

### 3 THE ECONOMY – REGIONAL, TERRITORIAL AND NATIONAL

#### *How will the project affect the economy?*

Three interrelated topics are analyzed in this section:

- procurement, employment and regional economic effects
- territorial and national economic effects
- dynamics directly related to procurement and employment opportunities, including demographics

#### 3.1 Procurement, Employment and Regional Economic Effects

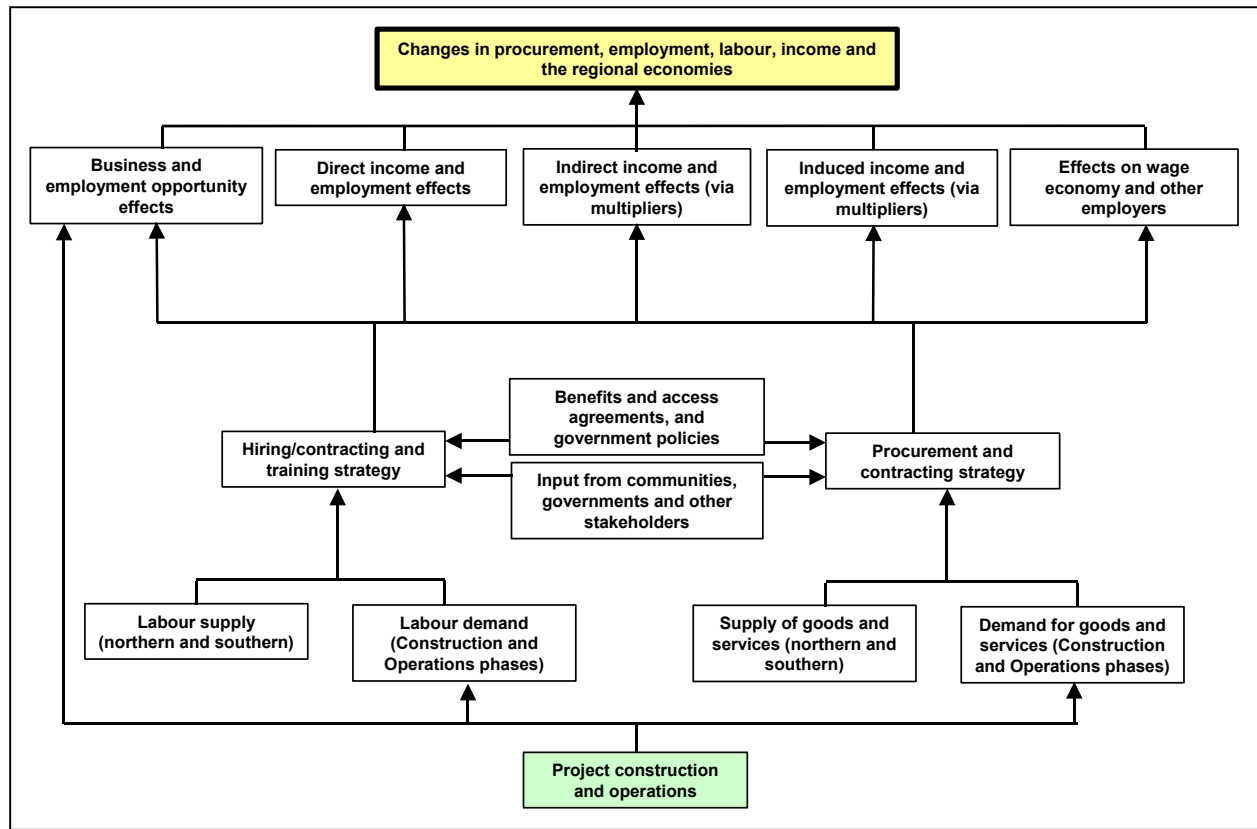
##### *How will the project affect the regional economies, and the Northwest Territories economy as a whole?*

##### 3.1.1 Effect Pathways

The expected influences of the project on procurement, employment and regional economies of the Northwest Territories and northwestern Alberta are shown in Figure 3-1. In broad overview, project effects will derive from interactions of demand and supply. The project will generate a large demand for goods, services and workers at project locations in the Northwest Territories. Qualified and competitive suppliers of goods, services and workers in northern communities and regions will respond to the demand if possible and within their capacity limitations. Where demand exceeds northern supply capacity, the project will look beyond the Northwest Territories to meet supply requirements.

