Strait of Canso & Sydney Harbour Offshore Positioning Strategy

Prepared for:

Cape Breton Growth Fund
Task Force for the Development of the Oil & Gas Sector

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SUMMARY

1. MAIN FINDINGS

This report sets out a development strategy for Sydney Harbour and the Strait of Canso (the Study Area) aimed at maximizing the economic benefits from offshore oil and gas activity. The need for a strategy finds its rationale in the belief that the Study Area can achieve a higher level of involvement in future activity than it did in the past. The relatively low level of past involvement is attributable to several factors, including industry structure in the Study Area (geared towards traditional resource sectors), poor investment climate (due to slow pace of offshore development), and a weak policy environment.

Offshore exploration and development requires a wide range of goods and services. Each of these represents an opportunity for suppliers. Differences in the characteristics of these goods and services – how they are produced and how the offshore acquires them – coupled with the uncertain nature of the offshore sector itself, mean that some opportunities are inherently more attractive than others from the perspective of organizations wishing to enter the supply industry.

For the Study Area, the more attractive opportunities are supply base, fabrication yard, education and downstream industries (including petrochemicals). Table S-1 summarizes the relative attractiveness of opportunities under alternative levels of offshore activity. Whether an opportunity is judged to be weak, moderate or strong depends on such factors as the level and predictability of demand, the nature and size of the various barriers to entering the industry, the competitive environment, and the effectiveness of supplier development action taken by the offshore sector.

Table S-1
Ranking of Offshore Prospects for the Study Area (2002-2011)

	Low Case	Medium Case	High Case
Exploration wells			
Northeast of Sable	6	29	63
Southwest of Sable	38	89	138
Projects			
Northeast of Sable	1	3	6
Southwest of Sable*	5	7	10
Drilling rig contractor	weak	weak	weak
Supply base	moderate	strong	strong
Drilling services	weak	weak	moderate
Supply vessel	weak	weak	moderate
Fabrication	weak	moderate	strong
Offshore construction	weak	weak	weak
Onshore construction	weak	moderate	moderate
Education/training	moderate	moderate	strong
Petrochemical/other	weak	moderate	strong

*Including SOEP Tier 2 and Deep Panuke.

2. RECOMMENDATIONS

Policy

As a first step in its offshore strategy, a Study Area offshore trade association should send an urgent message to the Government of Nova Scotia that the benefits of offshore development are largely passing the province by. The message should highlight a few key points:

- The current policy regime is inadequate generally, and particularly as it pertains to the regional distribution of benefits. The current policy encourages offshore companies to assess local supply capability by looking back to see what has been done, rather than by looking ahead to see what is possible.

- *If* governments wish to see the development of an offshore supply capability in Nova Scotia, and *if* they wish to see a regional distribution of benefits, then policy and strategy must be implemented that give real meaning to the concept of full and fair opportunity to compete. *If* the resource is to be developed for the benefit of its owners – the people of Canada including Nova Scotia – then projects should be designed to achieve, not circumvent, this objective.

Supply Base

The CBGF should give careful consideration to supporting the development of a supply base in the Study Area to meet anticipated requirements arising from exploration northeast of Sable Island. A supply base becomes an increasingly attractive prospect as offshore activity intensifies.

Mulgrave is the preferred location in the short term because it meets all key site criteria. Sydport and the Sydney Marine Terminal meet most basic criteria, and cannot be ruled out as short-term prospects, particularly if exploration goes forward in Sydney Bight. Should the level of offshore activity in the future warrant more and larger supply base facilities, consideration could be given to developing a facility at Bear Head or the Melford Land Reserve.

In order of priority, the main infrastructure and service requirements for Mulgrave are:

- Office
- Warehouse
- Increased water main capacity;
- Silo storage for bulk commodities (e.g., cement, mud);
- Tank storage for fuel.

Support from the Growth Fund should be conditional on:

- The submission to the Growth Fund of a formal business plan to develop the site to industry standards (this may be done by the Strait of Canso Superport Corporation or a supply base operator).

- Tangible evidence of a commitment to the initiative in the form of an equity contribution to an agreed set of expenditures.
- A letter of support for the proposal from the Strait of Canso Superport Corporation as owner of the wharf facilities.

Fabrication Yard

The CBGF should support the development of a fabrication yard in the Sydport Marine Industrial Park. Fabrication of structures and components represents a major share of offshore requirements for which there is limited supply capacity in Nova Scotia.

Sydport is the preferred location in the short term because it meets key site criteria, is available for immediate development, and the yard has the backing of an investment group. Should the level of offshore activity in the future warrant larger fabrication facilities, consideration could be given to supporting the development a yard at Bear Head or the Melford Land Reserve.

In order of priority, the main infrastructure and service requirements for the Sydport site are:

- Wharf up-grading to meet load bearing and load-out requirements
- Site improvements for assembly and laydown areas
- Extension of rail access to laydown area
- Construction of fabrication hall(s) and shops
- Construction of offices and warehouse

In addition, in order to pre-qualify as a bidder on offshore fabrication contracts, the yard must secure all necessary certifications (HSE, ISO, welding standards). To enhance their prospects for success, the proponents of the yard should involve an experienced offshore fabrication company as an active joint venture partner.

Support from the Growth Fund should be conditional on:

- The submission to the Growth Fund of a formal business plan by the yard operating company to develop and operate the site to industry standards;
- A feasibility study setting out detailed yard development costs and pro forma revenues;
- A commitment to the development by the yard operating company in the form of an equity contribution to an agreed set of expenditures;
- A memorandum of understanding or joint venture agreement between the Laurentian Group (or other operating entity) and an internationally recognized offshore fabrication company; and,
- Completion of commitments by the Laurentian Group under the Sydport Purchase and Sale Agreement.

Downstream Opportunities

The CBGF should provide support to advance the development of downstream opportunities. Each of the opportunities identified in this report requires access to natural gas or natural gas liquids. Each also requires access to suitable sites. To further the development of these opportunities, three strategic initiatives should be carried out:

- Policy development – representations should be made to the provincial government that offshore policy, and any agreements entered into pursuant to development plans and production licences, must include commitments by producers to supply ethane and other natural gas liquids for downstream uses.
- Port Master Plan – a plan should be developed for the Strait of Canso so that sites for potential downstream opportunities can be clearly identified and set aside. This will provide assurance that all land use options are identified and priorities specified so that potential downstream opportunities are not foreclosed.
- Selected studies – consideration should be given to supporting studies needed to further define opportunities and advance specific proposals for the Study Area.

Education

Suitable education programs are vital for ensuring residents of the Study Area are prepared for offshore employment opportunities. These programs also represent an export opportunity in so far as they attract students from outside the Area. Developing and mounting these programs requires sound planning, qualified staff and suitable facilities. An important area for potential CBGF support would be in the form of assistance for laboratory facilities and teaching equipment (e.g., simulators). Specific opportunities for support should be determined through discussions between the CBGF and individual institutions.

Co-operation and Strategic Planning

Stakeholders in the Study Area recognize the need to plan and market the regions' assets co-operatively, rather than competitively. They express considerable frustration, not just at the lack of a co-ordinated effort to secure offshore benefits, but at how wasteful and counterproductive the current approach is that pits one region against another. They recognize that offshore activity can play a potentially important role in generating economic growth, and that increased economic activity in one region permeates the whole economy, thereby benefiting all regions.

In the interests of efficiency and effectiveness, stakeholders should create a single organization to assist with marketing assets in the Study Area to the offshore sector. This regional organization (e.g., a Study-Area offshore trade association) would complement, not duplicate, development and marketing initiatives conducted by individual private sector operators of such facilities as supply bases and fabrication yards. It could also assist the private sector by identifying offshore opportunities and recommending strategic public sector investments.

Targeted marketing initiatives aimed at supply and service companies that support exploration and fabrication should form a central thrust of the strategic plan. Efforts to identify prospects could begin immediately, starting with the list set out in Table 17. Marketing the areas in advance of development of facilities and award of contracts is recommended in order to ensure that prospective suppliers are aware of the range of opportunities and location possibilities. This initiative should be accompanied by an assessment of companies' interest in order to determine their decision criteria and to identify any infrastructure requirements.

I.

OVERVIEW

1. BACKGROUND

Offshore oil and gas exploration and development activity in Nova Scotia waters has centered on the area around Sable Island for 35 years. Virtually all onshore activity supporting the 150 or so exploration programs and the two development projects (so far) has occurred in the Halifax-Dartmouth area. This includes operator offices, engineering and management, supply bases, outfitting and fabrication, and the support services these activities require.

Industry and institutions based in the CBRM and the Strait of Canso area (the Study Area) have had limited involvement in offshore activity to date. There are several related reasons for this. The pace of development has been slow, offering little promise of the kind of sustained activity needed to spur investment. The structure of the local economy is geared more toward meeting the needs of traditional resource industries. Federal and provincial offshore development policy embodies a fairly passive approach, leaving it to the offshore companies to determine how much or how little they will involve the provincial (and regional) supply community. Halifax, with its services and amenities, emerged as the centre of offshore activity in the late 1960s, and has strengthened this position over the years.

Nonetheless, as opportunities have emerged, local suppliers and facilities have responded with some success. For example, the port of Mulgrave served as a supply base for two drilling programs in the 1970s and 1980s, and a fabrication shop in the area has an enviable track record in meeting offshore needs. Also, construction of facilities for the Sable Offshore Energy Project (SOEP) in the Strait of Canso area during the late 1990s drew on local contractors and the area workforce.

Offshore exploration is entering a new phase. New companies are taking an interest in offshore potential in new areas, including the deep water on the edge of the Scotian Shelf (eg, off Banquereau Bank), and the Laurentian Sub-Basin off Cape Breton. This shift in location to the northeast provides considerable impetus for re-thinking some of the established patterns of onshore support and goods and services supply. The proximity of excellent all-weather harbours and port facilities on Cape Breton provides scope for optimism that Island industry, infrastructure and institutions could have a major role to play in future exploration and development activities.

The exploration licences held by Corridor Resources (west coast of Cape Breton) and Hunt Oil (Sydney Bight) are two of the more promising sources of opportunity for suppliers in the Study Area. How soon seismic work and drilling may begin in these areas is not known. The fishing industry and environmentalists have raised concerns about the potential effects of seismic activity on fish stocks. These concerns were the subject of a public enquiry conducted in 2001-02.

The report of the Public Review Commission (PRC) was submitted to the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) and the provincial and federal ministers responsible at the end of March 2002. The Commissioner does not recommend a moratorium on exploration activity – indeed she goes out of her way to point out that it is not within her mandate to advise whether or not exploration activities should proceed. This is up to the CNSOPB. The Commissioner's recommendations are directed towards how the CNSOPB should carry out its review. She recommends that:

- resources should be convened to address the various knowledge gaps about the marine environment in the southern Gulf of St. Lawrence; and,

- the consultative system applicable to the review of exploration programs be broadened so that the advice of a cross-section of interests can be considered in deciding whether proposed activities should proceed, and any specific measures that should be taken in the event approval is given.

It remains to be seen whether the CNSOPB and Ministers will accept these recommendations. If they do, it is not clear how long it will take for the expanded review process to reach a conclusion. Of course, it is also not clear what the outcome will be.

2. PURPOSE AND OBJECTIVES

The Cape Breton Growth Fund (CBGF) has established a Task Force to examine the potential that offshore exploration and development may hold for Cape Breton, and how the Island should prepare itself to maximize the economic benefits from this potential. A clear sense of the opportunities is needed. A widely accepted strategy – a master plan – for capitalizing on opportunities is also needed. This study is a response to these needs.

The Terms of Reference sets out three main objectives for the study:

- Clearly define a critical path for economic growth in the Cape Breton Regional Municipality and the Strait of Canso ("the Regions") as it applies to potential developments arising from oil and gas exploration and development;

- Provide an analysis of the top prospects for economic growth; and,

- Provide an analysis of the infrastructure and services needed to accommodate future growth in each of the Regions.

3. APPROACH

Meeting the study objectives requires a systematic approach composed of five related activities.

- In order to identify potential growth opportunities for the Regions, we first develop a set of low, medium and high offshore exploration and development cases. These cases determine – for study purposes – the nature and extent of the offshore requirements over the next ten years. Requirements are specified at a general level: drilling rigs and support services, supply base and logistical support, engineering, fabrication, pipeline installation, operations management, and downstream opportunities such as petrochemical production. Requirements likely to provide good prospects as Regional opportunities are identified.

- Once offshore requirements are specified, we assess and rank the capacity of each Region to respond to these needs in the short and longer terms. Capacity is assessed in terms of basic site criteria, industrial capability and interest, available infrastructure and services, and institutional support. As part of this assessment, we identify sites within Regions that may be better suited than others to meet certain types of opportunities.

- With opportunities and capacity to respond assessed, we next identify any gaps in infrastructure, services and education in relation to highly rated Regional opportunities. How these gaps could be addressed to encourage sustainable economic development is described.

- We also quantify the impact on the Cape Breton economy of offshore oil and gas developments over the past decade. This analysis captures the two offshore projects (Cohasset/Panuke and Sable), on-going exploration, as well as the Maritimes & Northeast Pipeline. Reasons for the actual level of involvement and resulting economic impact are explored and strategies for the future are set out.

- The final step is to integrate the outputs of these activities and define a strategy – vision and critical path – that maximizes the potential for economic growth. Creation of this strategy is aided by the results of an offshore workshop held two-thirds of the way through the study. Involving stakeholders from the Regions, the workshop reached a broad consensus on the preferred sites for specific offshore opportunities. The strategy reflects this consensus and incorporates an approach and framework for joint development and marketing of the ports at the Strait of Canso and Sydney.

4. CAVEATS

The reader should understand clearly that this study, by its very nature, proceeds from a position of considerable uncertainty. As such, the study can be characterized as one that both asks and responds to the question "What if…?". The analysis, conclusions and recommendations incorporate this uncertainty at every stage:

- **Offshore requirements**: these requirements will become real only if the exploration and development cases occur more or less as they are presented. It follows that the opportunities these requirements represent for Cape Breton are conditional. They depend on: exploration programs actually going forward as indicated (location and timing) in the cases; a success rate at least as great as the historical experience on the Scotian Shelf; and, the use of conventional steel jacket/topsides technology for field development.

- **Competitive environmen**t: Competing for offshore contracts is difficult and costly. Prospective suppliers in Cape Breton face two major hurdles. Those interested in competing for supply base contracts face a well-developed and entrenched capability in the Halifax area. Breaking into this market will be a challenge. Prospective fabrication contractors also face challenges. This begins with developing sufficient experience to gain placement on a bid list, and extends to competing on a "best value" basis with international suppliers. The results of the bidding process for the first stage of SOEI's Tier 2 (Alma Project), where virtually all the fabrication work was awarded to yards in the U.S. and Europe, reveal how great the challenges are even for established fabricators in Nova Scotia. This is reinforced by the approach taken by PanCanadian for its Deep Panuke project, which limits *by design* the amount of work available to contractors in the province.

- **Policy environment**: The recently released Nova Scotia Energy Strategy, *Seizing the Opportunity*, contains a supportive statement of principle regarding provincial involvement in offshore projects:

  > "Nova Scotians should be the primary beneficiaries of the industrial benefits and revenues generated by the province's energy resources. These benefits should be distributed as widely as possible throughout the province."

  The vehicle for implementing this principle is a device called the *Offshore Strategic Energy Agreement*. Such agreements will be entered into voluntarily between project proponents and the province. How, and *how well*, these proposed agreements will work on future projects is uncertain. But what is clear to many industry observers and prospective suppliers is how poorly the existing Canada and Nova Scotia benefits approach has served the provincial supply community in the past.

