



Guideline for the Management of Contaminated Sites

Version 2
November 2003

PREFACE

This documentation was developed by the New Brunswick Department of Environment and Local Government (DELG) based upon the guiding principles of protection of human health and the environment as well as the endorsement of a risk based approach to contaminated site management. It is intended to assist those involved with contaminated site management in understanding their roles and responsibilities from project initiation through to regulatory closure of a site.

This information supersedes Version 1.0 of the *Guideline for the Management of Contaminated Sites* (the *Guideline*) initially produced by the DELG in 1999. The initial version was issued concurrent with the desire of the DELG to move the remediation of contaminated sites into a risk based management approach, from the previous utilization of generic clean-up values. Risk based management is consistent with the Canadian Council of Ministers of the Environment (CCME) national framework for managing contaminated sites.

The opportunity to apply the principles of risk assessment and risk management to contaminated sites was advanced, in part, due to the development of standardized, scientifically defensible tools. One such tool is the American Society for Testing and Materials (ASTM) 'Risk Based Corrective Action' (RBCA) approach. Within the RBCA approach, three increasing tiers of technical complexity (Tier I, II, and III) are available for the management of contaminated sites. All three Tiers provide protection of human health and the environment. The person responsible for the management of a contaminated site has the option to use the Tier that they consider the most appropriate for the site. Tiers I and II are likely to be sufficient for use in the management of most contaminated sites. Complex sites may require a Tier III analysis, which may involve extensive study and multiple technical approaches.

The DELG has assisted in the development of a modified version of the ASTM RBCA process for use in New Brunswick and the other Atlantic Provinces through participation in the Atlantic Partnership in RBCA Implementation (PIRI) Committee. The Atlantic RBCA process forms the technical foundation upon which this *Guideline* is based. Guidance on the technical application of Atlantic RBCA is presented in the Atlantic RBCA User Guidance, Version 2, which has been endorsed by all the Atlantic Provinces. This new software is considered to be technically harmonized with the CCME Canada Wide Standard (CWS) for Petroleum Hydrocarbons in Soil, thereby satisfying expectations placed upon New Brunswick as a signatory of the CWS sub-agreement.

The DELG considers the Atlantic RBCA process to be the most appropriate tool to be used when managing petroleum-impacted sites in New Brunswick. Other risk based tools and approaches may be used, however early consultation with the DELG is recommended. Regardless of the selected specific technical approach, compliance with the DELG regulatory and technical guidance material must be maintained throughout the Management Process.

When managing sites impacted by contaminants other than petroleum hydrocarbons, the overall Management Process will be the same, however the scientific methodologies will be different. The utilization of risk assessment and risk management principles may be applicable to such sites. In instances where the DELG does not have screening criteria established for a particular contaminant, screening criteria established under the jurisdiction of the CCME may be used to evaluate such sites. Should the CCME screening criteria not apply or not exist, the DELG may consider screening criteria established under other provincial jurisdictions. Environmental criteria and related documentation established by the CCME can be viewed at www.ccme.ca.

This *Guideline* describes the general Management Process to be used during the remediation of contaminated sites. The technical details, definitions, methodologies and criteria used throughout the Management Process are found in other documents referenced by web hyperlinks. (Indicated by underlined phrases in the text).

Amendments to this *Guideline* document are anticipated as opportunities for improvement arise. Users should ensure that they are using the most recent version. Those responsible for the management of contaminated sites are also encouraged to involve DELG staff throughout the Management Process, particularly where there is uncertainty pertaining to departmental policies.

For further information please contact

The Remediation Branch of the Environmental Management Division,
NB Department of the Environment and Local Government,
Marysville Place, 20 McGloin Street, Fredericton, NB

at (506)-444-5955

or visit the following web sites:



www.gnb.ca/0009



www.atlanticrbca.com

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1.0 INTRODUCTION

This *Guideline* is intended to provide a common-sense based, scientifically defensible approach to the management of contaminated sites in the Province.

The following points were considered by the DELG during the development of the Management Process.

- The environment and human health must be protected.
- The Responsible Party should finance the remedial process.
- The Site Professional must be accountable for the results of his/her work throughout the Management Process.
- The Management Process should allow for efficient use of human and financial resources while protecting the environment and the public.
- The Management Process should be applicable to all contaminated sites.
- The Management Process should be acceptable to the stakeholders.

The key modifications contained in Version 2 of the *Guideline* are outlined below:

- The number of steps in the Management Process has been reduced. Most significantly, the Environmental Site Assessment (ESA), risk assessment, and Remedial Action Plan (RAP) are included in a single submission to DELG.
- A means to audit the Management Process, as per the DELG *Protocol for the Processing of Site Professional Submissions*, has been developed to encourage consistency in consultant submissions and to reduce DELG processing time.

