on-site residence (similar to those specified for residential/parkland sites, below) is considered in the default scenario. Agricultural lands are generally accessible by the farmer and family members, including children, who represent a more sensitive human receptor category.

Residential/Parkland The primary land use/activity is residential or recreational activity. This category assumes parkland can be a buffer between areas of human residency, and includes campgrounds, but does not include undeveloped wild lands such as national or provincial parks.

The generic residential property assumed for this category is a typical detached, single family home with a backyard where children, particularly toddlers, play. Parks may also serve as areas for children's play and other family activities and so are also included in this land use category.

Commercial The primary land use/activity is commercial (e.g., shopping malls and offices). Commercial land use properties span a wide variety of activities with varying degrees of access to human and ecological receptors. This land use category may include commercial day-care centres. It does not include operations where food is grown. For purposes of deriving environmental quality benchmarks, it is commonly assumed that the generic commercial property contains a daycare facility. Daycares are a sensitive commercial property land use that is permitted in many municipal jurisdictions in Canada.

Industrial The primary land use/activity involves the production, manufacture, or construction of goods. Industrial properties span

a wide variety of land uses and activities, but generally do not permit direct public access to human receptors (except workers). Thus, children would not be expected to access these properties to any significant extent. Access to industrial properties is often limited for ecological receptors as well.

6.2.4 Soil Texture Classifications

The Tier 1 EQS tables allow the distinction between fine-grained textured soil or coarse-grained textured soil. In most cases the coarse-grained soil types have lower criteria.

If the fine-grained soil type is to be selected, then this choice must be supported with data from a sieve analysis of soil from the appropriate soil zone. In such cases, soil sieve analytical results must be presented along with the soil analytical chemistry data during notification. The description of these two soil textures are as follows:

i) Fine-Grained Soil

A fine-grained soil is defined as material having greater than 50% (by dry weight) particles equal to or less than 75 microns (200 mesh) in diameter.

ii) Coarse-Grained Soil

A coarse-grained soil is defined as material having greater than 50% (by dry weight) particles greater than 75 microns (200 mesh) in diameter.

6.2.5 Groundwater Use

The Tier 1 EQS tables allow the distinction in groundwater use between potable and non-potable scenarios. This is done to protect groundwater for potential future use. Sites outside municipally serviced areas are considered as potable. However, even some municipal areas may be considered potable if they have no water servicing, or if they are within established safe distances from existing water supply wells or municipal boundaries. These factors have been considered in the screening flowchart of Appendix 2, Figure 3.

The Tier 1 EQS soil tables also require potable/non-potable determinations, due to the possible leaching from soils of substances that could negatively affect potability of groundwater. Figure 3 must be followed when determining groundwater potability to be used for determining criteria within all relevant Tier 1 EQS tables for a site.

6.2.6 General Requirements for Use of the Tier 1 EQS Tables

General requirements for the use of the Tier 1 EQS tables are provided in A3-1 in Appendix 3.

APPENDICES

Appendix 1 FORMS

A1-1 Information on Notification of Free Product or Contamination

The presence of free product in soil or groundwater must be verbally reported to Nova Scotia Environment, the site owner, and any persons affected by the contaminated site immediately upon knowledge of the condition, as specified in Section 8 (1) of the *Contaminated Site Regulations*.

In addition, written notice of free product in soil or groundwater must subsequently be provided to the Minister, the site owner, and any persons affected by the contaminated site within five business days following knowledge of such occurrence, as specified in Section 8 (2) of the *Contaminated Sites Regulations*. A different time limit for written notice of free product in soil or groundwater may be required, subject to Section 8(3) of the *Contaminated Sites Regulations*.

FRM-100 Notification of Free Product or Contamination, includes space to record information for both verbal (only for free product in soil or groundwater) and written notifications (for all affected media). Documentation of the record of verbal information on FRM-100 is to be made at the same time as written notification.

FRM-100 is also to be used for all written notifications of contamination in soil, sediment, groundwater and surface water. This information must be provided to the Minister, the site owner and any persons affected by the contaminated site within 90 days of first knowledge of other contamination, as specified in Section 9 of the *Contaminated Sites Regulations*.

A1-2 Information on Verification of 30-day Cleanup Exemption

When site contamination is cleaned up within 30 days of release and meets all conditions provided in Section 5.2.2. of this protocol, no notification of contamination is required. In such cases, however verification of cleanup to the Minister must be made by fully completing and submitting form FRM-101 Verification of 30-day Cleanup Exemption, which is to be signed by the site professional as well as the site owner (or their approved agent).

