Workplace Essential Skills Initiative Phase 1: The Petroleum Industry

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June 30, 2008
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Overview

The oil and gas (petroleum) industry in Canada is both substantial in terms of economic impact and complex in terms of the range of employment it offers. Canada is the world's third-largest producer of natural gas and eighth-largest producer of crude oil. The energy sector is a major contributor to Canada's economy, accounting for six per cent of the national GDP. The sector provides essential services, wealth and operates in a high-technology environment.

The majority of oil and gas activity in Western Canada occurs in the Western Canada Sedimentary Basin which encompasses areas in north eastern BC, Alberta, Saskatchewan, Manitoba and the Northwest Territories. In British Columbia, industry activity occurs primarily in the north eastern section of the province with continued discussion about off-shore activity of the northwest coast.

The key sectors of the petroleum industry in Canada are exploration, development, production, service industries, pipeline transmission, gas processing and mining, extracting, and upgrading heavy oil and bitumen. For the purposes of this research, the industry has been broadly segmented for clarity and ease of understanding, as well as to reflect standard industry nomenclature.

The bulk of the industry activity in British Columbia occurs “upstream” focusing on exploration, drilling, production and transmission. In the past, British Columbia was home to several oil refineries but today only one refinery operates in the province.

While the industry provides employment to more than 500,000 people in Canada, it faces typical and unique human resource issues including lack of clear career paths, reliance on a non-traditional workforce, skill shortages, and workplace essential skill issues. The workplace essential skill issues in this industry manifest in a number of ways including higher-than-expected safety incidents, productivity issues, high retention and turn-over rates, and workplace communication challenges.

This report was developed for the British Columbia Ministry of Advanced Education’s Workplace Essential Skills Initiative and is laid out in key sections: Industry Overview, Essential Skills Gaps, Essential Skills Resources, Recommendations and Pilot Project.

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1 See also “Labour Market Needs in British Columbia’s Oil and Gas Industry.” BC Innovation Council, April 2007

2 See also “The Strategic Human Resources Study of the Upstream Petroleum Industry: The Decade Ahead.” Petroleum Human Resources Council of Canada (http://www.petrohrsc.ca)
Report Methodology

This report was prepared by conducting literature and website review, employer interviews and an online survey. Employers, professional and industry associations, post-secondary institutions, and service providers across British Columbia and Alberta were involved in the research to develop the industry overview, gap analysis and the identification of resources. Federal organizations such as ACCC, HRDC and ABC were consulted in the development of essential skills terminology, best practices and resource identification.

For this project the research was conducted across British Columbia and Alberta as many of the realities of Alberta exist in this province and many organizations working in this industry work in both provinces. While many of the sources referenced are from Alberta-based organizations, their information is relevant to the BC industry.

Industry Overview

Given the growing demand for oil and gas global as well as the continuing increase in the barrel price of oil, the petroleum industry is viewed as a ‘growth industry’ by human resource and industry organizations. Combined with the shifting demographics in the industry, employment opportunities across the industry are significant, as are options for career advancement.

The industry is typically segmented into specific aspects of the production cycle of petroleum products distinguishing between upstream, midstream and downstream which covers activities from exploration to the marketing of the final product. Employment in a specific segment is typical but the lines between sectors can in some instances be grey, rather than black and white, and it is not unusual for one position or job title to work across many industry sectors. For example, chemical engineers may be employed at various stages between upstream and downstream activities.

While this report provides an overview of key employment areas in the petroleum industry, it is important to note the information provided here is not exhaustive and that exceptional employment resources for this sector already exist. Some of the most comprehensive and useful resources have been listed in Appendix A.

The sector profile chart on the following pages provides a sample of positions across the industry but does in no way reflect all of the positions (and various position titles) that exist. Rather it features an overview by way of sample position titles in industry sectors, educational (and not professional membership) requirements, as well a link to the occupational profiles which contains substantially more information on each position listed.

Useful industry employment links appear in Appendix B.