- Further explanation of the roles and responsibilities of the Site Professional is included.
- Clarification of the Limited Remedial Action (LRA) process is provided.

1.1 Responsibilities of Key Parties

Generally, the three key parties involved in the management of contaminated sites in the Province are the Responsible Party, the Site Professional and the DELG. In those instances where contamination has migrated beyond the site property boundary and affects properties owned by others, these Third Parties become a component within the Management Process. The Responsible Party will keep Third Parties informed of the contaminant levels present on their property and of the progress in addressing these contaminant levels.

The primary responsibility for technical judgement and problem resolution rests with the Site Professional. The Site Professional is responsible for ensuring that criteria for the protection of human health and the environment have been achieved. The DELG is responsible for reviewing this determination and ensuring that the Management Process herein is followed throughout the auditing process.

The Responsible Party is expected to finance the Management Process, manage the site in a timely fashion, and maintain an appropriate level of due diligence throughout the Process.

Within the context of this *Guideline*, the general responsibilities of the parties are as follows:

The Responsible Party

- is responsible for compliance with the *Guideline*;
- is responsible for notifying the DELG of the presence of contamination on subject or Third Party properties as per the DELG *Water Quality Regulation* and the *Petroleum Product Storage and Handling Regulation*;
- is responsible for ensuring that any Third Party is notified about the presence of contamination on their property;
- is responsible for ensuring that a person who meets the qualifications of a Site Professional oversees the management of the contaminated site;
- is responsible for taking appropriate action to ensure that the environment and human health are protected, and for remaining informed of all activities undertaken during the Management Process;
- is responsible to forward Site Professional submissions to the DELG for processing; and
- is responsible for the satisfactory remediation of the contaminated site and completion of the Management Process in a timely manner.

The Site Professional

- is responsible for ensuring professional competence for all work undertaken within the Management Process;
- is responsible for notifying the Responsible Party and the DELG of the presence of contamination and associated risks to human health and the environment on subject and Third Party properties as per the DELG *Water Quality Regulation* and the *Petroleum Product Storage and Handling Regulation*;

- is responsible for reviewing the contents of all reports as listed in Part 2a of the Record of Site Condition;
- is responsible for the contents of all reports as listed in Part 2b of the Record of Site Condition;
- is responsible for determining if remedial criteria and objectives of the proposed Remedial Action Plan (RAP) have been achieved;
- is responsible for delivering all documentation related to the management of the contaminated site to the Responsible Party; and
- is responsible for the completion of the relevant sections of the Record of Site Condition and for provision of the Record of Site Condition to the Responsible Party.

The Department of Environment and Local Government

- is responsible for supporting and promoting the protection, restoration, enhancement and wise use of the environment;
- is responsible for identifying a Responsible Party;
- is responsible for ensuring that the Management Process is followed and that a regulatory response is provided in a timely manner;
- is responsible for auditing the Management Process;
- is responsible for ensuring compliance with the *Guideline* if non-compliance by the Responsible Party exists; and
- is responsible for acknowledging the conclusion of the Management Process.

2.0 REGULATORY FRAMEWORK

New Brunswick's environmental legislation states that a contaminant cannot be released into or upon the environment unless acting under permission given through legislation. However, the DELG acknowledges that accidental releases do occur and that a process for the evaluation of the resulting contamination is necessary. This *Guideline* has been developed to support the Minister's authority to address Responsible Parties and to provide guidance to all parties involved in situations where a contaminant release has occurred.

2.1 Determination of a Responsible Party

Unless specifically enumerated in an Act or regulation, the Minister (or designate) may choose a person (Responsible Party) from anyone whose conduct or failure to act caused or contributed to the contamination. In this context, the Minister has the discretion to determine who is responsible for ensuring the remediation of a contaminated site. This determination may require assessment and/or investigative efforts by the DELG.

The Minister does not determine or apportion liability. Any contaminated site issues not related to the protection of the environment/human health that arise between Responsible Parties and Third Parties are considered by the DELG to be civil matters to be settled by the two parties outside of the Management Process.

