

**2013 Restoration Verification Audit  
Program Procedure  
Manual**

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## **1.0 Introduction and Scope**

The BC Oil and Gas Commission's (Commission) Restoration Verification Audit Program was created to provide the Commission and the public with assurance that Certificate of Restoration regulatory requirements are being met. Restoration requirements in OGAA and its associated regulations are in place to ensure that sites no longer required for exploration and production are restored to a safe, productive state. The permit holder is obligated to reclaim a site and receive a Certificate of Restoration (CoR) before it is allowed to cease payment on a surface tenure.

The CoR application is a two-part application. Part 1 ensures that the potential for contamination resulting from operations has been assessed and addressed, while Part 2 ensures acceptable surface reclamation has occurred, including site contour and re-vegetation.

The Commission's Environmental Management and Reclamation Department assesses CoR applications and certifies compliant sites, based on the information provided. The CoR process does not include field assessment by the Commission; it relies on the word of a registered professional or technologist, hired by the permit holder.

This document details the Restoration Verification Audit Program (the Program), including participants, their respective roles and responsibilities, goals of the audit, processes and audit methodologies. Audits of selected CoR applications and field verification of site conditions are conducted in accordance with the methodology outlined within this document.

## **2.0 Audit Objectives**

The objective of the Program is to demonstrate that CoR regulatory requirements under the Oil and Gas Activities Act and the Environmental Management Act are being met and that contamination at reclaimed oil and gas sites is being addressed in accordance with provincial regulatory requirements. This is accomplished through reviewing files and submitted documentation, as well as sampling of environmental media at selected sites by OGC professionals. The audit focuses on Part I of CoR applications and the evaluation for potential residual contamination. In the future, the program may be expanded to review surface reclamation as well.

## **3.0 Audit Overview**

The procedure manual was developed in 2012 by the Commission's Environmental Management and Reclamation Department with assistance from the Operational Analysis and Audit Department and this is the first revised version.

Selected CoR applications must be assessed in accordance with the roles, responsibilities and procedures outlined within [Section 4.0](#). CoR applications are divided into three categories based on

the past activities at the site and the potential risks associated with possible contaminants. Sampling intensities and field investigation requirements for each category are discussed in [Section 5.0](#).

Permit holders whose CoR applications are selected for audit will be notified by letter. The assigned Commission professional will review each application and develop a site-specific confirmatory sampling plan. Sampling plans will be provided to the permit holder for review and provide comments to the Commission to be considered before finalizing the plan. Once the sampling plan is finalized, the assigned Commission professional will schedule field verification activities and sample in accordance with the plan.

At the conclusion of audit activities, a report of the site assessment will be prepared and a copy will be provided to the permit holder. The Commission will grade the audit based on the results of the site assessment, in accordance with [Section 6.0](#).

The decision to grant a CoR is a statutory decision and may not be rescinded based on the results of the audit; therefore, the selection of a permit holder's application for audit will not affect the site's status as having been issued a CoR. CoR applications selected will be reviewed and adjudicated by the Commission in accordance with established procedures. However, in accordance with OGAA, unacceptable findings from the audit may require further work by the permit holder. After completion of the annual audit, a general report of the audit findings will be published.

#### **4.0 Audit Roles and Responsibilities**

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

- Commission staff will act in an ethical manner and make decisions with due professional care, based on evidence obtained during the audit. Commission staff will not act outside of their areas of competence and knowledge.
- Commission staff will be impartial and independent of the activity being audited and act without bias or prejudice.
- Audit results will be presented in a fair and accurate manner and will truthfully reflect the audit activity and evidence.

Procedures associated with the individual audit roles are outlined in the following subsections.

