7 SOCIOECONOMIC ASSESSMENT

7.1 Approach and Methodologies

Socio-economic assessment is a process that is executed from the inception of project planning to project termination or abandonment. The socio-economic assessment of the Project focuses on those matters that are of real concern to the various groups, who may, in one way or another, be affected by some facet of the Project. At the same time, it addresses issues identified by those professionals with experience in similar projects and issues that must be addressed to meet regulatory requirements. The process involved consultation, networking within the area of interest, semi-structured interviews, meetings and open houses, and participant observation. The issues that have been identified are derived from:

- interviews with key individuals knowledgeable about the study area;
- consultation with the public;
- Scope of the Environmental Assessment (CNSOPB et al. 2001b);
- reference to the work undertaken for the SOEP;
- work undertaken by EnCana for this study; and
- the technical expertise of the Study Team.

Given the nature of the Project and the distribution of its likely effects, the analysis of the socioeconomic effects was undertaken by reference to five distinct geographical areas, namely:

- Canada and the Province of Nova Scotia;
- Halifax Regional Municipality;
- Service Communities, or those communities within less than one hour's commuting distance of the landfall location, that might provide services during the development and production phases of the Project (*i.e.*, Guysborough, Sherbrooke and Antigonish);
- Guysborough County and the communities in proximity to the selected landfall location; and
- the offshore area.

The linkages that exist between the Project and each of the areas identified above are summarized in Table 7.1.



Table 7.1 Project 1	Linkages to Impacts							
Issue/Concern	Guysborough Disti	rict & Landfall Area	Service Communities: Guy. Antiec	sborough, Sherbrooke and onish	Halifax Regiona	l Municipality	Offshor	e Area
	Project Linkage	Stakeholders	Project Linkage	Stakeholders	Project Linkage	Stakeholders	Project Linkage	Stakeholders
THE ECONOMY								
Employment	 construction 	 those seeking 	 construction 	 those seeking 	 construction 	 those seeking 	 offshore activity 	 employees
	 operational expenditures 	employment municipality 	 operational expenditures 	 employment municipalities 	 operational expenditures 	 employment municipality 		
Business Opportunities	• investment	 businesses municipality 	 investment 	 businesses municipalities 	• investment	 businesses municipality 	 offshore activity 	 businesses
Training	Need for skills	residentseducational sectors	need for skills	residentseducational sector	need for skills	 educational sector those hoping to gain entry to the industry 	need for skills	 employees educational sector
Property Tax Base	Onshore pipeline development	municipalityresidents	No Linkage		 development and property occupation 	 municipality 	No Linkage	
Economic Stability & Growth	 construction expansion of industrial sector 	 municipality businesses GCRDA 	 construction expansion of industrial sector 	municipalitybusinesses	 construction expansion of industrial sector 	municipalitybusinesses	 offshore activity 	 businesses
Aquaculture and the Fishery (Inshore/Offshore)	 pipelines accidental events 	inshore fishersdivers	No Linkage		No Linkage		 offshore construction operations 	offshore fishers
Tourism	industrial infrastructure	 tourist operators residents 	No Linkage		No Linkage		 offshore activity 	 recreational boaters visitors to Sable Island
THE ENVIRONMENT								
Water Quality	construction	 beneficiaries of clean water 	No Linkage		No Linkage		No Linkage ¹	offshore fishery
Air Quality	No Linkage		No Linkage		No Linkage		 gas production facilities 	 employees other persons located offshore
INFRASTRUCTURE								
Roads	construction traffic	 residents road users 	construction traffic	 road users 	 construction traffic 	road users	No Linkage	
Wharves	construction traffic	local users	No Linkage		 offshore servicing 	 municipality port / facility operators 	No Linkage	
Emergency Services	accidents	 employees local residents emergency service providers 	accidents	employeesemergency services	 accidents 	emergency facilities	accidents	 employees emergency facilities
SOCIAL FACTORS								
Land and Water Use	construction	 local land owners and users municipality 	No Linkage		constructionoperation	 local land & property owners municipality 	 pipelines platforms accidents 	 other offshore water users
Marine Archaeological Resources	construction	 Nova Scotian Museum recreational divers 	No Linkage		No Linkage		No Linkage	
Land Based Archaeological Resources	• construction	 First Nations and Aboriginal people Nova Scotian Museum 	No Linkage		No Linkage		No Linkage	
Current Land and Resource Use for First Nation's and Aboriginal Purposes	• construction	• First Nations and Aboriginal peoples	No Linkage		No Linkage		No Linkage	
Public Health and Safety	constructionaccidental events	 municipality employees residents 	No Linkage		No Linkage		constructionaccidental events	 employees other offshore water uses

Note: 1. As referenced in the text there are discharges from the platforms to the marine waters. The analysis related to these discharges is being addressed in Section 6. To the extent that there is no significant impact on commercial fish species, there is no socio-economic linkage.

The methods used in socio-economic assessment range from the very informal to the highly structured. The methodologies used for this Project included the application of a structured economic model that detailed the economic consequences of the Project on both Canada and the Province of Nova Scotia and more informal consultative techniques. The assessment also drew on secondary sources of information, (*e.g.*, demographic and economic data from Statistics Canada, information on infrastructure from provincial and municipal agencies *etc.*), attained information directly from those groups and interests within the study area, and drew on the technical expertise of the Study Team.

Other activities included:

- review of published literature, unpublished reports and data from government agencies and departments, universities and research institutions and other relevant offshore operators;
- interviews with individuals with knowledge of specific topics, *e.g.*, those with an understanding of how SOEP changed the socio-economic context of the study area;
- telephone surveys; and
- team meetings to ensure the efficient exchange of information.

The socio-economic analysis involved the following steps as shown in Figure 7.1.





Figure 7.1Socio-economic Assessment Methodology

Section 2(1)(a) of the CEAA defines an environmental effect as:

any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.

The socio-economic assessment for the Deep Panuke Project focuses on socio-economic impacts associated with a Project-induced change in the environment.

Section 16(1)(a) of *CEAA* states that every assessment shall include a consideration of "any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out". Cumulative impacts can arise from the consequences of



a single project, or from the effects of different projects whose area of influence overlaps. The assessment of cumulative socio-economic impacts is inherently concerned both with the processes of socio-economic change and the growth-induced effects of a project. In this regard, it is essential to note that the socio-economic status of any area is never static. It evolves in response to many factors, local, regional and international.

At this time, the landfall area, the regional area encompassing the District of Guysborough and the Strait of Canso, and the Province of Nova Scotia are each responding to the new and accelerating demands being placed on labour and infrastructure by the current initiatives of the oil and gas sector. The development of the SOEP gas plant and associated pipeline infrastructure that serves the plant has changed the economic base of the municipality. SOEP and the M&NP project have changed the expectations of the communities within the area with respect to further industrial investment. Important initiatives, for example, have been undertaken by the Municipality to encourage industrial development to locate adjacent to the gas plant.

Cumulative socio-economic impact assessment involves systematic consideration of how a project might interact with the broader socio-economic changes that are occurring within an area. For example, the interaction between two or more projects may generate the need for new infrastructure or initiate significant changes in the socio-economic dynamics of the area. The development of a new economic sector would certainly have widespread consequences, and this Project represents an important milestone in the development of an offshore industry in Nova Scotia. The government of Nova Scotia, however, does recognize that:

Successful development of the offshore oil and gas industry requires more discoveries, which in turn requires more information on the resource potential. The first priority is to encourage exploration (NSDNR 2001b).

This study identifies the anticipated impacts of this Project on the provincial economy, its importance to the Halifax Regional Municipality and its relevance to further economic development in Northeast Nova Scotia. It takes into account both the changes that have occurred as a consequence of projects executed in the recent past, current activity in the offshore, those projects that my be taking place concurrently and the plans of the Municipality of the District of Guysborough.



7.2 Socio-economic Context

7.2.1 Provincial Profile

7.2.1.1 The Economy

Nova Scotia has a long and varied social and economic history originating with the First Nations and Aboriginal people who relied on the resources of the land and waters and traveled widely throughout the Province. As the province was settled by Europeans, the colony rapidly developed as a maritime economic power. The 20th century brought further change. Fishing, forestry and mining remain the economic mainstay of many rural communities, but, today the tertiary sector accounts for 75.5% of the economy and close to 50% of GDP is directly attributable to the export of goods and services. Despite the low contribution of the primary sector to GDP, there is a considerable value added to fishery, forestry and mining products through manufacturing and processing before they leave the province.

The oil and gas industry contributes to the provincial economy in several ways including:

- **Expenditures**: these include the exploration, development and production spending required to find, extract, process and transport oil, natural gas and associated gas product. The resultant infrastructure becomes part of the "capital stock" of the province. To March 31, 2001, SOEP had spent \$2.5 billion, of which \$846 million (34%) was Nova Scotia content (SOEI 2001b). On the exploration side, petroleum companies have been issued permits for work totalling \$1.03 billion in actual and proposed expenditures (NS Petroleum Directorate 2001b).
- **Employment**: exploration, development and production have generated thousands of person-years of permanent and temporary employment for Nova Scotians. The Cohasset Project, for example, provided 3,727 persons years of employment over its lifetime (PanCanadian 2001b), and to March 2001, the SOEP had provided 4,265 persons (SOEI 2001b).
- **Royalties:** gas production is subject to a royalty structure initially based on gross revenues, with a move to net revenues as a project matures; the system is designed to encourage "risk taking" by offering lower royalties for the first project in any new area; and
- Research & Development (R&D), Education and Technology Transfer: as part of the regulatory requirements, petroleum companies must transfer knowledge, skills and technology to Nova Scotian individuals and firms. For example, since 1995, SOEP has spent over \$45 million in R&D, education and technology transfer initiatives in the province (SOEI 2001c).



One indication of the effect of this sector on the provincial economy is reflected by the Department of Finance's estimate that the SOEP alone would account for 2.2% of the provincial economy by the end of 2001, if it met its production targets (NS Petroleum Directorate 2001a); this is roughly the contribution of the agriculture and fishing industries combined. New oil and gas projects will augment this contribution.

7.2.1.2 **Population and Employment**

The provincial population in 2000 was 940,996; this represented an increase of 5.8% since 1986 (NS Department of Finance 2000). In 1999, the provincial labour force was 452,000, an increase of 40.8% over 25 years. This growth was primarily in the private sector (NS Department of Finance 2001); over the same period public sector employment as a percentage of total employment declined.

Nova Scotia has a lower participation rate (*i.e.*, the ratio of the labour force (employed persons and those looking for work) to the population over 15 years old), than the Canadian average. In 2000, this rate was 61.0% versus 65.6% in Canada. The unemployment rate in Nova Scotia is also a higher than the Canadian average. In 1999, the provincial unemployment rate was 9.6% compared to 7.6% nationally. At the same time unemployment in the Halifax metropolitan region was 6.7%, which was the lowest rate east of the Ottawa-Hull region.

Table 7.2 provides data with respect to the number of people of Aboriginal origin and descent living in Guysborough County and in the province as a whole in 1996. As indicated by Statistics Canada:

There are different ways to define the aboriginal population. Data presented in this table (Population by Aboriginal Group, 1996 Census, http://www.statcan.ca: 80/english/Pgdb/People/Population/demo39a.htm) are for those who identified with one or more Aboriginal groups (North American Indian, Metis, or Inuit). Also included are those who did not identify with an Aboriginal group, but who reported that they were Registered/ Treaty Indians or Band/First Nations members. The 1996 Census also provides information on those who reported Aboriginal ethnic origin/ancestry. Depending on the application, data on either identity or ethic origin/ancestry may be appropriate for defining the aboriginal population.



Table 7.2Aboriginal People in	n Nova Scotia a	nd Guysborougl	n County	
	Guysborough County	Guysborough Municipal District	St. Mary's Municipal District	Nova Scotia
Aboriginal (North American Indians, Metis, and Inuit) persons:	50	20	25	12,380
Speakers of Mi'kmaq	0	0	0	4,455
Persons who indicated aboriginal among their ethnic origins	240	45	85	26,795
Source: Statistics Canada, 1996				

As of 1996, there were 11,340 registered First Nation's people in the province, 210 Inuit and 860 Metis (total 12,380) (Statistics Canada will not release any 2001 data on ethnic origin or Aboriginal populations until January, 2003). Of the registered First Nation's peoples, approximately 3,700 live off reserve; over 2,000 of these live in HRM where there is the greatest access to employment. The registered Mi'kmaq population in Nova Scotia is represented by 13 band councils and two tribal councils: the Confederacy of Mainland Mi'kmaq and the Union of Nova Scotia Indians. There are no Mi'kmaq reserves in the immediate vicinity of the landfall (Appendix B, SEIS (DPA Volume 5)).

As shown in Table 7.2, there were, in 1996, a considerable number of people (*i.e.*, 26,795) who indicated Aboriginal among their ethnic origins. If 6,745 registered Mi'kmaq live on reserves, over 20,000 people of aboriginal origin, including registered First Nation's peoples living off reserve, live in the towns and rural areas of Nova Scotia. The Native Council of Nova Scotia was established in 1974 to represent the social, economic and cultural interests of Aboriginal peoples living off reserve.

Table 7.2 indicates that in 1996, some 240 people of Aboriginal descent lived in Guysborough County; 45 in the Municipality of the District of Guysborough, 85 in the Municipality of the District of St. Mary's and the balance in the incorporated towns of Mulgrave and Canso.

7.2.1.3 Infrastructure

Infrastructure is the network of public and private facilities (*e.g.*, roads, marine wharves, water and sewage systems, housing) needed to support economic and social development. The Project will place demands on such infrastructure, particularly during the construction phase. During this phase, an increased use of roads, marine terminals and commercial air facilities can be anticipated. These increased activities will have economic benefits for those directly employed in associated service industries, including, for example, those employed in transportation related activities (*.e.*, shipping, terminal operators, stevedoring, retail and commercial fuel suppliers, equipment sales) and other related services. An increased use of air services, including helicopters, can also be anticipated.



Housing stock is a critical and valued component of the infrastructure needed for sustained economic growth. Over the past five years, HRM has experienced an increase in both the number of housing starts and in house prices. The continued demand for housing is fueling residential development in areas around the metropolitan core (*e.g.*, in Bedford, Timberlea, St. Margaret's Bay, Cole Harbour and Porter's Lake). There has also been a significant increase in the number of rental apartment units, including high-end apartment units, coming onto the market.

