



Professional Engineers  
and Geoscientists of BC  
www.apegbc.ca

## EXPERIENCE QUALIFICATION GUIDELINES FOR REGISTRATION/LICENSURE THROUGH THE ENVIRONMENTAL ENGINEERING DISCIPLINE

### INTRODUCTION

#### *THE ENVIRONMENTAL ENGINEER*

Environmental Engineering addresses the presenting and solution of problems resulting from the effects of human interaction with the environment. It concerns the investigation, planning, design, construction and management of human activities to protect public health and the environment and to interact sustainably with the earth's natural resource systems and carrying capacity.

An environmental engineer is a professional engineer who applies science, technology, engineering methods and planning to address human interactions with the natural environment, to minimize impact and mitigate adverse effects. Environmental engineers design, implement and manage systems to protect human health and the natural environment, including:

- water supply, treatment, conservation and distribution;
- gaseous, solid and liquid waste collection, treatment and disposal;
- pollution prevention and waste minimization;
- monitoring and analysis of waste effects on air, soil and water quality;
- environmental impact assessment;
- monitoring, assessment and abatement of environmental noise;
- environmental impact mitigation planning and implementation;
- air and water resources assessment, monitoring and management;
- environmental regulatory process management;
- environmental audits and site remediation.

Identifying, conceptualizing, analyzing and predicting environmental interactions draws upon knowledge from a wide range of disciplines and requires that an environmental engineer have a broad understanding of scientific principles of transport in the environment, in addition to other professional disciplines such as biology, chemistry, meteorology and general engineering.

As environment engineers operate at the interface between humans the earth's natural systems, they are people-oriented and must be able to work with multi-disciplinary teams, and be able to write, speak and listen to other professions, governments and the general public.

**EXPERIENCE**

***ENVIRONMENTAL ENGINEERING EXPERIENCE***

The elements of environmental engineering experience acceptable for registration have been itemized in the following tables under the categories described in the APEGBC *Program Guide for Engineers and Geoscientists-in-Training - Satisfactory Engineering Experience*. As with the Academic/Curriculum Requirements, certain elements of experience are mandatory, while others are specific to the individual’s background and employment sector.

**ENVIRONMENTAL ENGINEERING EXPERIENCE**

**INDOCTRINATION**

*The candidate should have been involved in the implementation of engineering designs to experience firsthand the practical problems that arise. Experience should include:*

- *visits to locations where engineering designs are being put into practice, preparation, assembly, installation, testing, commissioning;*
- *observation of how the individual design elements fit into the whole process;*
- *exposure to problems that arise during the implementation of engineering designs, e.g., the practicality of design tolerances, adjusting designs to fit practical problems, maintenance philosophies.*

<b>Evaluation for Applicant:</b> _____		
<b>INDOCTRINATION</b>		
	<b>MANDATORY</b>	<b>FIELD-DEPENDENT</b>
<i>INDOCTRINATION</i>	<input type="checkbox"/> Data Sourcing/compiling <input type="checkbox"/> Literature Reviews <input type="checkbox"/> Site Visits to Applications of Environmental Design <input type="checkbox"/> Project team member on environmental studies <input type="checkbox"/> Review and Assess Technical Reports	<input type="checkbox"/> Trip Reports <input type="checkbox"/> Construction Supervision <input type="checkbox"/> Site visits to observe & understand Environmental Engineering Systems <input type="checkbox"/> Exposure to problems and determination of solutions during implementation of Environmental Management Systems <input type="checkbox"/> Permit and Regulatory Administration

**APPLICATION OF THEORY  
ANALYSIS, DESIGN AND SYNTHESIS, TESTING, IMPLEMENTATION**

*The skillful application of theory is a necessary component of engineering. To be accepted, a candidate's experience shall include active and responsible participation in all aspects of the following:*

***analysis**, including scope and operating conditions, safety and environmental issues, and judgements concerning economic feasibility and technical merit;*

***design and synthesis**, including specifications, compliance with codes and standards, integration of components and sub-systems into larger systems, reliability, ease of maintenance, human and environmental aspects, and societal implications'*

***testing**, including methodology and techniques, functional specification verification, product or technology commissioning and assessment;*

***implementation**, including engineering cost studies, optimization techniques, process flow and time studies, quality assurance implementation, cost/benefit analysis.*

**Evaluation for Applicant:** \_\_\_\_\_

**APPLICATION OF THEORY**

	<b>MANDATORY</b>	<b>FIELD-DEPENDENT</b>
<i><b>ANALYSIS</b></i>	<input type="checkbox"/> Phase Contaminant & Quantity Characterization <input type="checkbox"/> Analysis of Environmental Options <input type="checkbox"/> Environmental Assessment <input type="checkbox"/> Economic Feasibility Analysis	<input type="checkbox"/> Data Management <input type="checkbox"/> Monitoring Program Assessment <input type="checkbox"/> Pollution Prevention/Waste Minimisation <input type="checkbox"/> Technology Assessment and Evaluation <input type="checkbox"/> Equipment Performance Analysis <input type="checkbox"/> Process Performance Analysis <input type="checkbox"/> Legal/Regulatory Assessment <input type="checkbox"/> Risk Assessment <input type="checkbox"/> Airshed & watershed Management

