Analysis of Gaps and Issues Related to Labour Supply and Demand in Offshore Exploration and Production in Newfoundland

Petroleum Industry
Human Resources Committee

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Key Findings

1. Employment, Skill and Competency Development

- Newfoundland’s offshore oil and gas industry presents unique challenges in that it is a high-risk physical and economic environment and requires very competent, highly technical and specialized skills.
- There is keen competition in specialized skill areas, and attracting and retaining workers from other parts of Canada and the world can be a complex and high cost proposition.
- It is in the long-term interest of companies competing in the oil and gas sector to encourage skill development in Newfoundland and Labrador. In addition, public policy on skill transfer and optimizing employment is best served by encouraging skill development in Newfoundland and Labrador.
- For the majority of employment opportunities offered by exploration and production activities offshore Newfoundland, there is no gap between supply and demand. There is a steady local supply of skills that meet industry needs and satisfy job requirements.
- Where gaps occur the most significant challenge is in meeting increasing industry requirements for ‘relevant work experience’ and competency development, much of which is industry and company specific. This gap, while never exceeding ten positions for any one occupation, involves many of the highly-technical and very experienced human resources, those with the most promising export potential and in the highest demand globally. If this gap is to be closed, specific interventions and partnerships between industry, government, and education for both specialized training and ‘competency development in the workplace’ must be considered.
- Given that highly technical and skilled oil and gas human resources are in high demand globally, an additional challenge arises from the difficulty of attracting and retaining these skill sets to offshore Newfoundland.

2. Education and Training

- Education and Training institutions in Newfoundland and Labrador, both private and public, are producing the basic skills and some of the specialized skills to serve the exploration and production segments.
- There are very few specialized engineering fields that are not available through local educational institutions. In addition, the education and training programs that are not provided locally do not represent significant demand and may not justify investment in education and training.
- In order to participate in this industry there is a trend toward higher educational and technical requirements, as well as continuous professional development and multi-skills training.

3. Other Considerations

- The Provincial tax system continues to be a disincentive to attracting other Canadian workers. The Canadian tax system may also have implications for foreign workers and other Canadians working abroad.
- Issues such as employment equity, improved public information about the industry and its workers, and labour market issues in the supply and service sector are becoming more critical as the industry develops in Newfoundland and Labrador.
Introduction

A Petroleum Industry Human Resources Committee (PIHRC) was established in December 1998 to review the employment, training, and other human resource issues related to the petroleum industry in Newfoundland and Labrador over the next ten years. All stakeholders share the same objective: developing a competent local supply of labour to service the offshore petroleum industry. The Committee comprises representatives from the following groups and agencies: Human Resources Development Canada (HRDC), Canadian Association of Petroleum Producers (CAPP), Atlantic Canada Opportunities Agency (ACOA), Newfoundland and Labrador Ocean Industries Association (NOIA), the provincial departments of Education, Human Resources and Employment, and Mines and Energy. Adele McNicholas, of Baltic Services Inc, has chaired the Committee since April 2000 and has authored this report. (A listing of current PIHRC members is in Appendix A.)

Following an initial forum with industry stakeholders, held in February 1999, the Committee agreed to undertake three studies, as follows:

Demand Study: Estimation of Direct Human Resource Requirements Offshore Exploration and Production Newfoundland and Nova Scotia 2000-2010. This report was prepared by CAPP, and covers direct offshore oil and gas industry employment for fifty (50) occupations only in the exploration and production phases.

Training Study: Petroleum Education and Training Capabilities for the Provincial Post-Secondary Education System. This report was conducted by the provincial Department of Education and covers public and private institutions.

Supply Study: Newfoundland and Labrador’s Offshore Petroleum Industry Supply Study Working Paper. This report was conducted by PIHRC, through the Department of Human Resources and Employment.

An executive summary of each report is contained in Appendix B.

These reports formed the basis for the Committee’s deliberations over the past year. This Gap Analysis draws on information presented in those reports. This analysis highlights areas where there are labour supply and demand gaps, and to present issues related to the labour market facing this segment of the oil and gas industry, in this Province, at this time.

Each component study has limitations. For example the Demand Study does not address seismic, construction or project engineering employment demand, nor does it reflect any indirect employment. All studies were affected by limited access to appropriate information, and the human resource demand unknowns associated with a volatile resource industry. Additionally, it is simply not possible to predict all the program changes that are a normal course of events for educational institutions.

By definition, then, this Gap Analysis also has limitations. The Committee is also charting new territory: this is the first analysis of gaps in labour supply and demand for any aspect of the Province’s oil and gas industry. Accepting these obvious limitations as noted above, the Committee still felt a gap analysis provided a valuable tool toward a better understanding of labour market issues and dynamics.
Offshore jurisdictions manage their resources to meet several objectives. These include local supplier development; revenue in the form of royalty payments; the development of downstream industrial activity; the development of institutional capability in education, training, research and development; and, the provision of employment opportunities, both direct and indirect, in the industry.