Addressing purely labour considerations first, labour demand and labour supply, and the pending benefits and access agreements, the Canadian and Northern Benefits Plan, the Northwest Territories Socio-Economic Agreement, and inputs from communities and other stakeholders will influence educational upgrading, training, hiring and contracting strategies. These strategies will have multiple regional effects on:

- direct, indirect and induced employment and income
- capacity development
- the wage economy
- other employers



**Figure 3-1: Project Effects on Regional Economies and the Northwest Territories Economy**

The influences driving effects on goods and services are similar to those for labour. The supply of goods and services and the demands for them, and benefits and access agreements, the Northwest Territories Socio-Economic Agreement, the Canadian and Northern Benefits Plan, and inputs from communities and other stakeholders will affect procurement and contracting strategies. These strategies will have multiple regional effects on:

- business opportunities
- revenue and capacity development
- direct, indirect and induced income and employment
- the wage economy and other employers

This analysis of the effect pathways for project effects on regional economies, and employment and expenditures therein, is based on both quantitative and qualitative data. There are empirical indicators for most of the links in the diagram. It is clear that project-induced demands will affect the supplies of, and the demands for, employees, goods and services in study area regions and communities.

### 3.1.2 Existing Baseline Conditions

Two sets of data relevant to labour supply are available:

- regional data on labour force participation up to 2002
- data showing the occupations in which residents of the Northwest Territories and the settlement regions were employed in 1999

The expected project influences on employment opportunities for northern individuals in the study area regions in the Northwest Territories are linked to Table 3-1, which shows the rates for participation in the labour market, employment rates and unemployment rates for 1989, 1994, 1999 and 2002. The table shows that labour force participation and employment rates are noticeably higher in the regional centres of Inuvik, Norman Wells, Fort Simpson, Hay River and Yellowknife than other communities in the regions, and the regions as a whole where these centres are located. In addition, unemployment rates are lower in the regional centres compared with elsewhere in the regions. The participation, employment and unemployment rates of the regional centres strongly influence the rates for the Northwest Territories as a whole.

**Table 3-1: Participation and Employment Rates Using Standard National Labour Force Definitions**

Region	Rate	1989 <sup>a</sup> (%)	1994 <sup>a</sup> (%)	1999 <sup>a</sup> (%)	2002 <sup>b</sup> (%)
Northwest Territories	Participation rate	75	77	78	76
	Employment rate	65	66	68	69
	Unemployment rate	13	15	14	9
Inuvialuit Settlement Region (ISR)	Participation rate	59	60	66	66
	Employment rate	39	40	46	47
	Unemployment rate	33	33	30	27
Gwich'in Settlement Area (GSA)	Participation rate	76	78	78	72
	Employment rate	67	62	68	61
	Unemployment rate	13	20	14	15
Sahtu Settlement Area (SSA)	Participation rate	66	70	78	75
	Employment rate	55	53	62	63
	Unemployment rate	16	24	20	17
Deh Cho Region (DCR)	Participation rate	61	64	68	68
	Employment rate	45	46	52	57
	Unemployment rate	26	28	23	17
Inuvik	Participation rate	82	82	82	76
	Employment rate	77	69	74	68
	Unemployment rate	6	16	10	11

