



# Restoration Verification Audit Program Procedure Manual

Version 2.1: November 2023

# About the Regulator

The BC Energy Regulator (Regulator or BCER) is the single-window regulatory agency with responsibilities for regulating oil and gas activities in British Columbia, including exploration, development, pipeline transportation and reclamation.



The Regulator's core roles include reviewing and assessing applications for industry activity, consulting with First Nations, ensuring industry complies with provincial legislation and cooperating with partner agencies. The public interest is protected by ensuring public safety, protecting the environment, conserving petroleum resources and ensuring equitable participation in production.

## Vision, Mission and Values

### Vision

A resilient energy future where B.C.'s energy resource activities are safe, environmentally leading and socially responsible.

### Mission

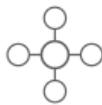
We regulate the life cycle of energy resource activities in B.C., from site planning to restoration, ensuring activities are undertaken in a manner that:



Protects public safety and the environment



Supports reconciliation with Indigenous peoples and the transition to low-carbon energy



Conserves energy resources



Fosters a sound economy and social well-being



### Values

**Respect** is our commitment to listen, accept and value diverse perspectives.

**Integrity** is our commitment to the principles of fairness, trust and accountability.

**Transparency** is our commitment to be open and provide clear information on decisions, operations and actions.

**Innovation** is our commitment to learn, adapt, act and grow.

**Responsiveness** is our commitment to listening and timely and meaningful action.

# Additional Guidance

As with all Regulator documents, this document does not take the place of applicable legislation. Readers are encouraged to become familiar with the acts and regulations and seek direction from Regulator staff for clarification.

The Regulator publishes both application and operations manuals and guides. The application manual provides guidance to applicants in preparing and applying for permits and the regulatory requirements in the planning and application stages. The operation manual details the reporting, compliance and regulatory obligations of the permit holder. Regulator manuals focus on requirements and processes associated with the Regulator's legislative authorities. Some activities may require additional requirements and approvals from other regulators or create obligations under other statutes. It is the applicant and permit holder's responsibility to know and uphold all legal obligations and responsibilities. For example, Federal Fisheries Act, Transportation Act, Highway Act, Workers Compensation Act and Wildlife Act.

Throughout the document there are references to guides, forms, tables and definitions to assist in creating and submitting all required information. Additional resources include:

- [Glossary and acronym listing](#) on the Regulator website.
- [Documentation and guidelines](#) on the Regulator website.
- [Frequently asked questions](#) on the Regulator website.
- [Advisories, bulletins, reports and directives](#) on the Regulator website.
- [Regulations and Acts](#) listed on the Regulator website.

In addition, this document may reference some application types and forms to be submitted outside of the Application Management System but made available on the Regulator's website. Application types and forms include:

- Heritage Conservation Act, Section 12
- Road use permits
- Water licences
- Master licence to cut
- Certificate of restoration
- Waste discharge permit
- Experimental scheme application
- Permit extension application

## Manual Revisions

The Regulator is committed to the continuous improvement of its documentation. Revisions to the documentation are highlighted in this section and are posted to the [Documentation Section](#) of the Regulator's website.

Stakeholders are invited to provide input or feedback on Regulator documentation to [ServiceDesk@bc-er.ca](mailto:ServiceDesk@bc-er.ca) or submit feedback using the [feedback form](#).

Version Number	Posted Date	Effective Date	Chapter Section	Summary of Revision(s)
2.0	March 10, 2020	March 10, 2020	Various	This document reflects the current Restoration Verification Audit Program procedures.  This document has also been converted to align with the Regulator's Documentation Standards and as such has been versioned 2.0.
2.1	Nov 08, 2023	Nov 08, 2023	Various	Replace BCOGC with BCER; OGAA with ERAA; new logos, references and associations

