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Remediation Process Guide

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Executive Summary

The NEB's 2019 Guide provides companies with direction on how to protect the environment and human health against contaminant exposure, related to their facilities or infrastructure. It provides the framework for companies to effectively demonstrate that they are managing and mitigating the environmental impacts of contaminant releases to the highest standards. It also includes information on submissions that describe successful remediation and provides details on how to properly adhere to NEB expectations.

The 2019 update has incorporated feedback from regulated companies and NEB staff to include the following:

- the Guide is now applicable throughout all phases of the project lifecycle from pre-construction to abandonment
- clarity on expectations for risk management, criteria selection and engagement; and
- new reporting requirements using the Online Event Reporting System

The NEB is seeking public comment on the Guide, regarding clarity and comprehension. As the NEB is seeking comments on the Guide, this version is a DRAFT. A finalized version can be expected in mid 2019.

The first official Remediation Process Guide (Guide) was published in May 2011. With this publication's release, the National Energy Board has become the lead regulator for remediation activities for NEB-regulated companies.

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1. Purpose

The National Energy Board (NEB) is committed to protecting the environment and the public from significant adverse effects of environmental contamination related to NEB-regulated infrastructure. The NEB developed this Remediation Process Guide (Guide) to provide guidance on how to facilitate successful remediation in the event of a hydrocarbon or other type of contaminant release. This Guide describes the most common approaches by which a company can demonstrate that the contamination associated with NEB-regulated infrastructure has been appropriately remediated to the most stringent applicable criteria.

This Guide does not address unique conditions that may need to be considered during remediation. For inquiries related to site specific contaminated sites, contact remediation@neb-one.gc.ca.

This Guide applies to energy infrastructure regulated under the *National Energy Board Act* (NEB Act) and the *Canada Oil and Gas Operations Act* (COGOA).

At a minimum this Guide applies to:

- remediation of spill sites;
- remediation of residual soil and groundwater contamination from recent spills; or
- remediation of historical contamination located on:
  - company-owned property (e.g. pump or compressor station, tank terminal or processing plant);
  - a right-of-way (RoW); or
  - property impacted by contamination related to NEB-regulated infrastructure.

The Guide does not apply to:

- initial clean-up of free product from a release – this activity will be managed under emergency response activities as specified in the company's Emergency Procedures Manual,
- remediation of contamination that occurs from a release site located in an offshore area, or
- contaminated sites that were undergoing remedial activities under a provincial regulator at the time this Guide was initially produced in 2011.

This Guide applies to contamination identified during all phases of the pipeline lifecycle, from pre-construction through abandonment.

The NEB requires companies to have management systems and programs in place to identify the hazards, manage risks and implement controls to protect people and the environment. Section 48 of the *National Energy Board Onshore Pipeline Regulations* (OPR) and Section 14 of the *National Energy Board Processing Plant Regulations* (PPR) require a company to have an Environmental Protection Program to manage conditions that have the potential to adversely affect the environment. Section 25(3) of COGOA also states 'Every person required to report a spill under subsection (2) shall, as soon as possible, take all reasonable measures consistent with safety and the protection of the environment to prevent any further spill, to repair or remedy any condition resulting from the spill and to reduce or mitigate any danger to life, health, property or the environment that results or may reasonably be expected to result from the spill.'

2. Regulatory Approach

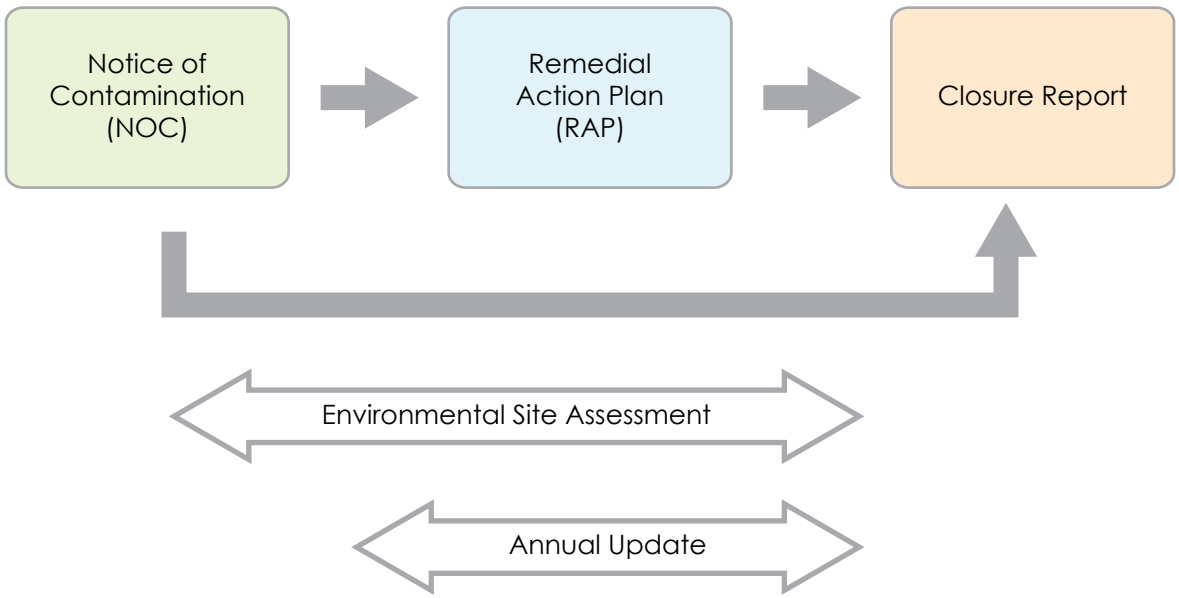
As of 2011, the NEB is acting as the lead agency for all contaminated sites and remediation requirements related to NEB-regulated energy infrastructure. In situations where remediation commenced prior to 2011, and companies remain engaged with municipal or provincial agencies to obtain site closure, the NEB will continue to act as a stakeholder in the ongoing work. Closure documentation, such as a remediation certificate, issued by the regulator should be submitted to the NEB once the contaminated site is considered closed by the respective regulator.

Section 6.4 of the Guide identifies that the NEB requires companies to use the most stringent applicable remediation standards (provincial/territorial or Canadian Council of Ministers of the Environment (CCME)). The only situation where the standards do not apply, is if it can be demonstrated that site-specific conditions justify the use of other criteria or the application of a risk assessment and/or risk management approach. Justification for the use of particular criteria and additional site-specific data must be provided to support the application of site-specific remediation objectives.

3. Remediation Process

Companies are expected to follow the Remediation Process as illustrated in Appendix A, Figure A1. A simplified process is show below in Figure 1.

Figure 1. Summary of Remediation Process Framework



The Remediation Process applies to:

1. clean-up of contamination from an event that has occurred in the past but has been recently identified and has not yet been remediated. This includes contamination that:
   - occurred as a result of a previous/historical release;
   - is an accumulation of contaminants over time; or
   - cannot be removed due to close proximity to infrastructure.
2. clean-up of residual contamination where contamination results from a recent release that meets the definition of a Reportable Incident.