**Table 3-1: Participation and Employment Rates Using Standard National Labour Force Definitions (cont'd)**

Region	Rate	1989 <sup>a</sup> (%)	1994 <sup>a</sup> (%)	1999 <sup>a</sup> (%)	2002 <sup>b</sup> (%)
Norman Wells	Participation rate	83	86	90	88
	Employment rate	78	78	84	84
	Unemployment rate	7	9	7	5
Fort Simpson	Participation rate	74	72	72	78
	Employment rate	55	59	60	72
	Unemployment rate	25	18	16	8
Yellowknife	Participation rate	87	88	86	84
	Employment rate	83	82	80	82
	Unemployment rate	4	7	8	3
Hay River	Participation rate	82	82	81	76
	Employment rate	69	70	73	70
	Unemployment rate	15	14	9	9
NOTES:					
a Government of the Northwest Territories (GNWT) Labour Force Survey data					
b In the 2002 GNWT Bureau of Statistics Survey, the ISR and GSA were combined and published as the Beaufort Delta Region (BDR). BDR data has been split into the ISR and GSA using a series of indicators. See Section 3.1.3.2, Measures of Regional Economic Effects for more details.					
SOURCES: GNWT Bureau of Statistics (1999, 2002a), Statistics Canada (2003)					

Information on the occupations of employed persons in 2001 in the Inuvialuit Settlement Region (ISR), Gwich'in Settlement Area (GSA), Sahtu Settlement Area (SSA) and Deh Cho Region (DCR) is found in Table 3-2. Because community-specific data is not available, the data for residents of the regional centre is aggregated with that for residents of the Aboriginal communities in each region. There are many non-Aboriginal employees of government and other organizations included who are not permanent territorial residents. Therefore, little can be inferred about the work competence of Aboriginal residents.

Table 3-2 shows that there are many workers in all regions, including those in:

- management and business
- skilled and unskilled trades and transportation
- sales and service occupations

Table 3-2: Standard Occupational Groupings (2001)

Occupational Grouping	NWT	ISR	GSA	SSA	DCR	Yellow-knife	Hay River	Alberta ICCs
Total labour force (No.)	20,785	965	2,045	695	1,515	10,470	2,030	2,770
All occupations (No.)	20,425	915	2,015	685	1,470	10,380	2,000	2,755
Management, business, finance and administration (%)	21	12	23	18	15	24	20	17
Clerical (%)	9	5	9	5	7	11	11	3
Natural and applied science, and related (%)	7	5	6	3	4	9	5	6
Health (%)	4	4	5	3	2	4	4	3
Social services, education, government and religion (%)	12	17	13	15	13	11	9	7
Art, culture, recreation and sports (%)	2	2	2	3	2	3	1	0
Sales and service (%)	22	27	21	22	25	21	25	21
Trades, transport and equipment operators, and related (%)	17	22	19	25	21	13	20	17
Primary industry (%)	4	7	3	9	10	3	4	14
Processing, manufacturing and utilities industries (%)	1	0	1	3	3	1	2	11
NOTE: NWT = Northwest Territories								
SOURCES: GNWT Bureau of Statistics (2001), Statistics Canada (2003)								

Some of these skills and work experience could have direct or indirect application to the project, and those with these skills might decide to pursue project-related employment. However, it is not the intention of the project to target qualified labour in existing northern businesses, and community and territorial government and service agencies during the project recruitment process. Instead, the targeted labour supply will be unemployed Northwest Territories residents that *want a job*. In addition, northern businesses that are qualified and interested in providing goods and services needed by the project are encouraged to pursue opportunities created because of the project. Staff of these northern businesses are included in the occupations listed in Table 3-2.

Data from several sources provides a snapshot of existing business capacity in the Northwest Territories, including:

- Northwest Territories Chamber of Commerce
- Inuit Business Directory
- Inuvialuit Business List
- Gwich'in Business List
- Aboriginal Business Directory
- Inuvik Chamber of Commerce

- Norman Wells and District Chamber of Commerce
- Fort Simpson Chamber of Commerce
- Hay River Chamber of Commerce
- Yellowknife Chamber of Commerce
- various community websites

All these sources have websites containing inventories of registered businesses located in communities and regions throughout the Northwest Territories. However, the information contained in the databases is dynamic, very brief, incomplete and in some instances out of date. It is not an inventory of all existing businesses in the Northwest Territories, but it does provide a good representation of the types, numbers and locations of businesses in the communities and regions throughout the Northwest Territories.