## Table of Contents

About the Regulator .....	2
Additional Guidance.....	3
Preface .....	8
About 8	
Manual Structure.....	8
Manual Scope .....	8
Additional Guidance.....	Error! Bookmark not defined.
Compliance and Enforcement.....	8
1. Introduction and Scope.....	9
2. Audit Objectives.....	10
3. Audit Code of Conduct and Roles and Responsibilities 3.1 Code of Conduct ...	11
3.2 The Audit Roles and Responsibilities.....	11
4. Risk Classification and Site Assessment.....	13
4.1 Perceived Risk.....	13
4.2 Application Risk Classification.....	13
4.3 Application Selection .....	14
4.4 Site Assessment – CoR Part 1 .....	14
4.4.1 Site Assessment – Level I .....	15
4.4.2 Site Assessment – Level II and Level III .....	15
4.4.3 Site Assessment Constraints .....	15
4.5 Site Assessment – CoR Part 2 .....	16

**5. The Audit Process ..... 17**

**5.1 Audit Frequency ..... 17**

**5.2 Application Selection ..... 17**

**5.3 Desktop Component ..... 17**

**5.3.1 Information Review ..... 17**

**5.3.2 Establish Regulatory Context ..... 18**

**5.3.3 Checklist Completion ..... 18**

**5.3.4 Creating a Work Plan ..... 18**

**5.3.5 Permit Holder Notification ..... 18**

**5.4 Field Component ..... 19**

**5.4.1 Field Assessment ..... 19**

**5.4.2 Laboratory Analysis ..... 19**

**6. Audit Results ..... 21**

**6.1 Desktop Review Results ..... 21**

**6.1.1 Documentation Errors and Omissions ..... 21**

**6.1.2 Technical Errors and Omissions ..... 21**

**6.2 Field Results ..... 21**

**6.3 Audit Grades ..... 22**

**6.4 Notification of Unacceptable Grades ..... 22**

**6.5 Permit Holder Justification and/or Investigation/Remediation ..... 22**

**6.6 Regulator’s Decision ..... 23**

**6.7 Audit Summary Report ..... 23**

**6.8 Audit Record ..... 23**

**References.....24**

# Preface

## About

The Restoration Verification Audit Program Procedure Manual provides Industry, First Nations, and the public an understanding of the Commission's Restoration Verification Audit Program including the process undertaken by the Regulator when a Certificate of Restoration application is selected for audit.

The manual has been prepared to be as comprehensive as possible; however, it is not all encompassing and may not cover all site-specific situations. Where circumstances or scenarios arise and are not covered by the manual, the Regulator's Supervisor, Environmental Stewardship, is available for assistance.

## Manual Structure

This manual first provides introduction, scope and objectives of the audit program and then outlines audit code of conduct and roles and responsibilities of audit team members.

Also capture the application risk classification and the audit process that includes desktop component and field component of the audit program. This manual concludes with audit findings, assigning grades, reporting and communications with stakeholders.

## Manual Scope

The scope of this manual is meant to provide an explanation of the audit process for sites assigned a status of 'certified' under the Certificate of Restoration process and includes both Part 1 and Part 2 of the CoR application. Information related to the Certificate of Restoration application process can be located in the Regulator's [Site Remediation and Reclamation Manual](#). Sites eligible for this audit include all oil and gas wellsites and facilities.

## Compliance and Enforcement

Although not a regulatory requirement under the Environmental Management Act or Contaminated Site Regulation, the Restoration Verification Audit Program can be viewed as a valuable continuum to the Certificate of Restoration process as it provides assurance to the public that regulatory requirements for Part 1 and Part 2 of the Certificate of Restoration process are being met.

CoR applications selected will be reviewed and adjudicated by the Regulator in accordance with the established procedures outlined in this manual; however, in accordance with Sections 41 and 43 of the Energy Resource Activities Act, unacceptable findings from the audit may require further work by the former permit holder.

Should the former permit holder fail to provide the additional information requested during the audit process, the Regulator's Compliance and Enforcement Department would work alongside the audit team to exercise their authority and, if necessary, may issue Orders to ensure that the required work is completed. For more information regarding the Regulator's Compliance and Enforcement processes, please refer to the [Compliance and Enforcement Manual](#).

# 1. Introduction and Scope

The BC Energy Regulator's (the Regulator's) Restoration Verification Audit Program (the Program) was created to provide the Regulator and the public with assurance that Certificate of Restoration (CoR) requirements are being met.