The Supply and Demand Studies already undertaken for this Committee provide an indication of the scope of some of those employment opportunities. As cautioned, they do not provide a complete picture, limited as they are to fifty (50) occupations in selected activities in the petroleum industry cycle, providing in total about 2,000-2,500 jobs. (It is relevant to note here that an earlier (1999) study, "Harnessing the Potential" placed employment estimates at about 20,000 jobs, involving all segments of the industry in New Brunswick, Nova Scotia and Newfoundland and Labrador.)

There are also limitations that affect sources of information on both supply and demand sides. However, they do provide us with an indication of the nature of the employment opportunities offered by the industry. It gives us, for the first time, quantitative information on the supply and demand sides. It also provides some of the qualitative information on experience and skill sets required to successfully obtain employment in this sector. Analyzing this information for each category of employment allows the emerging issues to be more clearly defined.

This is the dual objective of this gap analysis: to highlight obvious gaps between supply and demand in the local labour market; and, to identify issues that affect this industry, our institutional capability, and a provincial government policy objective of optimizing benefits.

The Committee did not attempt to propose recommendations in this study. Instead it has highlighted key findings as an appropriate base to determine actions for further dialogue and consideration. A Forum, with representation from key stakeholders, was held on January 30, 2001, in St. John's, to discuss the major issues and identify potential actions and next steps. Where appropriate, the Committee has incorporated suggested changes into this final report. A summary Report of that Stakeholder Forum is available, as well as an outline of future actions and next steps as proposed by the PIHRC.

As a final note, this Gap Analysis is not intended to reach a single conclusion. The implications and relevance is different for each Committee member, as it will be for each reader.
Gaps

Early in its discussions of the supply and demand of labour for this segment of the industry, the Committee recognized that there were several different kinds of gaps involved. Four categories were selected, as follows:

1. Institutional Education and Training Gaps
2. Trained Labour Pool but Insufficient Work Experience
3. Trained and Experienced Labour Pool but Difficult to Attract to Newfoundland
4. No Gaps or Obvious Issues

After considerable discussion by the Committee, the fifty occupations examined in the labour supply and demand study have been grouped according to these four categories and are presented here according to this format. Some occupations fall into several categories. Those that fall in **only one** category are bolded. A summary supply/gap matrix is provided in Appendix C.

Category One: Institutional Education and Training Gaps

After ten to twelve years of sustained petroleum activity in Newfoundland and Labrador, the Province's institutions, both public and private, are meeting most of the employment demands for the industry. This is particularly true in terms of basic skills training. However, as a small Province, Newfoundland and Labrador does not have the institutional capacity or capability to educate and train for every single occupational opportunity associated with the offshore. There remain, therefore, a few occupations for which we do not provide education and training, at any level. These are as follows:

- Petroleum Engineer
- Geological Engineer
- Asset Integrity Management
- Chemical/Process Engineer
- Materials Engineer

Category Two: Trained But Insufficient Work Experience

When employers were interviewed during the course of these studies, they strongly emphasized the need for relevant industry work experience. They also stressed that offshore Newfoundland is a demanding and specialized environment that requires some key skill sets beyond the demands of a normal shore-based petroleum industry such as Western Canada.

Entry level positions do exist in this industry but they are few, and tend to be peripheral to the industry. Mostly, employers require industry experience. Work experience requirements range from two to ten years. Some operators require general petroleum industry experience; others demand specific time spent offshore. More importantly though, in an increasing number of cases, ‘related work experience’ translates to skills acquired from experience with a specific company, a specific type of rig/vessel, and/or specific production, maintenance equipment.
Therefore, although our institutions are producing graduates in many of these categories, related and relevant work experience is required to be eligible to compete for employment in this industry.

The following are occupations that fall under this category:

- Geologist
- Geophysicist
- Petroleum Engineer
- Geological Engineer
- **Engine Room Crew-Marine**
- **Crane Operator**
- Process Supervisors
- Process Operators
- Dynamic Positioning Officer
- **Instrument Technician**
- **Ballast Control Operators**
- Mechanical Engineer
- Electrical Engineer
- **IT Support Service**
- Drillers and Testers
- Marine Officers (Master Mariners)

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**Category Three: Trained, Experienced but Difficult to Attract to and Retain in the Province**

Given the relatively young age of the petroleum industry in Newfoundland and Labrador, most young trained Newfoundlanders went elsewhere to acquire experience in the oil and gas industry. Also, given the complexity and uniqueness of some of the occupations associated with the offshore, some of the skills required are present only in jurisdictions with a longer history and more activity such as the North Sea and Gulf of Mexico. Some of these skilled workers are Newfoundlanders; many are not. Regardless of whether an attachment to ‘home’ exists, it can be difficult to entice them to come to this province, and sometimes this country, for employment opportunities.