Residual contamination is defined as contamination that requires further remediation to achieve the appropriate criteria. The *National Energy Board Event Reporting Guidelines* specify that a Detailed Incident Report (DIR) must be submitted within 12 weeks of reporting an incident. If there is still contamination that exceeds criteria resulting from the Reportable Incident at the time of a DIR submission, the incident site will automatically transition into a contaminated site and will need to be further remediated in accordance with the Remediation Process. For Reportable Incidents, the Remediation Process applies to all remedial activities occurring after the DIR submission. Requirements related to reporting incidents can be found at the *National Energy Board Event Reporting Guidelines* NEB - National Energy Board Event Reporting Guidelines. A diagram of the transition from the Incident Process to Remediation Process can be found in Appendix A, Figure A2.

Sections 4-9 describe the Remediation Process stages that the NEB expects regulated-companies to follow.

Initial Cleanup Plan (ICP)

If a release that meets the definition of a Reportable Incident occurs, an Initial Cleanup Plan (ICP) may be requested during the Emergency Management phase. The ICP will outline interim remedial objectives prior to Remedial Action Plan development and submission and will assist in transitioning remediation of the incident site into the Remediation Process.

4. Reporting Contamination

4.1 Reporting contamination to the NEB

The NEB has developed a web-based Online Event Reporting System (OERS) that NEB-regulated companies are required to use to report contamination. Reporting contamination occurs through a Notice of Contamination (NOC) submission, labeled in Figure 1 above. Guidance on submitting a NOC through OERS can be found in the *Event Reporting System User Guide*.

Once sufficient assessment has been conducted to gather information required for the NOC, the NOC should be submitted to the Board **as soon as possible**. The NEB recognizes that further delineation following the NOC submission may require amendments to the information initially provided in the NOC. In this case, an email should be sent to remediation@neb-one.gc.ca explaining the updates to the NOC. The NEB recognizes that the information entered in the initial NOC submission is the most accurate information available at the time.

Once a company notifies the NEB of a contaminated site, the NEB assigns a remediation file number (REM) to the site and appoints an Environmental Specialist to act as a liaison with the company throughout the remediation project. The NEB Environmental Specialist will be an Inspection Officer. Inspection Officer holds all of the responsibilities and authority of an Inspection Officer as defined in section 49 of the *National Energy Board Act*.

The documentation the NEB requires following submission of the NOC will depend upon the complexity of remediation, the risk of off-site migration and the risk of contaminant exposure to sensitive receptors, contaminant characteristics and third-party interest in the site. The information provided in the NOC will assist in the determination of further documentation required for the contaminated site. Examples of different scenarios that companies may encounter and the expected actions that correspond to these scenarios, following the submission of NOC, are included in Appendix E.

4.2 Notification and engagement of interested parties

If contamination occurs on privately owned land or is suspected to have migrated onto privately owned land, the regulated company is expected to contact parties whose rights or interests may be impacted by the contamination prior to, or at the same time as, the contamination is reported to the NEB. The party(ies) should be made aware of the type and level of contamination and the company's planned next steps for remediation.

It may be necessary to involve additional regulators such as federal, provincial, territorial and municipal governments in the remediation project when:

- contamination has migrated offsite (outside of company-owned property or company RoW, lease or easement) and/or
- a potential for off-site migration exists due to the type of contaminant or the magnitude of release.

Transparency and engagement with all interested parties is encouraged by the NEB. In all situations a company should:

- strive for open communication between all agencies, organizations and persons involved;
- develop a communication protocol for sharing of information regarding the project;
- commit to undertaking remedial activities that have the best possible outcomes, which consider the concerns of regulators, potentially-impacted Indigenous groups and other interested parties; and
- maintain a record of communication related to remedial activities with landowners, rights holders, and interested third parties.

5. Environmental Site Assessment

The NEB recognizes that various terminology is used across Canada to describe studies undertaken to assess site conditions and characterize and delineate contamination encountered (e.g.: Environmental Site Assessment, Phase II, Phase III, Screening Level Assessment, etc.). The term Environmental Site Assessment (ESA) will be used in this Guide. An ESA should characterize the site and contamination sufficiently to support the proposed remedial activities, including but not limited to the Remedial Action Plan and Closure Report. Guidance for conducting a Phase II ESA may be found in *CSA Z769-00 Phase II Environmental Site Assessment*.

The appropriate level of Environmental Site Assessment (ESA) should be conducted prior to remediation of all contaminated sites. The NEB Environmental Specialist (ES) may request a full copy of the ESA report.

Elements of a detailed ESA typically include:

- an intrusive site investigation resulting in site characterization;
- delineation of the contamination in soil and groundwater vertically and laterally;
- calculations of volume of impacted soil and extent of impacted groundwater; and
- identification of remediation objectives and remedial options analysis.

If contamination is cleaned up immediately upon detection and a detailed ESA is not completed, the company must provide an appropriate level of site information in the Closure Report to justify the selected remediation criteria and to demonstrate that the criteria have been met. Justification for the omission of an ESA must be provided and more conservative remediation criteria might be required than would otherwise be applicable.

Detailed results in the ESA are required to support the selection of site-specific criteria, up to and including a risk-assessment and/or risk management. The ESA must provide sufficient information to develop an appropriate RAP.

6. Remedial Action Plan (RAP)

6.1 RAP requirement

A RAP is a document that describes in sufficient detail how remediation of a contaminated site will occur. Unless contamination is minimal and can be cleaned up quickly, contaminated sites will require the development and implementation of a RAP.

This Guide contains Appendix C entitled 'Assessment Guide for RAP Requirement'. This Appendix provides examples of criteria that the ES will consider in determining whether a RAP is required or whether it is appropriate to proceed directly to the Closure Report. Companies are encouraged to consult the ES to discuss the complexity and detail required in a RAP prior to its development.

6.2 RAP contents

Every contaminated site is different and the NEB expects that companies will submit information that is relevant to the nature, scale and complexity of remediation at the specific site.

The RAP should include the following items:

1. Background:
   a) A summary of the data collected during ESA site characterization and delineation investigations, including complete surface and subsurface site characterization and contaminant characterization.
   b) A detailed map or maps that clearly identify the contaminant source location, affected surface and subsurface areas and all sample locations.

2. Scope of Remediation:
   a) Contaminants of concern
      i. The preferred format is tabular, clearly identifying the contaminant and supporting rationale.
   b) Remediation objectives
      i. The preferred format is tabular, clearly identifying the selected remediation criterion or criteria for each contaminant of concern and supporting rationale.
      ii. Rationale for selection. If site specific objectives have been established, attached the risk assessment as an appendix to the RAP
   c) Method(s) by which remediation will be conducted (detailed description). This should include consideration of physical/chemical limitations, construction requirements, environmental as well as health and safety implications, regulatory approvals, landowner and potentially-impacted Indigenous groups expectations.
   d) Details of sampling and analyses to be performed pre and post remediation, and quality assurance and quality control measures to be implemented.
   e) Control measures and contingency plans to mitigate potential adverse effects to receptors such as humans, aquatic life, livestock, vegetation and wildlife.
   f) A detailed timeline for implementation of the RAP.

3. Post-Remediation:
    a) Any proposed long term monitoring program including details and timing of sampling, analysis, review and reporting to be performed.
    b) Corrective action plan to mitigate any concerns or issues identified during monitoring.
    c) Contingency plans for changes to site conditions identified during a long term monitoring program.
    d) Slope stability and erosion control as necessary.
    e) Reclamation plans may be required to return the site to a productive or natural state. It may not be possible to include reclamation results in the Closure Report since several growing seasons are often required to stabilize the site.