The Deep Panuke and SOEP Tier 2 projects will provide the first test of this new approach. In its Development Plan Application for Deep Panuke, PanCanadian estimates that Nova Scotia content could reach about 18% of total expenditures. This estimate is based on a project design that effectively precludes involvement of Nova Scotia industry due to its capacity/capability constraints. In negotiating the *Offshore Strategic Energy Agreement* with PanCanadian, the provincial government would appear to have little option but to convince PanCanadian to modify its design in order to generate an acceptable level of Nova Scotia participation.

The *Canada-Nova Scotia Accord Act* which governs offshore exploration and development stipulates that Nova Scotia industry must be given a "…full and fair opportunity" to compete for contracts. The Act does not stipulate what "full and fair" means. But to apply this test only *after* a project is designed would seem to side-step the spirit of the legislation. To have real meaning for Nova Scotia suppliers, the full and fair test should be applied to a project from its inception. Looked at another way, it is not clear what is full and fair about designing project components that only yards (often subsidized) in Europe or Southeast Asia have the opportunity to build.

II.

OFFSHORE CASES AND ACTIVITIES

1. PERSPECTIVE

The first 35 years

In the 35 years of exploration in the Nova Scotia offshore area, the petroleum industry has acquired several hundred thousand km of seismic data and has drilled some 140 exploration/delineation wells (Table 1). Drilling activity has varied in intensity over the years, with success the main driver in the number of exploratory wells drilled. Of the 72 wells drilled during the late 1960s and 1970s, eight resulted in Significant Discoveries.

This success, when combined with incentives under the *National Energy Policy*, provided the impetus for another 52 exploration wells in the 1980s. These resulted in a further 14 Significant Discoveries. Most of these are relatively small, yet potentially economic, gas fields. Exploration activity during the 1990s was relatively light, with six wells drilled. One of these is the Deep Panuke discovery well. Activity during the 1990s was dominated by field development, with a total of 39 wells drilled for the Cohasset/Panuke (27) and Sable (12) projects.

Table 1
Exploration Activity on the Scotian Shelf, 1967-1999

Years	Wells Drilled				Significant Discoveries
	Exploration	Delineation	Development	Total	
1960-1969	3	-	-	3	1
1970-1979	56	13	-	69	7
1980-1989	39	13	-	52	14
1990-1999	6	-	39	45	-
2000-2001	8	3	2	13	-
Total	112	29	41	182	22

Source: CNSOPB

The significant discoveries (including Deep Panuke) contain estimated recoverable reserves of just over 7 trillion cubic feet (TCF) of natural gas, and 220 million barrels of oil and condensate. The Geological Survey of Canada (GSC, 1989) estimates these discoveries represent just under 40% of the gas reserves (18 TCF) and 20% of the oil reserves (1.1 billion barrels) predicted to exist in Nova Scotia's offshore area. Recoverable reserves in the Laurentian Sub-basin are estimated at 8-9 TCF.

These significant discoveries have so far resulted in two offshore development projects, with a third in the planning stage.

- **Cohasset/Panuke** – a relatively small oil project – was the first offshore development on Canada's east coast. The discovery well was drilled in the early 1980s. Production began in 1992 and ended in 1999, with the field producing about 45 million barrels of light oil.

- **Sable Offshore Energy Project (SOEP)** – a multi-field natural gas development – is Nova Scotia's first major offshore project. SOEP incorporates six of the 22 significant discoveries, with a total of just over 3.0 trillion cubic feet (TCF) of gas. Production began in late 1999.

- **Deep Panuke**, located some 65 km to the southwest of Sable Island, is in the planning stage. The Development Plan Application was filed on March 1, 2002. The field is estimated to hold about 1 TCF of natural gas and will produce at an average daily rate of 400 MMcf. The project consists of three platforms (production, wellhead and accommodation), with gas transported to shore by a pipeline running more or less parallel to the SOEP pipeline. It will hook up with the Maritimes and Northeast Pipeline at the landfall near Goldboro. With gas processed offshore, there is no need for an onshore gas plant.

Looking ahead

Until 2000, offshore exploration had focussed almost exclusively on prospects on the Scotian Shelf. Offshore exploration is now entering a new phase. Though exploration and production continues on the Scotian Shelf, the search is moving to deeper water at the edge of the shelf and into the Laurentian Sub-basin. Current ELs are shown on the map in Figure 1.

Considerable quantities of natural gas and oil are at stake. The GSC estimates that over 18 TCF of gas and 1.1 billion barrels of oil lie under the Scotian Shelf. About 3.0 TCF are tied into SOEP. The other Significant Discovery Licences also account for about 3.0 TCF. Deep Panuke accounts for an estimated 1 TCF. This means that some 11 TCF remain to be found (assuming the GSC estimate is correct).

The Scotian Shelf and adjacent regions in the 400,000 km^2 Nova Scotia Offshore Area hold six other promising geological areas.

- **Laurentian Sub-basin**: this area to the east of Cape Breton contains some 300 promising structures based on seismic analysis, but no wells have yet been drilled. Characteristics are similar to the Sable Sub-basin. The GSC estimates 8-9 TCF of gas reserves and 600-700 MMbl of oil in the area. What proportion of this area might fall within the jurisdiction of the CNSOPB had been the subject of an on-going dispute between Nova Scotia and

Newfoundland. The boundary drawn by the tribunal established to resolve the dispute leaves most of the sub-basin (and the Exxon-Mobil acreage) on Newfoundland side of the line. This diminishes the jurisdiction of the CNSOPB. It also reduces the influence Nova Scotia may have had over any exploration and development work that may occur in the area. The new boundary is shown in Figure 1.

- **Sydney Basin**: two wells drilled in this area discovered shallow gas bearing sands. The structural characteristics suggest the basin could contain many other gas plays. That the area contains extensive and thick coal reserves provides encouragement that gas reservoirs may be discovered. Hunt Oil holds exploration licences for two blocks in the area. Exploration activity is held up pending the outcome of hearings into environmental effects.

- **Georges Bank**: is similar geologically to the Sable sub-basin. Resource estimates are 5.3 TCF of gas and 1 MMbbl of oil. A moratorium on exploration has prevented drilling, so the potential is unknown. In 2000, the federal and provincial ministers of natural resources extended the moratorium to 2010.

- **Fundy and Shelburne Basins**: these areas are considered prospective for hydrocarbons. They contain thick sediments, but only a few wells have been drilled to evaluate them.

- **Abenaki Carbonate Bank**: this extensive structure running along the edge of the Scotian Shelf to the southwest of Sable Island has been lightly explored. COPAN produced from only a small part of this structure. Three other plays have been explored and found to contain uneconomic hydrocarbon reserves.

- **Deeper reservoirs and deep water slope**: there is possible potential in the Scotian Basin in the deeper structures lying under the SOEP fields. These structures await further definition. Similarly, there may be potential in the areas seaward of the Scotian Shelf slope in waters exceeding 2000 m depth. These areas are likely to be explored over the next 5-10 years under exploration licences issued in the past 2-3 years. Marathon Canada is drilling the first deepwater well (Annapolis B-24 in 1750 m of water) some 70 km south of Sable Island.

Since 1996, the Canada-Nova Scotia Offshore Petroleum Board has issued 59 exploration licences (ELs), including nine late in 2001. In addition to expanding the area of interest around Sable Island, these new ELs open up virtually the entire slope of the Scotian Shelf to exploration (see map on the following page). The total value of work committed under the licences is just over $1.5 billion. Seventeen of the licences represent clear commitments to drill exploratory wells (with a total value of $1.1 billion). Several wells have been drilled pursuant to these ELs, with only one so far in deep water (Annapolis B-24). Twelve of these commitments and the remaining 42 licences represent commitments to at least conduct seismic surveys, with the possibility of subsequent exploratory drilling.

Map here

Each EL covers a period of nine years, divided into five and four year periods. Work should be completed within the first five years (Period 1), though under certain circumstances a sixth year will be allowed to complete work provided it is started in the fifth year and continues with due diligence. Period 2 is available essentially to allow the operator time to assess results and declare a Significant Discovery if warranted. At the end of nine years the land reverts to the Crown if a Significant Discovery is not declared.

2. EXPLORATION AND DEVELOPMENT CASES

Rationale for a case approach

Opportunities for Cape Breton industry and institutions to participate in offshore oil and gas activity depend on the nature, extent and location of offshore requirements. Taking advantage of opportunities requires that industry and institutions have the capacity to respond to needs in a timely and competitive manner. The challenge facing prospective suppliers lies in the impossibility of predicting offshore needs with confidence. The options are to wait and see, or to try to anticipate needs. Waiting and seeing guarantees the opportunities will pass by. Anticipating needs allows suppliers to assess their own capacity to respond, and to take the necessary steps to position themselves to be responsive when needs actually arise.

Developing a set of offshore exploration and development cases is a necessary first step in identifying needs. This approach does not provide certainty that the needs will actually arise, but it at least provides insight into the nature and extent of needs under different assumptions about the scale and location of offshore activity.

In specifying offshore needs and how these translate into opportunities it makes sense to divide activity into three phases: exploration, development and production. For planning purposes it also makes sense to work with different levels of activity in order to assess the sensitivity of opportunity to different levels of demand.

Low, medium and high cases

For purposes of this analysis low, medium and high cases are formulated. These cases are consistent with plausible levels of activity, where the low case is based on current exploration commitments on the Scotian Shelf. The medium and high cases build from there. In each case, on-going exploration and development are based on reasonable assumptions about finding rates and demand for natural gas in the U.S.

Each case is divided into two geographic areas, Northeast of Sable and Southwest of Sable. This distinction is made because proximity to the offshore lands being explored or developed confers certain advantages on adjacent onshore areas, particularly with respect to the location of supply bases. “Northeast of Sable” refers to the area lying to the northeast of an imaginary line drawn from the Gully to Canso in Guysborough County. It includes Banquereau Bank and the slope seaward of the Bank, Sydney Bight and the

Laurentian Channel. "Southwest of Sable" refers to the area lying to the southwest of the Gully-Canso line, including the area of intense exploration around Sable Island.

- **Low Case:** this case is based on the assumption that work commitments under current ELs represent the minimum level of activity that is likely to occur. We assume that the exploration activity results in one project to the Northeast of Sable, and three new projects (ie, in addition to Deep Panuke and SOEP Tier 2) to the Southwest.

- **Medium Case**: this case assumes a greater number of exploration wells than the low case resulting in proportionately more discoveries. Three projects are developed Northeast of Sable (two on the shelf and one on the slope) and five Southwest of Sable (three on the shelf and two on the slope) in addition to SOEP Tier 2 and Deep Panuke. All projects are natural gas projects.

- **High Case**: this case assumes a greater number of exploration wells than the medium case resulting in more significant discoveries. Six projects are developed Northeast of Sable (three on the shelf and three on the slope) and eight Southwest of Sable (five on the shelf and three on the slope) in addition to SOEP Tier 2 and Deep Panuke. One deep slope project is light oil, and the others are natural gas.

Details of these cases are set out in Appendix A.

Basic information from Appendix A concerning the number of wells, projects and major offshore requirements for each Case is summarized in Table 2. "Exploration well" indicates the number of wells drilled each year. "Project" refers to the number of offshore projects in development (including delineation and regulatory approval) and/or production each year. "Supply base" indicates the number of bases likely to be required each year. These bases are multi-user and would support drilling, development and operations. "Fabrication" refers to the annual requirement for major components such as decks (topside facilities) and jackets (support structures).

Among the key assumptions:

- A moratorium on seismic work and exploration drilling is not imposed for the waters around Cape Breton. This assumption is consistent with the outcome of the CNSOPB Public Review process. The timing of any seismic work and drilling activity is uncertain, though by assumption, it is expected by 2004/05.

- Under any case, 2005 is the earliest that exploration drilling would take place in Sydney Bight or off the west coast of Cape Breton. This is because it is expected to take at least 2 years after the PRC decision to complete additional studies and the review process, conduct seismic work, interpret the data, decide on a drilling target, and mobilize a rig to carry out the work.

- Under any case, 2004 is likely to be the earliest that exploration drilling would take place in the Laurentian Sub-basin. Now that the tribunal has rendered its decision on the Nova Scotia-Newfoundland boundary, it is expected to take at least 2 years to conduct seismic work, interpret the data, decide on a drilling target, and mobilize a rig to carry out the work. But it could be many more years because it is not clear when or if Exxon-Mobil (or any successor EL holder) would carry out activity in this area. The extent to which the Study Area would benefit from any future activity is also uncertain, given that most of the sub-basin now falls within Newfoundland jurisdiction. As a practical matter, though, the Area offers the advantage of shorter supply lines (and probably lower costs) to support drilling activity. How important this factor is in determining supply base location (for example) remains to be seen.

- For conventional fields on the Scotian Shelf, it would typically take four years from discovery to production to complete delineation drilling, meet regulatory requirements, and carry out project development. For deep-water fields on the slope, the overall project schedule from discovery to production is assumed to be six years due to complexities of working in this environment.

- No attempt is made to guess where drilling activity Northeast of Sable would occur, other than to assume a certain number of wells would be drilled either on the shelf or slope. Each drilling program requires shore-based support (the Low and Medium Cases assume two bases are required, while the High Case assumes three). This does not necessarily mean two or three separate facilities are needed. Rather, it means that two or three programs need the service. In practice, a single multi-user base could support several programs, with operators sharing logistical support (supply vessels and helicopters).

- Fabrication requirements depend on the number of fields tied into each project. The number of fields varies from one to three as indicated by the number of discoveries associated with each project in Figures 1-6. Each shelf field is assumed to require a production platform – steel jacket and topside facilities – plus a single accommodation platform for the project (for example, SOEP Tier 1 consists of four platforms – one at each of three fields, plus an accommodation platform). It is possible that remote fields could be tied in with sub-sea completions, thereby altering the fabrication assumptions. But this is ruled out on the basis of economics since simple wellhead jackets are relatively inexpensive to build. Each slope project requires a single production facility, with remote fields developed with sub-sea completions tied into the facility by inter-field flow lines. The number of major structures fabricated each year is shown under Development in the bottom half of each Figure. Under the Low, Medium and High Cases, only SOEP Tier 2 and Deep Panuke generate fabrication requirements up to 2005. Thereafter, new projects create increasing demands over time under successive Cases.

Table 2: Offshore Activity and Requirements

LOW CASE	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Northeast of Sable										
Exploration well				2	3	1				
Project								1	1	1
Supply base				2	2	1	1	1	1	1
Fabrication (major structures)									2	2
Southwest of Sable										
Exploration well	7	5	4	3	3	2	4	5	3	2
Project	1	2	2	3	3	4	4	4	5	5
Supply base	3	2	2	2	2	3	3	3	3	3
Fabrication (major structures)	2	6	8	2		6	6	6	2	2
Petrochemical										
Production (mmcf/day)			400	400	400	400	400	800	800	800

MEDIUM CASE	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Northeast of Sable*										
Exploration well			4	6	6	5	3	2	2	2
Project						1	1	2	2	3
Supply base			2	2	2	2	2	2	2	2
Fabrication (major structures)						6	6	6	4	4
Southwest of Sable										
Exploration well	8	9	9	9	9	9	9	9	9	9
Project	1	2	2	3	4	5	5	6	7	7
Supply base	3	3	3	3	3	3	3	3	3	3
Fabrication (major structures)	2	6	8	2	6	6	8	10	10	8
Petrochemical								P	P	P
Production (mmcf/day)			400	400	400	400	800	1,200	1,800	2,200

HIGH CASE	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Northeast of Sable										
Exploration well			4	6	8	9	9	9	9	9
Project				2	2	2	4	4	5	6
Supply base			2	2	2	3	3	3	3	3
Fabrication (major structures)						6	6	10	4	12
Southwest of Sable										
Exploration well	8	12	14	14	15	15	15	15	15	15
Project	1	4	4	5	6	7	7	8	9	10
Supply base	3	4	4	4	4	4	4	5	5	5
Fabrication (major structures)	2	6	8	2	10	10	12	12	12	12
Petrochemical								P	P	P
Production (mmcf/day)			400	400	400	800	800	2,200	2,200	3,200

*Including SOEP Tier 2 and Deep Panuke

- Stand-alone Scotian Shelf projects are assumed to require a minimum of 400 MMcf/day to be considered economic (smaller fields would be economic if tied into existing infrastructure). Slope projects are assumed to be economic at 600 MMcf/day (this is little more than a guess – until more work is done to assess deep water development options, making reliable estimates of field economics will not be possible). Under the Low Case, total production (northeast and southwest of Sable combined) reaches 800 MMcf/day by 2011. This is based on two fields (in addition to current production of about 500 MMcf/day from SOEP). The Medium Case reaches 2,200 MMcf/day (five fields), while the High Case reaches 3,200 MMcf/day (seven fields) by 2011.