The Program was initiated in 2012 and implemented by the Commission's Environmental Stewardship branch of the Operational Policy and Environment Department. This version of the manual reflects improvements based on learnings revealed during eight years of Program execution and demonstrates the Regulator's commitment to effectively safeguard the public and the environment.

The Program is a necessary component of the results-based regulatory approach to the CoR process. The results of the audit will not affect the site status as certified; however, if major documentation errors, technical errors and/or omissions are found, the Regulator may require the permit holder to provide further information and/or complete further investigation and/or remediation work.

The user of this Restoration Verification Audit Program Procedure Manual (the Manual) should be familiar with the CoR requirements in the Energy Resource Activities Act ([ERAA](#)) and its associated regulations which are the framework to ensure that decommissioned sites are restored to a safe and productive state. The permit holder is obligated to reclaim a site and receive a CoR before it is allowed to cease payment on a surface land tenure.

On an annual basis, the Regulator randomly selects a certain percent of certified sites to conduct reviews of files and submitted documents as well as field verification. Sites are selected for audit from the population that was certified in the prior fiscal year and focus on Part 1 and Part 2 of a CoR application. To minimize barriers to efficiency and maximize cost savings, the BCER schedules the field component of yearly audit during the late spring and through the summer months with completion target for early fall.

The CoR application process is a two-part application; part 1 ensures that potential contamination resulting from activities on the site have been assessed and addressed and Part 2 ensures surface restoration objectives have been achieved. The CoR application adjudication process does not typically include a field assessment by the Regulator; it relies on the assessment and conclusions of a qualified environmental professional hired by the permit holder. Additional information regarding the CoR Application process is available on the Regulator's [website](#).

The scope of the Program is focused on verifying the following specific requirements of the CoR process:

- a) identification of those sites that require investigation;
- b) assessment of presence or absence of potential contaminants of concern (PCOCs) within the identified areas of potential environmental concern (APECs);
- c) if contaminated, then elimination, mitigation, correction, reduction, counteraction, or removal of residual contaminants or the adverse effects on the environment or human health of residual contaminants; and
- d) surface restoration pursuant to Section [19](#) (1) of the Environmental Protection and Management Regulation (EMPR).

Surface water and groundwater may be evaluated in some situations. Soil and water quality at remote sump locations or other areas where fluids were disposed of by pump-off or Landspray While Drilling (LWD) method(s) are not included as part of the routine audit.

## 2. Audit Objectives

The objective of the Program is to verify that environmental risks at the reclaimed oil and gas sites are being addressed in accordance with provincial regulatory requirements under the [ERAA](#) and the Environmental Management Act ([EMA](#)). This provides assurance that decommissioned oil and gas sites are being managed in accordance with legislative and regulatory requirements.

The objective of the Program is accomplished through a phased process which includes a desktop review of files and submitted documents, sampling of select environmental media, comparison of the laboratory analytical results against the applicable provincial regulatory framework and a qualitative surface restoration assessment pursuant to Section [19](#) (1) of the EMPR by BCER professionals.

### 3. Audit Code of Conduct and Roles and Responsibilities

#### 3.1 Code of Conduct

The Program is a systematic process that relies on the principles of independence and impartiality. Specifically, the following principles guide the conduct of the Program and the presentation of audit results:

- BCER staff as auditors will act in an ethical manner and make decisions with due professional care based on evidences obtained during the audit. BCER staff will not act outside of their areas of competence and knowledge;
- BCER staff will be impartial and independent of the activity being audited and act without bias or prejudice;
- Confidential information obtained or reviewed during the audit process will be held in confidence by the Auditors and only included in the audit report where the information is relevant to an audit finding and decision making; and
- Audit results will be presented in a fair and accurate manner and will truthfully reflect the audit activity and evidence.

Responsibilities associated with the individual auditor roles are outlined in the following subsections.

#### 3.2 The Audit Roles and Responsibilities

The Audit Team is selected by the Supervisor, Environmental Stewardship, and takes into account the competencies needed to achieve the objectives of the audit within the defined scope.