The following are occupations that fall under this category:

- Geologist
- Geophysicist
- Petroleum Engineer
- Geological Engineer
- **Drilling Superintendent / Drilling Supervisor**
- Process Supervisor
- Process Operator
- Mechanical Engineer
- Electrical Engineer
- Marine Officers (Master Mariners)
- Drillers and Testers
Gaps (continued)

Category Four: No Gaps; No Issues

Many of the positions related to the offshore petroleum industry are dictated by simple supply and demand principles. There is a steady and sometimes abundant supply of skills required; this supply is available locally; and, relevant work experience is not an issue. Typically, then, these are positions that could be completely staffed by Newfoundlanders, i.e., they are trained here, and there are no serious experience issues which should restrict entry by Newfoundland graduates.

The following are occupations that fall under this category:

- Geological Technologist
- Floorman/Roustabout
- Wellhead Technicians
- Deck Crew
- Marine Officers
- Helicopter Pilot
- Helicopter Mechanic
- Refueler
- Maintenance Trades (machinists, plumbers, welders, etc)
- Maintenance Supervisors
- Mechanic
- Materials Handling
- Motor Operator
- Medic
- Radio Operator
- Ice/Weather Observer
- Food Service Supervisor
- Cook
- Catering Staff
- Cleaner
- Structural Engineer
- General Management
- Human Resources Management Staff / Specialist / Advisors
- Purchasing / Supply Chain Staff
- Accounting Staff
- Business Services Management
- Safety-Environmental Management Staff (Advisors)
- Information Systems Management Staff (Advisors)
- Auditor-Accountant
- Administrative Assistants
- Materials Management/Logistics
1. Experience and Competency

The entry-level positions, such as food services personnel, require basic safety and familiarization training for offshore operations. Other more highly skilled occupations such as production technicians may be accepted at entry level but subsequently demand specific competency development. Most positions, as evidenced in gap Category Two (Trained but Insufficient Work Experience), require some level of relevant industry experience. This is particularly true of the more highly skilled positions. There are only a few positions, such as structural engineers, basic management positions, and human resources personnel where relevant industry experience is an asset but not a critical component.

The notion of ‘relevant industry experience’ is particularly critical in an operating environment like offshore Newfoundland and Labrador, which is highly specialized and technically demanding. This notion of experience also offers real challenges in analyzing labour market dynamics and can refer to general industry experience, as well as specific company/equipment experience with demonstrated competencies.

General experience with oil and gas projects is often a requirement for work in this industry. This can refer to any aspect of the industry, be it offshore, onshore, downstream or upstream. Many jobs in the Newfoundland industry, however, require very specific offshore experience, because of its specialized nature. Opportunities for geologists and geophysicists in the offshore industry in Newfoundland, for example, require specific reservoir knowledge from offshore environments. By contrast, in the Western Canadian oil basin the industry would accept more entry-level geologists and those with onshore-only experience.

There is an increasing requirement, however, for very specific training, beyond the capabilities of institutions and much more defined than generic offshore/onshore experience. This is training with a specific company, with a specific type of rig/vessel, or training on specialized equipment, often in addition to formal institutional training. This combination of education, training, certification, experience and skill sets necessary to perform any given job or task is known as ‘competency’ and it has become one of the most critical requirements and issues related to employment in this sector.

The norm in the petroleum industry at present is to assess competency at all levels. Workers must demonstrate a strong understanding of the tasks and meet rigorous competency tests before they are hired or advance in positions. Levels of competency will vary according to job and task, and certain competency levels will require specific functional certification and experience on specific equipment. Undoubtedly, it has become a critical component in determining the acceptability of individuals for offshore employment. This adds another dimension and challenge to preparing people for positions in the offshore oil and gas industry. It goes beyond the capability of education and training institutions and is very company specific, making it a difficult requirement to fulfill and one that is only possible through partnership.
It is a reasonable expectation to find well trained workers in Newfoundland and Labrador: the educational institutions, both public and private, have come a long way in meeting much of the basic demand. It is more difficult to attract skilled workers who have been away to work in Western Canada, Gulf of Mexico or the North Sea, but they do exist. However, the pool of available workers diminishes substantially once the requirements involve another layer of experience: that of a specific company, years of experience on a particular type of equipment, and demonstrated competencies. This produces the kind of gaps evidenced in Category Two, and the most significant challenge for labour market interventions.

As a qualitative measure, there will undoubtedly be debate about how much ‘required experience’ is real and how much is offered as an excuse for the industry to be able to hire in an open marketplace. Yet, if very specific experience and competencies are indeed the norm for this industry, they must be addressed or else the skill gap will continue.

2. Education and Training Capability

The background study on education and training, Petroleum Education and Training Capabilities for the Provincial Post-Secondary Education System, provides an extensive listing of all programs, courses, facilities, and specialty centers with petroleum related capabilities. The listing covers both private and public institutions and provides an exhaustive review of provincial capability to meet the needs of the petroleum industry. The list is impressive, given the young age of the industry in this Province, and the delays in getting the industry established. Indeed, as evident in the list of gaps, there are few areas where the Province does not provide the basic skill training necessary to meet the employment opportunities offered by the industry segment examined in these studies.

In terms of high-end specialty training and education, it is important to note that petroleum, chemical, and corrosion engineering programs are not offered at post-secondary educational institutions in Newfoundland. However, the existing operators do not see this as a major issue. There are some examples of other higher end post-graduate level training tailored to the offshore oil and gas industry such as safety and environmental management.