- The potential for petrochemical production depends on several factors. Chief among these is the availability of sufficient quantities of competitively priced feedstock. Land area and access suitable marine transportation facilities are also key factors. The Strait of Canso and the Goldboro area meet the locational criteria.

  The use of Scotian Shelf gas for petrochemical production has been (and continues to be) studied, with a complex linked to ethylene production considered the best prospect. An annual capacity of 500,000 tonnes is considered the minimum for international competitiveness, with plant economics improving as capacity increases. A 500,000 tonne plant would require about 650,000 t of ethane feedstock (or equivalent quantities of ethane, propane and butane). The recoverable ethane from SOEP and Deep Panuke combined would meet about 75% of this requirement. Importing propane and butane could make up the gap in feedstock requirements, though this adds to cost and project complexity. Nonetheless, this approach holds potential and is under consideration by private interests.

  Required ethane quantities become possible in the second half of the decade under the Medium and High Cases assuming: a) the gas contains sufficient ethane; b) that a sufficient share of the volumes of gas assumed in these cases lands at a common point (e.g., Goldboro); and, c) the ethane can be purchased at an internationally competitive price.

  It is worth noting that an offshore pipeline to the U.S. has been proposed and is under consideration. It would take gas directly from offshore production facilities to the U.S., with a landfall (and gas plant) somewhere in southwest Nova Scotia. If built, it could have a negative effect on petrochemical potential because it could reduce the volume of gas available in the Study Area to a level below that needed for petrochemical viability. A pipeline taking ethane and other liquids to the Strait Area from southwest Nova Scotia could address this issue, but it is difficult to comment further until more is known about the proposal generally.

III.

OFFSHORE OPPORTUNITIES IN PERSPECTIVE

1. PROSPECTS FOR GROWTH

Some factors to consider

Offshore exploration and development generate a substantial demand for a wide range of goods and services. A single well drilling program on the Scotian Shelf costs in the range of $40-50 million. Capital requirements for a conventional offshore development project are in the $2-3 billion range, with annual operating costs of $50-75 million.

Some of the goods and services required for exploration and development represent sound prospects for industry and institutions in the Study Area. Others do not. The factors to consider in determining the relative attractiveness of a prospect include:

- **Demand characteristics**: These include the volume, predictability, stability and duration of demand. Volume refers to the number of units required; predictability to the relative certainty that the demand will arise; stability to the change in the number of units required over time; and, duration to the length of time (months, years) the good or service is required. Generally, the higher the volume, the greater the predictability and stability, and the longer the duration, the more attractive the prospect is.

- **Barriers to entry**: This refers to the difficulty of gaining access to the market. Barriers take several forms: *capital requirements* (investment needed for plant, equipment, training and marketing); *financing* (the financial strength needed to carry out a project); *technology* (access to management and production methods, as well as any patented processes); *experience* (must demonstrate the ability and capacity to meet supply specifications in order to be considered a qualified bidder); and, *bid package* (size of bid packages may preclude otherwise capable suppliers). Generally, the greater the barriers to entry the less attractive the prospect is. Local suppliers can reduce some of these barriers (e.g., technology and experience) through joint ventures with experienced companies.

- **Location:** Some activities generate demands that are dependent largely on the proximity of the land to the area of offshore operations. For example, supply-bases tend to be located in suitable ports close to offshore activity in order to minimize transportation costs and reduce any weather downtime. But factors other than proximity can influence the location decision. For example, Halifax

is not the closest port to the fields around and to the northeast of Sable Island. But it has well-established facilities linked to a strong service sector and amenities. Generally, for location-specific activities, the closer the supplier the better the prospect. But this advantage can be blunted by other factors and can present a competitive challenge to prospective sites (ie, the Study Area).

- **Competition**: The oil and gas industry operates on a global scale, securing goods and services from "best value" suppliers on an international basis. These established suppliers present formidable competition for new entrants because they: are well known to the offshore operators and their major contractors; are familiar with industry bidding procedures and certification requirements; are highly specialized in meeting offshore needs; operate in low cost and/or subsidized environments; and, in many cases, operate at relatively high capacity utilization thereby allowing highly competitive pricing. Generally, the more entrenched the competition, the less attractive the prospect is.

- **Uncertainty**: This rules virtually every aspect of the offshore sector. There is uncertainty from year to year about levels of drilling activity; the likelihood of discoveries; and whether and when projects will go ahead. The offshore history in Atlantic Canada is one of elusive opportunity. This environment is particularly challenging to prospective suppliers because participating means investing substantial capital in plant, equipment, systems, staff and certifications in the face of almost complete uncertainty about the nature, size and timing of offshore demand. Few prospective suppliers have access to the capital needed to weather the uncertainty.

Assessing the prospects for growth

The goods and services required for offshore exploration and development are too numerous to list separately, but can be grouped into a few general categories in order to assess their merits as prospective sources of economic growth in the Study Area. These goods and services are listed in Table 3, with an assessment of how the factors above influence their attractiveness generally as investment prospects.

The general conclusions are that the offshore industry operates in an expensive and risky environment, with well-defined needs that are met by a highly specialized and generally capital-intensive supply industry. It is a difficult industry for a supplier to break into, though there are many niche opportunities for suppliers to suppliers. For example, it would be highly unlikely that a new entrant would make it to the bid list to fabricate a 5,000-tonne integrated deck. On the other hand, fabricating some of the smaller structures as a sub-contractor offers a stronger possibility, though even this is not without its challenges.

The analysis from Table 3 is made specific to the Study Area in Table 4. Requirements are listed by phase: exploration, development and production. Each requirement/ opportunity is assessed in light of the factors outlined in Table 3, and also in the context of the low, medium and high offshore activity cases.

Table 3: Market and Industry Characteristics for Offshore Suppliers

	Demand	Barriers to entry	Competition	Market
▪ Drilling rig contractor	▪ Offshore operator contracts service from rig owner ▪ Cyclical/intermittent demand	▪ Capital/technology/ financing/ experience	▪ Strong competition from several global companies if using Canadian vessels	▪ Would have to operate internationally to maximize rig utilization
▪ Drilling services	▪ Offshore operator contracts service from companies ▪ Cyclical/intermittent demand	▪ Capital/technology/ experience	▪ Several well established international companies	▪ Would have to operate internationally; some niche opportunities possible
▪ Supply base	▪ Offshore operator contracts service from base operator ▪ Single or multi-user base ▪ Contracts: months to years	▪ Suitable port ▪ Suitable facilities ▪ Systems and logistics experience	▪ Halifax - regional home to operators and drilling service companies	▪ Base serves immediate offshore area ▪ Base operators are national and international firms
▪ Supply vessel/helicopter	▪ Offshore operator contracts service from vessel owner ▪ Cyclical/intermittent demand ▪ Contracts: months to years	▪ Capital ▪ Financing ▪ Experience	▪ Well established international companies ▪ Local (NS) capacity has developed over past 20 years	▪ Could/do operate successfully in Atlantic offshore area depending on level of activity
▪ Engineering /management	▪ Offshore operator contracts service from Engineering, Procurement Construction (EPC) contractor ▪ Contracts extend to years	▪ Offshore experience ▪ Planning systems ▪ Procurement management ▪ Contract management ▪ Financing	▪ 5-10 large, well known international firms with extensive offshore experience ▪ joint venture partnerships	▪ Would have to operate internationally; some niche opportunities possible in local and Canadian market
▪ Fabrication	▪ Small components/modules to jackets and integrated topside facilities ▪ Contracts with several yards on each project to shorten schedules/reduce risk ▪ Cyclical/intermittent demand	▪ Capital cost of facilities ▪ Planning/management systems ▪ Demonstrated capacity to meet quality, delivery specs ▪ Familiarity with bidding process and operators ▪ Uncertain demand	▪ 50 or so large, well known international fabricators with extensive offshore experience	▪ A large fabrication facility would have to compete internationally to survive. ▪ Small yard could survive on moderate offshore activity, but would have to diversify outside offshore sector
▪ Offshore construction	▪ Offshore operator contracts service from specialized pipelaying/marine contractor ▪ Contracts: months to years	▪ High capital cost of vessels and equipment/ Financing ▪ Demonstrated capacity to execute offshore projects	▪ 5-10 international firms specializing in pipelaying and platform installation and hook-up	▪ Would have to operate internationally to maximize vessel/barge utilization
▪ Onshore construction	▪ Limited demand so far ▪ Contracts extend to years	▪ Planning/mgt systems ▪ Demonstrated capacity to meet quality, delivery specs ▪ Financing	▪ 5-10 CDN/US firms specializing in gas plant, refinery, petrochemical construction	▪ Would have to operate in national/US market ▪ Sub-contracting and JV opportunities

Table 4: Assessment of Prospects for the Study Area under Alternative Offshore Cases

	Low Case	Medium Case	High Case
EXPLORATION			
• Drilling rig contractor	• Weak: high capital cost/strong competition/uncertain demand	• Weak: high capital cost/strong competition/uncertain demand	• Weak: high capital cost/strong competition/uncertain demand
• Supply base	• Moderate: location is a plus, but low activity/uncertainty/cost could limit operator interest to Halifax	• Strong: sufficient activity for base in CB in medium term	• Strong: sufficient activity for one or more bases in CB in medium term
• Drilling services	• Weak: suppliers can meet drilling needs from Halifax operations	• Weak: suppliers can meet drilling needs from Halifax operations	• Moderate: suppliers may re-locate given level of activity
• Supply vessel/helicopter	• Weak: high capital cost/strong competition/uncertain demand	• Weak: high capital cost/strong competition/uncertain demand	• Moderate: high capital cost/strong competition/uncertain demand
• Education/training	• Moderate: local needs are limited, but opportunities are national	• Moderate: needs expanding and costs relatively low	• Strong: needs expanding and costs relatively low
• **DEVELOPMENT**			
• Engineering/management	• Weak: strong competition	• Weak: strong competition	• Weak: strong competition
• Fabrication	• Weak: high barriers/strong competition/uncertain demand	• Moderate: niche opportunities but high barriers/strong competition	• Strong: good opportunities but high barriers/strong competition
• Offshore construction	• Weak: high capital cost/strong competition/uncertain demand	• Weak: high capital cost/strong competition/uncertain demand	• Weak: high capital cost/strong competition/uncertain demand
• Onshore construction	• Weak: limited opportunity to develop local capacity as prime- or major sub-contractor	• Moderate: some opportunity to develop capacity as sub-contractor or joint venture partner	• Moderate: some opportunity to develop capacity as major sub-contractor or joint venture partner
• Supply base	• Moderate: long-term need makes CB location attractive prospect	• Strong: long-term need makes CB location very attractive prospect	• Strong: long-term need makes CB location very attractive prospect
• Supply vessel/helicopter	• Weak: high capital cost/strong competition/uncertain demand	• Moderate: high capital cost/strong competition/uncertain demand	• Moderate: high capital cost/strong competition/uncertain demand
• Education/training	• Moderate: needs are limited	• Moderate: expanded needs	• Strong: greatly expanded needs
• **PRODUCTION**			
• Operations	• Weak: unlikely to leave Halifax	• Moderate: possible office in CB	• Moderate: possible office in CB
• Supply base	• Moderate: long-term need makes CB location attractive prospect	• Strong: long-term need makes CB location attractive prospect	• Strong: long-term need makes CB location attractive prospect
• Supply vessel/helicopter	• Weak: high capital cost/strong competition	• Moderate: high capital cost/strong competition	• Moderate: high capital cost/strong competition
• Education/training	• Moderate: national needs	• Strong: expanded needs	• Strong: expanded needs
• **PETROCHEMICAL**	• Weak: inadequate feed-stock	• Moderate: medium-term possibility	• Strong: medium-term possibility

Three very general conclusions emerge from the summary in Table 4:

- the strongest prospects are ones that are in some way location-specific (for example, supply base and onshore construction);
- prospects generally become stronger as the level of activity rises and the level of uncertainty about the timing and level of demand diminishes (for example, fabrication);
- some opportunities are likely to remain unattractive prospects for many years (for example, drilling rig contractor, offshore construction) because of the challenges arising from such key factors such as capital cost, international competition and uncertainty.

2. OFFSHORE IMPACTS IN THE STUDY AREA IN THE 1990s

Projects in the 1990s

Offshore development during the 1990s had a modest impact on the Study Area economy. This study seeks to quantify this impact, and to explore some of the lessons learned.

The decade saw the implementation of two projects – Cohasset/Panuke and SOEP – as well as modest exploration drilling.

Cohasset/Panuke (Copan)

Copan was a relatively small oil project – was the first offshore development. The discovery well was drilled in the early 1980s. Two fields – Cohasset and Panuke – located about 50 km southwest of Sable Island were tied into the project, with a wellhead platform in each field. Development began in 1990, with production commencing in 1992 and terminating in 1999. The project produced about 45 million barrels of light oil. A shuttle tanker transported oil from a storage vessel moored at the field to refineries. Total capital cost was in the range of $500 million, with a substantial share of the fabrication requirements awarded to Nova Scotia yards.

The project consisted of the following activities:

- Preliminary studies including environmental, geological and engineering. Firms based in the Halifax area conducted many of these studies, though most of the design engineering was conducted outside the province.
- Jackets and part of the topsides were fabricated in a yard in Dartmouth, with the balance of the topsides fabricated outside the province. An international marine contractor installed platforms.

- Development drilling using a dedicated jack-up rig was contracted to a US-based rig contractor.
- Storage vessel and shuttle-tanker were leased from a Scandinavian shipping company.
- The operating company (Lasmo) carried out project management from its offices in Halifax.

Lasmo placed the order for jackets locally, with other components going to international bid. The project experienced delays with fabrication of jackets and topsides and incurred major cost overruns. A summary of Nova Scotia and other content is set out in Table 5.

Table 5
Content Estimates for Cohasset/Panuke Components

	Percentages		
Component	**N.S.**	**R.O.C.**	**Foreign**
Preliminary studies	30	50	20
Well head jackets	45	30	25
Topside facilities	25	75	-
Inter-field flow lines	7	3	90
Development drilling	35	12	53
Engineering/management	40	55	5
Weighted Average	37	33	30

Lasmo Nova Scotia Ltd.