The Audit Team conducts the audit. There may be additional participants during an audit with varying degrees of contributions. A description of specific roles and responsibilities of the Lead Auditor, Audit Team members, and participants are presented in Table 3.

**Table 3: Roles and Responsibilities of RVAP members**

Role	Responsibilities
Lead Auditor  Supervisor, Environmental Stewardship, BC Energy Regulator	<ul style="list-style-type: none"> <li>▪ Allocates BCER professionals and assign responsibilities to conduct audit</li> <li>▪ Oversees the selection of CoR applications for audit</li> <li>▪ Oversees logistics of the audit program on behalf of the Regulator</li> <li>▪ Approves payments for contractors</li> <li>▪ Oversees the conduct of the audit team members</li> <li>▪ Reviews and approves audit summary report for publication on the Regulator’s website</li> </ul>
Audit Team Leader  Environmental Management Officer, BC Energy Regulator	<ul style="list-style-type: none"> <li>▪ Schedule and coordinates audit activities</li> <li>▪ Selects CoR applications for audit</li> <li>▪ Communicates with the Auditee, Observers, Guides and contractors</li> <li>▪ Supervises desktop component of the audit and reviews draft audit plan with the Audit Team before finalizing</li> </ul>

	<ul style="list-style-type: none"> <li>▪ Notifies Auditee with a copy of the audit plan and respond to inquiries regarding the plan</li> <li>▪ Supervises field component of the audit</li> <li>▪ Checks audit evidences, data and document management and drafting of reports</li> <li>▪ Determines audit grade</li> <li>▪ Coordinates invoicing and manage payment information</li> <li>▪ Reviews and discusses audit findings with the Audit Team and identifies any required revisions before finalizing audit reports</li> <li>▪ Forwards a copy of the final audit report to Auditee</li> <li>▪ Develops a draft audit summary report for publication on the Regulator’s website.</li> </ul>
<p>Auditor(s)-In-Training</p> <p>Summer or co-op Student(s) – BC Energy Regulator]</p>	<ul style="list-style-type: none"> <li>▪ Assist in audit preparations, including gathering of required documents, drafting audit plan, preparation of site access information and field component of the audit program</li> <li>▪ Participate in review of audit evidences, audit documents, sample and data management, and drafting audit reports</li> </ul>
<p>Technical Specialist(s)</p> <p>BC Energy Regulator professionals</p>	<ul style="list-style-type: none"> <li>▪ Provides technical expertise in areas relevant to their assignment(s) within the audit. It may include, risk assessors, biologists, agrologists, soil scientist, hydrogeologists, foresters, chemists, etc.</li> </ul>
<p>Audit Client</p> <p>BC Energy Regulator</p>	<ul style="list-style-type: none"> <li>▪ Provides logistics of the audit Program</li> </ul>
<p>Auditees</p> <p>Permit holder</p>	<ul style="list-style-type: none"> <li>▪ Are expected to cooperate with the Regulator’s Audit Team in conducting audit</li> <li>▪ Disclose all requested documents to the Regulator in a timely, thorough, factual, and accurate manner</li> <li>▪ Review work plan and provide comments and ask questions regarding the work plan</li> <li>▪ Review audit reports and provide comments, additional information, or clarifications, as appropriate</li> <li>▪ Where additional field work may be required, the Auditee will create and submit the plan to the Lead Auditor within the timeframe</li> </ul>
<p>Observer</p> <p>First Nations, landowners and Auditee</p>	<ul style="list-style-type: none"> <li>▪ Accompany the field portion of the audit but does not interfere or involve with the conduct of the audit</li> </ul>
<p>Guide</p> <p>Landowner(s) or another person familiar with the site</p>	<ul style="list-style-type: none"> <li>▪ Provides support in accessing the site</li> <li>▪ Is not part of the Audit Team and does not influence or interfere with the conduct of the audit</li> </ul>

## 4. Risk Classification and Site Assessment

Certified sites are classified based on the potential risks to human health and the environment due to the historical activities at the site, the potential contaminants associated with the activities, potential receptors and exposure pathways specific to the site.