**Evaluation for Applicant:** \_\_\_\_\_

**APPLICATION OF THEORY** *continued*

<p><b>DESIGN AND SYNTHESIS</b></p>	<p><input type="checkbox"/> Play an active and responsible role in at least one of the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Conceptual Design or Design Analysis</li> <li><input type="checkbox"/> Process Design or Design Analysis</li> <li><input type="checkbox"/> Detailed Design or Design Analysis</li> <li><input type="checkbox"/> Design of Monitoring Programs</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Design/Drawing Layout</li> <li><input type="checkbox"/> Equipment Specifications and Selection</li> <li><input type="checkbox"/> RFP's &amp; Consultant Selection Process</li> <li><input type="checkbox"/> Environmental Management Systems Design &amp; Implementation</li> <li><input type="checkbox"/> Analyze proposed treatment system &amp; recommend Permit &amp; Licence conditions in light of legal framework, public &amp; social considerations &amp; environmental needs</li> <li><input type="checkbox"/> Plume Modeling</li> <li><input type="checkbox"/> Risk Assessment</li> </ul>
<p><b>TESTING</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Inspection of Construction and Commissioning</li> <li><input type="checkbox"/> Testing of Environmental Strategies &amp; Systems for Results</li> <li><input type="checkbox"/> Process &amp; Systems Audit &amp; Evaluation</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Pilot Plant Operation</li> <li><input type="checkbox"/> Research and Development of Prevention and Remediation Solutions</li> <li><input type="checkbox"/> Field Design</li> <li><input type="checkbox"/> Equipment Performance Testing</li> <li><input type="checkbox"/> Environmental Management Systems Testing</li> <li><input type="checkbox"/> Develop &amp; Test Environmental Indicator</li> <li><input type="checkbox"/> State of Environment Evaluation</li> <li><input type="checkbox"/> Test Hypothesis</li> <li><input type="checkbox"/> Field Sampling &amp; Monitoring</li> </ul>
<p><b>IMPLEMENTATION</b></p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Monitoring of Program Implementation</li> <li><input type="checkbox"/> Implementation Team Member</li> <li><input type="checkbox"/> Implementation of Environmental Strategies</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Environmental Management System Implementation</li> <li><input type="checkbox"/> Construction Supervision</li> <li><input type="checkbox"/> Operation Manual Preparation</li> <li><input type="checkbox"/> Operator Training</li> <li><input type="checkbox"/> Implementation of Legislation &amp; Standards</li> <li><input type="checkbox"/> Implementation of Environmental Systems in specific areas</li> <li><input type="checkbox"/> Implementation of Audit Review Systems</li> </ul>

## MANAGEMENT, COMMUNICATIONS, SOCIAL IMPLICATIONS

*Management of technical resources is an important component of engineering. Assumption of increased responsibility is an important aspect of qualifying experience.*

**Evaluation for Applicant:** \_\_\_\_\_

### MANAGEMENT, COMMUNICATIONS, SOCIAL IMPLICATIONS

<b>MANAGEMENT</b>	<input type="checkbox"/> Participation in Project Management	<input type="checkbox"/> Team Leader <input type="checkbox"/> Contract Management <input type="checkbox"/> Supervision of Coops/Students & Other Technical Personnel
<b>COMMUNICATIONS</b>	<input type="checkbox"/> Written and Oral Presentation of Engineering including all aspects of daily correspondence and record-keeping to major reports <input type="checkbox"/> Presentations (one of the following): <input type="checkbox"/> to Senior Management <input type="checkbox"/> to Public/Stakeholders <input type="checkbox"/> to Political Levels (municipal councils)  <input type="checkbox"/> Attendance at Conferences <input type="checkbox"/> as an Environmental Specialist  <input type="checkbox"/> Participation in Management of Public Processes	<input type="checkbox"/> Technical advice to industry consultants & Public <input type="checkbox"/> Draft technical documents within the legal framework <input type="checkbox"/> Writing Research & Contract Proposals <input type="checkbox"/> Writing Technical Papers <input type="checkbox"/> Writing Progress Reports <input type="checkbox"/> Preparing Draft Briefing Notes, Communication Strategies or Written Presentations to Government <input type="checkbox"/> Preparation of Cabinet and Treasury Board submissions or submission to government by industry or other levels of government <input type="checkbox"/> Exposure to group dynamics and the important role they play in setting the environmental agenda, whether in a local community or a the provincial or federal level.

Evaluation for Applicant: \_\_\_\_\_

**MANAGEMENT, COMMUNICATIONS, SOCIAL IMPLICATIONS** *continued*

***SOCIAL  
IMPLICATIONS***

Exposure to government and private sector requirements and relations

- Public Participation
- Membership in a Non-Profit Organization
- Understanding the role of Public, Public Bodies and Non-Governmental Organizations in Environmental Policy
- Part of multi-disciplinary teams on environmental studies & processes (e.g. Health, Biology, Chemistry, Geology, Economic, Geography, Ocean Sciences, etc.)
- Exposure to the role that economics and social factors play in determining and influencing the environmental agenda
- Familiarity with the principles and application of sustainability