7.2.1.4 Education and Health Services

The Maritime Region has proportionally more of its young people enrolled in institutions of higher education than any other part of Canada. This is, in part, a reflection of the number of universities and colleges that serve the region. Nova Scotia has eleven post-secondary colleges and universities, in addition to the 14 campuses of the NSCC system. Together these offer a wide range of courses to approximately 30,000 full-time students. A further 13,500 people access the NSCC's continuing education and customised training programs. Although many of the jobs associated with the offshore require very specialised expertise, substantive experience, or both, a number of initiatives have been taken by both government and industry to ensure that those who seek employment within this sector can access pertinent training programs in Nova Scotia.

A number of hospitals in the province provide primary and secondary care within a specific service area. Two of these, the Queen Elizabeth II Health Services Centre and the IWK Health Centre, provide tertiary care; both are located in HRM. The former would be the primary facility to respond to the needs of a serious industrial accident.

Emergency Health Services Nova Scotia (EHS) is a division of the Nova Scotia Department of Health. EHS is responsible for the continuing development, implementation, monitoring and evaluation of prehospital emergency health services in the province. The EHS network provides 911 service across the province and operates the air medical transport program that flies out of the Halifax International Airport.

Emergency responses, other than a health emergency, are co-ordinated through the provincial Emergency Measures Organization (EMO), also initiated through the 911 emergency number province-wide. The EMO has developed a Special Hazards Response Unit (SHRU) to address special hazard situations outside HRM. EMO in the Central Zone has worked with M&NP to develop procedures related to emergencies that may involve the natural gas pipeline.

Police services within the study area are provided by the Royal Canadian Mounted Police (RCMP) and the Halifax Regional Police Service. Fire services consist of both full time and volunteer fire brigades. These services are also mobilized through the provincial 911 emergency number (NSDNR 2001a).



The federal and provincial governments have established procedures and support infrastructures to respond to offshore emergency events. Those companies operating offshore are also required to have demonstrated capability to respond to any event that may arise as a result from their activities offshore (*i.e.*, Emergency Response Procedures (ERP) and Emergency Response Teams (ERTs)). The agencies that have jurisdiction with respect to offshore emergency support include the CNSOPB, Canadian Coast Guard, and Environment Canada.

7.2.2 Halifax Regional Municipality (HRM)

The HRM is the administrative and transportation hub of Nova Scotia, the location of many federal government departments and agencies, and the metropolitan centre of the Maritime Region. In 1996, the population of HRM was reported to be 352,153; this is now estimated to be 367,502, an increase of over 4%.

HRM has the largest economy in the province. Population, labour force and employment have all grown through the 1990s. The labour force is highly educated. The energy sector, the film industry, and information technology companies have all played a part in making Halifax the centre of information technology in eastern Canada. Growth in each of these areas has, in turn, spun secondary growth in the service sector and fueled pressure for accommodation. The municipality has accommodated this economic growth and has identified additional lands for industrial, commercial and residential expansion.

7.2.3 Guysborough County

The pipeline transporting natural gas from the Deep Panuke production platform will come onshore near Goldboro, adjacent to the main subsea pipeline from the SOEP Thebaud platform. Guysborough County, located in the northeastern part of the province, comprises four administrative areas: the District of Guysborough; the District of St. Mary's; the Town of Canso; and the Town of Mulgrave. In 2001, the area had a population of approximately 10,500.

The Mi'kmaq people were the original inhabitants of the area, but there are no First Nations' settlements located in the County of Guysborough (Appendix B, SEIS (DPA Volume 5)). As detailed in Section 7.2.1.2, approximately 240 people of Aboriginal origin live in the area.



7.2.3.1 Economy

Guysborough County is distinctly rural. Its economy has been dependent upon fisheries and forestry, and intermittently upon mining. More recently the area has seen an expansion in its service sector, including a growth in tourism related employment.

From 1995-1997 and throughout construction of SOEP, the Guysborough area was subject to study and survey. Many hotels, B&Bs, and retail and service outlets enjoyed a temporary benefit from the visiting crews, who were resident in the area for weeks at a time. Approximately 70 homes within a 40 km radius of the plant site provided accommodation to over 100 workers (SOEI 1999). The associated expenditures, as well as the wages and salaries paid to local personnel employed on site, were a direct financial benefit to the local area. These temporary benefits lasted the duration of the construction. Of the 76 personnel who now work at the SOEP gas facilities in Goldboro, Point Tupper and offshore, it is estimated that 23 are originally from Guysborough County (SOEI 1999).

The SOEP gas plant and the associated pipeline infrastructure, and the accelerating interest that is being expressed in offshore exploration and development has profoundly changed how the Municipality of the District of Guysborough views the future. The developments that have occurred are seen as the foundation for further industrial development both on lands identified for industrial purposes at Goldboro and at the Melford Industrial Land Reserve on the west side of the Strait of Canso. The development of this Project adds additional infrastructure and provides a second source of natural gas thereby strengthening security of supply.

7.2.3.2 Inshore Fisheries and Aquaculture

Today's East Coast fishery reflects a complex relationship between fish stocks, the equipment required to catch specific species, and the communities who derive their livelihood from this resource base. There is a considerable degree of specialization. In contrast, for example, to the boats that primarily fish inshore, fleets that access offshore stocks use different equipment, stay at sea for longer periods of time, and generally work out of larger ports that can provide the necessary supporting infrastructure.

Most of the relevant fisheries data is aggregated for all of Guysborough County, or the DFO statistical districts that encompass the county. The inshore fisheries study area was selected to extend approximately 30 km on either side of the proposed pipeline landfall in Goldboro (*i.e.*, from Berry Head to the St. Mary's River estuary). This area is within DFO Statistical Districts 16 and 17.

The coastal waters of Guysborough County support fisheries for groundfish, pelagic species and invertebrates. In 1999, 257 fishing vessels were registered in Guysborough County. The fishery directly employed 598 people, 345 full-time and 253 part-time (Boudreau and SRSF 2001; DFO 2001c.



Table 7.3 lists ports in the study area in 1999, with the number of registered vessels, full-time, part-time and core fishermen in each. Recent overall numbers of vessels have remained fairly steady, though some vessels' home ports may shift from year to year (K. Brickley, Fisheries and Oceans Canada, pers. comm. 2001).

Table 7.3 Numb	ers of Fishermen by Port, 19	99		
Port	Vessels (<34.9 ft, unless otherwise noted)	Full-time	Part-time	Core
Bickerton West	2	3	1	1
Coddles Harbour	3	5	2	2
Country Harbour	2 (<34.9 ft), 1 (45-64.9 ft.)		2	1
Drum Head	5	8	1	3
Fisherman's Harbour	3	5	5	3
Isaac's Harbour	3	3	1	1
New Harbour	5 (<34.9 ft), 1 (35-44.9 ft)	9	5	
Port Bickerton	5 (<34.9 ft), 2 (35-44.9 ft)	16	11	9
Port Hilford	2	3	0	2
Seal Cove		2	1	
Sonora	9	11	29	6
Stormont		3	0	
Wine Harbour	3 (<34.9 ft), 1 (35-44.9 ft)	3	2	3
Total	49	88	60	
(Source: DFO 2001d; Bou	Idreau and SRSF 2001)			

Most inshore fisheries in the study area operate between April and October. Landed values for 2000 in District 16 were \$724,000 for the inshore fishery, and \$15,635,000 for the "offshore" fleet of vessels >65 ft in length; the latter represents the northern shrimp catch from off Greenland (DFO 2001b). For District 17, the reported values for the inshore fishery were \$8,240,000; no catch was reported for the "offshore" vessels (DFO 2001b). The landed inshore value for District 17 reflected an increase in the valuable snow crab catch taken by "inshore" vessels.

Apart from the northern shrimp fishery, almost all the fishery revenue is derived from inshore waters, and from vessels classed as inshore, even if their catches were made far from shore. There are a total of 157 inshore lobster licences in Statistical Districts 16 and 17; this fishery is considered the most stable of the fisheries in the referenced Districts. Nevertheless, to ensure the future of the fishery, the lobster fishermen in the county, with others on the eastern shore, initiated a four-year conservation plan in 1998, enforced by DFO, to increase egg production in eastern Nova Scotia. The Project study area falls within Lobster Fishing Areas 31b and 32, where the season opens on April 19 and closes June 20. Although the total weights landed decreased substantially over the past decade, the total landed value from Guysborough County increased from \$2.2 million in 1990 to \$2.9 million in 1999.



Sea urchins are harvested for their roe; Japan is the principal market. Harvesting is not restricted by season, but generally occurs from September to March. In the 1999-2000 season, there were 10 active and 5 inactive urchin licences in Guysborough County.

Crab, shrimp and soft-shell clams have all increased the value of the invertebrate fishery.

Snow (queen) Crab Fishery

DFO expects the 2002 inshore and offshore season for snow (queen) crab to take place between June 1 and October 31. Since a quota system is in place, most boats finish well before the formal end of the season. In 2001, for example, 80% of the quota for the temporary allocations for Guysborough County fishers had been caught by early September (M. Eagles, Fisheries and Oceans Canada, pers. comm., 2001). The 1999 value of snow crab landings allocated to the inshore in Statistical District 17 was \$513,000; no landings were recorded for District 16, but this reflects the lack of a buyer within this District rather than an absence of fishermen. In Crab Fishing Area (CFA) 24, the catch more than tripled between 1999 and 2000 to a total of 4,300 t; in 2001 it fell to 4,043 t (DFO 2002).

Pelagic Fisheries

Bluefin tuna have been fished off Canso since 1980, with catches fluctuating from very good to poor, but peaking in 1995 with a landed value of over \$2 million. In 1999, landings exceeded 34,425 kg, and were valued at \$569,511. There are several swordfish and shark licences held in Guysborough County. The majority of catches are made in the Country Harbour and Ecum Secum areas. Mackerel, alewives and herring are fished opportunistically along the coast, primarily for bait.

Revenues and Earnings

To estimate the probable number of secondary jobs generated by Guysborough County fisheries, Boudreau and SRSF (2001) calculated that one full-time, or two part-time fishing positions, would create four spin-off jobs. They estimated the number of such jobs as 1,886, which represents 25% of the County's total employment (Boudreau and SRSF 2001).

First Nations and Aboriginal Fisheries

The Membertou Corporate Division has estimated that the net value of the aboriginal fishery in Nova Scotia was \$15,678,000 or 3% of the total fishery for the Scotia-Fundy Region in 1999 (Membertou Corporate Division 2002). As more long-term "Marshall Agreements" are reached, the commercial value of this fishery will grow. Licences and permits are held by a number of bands for lobster, snow crab, bluefin tuna, sea urchin, and blue shark. The First Nations and Aboriginal commercial fishery that takes place in the central region of 4W will be, in the opinion of the Membertou Corporate Division, the



region of greatest concern for the Aboriginal community. The following groups have access to commercial fisheries in 4W:

- Chapel Island Band: 1 snow crab licence and 1 snow crab temporary permit;
- Indian Brook Band: sea urchin licence, 4 LFA lobster licences and a snow crab licence;
- Membertou Band: a Bluefin tuna permit;
- Millbrook Band: 2 sea urchin licences, 2 lobster licences and a snow crab licence; and
- Native Council of Nova Scotia: 2 lobster licences, 1 blue shark licence, and 1 snow crab licence.

There are no First Nations aquaculture sites in the county.

Aquaculture

Across Nova Scotia, the value of aquaculture production has increased from \$5.4 million in 1990 to over \$50 million in 1999, an increase of over 800% in a decade; approximately 90%, or \$30 million, comes from the Scotia-Fundy Region. Growth is expected to continue, but not at the same rate (DFO 2000a). There are currently 32 active aquaculture leases in Guysborough County.

Cultivation of blue mussels is the most successful form of aquaculture in both Country Harbour and Guysborough County (Boudreau and SRSF 2001). Steelhead salmon are produced in Guysborough County on a seasonal basis, but not in Country Harbour. Yearling rainbow trout are placed in ocean cages in the spring, fed and reared through the summer, and harvested during the fall (Boudreau and SRSF 2001). The cultivation of scallops is a relatively new initiative, but there are no active scallop leases located within Country Harbour.

7.2.4 Landfall Communities

The landfall area for the purposes of the SEIS (DPA Volume 5) includes those communities in closest proximity to the landfall location whose residents might be directly or indirectly affected by the Project; this includes the Isaac's Harbour Area and the Port Bickerton Area.

7.2.4.1 Isaac's Harbour Area

This area includes the communities of Goldboro, Isaac's Harbour, Drum Head, Seal Harbour and Coddles Harbour, Stormont, Middle Country Harbour, and Crossroads Country Harbour. Roads in the area are two lane; the main routes are paved, but some of the side roads are not. A 12-vehicle ferry crosses Country Harbour near its mouth providing an important link between the Isaac's Harbour area and the Port Bickerton Area.



In 1996, the population of this area was approximately 855, a decline of 10% from the 1991 census. The labour force was 325, of whom 235 were employed. The unemployment rate at the time was 27.6%. The average family income was \$32,193. The most important sources of employment were logging and forestry. Fishing, though of central importance to the economy, did not directly involve large numbers of people.

Land Use

The proposed routing for the pipeline from landfall to the tie-in location is largely through lands that have been disturbed in the recent past, or are grown over with alder scrub. No active agriculture or logging takes place on any of these lands. There are no active mineral workings in the vicinity of the proposed pipeline corridor, but there are lands that are subject to mineral licences including licences on property that extends across the proposed pipeline route. A licence conveys the right to explore, but not to work, unless permission for surface access is granted from the landowner.

Current Land and Resource Use for First Nations' and Aboriginal Purposes

There is evidence that the Mi'kmaq historically frequented areas in the vicinity of Country Harbour and Isaacs Harbour. Today there are no First Nation's communities in the County of Guysborough, but there are some 240 people of Aboriginal descent living in the county (refer to Section 7.2.1.2).