Appendix 1 FORMS

Form FRM-100 Notification of Free Product or Contamination

Form FRM-101 Verification of 30-day Clean-up Exemption

Appendix 2 FIGURES

- Figure 1 Flow Chart for Notification of Free Product in Soil or Groundwater
- Figure 2 Flow Chart for Notification of Contamination in Soil, Sediment, Surface Water or Groundwater
- Figure 3 Determination of Groundwater Potability

Figure 1 Flow Chart for Notification of Free Product in Soil or Groundwater

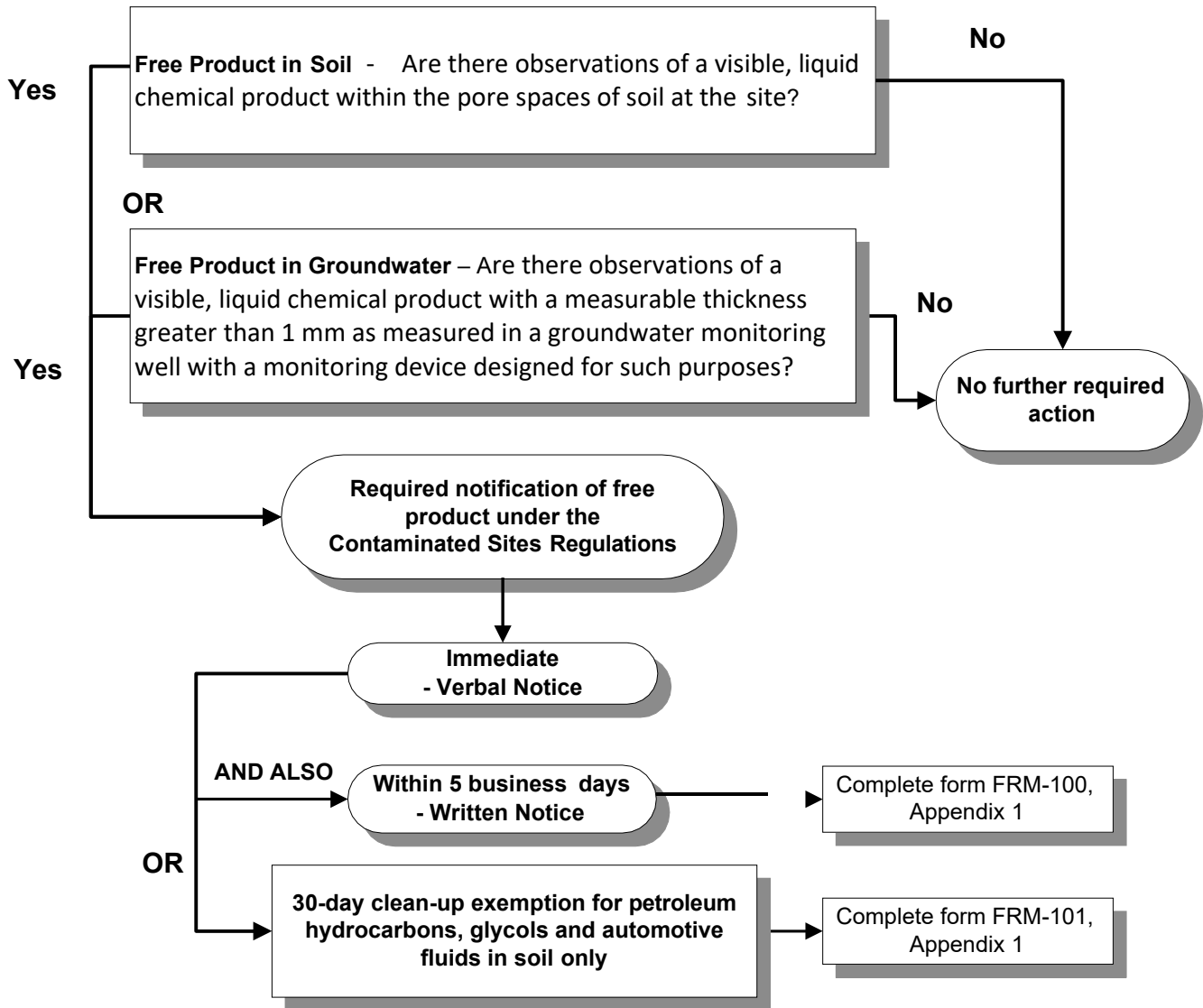


Figure 2 Flow Chart for Notification of Contamination in Soil, Sediment, Surface Water or Groundwater