The following sections outlines the perceived risk associated with a site, risk classification, application selection and site assessment of a certified site.

### 4.1 Perceived Risk

The perceived risk associated with a certified site is based on the sum of the probability of an occurrence and the consequence of an occurrence. In the context of certified sites, the perceived risk is that contamination may remain after a CoR has been issued; the consequence of which is the health and safety of the general public and the environment that could be affected by any residual contamination.

The severity of the consequence is dependent on many complex and occasionally competing factors, including, but not limited to, the specific contaminant, concentration of the contaminant, volume of the contaminated media, the presence of receptors, and an operable pathway between the source and the receptor.

There is an intrinsic low probability for any risk level of a certified site to have a high degree of perceived risk given that the application for a CoR has been signed off by a qualified professional. However, the probability for residual impacts at a site would certainly depend on the historical activities at the site. For example, if the site produced or stored petroleum products or natural gas, there would be higher probability for residual impacts at a site, versus a site that has not, and even higher when it is known that the site had relatively high concentration of contaminants with potential to affect a receptor. Therefore, sampling intensities may differ depending on the site risk class for which an application is selected for an audit.

### 4.2 Application Risk Classification

Applications for certified sites are classified based on the potential risk associated with a site once certified. Application risks are classified as Level I, Level II, and Level III and are defined in Table 4.2.

**Table 4.2: Application Risk Classification**

Risk Class	Definition
Level I	Application from a site where the site has never been active for the production of petroleum or natural gas or for use as an injection/disposal well.
Level II	All other applications from sites where there has never been known to exceed a priority threshold on the site, as defined in Section 3.2 of the <a href="#">Upstream Oil and Gas Site Classification Tool</a> .
Level III	All applications from sites, where at some point in time, has been known to exceed a priority threshold, as defined in Section 3.2 of the Upstream Oil and Gas Site Classification Tool.

## 4.3 Application Selection

Applications are selected in view of the application risk class and a weighted sampling intensity. Sites that have a higher potential for anthropogenic contaminants and pose a higher risk to receptors are weighted higher to increase the probability of auditing such sites. The sampling intensities associated with each Application Risk Classification are presented in Table 4.3.

**Table 4.3: Sampling Intensities**

Risk Class	Sampling Intensity
Level I	1X
Level II	2X
Level III	3X

Where X Denotes an element of a population and each certified site is an element “X” of the population (all sites certified during the fiscal year).

A stratified random sampling strategy is used to select applications for certified sites from the set of total sites that have received a CoR in the past fiscal year, the details of which are provided as follows:

- Step 1. All certified sites are assigned a Risk Classification Level (Level I, II or III) based on perceived risks associated with the sites, as shown in Table 4.2.
- Step 2. All sites are further assigned a probability factor (1, 2, or 3) to be selected for compliance assessment, i.e., 1X has one chance, 2X has two chances and 3X has three chances of being selected for compliance assessment. Probability factors are assigned based on Risk Classification Level (Level I, II, or III), as shown in Table 4.3.
- Step 3. The population of sites certified during the fiscal year prior are divided into subpopulations based on legal land location and Crown versus private ownership.
- Step 4. Sites are randomly selected from the subpopulations of the population with weighted bias toward Level II and Level III activities, as shown in Table 4.3. If the randomly selected sites result in one permit holder being selected at a frequency greater than 15% above the frequency of their applications in the total population, then selected sites will be replaced with another randomly selected site from the same subpopulation to ensure a more representative sample amongst permit holders.

Sampling intensities may be adjusted in successive audit years based on the results of the Program.