3 64% of the respondents had employees in British Columbia.
<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Sample Positions</th>
<th>Job Duties</th>
<th>Education¹</th>
<th>Occupational Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exploration</td>
<td>Exploration Geophysicist/Geologist</td>
<td>Geophysicists use the principles of physics, mathematics and geology to study the surface and internal composition of the earth. Exploration geophysicists look for oil, natural gas, water and minerals for economic exploitation and for environmental projects.</td>
<td>4 years post-secondary education/training</td>
<td>Exploration Geophysicist</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Physical Science Professional</td>
</tr>
<tr>
<td>Geological and Geophysical Technologist</td>
<td>Geological and geophysical technologists apply their knowledge of the study of the Earth in exploration, production and management. They may work independently or with a team of geologists, geophysicists, mining engineers or petroleum engineers.</td>
<td>2 years post-secondary education/training</td>
<td>Geological or Geophysical Technologist</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Physical Sciences Technologist</td>
</tr>
<tr>
<td>Land Surveyor</td>
<td>(also Survey Chief, Survey Crew, Survey Assistant)</td>
<td>Land surveyors plan, direct and conduct legal surveys to determine and interpret the location of boundaries, contours and other natural or human-made features.</td>
<td>4 years post-secondary education/training</td>
<td>Land Surveyor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2 years post-secondary education/training (survey assistant)</td>
<td>Surveying and Mapping Technologist</td>
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<tr>
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<td></td>
<td>Survey Assistant or Helper</td>
</tr>
<tr>
<td>Mapping Technologist</td>
<td>Mapping technologists gather, analyze, interpret and use geospatial information to define locations of natural and manmade features on, above and below the earth's surface.</td>
<td>2 years post-secondary education/training</td>
<td>Mapping Technologist</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Surveying and Mapping Technologist</td>
</tr>
<tr>
<td>Civil Engineer</td>
<td>Civil engineers plan, design and supervise the construction, maintenance and decommissioning of a wide variety of public and private structures and facilities.</td>
<td>4 years post-secondary education/training</td>
<td>Civil Engineer</td>
<td></td>
</tr>
<tr>
<td>Civil Engineering</td>
<td></td>
<td></td>
<td>2 years post-secondary education/training</td>
<td>Civil Engineer</td>
</tr>
<tr>
<td>Technologist</td>
<td></td>
<td></td>
<td></td>
<td>Civil Engineering Technologist</td>
</tr>
</tbody>
</table>

¹ This table reflects educational/training requirements only and does not include professional designations that may be required for professional practice or employment.
<table>
<thead>
<tr>
<th>Job Title</th>
<th>Description</th>
<th>Education/Training</th>
<th>Related Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geomatics/Surveying Technologist</td>
<td>Geomatics technologists conduct or participate in field surveys, office calculations and plan production to determine the exact locations and relative positions of natural features and man-made structures on the earth’s surface, underground and underwater.</td>
<td>2 years post-secondary education/training</td>
<td>Geomatics/Surveying Technologist</td>
</tr>
<tr>
<td>Drilling</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Health and/or Safety Officer/Assistant</td>
<td>Occupational health and safety advisors facilitate the development, implementation and maintenance of workplace safety programs.</td>
<td>Educational requirements vary</td>
<td>Health and Safety</td>
</tr>
<tr>
<td>Drilling and Service Rig Managers</td>
<td>Oil and gas well drilling and service rig managers supervise large crews of specialized workers on drilling and service rigs.</td>
<td>High school diploma</td>
<td>Drilling Rig Services Manager, Rig Manager</td>
</tr>
<tr>
<td>Rig Technician</td>
<td>Rig technicians operate oil and gas drilling rigs.</td>
<td>4 or 5-year rig technician apprenticeship program</td>
<td>Rig Technician, Drillers and Blasters</td>
</tr>
<tr>
<td>Petroleum Engineer</td>
<td>Petroleum engineers are involved in the exploration and development of oil and gas. They apply the principles of geology, physics, chemistry and engineering sciences to the recovery of petroleum and natural gas from conventional reservoirs and oil sands.</td>
<td>4 years post-secondary education/training</td>
<td>Petroleum Engineer, Petroleum Engineer</td>
</tr>
<tr>
<td>Petroleum Engineering Technologist</td>
<td>Petroleum engineering technologists are responsible for many of the technical activities involved in the production of oil and gas from conventional reserves, as well as from heavy oil and oil sands. Their knowledge and training is applied to petroleum drilling, geology, production procedures, formation evaluation and</td>
<td>2 years post-secondary education/training</td>
<td>Petroleum Engineering Technologist, Technical Occupations in the Physical Sciences</td>
</tr>
</tbody>
</table>

