



Confirmation of Remediation 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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TABLE OF CONTENTS

TABLE OF CONTENTS	i
1 OBJECTIVES	1
2 DEFINITIONS	1
3 CONFIRMATORY SOIL SAMPLING	2
Table 1. Confirmatory Sampling Requirements.....	3
4 CONFIRMATORY GROUNDWATER SAMPLING	3
4.1 Post-remediation Groundwater Sampling Requirements.....	3
4.2 Monitoring Well Decommissioning.....	4
5 CONFIRMATORY SOIL VAPOUR, SUB-SLAB AND INDOOR AIR SAMPLING	4
6 LABORATORY REQUIREMENTS	5
7 WASTE MANAGEMENT	5
8 BACKFILL MATERIAL.....	6
9 CONFIRMING AND DOCUMENTING LONG-TERM EXPOSURE MANAGEMENT	6
10 CONFIRMATION OF REMEDIATION REPORT	7
10.1 General Reporting Requirements	7
10.2 Reporting of Confirmatory Sampling Information	8
10.3 Reporting Requirements - Appendices	8
10.3.1 Figures, Drawings, and Surveys.....	8
10.3.2 Analytical Data.....	9
10.3.3 Manifest Information	9
10.3.4 Photographs	9
10.3.5 Confirmation of Remediation Form	9
11 REQUESTS FOR TIME EXTENSIONS	10
APPENDICES	11
Checklist CHK-700 Confirmation of Remediation Checklist	11
Form FRM-700 Record of Site Condition	11
Form FRM-701 Declaration of Property Condition	11

1 OBJECTIVES

This *Confirmation of Remediation Protocol* is applicable to the requirements specified in Section 13(1)(c) and Section 15(1)(d) of the regulations regarding the duties of a site professional to prepare and file with the Minister a confirmation report in accordance with a Ministerial Protocol.

The confirmation report must indicate that the objectives of the remedial action plan have been met, including the applicable numerical remediation levels, risk-based site-specific remediation levels, or ongoing site management measures in the case of limited remediation.

The objectives of this protocol are to:

- a) provide the minimum requirements for confirmatory sampling of soil, groundwater, and air
- b) detail the requirements for preparing a confirmation report following the remediation of a contaminated site, either by limited remediation or full property remediation as defined by the Contaminated Sites Regulations.
- c) provide regulatory requirements for reporting information from a confirmation report, including checklist CHK-700: Confirmation of Remediation Checklist.

The *Confirmation of Remediation 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.

Exposure Management: means the measures used to protect site receptors at risk from contaminant exposure. These measures can include long-term monitoring to verify non-exposure, engineering controls, physical controls, or administrative controls, all of which potentially require long-term management.

L1 Environmental Site Assessment: means the process used to assess contamination of soil following a release from a single source with single or multiple contaminants of concern.

L2 Environmental Site Assessment: means the process used to assess contamination of soil, groundwater, sediment, or surface water from a single source with single or multiple contaminants of concern.

L3 Environmental Site Assessment: means the process used to assess contamination of soil, groundwater, sediment, or surface water associated with single or multiple sources and/or contaminants. Upon completion of the L3 environmental site assessment process the presence and extent of contaminants associated with all sources identified on the property have been assessed.

3 CONFIRMATORY SOIL SAMPLING

Discrete samples must be collected from each excavation wall and floor as specified in Table 1: Confirmatory Sampling Requirements, presented below. The confirmatory soil sampling requirements presented below match the soil sampling requirements for an environmental site assessment described Section 4.2 of protocol PRO-200, *Environmental Site Assessment for Limited Remediation Protocol*. Therefore, if the soil sampling requirements presented have already been completed for an L1 environmental site assessment which confirms remediation to applicable Tier 1 EQS criteria (protocol PRO-100, *Notification of Contamination Protocol*) has been met, additional sampling may not be required.