Sable Offshore Energy Project (SOEP)

SOEP is a multi-field natural gas development – is Nova Scotia's first major offshore project. SOEP incorporates six of the 22 significant discoveries, with a total of about 3.2 TCF of gas. It took many years to reach the development stage. The discovery well forming the core of the project was drilled in 1979. It was not large enough to support development in its own right. Subsequent drilling in the area led to the discovery of several more fields. The first attempt to develop these fields (the Venture Offshore Development Project) was halted in 1986, when market conditions proved inadequate.

The project was resurrected in 1990 as markets strengthened and sufficient gas reserves were brought into play. Engineering commenced in 1997, with field development occurring during 1998-1999. Production commenced in late 1999. The project is being developed in two phases (tiers). Tier 1 ties in three fields (Thebaud, Venture and North Triumph), with average daily production of about 530 million cubic feet (MMcf). Tier 2 is underway, with a fourth field (Alma) to come on stream in 2003. The remaining two fields (South Venture and Genelg) will be developed and tied in as required to maintain the design production level.

Capital costs for the project are estimated at $3.0 billion, with $2.0 billion spent in Tier 1 and $1.0 billion in Tier 2. Annual operating costs are estimated at $85 million.

SOEP consists of five main components:

- Offshore production platforms: engineering, fabrication, installation, operation and maintenance. These are located at the offshore project site around Sable Island.

- Offshore wells: engineering, drilling, completion, production and maintenance. These are located at the offshore project site around Sable Island.

- Pipelines: engineering, fabrication, installation operation and maintenance of main subsea pipeline, interfield flowlines, and onshore natural gas liquids pipeline. These are located (respectively) at the offshore project site around Sable Island, between the project site and the landfall at Country Harbour, and between the Gas Plant at Goldboro and the fractionation plant at Point Tupper.

- Onshore facilities for process gas and liquids: engineering, construction, operation and maintenance.

- Project management.

SOEI adopted an Alliance approach to contracting. Contractors were selected on the basis of performance, not lump sum contract (as is often the case). They entered into a partnership with SOEI, with established cost targets and a mechanism for sharing savings. Generating benefits for local industry was among the factors taken into consideration in judging performance. Instead of detailed specifications issued by SOEI, contractors working closely with SOEI and other Alliance members provided technical solutions. This introduced considerable flexibility, and also allowed for faster implementation of the project. And since contractors were not bound by lump-sum contract constraints, flexibility was built-in to promote participation by local contractors.

The various project activities provided a range of opportunities for Nova Scotia companies and individuals. The extent to which local companies took (and are taking) advantage of these opportunities depended both on the location and nature of these activities, and the interest and capability of the local suppliers. It also depended on their interest and capacity for entering into joint-venture arrangements with Alliance members.

Nova Scotia content for Tier 1 reached about 30%. Table 6 shows the main Alliance partners and the Tier 1 contracts for which they were responsible. Much of the international spending falls into the category requiring highly specialized skills (eg, project design and management) and equipment (eg, drilling rigs, lift barges, pipelaying vessels) not available in Canada. By the end of the project

(Tier 2), SOEI expects Nova Scotia content to rise to the 35% range, with about 20% spent in the rest of Canada, and the balance (45%) spent internationally.

Table 6
Content Estimates for Major SOEP Tier 1 Contracts

		Percentages		
Contractor	**Scope**	**N.S.**	**R.O.C.**	**Foreign**
Allseas Canada Limited	Offshore Pipeline	26.00	19.00	55.00
Saipem (UK) Limited	Transport/Install	11.00	3.00	86.00
BBA	Onshore Facilities	89.00	11.00	0.00
Kvaerner Oil & Gas	Topsides	0.01	0.05	99.40
Peter Kiewit & Sons	Main Jackets	0.00	0.00	100.00
MMI/Brown & Root	Topsides North Triumph	96.00	4.00	0.00
MMI/Brown & Root	Early Jackets	76.90	0.00	23.10
Fabco/CKT	Living Quarters	70.00	0.00	30.00
Agra Monenco/Brown & Root	Front End Engineering	10.00	60.00	30.00
Agra Monenco/Brown & Root	Project Management	10.00	30.00	60.00
Elsag Bailey	Automation Systems	12.00	54.00	34.00
Rowan/Sante Fe	Well Construction	20.00	30.00	50.00
Weighted Average		30.00	17.00	53.00

Source: SOE Inc.

Maritimes and Northeast Pipeline Project (M&NP)

Gas is being transported to markets in the U.S. via a 558 km main transmission pipeline (the M&NPP) across Nova Scotia and southern New Brunswick. Within Nova Scotia (234 km), it traverses the northeastern part of the mainland, in a more or less straight line, between the gas plant at Goldboro in Guysborough County and the border with New Brunswick just north of Amherst.

The pipeline was constructed in 1999, with completion coinciding with the start-up of SOEP gas production. The work in Nova Scotia was carried out with two construction spreads: one working westward from Goldboro to Oxford, and a second from Oxford to Tidnish. Total capital cost was about $700 million, with about $300 million spent on facilities in Nova Scotia.

A retrospective analysis of M&NP spending in the Maritimes (Nova Scotia spending is not available) indicates that about $435 million (of $700 million), or about 62%, was spent on locally supplied goods and services. The contract for construction of the main transmission line was awarded to BFC-Marine, an Alberta-based joint venture company. Nova Scotia and New Brunswick companies took advantage of many sub-contracting opportunities (mainly in land clearing and trucking). The main contractor hired within the region to the fullest extent possible, resulting a construction workforce that was about 80% local. Content estimates by main component are set out in Table 7.

Table 7
Maritime Expenditure Estimates for M&NP Pipeline

	Percentages	
Component	**Maritime**	**Import to Region**
Pipe and fittings	5	95
Pipeline contract		
Labour	80	20
Contractor equipment	-	100
Third party equipment	100	-
Material	100	-
Sub-contracts	73	27
Other contracts	100	-
Engineering	100	-
Inspection	80	20
Project management	80	20
Weighted Average	62	38

Source: M&NP

Exploration

Limited exploration occurred during the 1990s; the focus was mainly on field development. Of the 58 wells drilled between 1990 and 2001, just 17 were exploration/delineation wells and 41 were development wells for Copan and SOEP. All were located in the Sable Island area and were serviced from supply bases in Halifax Harbour. A breakdown of typical costs for a $50 million exploration well is shown in Table 8.

Table 8
Content Estimates for Typical Offshore Exploration Well

	Percentages		
Component	**N.S.**	**R.O.C.**	**Foreign**
Drilling rig	12	8	80
Supply vessels	80	0	20
Helicopter	50	50	-
Drilling services	20	60	20
Materials/supplies	15	30	55
Supply base/support	50	45	5
Weighted Average	35	25	40

Participation by Study Area firms

SOEP

Several companies and individuals based in the Study Area competed successfully for SOEP contracts and employment. But the level of participation is relatively low and limited mainly to pipe fabrication for the onshore facilities, fabrication of some topsides facilities components for the offshore platforms, and sub-contracting. Total Study Area content during Tier I is estimated to be in the range of $20 million, including employment income earned by individuals working on other project components (eg, construction of the gas plant and fractionation plant).

Few Study Area firms expressed an interest in participating. For each of the 25 sub-contracts related to onshore work at the Strait of Canso (the most accessible SOEP opportunities), bids were received from at most 1-2 firms. Competitiveness is also an issue. Study Area firms won just five of the 25 contracts (two going to a single Sydney-area firm, and three to two Strait area firms). Firms based in the Halifax area won about half of the Strait of Canso contracts.

With respect to interest in offshore work more generally, by mid-1998, 60 firms from the Study Area had registered with BIDS, the point of entry to receive SOEP information and bid documents (Table 9). Of these, 25 were based in the Sydney area, and the rest mainly in the Strait area. By contrast, some 850 firms based on mainland Nova Scotia were registered.

Table 9
Nova Scotia Firms Registered to Bid on SOEP Contracts, 1997-1999

	Number
Nova Scotia (mainland)	850
Cape Breton (Strait Area)	35
Cape Breton (Sydney Area)	25
Total	910

Source: BIDS Nova Scotia Limited.

Cohasset/Panuke and M&NP

Reliable estimates are not available of participation in these projects by Cape Breton firms. Anecdotal evidence obtained from project proponents and stakeholders in Cape Breton suggests the level of participation was minimal.

Content estimates

By applying the content estimates from Table 6 to project expenditure data obtained from the SOE Inc., it is possible to develop a spending profile by impact area and over time (Table 10). SOEP impacts are concentrated in the Halifax, with a relatively small impact in the Study Area.

Table 10
Estimated SOEP Expenditures by Area, 1997-98
(1997 $ millions)

Year	NS (1)	Study Area	Other (2)	Total
1997	21	0	77	98
1998	200	9	710	919
1999	270	11	600	881
Total	491	20	1,387	1,898

(1) All of Nova Scotia excluding the Study Area.
(2) Expenditures made outside NS.
Source: SOE Inc.

Concluding observations

From the expenditure estimates in Table 10 it is clear that the industrial impacts from SOEP were relatively small in the Study Area. This can be attributed to several factors.

- **Industrial capacity**. Few firms have the capacity to compete effectively for contracts, particularly given the size of most bid packages, and the contracting arrangements. The lack of capacity is largely due to historical factors in the Study Area economy, dependent as it is on traditional resource-based industries. The basis and opportunity for developing the kind of manufacturing and service capacity needed to participate in offshore projects has simply not been present in the local economy. Indeed, though it is improving, there continues to be a limited basis for offshore involvement within the economy of Nova Scotia as a whole. The content estimates for Deep Panuke by Pan Canadian and for SOEP Tier 2 would confirm this. Increasing the content in the future depends on two conditions: a pace of offshore activity offering the consistency and predictability in demand that firms need to justify the costs to develop or expand capacity; and, a development policy providing offshore companies with an incentive to give real meaning to the concept of “full and fair opportunity”.

- **Familiarity and cost**. Few firms in the Study Area expressed an interest in competing for contracts. This is evident from the registration data from BIDS (Table 9). Three factors contribute to this. Lack of capacity (including Health, Safety and Environment certifications and ISO rating), lack of familiarity with project requirements and bidding procedures, and sufficient lack of confidence in success to make the cost of qualifying for a bid list worthwhile. There is little question that the cost of ‘getting up to speed” is relatively high for most firms.

- **Location**. Only one of the direct SOEP activities occurred in the Study Area (the fractionation plant at Point Tupper). This limited the opportunity for local content as compared with Halifax where such location-specific activities as the operator office, engineering/ management, supply base and marine and air logistics were based. Also, the lack of visible project components in the area may have limited the perception of opportunities among local suppliers.

- **Bidding**. Prospective suppliers probably had limited understanding of project requirements and how to bid for contracts. Also, many of the bid packages would have exceeded the capacity of most firms. SOEP was fast-tracked. This left SOEP staff limited time to familiarize suppliers with project requirements and bidding procedures. Added to the capacity and cost factors, it should not be surprising that Study Area content was relatively low.

Three important lessons emerge from this experience.

- It is unreasonable to expect offshore supply capacity to evolve overnight. It takes many years and well-founded expectations about *consistent project activity* for offshore supply capacity to develop. In other words, firms are unlikely to invest unless there is an acceptable risk that offshore activity is going to continue to generate a certain level of demand. This is not so much a lesson for prospective suppliers (they know their constraints) as it is for governments and the public who are concerned that local content levels appear to be low. So far, we have had just two projects several years apart, with a third in the planning stage. The evidence suggests this falls well short of the sustained activity needed to support supplier confidence.

- The policy environment for the Nova Scotia offshore is one of open competition. This is good for project proponents, but it leaves local industry skeptical about the strength of any commitments to procure goods and services in the province. Given the entrenched position many international suppliers have in the industry, it raises questions among local suppliers about whether being *equally* competitive is good enough from a proponent's perspective. Local suppliers also question the meaning of and commitment to "full and fair opportunity", when the principle is applied only at the bid stage and not during design.

- To qualify as a bidder for many contracts, the prospective supplier must have a demonstrated ability to meet specifications. This is not a theoretical exercise. Nor is it an exercise in simply securing HSE or welding certifications, and an ISO rating. It is all of these things plus *actual* experience in delivering the good or service to industry standards. Few local suppliers meet these criteria. This puts added emphasis on the need for supplier development initiatives. It also underscores the importance of securing experience through joint venture partners. These ideas are not new. But it seems clear they have to be pursued with greater enthusiasm if local participation is going to increase.

IV.

PROSPECTS FOR GROWTH

1. OVERVIEW

The discussion in Chapter III should leave little doubt that offshore opportunities are not all created equal. Differences in the characteristics of demand and supply mean that some opportunities are inherently more attractive than others. On the demand side, there is uncertainty about the number, timing and size of future offshore developments. The offshore tends not to provide a stable basis for industrial development. On the supply side, there is little incentive to build or expand capacity in this climate and it can be difficult to attract joint venture partners (particularly ones who will invest). For any firm wishing to invest in supply capacity, the business plan must encompass sufficiently diversified capabilities to allow access to a range of domestic and export markets.

Though this is in some ways a bleak analysis, there are steps local industry and institutions can take to position themselves in preparation for offshore activity. Indeed, a case can be made for making strategic investments in anticipation of offshore requirements. Experience shows that if prospective suppliers wait until there is *complete* certainty, they will have missed the opportunity. The challenge is to find the right balance between risk and reward – to identify and make strategic investments.

The ease with which suppliers can be left behind is one of the lessons emerging from the SOEP experience. SOEI conducted many supplier development seminars and site visits in the lead-up to the Sable project. These initiatives were intended to inform prospective suppliers about their own capacity to do work for the project, about project requirements, and about the bidding process. In the end, Nova Scotia content was judged to be disappointing. A combination of factors would account for this: a first major project, uncertainty about bidding procedures and required certifications, cautiousness about establishing or expanding capacity, and of course, that the project was fast-tracked. By its own admission, SOEI recognizes that it had "…overestimated the ability of Nova Scotia suppliers and sub-contractors to respond to opportunities."

The inability of local industry to capture a significant share of the opportunities generated by offshore development creates considerable skepticism among the supply community about the commitment to procure goods and services in the province. Low provincial content also puts considerable pressure on governments to do something about it. Calling the offshore sector to account may make for good press, but it does little to change two of the immediate underlying constraints – inadequate local capacity and uncertain demand. What is needed is a longer-term capacity development policy backed up by clear incentives to give practical effect to "full and fair opportunity" across the full project cycle.

Attempting to create capacity through investment of public funds may address one constraint - capacity. But it does not resolve the question of cyclic and intermittent demand. The Newfoundland experience offers a good case in point. Governments invested over $400 million to develop two offshore construction and fabrication facilities during the early 1990s. One site – a world class facility (Bull Arm) – was developed to build and outfit the Hibernia platform. It has been largely idle since. A decade later the other site (Cow Head near Marystown) has seen little or no work at all. This is not to suggest that the investments were misguided, but simply to note that creating capacity can carry a substantial price. Making the price worthwhile requires, at a minimum, sound management and strong domestic and international markets.

This chapter extends the discussion of Chapter III by focusing on the relatively attractive prospects for the Study Area, and determining what has to be done to position sites in the Area to turn potential opportunities into actual projects. To do this we first review the more attractive prospects, identify the regions most suited to accommodate each prospect, identify specific sites within each region, and indicate how infrastructure and services need to be up-graded to meet offshore industry standards.