2.2 Regulatory Rationale

The Minister's authority pertaining to the issuance of Orders necessary to address a contaminated site is outlined primarily in the

Clean Environment Act, R.S.N.B. 1973, c. C-6, the *Petroleum Product Storage and Handling Regulation*, N.B. Reg. 87-97 and the *Water Quality Regulation*, N.B. Reg. 82-126 both established under the *Clean Environment Act*. This authority may be enforced by means of a Ministerial Order issued by the Minister under the Act or an order issued by the Minister or anyone designated to act on his/her behalf, under the Regulations. Both Ministerial Orders and orders are hereinafter referred to as Orders. Anyone who fails to comply with an Order issued under the *Clean Environment Act* or its regulations commits an offence and is subject to the DELG's *Compliance and Enforcement Policy*.

2.3 Notification

The *Petroleum Product Storage and Handling Regulation* requires that any person who suspects or detects that a petroleum product is leaking or has leaked from a storage tank system to notify the Minister (or designate) of such leak.

The *Water Quality Regulation* requires immediate notification to the Minister (or designate) where any contaminant is emitted, discharged, deposited, left or thrown in any place such that it may, directly or indirectly, result in water pollution or increased water pollution in any waters of the Province. In situations where it is mutually agreed by the Site Professional and the Responsible Party that the Responsible Party will notify the DELG, the Site Professional must verify that this notification did occur. If the DELG determines that notification by the Responsible Party did not occur, both the Responsible Party and the Site Professional may

be held accountable by DELG for failing to comply with the requirements of the Regulations outlined above.

2.4 Site Professional Qualifications

A Site Professional, within the context of the *Guideline*, is defined as a person of appropriate qualifications as per the requirements of the Association of Professional Engineers and Geoscientists of New Brunswick (APEGNB).

The Site Professional manages the assessment and remediation of contaminated sites on behalf of the Responsible Party. Other professionals and technical experts, such as toxicolo-

gists and ecological risk assessment specialists, may play an important role in contaminated site management and the DELG acknowledges this multi-disciplinary approach may be appropriate for certain sites. However, the Site Professional is responsible for ensuring that other technical experts are adequately qualified to carry out their portion of the work, and assumes responsibility for all environmental work undertaken for the project. Additional details pertaining to required Site Professional qualifications in New Brunswick can be found at www.atlanticrbca.com. To review information related to the APEGNB and applicable legislation, visit www.apegnb.com.

3.0 MANAGEMENT PROCESS ---

The Management Process is presented graphically in Appendix A and is described in detail in this section.

Throughout this Process, the DELG will communicate with the parties involved and establish reasonable timelines for remediation. Those sites that have the potential to significantly impact the environment and/or human health will be held to more stringent timelines.

3.1 Preliminary Evaluation

Initial notification to the DELG is required at the earliest possible time following the discovery of the contamination occurrence. Occurrences may be the result of spills or accidents and may be discovered following investigations completed due to sale of the land, refinancing or other situations.

In some instances, initial emergency action may be required to reduce the potential of immediate harm to the environment and human health. In many situations, it is appropriate for such actions to be initiated by the Site Professional or Responsible Party prior to the arrival or involvement of the DELG. In these situations, the Site Professional or Responsible Party must minimize any long-term environmental impacts resulting from the emergency action.

Following the initial notification, DELG staff will conduct a site inspection and/or review the situation. The significance of the problem will be evaluated by utilizing an internal Departmental inspection questionnaire. The DELG will determine if Limited Remedial

Action (LRA) measures are appropriate to attempt at the site or if site conditions are such that the Management Process must be followed. The DELG will attempt to determine a Responsible Party at this time and may then order the Responsible Party to carry out the remediation.

3.2 Limited Remedial Action

In New Brunswick, Limited Remedial Action (LRA) is defined as:

“The remediation of soil impacts at a site under the direction of a Site Professional, or DELG personnel in exceptional circumstances. The DELG shall determine, during completion of a site inspection questionnaire, if it is appropriate to attempt to use limited remedial action measures at a site.”

The LRA approach allows for a timely cleanup of contaminants in situations where there is less potential risk to human health and the environment. If it has been determined that it is feasible to carry out LRA, the DELG will request that the Responsible Party hire a Site Professional and complete the LRA process. Should it be determined that LRA is not appropriate or that the LRA process has not been successful in remediating the site, the DELG will require the Responsible Party to follow those components of the Management Process outlined in the following Sections.

3.3 Environmental Site Assessment and Remedial Action Planning

The Site Professional and Responsible Party may review current technical documentation related to site assessment and remedial action planning by visiting www.atlanticrbca.com. This includes information on minimum site assessment requirements, Limited Remedial Action, specific testing requirements related to contaminants of concern, applicability of screening criteria, development of site-specific criteria and application of the Management Process within Protected Wellfield and Watershed Areas.