4. Engagement:
    a) A record of engagement with affected landowners, potentially-impacted Indigenous groups and any other parties affected by the contamination or remedial activities. Any persons which have been notified of contamination should be engaged on the plan for remediation.
    b) A record of any engagement with other involved regulators (see Sections 2 and 5.2); and
    c) A summary of any concerns raised and the company's efforts to address them.

5. Concordance Table:

    The Concordance Table included in the RAP should direct the reader to the location within the report that information can easily be accessed regarding remediation objectives and results. An example of information to be included in the concordance table is found in Appendix B.

6.3 NEB acceptance of the RAP

Upon submission of the RAP to the NEB, the ES assigned to the contaminated site will conduct a review of the document. If the RAP is found to be acceptable based on the site-specific information provided and the information is consistent with the NEB's knowledge of the site, the NEB will send an email notification through OERS that the RAP has been accepted. The acceptance of the RAP documents that the company and the NEB have established remediation expectations.

The Board encourages continual improvement practices within companies' environmental management programs and activities. The company must notify the NEB of any amendments to the RAP that are made following RAP acceptance via an email to remediation@neb-one.gc.ca.

These amendments include but are not limited to:

- a change in the scope of the RAP,
- a change in timelines for remediation, or
- the addition of a risk assessment or risk management component.

The intent of a RAP amendment is to encourage engagement and transparency between the company and the NEB. An amendment should be submitted as soon as possible. Prior to submitting a RAP amendment, all affected landowners, potentially-impacted Indigenous groups and other interested third-parties should be consulted on the proposed changes.

6.4 Remediation criteria

The NEB accepts remediation criteria established by the province or territory where the contaminated site is located and the use of the Canadian Council of Ministers of the Environment (CCME) standards and guidelines. It is expected that the most stringent applicable criteria[1] be followed.

For each contaminant of concern, the applicable provincial or territorial and CCME criteria should be identified, and the more stringent of the two selected as the remediation criterion.

Provincial or territorial and CCME sets of criteria are typically established for various types of land use based on generic assumptions with respect to site characteristics, potential receptors and applicable exposure pathways. The primary objective is that human and ecological receptor exposures are maintained at or below levels at which adverse effects may be expected. Typical land use categories are industrial, commercial, residential, parkland and agricultural. These categories and other factors vary across the provinces and territories, thus criteria selection and remediation work must be adapted to each jurisdiction's definitions and approach.

Remediation criteria for a particular site must be selected based on applicable provincial or territorial or CCME criteria for the type of soil and land use. In situations where companies choose to apply a risk assessment approach where site-specific conditions justify the use of other criteria, refer to Section 6.5 for guidance. Less conservative remediation criteria may be acceptable only where sufficient site-specific data is provided to demonstrate that environmental and human health protection goals will be met without ongoing management or restriction of site use. In the case of a RoW, the most stringent applicable criteria based on the current land use crossed by and adjacent to the RoW must be followed both on and off the RoW.

6.5 Site-specific remediation objectives

There are situations in which a RAP cannot accommodate established remediation criteria, for example:

a) national, provincial or territorial criteria for a contaminant do not exist;

b) remediation to guideline-based criteria is not feasible for the targeted land use (e.g. contaminant is too deep or otherwise infeasible to access);

c) guideline-based objectives are not appropriate given the site-specific conditions (e.g. local or regional conditions are significantly different from what was considered in the development of generic guidelines, such that the generic guidelines are not applicable); or

d) receptors of concern requiring special consideration have been identified.

In situations where a RAP cannot accommodate established remediation criteria, it is necessary to conduct a risk assessment (ecological risk assessment and/or human health risk assessment) to establish site-specific objectives and/or take a risk management approach.

1 Various jurisdictions (CCME, provinces, territories) use various terms including criteria, standards and guidelines to refer to published sets of numerical or narrative remediation endpoints which are applied in various regulatory frameworks. In this document, "criteria" is used interchangeably with these terms.

7. Risk Management

Risk management for the remediation process involves the selection and implementation of a risk control strategy based on site-specific objectives. The decision to select a particular risk-based strategy should be informed by the risk assessment. The CCME approach to risk assessment and management is recommended; however, provincial approaches may be considered in certain scenarios. To verify your approach, consult with the assigned ES prior to commencing work. The CCME approach can be found in Section 5 of the document entitled CCME *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment*. Appendix D provides a brief summary of the information that should be included in an environmental and human health risk assessment.

A long term risk management approach may be acceptable for sites where contamination is inaccessible due to the presence of operating energy infrastructure. In such circumstances, risks would be managed pending alteration to or abandonment of the infrastructure. Prior to abandonment the site would need to be appropriately remediated and site closure achieved.

> The NEB requires that all contaminated sites are remediated prior to project abandonment. For projects which have reported contaminated sites to the NEB and have submitted an application to abandon, a Closure of an Abandonment Order will be issued only after a Remediation Closure Letter has been issued.

Examples of risk management strategies that may be deemed acceptable to the NEB include actions that reduce the probability, intensity, frequency or duration of exposure to contamination through soil, water or air/vapour pathways. Requirements of risk management include monitoring and periodic evaluation of the proposed strategy's effectiveness, as well as ongoing evaluation of any changes in site conditions and current policies and guidance pertaining to risk assessment and management. Risk management strategies involving controls such as zoning designations, land use restrictions or bylaws are unlikely to be acceptable to the NEB as they involve measures that are outside the NEB's jurisdiction and limit future land use.

Risk assessment followed by an appropriate monitoring period may be acceptable as a basis for the development of a Risk Management Plan (RMP) for sites that demonstrate human and ecological receptor exposures will remain below levels at which adverse effects are not expected to occur, and active management is not required.

The RMP should include the following:

- the results of the risk assessment for existing contaminants, including a description of the human and ecological receptors, and the pathways by which the receptors might be impacted by the contaminants;
- a detailed description of the controls selected to protect receptors;
- a description of implementation and maintenance of controls;
- a plan for monitoring and periodic site evaluation to verify that the assessment remains valid and that the applied controls remain effective; and,
- a method for ongoing evaluation of current policies and guidance pertaining to risk assessment and management that apply to jurisdiction of the specific site.

The detail and formality of the RMP should be consistent with the site-specific complexity and circumstances.

If the results of the ESA indicate that risk-assessment and risk management is the best approach for a particular site, the company should engage the NEB ES at the earliest possible stage. Consultation with an ES regarding the intent to develop a RMP should take place before the plan is submitted to ensure the company is aware of NEB expectations.

Following the review of the RMP, the ES may determine that specific conditions will be associated with acceptance of the RMP.

7.1 NEB acceptance of the RMP

Upon submission of the RMP to the NEB, the ES assigned to the contaminated site will conduct a review of the document. If the RMP is found to be acceptable based on the site-specific information provided, and the information is consistent with the NEB's knowledge of the site, the NEB will send an email notification through OERS that the RMP has been accepted. The acceptance of the RMP documents that the company and the NEB have established risk management expectations.