As a small jurisdiction, however, Newfoundland and Labrador cannot offer all things to all people in regards to its training capacity and capability. A decision on offering training for some of these high-end positions must be weighed against the cost of delivering quality programs in those areas. Specialty engineering programs such as chemical and petroleum engineering are expensive to deliver and public education and training institutions are already facing budget constraints. It is likely that the addition of new, expensive programs, if deemed necessary, may only be possible through partnership with industry.
For example, Memorial University launched a five-year Oil and Gas Development Partnership initiative in September 2000 with the aim to transform Newfoundland and Labrador into an internationally recognized leader in education, training, research and development related to all facets of the oil and gas industry. This initiative will involve the creation of new academic programs, recruitment of new faculty members, establishment of two new facilities (3-D visualization centre and non-destructive evaluation facility), and building on new research projects, outreach programs and strategic industrial partnerships. Specifically, the University is proposing the following new programs:

- Master level for oil and gas studies;
- Master and Doctorate levels for reservoir characterization and engineering;
- Bachelor of Engineering level for oil and gas options;
- Master, doctorate and advanced diploma levels in oil and gas engineering;
- Bachelor, Master and Doctorate levels in petroleum geology
- Advanced diploma level in marine safety

3. Related Training Issues

- Demand Size

It is important to get in perspective the absolute demand for workers in many of the positions involved in the exploration and production phases of the industry. Even in best case scenarios, there is a low requirement for workers in many occupations. This is particularly true for many of the highly skilled positions. For example, even if the Province invested in a program of chemical engineering, it is projected that the oil and gas industry would only require approximately five chemical engineers by 2010. The Province has hundreds of people with the basic skills required to work as wellhead technicians but demand estimates will not exceed approximately seven positions at any time. In contrast, by the year 2010, the industry will require about 100 people engaged in material handling, and about 70 each of cooks and cleaners. But without exception, all the positions involving an advanced level of education and training are only required in small numbers.

- Skill Exportability

The value of a skill is enhanced by its exportability. Given the opportunities that a global petroleum industry provides, it is unrealistic to expect that Newfoundlanders acquire these skills and experience just so they could all remain in the Province. It would therefore be beneficial if they were equipped with skills that could be exported to many other jurisdictions. This is particularly important in this very global industry.

Some positions have higher export value than others. This usually follows higher levels of skill and technical education but there are some exceptions: a competent driller could work around the globe based on experience developed offshore Newfoundland.
• **Cross-Sector Applicability**

Skills that have application to sectors other than just the oil and gas industry bring an added advantage to the worker. It also is an advantage when selling provincial capability to encourage the development of other sectors. This is valid for our education and training programs as well as for our centres of research. For example, the Institute of Marine Dynamics is used for testing yachts racing in the America’s Cup as well as for testing oil rigs. In the area of instrumentation, it also makes eminent sense to train people in this province even though the oil industry demand may be small, since these skills also satisfy demand in the marine/shipping industry, the high-technology sector, aviation and the manufacturing sector.

This does mean, however, that from time to time there will be competition for workers between various large construction and resource development projects. When the prospects for Voisey’s Bay nickel mine and the Lower Churchill power project were all being considered concurrently, there was very real concern about the supply of trained, experienced people to service those projects, in construction and operation phases, as well as increased activity in the petroleum industry.

• **Term of Position**

Some of the positions involved in the industry are long term (e.g. reservoir engineer, geologist); Others are more cyclical and may be of shorter duration and are only in demand for specialty operations on a rig (e.g. mud technicians, well testers). These are very important considerations in making training decisions.

• **Multi-skill Training**

The trend in the petroleum industry is toward employing multi-skilled trades people. An individual must be prepared to diversify his/her skills in several trades to enhance employability. Colleges in the Province are now providing some of these services.
4. Competency Development in the Workplace

Aside from formal training by private and public institutions, workplace training is also occurring within companies for the development of specific competency areas required for certain occupations. This is in keeping with the increased demand for company/equipment specific knowledge. This can be best accomplished through workplace training, i.e. by hiring graduates with basic skills, which can be then tailored to the needs of a particular company, process or system.

Workplace training is akin to the current apprenticeship system in the Province and across Canada for training trades people. An apprentice is someone who has completed an entry-level program in a specific area and has limited amount of practical job related experience. The apprentice will register and be sponsored through a supporting employer, gain work experience and be eligible to write journeyperson examinations after completing the minimum number of hours of extensive training as listed for the particular occupation.

There are no formal competency development programs for the offshore industry in Newfoundland, nor a culture of workplace training as there is in the UK, for example. The current involvement of the petroleum industry in workplace training in Newfoundland is on an ad hoc basis. Some positions with low education requirements, such as drilling equipment operators, are taken on as workplace trainees.

Information Technology graduates, for example, will not have intimate knowledge of the specialized information systems used in this industry or on a specific project, and this has become an obvious workplace training responsibility. On the higher end, the industry has recently begun to recruit graduates in instrumentation, making a commitment to workplace training, after having difficulty finding people with relevant industry experience.