Over the past six years, several parties, including SOEI and M&NP, have developed a plant and infrastructure at Goldboro on lands in proximity to the proposed pipeline corridor. As an integral part of its work program, EnCana has executed field programs and undertaken extensive consultation with many people in the area. EnCana has also met with Aboriginal leaders about this Project. There has, however, been no evidence to date that First Nations or Aboriginal people currently use lands and waters in or near the proposed RoW for traditional purposes such as hunting, trapping and gathering; this is confirmed in Appendix B (p. 20) of the SEIS (DPA Volume 5) prepared by the Membertou Corporate Division (2002):

1. There was a comprehensive TEK done relative to the SOEI pipeline route to its fractionation plant. In that survey, it was reported that there were no impacts to the traditional use of lands due to the fact that the site was very far removed from the Mi'kmaq population. Based upon those findings, the Membertou Corporate Division believes that no TEK will be required.

2. The construction of the Deep Panuke land based pipeline is only 3 km. Coupled with the above noted explanation, this very short pipeline route should not pose any concerns.



Further, there is no local indication or information that the lands in the vicinity of the proposed pipeline route are currently being used for traditional purposes by those people of Aboriginal descent living in Guysborough County. EnCana is continuing to consult with the CMM and Native Council of Nova Scotia in regard to use of lands and water for traditional purposes in the vicinity of landfall.

Features of Archaeological Interest

The initial marine and terrestrial archaeological work in the area was undertaken for the SOEP. Three shipwrecks, for example, were identified in the immediate vicinity of the nearshore pipeline and landfall:

- Saladin (1844);
- Finchley (1884); and
- Foundation Masson (1975)

This research also identified 16 cultural resources sites within the nearshore, landfall, and gas processing plant area. The sites range from reported pre-contact finds to twentieth century mining activities. Of these known sites, nine are within the vicinity of the proposed landfall and pipeline for this Project.

EnCana conducted a geophysical survey along the proposed pipeline corridor during September – October, 2001 and May 2002. With one exception, there were no shipwrecks identified in the survey area (500 m on either side of the proposed pipeline route). CHS charting indicates that a wreck, likely the Foundation Masson (1975), lies at a point 250 m to the north of KP1.4, about 100 m from the charted position of the wreck. It is noted that the stated accuracy of the CHS charting is 100 m. The Foundation Masson (1975) is not considered of historical significance by the Nova Scotia Museum (S.Powell, Assistant Curator, Archaeology, Nova Scotia Museum, pers. comm. 2002).

There are, however, two archaeological concerns associated with the lands immediately along the shore; these are:

- the potential for pre-contact archaeological resources (*i.e.*, associated with the people who inhabited the area before the arrival of the Europeans) along the shores in proximity to the proposed landfall; and
- the potential for Black royalist resources in and around Webbs Cove.

The above factors will be further addressed during the detailed routing of the pipeline in the vicinity of the landfall.



Education and Health Services

While students from the Isaac's Harbour area attend the Riverview Consolidated School in New Harbour for grades primary to six, junior and senior high school students can choose to attend school in Sherbrooke, Guysborough or Canso.

Isaac's Harbour has a small medical facility, but it is not continually staffed. Primary care services are available at the Guysborough Medical Clinic and the Guysborough Memorial Hospital. Most residents, however, access basic medical care at St. Martha's Regional Hospital in Antigonish. Tertiary services are provided in Halifax.

7.2.4.2 Greater Bickerton Area

The communities of Port Bickerton, Bickerton West, Fisherman's Harbour and the community of Harpellville have been grouped together and profiled as the Greater Bickerton area. Traditionally, fishing and forestry, including some processing associated with both industries, were the principal economic activities. Today, the local economy involves a balance between the natural resource sector and the tertiary sector.

In 1996, the population of this area was approximately 635. The labour force was 275, of whom 215 were employed. The unemployment rate at the time of the census was 23.6%, which was considerably higher than the provincial unemployment rate at that time of 13.3%. The manufacturing sector (*i.e.*, fish processing), provided the most important source of employment. The average family income was \$46,612.

7.2.5 Service Communities

Service communities are those larger communities within an hour's commuting distance of the landfall area that provide services to those in the landfall areas and that may be accessed by those involved in the development or operation of the Project. The following three communities are described: Guysborough, Sherbrooke and Antigonish.

7.2.5.1 Guysborough

The community of Guysborough (population approximately 500) is situated on the western shore of Guysborough Harbour, at the head of Chedabucto Bay, and is the administrative centre of the Municipality of the District of Guysborough. It is located approximately 25 km from the landfall site. The traditional economic activities in the area were agriculture, forestry, shipbuilding, and fishing.



Today, Guysborough is primarily a service-oriented community serving the needs of the surrounding rural area.

In 1996, the labour force in Guysborough was 190 of which 160 were employed. The unemployment rate at the time of the census was 15.8%. The average family income in Guysborough was \$41,198. The main sources of employment were in government services and in the retail sector. Other employment sectors included: logging and forestry; the accommodation, food and beverage sector; and health and social services.

The Strait Area School Board provided education to grades primary through 12 in two facilities: the Chedabucto Education Centre and Guysborough Academy. The recent development of Chedabucto Education Centre totally replaces the senior high school and has involved the complete refurbishment of the primary school.

The Guysborough Memorial Hospital is a two physician, 10 bed acute care facility. It operates a 24-hour emergency room and provides secondary care to a catchment area of approximately 3,600 residents within Eastern Guysborough County.

7.2.5.2 Sherbrooke

Sherbrooke (population 625), located on the St. Mary's River, is the administrative centre of the District of St. Mary's and the site of the historic village, a major tourist attraction.

The community is the local service centre for the surrounding rural area and provides for the immediate needs of local inhabitants with respect to medical, educational, government services and retail facilities. It is located approximately 25 km from Goldboro.

The unemployment rate at the time of the census was 23.6%, considerably higher than the provincial unemployment rate at that time of 13.3%. The average family income was \$35,709. The most important sources of employment were in retail, education, and the construction industries. The fishing and trapping and logging and forestry sectors each account for 5% each.

Two schools in Sherbrooke offer grades primary through grade 12. Primary medical services can be accessed locally at the St. Mary's Memorial Hospital.



7.2.5.3 Town of Antigonish

Today, Antigonish is the government, business, shopping, educational, medical and cultural centre for eastern mainland Nova Scotia. In 1996, the town's population was approximately 4,860.

The unemployment rate was 10% at the time of the census, which was substantially lower than the provincial unemployment rate of 13.3%. The average family income in Antigonish was reported as \$52,024, significantly higher than the provincial average of \$46,110. The most important sources of employment are education, health and social services. The wholesale trade industries, accommodation, food and beverage and government services also contribute to the employment profile.

St. Francis Xavier University, established in Antigonish in 1855, plays an important role in the economy of the town and attracts students from across Canada and beyond. The St. Martha's Hospital has provided medical services to the region since 1906.

7.2.6 The Offshore

The development of the offshore facilities and the associated pipeline to Goldboro is occurring in, or in proximity to, waters which are used for several purposes including near and offshore fishing, research, commercial shipping, military training activity, further exploratory drilling, and producing gas fields. The ocean floor is the location not only of the SOEP pipeline and associated gathering system, but also of communication cables.

7.2.6.1 The Fishery

DFO sets a Total Allowable Catch (TAC) for each fish and invertebrate stock within the Canadian 200 mile economic management zone. The TAC is then distributed among individual fishermen, groups of fishermen, or fishing companies by a system of catch quotas. The TAC and quotas are established based upon a stock assessment process involving detailed analysis of the fishery and data received from research cruises that are independent of the fishery. Management areas differ for fish and invertebrate fisheries.

DFO maintains two main databases on fishery success: catch-and-effort and landings systems. Similar data systems are maintained for all species, regardless of management regimes.

In 1999, the landed value of commercially harvested fish and marine plants in the Scotia-Fundy fisheries management sector was \$592 million from landings of 311,000 tonnes. That same year, the wholesale value of fish and fish products produced in the region was estimated at \$1.4 billion. The United States is the biggest market, accounting for some 70% of Scotia-Fundy's fisheries export sales (DFO 2000c).



Figure 7.2 delineates the Northwest Atlantic Fisheries Organization (NAFO) unit areas relative to the Deep Panuke Project. The histograms on the map show the average catch per unit area, by main species groups. In 4Wf, surrounding the platform, the main catch is scallop and crab. Crab, shrimp, and other invertebrates dominate the catch along the pipeline route in 4We, while closer to shore, the catch is made up largely of finfish. A mix of invertebrates and estuarial/small pelagic fish dominates in 4Wd, but in 4Wk the catch is almost entirely finfish.

Groundfish Fishery

Despite the closures that have occurred, the groundfish fishery has not improved on the eastern Scotian Shelf. Stocks of cod, haddock, white hake, and cusk remain at very low levels and removals are kept as low as possible. Pollock stocks, though in comparatively better condition, remain low. The central Shelf silver hake stock, fished primarily in Division 4W, is at a low level and catches will be kept low until the strength of recruiting year-classes improves. Halibut abundance is also low. Most redfish caught in Division 4W are part of the stock that is also resident in the Laurentian Channel. Redfish biomass is expected to decline gradually over the next few years. Stocks of small flatfish species all show indications of potential recovery, but it is too soon to relax restrictions on removals. Since the fishing moratorium in 1993, very little groundfish has been taken within 10 km of the platform location, though some fishing occurs along the pipeline route, especially in summer.

Large Pelagic Fishery

Drift longlines are the primary method used to catch the large pelagics, such as swordfish, tuna, and shark. Tuna are taken both along the Shelf break and in the nearshore waters of eastern Guysborough County, from Country Harbour to Canso. Fishing for tuna concentrates closer to shore after August, including an area to the east of the proposed pipeline, between Country Harbour and Tor Bay. Fishing for swordfish remains concentrated along the Shelf edge and in Emerald Basin. A fishery for shark occurs in the deep waters off the Shelf edge in all seasons. Little activity takes place within 50 km of the Deep Panuke platform site.

Small Pelagic Fishery

Herring and mackerel are the principal small pelagic species fished commercially on and around the Sable Island Bank. The stocks are in reasonable condition, and there are few restrictions placed on the fishery. Herring is the only species fished close to the proposed pipeline route by larger vessels that report fishing locations; this fishery takes place primarily in the spring. No small pelagics fishing activity occurs near the Deep Panuke platform site.





Deep Panuke Project Average Catch Per NAFO Unit Areas



k:\Projects\NovaScotia\NSD15999\Graphics\CEF_unitcatch.cdr

Invertebrate Fishery

The major invertebrate fisheries within the offshore study area are the scallop, crab, clams, and shrimp fisheries. Each species group is fished in distinct areas on the Scotian Shelf, and there is little overlap. These areas have remained relatively constant over the last five years. Scallop is the most important invertebrate fishery on the Sable Island Bank taking place approximately 35 km to the west and south of the Deep Panuke site. Shrimp and crab are fished between the platform location and the shore.

Trends in the Offshore Fisheries, Landings and Values

The overall value of Scotia-Fundy commercial fisheries landings increased annually from 1996 to 1999, rising 12.4% from 1998 to 1999 alone. Both the landed weights and the dollar value of invertebrates have steadily increased since 1987, while the value of groundfish has declined. Inshore lobster makes up the greater proportion of invertebrate landings, and in 1999 comprised almost half the overall total value (DFO 2000b). The 1999 total landed value was \$592 million.

On the Eastern Scotian Shelf, including Banquereau and Sable Island Banks, scallop landed value has trended upward for the past decade; landed value in 1999 at \$7,578,000 was almost double that of 1990.

"Emerging fisheries" are those that take new or non-traditional species; these fisheries are in either an exploratory or early commercial stage of development. Emerging species in various stages of development include bloodworms, whelks, hagfish, and Jonah, rock, and stone crab. The emerging species landings in Scotia-Fundy were worth \$13.2 million in 1998 (DFO 2000a).

Location of Offshore Catch Landings

The greatest portion of the areas total offshore catch, 23.2%, is landed by the Lunenburg fleet. Canso receives the greatest amount of the snow crab catch. Statistical Fishing District 17, closest to the pipeline landfall, receives the second greatest amount of offshore crab catch caught by "inshore" boats (*i.e.*, those less than 65 feet long). The Scotian Shelf fisheries are commercially important to Nova Scotia and to individual coastal communities.

7.2.6.2 Sable Island

Sable Island is approximately 50 km from the proposed Project platform site. The Sable Island Preservation Trust was incorporated in December, 1998, to "ensure the long term conservation of Sable Island". The Trust currently maintains a staffed environmental monitoring and emergency base on the island. The number of people on Sable Island at any given time varies, but 4-7 people are employed



full-time at the monitoring station. Seasonally, this can increase to 30 when scientists arrive to monitor migration patterns and to execute related research work.

7.2.6.3 Commercial Shipping

Offshore Nova Scotia accommodates considerable commercial shipping traffic destined to and from the eastern seaboard of the US and from the Great Lakes and Europe. Under *Eastern Canada Vessel Traffic Services Zone Regulations*, commercial shipping must follow dedicated routes and procedures upon nearing Halifax Harbour and the Strait of Canso. Outside of these controlled areas, mariners have discretion as to the selection of their preferred routing subject to proper navigation and seamanship practices.

7.2.6.4 Offshore Development Projects

The SOEP currently has one central staffed platform complex at the Thebaud field (approximately 45 km from the proposed Deep Panuke site), two satellite platforms, and the subsea pipeline gathering system and pipeline to Goldboro. Three other satellite platforms are being designed. When an operator has more than one offshore program underway, supply operations will be co-ordinated between the operations. Given the changing nature of the operations and the requirements of supplies, the number of supply boats operating in the vicinity of the Sable Island area will vary, but will seldom be less than six and may be as many as 12.

A producing operation, such as the Thebaud platform, would typically be supplied by support vessels two or three times a week. During drilling and development operations, however, this number would be significantly larger as substantially more material is required (bulk materials such as drilling fluids, bulk solids, (*e.g.*, barite, cement) and fuel, are often required in large volumes). Support of this nature might require up to six supply runs per week.

7.2.6.5 Offshore Exploration

The exploration for oil and gas in the waters off Nova Scotia continues to gain momentum. To date, 59 licences, valued at \$1.56 billion, have been purchased in the offshore area, and more than 180 exploration wells have been drilled. Geophysical research programs and exploratory drilling related to these bids add to the shipping and related activity taking place offshore, but the activity is spread across a vast area, not concentrated in a single area or corridor.