Site closure will not be granted for sites at which contamination cannot be fully removed and a risk management strategy is implemented to manage residual contamination. The NEB may instead accept the RMP with no additional action from the company required under the current site model and guidelines applied to the site. The company must continue to provide annual updates on risk managed sites.

Approval of the risk management plan relies on the principles, supported by ongoing environmental monitoring, that:

- the site model and nature of the impacts on the site do not change from those initially understood when the RMP was accepted and
- risks to receptors are deemed to be acceptably low over the time period between the present and the future date at which the remaining contamination is removed or contaminant levels naturally attenuate such that remediation criteria are met.

7.2 Contamination identified on company-owned property

Where contamination is identified within a company-owned facility, the NEB recognizes that it may not be reasonable to remediate all contamination during operations, particularly contamination that is in close proximity to existing facility infrastructure. Contamination may be managed by the company without an immediate requirement to remediate or submit a RMP if both of the following conditions are met:

- Contamination is confined to a company-owned facility with an implemented and established groundwater and surface-water monitoring program;
- No free product is detected in the groundwater monitoring wells

The NEB may request the monitoring program for review and evaluation at any point in time during the sites lifecycle to ensure it is meeting its required end result.

The groundwater and surface-water monitoring program should include routine monitoring and sampling and an annual review of the resulting data to assess any changes in conditions and any recommended changes to the program (in response to changing contaminant concentrations, environmental conditions/receptors, reference standards, operating parameters, etc.). The company must continue to meet any regulatory requirements with respect to the contamination, including measures to anticipate, prevent, manage and mitigate conditions that could adversely affect the environment per s. 48 of the OPR or s. 14 of the PPR. Company actions may include remediation of select areas of contamination to manage liabilities, prevent spreading or migration of contamination, or address contamination that becomes accessible as facility infrastructure is removed or replaced. Upon abandonment of the facility, the company must remediate all contamination in compliance with abandonment order conditions.

Contamination that is confined to company-owned property at a facility that does not have an implemented and established groundwater monitoring program will need to be further characterized through completion and submission of the CCME National Classification System for Contaminated Sites: Site Classification Worksheets following the guidance contained in the *National Classification System for Contaminated Sites Guidance Document*.

Contamination identified at a monitored facility as described above is expected to be reported to the NEB as described in Section 4 of this Guide. An annual update should be provided to the NEB as described in Section 8 of this Guide. If conditions change such that free product is identified or there is an indication that contamination may be migrating offsite, the company will notify the NEB as soon as possible of the changes and proposed actions in response. The notification will be emailed to remediation@neb-one.gc.ca for review by the assigned NEB ES. Upon review it is possible that further information or action may be required. If, or when, the company conducts further assessment, remediation or risk management for part or all of the facility, the company will follow this Guide to demonstrate successful completion of these activities.

8. Annual Updates

All contaminated sites that have not been closed and all risk managed sites require an annual update. An automatic notification to complete the annual update will be sent on April 1 each year. All required information should be inputted into OERS.

9. Site Closure

The following sections outline the documentation required to achieve site closure of a contaminated site. Site closure is achieved upon NEB issuance of a Remediation Closure Letter. The Remediation Closure Letter confirms that the company sufficiently demonstrated that the applicable criteria have been met based upon the information submitted in the Closure Report, and that the remediation file for the site has been closed.

Following issuance of a Remediation Closure Letter by the NEB, the company is no longer required to provide annual updates on these sites to the NEB. All regulatory requirements outside of the remediation context continue to apply to the Project after site closure is granted.

A Remediation Closure Letter will not be issued if the site is undergoing risk management as described in Section 7 of this Guide.

The company must submit two documents as the application for site closure:

1. Closure Report
2. Company Confirmation Letter

9.1 Closure report

A company must submit a Closure Report once the remedial activities, including monitoring, are complete. The level of detail in the Closure Report should match the scope of the remediation required. The Closure Report should include the following items:

a) details about the site and the origin of the contamination;

b) details about the remedial activities that were conducted;

c) tabulated contaminants of concern and selected remediation criteria, including rationale for selection if not already approved in a RAP;

d) site maps including GPS information (decimal degree format) and drawings showing excavation boundaries, sample locations, monitoring well locations, etc.;

e) summary of the methods and results of soil and water monitoring, sampling and analyses demonstrating that contaminants of concern meet the remediation criteria listed in (c);

f) a list of supporting reports containing full details of ESAs, remediation, monitoring, etc. Append any reports required to demonstrate successful completion of remediation and not previously submitted to the NEB; the ES may request submission of additional reports not previously submitted to the NEB;

g) updated record of engagement with landowners, potentially-impacted Indigenous groups and other interested third parties, any concerns raised and the company's efforts to address them; and

h) a Concordance Table (Appendix B) demonstrating that all aspects of the RAP were identified and addressed.

The NEB may request additional information from the company and may refer the Closure Report to other regulators or interested parties for comment.

9.2 Company confirmation letter

The Closure Report must be accompanied by a letter signed by an officer of the company confirming the following:

- all remedial activities were conducted in accordance with the RAP,
- any listed commitments in the RAP have been met, and
- the site was remediated to the applicable criteria.

If a RAP was not prepared, the letter accompanying the Closure Report should identify the following:

- Remediation was completed as outlined in the Closure Report, such that the selected remediation criteria were met.

9.3 NEB acceptance of site closure

Once satisfied that remediation to acceptable criteria is complete, the NEB will issue a Remediation Closure Letter. The NEB will not provide assurance of remediation being acceptable if conditions change at the site or if regulatory criteria, standards or guidelines change in the future. Companies retain liability for further remediation following site closure.

The NEB expects companies to restore the land to a state comparable with the surrounding environment and consistent with the current land use. Companies should accommodate the desired land use of those affected when it is reasonable to do so. The company must comply with all commitments and conditions regarding reclamation, as described in the RAP, Closure Report or Remediation Closure Letter.

10. Contact Information and Guide Improvement

To provide feedback or ask a question regarding the Guide, visit www.nebroundtable.ca/remediation-process-guide or email remediation@neb-one.gc.ca. Other means of communication should be directed to:

Address: National Energy Board
Suite 210, 517 Tenth Avenue SW
Calgary, Alberta
T2R 0A8

Telephone: 403-292-4800
Toll free: 1-800-899-1265
Fax: 403-292-5503
Toll free fax: 1-877-288-8803

11. References

Canada Oil and Gas Operations Act (R.S.C., 1985, c. O-7)

CCME. 2016. *Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment (volumes 1 through 4)*. Canadian Council of the Ministers of the Environment, Winnipeg. PN 1551, 1553, 1555 and 1557.

CCME. 2008. *National Classification System for Contaminated Sites: Guidance Document.* Canadian Council of Ministers of the Environment, Winnipeg. PN 1403.

CSA (2013) *Phase II Environmental Site Assessment* (Z769-00). Toronto. Canada: Canadian Standards Association.