The following minimum confirmatory sampling requirements must be met for remediation of all sites under Limited Remediation and Full Property Remediation:

- a) Discreet samples must be collected in accordance with Table 1 presented below.
- b) Samples must be collected within a depth of 0.25 meter from a face or excavation floor.
- c) In cases where in-situ remediation of soils has been documented in the Remedial Action Plan (RAP), the schedule, location, and concentration of confirmatory sample results must be documented. Results must demonstrate that the criteria established in the RAP have been met prior to completing the confirmation of remediation report (Section 10).

Table 1. Confirmatory Sampling Requirements *

Minimum Verification Sampling Requirements for Excavation Floor and Sidewalls		
Floor Area (m ²)	Floor Sample(s)	Sample(s) per Sidewall
<25	1	1
25-50	1	2
50-100	2	2
100-250	2	4
250-500	3	5
500-750	3	6
750-1000	4	7

* The above table is not to be used to determine number of assessment samples.

* For excavations deeper than 4 m, and for areas greater than 1000 m², site specific verification (and compliance) requirements are needed.

4 CONFIRMATORY GROUNDWATER SAMPLING

Groundwater conditions must be assessed following the completion of remediation activities conducted under Limited Remediation where an L2 or L3 Environmental Site Assessment (ESA) has been completed and in all cases where Full Property Remediation has been conducted. Groundwater monitoring wells installed during the Phase 2 ESA that were not compromised during remediation work may be resampled as part of the post-remediation groundwater characterization.

4.1 Post-remediation Groundwater Sampling Requirements

The following post remediation groundwater sampling requirements must be met:

- a) A sufficient number of monitoring wells to confirm groundwater conditions in all directions relative to areas remediated.
- b) Any additional monitoring wells installed to meet the requirements of this protocol must be installed within drilled boreholes. All field methods, calculations, and measurements used must be documented.
- c) Any groundwater monitoring wells used for remediation purposes (e.g. injection of chemical oxidants) may not be used for subsequent monitoring of groundwater.
- d) All monitoring wells must be monitored for water levels and the presence of any phase-separated or free hydrocarbon product floating on the water surface. If liquid product is present its thickness shall be measured using an interface probe. Whenever possible, the free product shall be removed, its volume recorded and additional monitoring conducted to determine recovery rates.
- e) A minimum of one groundwater sampling event must be conducted during a dry period (low water table) and one sampling event during a recharge period (high

water table), characteristic of different seasonal conditions following remediation.

- f) All confirmatory groundwater sample results must meet the criteria established in the site remedial action plan. Sufficient post-remediation groundwater data are required to demonstrate steady state or decreasing concentrations of potential contaminants.

4.2 Monitoring Well Decommissioning

When confirmation of groundwater remediation objectives has been made and monitoring wells are no longer required, the wells must be immediately decommissioned and sealed under the supervision of a site professional. At a minimum, decommissioned monitoring wells must not extend above the ground surface and must be sealed in a manner to eliminate the vertical movement of water into the monitoring well. Complete removal and full impermeable sealing of boreholes is the preferred approach.

5 CONFIRMATORY SOIL VAPOUR, SUB-SLAB AND INDOOR AIR SAMPLING

If confirmatory soil vapour, sub-slab or indoor air sampling is conducted, documentation must be provided to ensure the following requirements, as outlined in the latest version of the *Atlantic RBCA Guidance for Soil Vapour and Indoor Air Monitoring Assessments* have been met:

- a) measurement of soil vapours or indoor air concentrations conducted over a minimum one year period with sampling conducted in the winter heating season as well as the summer season
- b) sufficient air quality data to demonstrate concentrations consistently below applicable criteria

Unconditional closure can be achieved by demonstrating that the objectives of the remedial action plan and the closure monitoring have been achieved without further requirement for active site management, remediation, institutional, or engineered controls.

If the criteria established in the remedial action plan have not been met after remedial actions and confirmatory air sampling have been completed, conditional closure may be achieved using exposure management controls and on-going site management to protect human health and the environment.