7.2.6.6 Military Activity

Maritime Forces Atlantic conduct training and operations in various areas designated as Operations Areas (Ops Areas) off the coast of Nova Scotia. Ops Area India extends across much of the subsea pipeline route from the Deep Panuke site to landfall at Goldboro. The site of the Deep Panuke platforms are not located within a designated Ops Area (DFO 2001e). It is understood that there are several offshore sites where, in the past, munitions have been dumped. It was confirmed by DND, CFB Halifax, that the Project facilities are not located in proximity to any known sites with Unexploded Ordnance (UXO). Shallow geophysical surveys undertaken at the Deep Panuke site and along the pipeline route confirmed this.

7.2.6.7 Offshore Pipelines and Cables

A communications cable links Sable Island to the mainland of Nova Scotia. The proposed subsea pipeline will cross the route of this cable. Recent editions of the Canadian Hydrographic Service Nautical charts also show a number of abandoned subsea cables, or sections of abandoned subsea cables, in the vicinity of the pipeline route and the Deep Panuke platforms. Other than the Sable Island communication cable, the subsea cables in this area are no longer operative (DFO 2001a).

7.3 Socio-economic Impact Assessment

7.3.1 National and Provincial: Benefits and Impacts

Key provincial and national issues relate to the consequences of the Project at a macro-economic rather than a local level. These include the determination of:

- potential business and employment opportunities that will be generated during the development and production phases of the Project; and
- economic impacts to Nova Scotia and to Canada from purchases of goods, services and labour by the Project.

Estimates have been prepared of the potential business and employment opportunities and economic impacts that could be expected from the Project. These estimates provide a reasonable assessment of Nova Scotian and Canadian content and a realistic indication of potential opportunities, given recent experience with other similar developments and the current structure of the two economies. EnCana estimates a development cost of approximately \$1.1 billion (2002 dollars) including all contingencies. Table 7.4 provides a breakdown of this cost by component.



Ta	ble 7.4 Development Phase by Component	Cost Summary
	Component	Total Cost (\$ million)
1.	Engineering/Project management	\$127
2.	Offshore structures	\$474
3.	Drilling/completions	\$178
4.	Pipelines	\$242
5.	Offshore hook-up and commissioning	\$41
6.	Miscellaneous	\$38
To	tal	\$1100

7.3.1.1 Development Phase Opportunities and Impacts

This section details the employment opportunities and economic impacts arising from Project development expenditures. The analysis is conducted from the provincial as well as the national perspective, but the main emphasis, is on potential opportunities for Nova Scotia. Project development involves the installation of facilities and equipment to produce natural gas from the offshore installations with transport to landfall at Goldboro. The Project will not have significant onshore facilities; gas processing will occur offshore with market-ready gas transferred directly to M&NP facilities in Goldboro.

Materials and Labour Requirements

Project development involves approximately 2,805 person-years of direct employment (+/-25%). Employment requirements are presented in terms of person-years (equivalent of one person working a full year, or 2,080 hours). Generally, during construction, the number of jobs is greater than the number of person-years, as most people are employed for less than one year. To translate person-years into jobs, a multiplication factor of 1.35 may be used (SOEP 1996c) based on the types of activities and the average duration of jobs required.

Development Phase - Provincial Economic Impacts

Direct Project impacts are that portion of Project expenditures captured in an economy (*e.g.*, materials produced and purchased, margins on materials imported, wages and salaries, and jobs filled by local people). Direct Project development phase impacts in Nova Scotia are estimated at \$80 million in material purchases and \$117 million in wages and salaries. In total, Nova Scotia content is estimated to be about 18% of the total \$1.1 billion of Project development expenditures on materials and labour. The \$117 million in wages and salaries involves 1,441 person-years of employment, or roughly 1946 jobs



over the three-year development phase. It is important to note that all of these jobs would not occur in one year nor would they last the duration of the development phase.

As a result of development expenditures, provincial GDP (at market prices) is estimated to increase by \$181 million. The GDP multiplier is estimated at 0.16, meaning that for every dollar of Project development expenditures on labour and materials, 16 cents in new GDP is estimated to be generated in the Province. Household income is estimated to increase by \$154 million, \$117 million directly and \$37 million through the multiplier process. The household income multiplier is estimated at 0.14, meaning that for every dollar of Project development expenditures on labour and materials, 14 cents in new household income would be generated in Nova Scotia. These multipliers do not include induced impacts on household income.

Approximately 3,220 jobs are estimated to be created, 1,946 directly and 1,274 through the multiplier process. The employment multiplier (calculated as the total change in employment divided by total direct employment) is estimated at 1.65. That is, for every direct Project job, it is estimated that 0.65 additional spin-off jobs would be generated. This does not include induced impacts on employment.

Development Phase - National Economic Impacts

Direct Project impacts in Canada (including Nova Scotia) are estimated to be \$146 million in material purchases and \$129 million in wages and salaries. Canada is estimated to receive about 25% of the total \$1.1 billion on Project development expenditures. The \$129 million in wages and salaries estimated for Canadian labour involves 1,566 person-years of work, or roughly 2,114 jobs, spread over the development phase (2002-2005). As a result of development expenditures, Canadian Direct and Indirect GDP are estimated to increase by about \$242 million, household income by \$197 million, and employment (in the form of jobs) by 4,259.

7.3.1.2 **Production Phase Opportunities and Impacts**

Production activities are broadly divided into logistics, production and General and Administrative (G&A). The analysis is conducted from the provincial as well as the national perspective; however, the main emphasis is on potential opportunities for Nova Scotia. Project production involves collection of raw gas, processing, and transportation of market-ready gas to the landfall at Goldboro. The production phase is assumed to run for 11.5 years, from 2005 through 2017.



Materials and Labour Requirements

The production phase expenditures are assumed to be \$60 million annually (over \$31 million for materials and services and \$29 million for labour), for total production expenditures of \$690 million (\$357 million for materials and services and \$333 million for labour) over an 11.5 year period.

Project operation is assumed to require 184 person years (+/-25%) and 116 person-years (+/-25%) of work hired on a contract basis, for a total of 300 person years annually. This translates to 3,445 person-years of employment over the 11.5 year production period.

Production Phase - Provincial Economic Impacts

Direct Project impacts in Nova Scotia are estimated to be \$164 million in material purchases and \$301 million in wages and salaries. In total, Nova Scotia is expected to capture about 67% of the \$690 million Project production phase expenditure on materials and labour. The \$301 million in wages and salaries involves 3,159 person-years of work, or roughly 312 jobs (assuming a person-year to job factor of 1.35 for contract labour). The contract person-years are averaged over the entire production phase and it is unlikely that all would be required equally in every year or that any contract positions would last the duration of the production phase.

As a result of production expenditures, provincial GDP is estimated to increase by \$400 million. The GDP multiplier is estimated at 0.58, meaning that for every dollar of Project production expenditure on labour and materials, 58 cents in new GDP would likely be generated in the Province. This figure is exclusive of induced impacts. Household income is estimated to increase by \$342 million, \$301 million directly, and \$41 million through the multiplier process. The household income multiplier is estimated at 0.50, meaning that for every dollar of Project production expenditures on labour and materials, 50 cents in new household income would be generated in Nova Scotia.

An estimated 480 jobs would likely be created, 312 directly and 168 through the multiplier process. The employment multiplier (calculated as the total change in employment divided by total direct employment) is estimated at 1.5. That is, for every direct Project job, an estimated 0.5 additional spin-off jobs would be generated. This analysis does not include induced effects in either income or jobs.

The production phase impacts are larger as a percentage of expenditure than the development phase impacts. The differences are a result of higher Nova Scotian content estimates for the production phase.



Production Phase - National Economic Impacts

Direct Project impacts in Canada (including Nova Scotia) are estimated to be \$292 million in materials purchases and \$330 million in wages and salaries. In total, Canada would likely receive about 90% of the total \$690 million on Project production phase expenditures on materials and labour. Approximately 10%, or \$69 million of Project production phase expenditures, is estimated to be spent on imported materials and labour.

The \$330 million in wages and salaries that is estimated for Canadian labour involves 300 person-years of work, or roughly 337 jobs (assuming a person-year to job factor of 1.35 for contract labour), spread annually over the production phase. As a result of production phase expenditures, Canadian direct and indirect GDP is estimated to increase by \$583 million, household income to increase by \$464 million and employment (in the form of jobs) by 722.

7.3.2 Halifax Regional Municipality: Benefits and Impacts

7.3.2.1 Employment

HRM is the administrative and commercial centre of the province and has accommodated the needs of the oil and gas industry and the companies and organizations that service and represent the industry, including a wide range of professional services. The oil and gas sector is increasingly recognized as important to the economy of the metropolitan area and this trend is likely to continue.

The Project will generate 1,441 person years of employment over three years during the development phase and 3,159 person years of employment during the 11.5 years of production. Apart from the employment generated offshore and in the vicinity of the landfall, particularly during construction, the greatest portion of the economic benefit will accrue to the HRM. These benefits include both direct and indirect employment. EnCana has established an operating presence and a Project office in Halifax; together these offices employ several hundred people. As the Project evolves, staffing needs will change. The design and engineering work will, in large part, be undertaken in HRM. Given the availability of wharf space and marine expertise, some of the construction and marine services may also take place at one or more of the facilities that exist within the HRM. Decisions with respect to the allocation of many key contracts will not be made for some time, but substantial employment benefits can be expected to accrue to the city in part because of the expertise and resources that exist in the area.



7.3.2.2 Business Opportunities

The oil and gas industry requires a wide range of services including marine-related support, consulting engineers, lawyers and other specialists and support services as an integral part of day to day operations. Some services will be provided by specialist firms that have been established in the city for a long time, some will be provided by firms that have been attracted to the region because of the growing presence of the oil and gas sector, and some will come from the new skills acquired by local firms aiming to compete for business in the oil and gas sector. The Project will provide direct and indirect contractual opportunities to those firms, including First Nations' and Aboriginal firms, that have expanded to meet the needs of this sector and to new firms that are striving to establish a base in the city.

7.3.2.3 Training

The catalyst for training is the need for skilled tradesmen during the development and production phases of the Project. The adequacy of the provincial labour force to meet the demands of the oil and gas sector has been a subject of discussion for several years. It is apparent, however, that government, educational establishments and industry have worked together to determine needs and to establish training programs. EnCana has played a lead role in several of these initiatives. Regardless of available training programs, there will still be shortages of skilled personnel, particularly those with the appropriate levels of experience to assume responsibility for certain tasks. This is a reflection of the nature of the oil and gas industry as much as it is a deficiency in educational program availability. Those trained in local programs and who gain experience with the industry in Nova Scotia can expect to work elsewhere in Canada or the world during their professional career. Training therefore becomes a long-term benefit, because the skills acquired during Project development and production can be used elsewhere on comparable projects. EnCana will continue to work with the NSCC to ensure that necessary training programs are in place to meet its anticipated needs.

7.3.2.4 Property Tax Base

Property occupied by EnCana in the HRM (*e.g.*, the offshore supply base and office space) is subject to assessment and occupancy tax. Any increase in the space taken, therefore, provides a direct benefit to the municipality.

7.3.2.5 Economic Stability and Growth

As noted above, the oil and gas sector has become an important growth sector in the HRM. The fact that EnCana is seeking authorization to develop the Deep Panuke Project substantiates the understanding that the oil and gas industry will be present in the region for the long-term. By making a commitment to



proceed with the applications to develop the Project as well as conducting the FEED study, EnCana demonstrates confidence in the future. This translates into wider business confidence in the region.

7.3.2.6 Roads

The principle source of Project impact on the road network of the HRM will occur during construction from the transportation of materials and the movement of the labour force to construction sites. It is not known at this time where the offshore structures will be built, nor where the pipe will be coated or stored. It is probable that some aspects of this work will be done within the HRM and the roads serving this region will accommodate more vehicles, including heavy loads. Although the road system serving the city will certainly accommodate any traffic associated with construction in the region, some concern has been expressed that further investigation is required to improve and expand the region's infrastructure, including the road system, to better accommodate additional urban growth.

7.3.2.7 Wharves

As stated above, it is not known at this time where the offshore structures will be built or assembled, nor where the pipe will be coated or stored. These activities will require appropriate wharfage and deep water. Further wharf facilities capable of handling purpose designed offshore support vessels with deeper drafts and specialized loading facilities may also be required. Capacity for all of these activities does exist within HRM, and EnCana already operates a supply base in the area. Such developments will generate economic benefits through the increased use of existing capacity and the generation of employment opportunities.

7.3.2.8 Emergency Services

Accidents and emergencies can occur at any time. The parties most directly involved in any workrelated accident are the employees and emergency services. It is anticipated that in the event of any serious accident or injury during development, production or decommissioning of any facilities, injured personnel would be transported to the Queen Elizabeth II Health Services Centre in HRM, which is fully equipped to provide tertiary care. With the appropriate safety plans in place, the occurrence of a serious accident is unlikely, but any eventuality could be accommodated.

7.3.2.9 Land Use

Office space and commercial and industrial areas in the city will be required to support Project activities. Such requirements will be accommodated within existing office buildings and areas designated for commercial and marine purposes. Such activities facilitate the intent of the land use



planning strategy to encourage economic development. This increased activity represents a defined Project benefit.

7.3.2.10 Public Health and Safety

The development of the Project as defined has no consequences for public health and safety in the HRM. No further analysis of this topic has been conducted with respect to this area.

7.3.2.11 Archaeological and Heritage Resources

The development of the Project as defined has no consequences on archaeological and heritage resources in HRM. No further analysis of this topic has been conducted with respect to this area.

7.3.2.12 Current Land and Resource Use for First Nations and Aboriginal Purposes

The development of the Project as defined has no consequences on current land and resource use for First Nations and Aboriginal purposes in HRM. No further analysis of this topic has been conducted with respect to this area.

7.3.2.13 Mitigation

Project design has taken into account environmental and socio-economic factors of interest or concern. Good engineering practices will further minimize the likelihood of adverse impacts. The following specific mitigative measures have been recommended with respect to Project activities in HRM:

- EnCana will continue to work with the NSCC to ensure that necessary training programs are in place to meet their anticipated labour needs; and
- EnCana will continue to provide information to the business community, including the First Nations' and Aboriginal business community, about the procurement process, the forthcoming development and operational activities and the opportunities associated with such activities.