#### **4.1 Environmental Management and Reclamation Department Procedures**

The logistics of the Program will be managed by the Director, Environmental Management and Reclamation as follows:

- The Director will coordinate the selection of CoR applications to audit and allocate Commission professional staff to conduct restoration verification investigations.
- The assigned Commission professional will review CoR Part 1 of the application and other documentation related to the site.
- Before field verification activities, the assigned Commission professional will prepare a site-specific investigation plan, which will be provided to the permit holder for review.
- Topsoil samples should be collected from a depth of 0-15 centimetres from surface. Subsoil samples should be collected in 100-centimetre increments to the depth of the borehole and wherever there is a noticeable change in soil quality or soil texture. All samples should be discrete.
- Selection of samples for laboratory analysis should be based on the results of previous site investigations, any newly identified areas of potential environmental concern, as well as information obtained from portable screening.
- When petroleum hydrocarbons are present in samples comprised of organic materials, such as peat, analysis should include silica gel cleanup.
- Detailed salinity analysis for soil samples includes pH, EC, SAR by saturated paste and analysis of soluble Na, Ca, Mg, K, SO<sub>4</sub>, Cl and per cent saturation.
- Groundwater and surface water samples may be required on a site-specific basis.
- At the conclusion of the investigations, the professional will prepare a report.
- The Director, with input from Environmental Management and Reclamation professional staff, will grade each audited application as per [Section 6.0](#), based upon the results of the site investigations.

The Environmental Management and Reclamation Department will report on the findings of the audit annually. These findings will be used to gauge industry compliance with CoR regulatory requirements and to improve subsequent CoR audits.

#### **4.2 Permit Holder Procedures**

Permit holders will be notified if a CoR application has been selected for audit and will have an opportunity to review the site-specific sampling plan.

Permit holders are expected to cooperate with the Commission’s audit team. The permit holders will be given the opportunity to discuss the findings and address identified concerns, if any, upon completion of site investigations.

## 5.0 Application Categorization and Selection

CoR applications will be categorized based on the past activities at the site and the potential risks associated with possible contaminants. Field requirements for site investigations performed on selected applications are dependent on the categorization of the application. Category definitions are outlined in Table 1.

**Table 1: Site Assessment Categories**

Site Assessment Category	Definition
Level I	Wells that have never been active for the production of petroleum or natural gas or for use as an injection well, and where drilling waste was not disposed of on-site.
Level II	All other wells that have never been known to exceed a priority threshold, as defined in Section 3.3 of the <a href="#">Upstream Oil and Gas Site Classification Tool</a> .
Level III	All oil battery sites and all other wells that have, at some time, been known to exceed a priority threshold, as defined in Section 3.3 of the <a href="#">Upstream Oil and Gas Site Classification Tool</a> .

### 5.1 Risk Assessment, Audit Sampling Intensities and Audit Frequency

#### Risk Assessment

Sampling intensities for each site assessment category have been weighted to increase the likelihood of auditing sites that have a higher potential for anthropogenic contaminants and sites that pose a higher risk to receptors.

The apparent risk associated with a site is a product of the likelihood and consequence of an occurrence. The apparent risk for each site is that contamination may remain after a CoR has been issued, the consequence of which is the health and safety of the surrounding environment could be affected by the contamination. The severity of the consequence is dependent on many factors, including the specific contaminant, volume and concentration of the contaminant, the presence of sensitive receptors and a viable pathway between the source and the receptor. The likelihood for all categories of restored sites should ultimately be less likely, as the restoration of the site has been signed off by a registered professional. However, the likelihood for residual impacts at a site

would be higher if the site has produced or stored petroleum or natural gas versus a site that has not, and higher still if the site is known to have had relatively high concentrations of contaminants with potential to affect a receptor. Therefore, sampling intensities, listed in Table 2, differ depending on the site assessment category.

**Table 2: Sampling Intensities**

<b>Site Assessment Category</b>	<b>Sampling Intensity</b>
Level I	base
Level II	2 x base
Level III	3 x base

### **Audit Frequency**

CoR applications are submitted to the Commission throughout the calendar year. To ease administrative burden and increase efficiencies, site selection for audit and restoration verification will be conducted annually by the Commission.