6 LABORATORY REQUIREMENTS

Appropriate laboratory analysis must be conducted for samples collected, including the following:

- 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 the latest revisions of the Atlantic RBCA guidelines for laboratories, Tier I and Tier II petroleum hydrocarbon methods.
- 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.

7 WASTE MANAGEMENT

Waste streams must be managed appropriately. Confirmation of remediation pursuant to the *Contaminated Sites Regulations* does not apply to the evaluation of the following materials or substances of concern:

- a) asbestos-containing materials
- b) urea foam formaldehyde insulation (UFFI)
- c) radon
- d) mould
- e) substances or building materials specifically related to, or found in, construction materials and not present in soil, sediment, groundwater, or surface water

The above products are to be managed in accordance with applicable regulations and appropriate standards.

The characterization, storage, transportation, and disposal of all other wastes generated during remediation activities shall be reported under this protocol. Documentation to be included in a confirmation of remediation report shall include:

- i. field methodologies and controls used to manage materials on site and prevent dilution of wastes
- ii. measures taken to ensure stockpiled soils for disposal have been adequately characterized and appropriately managed
- iii. description of any control measures taken to address materials being discharged from the site (e.g. excavation dewatering)
- iv. manifests or manifest summary from the approved receiving facility, which document all materials transported off-site

8 BACKFILL MATERIAL

If imported backfill material is used on site, documentation must be provided to confirm the following:

- a) source
- b) environmental quality
- c) volume

If the backfill material used was generated on-site, documentation must be provided to confirm the following:

- i) adequate characterization to support quality necessary to meet site remediation standards. In cases where contaminants have been identified in a stockpile, a sampling program must be conducted to determine an accurate representation of the contaminant concentrations in the entire pile. If a single soil chemistry description is to be applied to an entire stockpile, justification that the material is sufficiently homogeneous must be provided
- ii) volume of material used

9 CONFIRMING AND DOCUMENTING LONG-TERM EXPOSURE MANAGEMENT

Protocol PRO-500, *Remediation Levels Protocol* describes the use of exposure management measures in contaminated sites remediation and protocol PRO-600, *Remedial Action Plan Protocol* describes requirements of a risk management plan (RMP). Any exposure management measures to be used, and the objectives for their use, must be described in the remedial action plan (RAP) for a site. The effectiveness of such measures must then be confirmed to meet the objectives of the RAP.

Confirmation of exposure management measures must document that any engineering or physical controls to be used have been installed and are performing as designed, meeting the

RAP objectives. In addition, any administrative controls used to restrict access must be documented, in place, and performing as designed to meet RAP objectives.

Confirmation of exposure management measures must be documented and include the following, where applicable:

- a) description and photos of site physical barriers
- b) operational settings and corresponding flow rates for air exchange devices as well as air samples
- c) groundwater monitoring results and evaluation related to hydraulic controls
- d) records of administrative site restrictions and how they are put into action (notices, posting, fencing, etc.)

Conditions associated with the maintenance of engineered controls and monitoring must be documented in a risk management plan (RMP) appended to and referenced within form FRM-700, Record of Site Condition.

10 CONFIRMATION OF REMEDIATION REPORT

10.1 General Reporting Requirements

In addition to that which is identified in previous sections of this protocol, the following requirements must be met and clearly documented in the confirmation of remediation report:

- a) work completed in accordance with the remedial action plan objectives
- b) all applicable requirements outlined in the *Contaminated Sites Regulations* met prior to filing the confirmation of remediation report
- c) indication where different standards have been applied to distinct areas of the site, as specified in the RAP (i.e., subject properties, road-ways, off-site property lands), and the applicable numeric or risk-based remediation standards for each contaminated media must be identified
- d) rationale for the use of all remediation standards and demonstration that the remediation and/or risk management measures achieve the objectives
- e) impacts identified on third-party properties addressed to meet the requirements outlined in the applicable Ministerial Protocols (protocol PRO-200, *Environmental Site Assessment for Limited Remediation*; protocol PRO-400, *Phase 2 Environmental Site Assessment*; and protocol PRO-600, *Remedial Action Plan protocols*), pursuant to the *Contaminated Sites Regulations*