7.3.2.14 Summary of Residual Impacts

As summarized in Table 7.5, HRM will derive substantial benefit from the development and operation of the Project including:



- employment during development and operation;
- business opportunities during development and operation;
- workforce training during development and operation;
- increased revenue from property taxes during development and operation; and
- activities and investment that will facilitate economic stability and growth in the region.

7.3.3 Service Communities: Guysborough, Sherbrooke and Antigonish: Benefits and Impacts

7.3.3.1 Employment

The service communities of Guysborough, Sherbrooke and Antigonish are within less than an hour's commuting distance of the landfall area and may provide services during Project development and operation. The residents of these communities are interested in employment that may be available either directly from the Project or indirectly through contractors or other businesses that benefit from Project activities. While it is certain that the construction of the subsea and onshore pipeline and the subsequent production phase will bring some employment benefit, there will be no plant construction at Goldboro and no requirement for a permanent operational presence in the area.

7.3.3.2 Business Opportunities

Business opportunities are generated in response to investment and the likelihood of new employment. As noted above, there will be some employment during Project construction, but it will be limited in duration. The bringing ashore of a second source of natural gas, however, reflects the gradual diversification in, and security of, supply that is essential to future industrial development in the region. This in turn will provide opportunities for businesses in Guysborough, Sherbrooke and Antigonish.

7.3.3.3 Training

Although training is a topic of interest, there appears to be some understanding that training for key trades is available through community colleges and trade unions. EnCana is working with the NSCC to ensure that training programs are in place to meet their anticipated labour requirements. Training is a benefit that can be attributed to the development and production phases of the Project. It is also a benefit that extends beyond the life of the Project because those trained can work on other comparable projects.



Table 7.5 Halifa:	x Regional Municipality	7: Residual Impacts			
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROIFCT	RESIDUAL IMPACT	DEGREE OF CERTAINTV
		THEEC	CONOMY		
Employment	Those seeking employment	Development and production expenditures	• The Project is a source of both direct and	Employment benefit during development	Benefit is certain
	 Non-government organizations 		indirect employment during development	Employment benefit during production	Benefit is certain
)		and production	Insignificant benefits during decommissioning	Impact is of low certainty
Business Opportunities	BusinessesHRM	Development and production expenditures	• Project investment is a catalyst for further	Development will bring benefit	Benefit is certain
			economic expenditures	Production will bring benefit	Benefit is certain
				Insignificant impact during decommissioning	Impact is of low certainty
Training	 Those who look necessary skills 	Development and production expenditures	• EnCana skill needs	Benefit during development	Benefit is certain
	Education sector	Labour needs		Benefit during production	Benefit is certain
				No impact during decommissioning	Impact is certain
Property Tax Base	• HRM	 Occupancy of property 	All office space and other Project related	Development will bring benefit	Benefit is certain
			spaces subject to assessment and related	Production will bring benefit	Benefit is certain
			property taxes	Insignificant impact during decommissioning	Impact is of low certainty
Economic Stability/Growth	Business communityHRM	Development and production expenditures	• Expansion of oil and gas sector	Development will bring benefit	Benefit is certain
		• Expansion of industrial sector		Production will bring benefit	Benefit is certain
				Decommissioning will have an insignificant impact	Impact is of low certainty
Aquaculture and the Fishery	• None	• Construction of the marine facilities	 No Linkage 	N/A	N/A



Table 7.5 Halifa	x Regional Municipality	7: Residual Impacts			
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
Tourism	• None	Construction of industrial infrastructure	 No Linkage 	N/A	N/A
		THE ENV	IRONMENT		
Water Quality	• None	 Construction of the nearshore and onshore pipelines 	No Linkage	N/A	N/A
Air Quality	• None	Gas treatment	 No Linkage 	N/A	N/A
		INFRASI	FRUCTURE		
Roads	Road UsersHRM	Construction traffic	Use of public roads by construction vehicles	Development will have no impact	Impact is certain
	• NSTPW			Production will have no impact	Impact is certain
				Decommissioning will have no impact	Impact is certain
Wharfs	 Operators of wharf space 	 Construction and operational activities 	Use of wharfs	Development will bring benefits	Benefit is of low certainty
	·	·		Production will being benefits	Benefit is of low certainty
				Decommissioning will have insignificant impact	Impact is of low certainty
Emergency Services	 Employees Emergency service 	Accidental events	Accidental events during development	Development will have an insignificant impact	Impact is certain
	providers		and production	Production will have an insignificant impact	Impact is certain
				Decommissioning will have an insignificant impact	Impact is certain



7.3.3.4 Economic Stability and Growth

The fact that a second offshore project is seeking development authorization in northeastern Nova Scotia is more important to economic stability and growth in the service communities than the local employment that will be generated by the Project itself. The proposed development of the Project is concrete evidence that the investment in infrastructure made by M&NP is attracting other users. The availability of a second source of market-ready gas increases marketable volumes and ensures a secure, long-term supply. It also indicates that the provincial offshore industry is maturing and that northeastern Nova Scotia is playing a key role in that process.

7.3.3.5 Roads

The only source of Project impact on the road network will occur during construction from the transportation of materials and the movement of the labour force to construction sites. As the pipe lay-down area has not yet been selected, the routes that will carry the construction loads cannot be identified. Goldboro, however, will be the destination of the materials required to construct the onshore pipeline. The routes that serve Goldsboro, as well as one or more of the service communities, include Route 316, Highway 7 and the TransCanada Highway. Apart from the increase in traffic at Goldboro, there may be a temporary increase in traffic along sections of these routes during the construction period. It is not anticipated that Project related traffic movements will be of a magnitude to cause disruptions to traffic flow or to pose a hazard to public safety. There will be no impact on the road system during Project operation or decommissioning.

7.3.3.6 Emergency Services

There are small hospital facilities located in Guysborough and Sherbrooke and a larger facility, St. Martha's Hospital, in Antigonish. Given the location of Project related construction activities in the vicinity of Goldboro, it is likely that in the event of an emergency, those injured would first be taken to St. Martha's Hospital. In the case of very serious injury, or multiple events, those injured would likely be transferred to the Queen Elizabeth II Health Services Centre in Halifax. With the appropriate safety plans in place, the impact of any Project related accidental event on emergency facilities in Guysborough, Sherbrooke and Antigonish would be insignificant.

7.3.3.7 Public Health and Safety

The development of the Project as defined has no consequences for public health and safety in the communities of Guysborough, Sherbrooke and Antigonish. No further analysis of this topic has been conducted with respect to this area.



7.3.3.8 Archaeological and Heritage Resources

The development of the Project as defined has no consequences on archaeological and heritage resources in the communities of Guysborough, Sherbrooke and Antigonish. No further analysis of this topic has been conducted with respect to this area.

7.3.3.9 Current Land and Resource Use for First Nations and Aboriginal Purposes

The development of the Project as defined has no consequences on current land and resource use for First Nations and Aboriginal purposes in the communities of Guysborough, Sherbrooke and Antigonish. No further analysis of this topic has been conducted with respect to this area.

7.3.3.10 Recommended Mitigation

Project design has taken into account environmental and socio-economic factors of interest or concern. Good engineering practices will further minimize the likelihood of adverse impacts. In addition, the following mitigative measures have been recommended:

- communication with service communities and/or Chambers of Commerce to ensure information on business opportunities is made available early in the bidding process; and
- continued work with the NSCC to ensure that the necessary training programs are in place to meet anticipated labour requirements.

7.3.3.11 Summary of Residual Impacts

As summarized in Table 7.6, the service communities of Guysborough, Sherbrooke and Antigonish will derive the following benefits from the Project:

- employment during construction;
- business opportunities during construction;
- workforce training during construction and operation; and
- activities and investment that will facilitate economic stability and growth.



Table 7.6 Servic	e Communities: Guysb	orough, Sherbrooke and	Antigonish: Residual Ir	npacts	
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
		THE EC	CONOMY		
Employment	 Those seeking employment 	Development and production expenditures	Need for labour	Some benefit during development	Benefit is certain
	Municipalities			Some benefit during	Benefit is certain
				Some benefit during decommissioning	Benefit is of low certainty
Business Opportunities	 Businesses Municipalities 	 Development and production expenditures 	Project investment as a catalyst for further	Development will bring some benefit	Benefit is certain
	4		economic expenditures	Production will bring little benefit	Benefit is certain
				Some benefit during decommissioning	Benefit is of low certainty
Training	 Those who lack necessary skills 	Development and production expenditures	EnCana's skill needs	Benefit during development	Benefit is certain
	Education sector	 Labour needs 		Benefit during production	Benefit is certain
				Insignificant impact during decommissioning	Impact is certain
Property Tax Base	None	Occupancy of property	 No Linkage 	N/A	N/A
Economic Stability/Growth	Businesses Municipalities	Development and production expenditures	Expansion of oil and gas sector	Development will have some benefit	Benefit is certain
	4		Security of gas supply	Production will have some benefit	Benefit is certain
				Decommissioning will have an insignificant impact	Impact is of certainty
Aquaculture and the Fishery	• None	• Construction of the marine facilities	 No Linkage 	N/A	N/A
Tourism	• None	• Construction of industrial infrastructure in the area	 No Linkage 	N/A	N/A



Table 7.6 Servic	e Communities: Guysh	orough, Sherbrooke and	Antigonish: Residual Ir	npacts	
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
		THE ENV	TIRONMENT		
Water Pollution	• None	Construction of the nearshore and onshore pipelines	 No Linkage 	N/A	N/A
Air Pollution	None	Gas treatment	 No Linkage 	N/A	N/A
		INFRAS	TRUCTURE		
Roads	 Road users Municipalities 	Construction traffic	Use of public roads by construction vehicles	Development will have an insignificant impact	Impact is certain
	NSDoT&PW			Production will have no impact	Impact is certain
				Decommissioning will have no impact	Impact is certain
Wharfs	• None	Construction activity	 No Linkage 	N/A	N/A
Emergency Services	 Employees Emergency service 	Accidents Events	Accidental events during development	Development will have an insignificant impact	Impact is certain
	providers		and production	Production will have an insignificant impact	Impact is certain
				Decommissioning will have an insignificant impact	Impact is certain
		SO	CIAL		
Land and Water Use	• None	Development and production activities	 No Linkage 	N/A	N/A
Current Land and Resource Use for First Nations' and Aboriginal Purposes	• None	Development and production activities	No Linkage	N/A	N/A
Archaeological and Heritage Resources	• None	Pipeline construction	 No Linkage 	N/A	N/A
Public Health and Safety	• None	Development and production activities	Accidental events during construction and operation	N/A	N/A



7.3.4 Guysborough County and Landfall Communities: Benefits and Impacts

7.3.4.1 Employment

The pipeline transporting natural gas from the Deep Panuke site will come ashore at Goldboro in Guysborough County, Nova Scotia. Based on information received during the public consultation process, the priority of many in Guysborough County and eastern Nova Scotia is employment and secondly, other economic benefits that may be generated by the Project. This Project builds on the infrastructure that is in place. Since the Project's development will not involve the construction of a new plant at Goldboro, there will be no permanent operational presence by EnCana in the local area. Pipeline construction, both onshore and offshore, will take place over the course of one construction season. The maximum employment that will be generated by the construction of the onshore pipeline is unlikely to exceed 50. Nevertheless the Project will generate a wide range of activities in support of both development and operation. These employment opportunities, both offshore and in HRM, will be open to all qualified applicants including those from the Goldboro area.

7.3.4.2 Business Opportunities

The bringing ashore of a second source of natural gas reflects the gradual diversification in, and security of, the supply of natural gas that is important to future industrial development in the area and elsewhere in the region. The Project will increase the development momentum in the area and secure Goldboro's position as the first natural gas landfall location in the province. The Project, for example, is one of the reasons for the proposed expansion in the capacity of the M&NP main transmission line. The anticipated immediate and direct business opportunities associated with the Project at landfall will be small, but the wider opportunities associated with the Project and with other developments that may rely on the gas supply will be greater.

7.3.4.3 Training

The catalyst for training is the requirement for skilled personnel during Project development and production. EnCana is working with the NSCC to ensure that the necessary training programs are in place to meet their anticipated labour requirements. Those trained in local programs and who gain experience with the industry in Nova Scotia can expect to work elsewhere during their careers. Training therefore becomes a long-term benefit, because the skills acquired are transferable between projects.



7.3.4.4 Property Tax Base

The lands used for the development of the onshore pipeline from landfall to the tie-in with M&NP mainline, a distance of 3-4 km, will be subject to taxation. The Municipality of the District of Guysborough will receive these revenues which represent a source of income for the municipality. As indicated in Section 4.2.1.3 of the SEIS (DPA Volume 5), no agreement has yet been reached with respect to the province's assessment of the gas plant and the existing pipeline infrastructure. The outcome of these negotiations will have a bearing on the assessment of the proposed new infrastructure and on the property taxes that will be collected by the municipality. Based on current assessment rates for SOEP and M&NP infrastructure, the estimated assessment value for the proposed infrastructure would be in the vicinity of \$5.5 million. This in turn would generate a tax benefit for the municipality of approximately \$84,000 annually.

7.3.4.5 Economic Stability and Growth

The Municipality of the District of Guysborough and surrounding areas have accommodated substantial economic investment over the last few years. There is also considerable optimism that this area will attract further industrial and residential development. However, municipal representatives have indicated on several occasions that they would prefer to see the development of an onshore sour gas treatment plant at Goldboro, rather than the offshore treatment proposed for Deep Panuke. This option, it is argued, would bring more employment and local investment to the area during construction and operation.

The technical reasons for treating the sour gas offshore are significant and are addressed in the Development Plan (DPA Volume 2) and Section 2.10 of the CSR. While it is acknowledged that an additional onshore plant would generate more local construction employment and increased tax revenues, long-term employment during operation would likely be minimal. This Project adds not only quantity, but also security, to the supply of natural gas at Goldboro. Goldboro may not be the only landfall to be developed in Nova Scotia over the longer term, but it has the advantage of being the first, and therefore is a competitive option for many offshore players. At the same time the municipality is successfully generating interest in the industrial lands adjacent the gas plant. In this context, the Project augments and supports the foundation for economic stability and growth in the immediate area. This is a distinct and important Project benefit.

