

Archaeology Audit Report 2010

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About the

BC Oil and Gas Commission

The BC Oil and Gas Commission 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 Commission's core roles include reviewing and assessing applications for industry activities, 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.

For general information about the Commission, please visit www.bcogc.ca or phone 250-794-5200.



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1 Introduction

In 2008 the BC Oil and Gas Commission (Commission) introduced the Archaeology Audit Program (AAP). The annual audit is a vital part of a performance-based review process, and participation by applicants is required for the Commission to gauge the efficiency of individual companies' management systems.

The AAP process consists of an office component and a field component. Questions are divided into four modules, with each module designed to examine a particular aspect of a company's archaeology management system. The audit findings are specific to individual modules and categories include: Exemplary Performance (EP), Satisfactory (S), Opportunity for Improvement (OI) and Non-conformance (NC).

The third AAP audit commenced in June 2010 with 22

oil and gas companies selected for office document reviews and corresponding field audits¹. The map in Appendix 1 indicates the locations of field audits conducted within a three-year period.

This report details the 2010 audit implementation, processes involved in assigning ratings, audit results and recommendations for improvements. Specific results and recommendations for participating companies were detailed in individual reports provided to those companies.

The AAP supports a continuous improvement environment for oil and gas companies. The 2010 audit examined companies for modifications that had been previously recommended, and future audits will continue to evaluate previously deficient management systems to ensure recommendations were implemented.

Audit Principles and Objectives

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

- Auditors shall act in an ethical manner and make decisions applying due professional care based on evidence obtained during the audit. Auditors will not act outside of their areas of competence and knowledge.
- Auditors will be impartial and independent of the activity that they are auditing, and act without bias or prejudice.
- Confidential information reviewed or obtained during the audit will be held in confidence by the auditors and only included in the audit report where the information is relevant to an audit finding.
- Audit results will be presented in a fair and accurate manner, and will truthfully reflect the audit activity and evidence.

The AAP has two primary objectives:

1. Ensure that client management systems are adequate for compliance with legislative and regulatory obligations.
2. Gather baseline data to establish procedures for best management practices for archaeology within British Columbia's oil and gas sector.

While the AAP was not designed to conduct compliance audits, it is the duty of the audit team to notify the Commission enforcement branch of any observed breaches in legislation.

¹ Four companies were subsequently removed from the audit: three became inactive and one audit was cancelled because of a lack of auditable projects.

2 Background and Scope

The Commission's archaeology review of oil and gas applications operates on a performance-based approach, placing responsibility and accountability for compliance on applicants. The performance-based system is described in the Commission's [Archaeology Guideline](#), which provides direction to companies applying to develop oil and gas resources in British Columbia.

The AAP was created as a necessary component of the performance-based approach. The protocols are designed to examine companies' oil and gas management systems for effectiveness as they pertain to regulations (under the Commission) and legislation (the provincial Heritage Conservation Act).

The audit is separated into an office component and a field component. The office component is designed to evaluate general management systems through examination of client/agent document tracking, communications systems and report submissions, while the field component reviews field personnel protocol and processes. Table 1 details the type of questions included in each audit module, as well as the objectives and execution protocols. Audits are separated into geophysical and non-geophysical due to differences in the auditing requirements.

The questions in the General Management System and Archaeological Site Mitigation modules are designed to examine the structure and effectiveness of existing document management, and communication and field processes as they apply to the archaeological components of the audited development. The Project Specific Document Examination module serves to verify the information gathered from the previous two

Table 1: Module Objectives and Protocols

Module (Non-geophysical) and (geophysical)	Objective	Protocol
General Management System Questions (Module 1) and (Module 5)	To ensure applicants have adequate management and control systems in place by examining document and process tracking systems.	Each question to be answered by applicant/operator/agent during interview.
Archaeological Site Mitigation Questions (Module 2) and (Module 6)	To ensure practices and procedures are in place to manage archaeological resources found within or adjacent to development boundaries	Each question to be answered by applicant/operator/agent during interview.
Project Specific Document Examination (Module 3) and (Module 7)	To confirm required documents are retained on file.	Examine physical files for each selected project.
Field Inspection and Related Questions and Documents (Module 4) and (Module 8)	To confirm management of archaeology sites has been implemented and proper documentation is on file with field supervisor. Confirm field supervisor is knowledgeable in management process.	Each question to be answered by field supervisor who was present during construction of selected project. Projects are selected based on presence of archaeological concerns.

modules and confirm required documents are retained appropriately. The Field Inspection module examines the practical implementation of the information gathered for all three document audit modules and confirms with field supervisors that current processes are consistent and communication practices between office and field staff are sound.