5 Job titles are profiled only once in this table, although a position may exist across industry sectors.
<table>
<thead>
<tr>
<th>Occupation</th>
<th>Description</th>
<th>Education/training requirements</th>
<th>Designation/Training (Occupational)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wireline Field Supervisors</strong></td>
<td>Wireline field supervisors direct the work of wireline operators and collect and process data from wireline operations.</td>
<td>Education/training requirements vary</td>
<td>Wireline Field Supervisor Wireline Operator</td>
</tr>
<tr>
<td><strong>Well Service Equipment Operator</strong></td>
<td>Well testing services supervisors oversee oil and gas well data collection to determine reservoir deliverability and identify produced fluids.</td>
<td>Designated (trade) occupation – no formal training program is offered but an occupational certificate is required.</td>
<td>Well Service Equipment Operator Well Services Supervisor Well Testing Operator</td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Instrumentation Engineering Technologist</strong></td>
<td>Instrumentation engineering technologists apply their knowledge of pneumatic, electronic and microcomputer measurement and control systems in business, engineering and industry settings.</td>
<td>2 years post-secondary education/training</td>
<td>Instrumentation Engineering Technologist Industrial Instrument Technicians and Mechanics</td>
</tr>
<tr>
<td><strong>Field Production Operator</strong></td>
<td>Field production operators are responsible for the initial separation processes or the special treatment required to ensure that impurities such as water, gas and sediments are removed from oil and gas in the field. Once separated, the oil or gas is transported by pipeline to refineries, gas plants or markets.</td>
<td>Education/training requirements vary</td>
<td>Field Production Operator</td>
</tr>
<tr>
<td><strong>Environmental Engineer</strong></td>
<td>Environmental engineers design systems, processes and equipment for air, water and soil pollution assessment, prevention and control, solid and hazardous waste management, and the remediation of contaminated sites.</td>
<td>4 years post-secondary education/training</td>
<td>Environmental Engineer Environmental Engineer</td>
</tr>
<tr>
<td><strong>Petroleum Engineering Technologist</strong></td>
<td>Petroleum engineering technologists are responsible for many of the technical activities involved in the production of oil and gas from conventional reserves, as well as from heavy oil and oil sands. Their knowledge and training is applied to</td>
<td>2 years post-secondary education/training</td>
<td>Petroleum Engineering Technologist</td>
</tr>
<tr>
<td>Industry</td>
<td>Job Title</td>
<td>Job Description</td>
<td>Education/Training</td>
</tr>
<tr>
<td>--------------------------------</td>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>Petroleum Drilling, Geology, Production Procedures, Formation Evaluation and Reservoir Engineering.</td>
<td>Industrial Electrician</td>
<td>Industrial electricians install, maintain, test, troubleshoot and repair industrial electrical equipment and associated electrical and electronic controls. They are employed by electrical contractors and maintenance departments of factories, plants, mines, shipyards and other industrial establishments.</td>
<td>4 or 5-year industrial electrician apprenticeship program</td>
</tr>
<tr>
<td>Processing</td>
<td>Process Control Engineer/Technologist</td>
<td>Process control engineers/technologists oversee the effective execution of day-to-day processes in refineries, utilities, water treatment, boiler, steam and cogeneration facilities.</td>
<td>2 - 4 years post-secondary education/training</td>
</tr>
<tr>
<td></td>
<td>Processing Managers/Supervisors</td>
<td>Processing managers and supervisors direct the work of employees engaged in a variety of industrial processing activities.</td>
<td>2 - 4 years post-secondary education/training</td>
</tr>
<tr>
<td></td>
<td>Chemical Engineer</td>
<td>Chemical engineers research, design, and develop chemical processes and equipment, oversee the operation and maintenance of industrial chemical processing plants and perform duties related to chemical quality control, environmental protection and biochemical or biotechnical engineering.</td>
<td>4 years post-secondary education/training</td>
</tr>
<tr>
<td></td>
<td>Millwright</td>
<td>Millwrights install, maintain, repair and troubleshoot stationary industrial machinery and mechanical equipment in factories, production plants and recreational facilities.</td>
<td>4 or 5-year millwright apprenticeship program</td>
</tr>
<tr>
<td>Transportation</td>
<td>Pipeline Operators/Maintenance Workers</td>
<td>Oil pipeline operators and maintenance workers monitor and conduct the day to day operations of oil pipelines and associated facilities. Gas pipeline operators and maintenance workers monitor the day to day operations of meter and compressor stations</td>
<td>High school diploma</td>
</tr>
</tbody>
</table>
Swampers and Operators

Oil and gas transportation swampers and operators transport the equipment and supplies used in oil and gas exploration, development and production.

Designated (trade) occupation – no formal training program is offered but an occupational certificate is required.