National Energy Board Act (R.S.C., 1985, c. N-7)

12. Abbreviations

CCME	Canada Council of Ministers of the Environment
COGOA	*Canada Oil and Gas Operations ActDIR Detailed Incident Report*
ES	Environmental Specialist
ESA	Environmental Site Assessment
FACS	A Federal Approach to Contaminated Sites, November 1999
GPS	Global Positioning System
ICP	Initial Cleanup Plan
NEB	National Energy Board
NEB Act	*National Energy Board Act*
NOC	Notice of Contamination
NT	Northwest Territories
NU	Nunavut
OERS	Online Event Reporting System
O&M	Operations and Maintenance
OPR	*Onshore Pipeline Regulations*
PPR	*Processing Plant Regulations*
RAP	Remedial Action Plan
RoW	Right of Way

13. Glossary of Terms

Clean-up – To remove chemical substance or hazardous material from the environment to and prevent, minimize or mitigate damage to public health, safety or welfare, or the environment, that may result from the presence of the chemical substance or hazardous material. The clean-up is carried out to specific clean-up criteria. (FACS Glossary)

Contaminant – Any physical, chemical, biological or radiological substance in air or soil or water that has an adverse effect. Any chemical substance whose concentration exceeds background concentrations or which is not naturally occurring in the environment. (FACS Glossary)

Contaminated Site – A contaminated site is defined as a site at which substances occur at concentrations: (1) above background levels and pose or are likely to pose an immediate or long term hazard to human health or the environment, or (2) exceeding levels specified in policies and regulations. (FACS Glossary)

Detailed Incident Report (DIR) – Companies are legally required to file a DIR under the OPR and PPR (as more fully described in the NEB Event Reporting Guidelines, 2018), that contains a description of the incident, affected group(s), losses and impacts, conditions contributing to the incident, detailed analysis of any failed component, corrective actions taken, underlying causes and actions proposed to prevent a similar incident.

Environmental Site Assessment (ESA) – A systematic due diligence process that includes studies, services and investigations to plan, manage and direct assessment decommissioning and clean-up actions. (FACS Glossary)

Offshore Area – means Sable Island or any area of land not within a province that belongs to Her Majesty in right of Canada or in respect of which Her Majesty in right of Canada has the right to dispose of or exploit the natural resources and that is situated in submarine areas in the internal waters of Canada, the territorial sea of Canada or the continental shelf of Canada.

Phase I Environmental Site Assessment (Phase I ESA) – The four principal components of a Phase I ESA are: records review, site visit, interviews and evaluation of information and reporting. A full description of the requirements, methodology and practices can be found in the CSA document Z768-01 (R2012) or ASTM Practice E 1527.

Phase II Environmental Site Assessment (Phase II ESA) – The principal components of a Phase II ESA are: development of investigation and sampling work plans; investigations and inspections; and interpretation and reporting of sampling results. This investigation is normally undertaken when a Phase I ESA determines a likelihood of significant site contamination. A full description of the requirements, methodology and practices can be found in the CSA document Z769-00 (R2013) or ASTM Practice E 1903-97. A Phase II ESA sometimes includes what may be termed a Phase III ESA. This may include investigating the nature and extent of adverse environmental impacts and determining the potential risk to human health and the environment. Key components include: delineation of contamination, soil volume calculations and groundwater affected, notification, establishing remediation objectives and determining remediation options.

Receptor – The person or organisms, including plants, subjected to chemical exposure. (FACS Glossary)

Reclamation – The process of restoring disturbed land to a state comparable with the surrounding environment and consistent with the current land use.

Release – Includes discharge, spray, spill, leak, seep, pour, emit, dump and exhaust. (OPR and PPR)

Remediation – The improvement of a contaminated site to prevent, minimize or mitigate damage to human health or the environment. Remediation involves the development and application of a planned approach that removes, destroys, contains or otherwise reduces the availability of contaminants to receptors of concern. (FACS Glossary)

Remediation Criteria – Numerical limits or narrative statements pertaining to individual variables or substances in water, sediment or soil which are recommended to protect and maintain the specific use of contaminated sites. When measurements taken at a contaminated site indicate that the remediation criteria are being exceeded, the need for remediation is indicated. (FACS Glossary)

Reportable Liquid Release – For energy infrastructure regulated under the OPR or PPR (as more fully described in the NEB Event Reporting Guidelines, 2014), reportable liquid releases include the unintended or uncontrolled release of high vapour pressure hydrocarbons, the unintended or uncontained release of low vapour pressure hydrocarbons in excess of 1.5 m^3, and any other liquid release that results (or could result, under the PPR) in a significant adverse effect on the environment. All spills are reportable for exploration or production facilities regulated under COGOA. A liquid release must be reported as an incident through OERS if it is greater than 0.1 m^3 (100 L) or if it has the potential to cause an adverse effect.

Risk Assessment: – The scientific examination of the nature and magnitude of risk to define the effects on both human and other receptors of the exposure to contaminant(s).

Risk-Based Approach – An approach based on a detailed evaluation of hazard and exposure potential at a particular site. Risk assessment is an important tool to use where, for example, national criteria do not exist for a contaminant or clean-up guideline-based criteria is not feasible for the targeted land use, where guideline based objectives do not seem appropriate given the site specific conditions, where significant or sensitive receptors of concern have been identified or where there is significant public concern, as determined by the lead agency.

Risk Management – The selection and implementation of risk control strategy, followed by monitoring and evaluating the effectiveness of that strategy. Risk management may include direct remedial actions or other strategies that reduce the probability, intensity, frequency or duration of the exposure to contamination. The latter may include institutional controls such as zoning designations, land use restrictions or orders. The decision to select a particular strategy may involve considering the information obtained from a risk assessment. Implementation typically involves a commitment of resources and communication with affected parties. Monitoring and evaluation may include environmental sampling, post-remedial surveillance, protective epidemiology, and analysis of new health risk information, as well as ensuring compliance.

Significant Adverse Effect on the Environment – release of any chemical or physical substance at a concentration or volume sufficient to cause an irreversible, long term, or continuous change to the ambient environment in a manner that causes harm to human life, wildlife, or vegetation. (NEB Event Reporting Guidelines, 2014; see Guidelines for more details and examples)

Site Characterization and Delineation – A program or study that determines the magnitude, nature, degree, and lateral and vertical extent of the contamination that exceeds appropriate criteria or standards.

Site-Specific Remediation Objectives – The process of applying environmental quality guidelines at the site level to establish remediation or clean-up targets for the site. Site-specific remediation objectives may be adopted from existing guidelines (generic criteria), modified from existing guidelines, or developed using a risk assessment approach.

Survey – GPS coordinates and a survey drawing provided to show a contaminated site area, boundaries, contours, elevations, improvements, and its relationship to the surrounding land in accordance with accepted coordinates.

Appendix A

Figure A.1: Remediation Process Framework

A summary of the significant steps within the NEB Remediation Process. The criteria behind the decision making in this process is described in the Guide. The pathway selected depends upon the complexity of remediation, site conditions and contaminant characteristics.