3.3.1 Environmental Site Assessment (ESA)

It is the responsibility of the Site Professional to plan and implement an appropriate environmental site assessment on behalf of the Responsible Party and in accordance with the current Atlantic RBCA User Guidance documentation. Through the completion of an ESA, the Site Professional gathers the necessary technical information to adequately plan appropriate remedial actions, if necessary. The amount of assessment information will generally increase at each risk assessment Tier.

A critical factor associated with an ESA is that the extent of the contamination in both soil and groundwater must be adequately defined and delineated, even if it has crossed the source property boundary. Delineation to applicable screening criteria levels is the minimum level of delineation required in all situations. However, further delineation may be required by DELG in circumstances where screening criteria are not applicable, or where ecological or aesthetic criteria must be achieved.

Consideration of the possible requirement for ecologically based studies must begin at this stage of the Process through the completion of an ecological screening document as detailed in the Atlantic RBCA User Guidance. Should the results of the screening indicate that there is a complete pathway for impact to ecological receptors, further evaluation is required.

3.3.2 Comparison of Site Assessment Data to Environmental Criteria

Once the environmental condition of the site has been assessed, the Site Professional will compare the results to appropriate screening criteria. When managing petroleum contaminated sites, the current Tier I Atlantic Risk Based Screening Level (RBSL) Criteria established by the Atlantic PIRI Committee are to be used, if applicable. Non-petroleum impacted sites are to be evaluated by means of an appropriate screening criteria established by the CCME or other provincial jurisdictions in instances where the DELG does not have screening criteria for the particular contaminant. In all situations, the Site Professional will provide a rationale for applicability of the chosen screening criteria to the site in question.

Should the screening criteria be exceeded, or deemed to be not applicable, the Site Professional and Responsible Party may choose to develop Site Specific Target Level Criteria. When managing petroleum contaminated sites, the current Atlantic Risk Based Corrective Action model established by the Atlantic PIRI Committee is to be used to develop these criteria. Non-petroleum impacted sites are to be evaluated by means of an appropriate risk assessment approach established by the CCME or other provincial jurisdictions. Use of the Atlantic RBCA model for contaminants other than petroleum hydrocarbons has not been validated by Atlantic PIRI at

this time. However, the Site Professional may use the model, with appropriate input modifications, subject to DELG approval. Use of a risk assessment approach for non-petroleum contaminants is considered to be a Tier III risk assessment.

Ecologically impacted sites are to be evaluated by means of an appropriate ecological risk assessment approach established by the CCME or other technical approaches acceptable to the DELG. This would involve comparison of site data to ecologically based screening or site specific criteria. Use of a risk assessment approach for ecological receptors is considered to be a Tier III risk assessment.

In those instances where the Site Professional utilizes an approach other than the Atlantic RBCA process or evaluates the site at a Tier III level of assessment, the DELG may review the submission using internal resources, or by engaging external expertise at Departmental cost.

For very complex sites, the Responsible Party may choose to engage another independent Site Professional as a peer reviewer. In these situations, early involvement of a peer reviewer is encouraged as it allows for modifications to be initiated at the planning and assessment stages of the project. Peer review comments are included in submissions to DELG.

If the Tier I RBSLs or Tiers II/III SSTL criteria for the contaminant are not exceeded, the Site Professional may conclude that further action is not required and submit (on behalf of the Responsible Party) a Closure Report, incorporating complete ESA information and a Record of Site Condition, to the DELG. The DELG will respond with a written Acknowledgment of Receipt.

The Responsible Party is required to inform Third Parties about the contamination discovered during the ESA by means of a

registered letter and provide proof of such disclosure to the DELG within the ESA/RAP Report. Notification to Third Parties must include the degree and extent of the known impacts to their property and an outline of the Responsible Party's remedial plans and schedules pertaining to the Third Party property. Notification must be completed regardless of the level of contamination determined to be present on the Third Party property.

3.3.3 Remedial Action Planning

When environmental criteria at Tiers I-III have not been achieved, remedial action will be required by the DELG. These remedial actions are to be developed in the RAP portion of the ESA/RAP report. This must summarize the rationale used to develop remedial and/or site management actions and include a monitoring plan.

The DELG requires the timely remediation of contaminated sites. Therefore, a reporting schedule and estimated timeline for completion of the Management Process is considered by DELG to be a fundamental and essential component of a RAP.

Timelines for the management of complex sites are expected to be broader and more flexible than those for typical sites. To streamline the Management Process, the DELG requires the submission of both documents together or a combined ESA/RAP document.