Swampers and Operators

Heavy Equipment Technician/Mechanic

Heavy equipment technicians maintain, repair and overhaul towed and self-propelled heavy vehicles and industrial heavy equipment, and commercial transport devices connected to or moved by a power unit.

4 or 5-year heavy equipment technician/mechanic apprenticeship program

Heavy Equipment Technician/Mechanic

Machinery and Transportation Equipment Mechanic

Heavy Equipment Operator

Heavy equipment operators use a variety of mobile machines and attachments to excavate, grade and landscape earth or move workers, materials and equipment.

Education/training requirements vary

Heavy Equipment Operator

Truck Driver

Truck drivers operate gasoline or diesel-powered trucks, tractor-trailers and similar vehicles to transport goods and materials over local routes or long distances.

Education/training requirements vary

Truck Driver

Motor Vehicle and Transit Drivers

Refining and Petrochemicals

Gas Plant Operator

Gas plant operators control automated processes which convert raw natural gas into forms that can be used by consumers.

Education/training requirements vary

Gas Plant Operator

Central Control and Process Operators in Manufacturing and Processing

Power Engineer

Power engineers supervise, operate and maintain machinery and boilers that provide power, heat, refrigeration and other utility services to heavy industry and large building complexes.

2 years post-secondary education/training

Power Engineer

Stationary Engineers and Power Station and System
<table>
<thead>
<tr>
<th>Job Title</th>
<th>Description</th>
<th>Education/Training</th>
<th>Division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumentation Technician/Mechanic</td>
<td>Instrument technicians install, maintain and repair the measuring and control instruments used in industrial and commercial processing.</td>
<td>4 or 5-year instrumentation technician apprenticeship program</td>
<td>Operators</td>
</tr>
<tr>
<td>Refinery/Upgrader Process Operators</td>
<td>Refinery/upgrader process operators are responsible for the day to day operations of oil refineries and upgraders.</td>
<td>1 year post-secondary education/training</td>
<td>Instrumentation Technician</td>
</tr>
<tr>
<td>Chemical Engineering Technologist</td>
<td>Chemical engineering technologists are involved in process design, plant engineering, environmental control, engineering sales and plant operations. They may work independently or in an engineering team.</td>
<td>2 years post-secondary education/training</td>
<td>Chemical Engineering Technologist</td>
</tr>
<tr>
<td>Manufacturing Engineer</td>
<td>Manufacturing engineers design, implement, direct and co-ordinate manufacturing system materials and processes to achieve the most efficient cost effective and high quality production possible in a safe and environmentally responsible manner.</td>
<td>4 years post-secondary education/training</td>
<td>Manufacturing Engineer</td>
</tr>
<tr>
<td>Accountant (also Production/Cost Accountant)</td>
<td>Accountants provide financial reporting and consulting services for organizations and individuals.</td>
<td>4 years post-secondary education/training</td>
<td>Accountant</td>
</tr>
<tr>
<td>Human Resource Professional</td>
<td>Human resources professionals facilitate the effective use of human resources to achieve organizational goals and objectives. They advise all levels of their education.</td>
<td>2 – 4 years post-secondary education/training</td>
<td>Human Resource Professional</td>
</tr>
<tr>
<td>Position</td>
<td>Description</td>
<td>Education/Training Requirements</td>
<td>Department</td>
</tr>
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<td>-------------------------------------</td>
</tr>
<tr>
<td>Personnel and Recruitment Officers</td>
<td>Organizations regarding people management, develop employee recruitment and retention programs, assist in the selection of job candidates, facilitate employee professional development, and develop and administer other human resource programs.</td>
<td>4 years post-secondary education/training</td>
<td>Personnel and Recruitment Officers</td>
</tr>
<tr>
<td>Information Systems Consultant</td>
<td>Information systems consultants analyze, design and develop information systems business solutions and provide advice on a wide range of information systems issues.</td>
<td>4 years post-secondary education/training</td>
<td>IS Consultant</td>
</tr>
<tr>
<td>Purchasing Agent</td>
<td>Purchasing agents buy goods, materials, supplies and services and ensure that they are of the quantity, quality, price and availability required by their organization.</td>
<td>Education/training requirements vary</td>
<td>Purchasing Agent</td>
</tr>
<tr>
<td>Operations Manager</td>
<td>Operations managers direct and coordinate the operation of manufacturing, service delivery and production departments in industrial, commercial and government organizations.</td>
<td>Education/training requirements vary; generally a minimum of a 4 year degree is required</td>
<td>Operations Manager</td>
</tr>
</tbody>
</table>
Essential Skill Gaps

A comprehensive online survey was developed and deployed to industry stakeholders across British Columbia and Alberta. The survey was to capture a snapshot of the understanding of workplace essential skills issues in the workplace as well as to determine preliminary interest levels in the development of resource materials. A sample of the survey appears in Appendix C.