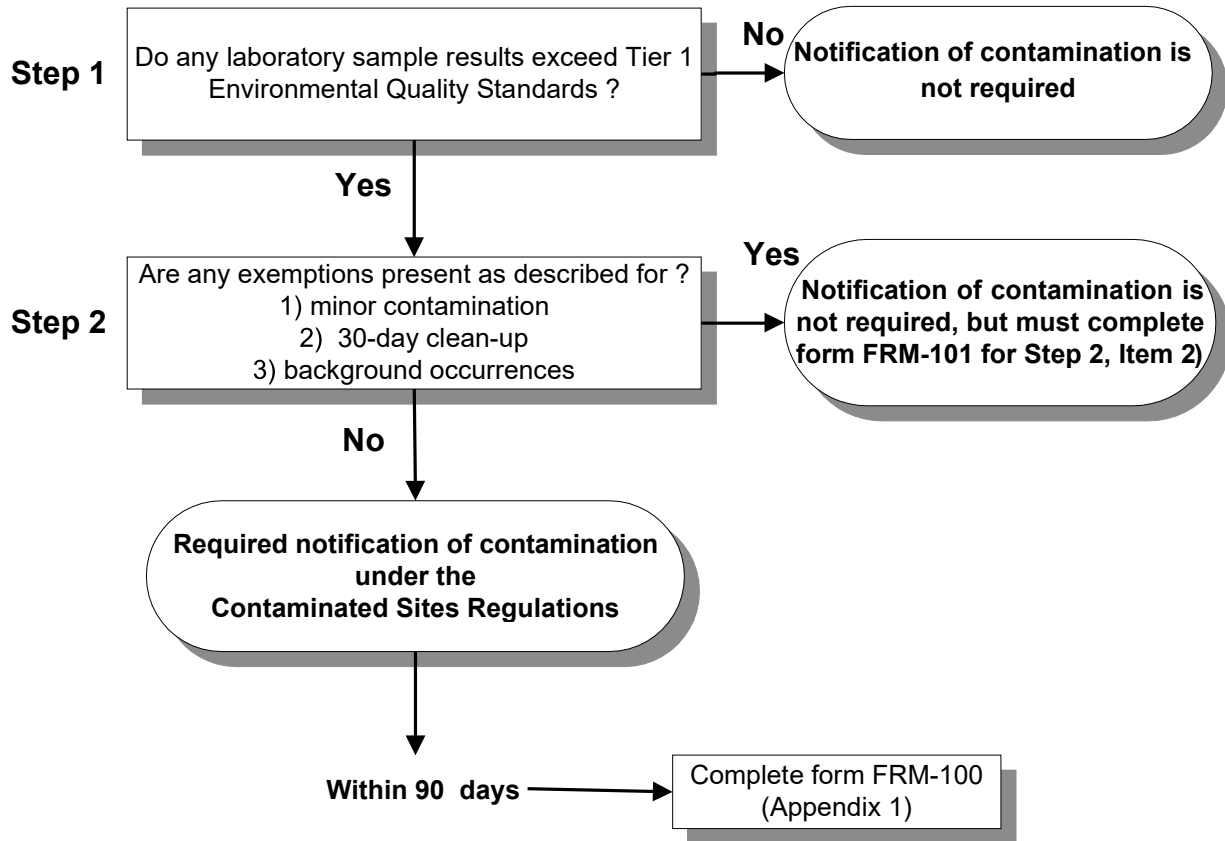
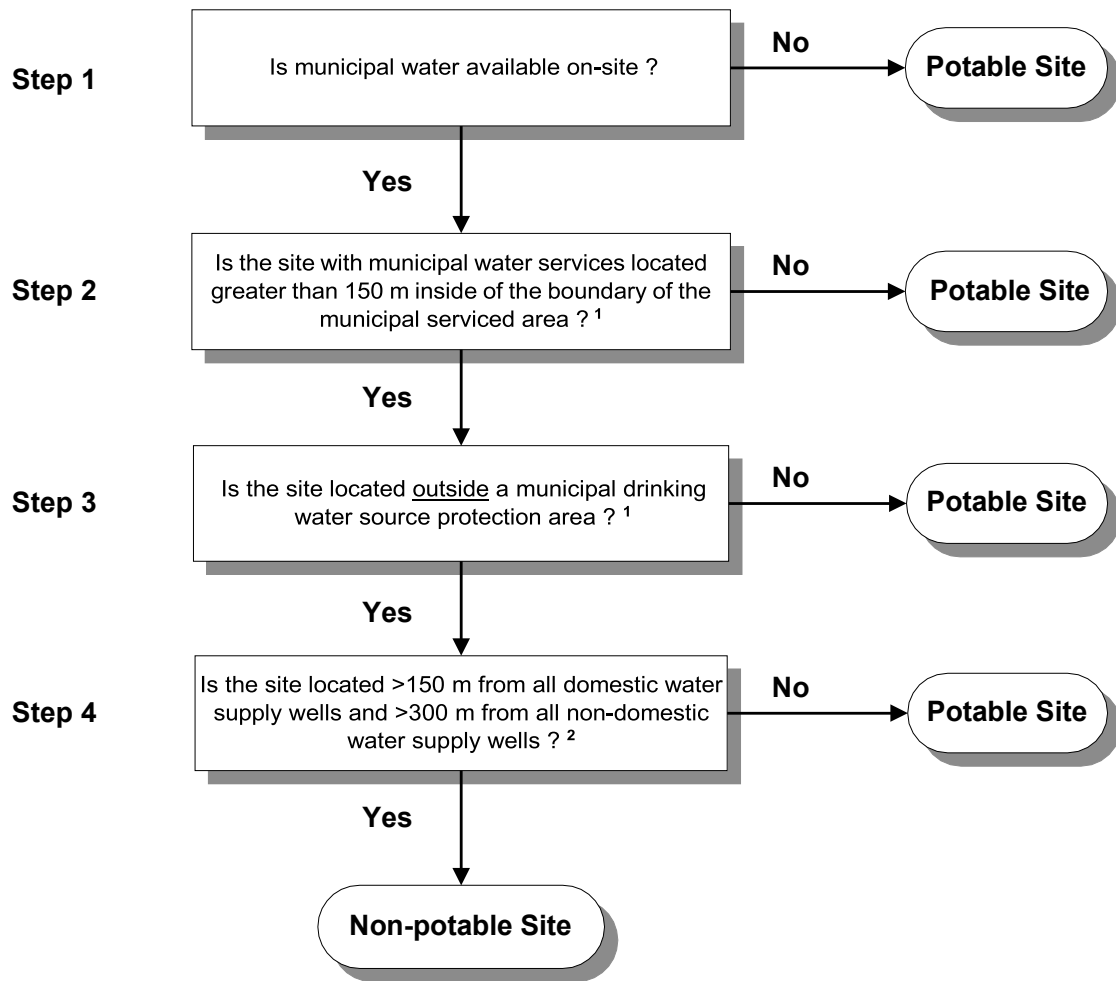