Many Northwest Territories businesses found in these databases can be grouped in the following categories, which match up with the list of potential project procurement opportunities described later in Table 3-3:

- air, marine and ground transportation services
- travel services
- accommodation and food services
- drilling and oilfield services
- engineering and environmental services
- logistics and hot shot services
- banking, administration and communication services
- building and industrial supplies
- cleaning and janitorial services
- fuel, water, sewage and solid waste services
- vehicle and heavy equipment sales, leasing, parts and repair service
- camp and catering services
- surveying
- general contracting, road, winter road and lease construction
- trade services (welding, pipefitting, electrical, plumbing, carpentry and general maintenance)

**Table 3-3: Project Procurement Opportunities**

<b>Business Opportunity</b>	<b>Typical Goods and Services Required</b>
Communication	<ul style="list-style-type: none"> <li>• Voice: telephone, cellular, satellite, VHF or UHF radios</li> <li>• Data: Internet, internal company systems</li> <li>• Satellite and cable television</li> </ul>
Community accommodation and related services	<ul style="list-style-type: none"> <li>• Apartments, hotels and motels</li> <li>• Restaurants</li> <li>• Taxi, laundry and dry-cleaning services</li> </ul>
Construction	<ul style="list-style-type: none"> <li>• Drilling                             <ul style="list-style-type: none"> <li>• drilling engineering and geologist</li> <li>• drilling supervision</li> <li>• drilling and completion rigs</li> <li>• coiled tubing unit</li> </ul> </li> <li>• Oilfield services                             <ul style="list-style-type: none"> <li>• cementing</li> <li>• drilling fluids</li> <li>• directional drilling</li> <li>• bit supply</li> </ul> </li> <li>• Facilities                             <ul style="list-style-type: none"> <li>• concrete, crushed rock, sand, gravel and ready-mix products</li> <li>• forms, rebar, cribbing, cement finishing and masonry products</li> </ul> </li> <li>• Pipelines                             <ul style="list-style-type: none"> <li>• timber for pipeline skids and survey laths</li> <li>• welding services and supplies, such as acetylene and oxygen</li> </ul> </li> <li>• Construction services</li> <li>• Surveying</li> <li>• Welding and inspection services</li> <li>• Building trades                             <ul style="list-style-type: none"> <li>• electrical, mechanical, instrumentation, insulating and pipefitting</li> </ul> </li> <li>• Building materials and supplies                             <ul style="list-style-type: none"> <li>• wire, fittings and pipe</li> </ul> </li> <li>• Civil construction services</li> <li>• Crane services</li> <li>• Heating, ventilation and air conditioning supply, installation and maintenance</li> <li>• Environmental monitor services</li> <li>• On-site safety professional services</li> </ul>
Equipment	<ul style="list-style-type: none"> <li>• Heavy equipment supply and service</li> <li>• Drilling equipment and services</li> <li>• Small engine and equipment supply and service</li> <li>• Industrial supplies, steam and high-pressure water</li> <li>• Industrial rental services</li> </ul>
Fuel and fuel storage	<ul style="list-style-type: none"> <li>• Propane, diesel, aircraft fuels, gasoline, grease, lubricant oil, anti-freeze and chemicals</li> <li>• Propane and fuel storage tanks: storage, inventory management and fuel delivery</li> <li>• Oil spill response services and equipment</li> <li>• Super cargo services</li> </ul>

Table 3-3: Project Procurement Opportunities (cont'd)