The survey was completed by 86 respondents in all sectors of the industry (including exploration, drilling, production, processing, transportation, refining and petrochemicals, marketing, regulatory and environmental) and at all levels of an organization from CEO’s to front line managers to HR assistants.

Some survey highlights are noted belows:

- 46% rated themselves as `somewhat familiar` with the term essential skills
- Respondents identified top business issues attributed to low levels of essential skills in their workforce as:
  - Communication challenges
  - Loss of productivity
  - Retention and turn over issues
  - Low uptake on internal training
  - Poor customer relations or service
- Writing, continuous learning, and computer use were ranked as the lowest skill level areas when considering an organization’s overall performance
- Reading text (40%), document use (39.1%) and writing (37%) were cited as barriers to the performance of routine work tasks
- 46% agreed that employees in their organization had sufficient essential skill levels to be promoted to increasing senior positions without essential skills upgrading or interventions while 42% disagreed
- Essential skill gaps appeared in recruiting in the following areas: thinking skills (54%), writing (44%), oral communication (44%) and document use (42%)
54% of the organizations had not engaged in any workplace essential skills testing or upgrading in the past 5 years while 25% indicated they had. 75% of the respondents indicated their organizations might be interested in accessing industry specific training or resources to address workplace essential skill gaps (36 of 48 respondents selected ‘yes’ or ‘perhaps’).

Areas of greatest interest for the development of resources were: thinking skills, oral communications, continuous learning, document use, and writing.

62% respondent organizations have employees working in BC

Essential Skills Resources

Research for this project uncovered a wide range of essential skills materials which have been developed by various stakeholders across Canada. From a resource perspective, materials tended to be developed either for a general audience (including youth and families) or for specific workplace applications (focusing on workplace essential skills.) For the purposes of this paper, the focus was on developing an inventory of workplace essential skill resources.

Workplace essential skill resources typically address either the end user (learner) or the practitioner. The Office of Literacy and Essential Skills has created excellent resources and tools for the practitioner and provincial bodies such as Literacy British Columbia and Alberta Workforce Essential Skills provide resources and professional development opportunities. However, research indicated that most employers surveyed were not aware of these resources and if they were, felt the resources were ‘too academic’ and not practically applicable to the workplace.

Some work has been done in workplace essential skills specific to this industry, although it has tended to be project based and employer specific. The Petroleum Human Resources Council of Canada (PETROHRSC) indicated during an interview for this project with staff, and in a subsequent industry-wide survey, a focus on conducting research and piloting projects in workplace essential skills. Bow Valley College has created a range of resource materials for industry, although not exclusive to oil and gas. Some organizations such as Suncor, have executed in-house essential skills projects which have yielded some proprietary materials. These singular initiatives notwithstanding, very little resource material has been developed exclusively for this industry.

6 Of those who elaborated on the intervention provided, most did not actually note any essential skills upgrading initiatives but rather confused the delivery of training in Excel, supervisory skills, business writing, and safety courses with essential skills training.
ACCC (Association of Canadian Community Colleges) is currently developing a database of essential skills resources available through post-secondary institutions across Canada.

A list of resources is provided in Appendix D.

**Recommendations**

Despite the existence of a range of essential skills resources, there appeared to be few workplace essential skills materials available which were developed specifically for the oil and gas industry. This reflects the reality for most essential workplace skills which are readily available; with the exception of the construction industry (Skillplan), there are few easily accessible materials that are industry specific. Any industry specific materials which do exist have been developed within the context of organization (company) specific initiatives and are thus proprietary, not available for general consumption.

An opportunity clearly exists to adapt existing workplace materials for deployment in the petroleum industry to decrease delivery time and increase speed with which learners can apply new skills in the field. However, a collaborative and integrated approach to the development of workplace essential skills resources for the industry is necessary as the current ‘silo’ approach to development is inadequate.

Key features of a development initiative should include:

- Stakeholder engagement (including learners, end-user organizations, practitioners and developers)
- Industry relevance ensured through true stakeholder involvement
- Development of a multi-dimensional approach to address complement of essential skills (not focusing on singular issues such as reading or writing)
- Partnerships across the industry to increase uptake and awareness building (for example, partnering with CAODC, Enform, or CAPP
- Integrating specific essential skill requirements and levels into position profiles
- Providing training to employers to build the level of knowledge on workplace essential skills and its impact on the workforce
- Undertake pilot projects with employers and communicate best practices
Pilot Project

A potential pilot project is outlined below. This pilot project was conceptualized during the research for this paper and focuses on an applied essential skills intervention that reflects stakeholder partnership and collaboration.