Figure 3 Determination of Groundwater Potability



¹ Information on municipal service areas and any source water protection areas can be obtained from the local municipality

² If necessary, determine the distance from surrounding property water supply wells to the contaminated site boundaries

Appendix 3 TABLES

A3-1 General Requirements for Use of the Tier 1 EQS Tables

- 1) All information necessary for use of the Tier 1 EQS tables including appropriate land use classifications, contaminants of concern, and affected environmental media must be properly determined.
- 2) For notification purposes, sampling must be conducted in areas identified as potential areas of contamination, based on initial site characteristics and information.
- 3) Appropriate laboratory analyses that must be conducted for samples collected include the following aspects:
 - a) Laboratories performing analysis must be accredited to ISO/IEC 17025 standards (and subsequent revisions) by the Standards Council of Canada (SCC) or the Canadian Association of Laboratory Accreditation (CALA). All routinely required analyses must appear on the laboratory's certificate.
 - b) All sampling and analysis must be in accordance with laboratory-approved recommendations concerning sample containers, storage and preservation.
 - c) Appropriate selection of laboratory analytical methods to ensure adequate conformance to data quality objectives, assessment endpoints (ecological or human health), and method/reportable detection limits.
 - d) In the case of petroleum hydrocarbons, analysis shall conform to Atlantic RBCA Guidelines for Laboratories, Tier I and Tier II Petroleum Hydrocarbon Methods (latest revisions).
 - e) For all other contaminants, the analytical methods recommended are those in the latest guidance from the Canadian Council of Ministers of the Environment (CCME) concerning sampling, analysis, and data management for contaminated sites.
- 4) Use of fine grained soil values from the tables must be supported with data from a laboratory sieve analysis of soil from the appropriate soil zone to confirm fine grained soils.
- 5) Use of non-potable soil or groundwater values must be supported by written rationale documenting information used for determinations of groundwater potential potability (Appendix 2, Figure 3).

Appendix 3 TABLES

Table 1A	NS Tier 1 EQS for Soil - All Land Uses; Potable Site
Table 1B	NS Tier 1 EQS for Soil - All Land Uses; Non-Potable Site
Table 2	NS Tier 1 EQS for Sediment
Table 3	NS Tier 1 EQS for Surface Water and Groundwater discharging to Surface Water
Table 4A	NS Tier 1 EQS for Groundwater - All Land Uses; Potable Site
Table 4B	NS Tier 1 EQS for Groundwater - All Land Uses; Non-Potable Site
Table 5	Substances Potentially Considered as Background Occurrences