- f) all relevant sections of checklist CHK-700, Confirmation of Remediation Checklist, presented in Appendix 1 of this protocol completed. Incomplete submissions must not be filed with the Minister
- g) the confirmation checklist submitted in conjunction with form FRM-700, Record of Site Condition or form FRM-701, Declaration of Property Condition
- h) signatures on checklist CHK-700, Confirmation of Remediation Checklist from the site professional, the responsible party, and site owner or their approved agent

10.2 Reporting of Confirmatory Sampling Information

The following information must be documented in the Confirmation of Remediation Report:

- a) clear description of sample locations and methods used to obtain the confirmatory samples
- b) confirmation that the requirements of this protocol have been met
- c) confirmation that criteria established in the RAP have been achieved
- d) leak detection test results and calibration results for soil vapour and sub-slab air samples
- e) distinction between confirmatory sampling results from each stage of the remediation, where multiple stages were conducted. Final boundary confirmation samples clearly identified
- f) field observations and monitoring data, where appropriate to support conclusions
- g) adequate post-remediation data to demonstrate that the remediation objectives have been met
- h) in addition to this protocol, other relevant technical guidance used to develop and implement the confirmatory sampling program, as well as any deviations from guidance referenced

10.3 Reporting Requirements - Appendices

10.3.1 Figures, Drawings, and Surveys

A scaled site map must be provided which includes the following:

- a) pre- and post-remediation conditions including land use, relevant structures found on site, and the boundaries of all areas of environmental concern

- b) the extent of remedial excavations (both lateral and vertical) with respect to all areas of environmental concern and contaminants of concern identified during site characterization
- c) removed/decommissioned structures (if different from pre-remediation)
- d) limits of all on-site or off-site management areas and property boundaries
- e) final confirmatory sampling locations and corresponding analytical results that confirm all contamination has been remediated, for each affected media
- f) post-remediation vapour or groundwater monitoring data in tabulated format (and graph format, if appropriate) and interpretation of trends and variations in the data

10.3.2 Analytical Data

The following documentation must be provided:

- a) printed copies of all analytical laboratory results used in the study
- b) tabulated analytical data for confirmatory samples compared with applicable remediation standards

10.3.3 Manifest Information

Manifests or manifest summaries from the receiving facility must be provided for all materials transported off-site. The manifest summaries must describe the type of materials received, origin (location), volume or tonnage, date received, and transporter identification.

10.3.4 Photographs

Site photos must be included in the confirmation of remediation report submission, including photos showing the site, remediation progress, and any methods applied in the remediation of the site.

10.3.5 Confirmation of Remediation Form

In accordance with Section 13(1)(c) and 15(1)(d) of the *Contaminated Sites Regulation*, checklist CHK-700, Confirmation of Remediation Checklist, provided in the appendix to this protocol, must be submitted to the Minister within twenty-four months of filing FRM-100, Notification of Free Product or Contamination, to the Minister or within another time period specified in writing by an inspector or administrator.

11 REQUESTS FOR TIME EXTENSIONS

To request a time extension for completing remediation, in accordance with Section 13(2) and 15(2) of the *Contaminated Sites Regulations* form FRM-400, Request for Time Extension, must be completed in entirety by a Site Professional. Form FRM-400, Request for Time Extension, and the minimum supporting documentation prescribed therein must be submitted to the Minister within twenty-three months of filing form FRM-100, Notification of Free Product or Contamination.

Acceptable submissions will result in an alternate date requirement for the remediation. The revised date to complete the remediation will be issued in writing by the Administrator or Inspector in accordance with the *Contaminated Sites Regulations*.

APPENDICES

Checklist CHK-700	Confirmation of Remediation Checklist
Form FRM-700	Record of Site Condition
Form FRM-701	Declaration of Property Condition