The data gathered during interviews, document examinations and field inspections is then compared to recommended and proven practices identified by the

Commission's archaeology and process improvement staff. The audits are conducted by Commission Heritage Conservation Program staff and are attended by oil and gas auditees.

As part of the audit process, First Nations representatives are notified and invited to attend the field audits within their respective areas of interest. In 2008, only one community attended. In 2009 the participation increased to four communities, but dropped to zero in 2010.

3 Sampling and Methodology

The target population for the 2010 archaeology audit consisted of projects approved during the 2009/10 fiscal year, plus applications approved during the first three months of 2009 (Jan. 1, 2009 to March 31, 2010). The audit sample was determined randomly with the probability of selection directly related to the number of projects approved for any one client during the selection period.

The audit process consists of interviews with key personnel, examination of relevant and previously identified documents and a field inspection of a project known to contain archaeological concerns. Typically only one development is chosen for field inspection and that project is selected by the audit team. Field projects must be handpicked due to a number of variables that cannot be controlled during random selection, including archaeological values, sample size and accessibility.

Field inspections, which are conducted to confirm mitigation recommendations, are file-specific and implemented on areas with archaeology concerns. They include a review of construction package documents and an interview with the construction supervisor responsible for field activities. If a selected company had no developments with archaeological concerns identified, then no field inspection is conducted.

All components of the audit are separated into two separate streams, one for geophysical developments

and one for non-geophysical developments. Parent populations were separated for sampling purposes and audit question modules were tailored to accommodate the two categories. Of the 22 companies randomly selected for the 2010 AAP audits, 13 were non-geophysical and nine were geophysical.

3.1 Non-geophysical Applications

During the audit period, the Commission approved 2,895 unique applications with a total of 3,030 applications, including amendments and revisions. The project applications were submitted by a total of 122 applicants. Ten per cent of applicants from the non-geophysical sample population were randomly selected for audit. For each applicant selected, a maximum sample of five projects was randomly drawn from the parent population for the file-specific component document portion of the audit. If less than five projects were approved for, all projects were selected.

For the field-related component of the audit, a specific file was selected at the discretion of the audit team. Files selected for field audits ideally contain areas with archaeological concerns so implementation of archaeological requirements can be reviewed and adherence verified.

A total of 11 non-geophysical companies are included in this report. Thirteen non-geophysical companies were

originally chosen for audit, but two companies have since become inactive and were eliminated from the results tally.

3.2 Geophysical Applications

During the audit period, the Commission approved 80 geophysical applications (including amendments) with 61 unique projects from 37 applicants. Because of the low number of clients, the geophysical stream of the audit used an audit level of 20 per cent of applicants. For each applicant selected, a maximum sample of five projects was randomly drawn from the parent population for the file-specific component document portion of the audit. If less than five projects were approved, all projects were selected.

For the field-related component of the audit, a specific file was selected at the discretion of the audit team. Files selected for field audit ideally contained areas with archaeological concerns so implementation of archaeological recommendations and requirements can be verified.

A total of seven geophysical companies are included in this report. Nine geophysical clients were chosen for audit, but one company is now inactive and another had a low activity rate with no suitable programs available for audit. These two companies have been eliminated from the results tally.

4 Data Analysis

The AAP audit approach groups like-themed audit questions into four modules (Table 1). The questions within each module were designed to evaluate the effectiveness of specific aspects of companies' archaeology management systems. This type of scoring is a more accurate reflection of the performance of companies in each area of their system.

Individual questions and ratings for each answer provided by the interviewee can be found in the appendix of the individual reports distributed to audited companies. For clients who scored OI or NC, explanation of those ratings can also be found in the appendix of their individual reports. An audit finding result is then assigned to each question in each module and a best fit finding is assigned to individual modules as a whole. Table 2 provides descriptions of criteria used to establish a finding for each answer within each module.



Artifact found in a cultivated field.



A marked archaeology site.