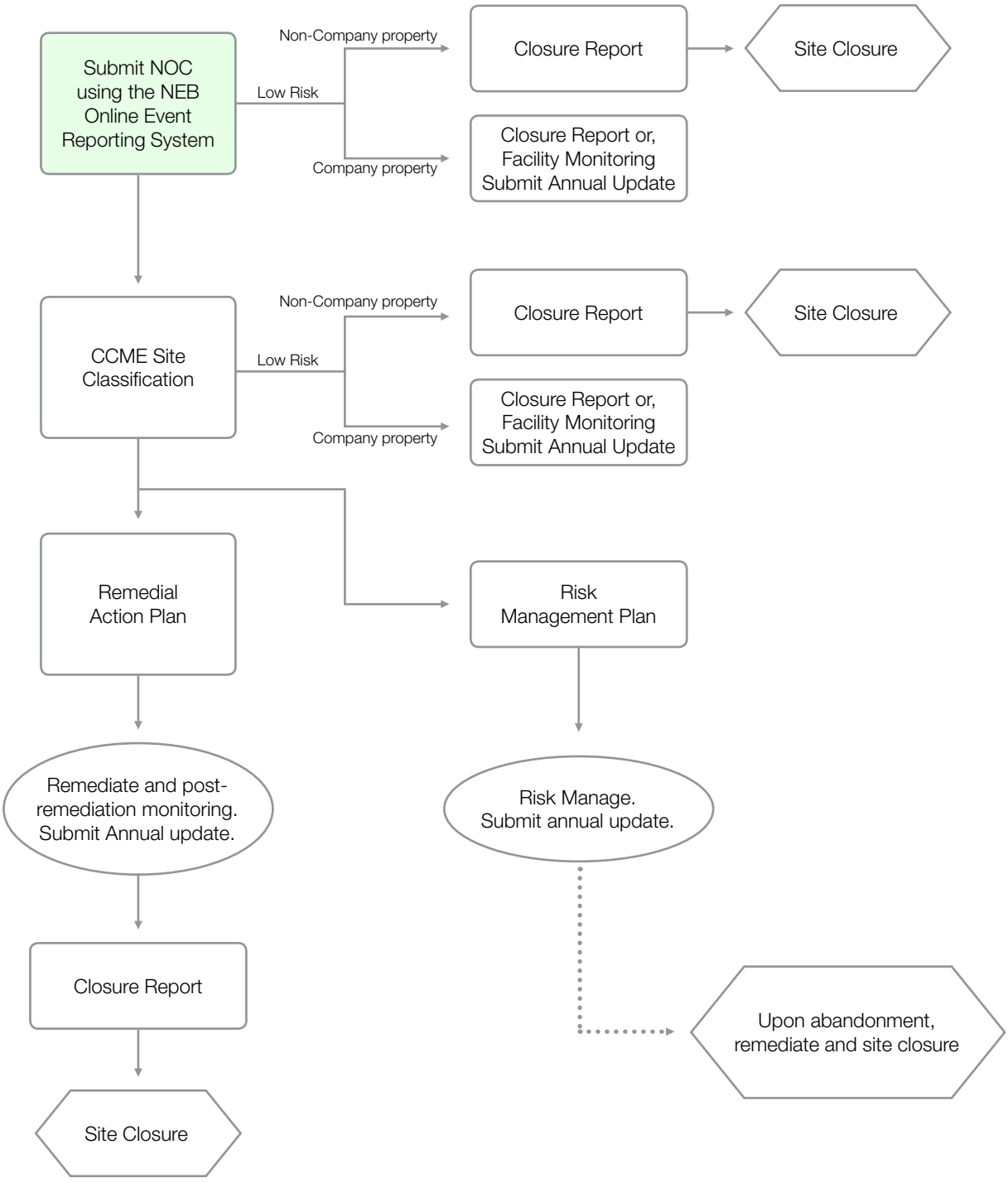
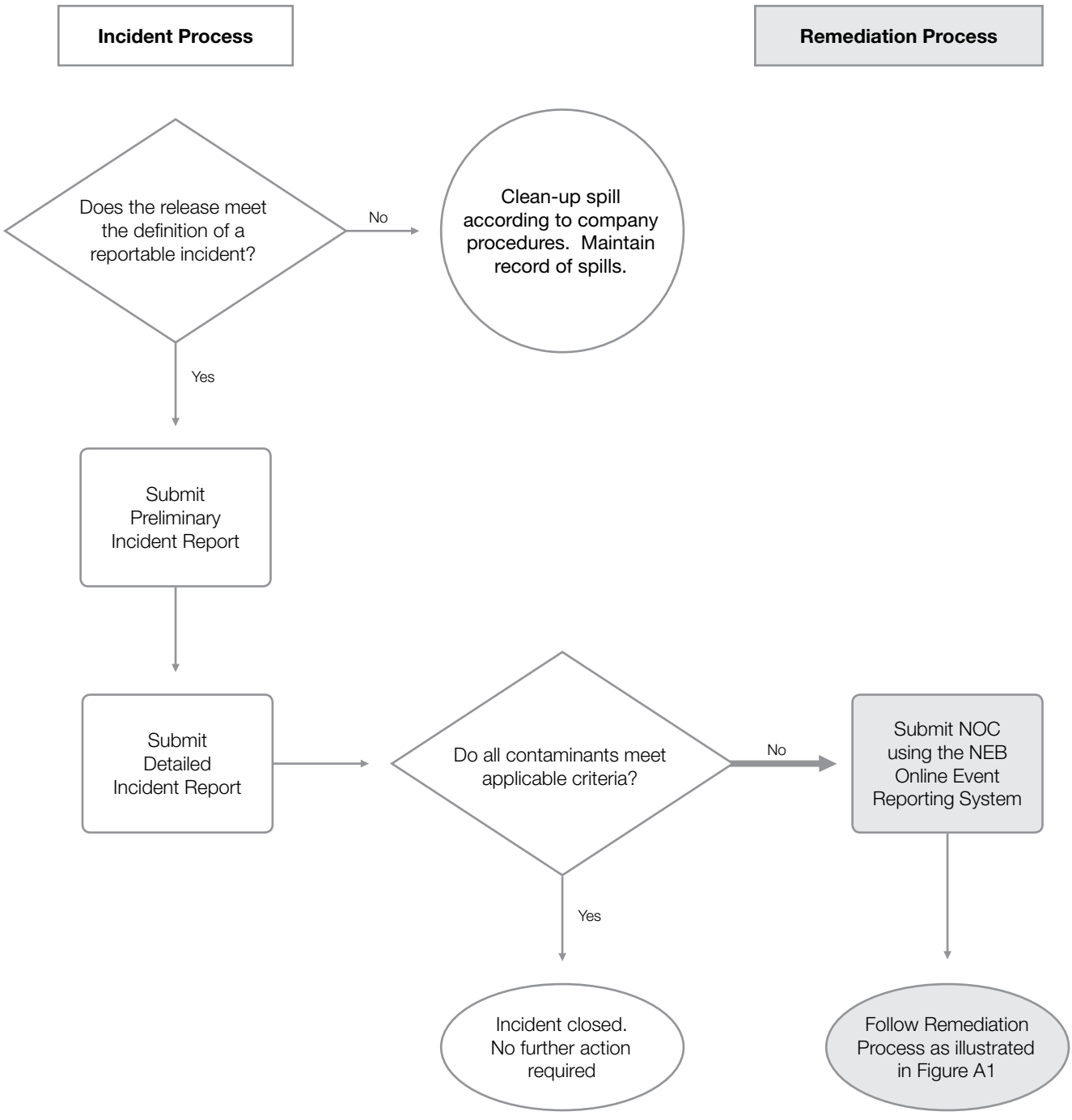


Figure A.2

A summary of the steps involved in transitioning clean-up of an incident site to remediation of a contaminated site.