7.3.4.6 Aquaculture and the Inshore Fisheries

Construction, particularly trenching, potential blasting, and burial of the marine pipeline in the nearshore area, is a potential source of impact on aquaculture and the inshore fishery. Construction activities will cause releases of sediment into the water column and disturbance to the seafloor within a relatively



narrow band along the pipeline RoW. Thus, the effects on fishing in inshore waters, particularly for lobster and rock crab, will likely be restricted to individual fishers who fish in specific areas according to tradition and interpersonal agreements. Access to sea urchins within the potentially affected zone is restricted to an individual leaseholder. As a result, individual compensation arrangements will be negotiated between EnCana and those potentially affected by construction activities.

Experience with the SOEP and other comparable projects has shown that measurable sediment increases during trenching and blasting are restricted to distances of less than one km from the construction zone. The aquaculture sites located in Country Harbour are well outside the construction zone and are unlikely to be affected. Changes to the sea bottom, both physical and biological, will be confined to a narrow zone; regrowth of marine plants, followed by recolonization by infauna and epifauna, will occur within a few years (refer to Section 6.3.3). The disturbed area, compared to the total fish habitat available, is insignificant.

Construction of the pipeline will result in a small temporary loss of productive fish habitat, but the size and duration of this loss will not result in significant adverse effects on the inshore fishery. EnCana is committed to developing a compensation program in consultation with fisheries interests prior to construction activities. This program will be consistent with the Compensation Guidelines Respecting Damages Relating to Offshore Petroleum Activity (C-NOPB and CNSOPB 2002). EnCana has also committed to the establishment of a fisheries lisison committee similar to that which operated successfully during SOEP construction, closer to the date of construction. No effects on aquaculture are anticipated.

7.3.4.7 **Tourism**

Development of additional industrial infrastructure in an essentially rural area may have an impact on tourism. There are currently two principal categories of visitors to this part of the Eastern Shore: those whose primary destination is the historic village museum in Sherbrooke; and those who visit the area to fish, hunt, canoe, walk or to enjoy the natural attributes of the area. A telephone survey of tourism operators conducted in the fall of 2001 (refer to Section 4.2.1.2 of the SEIS (DPA Volume 5)) suggested that the SOEP had increased the public awareness of the area among potential visitors, and they anticipated that the proposed Project would do the same. None of the respondents thought that the SOEP had caused any direct positive or negative impacts on tourism in the area.

While onshore construction of the Project may lead to a temporary increase in occupancy rates for a few Bed and Breakfast establishments, the demand for such accommodation will be substantially less than was the case during the construction of the SOEP gas plant and associated works. Consequently, it is anticipated that the Project will have minimal effects on area tourism.



7.3.4.8 Water Quality

Water quality in the area may be affected by siltation during construction of the nearshore and onshore pipeline, subsequent works on the pipeline during Project operation and by an accidental event involving the pipeline. The construction of the nearshore pipeline will disturb the nearshore benthos. The extent and severity of any resulting sedimentation will depend on alignment of the pipe, the nature of the seafloor, currents and the duration and type of dredging. Construction, however, will be of limited duration and once the pipeline is in place, there will be no further sedimentation. Onshore construction could cause sediment run-off, including potential acidic run-off, to reach streams and/or the marine environment. However, sediment controls are an integral part of normal construction practices and the sedimentation of freshwater or the marine environment from uncontrolled run-off is unlikely. Additional information on Project effects on water quality in the study area is included in Section 6.3.2. No significant adverse effects are predicted on water quality.

7.3.4.9 Air Quality

The principle source of Project related air emissions will be from the offshore processing facility. Given the distance of the facility from shore there will be no interaction between the Project and the Municipality of the District of Guysborough with respect to air quality. No significant adverse effects are predicted for the airshed of the landfall communities (refer to Section 6.3.1).

7.3.4.10 Roads

The principle source of Project impact on the road network will occur during construction as a result of materials transported and the movement of the labour force to construction sites. Construction of the onshore pipeline to the tie-in with the M&NP mainline will involve the use of specialized machinery and transportation of pipe to the RoW. Some of these materials may be transported to the Goldboro wharf by barge and then transported by road to construction sites. The onshore pipe lengths may also be transported from a pipe laydown area by road. The location of the pipe laydown area has not yet been determined. Therefore, is not possible to determine which routes will be used, other than those that access the construction area at Goldboro, such as Highway 316. Given the limited length of the onshore pipeline (3-4 km), pipe-hauling activities will likely last no more than a few days. Some disruption of traffic flow on Route 316 is likely to occur during the short period when pipes are being moved to construction sites. Any inconvenience to local residents will be minimized through notification to the municipality or other pertinent agencies of anticipated traffic disruptions, thus allowing appropriate traffic management techniques to be applied, if warranted.



7.3.4.11 Wharves

The principal source of impact on wharves in the area would occur during construction as the result of the movement of equipment and material. The Goldboro wharf was completely reconstructed by SOEI during gas plant construction. This wharf is available to EnCana should the need arise.

7.3.4.12 Emergency Services

Goldboro is a distinctly rural community and local emergency services are minimal. A paramedic base with two ambulances in Country Harbour serves an area that includes the communities of Goshen, Stormont, Goldboro, Isaac's Harbour, Drum Head, Seal Harbour and New Harbour. The SOEP has augmented the local emergency resources both directly and indirectly. For example, an increase in the local fire tax levy for District 7 has enabled the Harbourview Volunteer Fire Station to obtain new equipment. Due to their proximity to the gas plant, the SOEP has also provided the Harbourview group with a "Jaws of Life". These local resources would be available to respond to any Project related emergency in the vicinity of Goldboro. EnCana will also prepare the necessary safety plans to address all eventualities that may arise during construction and operation. The company will work with local emergency authorities to ensure that response teams are appropriately trained and equipped to address all accidents and emergency incidents.

7.3.4.13 Land Use

Construction of the pipeline from landfall to the tie-in with the M&NP mainline has the potential to disrupt land use. The routing of the pipeline from landfall to the tie-in location is largely through lands that have been disturbed in the past. No active logging is taking place on any land along the proposed RoW. The proposed RoW crosses an area designated by the Guysborough County Regional Development Authority (GCRDA) and the municipality as the Goldboro Industrial Park. The final RoW routing will be negotiated with the municipality to ensure minimal disruption to potential industrial development sites.

Although there are no active mineral workings in the vicinity of the proposed pipeline corridor, there are lands subject to mineral licences (refer to Figure 4.15 of SEIS (DPA Volume 5)) including licences on property that extends across the proposed pipeline corridor. Access through all lands will be negotiated with the landowner, including, where appropriate, the Crown. It will also be necessary to notify and consult with those parties that hold mineral licences.



7.3.4.14 Current Land and Resource Use for First Nations' and Aboriginal Purposes

As indicated in Section 7.2.4.1, there is evidence that the Mi'kmaq historically frequented the lands and waters around the landfall. Today, however, there are no First Nation's communities in the County of Guysborough and no indication that First Nation's or Aboriginal people use land and waters in or near the proposed RoW for traditional purposes such as hunting, trapping and gathering. In the absence of evidence of any current use (Membertou Corporate Division 2002), it is predicted that there will be no impact from Project activities on the use of land for traditional purposes by the First Nations and Aboriginal peoples.

As referenced in Section 7.2.3.2, First Nations and Aboriginal peoples have acquired licences to fish in the nearshore and offshore waters, including licences to fish in waters in proximity to the pipeline and its landfall. Consideration of the effects, if any, on such commercial licences is addressed in Sections 7.3.4.6 and 7.3.5.2 of this document (refer also to Sections 7.4.1.6 and 7.5.1.6 of the SEIS (DPA Volume 5)).

7.3.4.15 Archaeological Resources

As indicated in Section 7.2.4.1, three shipwrecks were identified in the immediate vicinity of the nearshore pipeline and landfall; several other wrecks are located in the approaches to Country Harbour. The Curator of Special Places at the Nova Scotia Museum has indicated that these wrecks have historical value. To the extent possible, the proposed pipeline will be routed to avoid interaction with any of these wrecks. The Nova Scotia Museum will be informed of all route modifications. Once the nearshore pipeline route has been finalized and any mitigative action recommended by the Curator of Special Places taken, impacts on marine archaeological resources during Project Construction will be insignificant. There will be no impact on these resources during Project operation or decommissioning.

Construction activities associated with pipeline construction from landfall to connection with the M&NP transmission main may have an effect on land-based archeological resources. A range of heritage resources has been identified near the proposed pipeline RoW. These pre-contact and historic archaeological resources include nine sites within the vicinity of the proposed landfall; none are located within the pipeline corridor. A field survey conducted in the fall of 2001 within the pipeline study corridor did not identify any additional archeological sites.

As there may potentially be pre-contact sites in the vicinity of the pipeline landfall or RoW that have not yet been identified, mitigative measures will be required in the event that such sites are encountered during construction. These measures include:



- inspection of the RoW by an archaeologist, in association with an Aboriginal representative prior to initiation of any ground disturbing activities;
- delivery of a heritage resource awareness program for construction personnel; and
- monitoring by an archaeologist, in association with an Aboriginal representative, of construction activities at any locations as having a high potential for archaeological resources.

Through implementation of the above mitigative measures, the effects of construction activities on landbased archaeological resources will be insignificant. There will be no impact on such resources during Project operation or decommissioning.

7.3.4.16 Public Health and Safety

Public health and safety at and in the vicinity of the landfall might be affected during development, production and decommissioning by an accidental event or, during production by emissions. Due to the nature of the Project (*i.e.*, offshore processing), the assessment of the onshore effects of changes to air quality are confined to routine construction emissions (*e.g.*, grading, vehicle emissions and dust) (refer to Section 6.3.1). The preparation and enforcement of the construction EPP to ensure that all construction activities are undertaken in an environmentally acceptable fashion will ensure that emissions generated during normal construction activities are kept to acceptable levels.

Accidental events are unpredictable. As indicted in Section 7.4.3.3 of the SEIS (DPA Volume 5), EnCana will prepare the necessary safety plans to address all eventualities that may arise and will work with the local authorities to ensure that the response teams are appropriately trained and equipped to address all accidents and emergency events.

7.3.4.17 Recommended Mitigation

The routing and design of the nearshore and onshore pipeline and related facilities has taken into account relevant environmental and socio-economic factors. For example, nearshore pipeline routing and the landfall site have been selected to avoid and historically important marine wrecks and valued pre-contact sites. Following is a summary of specific mitigative measures that EnCana will implement as appropriate:

- encourage its contractors and subcontractors during construction to work with local agencies to hire labour from the District of Guysborough;
- work with the Municipality of the District of Guysborough to ensure that information on contracts and business opportunities is made available to those local parties who could provide the required services;



- continue to work with the NSCC to ensure that the necessary training programs are in place to meet anticipated needs for trained labour;
- negotiate compensation agreements to mitigate any demonstrable economic losses resulting from spills, gear and vessel damage and lost opportunity for fishing ;
- use appropriate measures (e.g., silt curtains) to minimize the movement of sedimentation and potential acidic runoff;
- prepare an EPP;
- notify the Municipality of the District of Guysborough and other pertinent agencies and the EILC whenever construction activities will disrupt traffic flow on Route 316 during construction;
- work with local emergency authorities to ensure that response teams are appropriately trained and equipped to address all accidents and emergency incidents;
- work with the Municipality of the District of Guysborough to ensure that pipeline routing through designated industrial lands is acceptable;
- notify and consult with landowners and holders of mineral licences with respect to pipeline routing;
- liaise with the Curator of Special Places at the Nova Scotia Museum to determine what, if any, mitigative actions are required to protect the identified marine wrecks;
- conduct, with an archaeologist and an Aboriginal representative, an inspection of the right-of-way after the survey line is marked to identify archaeological sites;
- deliver an awareness program with respect to archaeological sites for construction related personnel; and
- conduct monitoring of construction activities at sites that have potential for archaeological resources.

7.3.4.18 Summary of Residual Impacts

As summarized in Table 7.7, Guysborough County and, more specifically, the landfall communities will derive the following benefits from the Project:

- a second source of gas which will contribute to economic stability and growth;
- training benefits during development and production;
- employment benefit during development;
- some benefit to businesses during development; and
- new property taxes.



Table 7.7 Guysboro	ough County / Landfall	Communities: Residual I	impacts		
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT	LINKAGE TO	RESIDUAL IMPACT	DEGREE OF
		SOUKCE THE E	CONOMY		CERTAINTY
Employment	Those seeking employment	Development and production expenditures	• The Project is a source of both direct and	Some benefit during development	Benefit is certain
	Municipality		indirect employment during development	Some benefit during production	Benefit is certain
			and production	Some benefit during decommissioning	Benefit is of low certainty
Business Opportunities	BusinessesMunicipality	Development and production expenditures	• Project investment as a catalyst for further	Development will have some benefit	Benefit is certain
	а 1		economic expenditures	Production will bring little benefit	Benefit is certain
				Decommissioning may bring some small benefit	Benefit is of low certainty
Training	 Those who lack the necessary skills 	Development and production expenditures	• EnCana's skill needs	Benefit during development	Benefit is certain
		• Labour needs		Benefit during production	Benefit is certain
				Insignificant impact during decommissioning	Impact is certain
Property Tax Base	 Municipality Residents of the area 	Onshore pipeline infrastructure	Onshore pipeline will be subject to	No impact during development	N/A
			assessment and related property taxes	Production will bring benefit	Benefit is certain
				Benefits will cease when the Project is	Impact is of certain
				decommissioned	
Economic Stability/Growth	BusinessesMunicipality	Development and production expenditures	• Expansion of oil and gas sector	Development will bring benefit	Benefit is certain
	GCRDA	• Expansion of industrial sector	 Security of supply 	Production will bring benefit	Benefit is certain
				Decommissioning will	Impact is of low certainty
				have an insignificant impact	