The demand for workplace training is obviously increasing as employers demand more ‘relevant workplace experience’. This will be met somewhat by workers who have worked elsewhere and acquired the right combination of training and experience. But it must be augmented by a commitment by the oil and gas industry to take on graduates and train them in-house, as a longer-term investment. In some cases, there may well be institutional interest in taking some of the basic skill training further with industry partnership. This has already started to happen with ballast control operators, for example, where the Marine Institute has taken on some specialized ballast control training beyond its basic program.
5. Global Demand for Highly Skilled Oil and Gas Occupations

The petroleum industry is active worldwide and many of its workers will work in several different jurisdictions during their careers. This is particularly true of some of the highly skilled positions offshore Newfoundland, such as drilling supervisors and superintendents, where about 80% of the existing pool are foreigners.

This trend is increasing as companies see their workers as part of a global pool that can service a project in any part of the world. In many occupations, workers will move around in response to compensation and career development goals. The consequence is high turnover and increased competition in certain positions in the Newfoundland offshore such as drillers, toolpushers, and offshore installation managers. Expertise in offshore environments in specialty occupations would be valued in several jurisdictions, and workers may well follow projects from the North Sea to Angola to the Gulf of Mexico and to Newfoundland. In addition, there is a global shortage of many of these high-end positions, making it a very competitive field. Process supervisors and operators are other examples of occupations that are in great demand because of a current high activity in exploration and development worldwide.

As a consequence, there are definite difficulties in attracting and keeping technical personnel in Newfoundland and in Canada as a whole. Admittedly, there are some cases of locals who may want to move ‘home’, but even that desire may not overcome other obstacles. The compensation for Canadian workers offshore Newfoundland is often lower on a total ‘all-in’ basis than other international offshore environments. Lifestyle can be a consideration for those not from Newfoundland, or those who are but enjoy the global nature of the business. Some experienced workers are not interested in the routine and extended commute associated with offshore work. The higher Canadian tax environment is another strong general disincentive, and makes it easier to attract foreign workers from Houston or the UK, rather than other Canadian workers.

The global nature of these positions means that there is only so much labour market intervention possible to fill some positions by Newfoundlanders. There is a global pool, and global factors, that determine labour supply in many parts of this industry. But as attractive high-end positions, these may well deserve some increased involvement and intervention to ensure greater participation levels and opportunities by Newfoundlanders.
6. Offshore Environment

There are some occupations where the absolute supply may well be strong but it is difficult to convince candidates to work offshore. Attracting nursing and paramedic staff, for example, has proven difficult for the offshore petroleum industry. Others may be comfortable with a marine environment but not the oil and gas industry. General purpose marine officers, for instance, are trained in abundant supply in this province but they are not always a good fit for the unique working environment of a platform or FPSO, which are stationary 'vessels' that often involves non-traditional marine duties. Therefore, while there may be an adequate supply for some of these positions, other issues create difficulties in finding qualified candidates willing to work offshore.

7. Increased Education Requirements

The oil and gas industry is no different from most traditional industries in that, over time, it has increased the educational requirements for many of its occupations. Increased safety and liability requirements and the increased use of technology, in all jobs in the industry, have prompted a corresponding increase in educational requirements.

Traditionally, some positions, such as drillers and testers, did not require completion of secondary school. This has now changed and, in fact, other positions that could be filled by secondary school graduates are now demanding some type of technical training, diploma, or degree.

8. Information Deficiencies

In obtaining information for the supply study, it became obvious that there is limited information about graduates from Newfoundland and Labrador education institutions. The present tracking system only allows for a one-year follow-up. On the demand side, there was reluctance on the part of some employers to share information about specific employees and basic job requirements. A sense of confidence and trust between key stakeholders is essential to build a better understanding of the dynamics of the petroleum industry labour market. Additionally, our capabilities in tracking graduates must be improved.

In addition to the other limitations identified earlier in this report, the Committee has raised issues related to employment equity (gender, race, etc). However, employment equity was not within the scope of the Demand or Supply Studies and subsequently has not been addressed in this Gap Analysis.
Summary

Although there are several limitations involved in performing a labour market analysis for the oil and gas industry, it does allow for a better understanding of the nature and relationship of supply and demand dynamics for employment opportunities in this industry, and increases our awareness of the issues affecting the labour market.

The studies undertaken for the Petroleum Industry Human Resource Committee (PIHRC), reveal that there is no gap between supply and demand for the majority of employment opportunities offered by the exploration and production activities offshore Newfoundland. Employment in most occupations, as identified in Category Four, is determined by straightforward labour market principles: i.e., there is a steady local supply of skills that meet industry needs and satisfy job requirements. This is particularly true of employment opportunities which demand basic skills, but also includes some higher-end positions, as shown in the list contained in Category Four.

The largest gap occurs in Category Two, i.e., in meeting increased industry requirements for 'relevant work experience'. This challenge results in gaps between supply and demand for certain occupations. The gap, in terms of numbers is small: In no category does the gap exceed ten positions. However, the issue of 'relevant experience' in this industry is significant and it is becoming even more critical as competency has become the watchword for skill attainment and job advancement. Most competencies are gained through on-the-job, specialized work experience.