2. INFRASTRUCTURE AND SERVICE NEEDS

Prospects

The analysis in Chapter III ranks the potential prospects as weak, moderate or strong depending on its market and industry characteristics and in relation to the level of offshore activity. In summary (Table 11):

Table 11
Ranking of Offshore Prospects for the Study Area (2002-2011)

	Low Case	Medium Case	High Case
Exploration wells			
Northeast of Sable	6	29	63
Southwest of Sable	38	89	138
Projects			
Northeast of Sable	1	3	6
Southwest of Sable*	5	7	10
Drilling rig contractor	weak	weak	weak
Supply base	moderate	strong	strong
Drilling services	weak	weak	moderate
Supply vessel	weak	weak	moderate
Fabrication	weak	moderate	strong
Offshore construction	weak	weak	weak
Onshore construction	weak	moderate	moderate
Education/training	moderate	moderate	strong
Petrochemical/other	weak	moderate	strong

*Including SOEP Tier 2 and Deep Panuke.

- **Low Case**: all prospects but the supply base are weak simply because there is insufficient activity to justify investment. The supply base is the one exception. The "moderate prospect" ranking assumes offshore activity occurs in the area identified as "northeast of Sable". Location is a key determining factor, though a deep water port is also important as exploration moves farther offshore and requires larger (deeper draught) supply vessels. The attractiveness of the supply base is also strengthened the more proximate offshore activity is to the Study Area and the farther away it is from Halifax. Fabrication ranks as weak because demands are few and far between under the low case.

- **Medium Case**: a supply base attains "strong prospect" ranking, with other opportunities including fabrication ranking as moderate due to the higher level of development activity. Fabrication is an opportunity that can evolve over time as demand increases. Again, the strong ranking for the supply base is linked to activity in the Sydney Bight, Laurention Sub-Basin and Banquereau Bank areas. Downstream opportunities (e.g., petrochemical plant, electrical generation, co-generation, smelting) become more attractive as gas production increases. Bringing such opportunities to fruition requires that certain minimum quantities of gas are available for industrial use in designated areas. The Government of Nova Scotia recognizes this in its Energy Strategy, *Seizing the Opportunity*, and is committed to entering into necessary agreements with producers to advance these opportunities.

- **High Case**: supply base, fabrication and education/training attain strong prospect status since these are driven largely by activity level. Risk and competitive factors continue to make rig and offshore construction contracting weak prospects, while supply vessel contracting improves to a moderate rank. Downstream prospects become stronger under stringent supply/price and market assumptions.

To conclude, a supply base, fabrication yard, education/training programs, and downstream production opportunities are the most attractive prospects for contributing to regional growth in the Study Area.

Site criteria

Basic site, infrastructure and service requirements for a supply base and fabrication yard are industry specific and well known. Education and training programs are of two kinds: general, for entry-level positions covering a range of industries, and specialized for industry-specific occupations.

Supply Base

The most basic site criteria for a supply base are adequate water depth, dock facilities and good transportation access. These criteria, together with other requirements, are set out in Table 12.

Table 12
Supply Base Site Criteria and Basic Requirements

Basic requirements	Exploration/Production	Development
Water depth	• 7-8 m at low tide	• 7-8 m depth at low tide
Wharf length/width	• 100 m x 30 m	• 200 m x 30 m
Wharf load	• 10 t/m2	• 10 t/m2
Outside storage	• 3,000 m2	• 20,000 m2
Inside storage	• 1,000 m2	• 4,000 m2
Certifications	• HSE & ISO 9002	• HSE & ISO 9002
Mud & cement	• Bulk delivery/silos	• silos
Water and fuel	• Bulk delivery/on-site supply	• on-site supply
Offices	• 2-3	• 3-4
Support services	• road, rail & air access	• road, rail & air access
Offsite storage	• storage & warehousing	• storage & warehousing

The differences in the basic requirements for an exploration/production base and one used during development are also shown in Table 12. A greater flow of materials and equipment during development necessitates more storage area, as well as a longer wharf to handle greater vessel traffic. Ideally, outside storage would form part of the base itself, but this is not essential (the bases in Halifax rely on a combination of on-site and off-site storage). A base supporting a one-well exploration program can function with bulk deliveries of mud and cement, but would operate more efficiently with on-site silo storage, particularly as drilling activity increased.

Fabrication Yard

A fabrication yard also requires minimum water depth and dock facilities, but site criteria also include flat land at dockside for assembly and load-out of structures. The criteria vary with the nature of the offshore requirements. The larger and more complex the structures, the greater the lay down and work areas. The basic requirements are set out in Table 13, together with some of the key facilities and equipment.

Three yard configurations are given in Table 13. The most basic yard would be capable of fabricating smaller structures (under 250 tonnes) referred to as top mounted (TM) structures. These include such things as flare booms, heli-decks, bridges and skid-mounted packages. Once a yard has demonstrated its ability to fabricate these to industry specifications, it would be in a position to take on larger and more complex projects. Depending on market conditions, it may decide to expand its capacity to take on modules and/or decks. Such a progression is likely to take several years and require a substantial commitment of capital (an initial investment in the $20 million range, rising to $75-100 million, would not be unreasonable).

Table 13
Fabrication Yard Site Criteria and Basic Requirements

Basic requirements	TM Structures <250t	Jackets 500-3,000 t	Modules/decks 250-3,000 t
Water depth	• 7 m at low tide	• 7 m at low tide	• 7 m at low tide
Wharf height	• 2.5-3.0 m at low tide	• 2.5-3.0 m at low tide	• 2.5-3.0 m at low tide
Wharf length/width	• 200 m x 40 m	• 200 m x 40 m	• 200 m x 40 m
Wharf load	• 10 t/m2	• 10 t/m2	• 10 t/m2
Bollards	• 6x75 t - loadout quay • 8x25 t - materials quay	• 6x75 t - loadout quay • 8x25 t - materials quay	• 6x75 t - loadout quay • 8x25 t - materials quay
Laydown area	• 1 ha - flat	• 2 ha - flat	• 2 ha - flat
Outside work area	• 75m x 100m - flat	• 150m x 200m - flat	• 200m x 200m- flat
Inside work area	• 50mx50mx20m	• 100mx50mx40m	• 85mx50mx40m
Fab/paint shops	• 3-4	• 3-4	• 4-5
Inside storage	• 2,000 m2	• 3,000 m2	• 3,000 m2
Outside storage	• 500 m2 covered	• 1,000 m2 covered	• 1,000 m2 covered
Cranes	• overhead/crawler	• crawler	• overhead/crawler
Certifications	• ISO 9002/ASME/CWB	• ISO 9002/ASME/CWB	• ISO 9002/ASME/CWB

Downstream opportunities

Downstream opportunities fall into two general categories: those using gas as feedstock to produce intermediate and final products (e.g., petrochemicals); and, those using gas as a source of energy (e.g., electrical generation, smelting, other heavy industry).

There are essentially two options for using natural gas as petrochemical feedstock.

- **Methane**: instead of using the methane stream for direct sales gas to energy users, it could be used for production of such compounds as methanol, acetylene and ammonia. This possibility is ruled out on the basis of economics because methane has a higher value as a source of energy than as a petrochemical feedstock.

- **Natural gas liquids**: these include ethane, propane and butane. They could be used to produce ethylene, which in turn is used as a feedstock for a range of intermediate and final products. Ethylene plants are generally constructed close to the feedstock source, with derivative plants located close by in order to minimize the cost and hazards of transporting raw ethylene.

The basic site criteria for a petrochemical facility are proximity to feedstock, substantial land area (upwards of 100 ha), deep-water port, and rail and road access. The sites within the Study Area with the potential to meet these criteria are

in the Strait of Canso – between Point Tupper and Bear Head, and the Melford Land Reserve. Goldboro also offers potential, with the added advantage of a lower feedstock price since gas could be purchased net of the M&NP pipeline toll.

There is some trade-off between these areas with respect to electricity and heavy industry. Goldboro offers lower natural gas costs and suitable land, but lacks the natural deep-water port that exists in the Strait. The Strait areas, on the other hand, offer a deep-water port and substantial land, but higher natural gas costs.

Regional growth prospects

Supply base

Both the Sydney Harbour and the Strait of Canso regions offer locations meeting the basic site criteria for an offshore supply base. With varying levels of investment in infrastructure and facilities, locations in each region could offer the offshore industry an excellent base from which to operate in the short, medium and long term.

Sydney Harbour. There are four potential locations within the Sydney Harbour region: Sydport, the Sydney Marine Terminal, the Sysco site, and Louisbourg. Of these, Sydport and the Sydney Marine Terminal offer the best potential in the short to medium term (Table 14). Louisbourg meets some site criteria, but would require a major expansion in wharf facilities in order to meet minimal requirements. The Sysco site also meets some site criteria, but area clean-up and re-development are likely to rule out its availability in the short to medium term.

Table 14
Suitability of Potential Supply Base Locations in Sydney Region

Basic Requirements	Sydport	Sydney Marine Terminal	Sysco Site	Louisbourg
Wharf length/width	yes	yes	yes	no
24-hr all weather harbour	ice a factor	ice a factor	ice a factor	yes
Wharf load capacity	needs up-grade	yes	yes	no
Water depth	yes	yes	yes	yes
Outside storage	yes	needs offsite space	yes	no
Inside storage	yes	no	possible	no
Road/rail transportation	yes	no rail	yes	no rail
HSE & ISO 9002	in progress	no	no	no
General Comments	Site is suitable. Needs wharf up-grade. Access to rail requires minor extension (desirable, not essential).	Site is suitable, but public wharf status could constrain 24-hour use by offshore. Needs access to outside/ inside storage. Rail access desirable, not essential.	Site is suitable, but requires clean-up and re-development. Needs access to inside storage. Status and availability for supply base use uncertain.	Wharf would need major expansion. Needs access to outside/ inside storage. Rail access desirable, not essential. Public wharf status could constrain 24-hour use.

Strait of Canso. The Strait region offers four potential locations: Mulgrave, Bear Head, Melford Land Reserve and Port Hawkesbury (Table 15). Of these, Mulgrave offers the best immediate potential under any of the offshore cases. The wharf had been used as a supply base in the 1960s, 1970s and 1980s, and is currently being up-graded. There is ample outside storage, with back-up in the adjacent Mulgrave Marine Industrial Park. The Bear Head and Melford Land Reserves areas offer excellent potential in the longer term, assuming offshore activity approaches a level consistent with our High Case. As a public wharf with space and water depth constraints, Port Hawkesbury offers little potential.

Table 15
Suitability of Potential Supply Base Locations in Strait of Canso Region

Basic Requirements	Mulgrave Wharf	Port Hawkesbury	Bear Head/ Melford
Wharf length/width	yes	no	needs development
24-hr all weather harbour	yes	yes	yes
Wharf load capacity	yes	no	needs development
Water depth	yes	no	yes
Outside storage	yes	no	needs development
Inside storage	off-site	no	needs development
Road/rail transportation	no rail	yes	limited road, no rail
HSE & ISO 9002	needed	needed	needs development
General Comments	Site offers excellent potential. Priority infrastructure items are silos and inside storage facilities.	Wharf would need major expansion. Needs access to outside/ inside storage. Rail access desirable, not essential. Public wharf status could constrain 24-hour use by offshore.	Excellent long-term potential. Would be developed as greenfield sites. No facilities, infrastructure or services are available.

Concluding observations. Mulgrave Wharf in the Strait of Canso and facilities in Sydney Harbour meet the basic requirements for an offshore supply base. Each has several strengths and each also has one or two weaknesses.

- Mulgrave is the stronger candidate because it is situated on a deep-water ice-free port, and offers a substantial wharf that is ready for further development as a supply base (essentially, construction of silos and inside storage). This will require relatively low investment. Mulgrave is strategically located in close proximity to several ELs northeast of Sable Island. At least four experienced supply base companies are interested in establishing an operation in Mulgrave to serve future offshore requirements. Back-up land for inside and outside storage, and to accommodate any drilling service and supply companies that may locate adjacent to the base, is available in the Mulgrave Marine Industrial Park (a list of such services is set out in Appendix B). The Mulgrave wharf layout is shown in Figure 2.

Figure 2: Mulgrave Wharf

- Within Sydney Harbour, Sydport's strengths are its substantial land area and access to road and rail, while its main weakness is the need for wharf up-grading. The Sydney Marine Terminal is an excellent facility, but potential limitations on 24-hour availability and the need for off-site storage present constraints. The Sysco Site also meets basic requirements, but site re-development and uncertain access create uncertainty about the timing and terms of availability. The risk of interruptions to vessel traffic due to ice in the January-March period is a potential constraint shared by all facilities. Ice-breaking is available at cost, but there is a risk that an ice-breaker would not be available at short notice to meet the 24-hour needs associated with offshore logistics.

- The strategic question of which facility should be developed and promoted as a supply base was addressed at an offshore workshop convened as part of this study in February 2002. The group of 30 participants concurred with the consultant's conclusion that, for the reasons outlined above, Mulgrave is the preferred location. The group also recognized that action to develop the facility to industry standards

might have to precede any contractual commitment to use it as a supply base. This is because offshore operators have stated their need to base decisions on *actual*, rather than potential, capacity. The risk, of course, is that a demand for a base at Mulgrave may not arise. Or possibly, that the demand may arise at another location (e.g., Sydney). The latter is clearly possible given the proximity of the port to ELs in Sydney Bight, and to the potential for activity in the Laurentian Sub-basin. Again, the consensus at the workshop was that this is a risk worth taking; that in light of how decisions are made by offshore operators, not investing in advance of demand in this case is almost a guarantee that the demand will not arise.

Fabrication

Both the Sydney Harbour and the Strait of Canso regions offer locations meeting the basic site criteria for a fabrication yard. Strengths and weaknesses of preferred sites are set out in Table 16.

Table 16
Suitability of Potential Fabrication Yard Locations in the Sydney Harbour and Strait of Canso Regions

Basic requirements	Sydport	Sysco Site	Bear Head/Melford
Water depth	yes	yes	yes
Wharf length/width	yes	yes	needs wharf
Wharf load/bollards	needs upgrading	needs upgrading	needs wharf
Laydown area	yes	site re-development	site development
Outside work area	yes	site re-development	site development
Inside work area	needs facilities	needs facilities	needs facilities
Fab/paint shops	needs facilities	needs facilities	needs facilities
Inside storage	area available	area available	site development
Outside storage	yes	site re-development	site development
Cranes	purchase/rent	purchase/rent	purchase/rent
Certifications	none	none	none

Sydney Harbour. There are two potential locations within the Sydney Harbour region: Sydport and the former Sysco site. Sydport offers the best potential in the short to medium term. Among its strengths are adequate water depth and substantial serviced land area with access to good road, rail and utility services. Significantly as well, the company holding the interest in the site (the Laurentian Group) has advanced a plan to develop it as a fabrication yard. The Sysco site also meets basic site criteria and cannot be ruled out, particularly if an operator were to express interest. But area clean-up and re-development are likely to rule out its availability for the next few years. A recent development plan for the Sysco site addresses its fabrication yard potential, citing wharf, land and buildings as assets. The buildings could be re-developed as fabrication halls, but they are not situated on the site or in relation to each other to provide optimal workflow to a potential loadout area.

Strait of Canso. The Bear Head and Melford Land Reserves offer excellent potential as fabrication sites. Among their strengths is substantial land area on a deepwater port. Developing the sites would require a considerable investment in facilities as well as infrastructure and services. The capital requirements are likely to be justified only in the long term by demand for major structures under the High Case. McDermott (a major US fabrication company with yards along the Gulf Coast and in the UK) had given Bear Head serious consideration as a potential site in 1982, but the lack of offshore development caused the project to be shelved.

Concluding observations. Sydport in Sydney Harbour and the Bear Head/ Melford Land Reserves meet the most basic criteria for an offshore fabrication yard.