Business Opportunity	Typical Goods and Services Required
Logistics	<ul style="list-style-type: none"> <li>• Safety equipment, supplies and training</li> <li>• Materials management, expediting, freight transport, flight planning</li> <li>• Hot shot services</li> <li>• Air transport, aircraft charters and maintenance</li> <li>• Vehicle sales, rentals, repairs and service</li> <li>• Charter boats and barges</li> <li>• Procurement, including customs brokers</li> </ul>
Office	<ul style="list-style-type: none"> <li>• Janitorial services</li> <li>• Office space, supplies, furniture, computers and other equipment</li> <li>• Administrative services: secretarial (word processing), clerical, accounting, bookkeeping and payroll</li> <li>• Travel reservation services</li> <li>• Banking services</li> </ul>
Remote site services	<ul style="list-style-type: none"> <li>• Camps, camp catering, camp supplies</li> <li>• Retail and wholesale grocery supply</li> <li>• Water delivery, sewage treatment, snow removal and garbage disposal</li> <li>• Security services</li> </ul>
Safety and medical	<ul style="list-style-type: none"> <li>• Emergency medical facilities, staff, supplies, air and ground ambulance, dentistry, optometry and prescription drugs</li> <li>• Occupation health services</li> </ul>
NOTES: UHF = ultra-high frequency VHF = very high frequency	
SOURCE: Imperial Oil (2004e)	

### 3.1.3 Assessment and Management of Project-Specific Effects

The assessment of project-specific effects includes:

- an overview of some procurement and employment opportunities associated with the project
- a description of the methods used to assess procurement, employment, income and regional economic effects
- an assessment of expenditure, employment and labour income in the study area, taking into consideration capacity constraints that exist in the study area as a whole and the individual regions therein
- a qualitative assessment of effects on northern wages and other northern employers



The assessment of expenditure, employment and labour income has been extracted from a more detailed economic assessment of project effects on economies of the study regions, the Northwest Territories, Alberta and the rest of Canada, entitled *Predicted Economic Impacts of the Proposed Mackenzie Gas Project* (Ellis Consulting Services 2004).

### 3.1.3.1 Procurement and Employment Opportunities

Table 3-3, shown previously, and Table 3-4 show some of the direct and indirect project-related opportunities available to qualified business and individuals. Additional details on a component-by-component basis are shown in Table 2-1 through Table 2-25 in Section 2, Project Expenditures.

**Table 3-4: Project Employment Opportunities**

Job Type	Specific Job Titles	
<b>Construction</b>		
Management or supervisory	<ul style="list-style-type: none"> <li>• Construction manager</li> <li>• Superintendent</li> <li>• Foreman</li> </ul>	<ul style="list-style-type: none"> <li>• Assistant foreman</li> <li>• Assistant (lead hand)</li> </ul>
Equipment operators	<ul style="list-style-type: none"> <li>• Heavy equipment operator</li> <li>• Truck driver (oilfield or transport)</li> </ul>	<ul style="list-style-type: none"> <li>• Bus driver</li> <li>• Crane operator</li> </ul>
Trades	<ul style="list-style-type: none"> <li>• Welder</li> <li>• Electrician</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanic</li> <li>• Pipefitter</li> <li>• Other similar trades</li> </ul>
Labour, semi-skilled and unskilled	<ul style="list-style-type: none"> <li>• Swamper</li> <li>• Welder's helper</li> <li>• Nozzleman</li> <li>• Labourer</li> <li>• Oiler</li> </ul>	<ul style="list-style-type: none"> <li>• Rigger</li> <li>• Painter</li> <li>• Parts runner</li> <li>• Mechanic's helper</li> </ul>
<b>Drilling</b>		
Drilling supervision	<ul style="list-style-type: none"> <li>• Drilling supervisor</li> </ul>	<ul style="list-style-type: none"> <li>• Drilling engineer</li> </ul>
Rigs and crews	<ul style="list-style-type: none"> <li>• Rig manager</li> <li>• Derrickhand</li> <li>• Driller</li> </ul>	<ul style="list-style-type: none"> <li>• Motor man</li> <li>• Floor hand</li> </ul>
Services	<ul style="list-style-type: none"> <li>• Bit supplier</li> <li>• Directional drilling personnel</li> <li>• Coring personnel</li> <li>• Power tong crew</li> </ul>	<ul style="list-style-type: none"> <li>• Cementing crew</li> <li>• Wireline services personnel</li> <li>• Drilling fluids personnel</li> <li>• Well site geologist</li> </ul>
<b>Engineering and Technologists</b>		
Engineer	<ul style="list-style-type: none"> <li>• Mechanical</li> <li>• Chemical</li> <li>• Civil</li> </ul>	<ul style="list-style-type: none"> <li>• Geotechnical</li> <li>• Drafting</li> </ul>