A stratified random sampling strategy will be used to select sites for audit. The population of sites will be divided into subpopulations based on location and crown vs. private ownership. Sites will be selected from the subpopulations of sites that have received a CoR in the past fiscal year with weighted bias toward Level II and Level III activities, as shown in Table 2. If the randomly selected sites result in an operator being selected for audit 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. Half of the sites (50%) will be chosen in this manner. The remaining 50% of sites to be audited will be randomly selected from the remaining population of level II and III sites. The random selection of these sites will be biased by location to account for representation across operational areas, and will ensure that no operator is selected for audit at a frequency greater than 15% above the frequency of their application submissions compared to the total population. The frequency of the audit is expected to vary from year to year, based on the number of submissions, audit costs and available budget ,and will be reported annually with the findings of the audit.

Sampling intensities and audit frequency may be adjusted in subsequent years, based on the results of the audit and risk assessment. The applications that require Level II and Level III site assessments have a higher likelihood of being selected for audit and also may require more detailed site investigations.

## **5.2 Site Assessment Requirements**

Site assessment activities and requirements are dependent on the assessed category of the CoR application. Site assessments will be conducted as follows:

### Level I Site Assessment Requirements:

- An EM survey, if not previously conducted.
- One borehole where the EM survey indicates an anomaly to a maximum 3.0-metre depth.
- One borehole by hand auger at or near the well centre, no further than two metres from the original well centre, to a maximum 2.0-metre depth. Alternatively, one borehole by rig or probe within five metres of the well centre, to a maximum 5.0-metre depth.
- One borehole at the 5.0 metre radius of the well centre to a maximum 5.0-metre depth, located on the opposite side of the well centre from the borehole described above.
- Minimum of one borehole, as a control, to a maximum 6.0-metre depth.
- If a sump is associated with the activity then, in addition to the requirements above, the sump area should be investigated as follows:
  - An EM survey, if not previously conducted.
  - One borehole, as a control, to a maximum 6.0-metre depth.
- Two boreholes in a drilling waste disposal area to a maximum 6.0-metre depth, depending on the depth and method of disposal.
- If drilling waste was disposed of by land spread, then two boreholes with the disposal area extending one metre into native material below the disposal zone

### Level II and III Site Assessment Requirements:

- All Level I site assessment requirements.
- One borehole at each location selected due to the presence of an APEC or EM anomaly to a maximum 6.0-metre depth.

### Sampling Analysis Requirements:

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

#### a) Well centre:

- Detailed salinity.
- CSR metals, plus extractable barium, if necessary.
- BTEX, VPH, LEPH, HEPH.

#### b) Drilling waste disposal area:



- Detailed salinity.
- CSR metals, plus extractable barium, if necessary.
- BTEX, VPH, LEPH, HEPH.

c) EM anomalies and identified areas of potential environmental concern:

- Detailed salinity.
- CSR metals, plus extractable barium, if necessary.
- BTEX, VPH, LEPH, HEPH if there is evidence of hydrocarbons.

d) Controls:

- Detailed salinity.
- CSR metals.

## 6.0 Site Assessment Results

Upon completion, the Commission will assign one of the grades outlined in Table 3 to the CoR applications.

**Table 3: Application Grades**

<b>Application Grade</b>	<b>Description</b>
Fully Acceptable	The assessment supports the CoR application, confirming that there are no identified contamination concerns at the site. The application addressed all areas of potential environmental concern and demonstrated compliance with the numerical standards or accepted risk-based requirements.
Acceptable	The application lacks documentary support or the assessment does not fully support the application, but no areas were identified that exceed accepted risk-based closure requirements.
Unacceptable	The assessment does not support the application, and the discrepancy indicates potential for significant risk to either human health or the environment.

Before designating an application as unacceptable, the applicant will be given an opportunity to discuss the findings and address the identified deficiencies. If an application is considered unacceptable, the applicant will be required to perform further investigation and remediation, as necessary, to ensure that environmental concerns are resolved.