Appendix B

Concordance Tables

Table BI. Remediation Objectives and Results*

Medium	Contaminant of Concern	Remediation Objective	Remediation Results
Soil –onsite	BTEX/PHC/PAH	CCME Tier I Industrial Fine Grain as tabulated in RAP Table 3.1.	Soil exceeding criteria excavated and replaced as described in Table 2.2 of Closure Report.
Soil –offsite	BTEX/PHC/PAH	CCME Tier II Agricultural Fine Grain as tabulated in RAP Table 3.2	…
Groundwater	BTEX/THC	Site-specific objectives protecting Freshwater Aquatic Life as tabulated in Table 4 in 2018 Risk Assessment.	In-situ bioremediation success verified per sampling results in 2018 Groundwater Monitoring Report, Table 6.2.

*This table serves as an example of the information to be included in the Concordance Table. The Concordance Table should include only a high level description with references to the location in the reports that provide details. The Concordance Table in the RAP should be updated as required for inclusion in the Closure Report.

Table II. Company Commitments Related to Site Remediation**

Issue	Objective	Results
Creek restoration including installation of erosion matting	Creek restored to condition equivalent to condition prior to remedial activities. Landowner is satisfied with restoration activities.	Creek restored and landowner satisfied with condition of restored creek.

**This table provides a summary of commitments related to remediation of the contaminated site, if relevant.

Appendix C

Assessment Guide for RAP requirement

The questions in Table C1 provide examples of the type of information that the ES considers in determining whether a RAP is required or whether it is appropriate to proceed directly to a Closure Report. This table provides guidance only for the NEB ES assessing the scenario. The ES will exercise professional judgement in deciding whether a RAP is required. Responding in the affirmative to the questions in the table below indicate a RAP may be required.

Table C1. Assessment Guide for Next Steps

Need for a Remedial Action Plan	
8. Are there contamination exceedances based on:	Yes___ No___
a. selected remediation criteria (more stringent of applicable CCME and provincial or territorial criteria)?	
b. equivalent criteria from other jurisdictions in lieu of (a) for specific chemicals, or	
c. toxicity benchmarks for chemicals not covered in (a) or (b)?	
9. Is there a potential impact to humans from contamination exceedances at the site or offsite due to spill migration?	Yes___ No___
10. Is there evidence of significant impacts to ecological receptors (e.g. vegetation, wildlife)?	Yes___ No___
11. Does the affected area extend beyond company property or RoW boundaries?	Yes___ No___
12. Are there indicators of adverse environmental effects at the spill site (hydrocarbon sheen, stressed biota or presence of contaminants in soil) following initial clean-up?	Yes___ No___
13. Is there a potential for contamination to reach groundwater based on depth to groundwater, depth to confining layer, soil permeability etc.?	Yes___ No___
14. Is there a potential for contamination to reach surface water based on distance to a waterbody, ditches, soil permeability, conduits etc.? Is there a wetland, water body, or substrate of a wetland or water body within 30 m of the spill?	Yes___ No___
15. Does the top 1.5 metres of soil contain contaminants that cannot easily be removed?	Yes___ No___
16. Is there a potable surface water or groundwater source within 300 metres? Is the site underlain by a usable drinking water aquifer?	Yes___ No___
17. Are there any utility conduits through or under the spill site that will remain in contact with any contaminant?	Yes___ No___

Appendix D

Risk Assessment

This table provides a brief summary of the information that should be included in an environmental and human health risk assessment. For a more comprehensive guide refer to the *CCME Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment*.

Table D1: Required Environmental Risk Assessment Information

Sources of Information
◦ Literature review ◦ Previous ESAs including all historical data and site monitoring data ◦ Federal (CCME) or provincial risk assessment guidance documents ◦ Federal, provincial/territorial remediation criteria for all potential receptors, land uses, soil types etc. ◦ Site surveys with electromagnetic surveys, as-built diagrams etc.
Receptor Characterization
Receptor identification ◦ Identify habitats, communities and ecosystems which potentially have been exposed to the contamination ◦ Compile site-specific species lists ◦ Catalogue all potentially significant or sensitive species at or surrounding the site ◦ Identify receptors most likely to be affected by stressors associated with the contaminated site ◦ Compile background information on receptors of concern ◦ Identify missing species using ecosystem classification systems (i.e. Species that should be present but are absent) ◦ Based on any new information, refine and re-evaluate assessment and measurement endpoints and ensure priority receptors are still relevant and emphasized. Relation to exposure assessment ◦ Assess possible spatial/temporal overlap of receptors and contaminants of concern, based on the exposure assessment
Exposure Assessment
Selection of target chemicals ◦ Identify chemicals present at the site ◦ Review those chemicals and their concentration with respect to hazard assessment (toxicity, persistence, bioaccumulations) ◦ If toxicity data for the site exist, review and determine where responses indicate exposure ◦ Select target chemicals based on review/assessment of their properties ◦ Include all chemicals unless there is information that supports exclusion
Contaminant release/transport and fate ◦ Identify possible transport pathways ◦ Identify data gaps where the flow chart cannot be completed ◦ Provide preliminary quantitative estimates, if possible ◦ Identify areas to which contaminants have been or may be transported ◦ Identify potential reference sites, and obtain information for those sites
Exposure pathway analysis ◦ Identify most important exposure pathways ◦ Identify where there is not enough information to exclude potential pathways ◦ Identify why pathways have been eliminated

Aquatic and/or terrestrial exposure ◦ Identify most important exposure pathways and their link to biological components at risk ◦ If possible, provide preliminary estimates of exposure or tissue concentration using bioaccumulation and/or bio concentration factors, other measurements of exposure should be identified Uncertainty analysis ◦ Identify data gaps ◦ Identify key uncertainties, both qualitative and quantitative, and whether they are acceptable or unacceptable ◦ Evaluate whether preliminary quantitative ERA exposure assessment could reduce uncertainty significantly
Hazard Assessment
◦ Link exposure assessment to identify contaminants that are at concentrations that can be expected to be toxic/bio accumulative ◦ Consider mixtures of chemicals ◦ Choose species for which toxicity data are readily available and extrapolate to value ecosystem components (VEC). ◦ Where data are available, examine population/community information ◦ In conjunction with exposure assessment, use toxicological databases such a AQUIRE, IRIS ◦ Include an assessment of uncertainty
Risk Characterization
◦ Integrate the other components of the Screening Assessment ◦ Identify key uncertainties and data gaps, make recommendations for filling data needs ◦ Characterize risk as “high”, “intermediate” or “negligible” ◦ Make semi quantitative risk estimates using the quotient method, if possible

Appendix E

Contamination Scenarios and Expected Actions

Table E1. Contamination Scenarios and Expected Actions.

The table below provides examples of contamination scenarios that companies may encounter along with the accompanying expected actions. Refer to the Guide for details on the expected actions.

If there are questions or concerns on any steps within the Remediation Process contact remediation@neb-one.gc.ca for assistance with specific scenarios.