## 4.4 Site Assessment – CoR Part 1

Site assessment requirements for CoR Part 1 depends on the risk classification levels of the CoR application. Site assessment of the three risk classes of the CoR application will be conducted as follows:

## 4.4.1 Site Assessment – Level I

- Conduct a ground disturbance assessment;
- Complete an Electromagnetic (EM) survey at the site, if not previously conducted;
- Background: Minimum of one borehole for soil sampling, as a background, to a maximum 6.0 metre depth if a satisfactory one does not exist for comparison purposes within the CoR Part I application;
- EM anomalies and/or bare areas: One or more borehole(s) will be advanced to a maximum 3.0 metres in depth, where the EM survey indicates an anomaly or where vegetation is absent or noticeably stressed;
- Well center: Two boreholes advanced by hand auger around the well centre at 2.0 metres maximum radius, spaced opposite on either side of the well center to a maximum 2.0 metres depth. Or alternatively, two boreholes by rig within 5.0 metres on either side of the well centre to a maximum 5.0 metres depth;
- Former drilling waste storage and disposal area:
  - If drilling waste was disposed of by Mix-Bury-Cover, then two boreholes within disposal area to a maximum 6.0-metre depth will be completed, depending on disposal depth.
  - If drilling waste was disposed of by land spread, then two boreholes within the disposal area extending one metre into native material below the disposal zone
- Flare pit or stack: One borehole by rig to a maximum 5.0 metres depth or by hand auger to a maximum 2.0 metres depth.

## 4.4.2 Site Assessment – Level II and Level III

Due to the stratified random sampling strategy, the applications that are categorized as Level II or Level III have a higher probability of being selected for audit and may require a detailed site assessment. However, as a minimum, Level II and Level III sites require the following:

- All Level I site assessment requirements; and
- Remediation area(s): two boreholes advanced one metre into native material below the excavation depth.

The following subsection outlines some of the constraints that are considered when planning the audit program.

## 4.4.3 Site Assessment Constraints

Due to a combination of diverse landscapes, seasons, and large geographical extent of northeastern British Columbia, access to the sites for the purposes of completing an audit can have following constraints depending on the site-specific conditions.

1. **Winter Accessible sites /Helicopter accessible sites:** For sites that are selected and are accessible by vehicle only during the winter months, then the Regulator will use a helicopter to access these sites and boreholes will be advanced using a hand auger.
2. **Year-round accessible sites** – Track-mounted rig: For sites that are selected and are accessible year-round but cannot be accessed by a truck-mounted rig, then the Regulator will access the site on foot or by using an ATV and a track-mounted rig will be used to complete investigation.
3. **Year-round accessible sites** – Truck-mounted rig / No constraint sites: For sites that are selected and are accessible on a year-round basis by truck and a truck-mounted rig will be used to complete investigation.

## 4.5 Site Assessment – CoR Part 2

A qualitative surface restoration assessment for CoR Part 2 application, pursuant to Section [19](#) (1) of the Environmental Protection and Management Regulation includes topographic, soil and vegetation assessment.

## 5. The Audit Process

### 5.1 Audit Frequency

CoR applications are submitted to the Regulator throughout the calendar year. To ease administrative burden and increase efficiencies, application selection for audit and restoration verification will be conducted annually to mirror the Regulator's fiscal year and is conducted only on those applications where a CoR was issued in the previous fiscal year.

The audit is based on the issuance of a Certificate of Restoration to a site. Once certified, the site becomes a candidate to be selected for the audit Program. The number of applications selected for audit is expected to vary between years to year.

### 5.2 Application Selection

Applications are selected according to the established Risk Classification and associated weighted sampling intensity.

### 5.3 Desktop Component

This component of the audit includes the following:

- Information review
- Establish regulatory context
- CoR checklist completion
- Creation of work plan
- Permit holder notification

#### 5.3.1 Information Review

The audit commences with a desktop review of the existing CoR application package that the Regulator received from a permit holder. The CoR application and supporting documents to the application package will include some, or all, of the following components: CoR Part I application form and checklist, site investigation report, if contaminated, then remediation and confirmation and/or risk assessment reports, Site Profile, Site Classification Report, and additional documentation acquired during the CoR application preparation.

The application review is done to confirm and rationalize whether all onsite APECs were identified and investigated. The review also confirms whether all PCOCs were analyzed and met the applicable regulatory standards.

## 5.3.2 Establish Regulatory Context

While the permit holder worked through the CoR process, the British Columbia Contaminated Sites Regulation (BC CSR) may have been amended. In these scenarios, the Regulator will apply the standards used in the original adjudication of the application.