Table 3-4: Project Employment Opportunities (cont'd)

Job Type	Specific Job Titles	
Technologists	<ul style="list-style-type: none"> <li>• Instrumentation</li> <li>• Chemical</li> <li>• Information</li> <li>• Project manager</li> </ul>	<ul style="list-style-type: none"> <li>• Production operations</li> <li>• Mechanical</li> <li>• Petroleum</li> <li>• Electrical</li> </ul>
<b>Logistics Services</b>		
Accommodation	<ul style="list-style-type: none"> <li>• Camp manager</li> <li>• Camp attendant</li> </ul>	<ul style="list-style-type: none"> <li>• Camp maintenance trades and labourers</li> </ul>
Food services	<ul style="list-style-type: none"> <li>• Chef</li> <li>• Cook or baker</li> </ul>	<ul style="list-style-type: none"> <li>• Kitchen help</li> <li>• Food preparer</li> </ul>
Health and safety	<ul style="list-style-type: none"> <li>• Health, safety, environment coordinator</li> <li>• Safety professional (CRSP-certified)</li> </ul>	<ul style="list-style-type: none"> <li>• Emergency medical professional</li> <li>• First aid technologist</li> </ul>
Logistics	<ul style="list-style-type: none"> <li>• Expeditors</li> <li>• Warehouse person</li> <li>• Parts person</li> <li>• Shipper and receiver</li> </ul>	<ul style="list-style-type: none"> <li>• Supercargo</li> <li>• Logistics coordinator</li> <li>• Logistics manager</li> </ul>
Office support	<ul style="list-style-type: none"> <li>• Office manager</li> <li>• Administrative assistant</li> <li>• Expenditures</li> </ul>	<ul style="list-style-type: none"> <li>• Flight planners</li> <li>• Contracts coordinator</li> </ul>
Security	<ul style="list-style-type: none"> <li>• Security guard (watchperson)</li> </ul>	
<b>Project Management</b>		
Management	<ul style="list-style-type: none"> <li>• Project manager</li> <li>• Production operations</li> </ul>	<ul style="list-style-type: none"> <li>• Engineering manager</li> <li>• Information manager</li> </ul>
Procurement and purchasing	<ul style="list-style-type: none"> <li>• Procurement manager</li> <li>• Purchasing agent</li> </ul>	<ul style="list-style-type: none"> <li>• Materials coordinator</li> </ul>
Socio-economic specialists	<ul style="list-style-type: none"> <li>• Field coordinator</li> <li>• Cultural relations coordinator</li> <li>• Employment and training counsellor</li> </ul>	<ul style="list-style-type: none"> <li>• Traditional knowledge specialist</li> <li>• Community consultation and socio-economic coordinator</li> </ul>
Environmental specialists	<ul style="list-style-type: none"> <li>• Environmental monitor</li> <li>• Renewable resource technician</li> </ul>	<ul style="list-style-type: none"> <li>• Wildlife technician</li> <li>• Biologist</li> </ul>
NOTE: CRSP = Canadian registered certified professional		
SOURCE: Imperial Oil (2004e)		

### 3.1.3.2 Measures of Regional Economic Effects

The regional economic project effects were analyzed for both construction and operations. Three variables were measured to determine the effects for each phase. These variables included:

- project expenditures for each region
- employment on both a location and residency basis for each region
- labour income on both a location and residency basis for each region

Total estimated effects include the direct effects associated with the on-site construction and operations of the project, and the effects generated by the spin-off from this activity. The spin-off economic effects are referred to as *indirect* and *induced* effects, and are the result of the multiplier effects on the Northwest Territories, and other provincial and territorial economies.