Table 2. Finding Categories and Determination Descriptions

Finding Category	Description
Exemplary Performance (EP)	Assigned to companies with innovative, proactive processes or practices that exceed requirements such as: <ul style="list-style-type: none"> • Conducting a project walk-through and orientation with construction crews to identify archaeology concerns and confirm approved mitigation actions. • Conducting a post-construction field inspection to confirm mitigation strategies were employed. • Communication systems that are formalized and include proactive processes (for example, personnel assigned specifically to track processes, ensure requirements are met, deliver assessments and mitigation strategies directly to field supervisors, and confirm regulatory obligations are met).
Satisfactory (S)	Assigned to companies with practices that address most aspects of archaeology resource management and reporting. The system is generally sufficient to support compliance with legal and regulatory requirements, and can include processes such as: <ul style="list-style-type: none"> • Crew discussions on areas of archaeology concern on project plans and location(s) in pre-construction meetings. • Meeting all regulatory and legislated archaeological requirements without incident. • Basic tracking systems for processes and requirements.
Opportunity for Improvement (OI)	Assigned to companies with weak management processes that could lead to system breakdown and non-compliance events. A minimal effort has been given toward development plans for archaeological resources and/or ensure compliance with legal and regulatory requirements. Examples include: <ul style="list-style-type: none"> • Lack of pre-work meetings to discuss archaeology issues. • Appropriate archaeology documents are not provided to field supervisor. • Archaeology assessment reports are not tracked and/or have not been submitted to the Commission. • Lack of consistency in transferring archaeology assessment status or information to the field supervisor.
Non-Conformance (NC)	Assigned to companies when regulatory, legal or other requirements are not met, or where the ability of the company to comply with said requirements is jeopardized. Examples of when this rating would be used include: <ul style="list-style-type: none"> • Audit field inspection finds that Commission-approved archaeology recommendations for site mitigation have not been adhered to. • Finding that written instruction regarding archaeological issues has not been adhered to. • Any condition of approval for archaeology that is not adhered to. • Inability to provide applicable audit required documents. • Refusal of company to participate in the archaeology audit. • Non-response from the company to the audit selection letter. • Evidence from the company personnel gathered during the audit that reveals system failure and a non-compliance issue. • A process that is inherently negligent that will ultimately lead to a non-compliance event.

5 Audit Findings

The 2010 AAP scoring system was revised to provide more specific recommendations and a means for practical application to individual archaeology management systems. Each audited company was scored according to individual answers and a cumulative finding was assigned to individual modules. Ratings are discussed in this section by module, not by company, as scores were not combined to provide an overall rating for an auditee. Scores from 70 modules were considered in the results presented in this section.

The results for the 2010 audit were average, with 71 per cent of scored modules rating at satisfactory or higher. Tables 3 and 4 contain the cumulative scores for each module. One module each from two companies scored exemplary performance. One company scored high and on the border of EP-S for three modules, while three other companies placed between EP and S for one module each.

A total of 18 Opportunity for Improvement (OI) ratings (26 per cent) were assigned to companies' individual modules. A large number of OI ratings were given because of outstanding regulatory obligations (mainly reporting) and poor communication systems for notifying field staff of archaeology issues.

Companies that failed to adhere to audit protocols and requirements were also given a rating of OI for the applicable modules. Four companies failed to make available required personnel for interview, as detailed in the companies' selection letters and in the AAP procedure manual. Additionally, several companies did not present the required documents prior to or concurrently with the audit,

Table 3: Non-Geophysical Cumulative Results 2010

	Exemplary Performance	Satisfactory Performance	Opportunity for Improvement	Non-Conformance
Module 1	0	5	6	0
Module 2	2 ²	5	5	0
Module 3	0	9	2	0
Module 4	2	4	3	0
Totals	4	23	16	0

Table 4: Geophysical Cumulative Results 2010

	Exemplary Performance	Satisfactory Performance	Opportunity for Improvement	Non-Conformance
Module 5	1	5	1	0
Module 6	0	7	0	0
Module 7	1	5	0	1
Module 8	2	2	2	1
Totals	4 ³	19	3	2

² Two results were on the border of EP and S, but displayed as EP for charting purposes.

³ All four scores were on the border of EP and S, but displayed as EP for charting purposes.

five companies failed to reply to the selection letter within the established response time, and one company failed to cooperate with Commission staff prior to and during the audit processes.

One non-conformance (failure to adhere to permit conditions) was discovered as a result of the audit. The company was not aware that it occurred until preparations for the audit commenced. Poor communication among company and contractor parties was the cause of the system failure.

Conversely, eight companies received commendations for observed current best practices. Three of the eight companies experienced prior non-conformances that included an archaeology component. They have since created and implemented sound management plans to ensure future non-compliances are averted.

The field inspections of four developments were waived, three because there were no suitable areas to audit and one because of on-site safety concerns. Interviews with field personnel for three of those developments were conducted off project, but the field operations supervisor for the fourth company was not made available by the company.

Field audit results (modules 4 and 8) provide the most accurate measurement for effective communications with ground crews. Specifically, these modules examine the quality of direct communication methods with field supervisors responsible for implementing archaeology management plans. Two companies scored EP for the field audit module with the common denominator for a strong performance being communication practices. The top scoring companies had detailed tracking systems for required documents, successful transfers of information and set communication procedures for archaeology resource management. Two other companies provided documentation for a sound management of archaeology sites (module 2) as observed during the document audit, but the implementation of written principles to actual field processes was not fully implemented as indicated in the module 4 results.