This very specific training can often elude our graduates and is often not prevalent among workers in such a young oil province. This is important because it involves many of the highly technical skills, those with the most promising export potential, and those with applicability to other sectors. It is also the area of skills and occupation that would benefit most from specific interventions and partnerships between industry, government, and education for specialized training, or 'competency development in the workplace.'

The second most significant gap, Category Three, deals with the difficulty of attracting skilled people to offshore Newfoundland and Labrador. Many factors influence the work location decisions of individuals, including compensation, lifestyle, family preferences, and general tax environment. It also reflects the very global nature of this industry and the high demand for certain skill sets in oil and gas environments around the world. For some of these positions, again often highly skilled occupations, the specialized training required means that the workers have to come from a global ‘reserve’. As a global industry, there are real limits to the effectiveness of interventions to maximize local employment opportunities in the emerging provincial oil and gas sector.

The smallest gap exists for Category One, those occupations where we provide no training at all. They are specialized engineering fields that are not offered through local educational institutions. Although they are high value-added positions, the demand in the oil industry is low, and programs are costly to implement.

In all but these few specialized cases however, the Province’s public and private institutions provide basic education and training skills, and have met the challenges of the industry.

There is a trend toward higher educational and technical requirements, as well as multi-skill training, in order to participate in this industry. These should be further considered by educational institutes, counselors, and policy makers.
## Appendix A: List of PIHRC Membership

(As of December 15, 2000)

<table>
<thead>
<tr>
<th>Name</th>
<th>Organization</th>
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<tbody>
<tr>
<td>Tom Hawco</td>
<td>Human Resources Development Canada (HRDC)</td>
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<tr>
<td>Paul Barnes</td>
<td>Canadian Association of Petroleum Producers (CAPP) and its member companies</td>
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<tr>
<td>Kim Oxford,</td>
<td></td>
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<tr>
<td>Tom Diamond</td>
<td></td>
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<tr>
<td>Glen Gibling</td>
<td>Halliburton Energy Services, NOIA Board Member</td>
</tr>
<tr>
<td>George Osmond</td>
<td>Atlantic Canada Opportunities Agency (ACOA)</td>
</tr>
<tr>
<td>Leslie Galway</td>
<td>Newfoundland and Labrador Ocean Industries Association (NOIA)</td>
</tr>
<tr>
<td>Arthur Leung</td>
<td>Department of Education</td>
</tr>
<tr>
<td>Paul Dinn,</td>
<td>Department of Human Resources and Employment</td>
</tr>
<tr>
<td>Cindie Hussey</td>
<td></td>
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<tr>
<td>Gail Pearcey</td>
<td>Department of Mines and Energy</td>
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<tr>
<td>Adele McNicholas</td>
<td>Baltic Services Inc.</td>
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The Canadian Association of Petroleum Producers (CAPP) represents 170 companies whose activities focus on exploration, development and production of natural gas, natural gas liquids, crude oil, synthetic oil, bitumen and elemental sulphur throughout Canada. CAPP member companies produce approximately 95 per cent of Canada’s natural gas and crude oil. CAPP has opened up offices in both Halifax and St. John’s as a result of increased oil and gas activity in Eastern Canada.

In response to a stated requirement by stakeholders in Nova Scotia and Newfoundland for summary data of total projected demand for human resources and training in a variety of oil and gas related disciplines, CAPP initiated a study to estimate direct oil and gas human resource requirements in both Newfoundland and Nova Scotia. The following is a summary of the study:

Overview and Scope of Study:

- Human resource demand projections cover direct offshore oil and gas industry employment in the exploration and production phases. The study did not address seismic, construction, or project engineering employment demand during the development phase.

- The study included fifty (fifty (50)) employment disciplines as defined by National Occupation Code (NOC) categories. The projections in the report do not account for employment attrition. In addition, the Newfoundland activity scenarios do not account for natural gas development.

Approach:

- A simulation approach was used as a basis for the demand estimates with separate estimates prepared for the Newfoundland and Nova Scotia offshore areas. The projection covers the period 2000-2010.

- A simulation approach was used given there is considerable uncertainty about the nature and timing of future offshore activity.
The simulation is comprised of three (3) activity scenario cases:

- **Base Case:** corresponds to the status quo of fields expected to be in production during the 2000-2010 period based on current knowledge. Similarly, the projection of exploration activity is based on current information such as lease commitments made as of 1999.

- **Case 2: Moderate Activity:** this case adds one or two fields to the Base Case production level, with increased exploration.

- **Case 3: High Activity:** this case adds three or four fields to the Base Case, with increased exploration.

Each activity scenarios described above consists of a specified level of activity expressed in terms of two (2) key human resource demand drivers:

- number of rigs drilling exploration or development wells; and
- number of staffed offshore installations reflecting the number of offshore projects producing oil and gas.