The RAP is submitted by the Responsible Party to the DELG for acknowledgement. Any introduction of active chemical or biological agents, or potential contaminants associated with the remediation process into the environment, requires review and approval of DELG prior to implementation. This review may be undertaken in consultation with the New Brunswick Department of Health and Wellness.

The DELG may audit the RAP to ensure that relevant issues are addressed in accordance with the *Guideline*. Responsibility for the detailed technical work will, however, remain with the Responsible Party and the Site Professional. The acknowledgement or approval of DELG must be received by the Responsible Party and/or Site Professional prior to the implementation of remedial measures. In this regard, the DELG is committed to a timely response to ESA/RAP submissions as outlined in the DELG *Protocol for the Processing Site Professional Submissions*. Submissions undergoing review triggered by the audit process will require longer turn-around times. The Site Professional may also make a presentation of ESA/RAP or closure information directly to Departmental personnel to assist in expediting the review process.

The Responsible Party must advise the DELG of departures from the acknowledged Remedial Action Plan. In situations where predictions included in the RAP fail to be achieved, the Responsible Party will be required to revisit and enhance the RAP.

3.3.4 Monitoring

An essential component of a RAP is the monitoring program. The purpose of a monitoring program is to evaluate the performance of the corrective actions established in the RAP and/or to evaluate conditions related to site closure. The Site Professional will interpret the monitoring results to determine if contaminant plumes are stable and that applicable criteria have been achieved. Required components of the RAP include the following:

1. A clear re-statement of the remedial criteria/objectives or site management objectives.

2. A clear definition of the monitoring objectives.
3. Identification of the parameters to be monitored and measured.
4. Description, of when, where, and how data is to be collected, analyzed and reported to the Responsible Party and the DELG.
5. Description of how satisfactory RAP or site management performance will be confirmed.
6. Detailed interpretation of monitoring results.

3.4 Site Closure

When the Responsible Party and the Site Professional are satisfied that the requirements of the RAP have been met, a recommendation for closure can be made by forwarding a Closure Report and a Record of Site Condition, signed by the Site Professional, to the DELG.

Closure Reports should contain sufficient information to allow the DELG to conclude the Management Process without revisiting previously submitted reports. A clear and concise description of how and why the determination of site closure was made is also a critical component. This description is to include a statement indicating that closure objectives have been met and that any contaminant plumes are in a stable to shrinking phase.

If the closure documents meet DELG requirements, the DELG will conclude the Management Process by signing the Acknowledgment of Receipt and forwarding a copy of the Acknowledgment of Receipt to the Responsible Party and to the Site Professional.

Consistent with the position of CCME, the DELG recognizes two general types of site closure mechanisms; namely, **unconditional closure** and **conditional closure**.

3.4.1 Unconditional Closure

Unconditional closure can be achieved by demonstrating (by means of an ESA, risk assessment, closure report or confirmatory sampling or monitoring) that applicable Tier I Screening criteria or Tier II/III SSTL criteria have been met in accordance with the *Guideline*. Unconditional closure usually permits unrestricted future development or use within the particular land use designation (commercial or residential).

3.4.2 Conditional Closure

Conditional closure is a closure mechanism that identifies requirements for on-going actions and controls required to protect human health and the environment after remedial actions are complete. For example, in certain situations it may be impractical and/or cost prohibitive to remediate to defined criteria. In such instances, site-specific engineered or institutional controls can be established to achieve Tier I-III criteria.

Engineered controls may include asphalt or imported soil covers, treatment systems for aesthetic-level contamination in potable water, air ventilation systems, landscape architecture designs, etc. As future management of most of these measures lies outside the regulatory jurisdiction of the DELG, the Responsible Party must assume long-term responsibility for ensuring that engineered controls are monitored and maintained.

Institutional controls for conditional closure involve land use restrictions to ensure that human health or environmental objectives are achieved. Regulatory acceptance of such a state would normally be subject to certain conditions and would likely involve Departmental consultation with other stakeholders. Institutional controls may include restrictions on the drilling of potable wells, construction of buildings, modification of exposure criteria from the generic Atlantic PIRI values, etc.

The following will be required by DELG prior to conditional site closure:

- provision for the Responsible Party to maintain and operate any engineered systems as long as necessary to fulfill their intended function and preserve human health and environmental risks at acceptable levels;
- written agreement to the controls from all affected stakeholders including the Responsible Party, the land owner and any party entitled to use the site.

To assist the public in obtaining information regarding the environmental status of a property and restrictions on property use, the DELG will attach environmental notices to affected Property Identification Numbers contained within the Provincial Government's Land Registration System.

APPENDIX A

MANAGEMENT PROCESS GRAPHIC

DELG Contaminated Site Management Process