Artifact found in a cultivated field.



An archaeology site located on a knoll with snow fences for protection.

6 Conclusions and Recommendations

The results of the 2010 AAP audit illustrated the effectiveness of developing specific processes for archaeology requirements. Companies that demonstrated sound tracking systems for transfer of information and documents to the Commission, and to field personnel, produced the highest scores.

Companies for which previous weaknesses were detected in their management systems demonstrated implementation of past Commission recommendations and ranked among the highest performers in the 2010 audit.

Figure 1 on the following page contains a cumulative list of best practices using this and previous years' results, and Figure 2 contains a list of commendations earned by individual companies during the audit.

Figure 1: Cumulative List of Best Practices

1. There should be an on-site construction supervisor to provide field orientation for ground crews prior to project start-up when archaeologically sensitive areas exist within a development.
2. Specific individuals should be assigned responsibility for ensuring all regulatory and legislated archaeological requirements are met within project developments.
3. Transfer and receipt of required paper documentation to construction crews should be made prior to project commencement. The documents should include archaeology reports and Commission-accepted site mitigation strategies if applicable. The Commission issues a letter of acceptance for each archaeology site recovered during the course of an archaeological assessment. Receipt of this acceptance letter is required prior to job start up and should be included with the archaeology report when transferring documents to construction supervisors.
4. Upon receipt of audit selection letter, companies should contact the Commission to discuss scheduling.
5. Companies should be prepared for the audit and cooperate with Commission audit staff. Participation in the audit is mandatory as the audit is a key process within the performance-based assessment system. Companies cannot remain in a performance-based system without participating in the archaeology audit.
6. Audited companies should ensure the appropriate personnel are present for the audit interview, as outlined in the selection letter and AAP manual.
7. Companies should develop written archaeology resource management plans and formalize standard operating procedures already in use. The management plan should fully address and include the following:
 - Relevant legislative and regulatory requirements.
 - Processes for ensuring the completion of archaeological assessments and timely submission of archaeological reports to the Commission.
 - Checklists to ensure that all archaeological requirements are completed prior to construction activities.
 - Processes for fulfillment of requirements surrounding archaeological assessment and site avoidance requirements should range from high level planning to individual task assignments.
 - All staff, contractors and land agents should be familiar with the contents of a management plan.
8. Create or refine existing tracking systems to include project status and archaeology report submission dates. Emphasis should be placed on tracking and ensuring information regarding archaeology assessments and site management is accurately and graphically related to field staff.
9. Contact the Commission periodically to reconcile records for regulatory obligations.
10. Develop a communication record summarizing dates and information exchange. A project communication record serves as a valuable reference for project details and transactions. As well, it is the basis for development or improvement of data distribution processes, as the record illustrates where any breakdown in communication may have occurred.

Figure 2: List of Commendations Received by Individual Companies

1. The company has daily meetings to discuss specifics of the program, including avoidance of archaeology sites that may be in conflict.
2. A company representative accompanies the archaeologist to all sites within a program during the flagging event.
3. The company is committed to zero ground disturbance in their programs.
4. The company has revised tracking systems based on Commission recommendations and was the only company to have all report submissions up to date at the time of audit.
5. The company follows a standard Incidence Response Plan for any emergency situation, including those that involve archaeology.
6. The company discusses all environment and cultural sensitivities within a program, whether known or potential, at daily pre-work meetings.
7. The company has a specific person assigned to clerical duties in the field.
8. The company has detailed and exceptional record keeping tracked by their agent.
9. The company erects temporary hazard flagging around archaeology sites to ensure protection and improve visibility of site location to machine operators during program construction.
10. The company conducts daily tracking of machinery progress and proximity to sensitive areas within a program and alerts construction crews on day of possible conflict.
11. The company field supervisor has a frequent presence within program to ensure management of sensitive areas.
12. The company ensures that all archaeology work has been completed and management strategies in place prior to submission of their development application to the Commission.
13. The company has created a formal archaeology management procedure manual for staff and contractors.
14. The company is proactive and has applied the archaeology audit principles to other aspects of the company business.
15. The company's construction supervisor was extremely knowledgeable about archaeology resources, potential locations for those resources and is in constant communication with archaeology field crews during assessments.
16. Subsequent to a non-conformance event, the company has implemented Commission recommendations and has a sound tracking system and management plan.

Appendix 1

Locations of AAP Audits to date