Essential Skills Upgrading for 1st Year IIM Apprentices

Research in the field has indicated that the most successful workplace essential skills projects are a developed and delivered in partnership among stakeholder groups including workers, management and qualified educational partners/practitioners.

This project is designed to increase the completion and retention rates of first year apprentices in oil and gas related trades in British Columbia.7

Across Canada, it has been demonstrated on a small scale that an essential skills intervention can both increase apprentices’ completion rates and exam scores, while reducing drop-out rates. Furthermore, increasing apprentice completion rates will allow for more individual career-pathing opportunities across the industry as ticketed trades people typically realize more opportunities for advancement.

This potential project is important because British Columbia like other jurisdictions has disappointingly low apprenticeship completion rates. To work as a tradesperson in British Columbia it is compulsory to be certified in the trade or to be registered in an apprenticeship program that will lead to qualification. Journeypersons must complete their apprenticeship program and pass an inter-provincial standards exam to receive a Certificate of Qualification with an inter-provincial Red Seal endorsement and a Certificate of Apprenticeship.

While the completion of secondary school or equivalent is recommended for students interested in pursuing an apprenticeship, it is not required.

Given the loose nature of the prerequisites for these programs of study, many pre-apprentices who are admitted to apprenticeship programs do not have the necessary skills to effectively manage the course work and subsequent examinations. This leads to high drop-out rates.

This situation is of concern for a number of reasons:

1. Those apprentices who do not pass their certification exams often see doors to advancement shut and many become disillusioned and leave the trade.

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7 While this preliminary proposal focuses on apprentices, the project could potentially be expanded to address the workplace essential skills issues faced by and entry level operations personnel in the sector.
2. For employers, the shortage of qualified apprentices impedes succession planning and the ability to meet the demands of a booming economy. Employers need to know that their investment in the apprentice will lead to trade designation.

3. For government, the poor completion rates are costly in terms of training, tuition and support costs such as Employment Insurance and the lack of skilled trades personnel impedes GDP.

In order to ensure pre-apprentices are set up for success in these programs of study, it is recommended that an essential skills evaluation and upgrading program be implemented for first year apprentices in British Columbia.

**Why Essential Skills?**

Essential skills are the foundation skills that apprentices and journeypersons need to process and use information found in documents such as schematics, scale drawings, technical manuals, product labels, regulations, maps, flow charts, and assembly drawings. Research conducted across Canada has demonstrated a strong correlation between essential skills proficiency and apprentice completion rates, productivity, and safety performance. Simply put, apprentices with low levels of essential skills are far less likely to successfully complete their technical training than those with adequate skills.

Recent research conducted by Alberta Apprenticeship and Industry Training Board indicated that where essential skills testing and training were provided,

- More apprentices passed the course
- Few apprentices failed the course
- Marks on provincial exams increased

**The Solution**

Douglas College, in partnership with Northern Lights College and local employers, proposes the development of an evaluation and upgrading program, based on essential skills framework, to ensure first year apprentices in oil and gas related trades have the necessary skills for successful completion of their program of study.

The pilot program would test a new integrated delivery model where apprentices and prospective students benefit from a customized training plan and access to proven interventions and approaches. They will choose from:

- Essential Skills interventions including skills upgrading opportunities and assessments that are necessary preparation for successful completion of trade certification. Refresher courses, which include reading, document use, numeracy (fractions, ratios & proportions), test taking skills, and study habits/strategies.
• Approximately 20 hours of contextualized essential skills training will be provided to individuals identified as at risk through assessment process. Upgrading will be offer following technical training typically from 3.00 to 5.00 PM daily.

• Upgrading will be completed within first weeks of technical training, thereby ensuring student focus during last difficult weeks of technical training.

• Access to training using Building Workplace Essential Skills course will be made available to apprentices. Course will be adapted to reflect context of their training and future employment.

• Program will be offered through two of the Northern Lights College campuses (Dawson Creek and Fort St John) offering first year apprenticeship training. Approximately 100 students in RTO designated trades will be assessed and offered upgrading.