The actual human resource requirements for each case are determined by the full set of components needed to support each activity level, e.g., exploration and development drilling – drilling rig, supply vessels, shore base, helicopters, drilling services and management.

**Main Findings:**

- Moving from the Base Case to the Moderate and High Cases does not result in proportionately higher employment as compared to the 2000 level because of changes in production facility technology (Floating Production, Storage and Offloading Vessel - FPSO vs. Gravity Base Structure - GBS) and because operators are able to take advantage of economies of scale in use of facilities and personnel.

- Total employment is higher in Newfoundland than in Nova Scotia in all three cases. This is explained largely by the differences in technology used, which in turn is linked to differences between oil and gas developments and the scale of the projects in question.

- Most offshore occupations require a mix of formal education, practical training and certification and direct industry experience.
2. Petroleum Education and Training Capabilities Study for the Provincial Post-Secondary Education System

The Provincial Petroleum Education and Training Capability Study Report was initiated in response to one of the three recommendations made in a Petroleum Industry Forum held in February, 1999 with participants from the oil companies, service contractors, local public post-secondary institutions, provincial and federal government departments. The three recommendations lead to the development of three study reports: (1) Labour Demand Study, (2) Current Provincial Petroleum Capability Study and (3) Labour Supply Study. The recommendation for the Petroleum Capability is to review the current provincial education and training programs and center capabilities in the post-secondary education system related to the petroleum industry sector and their linkages with the oil and gas value chain. The oil and gas value chain was obtained from a study report titled "Harnessing the Potential – Atlantic Canada’s Oil and Gas Industry" prepared by Strategic Concepts Inc. and Community Resource Services in January 1999.

The purpose of this Petroleum Capability review report is to provide a detailed review of the current education and training programs in the provincial public and private post-secondary education system which can prepare students for the various entry level employment opportunities in the Petroleum Industry sector. In addition, this report is to review the current specialty training center capabilities in the public and private education system which can enhance, upgrade, certify or re-certify individuals or industry personnel to meet the on-going or specific training needs of the Petroleum Industry sector.

There is one committee and one working group established for the implementation of the Petroleum Capability study report:

• A Petroleum Industry Human Resource Committee (PIHRC) was established in December 1998 with representatives from Human Resource Development Canada (HRDC), Canadian Association of Petroleum Producers (CAPP), Atlantic Canada Opportunity Agency (ACOA), Newfoundland Ocean Industry Association (NOIA), and the provincial government Departments of Education, Human Resource and Employment, and Mines and Energy. The purpose of this committee is to review the employment, training, and other human resource issues related to the Petroleum Industry sector for the next 10 years. This human resource committee is also providing advice in the formulation of the Petroleum Capability study report.

• A working group was established in May 1999 with representatives from Faculty of Engineering & Applied Science, Faculty of Science, Faculty of Medicine and the Marine Institute of Memorial University; School of Engineering Technology and School of Industrial Trades of College of the North Atlantic for providing the program information and center capabilities for each individual faculty or department. The Department of Education is taking the lead in the organization and compilation of this Petroleum Capability review report. The Department is also compiling the program information for the private training institutions and their incorporation in the review report.

By reviewing details of the three reports, it is expected to identify skills that are currently in shortage and needs to be addressed. The skills gap analysis will also require input from industry particularly where the skills gap result from a lack of industry work experience. It should be noted that majority of the education and training programs in the post-secondary education system are preparing graduates for entry level positions within the Petroleum Industry.
Appendix B: Executive Summaries of Background Reports

In summary, the Capability review report consists of the following five Units:

Unit I: Provides background information on the provincial public and private post-secondary education system for meeting the petroleum related education and training needs of the Petroleum Industry sector. It includes the mission statements, profiles of faculties, departments and schools for Memorial University and College of the North Atlantic. It also includes contact information for both the public and private educational institutions.

Unit II: Outlines the Bachelor, Master and Doctorate degree programs for Memorial University’s Faculty of Engineering & Applied Science, Faculty of Science and the Marine Science Programs for Marine Institute that are related to Petroleum disciplines. It also outlines the Technology and Industrial Trades programs for the Marine Institute and College of the North Atlantic, and for the private training institutions that are related to the Petroleum disciplines.

Unit III: Provides a list of short term courses, duration and location of the specialty training centers or campuses that are offering specialized training at the Faculty of Engineering & Applied Science, Faculty of Science, Center for Offshore & Remote Medicine, Center for Marine Simulation, Center for Offshore Safety and Survival, and School of Maritime Studies of Memorial University; the Center for Advanced Technology & Innovation, Manufacturing Technology Center, Petroleum Training Center, School of Engineering Technology and School of Industrial Trades of College of the North Atlantic. It also outlines the specialty training courses available at a couple of the private training institutions.

Unit IV: Provides a list of all the courses for each semester of the program that are provided under Unit II above and are related to the Petroleum Industry sector and currently offered at Memorial University, College of the North Atlantic and the private training institutions.

Unit V: Outlines the provincial capabilities for the university, the public college and the private training institutions in terms of courses/programs and equipment/facilities and their linkages with the Oil and Gas value chain activities through the exploration, development, production and operation phases of the Petroleum development projects. Each institution has its unique program offerings that are relevant to the Petroleum Industry Sector.