- Sydport is the stronger candidate for immediate development (Figure 3). This is because the site meets basic criteria, is serviced, and has good access to road and rail transportation. Also, the Sydney area has a large workforce experienced in industrial manufacturing. Among the first steps in developing the site would be to up-grade the load bearing capacity of the main wharf to the minimum 10 t/m^2 required for offshore work. Extending rail access to proposed storage areas is also required. Investment in facilities and equipment would proceed at the pace dictated by the yard's competitive success and the level of offshore activity.

Figure 3: Sydport Marine Industrial Park

- The Bear Head and Melford Land Reserves are greenfield areas offering considerable potential. But realizing this potential would come at a substantially higher cost than Sydport for site development and basic infrastructure including roads, rail and services. Making such investments could not be justified unless and until offshore activity were to approach the scale reflected in the High Case, and an experienced fabrication company came forward with a plan to develop and market the site.

- The strategic question of which, if any, site should be developed and promoted as a fabrication yard was also addressed at the offshore workshop in February. For the reasons outlined above, the group supported the conclusion that Sydport is the preferred site. Finding the capital needed to develop the facility and securing contracts are the immediate and related challenges facing the Laurentian Group. Recruiting an experienced fabricator as a joint venture partner (and co-investor) is also an essential first step. Among the leading offshore fabricators are Aker, Hereema, Kvaerner, McDermott and Saipem, all of whom have experience in north Atlantic conditions. A commitment to a joint venture with Laurention by one of these companies would not only go some way to establish the credentials of the facility with offshore operators, but would signal potential investors (including government) that the concept has merit. Action to develop the facility to offshore industry standards would have to precede any contractual commitment.

Service and support opportunities

Development of a supply base and fabrication yard can be expected to attract service and support companies. Such companies also become targets for local development initiatives. The nature of the companies and when they might choose to locate depend on several factors, but principally on the future prospects of the offshore, and whether the needs can be met reliably and economically from any existing operations these companies have on the East Coast.

- **Supply base**: service and support companies fall into two broad categories – those needed by the base itself, and those needed by the offshore operations the base is supporting. Integral to the operation of the base are such services as office equipment and materials supply, utilities and stevedoring. These are generally available in the Study Area and are unlikely to trigger significant opportunities for new businesses. The real opportunities arise from servicing offshore operations. A long list of requirements is given in Appendix B. Each of these requirements is met by at least 10 companies, though for certain specialized services, a short list of 3-4 is the norm. Most of these companies have their headquarters in Calgary or Houston, and also operate from regional bases where activity levels warrant. For example, several major national and international drilling service companies have contracts with oil companies exploring offshore Nova Scotia and are located in the Halifax area (Table 17).

Table 17
Halifax-based offshore service companies

♦ Baker Hughes Canada	♦ M I Drilling Fluids
♦ Caneco Oil Field Service	♦ M I Swaco
♦ Cooper Cameron Corporation	♦ Nowsco-Fracmaster Company
♦ Cougar Helicopters Inc.	♦ Schlumberger Canada Limited
♦ Halliburton Energy Services	♦ Secunda Marine Services
♦ Jacques Fugro Geosciences	♦ Weatherford Drilling

Whether these or similar companies could be attracted to the Strait (or Sydney) would depend largely on their need to be on-site full-time at a supply base. For most, this would not be necessary, even if they had service contracts. They are in Halifax because this is where their clients (the oil companies) are located, and because this is where the helicopter service to and from the rigs is located.

Nonetheless, there may be reasons why it would make logistical and economic sense for these and other companies to locate sub-offices and facilities in the Study Area at some point in the future as offshore activity increases and Mulgrave (and/or Sydney) develops as a supply base. Indeed, the attractiveness of Mulgrave as a potential supply base could be enhanced if drilling services companies (e.g., mud, cement, chemicals) were to locate there, or at least indicate a willingness to locate there. An important strategic initiative at this stage, then, is to develop and maintain contact with these companies and work to attract them to the Study Area.

Though the companies listed in Table 17 are among the ones most likely to locate in the Study Area as offshore activity increases, they are not the only ones. Another strategic thrust should be to market the ports more widely among service companies generally. A complete list of oil field service companies can be found in various industry trade publications, and also at the Industry Canada website. Go to *www.strategis.gc.ca* and follow the links to Petroleum, Oil and Gas to find a complete listing of service companies and key contacts.

- **Fabrication yard**: a fabrication yard also relies on support services and supplies, though these tend to be ones that are more familiar than those associated with offshore exploration and development. There are several fabrication yards in Nova Scotia serving traditional industries, and many companies providing them with a range of goods and services. These yards differ from a yard geared towards supplying the offshore with respect to the type and complexity of structures produced, and also in terms of the standards and systems required for certification. But such differences apply to the yard itself, not to the type of goods and services such a yard requires. Accordingly, it is likely that the impact of a new yard would be felt mainly in the expansion

or re-orientation of existing suppliers, rather than in the establishment of many new ones. For example, established companies in the province and in the area would source and supply material and small equipment needs, as well as consumables (e.g., welding supplies, paint) and services. Depending on the type and volume of work the yard generates, opportunities for new (and existing) enterprises may arise in the following areas:

- Engineering/management
- Sub-contracting (electrical, instrumentation, mechanical)
- Testing and inspection
- Heavy equipment rental
- Machining
- Plate forming
- Training (skills, safety)

Downstream opportunities

A petrochemical facility at the Strait of Canso/Goldboro area is under active consideration. It faces some major challenges. Inadequate feedstock is the major impediment. A plant producing 500,000 tonnes of ethylene per year would require about 650,000 tonnes of ethane feedstock. Total recoverable ethane from SOEP and Deep Panuke is about 75% the required quantity (485,000 t/yr). In other words, it would take another project with a similar production profile (daily rate and gas composition) to provide the basis for an ethane-based petrochemical facility. Alternatively, the facility could use imported propane and butane instead of a pure ethane feed. This option is under consideration.

Natural gas production reaches the required level in the second half of the decade under the Medium and High Cases (see Appendix A). But this, in itself, does not provide sufficient conditions for petrochemical development. To be economic, these plants require relatively inexpensive feedstock. The value of the ethane in the SOEP sales gas stream is currently based on its use as an energy source in the U.S. market. By agreement with SOEP, ethane would be made available for downstream uses in Nova Scotia on commercial terms (essentially its replacement cost in the U.S.). A key element in the feasibility assessment, then, is the competitive price of ethane against the backdrop of U.S. market conditions.

Similar challenges face other downstream opportunities – sufficient quantities of natural gas at a suitable price.

In anticipation that these challenges will be met during the decade, planners in the Study Area (and Guysborough) should ensure that options for using the sites are not foreclosed. This means that all potential opportunities should be carefully considered in an integrated fashion before commitments to particular uses are made. All sites are greenfield and all potential opportunities have similar infrastructure and service requirements: site clearing, development and servicing; road (and possibly rail) construction; and wharf/dock construction. Costs and requirements would vary by site and use.

3. EDUCATION/TRAINING FACILITIES AND PROGRAMS

Institutions and programs

Education and training programs are of two kinds: general and industry-specific. To date, most programs are of a general nature, equipping graduates with the skills necessary to function in one of several industries. These include construction, fabrication, pulp and paper, electric power generation, and oil and gas. Most programs are generic because the current level of offshore demand is insufficient to warrant more specialized training. Nonetheless, two programs in Nova Scotia are aimed at equipping graduates with skills specific to the oil and gas industry: Petroleum Technology (offered at UCCB) and Petroleum Engineering (offered at Dal Tech). Programs are summarized in Table 18.

Table 18
Education Programs for the Oil and Gas Industry

Program	Focus	Institution
Construction trades	General	NSCC/UCCB
Fabrication trades	General	NSCC/UCCB
Process operations	General	NSCC/UCCB
Instrumentation	General	NSCC/UCCB
Marine	General	Nautical Institute
Petroleum Technology	Oil and Gas	UCCB
Petroleum Engineering	Oil and Gas	Dal Tech

Institutions in Nova Scotia are working directly with the oil and gas industry, and with institutions in areas of established oil and gas activity, to identify future needs and to plan programs to address those needs. For example, the Nova Scotia Community College (NSCC) has secured a $2 million donation from PanCanadian Petroleum and Ocean Rig ASA for program development. Irving Oil is contributing $250,000, also for program development. Similarly, UCCB has received industry funding (from Mobil, Imperial Oil, Shell Canada and Westcoast Energy) totaling in excess of $500,000. These funds will be used to develop program curriculum, implement renovations to facilities, and to purchase equipment. The NSCC has also entered into partnerships with Aberdeen College (UK) and the South Alberta Institute of Technology (SAIT) to promote technology transfer.

UCCB introduced a three-year diploma in Petroleum Technology in 1999. Now in its third year, the program is graduating its first six students. They will find jobs with oil and gas companies and their contractors, as well as with regulatory agencies, both in the Atlantic Region and elsewhere in Canada. As a measure of its success, the program is attracting students from across Nova Scotia, with enrollment currently at 18. It is a co-operative program, providing practical application of theories and advances in equipment and methods specific to the oil and gas industry. Courses include chemistry, and mechanical and electrical technology as these pertain to petroleum exploration, production and processing.

UCCB is also home to the Centre of Excellence for Offshore Petroleum Development and Petroleum Education. The Centre is a research facility aimed at evaluating technical problems facing industry staff involved in drilling, production and operations. The Centre is to develop specialized laboratories in process, control systems, fluid dynamics, and measurement and computer simulations.

Meeting future requirements

Like many companies and individuals in the province, institutions in Cape Breton and the rest of Nova Scotia face considerable difficulty in trying to position themselves to meet demands arising from the offshore. The basis for planning is limited – while there is good basic information about the kinds of jobs the offshore creates, how many of each and when they would emerge can only be guessed. And even if these variables were known with an acceptable level of confidence, institutional planners would still be faced with decisions about which occupations to mount programs for and which to leave to established institutions.

We can identify some 50-60 occupations for which demand typically occurs during offshore exploration, development and production (Table 19).

Table 19
Offshore Occupations by Category

Operations/Offshore	
· General management	· Drilling superintendent
· Human resources personnel	· Driller/tester
· Purchasing staff	· Drilling equipment operator
· Business services	· Floorman/roustabout
· Safety/environment management	· Wellhead technician
· Information systems	· Ship's master
· Accounting	· Ship's engineer
· IT support	· Deck hands
· Materials management	· Pilot (helicopter)
· Logistics	· Mechanic
· Geologist	· Electrician
· Geological engineer	· Maintenance trades
· Petroleum engineer	· Materials handling
· Corrosion/structural engineer	· Motor operator
· Mechanical/electrical engineer	· Crane operator
· Secretarial	· Radio operator
· Process operator	· Medic
· Instrument technician	· Catering staff
Construction/Fabrication	
· Civil engineer	· Plate fabricator
· Mechanical engineer	· Pipefitter
· Electrical engineer	· Boilermaker
· Engineering technologist (various)	· Ironworker
· Instrument technician	· Welder
· Nondestructive tester	· Insulator
· Construction supervisor	· Millwright
· Heavy equipment operator (various)	· Equipment mechanic
· Crane operator	· Electrician
· Carpenter	· Instrument fitter

Whether there is sufficient institutional capacity to meet the level of demand in any given occupation depends on the level of offshore activity, and also on the nature and level of the resulting work conducted not only in the Study Area, but in the province and Atlantic Region generally. Construction and operations activities will occur in the province. Offshore activity (ie, drilling, pipelaying and platform installation) will occur in provincial waters, though with a potentially high foreign content arising from foreign ownership of rigs and vessels. Fabrication could occur anywhere, but a portion of it is assumed to occur in a yard in the Study Area.

Indicative figures for total demand by category of activity are set out in Table 20. Narrowing this down to the Study Area is likely to be more misleading than helpful because of the large margin for error arising from the number of assumptions required. Also, graduates of the various education programs are mobile, and able to take up positions wherever opportunities arise.

Table 20
Annual Labour Requirements by Category of Activity – 2002-2011

Activity/years	Low Case persons	Medium Case persons	High Case persons
Construction/post-2005	50-100	300-400	400-500
Fabrication/all years	500-700	1,000-1,500	2,000-2,500
Offshore/all years	700-1,000	1,000-1,500	1,500-2,000
Operations/all years	300-400	700-1,000	1,000-1,200

See Appendix A for details of Offshore Cases.

Some general observations are possible:

- Most of the construction jobs would be located in the Strait of Canso and Goldboro regions. Under all cases, construction would occur between 2006 and 2011. The level of construction in the area could be affected by the proposed Blue Atlantic project, which would take gas from projects southwest of Sable directly to the US rather than to any landfall in the Goldboro area.

- Fabrication jobs would be located worldwide. A Study Area yard could employ 100-150 by mid-decade under the Low Case, rising to 300-400 towards the end of the decade under a High Case. The critical skills where shortages are most likely are in pipe fitting and welding (particularly high pressure/down hand welding), and instrumentation.

- Most offshore jobs would arise from drilling activity and support services (including supply vessel operations). These are directly proportional to the number of wells drilled. Main sources of employment are drilling rigs, supply vessels and drilling services. A single well program would employ up to 250 persons (including turn-around crews).

- Offshore operations encompass operator office, supply and services, offshore installations and gas plant. Employment rises more or less in proportion to the number of projects. A single project would employ 100-150 during production. Critical skills are in plant operations (operational leads), requiring formal training as well as 1-2 years of experience.

Concluding observations

Education institutions in the Study Area deliver entry-level programs applicable to several oil and gas industry occupations at the exploration, development and production stages. The capacity of the programs (including those at institutions elsewhere in the province) is more than adequate to meet the current level of demand in Nova Scotia. Indeed, institutions contacted during the study indicate that it is difficult for some graduates to find placements because local employment opportunities are limited.

Nonetheless, from the institutions' perspective, experience shows that even under current circumstances education is providing an export opportunity. Students from outside the Study Area are being attracted to the Petroleum Technology program. Work to expand the program offering at UCCB is continuing. The College is setting up a Bachelor of Technology degree in cooperation with the Newfoundland's College of the North Atlantic. Also, with support, UCCB is hoping to expand its research and teaching capacity with new lab facilities incorporating technology for three-phase gas separation.

There would not appear to be a need to expand capacity under the Low Case, based purely on job opportunities in the Study Area and the rest of Nova Scotia. But student demand is based on a wider market. Opportunities exist elsewhere in the Atlantic Region, and across Canada. It is this wider market institutions are, or should be, aiming at. As well, institutions should continue to maintain close contact with the industry to identify and respond to emerging needs. These could include short courses addressing specialized requirements (eg, arising from new equipment or processes).

The need for expanded capacity is more likely under the Medium Case, particularly after 2007 as several projects come on stream. The main areas of demand are likely to occur in fabrication trades (though this is largely dependent on the success in developing a competitive yard), offshore occupations related to drilling, and process operators on platforms and gas plants. For most occupations, institutions would have sufficient time to respond to the higher level of activity by expanding existing programs or developing new ones. We can continue to expect a planning/regulatory lag of 2-3 years between the time of discovery and the commencement of development, with another 2-3 years to production. Institutions should continue to monitor offshore activity and hold regular meetings with petroleum companies to identify emerging needs.

The need for expanded capacity is most likely under the High Case, with rising demand by mid-decade. The conclusions are similar to those for the Medium Case, though there would be higher demand and less time for program expansion and development. With higher sustained demand for production positions, particularly on offshore platforms,

institutions would begin to consider creation of a wider range of offshore-specific programs, as well as targeted short courses. Close working relationships with the industry, as well as strategic partnerships with institutions specializing in offshore programs, are essential at this level of activity.

V.

VISION AND STRATEGY

1. PERSPECTIVE

The main objective of this study is to define a critical path for economic growth in the CBRM and Strait of Canso as it applies to potential developments that are expected to arise from offshore oil and gas developments. Some of the top development prospects and the infrastructure and services needed to accommodate them are identified in Chapter IV.