NEB-Regulated Energy Infrastructure Contamination Scenarios and Expected Actions	
New Releases, Non-Reportable Incidents	
Scenario	Expected Action
Scenario 1 A contaminant release occurs (liquid or solid) that meets all of the following criteria: ◦ does *not* meet the definition of a reportable incident; ◦ contamination is contained to company owned property ◦ well contained, such that there is minimal potential for an adverse effect on the environment, and low risk of offsite migration; and, ◦ contaminant is immediately cleaned up to meet generic remediation criteria which are appropriate based on available site data	**Scenario 1** 1. Follow appropriate company processes/procedures to immediately clean up release, 2. Demonstrate success of full clean-up (evidence/documentation commensurate with characteristics of release and receiving environment), manage resulting waste, 3. Maintain record of release location and clean-up such that records are available upon request by the NEB. 4. Landowner and potentially-impacted Indigenous group notification as specified in company procedures.
Scenario 2 A contaminant release occurs (liquid or solid) that meets all of the following criteria: ◦ does *not* meet the definition of a reportable incident; ◦ contamination is contained to company owned property ◦ well contained, such that there is minimal potential for an adverse effect on the environment, and low risk of offsite migration; ◦ a groundwater monitoring program is in place and no free product is detected in groundwater monitoring wells; and, ◦ immediate full clean-up is not feasible (eg: due to interference with operating infrastructure).	**Scenario 2** 1. Inform the NEB via a NOC as soon as possible; 2. Complete ESA. Consult with ES, as needed. 3. Clean-up all accessible contamination 4. Implement risk controls and long term monitoring plans 5. Submit annual update to NEB 6. Notify the NEB should off site migration occur 7. Full remediation will be required pending removal of infrastructure in order to receive site closure.
Scenario 3 ◦ A contaminant release occurs (liquid or solid) that meets all of the following criteria: ◦ does *not* meet the definition of a reportable incident; ◦ contamination is contained to company owned property ◦ well contained, such that there is minimal potential for an adverse effect on the environment, and low risk of offsite migration; and ◦ immediate full clean-up is not feasible (eg: due to interference with operating infrastructure).	**Scenario 3** 1. Inform the NEB via a NOC as soon as possible; 2. Complete ESA. Consult with ES, as needed. 3. Clean-up all accessible contamination 4. Submit RMP (supported by a risk assessment) including risk control option (s) and monitoring plans, pursuant to this Guide. Consult with ES, as needed. 5. Implement risk controls and long term monitoring plans. 6. Submit annual update to the NEB 7. Notify the NEB should off-site migration occur. 8. Full remediation will be required pending removal of infrastructure in order to receive site closure.

New Releases, Reportable Incidents	
Scenario	**Expected Action**
Scenario 4 A contaminant release occurs (liquid or solid) that: ◦ does meet the definition of a reportable incident ◦ is contained such that clean-up can be completed by the time the Detailed Incident Report is submitted; and, ◦ Remediation to generic or slightly modified criteria (as justified by site data) is appropriate and achievable.	**Scenario 4** 1. Immediately report the release as an incident to the NEB. 2. Manage the emergency situation (if applicable), recover / clean-up free product on visibly contaminated soil or surface water 3. Conduct remediation activities according to company procedures. 4. Submit Detailed Incident Report (DIR). Include details on remediation activities and the remediation criteria used to assess remediation adequacy.
Scenario 5 A contaminant release occurs (liquid or solid) that: ◦ does meet the definition of a reportable incident; and ◦ is of large enough magnitude/scope that it cannot be entirely remediated within the timeline for DIR submission; and, ◦ Remediation to generic or slightly modified remediation criteria (as justified by site data) is appropriate and achievable.	**Scenario 5** 1. Immediately report the release as an incident to the NEB3. 2. Manage the emergency situation (if applicable), recover / clean-up free product on visibly contaminated soil or surface water. 3. Create an ICP (as required) and begin clean-up in consultation with the assigned NEB ES. 4. Submit Detailed Incident Report. **In OERS, indicate that residual environmental impacts will require remediation**. 5. Consult with affected parties 6. Submit a NOC to the NEB 7. Proceed with ESA, RAP and/or remediation activities as applicable pursuant to this Guide to achieve site closure. 8. Submit annual update to NEB until site closure is achieved
Scenario 6 A contaminant release occurs (liquid or solid) that: ◦ does meet the definition of a reportable incident; ◦ is of large enough magnitude/scope that it *cannot* be entirely remediated within the timeline for DIR submission; and ◦ immediate full clean-up is *not* feasible (eg: due to interference with operating infrastructure).	**Scenario 6** 1. Immediately report the release as an incident to the NEB3. 2. Manage the emergency situation (if applicable), recover / clean-up free product on visibly contaminated soil or surface water. 3. Create an ICP (as required) and begin clean up in consultation with the assigned NEB ES 4. Submit Detailed Incident Report. **In OERS, indicate that residual environmental impacts will require remediation**. 5. Consult with affected parties 6. Submit a NOC to the NEB 7. Proceed with ESA, RAP and remediate accessible contamination, as applicable pursuant to this Guide 8. Develop and submit risk management strategy (supported by a risk assessment) including risk control option (s) and monitoring plans, pursuant of the Guide. Consult with ES, as needed. 9. Implement risk controls and long term monitoring plans 10. Submit annual update to NEB until site closure is achieved 11. Full remediation will be required pending removal of infrastructure in order to receive site closure.

Historical Contamination	
Scenario	**Expected Action**
Scenario 7 Historical contamination is encountered at a location that meets the following criteria: ◦ coincides with a historically reported incident ◦ incident; ◦ is *not* the result of an identified new release; or ◦ is a result of accumulation over time; and ◦ remediation to generic or slightly modified remediation criteria (as justified by site data) *is* appropriate and achievable.	**Scenario 7** 1. Inform the NEB of the discovery via an NOC as soon as possible, and advise if contamination correlates with a previous Incident. 2. Clean-up all contamination 3. Proceed with ESA, RAP and remediation activities as applicable pursuant to this Guide to achieve site closure. 4. Submit annual update to NEB until site closure is achieved.
Scenario 8 Historical contamination is encountered at a location that meets the following criteria: ◦ coincides with a previously reported incident; ◦ is *not* the result of an identified new release; or, ◦ is a result of accumulation over time; and, ◦ immediate full clean-up is *not* feasible (eg: due to interference with operating infrastructure).	**Scenario 8** 1. Inform the NEB of the discovery via an NOC as soon as possible, and advise if contamination correlates with a previous Incident 2. Clean-up all accessible contamination 3. Complete ESA, RAP and risk management strategy (supported by a risk assessment) including risk control option(s) and monitoring plans, pursuant of the Guide. Consult with ES, as needed. 4. Implement risk controls and long term monitoring plans 5. Submit annual updates to NEB 6. Full remediation will be required pending removal of infrastructure in order to receive site closure.
Risk Assessment Required	
Scenario	**Expected Action**
As in scenarios 2-8 except that the ESA demonstrates that generic or slightly modified remediation criteria are not appropriate, do not exist, or are not achievable. Remediation to site-specific objectives is achievable	1. Inform the NEB of the discovery via an NOC as soon as possible, and advise if contamination correlates with a previous Incident 2. Clean-up all accessible contamination 3. Inform the assigned ES of the situation. 4. Complete a risk assessment to identify site-specific objectives based on stable site-specific parameters which do not require ongoing management. 5. Confirm NEB acceptance of the risk assessment approach 6. Proceed with RAP and/or remediation activities pursuant to this Guide to achieve site closure. 7. Submit annual update to NEB until site closure is achieved. 8. Long term monitoring may be required