It is important to note that the names of the degree, diploma and certificate programs are mostly very general and does not fully correspond to the professional or occupational titles designated by the Petroleum Industry sector. For example, a student graduated with a degree in Earth Science may be applying for work as an entry level Petroleum Geologist, Geophysicist, Geochemist or Seismologist. It is also very important to note that the Petroleum Capability review report only covers technical education and training programs related to Engineering and Applied Science, Earth Science, Offshore & Remote Medicine, Engineering Technology and Industrial Trades. The report does not provide any program information related to Business Administration, Information Technology, Human Resource Management, Catering, Purchasing and Accounting that have employment opportunities with the Petroleum Industry sector since these occupations are not considered as skill shortage areas.
Appendix B: Executive Summaries of Background Reports

- Newfoundland and Labrador’s Offshore Petroleum Industry Supply Study Working Paper

**Background**

The objective of the **Labour Supply Study Working Paper** is to provide estimated labour supply information, including academic qualifications, certification experience, and required competencies for fifty (fifty (50)) direct offshore petroleum related occupations.

The supply study working paper used the same fifty (50) occupational categories generated from the CAPP sponsored report entitled: *Estimation of Direct Human Resource Requirements Offshore Exploration and Production: Newfoundland and Nova Scotia 2000-2010*. By comparing and contrasting estimated labour supply to estimated labour demand, the working paper identified potential supply/demand gaps and issues for further discussion. In addition, the working paper provides general information to employment counselors and post-secondary institution representatives with respect to requirements for new or improved training programs as well as potential current and future employment opportunities within the petroleum sector.

**General Conclusions**

First, there are skills gaps that will be evidenced in the Province simply because the educational institutions do not offer the required training yet the occupations are necessary within the industry. In some cases, the labour demand may be so small that the “gap” does not justify the dedication of resources from our educational institutions. It then becomes an issue for consideration by employers within the industry as to how best to recruit and retain these individuals. Technology transfer and succession planning become the strategies of employers within the industry to address these skills gaps.

In some cases, the Province may very well be capable of training individuals but at graduation they do not possess the appropriate work experience, required industry experience, or offshore experience to be considered for employment. In that case, the Province loses its graduates because they move to positions elsewhere in Canada where they can gain the experience necessary to move to progressively more responsible positions. While the Province is training and graduating potential employees, it finds itself unable to meet labour demand requirements due to out-migration and/or graduates that do not meet the work experience requirements of industry.

A further complication exists once graduates move to positions outside the Province, that is, attracting them back to work in the Province. As a province and as employers within the industry, it is necessary to develop competitive benefits and recruitment strategies to attract qualified individuals particularly Newfoundlanders working outside the Province.
APPENDIX C: SUPPLY /GAP MATRIX

Analysis of Gaps and Issues Related to Labour Supply and Demand in the Offshore Exploration and Production of the Petroleum Industry Offshore Newfoundland

(Occupations that fall in only one category are in Italics)

1. Obvious training gaps.
   - Petroleum Engineer
   - Geological Engineer
   - Chemical Engineer
   - Materials Engineer
   - Asset Integrity Management (non-intrusive engineering)

2. Trained labour pool but insufficient work experience.
   - Geologist
   - Geophysicist
   - Petroleum Engineer
   - Geological Engineer
   - Drillers & Testers
   - Crane Operator
   - Dynamic Positioning Officer
   - Engine Room Crew (Marine)
   - Process Supervisors
   - Process Operators
   - Instrumentation Technicians
   - Ballast Control Operators
   - Mechanical Engineer
   - Electrical Engineers
   - IT Support Service
   - Marine Officers (Master Mariners)

3. Trained and experienced labour pool but difficult to attract to and retain in Newfoundland and Labrador.
   - Geologist
   - Geophysicist
   - Petroleum Engineer
   - Geological Engineer
   - Drilling Superintendent / Drilling Supervisors
   - Drillers & Testers
   - Process Supervisors
   - Process Operators
   - Mechanical Engineer
   - Electrical Engineer
   - Marine Officers (Master Mariners)

4. No gaps or obvious issues.
   - Geological Technologist
   - Drilling Equipment Operator
   - Floorman / Roustabout
   - Wellhead Technicians
   - Deck Crew
   - Marine Officers
   - Helicopter Pilot
- Helicopter Mechanic
- Refueller
- Maintenance Trades
- Maintenance Supervisors
- Mechanic
- Materials Handling
- Motor Operator
- Medic
- Radio Operator
- Ice / Weather Observer
- Food Service Supervisor
- Cook
- Catering Staff
- Cleaner
- Structural Engineer
- General Management
- Human Resources Management Staff / Specialist / Advisors
- Purchasing / Supply Chain Staff
- Business Services Management
- Safety-Environment Management Staff / (Advisors)
- Information Systems Management Staff (Advisors)
- Auditor-Accountant
- Administrative Assistants
- Material Management / Logistics
- Accounting Staff