Table 7.7 Guysbord	ough County / Landfall (Communities: Residual I	Impacts		
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
Aquaculture and Inshore Fishery	• Those involved in aquaculture or the inshore fishery	 Development of the nearshore pipeline Accidents 	Activities that cause sedimentation	Development will have an insignificant impac	Impact is certain
				Production will have no impact	Impact is certain
				Decommissioning will have no impact	Impact is certain
Tourism	Residents who feel that industrial development	 Development of industrial infrastructure 	 Incompatibility of activities 	Development will have no impact	Impact is certain
	is incompatible with tourism in the area	in the area		Production will have no impact	Impact is certain
	 Tourist operators 			Decommissioning will have no impact	Impact is certain
		THE ENV	TRONMENT		
Water Quality	 Residents of the area Stakeholders who have 	Construction of the nearshore and onshore	The generation of sedimentation and/or	Development will have an insignificant impact	Impact is certain
	made an investment dependent on clean	pipelines	the release of effluents	Production will have no impact	Impact is certain
	water			Decommissioning will have no impact	Impact is certain
Air Quality	• Residents of the area	• Gas treatment	Release of gases to the atmosphere during operation. Given the	N/A	N/A
			distance between the offshore treatment facilities and the area in		
			question, there is no linkage		



Table 7.7 Guysboro	ugh County / Landfall (Communities: Residual]	Impacts		
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT	LINKAGE TO	RESIDUAL IMPACT	DEGREE OF
		INFRAS	TRUCTURE		CENTAINTI
Roads	Users of Route 316 and other roads serving the	Construction traffic	 Use of public roads by construction vehicles 	Development will have an insignificant impact	Impact is certain
	 Iandfall area Municipality 			Production will have no impact	Impact is certain
	• NSDOT&PW			Decommissioning will have no impact	Impact is certain
Wharfs	• Users of any wharf used by the Project	Construction traffic	 Use of public wharfs during construction 	Development will have an insignificant impact	Impact is certain
			activity	Production will have no impact	Impact is certain
				Abandonment will have no impact	Impact is of low certainty
Emergency Services	 Employees Local residents 	Accidental events	 Accidental events during development 	Development will have an insignificant impact	Impact is certain
	 Emergency service providers 		and production	Production will have an insignificant impact	Impact is certain
	-			Decommissioning will have no impact	Impact is certain
		SO	CIAL		
Land and Water Use	Land owners and usersMunicipality	• Development of the onshore pipeline	 Lands used for pipeline construction and operation 	Insignificant impact on land use during development	Impact is certain
			·	Insignificant impact on land use during production	Impact is certain
				Decommissioning will have no impact on land use	Impact is certain
Current Land and Resource Use for First	 Aboriginal peoples 	 Development and production activities 	• Disturbance of lands	Development will have no impact	Impact is certain
Nations' and Aboriginal Purposes				Production will have no impact	Impact is certain
				Decommissioning will have no impact	Impact is certain



Table 7.7 Guysboro	ough County / Landfall (Communities: Residual I	mpacts		
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
Marine Archaeology	Those who value wrecks and other	Pipeline construction in inshore waters	Trenching during the laying of the subsea	Development will have an insignificant impact	Impact is certain
	historic artifacts in the coastal waters		pipeline	Production and decommissioning will have no impact	Impact is certain
Archaeological sites onshore	• Those who value historic artifacts	Onshore pipeline construction	Trenching and related activities associated	Development will have an insignificant impact	Impact is certain
			with pipeline construction	The operation and abandonment of the Project facilities will have no impact	Impact is certain
Public Health and Safety	EmployeesResidentsFishermen	 Construction activities Accidental events 	Accidental events during construction and operation	Development will have an insignificant impact Production will have an	Impact is certain Impact is certain
				Decommissioning will have an insignificant impact	Impact is certain



Potential Project related impacts include:

- effects on the inshore fishery from siltation during construction;
- effects on water quality from siltation and potentially from acidic runoff during construction;
- disruptions to traffic movement on Route 316 during construction;
- use of any wharf used during construction;
- emergency services in the event of an emergency during construction or operation;
- disturbance to the use of land during construction;
- disturbance to shipwrecks during construction; and
- disturbance of archaeological sites during construction.

While the Project has the potential to generate a number of impacts, with appropriate engineering design and implementation of mitigation measures, the adverse impacts on the Municipality of the District of Guysborough and the landfall communities will be insignificant.

7.3.5 The Offshore Area: Benefits and Impacts

7.3.5.1 Employment

Employment will be generated offshore through both the development and production phases of the Project. This will involve those employed in the construction and operation of the Project facilities and those who provide support to these activities. The latter includes those who provide transportation, both helicopters and service vessels, and those onshore whose services and goods are essential to the offshore undertakings (refer to Tables 6.29 and 6.50 of the SEIS (DPA Volume 5)). The required labour will involve a wide range of skills and experience and will be drawn from, and therefore will bring benefit to, communities throughout Nova Scotia.

7.3.5.2 Offshore Fishery

The offshore fishery is of economic importance to communities throughout Nova Scotia, but is of particular value to ports in southwest Nova Scotia from Lunenburg to Digby. All anticipated environmental perturbations from routine Project activities, and the effects of malfunctions and accidents will be contained within NAFO Division 4W. Although over 60% of the total catch from this area is landed in Canso and Lunenburg (refer to Table 4.17 of the SEIS (DPA Volume 5)), catch, particularly snow crab, are important to other parts of Nova Scotia including ports in southwest Guysborough County. The location of the offshore pipeline may also affect some fishing activities, particularly those for fixed gear (*e.g.*, snow crab). Fishing in the immediate vicinity of the platform (500 m) would be restricted over the life of the Project. Pipeline development would temporarily restrict



fishing in the vicinity of the pipelay vessel (refer to Section 2.4.3). Because of the spatial extent of the area accessed by most of the fisheries, a small displacement is not likely to result in a measurable economic loss. The low fish productivity near the Deep Panuke sites (refer to Section 6.1.2.2, Figures 4.20, 4.21, 4.22, 4.23 and 4.24 in the SEIS (DPA Volume 5)) indicates that there will be no significant economic impact on the offshore fishing industry as a result of the Project.

7.3.5.3 Current Offshore Resource Use for First Nations and Aboriginal Purposes

As indicated in Section 7.2.3.2, and in Appendix B of the SEIS (DPA Volume 5), the First Nation's commercial fishery has grown considerably in the past decade. Substantial growth has also taken place in the fishery conducted by the off reserve Aboriginal population. As DFO enters into further long-term Marshall Agreements, the commercial value of the Aboriginal fishery will undoubtedly grow further. The First Nations and Aboriginal peoples are also expanding into new fisheries such as commercial swordfish, bluefin tuna and offshore lobster and Jonah crab.

As detailed with respect to the offshore fishery above, the location of the offshore pipeline may affect some fishing activities, particularly those for snow crab and scallop. Fishing in the immediate vicinity of the platform (500 m) would be restricted (*i.e.*, complete loss of access) over the life of the Project. Pipeline development would temporarily restrict fishing in the vicinity of the pipelay vessel. The timing and locations of these restrictions would be published in a Notice to Mariners. Because of the spatial extent of the area accessed by most of the fisheries, a small displacement is not likely to result in a measurable economic loss. The low fish productivity near the Deep Panuke sites (refer to Figures 4.20, 4.21, 4.22, 4.23 and 4.24 in the SEIS (DPA Volume 5)), indicates that there will be no significant economic impact on the offshore commercial fishing industry, including the commercial fishery conducted by the First Nations and Aboriginal peoples, as a result of the Project.

7.3.5.4 Offshore Cables

The proposed subsea pipeline will cross the Sable Island communication cable, the only active subsea cable in the vicinity. The routing design will consider the location of the cable, and it is not anticipated that the Project will have any effect on the operation of the cable. EnCana will notify and consult with all involved parties prior to and during the construction of the proposed pipeline. Recent editions of the CHS Nautical Charts indicate a number of abandoned subsea cables, or sections of abandoned subsea cables, in the vicinity of the pipeline route and the Deep Panuke wellhead location. These, however, do not pose any impediment to Project construction or operation.



7.3.5.5 Other Offshore Activities

As detailed in Sections 7.2.6.2 to 7.2.6.7, several activities occur offshore including research on Sable Island, military training activity, commercial shipping and other offshore activities including exploration. Sable Island, approximately 50 km from the Deep Panuke site, is administered by the Sable Island Preservation Trust. The Trust staffs a monitoring and emergency base on the island and, on occasion, accommodates visits from tourists. Sable Island is identified as a VEC in the biophysical assessment (refer to Section 6.3.7); routine activities associated with construction, operation and decommissioning of the Project are not expected to adversely affect Sable Island.

Under the *Eastern Canada Vessel Traffic Services Zone Regulations*, commercial shipping must follow defined routes upon nearing Halifax Harbour and the Strait of Canso. Outside of these controlled areas, mariners have discretion as to the selection of their preferred routing, subject to proper navigation and seamanship practices. The platforms would be charted and commercial vessels would note the defined 500 m safety zone and keep their distance.

Currently, three producing platforms are associated with the SOEP, and three others are in the design phase. All are, or will be, located at some distance from the proposed Deep Panuke development. Seismic activity and exploratory drilling will occur along wide areas of the Scotian Shelf.

Maritimes Forces Atlantic conduct training and operations in various areas designated as Operations Areas. As detailed in Section 7.2.6.6, one such area, Ops Area India, extends across much of the proposed pipeline route. However, the platforms are outside of this area. DND will be notified of the pipeline routing to ensure that military training activities pose no threat to pipeline integrity.

Project facilities will be charted and there will be a 500 m safety exclusion zone identified around the platforms. It is predicted that the Project will have no socio-economic impacts on Sable Island, commercial shipping, other oil and gas production and exploration activities or military training.

7.3.5.6 Public Health and Safety

Public health and safety at and in the vicinity of the offshore production platforms could potentially be affected during development, production and decommissioning by an accidental event or, during operation, by emissions. The latter include emissions associated with electronic and magnetic fields and radiofrequency and microwave radiation. Air quality is considered a VEC because of its intrinsic value to human and ecosystem health and is addressed as such in Section 6.3.1.



The conditions leading to emissions will be regulated by operating procedures and the industrial hygiene practices of EnCana to ensure compliance with applicable air quality guidelines. Electric and magnetic field levels around electrical devices will be measured to ensure compliance with health and safety standards such as those established by the American Conference of Governmental Industrial Hygienists for monitoring radiation and magnetic fields (ACGIH 2001). Any installations emitting radio frequency and microwave radiation will also be designed and constructed to meet the relevant safety guidelines and standards and will be monitored during commissioning and operating to ensure that worker health and safety is protected. The detailed analysis of the effects of the Project on air quality, including Project malfunctions and accidents, has been conducted using a modeling approach (refer to Section 6.3.1). A range of safety measures will form an integral part of EnCana's Safety, Emergency and Contingency Planning procedures (refer to Section 4).

Project malfunctions and accidents, including the extremely unlikely occurrence of a surface or subsurface blowout of a production well, or injection well, pose a hazard to human health and safety. The greatest danger would be to persons aboard the platforms at Deep Panuke, or aboard vessels within 4 km in the worst case scenario. The mitigation for such events is to reduce the potential for occurrences. A detailed Safety Case analysis will be undertaken by EnCana to ensure that appropriate engineering design and materials procurement procedures are incorporated to ensure a safe facility. Training to promote safe operations will also be an integral part of Project operations.

Provided the mitigative measures detailed in the EPP are implemented, no significant adverse effects on human health and safety are expected from the development and operation of the Project. Routine operations can be conducted to ensure that emissions are well within air quality guidelines, and therefore will avoid impacts on human health and safety. Although extremely unlikely, there is the potential for significant adverse effects to occur in the event of a blowout of the injection or production well. Design, inspection, maintenance and integrity assurance programs will be in place to prevent such events from occurring. Proven engineering techniques are available to present these events and will be employed for the Project. All safety procedures will be documented and in place prior to the commencement of routine operations.



7.3.5.7 Recommended Mitigation

Project design has taken into account environmental and socio-economic factors of interest or concern. Good engineering practices will further minimize the likelihood of adverse impacts. The following is a summary of the specific mitigative measures that EnCana will implement:

- compensate fishers to mitigate any demonstrable economic losses resulting from spills, gear and vessel damage and lost opportunity for fishing;
- notify DND of the pipeline routing to ensure that military training activities pose no threats to the integrity of Project facilities and in regard to the location of UXOs;
- adhere to the practices stated in the EPP;
- provide "Notice to Mariners" to minimize impacts on fishing and marine activities; and
- execute a comprehensive training program and monitor electric and magnetic fields and microwave radiation to meet relevant safety guidelines and standards.

7.3.5.8 Summary of Residual Impacts

As summarized in Table 7.8, the Project will generate the following benefits:

- employment during Project development and production;
- business opportunities during Project development and production;
- training benefits to those who seek the requisite skills to work offshore during Project development and production; and
- investment in the offshore which will contribute to economic stability and growth and confidence in the future of the oil and gas sector.



Table 7.8 Offsho	ore: Residual Impacts				
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
		THEE	CONOMY		
Employment	• Those seeking employment	Development and production expenditures	Offshore activities	Employment benefit during development	Benefit is certain
				Employment benefit during production	Benefit is certain
				Insignificant impact during decommissioning	Impact is of low certainty
Business Opportunities	• Businesses	Development and production expenditures	Requirement for services and materials offshore	Development will bring benefit	Benefit is certain
				Production will bring benefit	Benefit is certain
				Decommissioning will bring some small benefit	Impact is of low certainty
Training	 Those who lack the necessary skills Education sector 	 Development and production expenditures Labour needs 	EnCana's skill needs	Benefit during development	Benefit is certain
				Benefit during production	Benefit is certain
				Insignificant impact during decommissioning	Impact is certain
Property Tax Base	• None	• Investment in land and onshore pipeline infrastructure	No Linkage	N/A	N/A



Table 7.8 Offsho	ore: Residual Impacts				
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
Economic Stability/Growth	• Businesses	Development and production expenditures	• Expansion of oil and gas sector	Benefit during development	Benefit is certain
				Benefit during production	Benefit is certain
				Insignificant impact during decommissioning	Impact is of low certainty
Offshore Fishery	• Those involved in offshore fishery	Offshore activities	Development and operation of the offshore platforms and	Insignificant impact during development	Impact is certain
			pipeine	Insignificant impact during production	Impact is certain
				No impact during decommissioning	Impact is certain
Tourism	 Recreational boaters Visitors to Sable Island 	Offshore activities	Development and operation of the offshore platforms and	No impact during development	Impact is certain
			pipeline	No impact during production	Impact is certain
				No impact during decommissioning	Impact is certain
		THE ENV	IRONMENT		
Water Quality	Offshore fishery	• Development and operation of offshore facilities	Generation and release of effluents	Refer to Section 6.3.2	N/A



Table 7.8 Offsho	ore: Residual Impacts				
ISSUES/CONCERNS	STAKEHOLDERS	PROJECT IMPACT SOURCE	LINKAGE TO PROJECT	RESIDUAL IMPACT	DEGREE OF CERTAINTY
Air Quality	 Employees Other persons located offshore 	Gas production facilities	Release of gases to the atmosphere during operation	Refer to Section 6.3.1	N/A
		INFRAST	RUCTURE		
Subsea Cables	Owners of cables	Construction activities	Subsea pipeline	Development will have no impact	Impact is certain
				Production will have no impact	Impact is certain
				Decommissioning will have no impact	Impact is certain
		SO	CIAL		
Other Offshore Activities	• Users	• Pipelines and associated facilities	Development and operational activities	No impact on other offshore activities during development	Impact is certain
				No impact on other	Impact is certain
				ousnore acuvues ouring production	
				Decommissioning will	Impact is certain
				have no impact on other offshore activities	
Public Health and Safety	 Employees Other persons offshore 	 Development and operation of offshore 	 Accidental events 	Insignificant impact during development	Impact is certain
		facilities		Insignificant impact during production	Impact is certain
				Insignificant impact during decommissioning	Impact is certain



Together the above factors will contribute significant benefits to the province and to communities throughout the province.