Expected Outcomes

This initiative is expected to:

1. Reduce the stress and apprehension felt by those enrolled in the first year of apprenticeship programs. Many students and apprentices have not taken academic studies and tests in years and are therefore quite fearful of the process. The services and supports offered through the project will boost confidence and encourage the timely and successful completion of certification.

2. Increase the number of pre-apprentices who enter and apprentices who successfully complete the program, including immigrants who may have educational credentials from outside Canada and Aboriginals.

3. Improve productivity and work place safety. Enhanced communication and leadership ability, combined with a stronger foundation in base skills will help workers improve their performance, safety records, and provide a solid base for the development of new skills.

4. Ensure a broader talent pool and access to apprenticeship training in British Columbia.

5. Ensure the efficient and effective use of employer and employee investments in apprenticeship training.

Proposed Program Partners

Preliminary discussions regarding this project, during the course of this research, indicated a high level of interest in the pilot. Below are the proposed partner programs at the time of the development of this preliminary pilot project overview.
• Douglas College
• Northern Lights College
• Resource Training Organization of BC
• Pyramid Corporation
Appendix A – Industry Overview Resources

Canadian Association of Petroleum Producers
Canadian Association of Geophysical Contractors
Canadian Association of Oilwell Drilling Contractors
Canadian Energy Pipeline Association
Centre for Energy
Conference Board of Canada
Energy Services BC
Enform
Labour Market Information (Service Canada)
Ministry of Energy, Mines and Petroleum Resources
Oil and Gas Commission
Offshore Oil and Gas in BC
Petroleum Human Resources Council
Petroleum Services Association
Small Explorers and Producers Association of Canada (SEPAC)
Appendix B – Employment Links

Alberta Learning Information Services
Careers in Oil and Gas
Employability Skills 2000+
HRDC Job Bank
Industry Training Authority
Job Search Online (North-eastern BC)
Ministry of Advanced Education (BC)
National Occupational Classifications
Oil and Gas Jobs in Canada (subscription required)
Training, Career and Worker Information (Service Canada)
Workfutures BC
Appendix C – On-line Survey Sample

Petroleum Industry Essential Skills Survey

The Government of Canada has developed a list of what they consider to be essential skills. By this they are referring to a set of transferable skills common across most occupations and used in daily life. These are defined as: reading text, document use, numeracy, oral communications, writing, working with others, thinking skills, computer use, and continuous learning. They enable workers of all levels to be more employable by helping them adapt better to new job demands, work challenges and changing work environments and they form the foundation upon which specific industry, technical, and occupational skills are built.

Thank you for completing this survey. Your feedback will help determine essential skill gaps in the workplace in the petroleum sector and provide the direction for the development of workplace tools, applications and resources.

1. How familiar are you with the term “essential skills”?
   - [ ] Very familiar
   - [ ] Somewhat familiar
   - [ ] Not familiar

Essential Skills in the Workplace

The fact that an individual may be skilled and technically competent in given work areas does not mean they have the same competency with all the listening, speaking, reading, writing and numeracy demands of the workplace. Recent Canadian research in workplace essential skills identified a link between low workplace essential skill levels and low productivity, poor safety records, poor team performance, regulatory/compliance breaches, high levels of customer dissatisfaction, and high error rates. Organizations that implement workplace essential skills interventions typically address the bottom line business impacts and enjoy the additional benefit of increased participation, enhanced employee engagement, improved morale and improved team performance.

Essential skills are READING TEXT; DOCUMENT USE; NUMERACY; WRITING; ORAL COMMUNICATION; WORKING WITH OTHERS; CONTINUOUS LEARNING; THINKING SKILLS (problem solving, decision making and organizing); COMPUTER USE.
2. Which of the following business issues has your organization experienced because employee essential skill levels were not adequate? Please select all that apply.

- Increase in avoidable safety incidents
- Loss of time due to safety incidents/issues
- Loss of productivity
- Absenteeism
- Poor customer relations or service
- Failure to meet regulatory (non-safety) requirements
- Low employee morale
- Low uptake on internal training
- Inability to attract new employees
- Retention and turn over issues
- Failure to meet organizational objectives
- Inability to adapt to changes in the workplace
- Higher error rates
- Communication challenges
- Employee conflict (interpersonal or team)
- Other (please specify)

3. Thinking about the overall performance of your organization, please estimate the essential skill levels of your employees:

<table>
<thead>
<tr>
<th>Skill</th>
<th>Excellent</th>
<th>Above Average</th>
<th>Acceptable</th>
<th>Poor</th>
<th>Don't Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading Text</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Document Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numeracy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Communication</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working with Others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuous Learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thinking Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Petroleum Industry Essential Skills Survey

4. A lack of or low levels of which of the following essential skills may have impeded the ability of employees in your organization to perform routine work tasks? Please select all that apply.