## 5.3.3 Checklist Completion

The CoR Part I Application Checklist is completed to verify documents for current regulatory compliance, investigation and remediation status, quality of data, validity of conclusions, and professional reliability.

## 5.3.4 Creating a Work Plan

Based on the information reviewed, the Regulator identifies all onsite APECs with associated PCOCs. The work plan will include:

- Background and Purpose
- Work Plan Tasks
  - Task 1: Planning and Coordination
  - Task 2: Field Investigation
  - Task 3: Reporting
- Audit Schedule
- Audit Team
- Contacts

## 5.3.5 Permit Holder Notification

The permit holders whose application for a site is selected for the audit will be notified in writing that their application has been selected the audit. The notification letter will include a site-specific work plan that will include the planned schedule for field work, sampling plan, and expected completion date.

The notification with work plan is provided to the permit holder for an opportunity to review and comment or ask for clarification. The permit holders are expected to cooperate with the Regulator's Audit Team.

## 5.4 Field Component

This component of the audit includes the following:

- Field assessment
- Laboratory analysis

### 5.4.1 Field Assessment

The field assessment will involve completion of an EM survey if one was not completed as part of the CoR Part 1 application and the sampling of relevant environmental media. This assessment is intended to confirm presence or absence of applicable potential contaminants of concern within the areas of potential environmental concern and relative concentrations of potential contaminants that were identified during the information review.

The sampling logistics of the field assessment are managed by the Audit Team Leader with the help of Auditors-In-Training and proceed as follows:

- a. Topsoil samples will be collected at a depth of 0-15 centimetres below ground surface. Subsoil samples should be collected in 100-centimetre increments to the depth of the borehole and / or wherever there is a noticeable change in soil quality or soil texture. All samples will be discrete;
- b. Selection of samples for laboratory analysis will be based on the results of previous site investigations, any newly identified areas of potential environmental concern, as well as based on information obtained from field screening;
- c. When petroleum hydrocarbons appear to be present in samples comprised of organic materials, such as peat, analysis will include silica gel cleanup;

A quality assurance and quality control (QA/QC) program will form part of the investigation plan.

Sample handling, preparation, and storage procedures will follow the methods described in the British Columbia Field Sampling Manual. Samples will be submitted, extracted and analyzed in accordance with the current Ministry Preservation and Holding Time Requirements. All laboratory analyses will be carried out in accordance with the procedures described in the latest version of the British Columbia Environmental Laboratory Manual.

### 5.4.2 Laboratory Analysis

Samples collected as part of the site assessment will be analyzed for the applicable parameters, as follows:

**Table 5: Parameters to be analyzed**

<b>APEC</b>	<b>Parameter</b>
Control / background	Detailed salinity, BC CSR metals
Well centre	Sodium, chloride, BC CSR metals, extractable barium (if appropriate), EPH, BTEXS, VPH, and PAH
Drilling waste storage and disposal area(s)	Sodium, chloride, BC CSR metals, extractable barium (if appropriate), EPH, BTEXS, VPH, and PAH
Flare pit	Sodium, chloride, BC CSR metals, extractable barium (if appropriate), EPH, BTEXS, VPH, and PAH
EM anomaly / bare area	Sodium, chloride, hydrocarbons if the evidence exists, BC CSR metals and extractable barium if the evidence exists
Miscellaneous APECs	Sodium, chloride, hydrocarbons if the evidence exists, BC CSR metals and extractable barium if the evidence exists

The laboratory must provide with the analytical report a copy of the Chain of Custody along with a Sample Integrity Receipt form.

## 6. Audit Results

The audit results of desktop review and field component are summarized in the audit report upon completion of the assessment to support the Regulator's grading of the application. The report confirms if the CoR regulatory requirements are met.

### 6.1 Desktop Review Results

Results of desktop review are used to establish if errors and omissions may have caused uncertainty in the conclusions supporting the original CoR application. Errors and omissions may be the documentation submitted and/or technical errors made by the permit holder or the permit holder's representative.