Economic multipliers trace the effect of a change in output or demand for a good or service. For example, an increase in demand for a commodity will produce three effects that are described by economic multipliers:

- *direct* effects – effects on industries (firms) that expand production to satisfy increased demand. For building the project, they are the effects associated with supplying major components and with construction contractors.
- *indirect* effects – ripple effects as the construction contractors purchase additional required inputs from other firms. In this case, these are the firms that supply goods and services to the construction contractors or those operating the pipeline and fields, such as expeditors, located in various communities in the Northwest Territories.
- *induced* effects – as all these firms expand production, they hire more staff and pay out wages, thereby increasing the income received by households. Households, after withdrawing a certain part for taxes and savings, spend this income, which in turn increases demand for other commodities.

Estimates of economic effects generated were determined from simulations using project estimates of employment and expenditures supplied by the project proponents. The simulations were done using Statistics Canada's Inter-Regional Input-Output Model (I-O Model). The model simulates direct and indirect effects. A second model run was done to estimate induced effects. The Statistics Canada I-O Model produces results at the territorial or provincial level only. The allocation of Northwest Territories effects by region was done using data produced by Ellis Consulting Services.

All dollar values in this analysis are measured in constant 2003 dollars. All employment is expressed in jobs or person-years. All direct employment

generated during construction is expressed as *jobs* because much of the work will be short term or seasonal, whereas all indirect and induced employment is expressed in *person-years*. All operations employment is expressed in *person-years* because it will be full-time or full-time equivalent (FTE) employment.

It is important to note that the results of the economic models should be viewed only as estimates and not absolutes. A major deficiency of most input-output models is that they are not subject to capacity constraints. In short, the input-output model operates as if there is sufficient unused industrial and labour market capacity to meet all incremental demand resulting from new economic projects. In the case of the Northwest Territories, there is limited capacity. The problem is compounded because it is unlikely that new investments will be made to meet a short-term increase in demand generated by project construction that will take place only for three to four years. As a result, although the Northwest Territories might produce goods and services that will be demanded by the project, there will likely not be sufficient capacity to meet the normal market share met by Northwest Territories producers, plus the incremental demand generated by the project. This will mean proportionately more goods and services will have to be imported than is normally the case. As the input-output model is based on averages, it will tend to overestimate the actual effect on the Northwest Territories economy. Other information was used in this analysis to refine model results and help offset this problem.

### **Demographic and Labour Market Estimates**

To estimate the effects on the regional labour markets, labour market projections were developed for the affected regions using the latest labour market information (GNWT Bureau of Statistics 2002a) and a demographic projection model developed by Ellis Consulting Services. The demographic model uses average birth and death rates, and is based on the 2001 census adjusted for the *undercount*. Historically in the Northwest Territories, there has been net out-migration. However, with the recent improvement in the economy, net migration has generally levelled off at a slightly positive rate. The demographic model adopted the recent trend and assumed no net migration for each region. The population estimates produced by the demographic model are based on the net natural increase (births minus deaths) only.

However, the model was adjusted to reflect expected exceptions to this rule at the regional centres of Inuvik, Norman Wells, Fort Simpson, Hay River and Yellowknife. The model adjustments were made recognizing that there will be some in-migration to these centres:

- to fill jobs in regional centres because of business, community services and government agency expansions

- to replace northerners that choose to leave existing employment to pursue higher-paying or more fulfilling work on the project
- on speculation that taking up temporary or permanent residence in the Northwest Territories will improve chances of finding direct project employment or spin-off indirect or induced employment generated because of the project

It is assumed that people from within northern regions will fill some of these jobs, but people from outside the Northwest Territories will also be recruited. Some of the incoming population will fill term positions, and rotate to and from their primary residences. Others will move to the Northwest Territories for the duration of construction and of those, some will take up permanent residence in the Northwest Territories.