In this final chapter we address some of the strategic initiatives needed in the Study Area in order to move the prospects from potential to actual. These initiatives are framed against a backdrop of competition and duplication of effort within the Study Area. From discussions with stakeholders in meetings and during the February workshop, it seems clear that most observers see the competition and duplication as at best wasteful and at worst counterproductive.

If the Study Area wishes to maximize the opportunities arising from the offshore in the future, then an approach emphasizing common goals and joint action seems to be essential. This is not to suggest that the Study Area would have benefited more than it actually did from earlier offshore activity. As the analysis in Chapter II shows, the combined effects of limited opportunity, a lack of industrial capacity, and general uncertainty played a far greater role in determining the impacts from earlier projects than the lack of a common strategy.

But things are changing. With a third offshore project in the planning stage and an expansion of exploration activity to areas northeast of Sable Island, there is optimism that greater and better opportunities lie ahead for the Study Area. Securing these opportunities requires vision and a willingness to cooperate. It also requires strategic investment in infrastructure and services that build on the natural strengths of the Area.

This study represents a first step on the path to securing potential opportunities. It sets out a strategy recognizing that events and resulting opportunities change. The planning approach has to accommodate change. It has to re-visit assumptions and options, and has to evaluate decisions in light of changing circumstances. To repeat the well-known observation - planning is a journey, not a destination. The CBGF Oil and Gas Development Task Force, or a body like it, should repeat this exercise periodically to ensure the objectives remain sound and that emerging opportunities are identified and brought into the strategic framework.

2. VISION

A shared vision of the role of the offshore in the development of the Study Area emerged through discussions with stakeholders during the course of this study. These discussions took the form of one-on-one meetings, as well as a workshop involving representatives of government, the private sector, labour and education institutions from all parts of the Study Area.

Though the vision addresses key issues, it is not complete. There is broad consensus on objectives and the action needed to achieve them, but further thought and discussion are required on such strategic matters as organizational structure and process.

There is consensus on the three most fundamental issues:

- **Common interest**: Government, business, labour and education organizations in the Study Area share a common interest in promoting economic development. There is agreement on the need to create income and employment opportunities throughout the Study Area. There is a recognition that increased economic activity in one region permeates the whole economy, thereby benefiting all regions. There is also a recognition that offshore activity can play a potentially important role in generating economic development and growth.

- **Building on strengths**: There is a role for public funds to support strategic investment in infrastructure and services. Many criteria could be put forward for selecting targets for investment. The consensus seems to be that investment targets that link strong prospects to natural strengths or advantages provide the best chance for development success. Investment in infrastructure for a supply base at Mulgrave and fabrication yard at Sydport is consistent with this criterion.

- **Cooperative action**: The opportunities arising from offshore development are most effectively secured through cooperative action. Stakeholders have expressed considerable frustration, not just at the lack of a coordinated or cooperative effort to secure offshore benefits, but at how wasteful and counterproductive the current approach is that pits one region against another. A cooperative approach is essential. Such an approach is emerging, at least in the Strait of Canso area, with the creation of a Mayors and Wardens group representing nine municipalities. For oil and gas planning (and perhaps for other areas of initiative), this group could be broadened to include the CBRM. Alternatively, a representative group such as the Oil and Gas Development Task Force should be formed to refine and oversee future strategic initiatives that encompass the Study Area as a single development entity.

3. STRATEGY

Develop a strategic planning framework

The Task Force should consider establishing a planning framework to support on-going development of the offshore sector in the Study Area. This study may be seen as the first iteration of this framework. In other words, the outputs of this study address each of the requirements listed below under *current and foreseeable circumstances*. But the study should be repeated periodically because circumstances change, and plans should be sensitive to such changes. It is a framework because it captures a set of activities which themselves may change over time as objectives are modified and as the planning organization (eg, Task Force) modifies its structure and shifts its focus.

The main elements of the framework (similar to the scope of this study) could include:

- Create the planning organization and set the mandate.
- Establish the planning horizon, scope and budget.
- Identify the planning issues. These would include:
  - Identify offshore opportunities
  - Assess Study Area capacity and interest
  - Identify challenges
  - Determine offshore industry interest
  - Specify and make strategic investments
  - Evaluate performance
- Adopt a reporting system.

Develop port master plans

There is a clear need for port master plans for the Strait of Canso and Sydney Harbour. At present, these harbours lack a unifying vision and any sense of priority about how assets would be used. This does not provide interested companies with a sense of comfort about future development and how conflicting uses and constraints on expansion might compromise their own investments over time.

Part of the difficulty to date in advancing a master planning agenda lies in the fractured governance structure of the ports. This may be a thing of the past in the Strait of Canso with the creation of the Superport Corporation, and also with the spirit of cooperation that is emerging among municipal units bordering the Strait.

Matters continue to be complex in Sydney Harbour. There is a port authority, but its mandate extends to one asset (the Sydney Marine Terminal). Others, including the Sysco and Devco sites, as well as Sydport and the Marine Atlantic Ferry Terminal and public wharf in North Sydney, lie outside its responsibility. From a planning perspective, this state of affairs creates a need for extensive cooperation among the various interests. Such cooperation would hopefully lead to the development of a planning framework for a port master plan so that the full development potential of the harbour may be realized.

Framework for joint marketing

There is a clear need for unified promotion and marketing of the Study Area as a place for the offshore to do business. At present, each of the regions in the Study Area operates independently and competitively. Not only does this present a confusing picture to prospective clients, it reflects a lack of planning and coordination that could raise questions about the quality of the business environment. In a more cynical way, it also provides an opening for prospective clients to play one region off against another.

As noted above, the initial steps to promote a cooperative environment in the Strait of Canso Region (the Mayors and Wardens group) are to be commended and hopefully will evolve into a strong unified planning voice in the Region. Broadening this group at some point to include the CBRM (for offshore-related and other issues of common concern) would be a logical extension. A corresponding Study Area private sector organization (e.g., an Offshore Trade Association) could also be formed for promotion and marketing purposes.

The framework would encompass three key elements:

- **A Memorandum of Understanding** (MOU) between the regional governments setting out the objectives, mandate and operating guidelines for a joint marketing agency.

- **A joint marketing agency to carry out the marketing plan**. This could be a new entity or an adjunct of an existing organization, provided it has a clear mandate as a single window on the Area and a separate budget to carry out its mandate. It could report to a Board composed of regional government and private sector representatives.

- **Create an Area marketing program**. This would consist of the following:

  - **Area identity program**: This is the counterpart to the corporate identity program. The logo or identifier could project a "can-do" image of port assets and people taking on, or ready to take on, a wide range of offshore opportunities. This message should inform all promotional materials.

  - **Advertising vehicles**: Several options should be exploited, with messages and images up-dated to reflect development and success. The advertising should also use testimonials and other methods to set straight the perception of a difficult labour climate in the Area.
    - Web site for global access
    - Brochures for distribution at meetings and trade shows
    - Advertising in trade publications and periodicals

- **Personal approaches**: Advertising is designed to draw attention to what the Area has to offer. It is in one sense the first line of communication. But direct contact is indispensable as a mechanism for presenting a case and answering questions. For this reason, it is essential that any program to promote the Area build in a direct contact approach.

    - Establish a presence where decisions are made. There is much to be said for setting up a small office or contracting the services of an established marketing representative in Halifax. This would facilitate a two-way flow of information between the offshore companies and their contractors (ie, emerging opportunities), and the body responsible for Area marketing and development (ie, suppliers, assets and solutions). The office/contracting approach could be long-term arrangement, or could be established at critical points in the offshore exploration/development cycle.

    - Meet the offshore sector. Whether or not the Area establishes a presence in Halifax, it must bring its message directly to the operators and contractors through meetings with them, and also by promoting site visits to the Area. These kinds of initiatives, of course, have taken place over the years. The difference under an Area-based approach lies in what the message is and how it is delivered.

    - Trade shows. A presence at major trade shows would continue, but the representation and the message would be Area-based. This said, participation at trade shows should be carefully considered. It is expensive and possibly not the best use of funds. For example, the target market for a supply base is limited essentially to the offshore operator. The most effective method of reaching this market is the direct approach - meeting with the prospective companies one on one.

4. RECOMMENDATIONS

Policy

As a first step in its offshore strategy, the Oil and Gas Development Task Force (or its successor organization) should send an urgent message to the Government of Nova Scotia that the benefits of offshore development are largely passing the province by. The message should highlight a few key points:

- The current policy regime is inadequate generally, and particularly as it pertains to the regional distribution of benefits. The current policy encourages offshore companies assess local supply capability by looking back to see what has been done, rather than looking ahead to see what is possible.

- *If* governments wish to see the development of an offshore supply capability in Nova Scotia, and *if* they wish to see a regional distribution of benefits, then policy and strategy that give real meaning to the concept of full and fair opportunity must be implemented. *If* the resource is to be developed for the benefit of its owners – the people of Canada including Nova Scotia – then projects should be designed to achieve, not circumvent, this objective.

- To be most effective, policies and benefits requirements should form an integral part of the Exploration Licence bid award process. Offshore companies should see themselves as entering into a contractual arrangement with a clear link between the privilege of exploring and developing, and their contribution to local economic growth. Development proposals should incorporate design approaches that strengthen local supply capability, and contain explicit local procurement initiatives as a competitive element of EL award. Whether these commitments are captured in Benefits Plans or Offshore Strategic Energy Agreements, they should amount to more than vague and unenforceable promises.

Supply Base

The CBGF should support the development of a supply base in the Study Area to meet anticipated requirements arising from exploration in the Sydney Bight, off Western Cape Breton, and the Banquereau Bank areas, and also in the Laurentian Sub-basin should opportunities arise there. A supply base is one of the more attractive prospects.

Mulgrave is the preferred location in the short term because it meets all key site criteria. Sydport and the Sydney Marine Terminal meet most basic criteria, and cannot be ruled out as short-term prospects, particularly if exploration goes forward in Sydney Bight. Should the level of offshore activity in the future warrant larger supply base facilities, consideration could be given to supporting development of a facility at Bear Head or the Melford Land Reserve.

In order of priority, the main infrastructure and service requirements for Mulgrave are:

- Office
- Warehouse
- Increased water main capacity
- Silo storage for bulk commodities (e.g., cement, mud)
- Tank storage for fuel.

Support from the Growth Fund should be conditional on:

- The submission to the Growth Fund of a formal business plan to develop the site to industry standards (this may be done by the Strait of Canso Superport Corporation or a supply base operator).

- Tangible evidence of a commitment to the initiative in the form of an equity contribution to an agreed set of expenditures.
- A letter of support for the proposal from the Strait of Canso Superport Corporation as owner of the wharf facilities.

Fabrication Yard

The CBGF should support the development of a fabrication yard in the Sydport Marine Industrial Park. Fabrication of structures and components represents a major share of offshore requirements for which there is limited supply capacity in Nova Scotia.

Sydport is the preferred location in the short term because it meets key site criteria, is available for immediate development, and the yard has the backing of an investment group. Should the level of offshore activity in the future warrant larger fabrication facilities, consideration could be given to supporting the development a yard at Bear Head or the Melford Land Reserve.

In order of priority, the main infrastructure and service requirements for the Sydport site are:

- Wharf up-grading to meet load bearing and load-out requirements
- Site improvements for assembly and laydown areas
- Extension of rail access to laydown area
- Construction of fabrication hall(s) and shops
- Construction of offices and warehouse

In addition, in order to pre-qualify as a bidder on offshore fabrication contracts, the yard must secure all necessary certifications (HSE, ISO, welding standards). To enhance their prospects for success, the proponents of the yard should involve an experienced offshore fabrication company as an active joint venture partner.

Support from the Growth Fund should be conditional on:

- The submission to the Growth Fund of a formal business plan by the yard operating company to develop and operate the site to industry standards;
- A feasibility study setting out detailed yard development costs and pro forma revenues;
- A commitment to the development by the yard operating company in the form of an equity contribution to an agreed set of expenditures;
- A memorandum of understanding or joint venture agreement between the Laurentian Group (or other operating entity) and an internationally recognized offshore fabrication company; and,
- Completion of commitments by the Laurentian Group under the Sydport Purchase and Sale Agreement.

Downstream Opportunities

The CBGF should provide support to advance the development of downstream opportunities. Each of the opportunities identified in this report requires access to natural gas or natural gas liquids. Each also requires access to suitable sites. To further the development of these opportunities, three strategic initiatives should be carried out:

- Policy development – representations should be made to the provincial government that offshore policy, and any agreements entered into pursuant to development plans and production licences, include commitments by producers to supply ethane and other natural gas liquids for downstream uses.

- Port Master Plan – a plan should be developed for the Strait of Canso so that sites for potential downstream opportunities can be clearly identified and set aside. This will provide assurance that all land use options are identified and priorities specified so that potential downstream opportunities are not foreclosed.

- Selected studies – consideration should be given to supporting studies need to further define opportunities and advance specific proposals.

Education

Suitable education programs are vital for ensuring residents of the Study Area are prepared for offshore employment opportunities. These programs also represent an export opportunity in so far as they attract students from outside the Area. Developing and mounting these programs requires sound planning, qualified staff and suitable facilities. An important area for potential CBGF support would be in the form of assistance for laboratory and demonstration facilities. Specific opportunities for support should be determined through discussions between the CBGF and individual institutions.

Co-operation and Strategic Planning

Stakeholders in the Study Area recognize the need to plan and market the regions' assets co-operatively, rather than competitively. They express considerable frustration, not just at the lack of a co-ordinated effort to secure offshore benefits, but at how wasteful and counterproductive the current approach is that pits one region against another. They recognize that offshore activity can play a potentially important role in generating economic growth, and that increased economic activity in one region permeates the whole economy, thereby benefiting all regions.

In the interests of efficiency and effectiveness, stakeholders should create a single organization to assist with marketing assets in the Study Area to the offshore sector. This regional organization (e.g., a Study-Area offshore trade association) would complement, not duplicate, development and marketing initiatives conducted by individual private sector operators of such facilities as supply bases and fabrication yards. It could also assist the private sector by identifying offshore opportunities and recommending strategic public sector investments.

Targeted marketing initiatives aimed at supply and service companies that support exploration and fabrication should form a central thrust of the strategic plan. Efforts to identify prospects could begin immediately, starting with the list set out in Table 17. Marketing the areas in advance of development of facilities and award of contracts is recommended in order to ensure that prospective suppliers are aware of the range of opportunities and location possibilities. This initiative should be accompanied by an assessment of companies' interest in order to determine their decision criteria and to identify any infrastructure requirements.