#### 6.1.1 Documentation Errors and Omissions

Documentation errors and omissions may include, but are not limited to, the following:

- Incomplete, incorrect or missing tables and figures.
- Incomplete, incorrect or missing analytical data and/or quality control and quality assurance information; and
- Uncertain conclusions due to insufficient evidence.

#### 6.1.2 Technical Errors and Omissions

Technical errors and omissions may include, but are not limited to, the following:

- Incomplete site investigation.
- Incomplete site remediation and/or risk assessment; and
- Uncertain conclusions due to insufficient technical information.

## 6.2 Field Results

The analytical results are tabulated and compared with the applicable standards to check if all parameters meet the applicable criteria.

## 6.3 Audit Grades

After completion of both the desktop review and field component of the audit, the application for a site is graded by the Audit Team in accordance with this Manual. The application grades are outlined in following Table 6:

**Table 6: Application Grades**

Application Grade	Description
Fully Acceptable	The assessment supports the CoR application, confirming that there are no identified non-conformities at the site. The application addressed all areas of potential environmental concern, considered all potential contaminants of concern and demonstrated conformance with the numerical standards or accepted risk-based closure requirements.
Acceptable	The application shows non-conformities in documentary support or the assessment did not fully support the application, but no areas were identified in verification audit that exceed accepted risk-based closure requirements.
Unacceptable	The assessment does not support the application and the identified non-conformity indicates potential for unacceptable on-going risk to either human health or the environment.

Prior to assigning a grade of unacceptable to the application for a site, the Regulator will provide an opportunity for the permit holder to clarify and address any perceived concerns.

## 6.4 Notification of Unacceptable Grades

The Regulator considers the application for a site unacceptable if the site investigation or remediation or the risk assessment is determined to be incomplete and / or the audit results indicate potential for significant risk to either human health or the environment.

The permit holder will be informed through a formal letter stating that the Regulator's investigation requirements have not been met and further action from the permit holder is required. The permit holder will be required to clarify and address the potential issues identified during the audit.

## 6.5 Permit Holder Justification and/or Investigation/Remediation

After receiving notification of any potential issues identified at the site, the permit holder will provide the Regulator with evidence-based justification of the issues and demonstrate how the site meets the requirements. The submitted information is not to be considered an extension or re-submission of the CoR Part 1 package.

If the permit holder is unable to justify the identified issues then they will be required to conduct further investigation and/or remediation, as required, to ensure that non-conformities are resolved.

## 6.6 Regulator's Decision

Once the required investigation and/or remediation is complete and all outstanding issues at the site have been addressed, the permit holder or their representative is required to submit justification and/or Investigation/Remediation report to the Regulator's Supervisor, Environmental Stewardship for further evaluation. The Regulator will review the investigation/remediation report and decide if the supporting evidence is satisfactory and the risks identified at the site have been addressed.

## 6.7 Audit Summary Report

Audit summary report of all findings resulting from each individual audit will be prepared be published on the Regulator website as part of the Annual Oil and Gas Site Restoration Summary.

## 6.8 Audit Record

All audit working papers will be retained as a part of the record. All physical records presented by the Auditee will be kept in a secured records area within the Regulator. Records will be destroyed via the Regulator's secure shredding service after seven (7) years. Client specific reports will be retained in the same manner as other documentation for the permitted activity.

## References

### BC Energy Regulator Documentation

- 1) [Energy Resource Activities Act \(ERAA\)](#)
- 2) [Environmental Protection and Management Regulation \(EPMR\)](#)
- 3) [Environmental Protection and Management Guideline](#)
- 4) [Access to Crown Land for Offsite Investigation Application Form](#)
- 5) [Certificate of Restoration Application Form – Part 1](#)
- 6) [CoR Application Part 1 Checklist](#)
- 7) [Certificate of Restoration Application Form – Part 2](#)
- 8) [Site Classification Tool](#)

### Ministry of Environment Documentation

- 1) [Environmental Management Act \(EMA\)](#)
- 2) [Contaminated Sites Regulation \(CSR\)](#)
- 3) [British Columbia Field Sampling Manual](#)
- 4) [British Columbia Environmental Laboratory Manual](#)
- 5) Current Ministry Preservation and Holding Times Requirements