Given the large geographic area in which other offshore activities occur, including the offshore fishery, there appears to be little or no conflict in spatial usage, as long as the parties involved communicate and record their activities on the appropriate charts. No residual socio-economic impacts have been identified.

7.4 Cumulative Effects Summary

The consequences of the development and production phases of the Deep Panuke Project will be positive. The Project will inject monies into the national and provincial economies and will generate both direct and indirect employment. Hundreds will be employed from the inception of the design process to the construction and installation of the offshore facilities; lesser numbers will be required at any one time during the operation phase, but much of the employment generated at that time will be of a more permanent nature. Despite tightening employment markets in Nova Scotia with respect to specific employment categories, there will be no large influx of people associated with either the design or development phase, and no resulting shortages or demands for new facilities and support services. The total increase in personnel in Nova Scotia will be primarily located in the HRM and will be small enough that existing facilities and services will be able to accommodate it.

The Project will have different consequences for different communities. Benefits will accrue at the national and provincial levels, and in varying ways to HRM, the service communities and the landfall area. The Project represents an important step in the establishment and growth of the oil and gas sector in Nova Scotia, and its development generates both growth and change throughout the region.

7.4.1 Cumulative Impacts in HRM

The development and operation of the Project will bring considerable benefits in terms of both employment and business opportunities to the HRM. At the same time, this increase in economic activity will exert pressure on the housing market and the infrastructure required to service economic and demographic growth. The regional authority is responsible for the preparation of development plans to ensure that new investment is accommodated in a rational manner. As indicated in Section 7.2.1.3 and in Section 4.1.4.4 of the SEIS (DPA Volume 5), the municipality has experienced an increase both in the number of housing starts and costs in recent years. This trend is likely to continue if the oil and gas sector continues to expand.

As detailed in Sections 7.3.2.10, 7.3.2.11 and 7.3.2.12 and in Table 7.5, there are no linkages between the Project and public health and safety, archaeological and heritage resources or First Nation's and



Aboriginal land and resource use in HRM. As there are no effects of the Project on any one of these issues, there can be no cumulative effects arising from the interaction of the Project with other developments with respect to these issues in HRM. The effects of the environment on the Project as further discussed in Section 8 will not act cumulatively with any facet of the Project in HRM.

Although the pressures of several projects occurring in the same time frame (*e.g.*, Tier II of the SOEP expansion of the M&NP transmission line, Hudson Energy Company's power generation facility and the Deep Panuke Project), against the background of increased exploration and related activity, should not be minimized, the municipal authority and other agencies are supportive of the investment that is occurring. The challenge is for the responsible agencies at all government levels to plan for the necessary infrastructure improvements and extensions.

7.4.2 Cumulative Impacts in Service Communities

The Project will bring another source of natural gas to Goldboro and thereby strengthen the presence of the oil and gas sector in northeastern Nova Scotia. There are indications that this process is already underway. The Hudson Energy Company, for example, had proposed to develop an 832 MW combined cycle, natural gas-fired power generation facility at Goldboro and to transport power to New York City by an offshore, subsea 500 kV high voltage direct current (HVDC) cable. Construction was scheduled to start in early 2003, with generation and transmission of electricity occurring in mid-2005. This project would represent the first gas using industrial plant to be located at Goldboro, and as such would generate considerable local and regional benefits. As of May 2002, however, this project was put on hold.

Each of the service communities (*i.e.*, Guysborough, Sherbrooke and Antigonish) is striving to diversify its economic base and to lever the oil and gas sector to this end. The Project, in association with other industrial initiatives, will serve to further the long-term objectives of these communities.

As detailed in Sections 7.3.3.7, 7.3.3.8 and 7.3.3.9 and in Table 7.6, there are no linkages between the Project and public health and safety, archaeological and heritage resources or First Nation's or Aboriginal land and resource use. As there are no effects of the Project on any one of these issues, there can be no cumulative effects arising from the interaction of the Project with other developments with respect to these issues in the service communities of Guysborough, Sherbrooke and Antigonish. The effects of the environment on the Project as further discussed in Section 8 will not act cumulatively with any facet of the Project in the service communities of Guysborough, Sherbrooke and Antigonish.

7.4.3 Cumulative Impacts at Landfall

Goldboro has experienced and accommodated the development of the SOEP gas plant and associated infrastructure, and the M&NP main transmission pipeline. These projects were the catalysts for the



designation of industrial lands adjacent the gas plant. Much has therefore changed in the area over the past five years.

To date, only one proposed project, an 832 MW combined-cycle, natural gas-fired power generation facility, by the Hudson Energy Company has been publicly disclosed. This project, which is currently on hold, if implemented, would transport power to New York City. If the proponent starts construction in early 2003, construction activity both onshore and offshore may overlap with construction of the Deep Panuke Project. It can be anticipated that the development and operation of such a plant would generate a demand for considerable labour during construction and a lesser amount during project operation. Because of the socio-economic impact assessment of the project has not yet been completed, it is difficult to predict the cumulative socio-economic effects. There would certainly be cumulative effects associated with employment, with the use of local infrastructure, and with the inshore fishery associated with the construction phase. These would have to be detailed by the Hudson Energy Company in their socio-economic assessment. There would be little or no cumulative interactions between the operational phases of the Deep Panuke Project and the Hudson Energy Project.

As detailed in Section 7.3.4 and in Table 7.7, there are linkages between the Project and public health and safety, archaeological and heritage resources, both marine and land, and First Nation's and Aboriginal land and water use in the landfall communities.

The Project will not have a significant effect on public health and safety during construction and operation. As detailed above, only one proposed project that may occur in the same time frame as the Project has been publicly disclosed. There are, however, no details of the construction techniques, mitigative measures, environmental protection plans or safety plans publicly available for review. It must, therefore, be assumed that the regulatory authorities will require comparable standards to those proposed by EnCana. The application of such measures, in conjunction with the implementation of those proposed by EnCana, will ensure that the cumulative effects on the health and safety of the employees, residents and fishers in the area during construction and operation of the projects remains not significant.

The Project will not have a significant effect on archaeological and heritage resources during construction, and will have no effect during Project operation and subsequent abandonment. The mitigative actions proposed by EnCana to protect any archaeological finds, in conjunction with those that would be required of the Hudson Energy Company, will ensure that the cumulative effect of the Project's construction on archaeological and heritage resources remains not significant.

As the Project is predicted to have no effect on First Nation and Aboriginal land and resource use in the vicinity of the landfall, it is unlikely that the project proposed by the Hudson Energy Company would have an effect on such uses. EnCana continues to consult with the Native Council of Nova Scotia with



respect to their use of land and water, if any, in the vicinity of the landfall. It is therefore unlikely that the consequences of the projects being developed and operated in the same timeframes will interact cumulatively to affect such uses.

The effects of the environment as further discussed in Section 8 will not cumulatively act with any facet of the Project in the landfall area.

There are no definitive plans for any other industrial development and no evidence that there has been, or is, speculative applications for residential or commercial development in the area. The GCRDA, however, is considering improvements to the infrastructure that serves the area, including the development of a rail corridor. The Deep Panuke Project does bring a second source of natural gas to the area and is an important step towards the foundation of an industrial node at Goldboro. This is in keeping with the stated objectives of the Municipality of the District of Guysborough.

Concern has been expressed that the proposed nearshore pipeline will be routed in waters that are of value to the inshore fishery. With the completion of the Deep Panuke Project, two pipelines will be coming onshore at Goldboro. Routing of the Deep Panuke pipeline (subsea and onshore) maximizes use of existing pipeline corridors, an approach that is consistent with the provincial energy strategy. If the Hudson Energy project proceeds, a high voltage power cable will also be located in nearshore waters. As indicated in Section 7.4.1.6 of the SEIS (DPA Volume 5), local fishermen who have leases in the area have expressed concern about the potential incremental loss of habitat as a consequence of these and any future pipelines and cables. Current issues, and any concerns that may arise as a result of future activity, must be addressed by the parties involved and, in part, by the agencies (municipal, provincial and federal), who are responsible for monitoring and managing the future use of the lands and waters in this area.

Based on the information compiled, including data on previous projects and the stated objectives of the municipality, the contribution of the Project to cumulative affects at the landfall location will likely be insignificant.

7.4.4 Cumulative Socio-Economic Impacts Offshore

From a socio-economic perspective, there is sufficient geographical area on the Scotian Shelf to accommodate many diverse activities. SOEP Tier I (*i.e.*, the Thebaud North Triumph and Venture fields), are currently producing an average of 550 MMscfd of natural gas per day. Tier II of the development plan involves the potential development of the reservoirs at the Alma field, followed by the development of the South Venture and Glenelg fields. Although the development and production of the latter fields will occur, in part, in time frames that parallel the Project schedule resulting in more activity



on the Scotian Shelf, no cumulative socio-economic effects between SOEP Tier II and this Project are anticipated.

As detailed in Section 7.3.5.7 and in Table 7.8, there is a linkage between the Project and public health and safety in the offshore area. If all mitigative measures detailed in the EPP are implemented, the Project will not have a significant effect on public health and safety during the development, operation and eventual decommissioning of the facilities. As detailed, there are several projects and activities that may occur offshore in equivalent timeframes. There are, however, no details of their construction techniques, proposed mitigative measures, environmental protection plans or safety plans publicly available for review. It must therefore be assumed that the regulatory authorities will require comparable standards to those proposed by EnCana. The application of such measures, in conjunction with those proposed by EnCana, will ensure that the cumulative effects on the health and safety of employees and other persons offshore during construction, operation and decommissioning of the Project remains not significant.

The consideration of the Project's effects on marine wrecks is addressed in the context of the nearshore waters adjacent landfall.

Two projects that have recently been submitted to the regulatory process may interact with the Deep Panuke Project. These are the Sable Island Wind Turbine Project proposed by the Meteorological Service of Canada and the Hudson Energy Company's proposal to develop a power plant as detailed above. The Sable Island Wind Turbine Project would involve the delivery, installation and operation of a wind energy system to provide 37.5 kW of wind power to Sable Island. No cumulative socio-economic effects between this project and the Deep Panuke Project are anticipated.

Cable routing for the Hudson Energy Company's subsea 500 kV HVDC cable is on hold, but it is anticipated to include crossings of submarine fibre optic cables and pipelines.

Two other projects have been publicly announced. These are the Blue Atlantic Transmission System proposed by El Paso Corporation and the Neptune Regional Transmission System (RTSTM). The former includes the development of an offshore natural gas distribution system that would bring natural gas and associated liquids to shore in Nova Scotia, most likely somewhere in southwestern Nova Scotia, and after processing, transport market-ready gas to New York. The intent of Neptune RTSTM is to connect Atlantic Canada and Maine to energy markets in the northeastern United states through a subsea, HVDC cable. No firm details are yet available with respect to either of these projects. It is, however, reasonable, to anticipate that construction activities would include pipe and cable laying, possible trenching, vessel traffic and onshore construction in Nova Scotia. There may be some temporal and spatial overlap of some of these activities with the Deep Panuke Project. If one or both occur in the same timeline, there may be competing demands for labour and associated services particularly through construction.



With respect to other ongoing offshore uses, Project activities are sufficiently distant from the users and visitors to Sable Island that no interaction or interference is likely between those accessing and working/visiting either area. Similarly from the information provided in Sections 7.2.6.1 and 7.3.5.2 with respect to the offshore fishery, little commercial fishery takes place in proximity to the offshore Project facilities. Construction may pose temporary insignificant impacts, but the operation of the facilities will have no significant impact on this important commercial activity.

Future activities offshore, including further exploratory activity will not pose an impediment to the safe development and operation of the Project. Similarly the Project will not inhibit further exploration and development.

7.4.5 Summary of Socio-Economic Cumulative Benefits and Impacts

The development and operation of the Deep Panuke Project relies on the exploration and development offshore that has occurred in the past. At the same time it represents the realization of the second project to bring natural gas to shore in Nova Scotia. This evolution of the oil and gas sector involves investment by many players, the involvement of all levels of government in new and challenging decision making processes, and the adaptation and development of traditional sectors of employment. In essence, the development of a new economic sector involves substantive change and adaptation. The availability of a new source of energy will, over time, lead to a new balance in energy usage in the province as a portion of industrial, commercial and residential users switch to natural gas from other sources of fuel. The availability of natural gas will also attract new investments to the province. Other industrial initiatives, such as those identified in the preceding sections, may follow.

More specifically, the following socio-economic cumulative impacts have been identified:

- pressure on the housing market and the infrastructure required to service economic and demographic growth in HRM;
- the catalytic role that the Project will play over the long term in strengthening the availability of natural gas in both northeastern Nova Scotia and throughout the province; and
- future development at Goldboro will need to be managed in accordance with municipal plans for the industrial park and surrounding lands.

By establishing a second pipeline between the offshore gas fields on the Scotian Shelf and the Nova Scotian mainland, the Project will provide further opportunities for Nova Scotians and other Canadians to participate in, and benefit from, the offshore oil and gas industry, thereby contributing to the economies of Nova Scotia and Canada.