- Reading Text
- Document Use
- Numeracy
- Writing
- Oral Communication
- Working with Others
- Continuous Learning
- Thinking Skills
- Computer Use

5. Please rate the ability of employees in your organization to undertake any of the below (unaided and unprompted):

<table>
<thead>
<tr>
<th>Skill Description</th>
<th>1 Excellent</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adapt to process/procedures/systems changes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read and apply critical information in standard work documents.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify and anticipate problems, generate and evaluate solutions and take responsibility for decisions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engage in and benefit from training opportunities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearly and effectively communicate with co-workers and customers by written communication (including email).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independently execute standard mathematical/financial operations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effectively obtain and apply information in key documents (i.e., MSDS, software instructions, technical specifications, policies and procedures, etc.).</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Petroleum Industry Essential Skills Survey

6. Most employees in your organization currently have sufficient essential skill levels (in all 9 skill areas: reading text, document use, numeracy, oral communications, writing, working with others, thinking skills, computer use, and continuous learning) to be promoted to increasingly senior positions without workplace essential skills upgrading or interventions.

- [ ] Strongly Agree
- [ ] Agree
- [ ] Disagree
- [ ] Strongly Disagree

7. Please indicate in which areas your organization is seeing workplace essential skill gaps when recruiting for entry level positions. Please select all that apply.

- [ ] Reading Text
- [ ] Document Use
- [ ] Numeracy
- [ ] Writing
- [ ] Oral Communication
- [ ] Working with Others
- [ ] Continuous Learning
- [ ] Thinking Skills
- [ ] Computer Use
- [ ] We are not seeing any skill gaps

8. To your knowledge, has your organization undertaken any workplace essential skills testing or interventions in the past 5 years?


9. Would your organization be interested in accessing petroleum industry specific training or resources to address any of the skill gaps identified above?
Petroleum Industry Essential Skills Survey

10. If testing, training or interventions in workplace essential skills were provided to your organization, improvements in which area(s) are most likely to have the greatest impact?

- Reading Text
- Document Use
- Numeracy
- Writing
- Oral Communication
- Working with Others
- Continuous Learning
- Thinking Skills
- Computer Use
- None

11. What is your position or job title?

- Owner
- President or CEO
- Human Resources Manager
- Other Manager (i.e., Service, Operations, or Unit Manager)
- Other (Non-Manager) Please specify below.

12. Please indicate your organization’s primary line(s) of business. Please select all that apply.

- Exploration
- Drilling
- Production
- Processing
- Transportation
- Refining and Petrochemicals
- Marketing
- Other (please specify)
Petroleum Industry Essential Skills Survey

13. Does your organization have employees who work in BC?
   - [ ] Yes
   - [ ] No

14. Please provide your contact information so we can send you a Tim Hortons gift card.

   Name: 
   Company: 
   Title: 
   Address: 
   City/Town: 
   Prov: 
   Postal Code: 
   Email Address: 
   Phone Number: 

Thank you for taking the time to complete this survey!

Carolyn Maclaren,
Project Consultant
Douglas College

Email: maclaren@douglas.bc.ca
Appendix D – Essential Skills Resources

Alberta Workforce Essential Skills (AWES)

ABC Canada

Bibliography of Workplace Literacy Resources 1981-2002

Building Essential Skills in the Workplace

Canadian Training Solutions for Workplace Learning

Conference Board of Canada - Workplace Literacy Central

Good Practice in Use: Guidelines for Good Practice in Workplace Education

HRSDC Essential Skills

Literacy Alberta

Literacy British Columbia

National Adult Literacy Database

National Adult Literacy Database At Work

Skill Plan

TOWES (Test of Workplace Essential Skills)

Workplace Basic Skills (US site)
Appendix E – Acronyms

ALIS – Alberta Learning Information Service
CAODC – Canadian Association of Oilwell Drilling Contractors
CAPP – Canadian Association of Petroleum Producers
CEPA – Canadian Energy Pipeline Association
HRSDC – Human Resources and Social Development Canada
LMI – Labour Market Information
PETROHRSC – Petroleum Human Resources Council of Canada
PSAC - Petroleum Services Association of Canada
SEPAC – Small Explorers and Producers Association of Canada
TOWES – Test of Workplace Essential Skills
WCSB – Western Canadian Sedimentary Basin