APPENDIX A

Offshore Exploration and Development Cases

Table A-1: Northeast of Sable - Low Case - Scotian Shelf/Laurentian Basin Oil and Gas Activity, 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf				1	1					
Slope				1	2	1				
Significant discoveries (#)										
Shelf										
Slope					1					
Development										
Gas projects										
Project #1										
Project #2										
Project #3										
Project #4										
Project #5										
Project #6										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)										
Oil (mmbbl/day)										

Delineation and regulatory

Field development

Production

Northeast of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Low Case										
Exploration/Delineation										
Jack-up rigs				1	1					
Mobile rigs				1	1	1	1	1	1	1
Supply vessels				4	4	2	2	2	2	2
Helicopter				2	2	1	1	1	1	1
Shore base				2	2	1	1	1	1	1
Development										
Engineering/management							1	1	1	1
Production structure									1	1
Topside facilities									1	1
Drilling (jack-up or platform)										1
Shore base										
Pipeline										
Pipe coating										
Gas plant										
Production										
Management/Operations										
Downstream										

Table A-2: Southwest of Sable - Low Case - Scotian Shelf/Laurentian Basin Oil and Gas Activity, 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf	5	3	2	2	2	1	2	2	1	1
Slope	2	2	2	1	1	1	2	3	2	1
Significant discoveries (#)										
Shelf	Deep Panuke			2				2		
Slope						1				
Development										
Gas projects										
Project #1										
Project #2										
Project #3	Sable Tier 2									
Project #4										
Project #5										
Project #6										
Project #7										
Project #8										
Project #9										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)			400	400	400	400	400	800	800	800
Oil (mmbbl/day)										

Delineation and regulatory
Field development
Production

Southwest of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Low Case										
Exploration/Delineation										
Jack-up rigs	2	1	1	1	1	1	1	1	1	1
Mobile rigs	1	1	1	1	1	1	1	1	1	1
Supply vessels	5	4	4	4	4	4	4	4	4	4
Helicopter	3	2	2	2	2	2	2	2	2	2
Shore base	3	2	2	2	2	2	2	2	2	2
Development										
Engineering/management	2	2	2	1	1	1	1	1	2	2
Production structure	1	3	4	1		3	3	3	1	1
Topsides	1	3	4	1		3	3	3	1	1
Drilling (jack-up or platform)			1	1			1	1		2
Shore base			1	1	1	1	1	2	2	2
Pipeline		to NS	to NS							
Pipe coating		1	1							
Gas plant										
Production										
Management/Operations			1	1	1	1	1	2	2	2
Downstream										

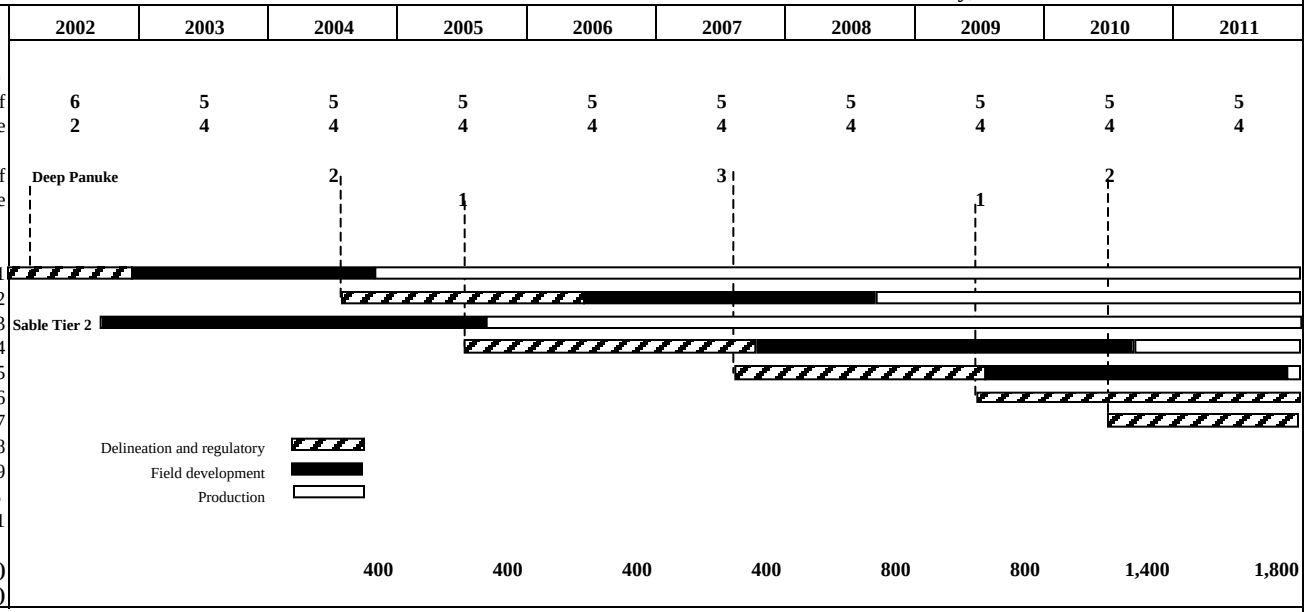
Table A-3: Northeast of Sable - Medium Case - Scotia Shelf/Laurentian Basin Oil and Gas Activity, 2002-2011

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf			2	3	3	3	2	2	2	2
Slope			2	3	3	2	1			
Significant discoveries (#)										
Shelf				2				2		
Slope					1					
Development										
Gas projects										
Project #1										
Project #2										
Project #3										
Project #4										
Project #5										
Project #6										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)								400	400	400
Oil (mmbbl/day)										

Northeast of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Medium Case										
Exploration/Delineation										
Jack-up rigs			1	2	2	2	1	2	2	2
Mobile rigs			1	1	1	1	1	1		
Supply vessels			4	5	5	5	4	5	4	4
Helicopter			2	3	3	3	2	3	2	2
Shore base			2	2	2	2	2	2	1	1
Development										
Engineering/management					1	1	2	2	2	2
Production structure						3	3	3	2	2
Topsides						3	3	3	2	2
Drilling (jack-up or platform)								1	1	2
Shore base								1	1	1
Pipeline							to NS	to NS	to NS	to NS
Pipe coating							1	1	1	1
Gas plant							1	1	1	1
Production										
Management/Operations								1	1	1
Downstream										

Table A-4: Southwest of Sable - Medium Case - Scotian Shelf/Laurentian Basin Oil and Gas Activity, 2002-2011



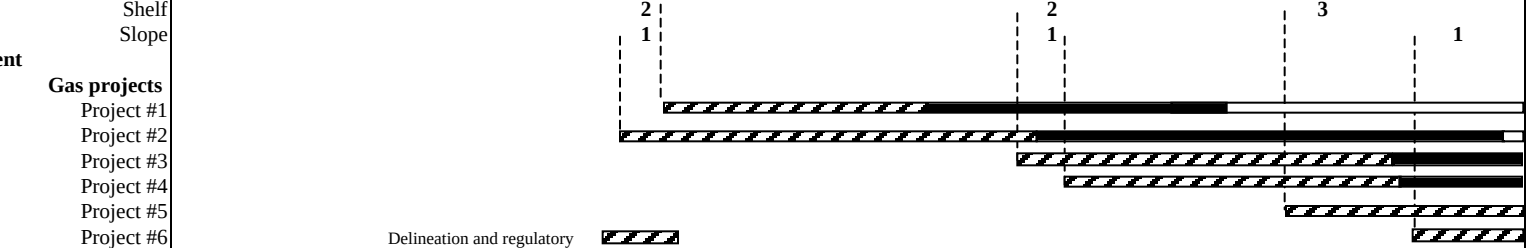
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf	6	5	5	5	5	5	5	5	5	5
Slope	2	4	4	4	4	4	4	4	4	4
Significant discoveries (#)										
Shelf			2			3			2	
Slope				1				1		
Development										
Gas projects										
Project #1										
Project #2										
Project #3										
Project #4										
Project #5										
Project #6										
Project #7										
Project #8										
Project #9										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)			400	400	400	400	800	800	1,400	1,800
Oil (mmbbl/day)										

Southwest of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Medium Case										
Exploration/Delineation										
Jack-up rigs	2	2	2	2	2	2	2	2	2	2
Mobile rigs	1	2	2	2	2	2	2	2	2	2
Supply vessels	5	7	7	7	7	7	7	7	7	7
Helicopter	3	4	4	4	4	4	4	4	4	4
Shore base	3	3	3	3	3	3	3	3	3	3
Development										
Engineering/management	2	2	2	2	2	2	3	2	3	2
Production structure	1	3	4	1	3	3	4	5	5	4
Topsides	1	3	4	1	3	3	4	5	5	4
Drilling (jack-up or platform)			1	1			1	1	2	1
Shore base			1	1	1	1	2	2	3	4
Pipeline		to NS	to NS		to NS/US	to NS/US	to NS/US			
Pipe coating		1	1		1	1	1			
Gas plant						1	1			
Production										
Management/Operations			1	1	1	1	2	2	3	4
Downstream										

Table A-5: Northeast of Sable - High Case - Scotia Shelf/Laurentian Basin Oil and Gas Activity, 2002-2001

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf			2	3	4	5	5	5	5	5
Slope			2	3	4	4	4	4	4	4
Significant discoveries (#)										
Shelf				2			2		3	
Slope				1			1			1
Development										
Gas projects										
Project #1										
Project #2										
Project #3										
Project #4										
Project #5										
Project #6										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)								400	400	1,000
Oil (mmbbl/day)										

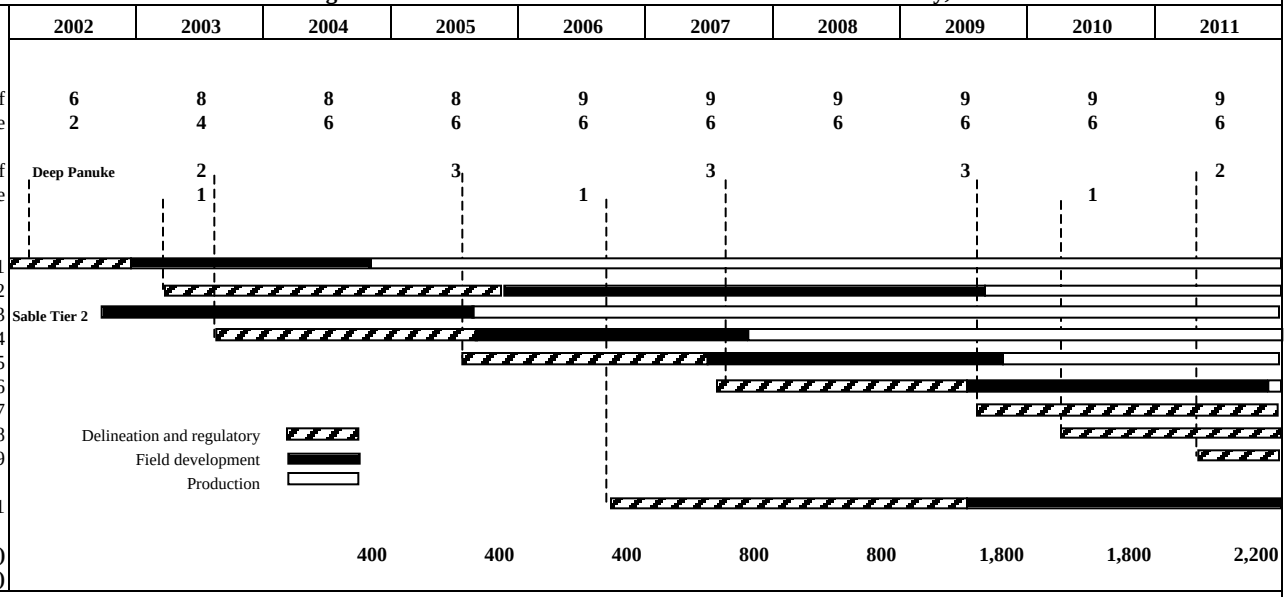


Northeast of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
High Case										
Exploration/Delineation										
Jack-up rigs			1	1	2	2	2	2	2	2
Mobile rigs			1	1	2	2	2	2	2	2
Supply vessels			4	4	7	7	7	7	7	7
Helicopter			2	2	3	3	3	3	3	3
Shore base			2	2	3	3	3	3	3	3
Development										
Engineering/management					2	2	2	3	4	4
Production structure						3	3	5	2	6
Topsides						3	3	5	2	6
Drilling (jack-up or platform)								1	2	4
Shore base								1	1	2
Pipeline							to NS	to NS	to NS	to NS
Pipe coating							1	1	1	1
Gas plant						1	1	2	1	1
Production										
Management/Operations								1	1	2
Downstream										

Note: Values in cells refer to number of units in use or under construction in a given year.

Table A-6: Southwest of Sable - High Case - Scotian Shelf/Laurentian Basin Oil and Gas Activity, 2002-2011



	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Exploration										
Wells (#)										
Shelf	6	8	8	8	9	9	9	9	9	9
Slope	2	4	6	6	6	6	6	6	6	6
Significant discoveries (#)										
Shelf		2		3		3		3		2
Slope		1			1				1	
Development										
Gas projects										
Project #1										
Project #2										
Project #3										
Project #4										
Project #5										
Project #6										
Project #7										
Project #8										
Project #9										
Oil Projects										
Project #1										
Production										
Gas (mmcf/day)			400	400	400	800	800	1,800	1,800	2,200
Oil (mmbbl/day)										

Southwest of Sable - Offshore Requirements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
High Case										
Exploration/Delineation										
Jack-up rigs	2	3	3	3	3	3	3	3	3	3
Mobile rigs	1	2	2	2	2	2	2	2	2	2
Supply vessels	5	9	9	9	9	9	9	9	9	9
Helicopter	3	5	5	5	5	5	5	5	5	5
Shore base	3	4	4	4	4	4	4	4	4	4
Development										
Engineering/management	2	2	2	2	2	3	2	3	2	2
Production structure	1	3	4	2	4	6	5	5	4	4
Topsides	1	3	4	2	4	6	5	6	5	5
Drilling (jack-up or platform)			2	2	1	2	2	2	1	2
Shore base			1	1	1	2	2	4	4	5
Pipeline		to NS	to NS		to NS/US	to NS/US	to NS/US			
Pipe coating		1	1		1	1	1			
Gas plant						1	1			
Production										
Management/Operations			1	1	1	2	2	4	4	5
Downstream										

Note: Values in cells refer to number of units in use or under construction in a given year.

APPENDIX B

Offshore Exploration Goods and Services

Offshore Drilling Support Services

Acidizing services	Laboratory services
Air quality monitoring	Liner equipment & services
Ambulance & related services	Logging
Blowout preventer manufacture	Machine shop
Blowout preventer parts & service	Mapping
Carbon dioxide	Milling tools & services
Casing jacks & recovery	Nitrogen equipment & services
Casing supply/storage	Offshore drilling & production equipment
Cathodic protection	Oilfield waste recycling & disposal
Cementing equipment & tools	Packers, service tools
Cementing services	Perforating and perforating supplies
Centrifuges & separators	Pipe
Chemical injection equipment	Pipe storage & transportation
Chemicals, processing & production	Power swivels & tongs
Chokes	Safety equipment rental
Coatings, external/internal	Pressure testing
Completion tools	Pumping services
Compressors	Reamers
Consulting, engineering	Rental equipment
Consulting, environmental	Rig moving
Consulting, geological	Rig safety inspections
Coring	Safety clothing
Directional drilling services	Safety equipment & trailers
Directional drilling tools	Safety services (H2s, breathing eq., First aid)
Directional surveying	Safety training
Drill bits/collars	Safety, contract personnel
Drill pipe screens, protectors, etc.	Safety, rentals
Drill string rental	Seismic processing, archiving and interpretation
Drill string supply/repair	Seismic survey audit
Drilling equipment	Service rig parts & repairs
Drilling fluids	Software development
Drilling motors & tools	Sonic logging & evaluation
Drillstem testing	Supply stores
Environmental audits-consultants	Swabbing equipment & supplies
Environmental services	Tooljoints, drill pipe
Fire fighting, protection & training	Tooljoints, tubing premium
Fishing tools & services	Training, safety, environmental
Fracturing equipment	Trucking
Fracturing fluids	Tubular running services
Fracturing services	Underbalanced drilling services
Gas lift equipment	Well optimization
H2s monitoring equipment	Wellhead completion equipment
Horizontal drilling services	Wellhead manufacture
Industrial cleaning	Wellhead supply & servicing
Inspection services, tubulars	Wellsite supervision
Instrumentation, surface	Wireline logging