In 2002, the GNWT Bureau of Statistics undertook a labour force survey in the Northwest Territories. Two definitions of unemployment can be derived from the 2002 survey:

- the first, which is used for the monthly national labour force survey released by Statistics Canada, requires that a person be actively seeking work to be considered unemployed
- the second includes all people who *want a job*, regardless of the reason they are not actively seeking work. The *want a job* definition expands the number of unemployed because it draws into the labour force persons who have given up looking for work but want a job.

The *want a job* definition was adopted for this analysis because, in many of the small communities, people have given up looking for work because of perceived and real education barriers, and the small number of jobs that become available. It is expected that most people will be attracted back into the active labour market by the opportunities presented by the project and therefore the *want a job* definition is the more suitable measure of the potential size of the labour force. The *want a job* unemployed in the Northwest Territories represent the targeted labour market in the Northwest Territories.

However, it is recognized that there will be some currently employed northern residents that seek and find work on the project. These individuals could include employees of northern businesses contracted to undertake work on the project or they could be qualified people that choose to leave their current jobs to secure higher paying and possibly more fulfilling work on the project. No assumptions have been made in the economic modelling as to the size of this labour market. However, estimates of northerners leaving existing jobs in search of project employment have been considered in terms of effects on community and regional demographics in Section 3.3, Demography.

### Definition of Migration

In this economic analysis, employment demands in the Northwest Territories and in all other provinces and territories are assumed to be satisfied from the local labour supply. However, in the Northwest Territories, this is limited by the capacity of the local labour market. Consequently, the project will lead to no permanent in- or out-migration between provinces and territories, with the exceptions expected in the regional centres of Inuvik, Norman Wells, Fort Simpson, Hay River and Yellowknife, mentioned previously.

Although no permanent in- or out-migration is expected, there will be a significant movement of direct employees from designated points of hire in southern Canada to and from camps in the Northwest Territories. When in the Northwest Territories, they will live in camps and will not establish residency in the North. The effect of spending their wages and salaries will occur in their home communities in the south and not in the Northwest Territories. The movement of workers on a fly-in and fly-out basis is not considered in- or out-migration.

However, beyond these southern workers who will take up temporary accommodation in camps while working on construction, it is recognized that there will be some in-migration and establishment of residency (temporary and permanent) in Inuvik and, to a lesser extent, Norman Wells, Fort Simpson, Hay River and Yellowknife. Adjustments to the economic analysis to account for this in-migration are discussed in Section 3.3, Demography.

#### 3.1.3.3 Capital Expenditures – Construction

Most construction will occur over the four-year period from 2006–2007 to 2009–2010, with the greatest concentration of work taking place during the winter months of 2007–2008 and 2008–2009. The data for construction is reported so that the time reference period encompasses the winter months of both years. For example, the period 2006–2007 covers the period July 1, 2006 to June 30, 2007.

Any construction and drilling that takes place after 2009–2010 is included in Section 3.1.3.6, Expenditures – Operations, which describes operations effects.

The project physical infrastructure components will be located or *put in place* in four regions in the Northwest Territories. All the anchor fields, the lateral pipelines and the Storm Hills pigging facility will be located in the ISR. The Inuvik area facility, about 40% of the natural gas liquid (NGL) pipeline and about 15% of the natural gas pipeline will be located in the GSA. About 60% of the NGL pipeline, 40% of the gas pipelines and 50% of the compression facilities will be located in the SSA. The other 50% of the compression facilities and the remaining 45% of the natural gas pipeline will be located in the DCR.

Table 3-5 shows the project *put in place* capital investment in the Northwest Territories by component. Over the main construction period from 2006–2007 to 2009–2010, project investment is estimated at \$6.2 billion.

Not shown in this table is \$86 million in capital investment in Alberta by NOVA Gas Transmission Ltd. (NGTL) in 2008–2009 to connect the project pipeline to the existing NGTL natural gas pipeline transmission system. There will also be some capital investment before and after this four-year construction period that will increase project investment to \$7.2 billion. The largest expenditure will be for the natural gas pipeline, which will account for almost half of all expenditures.

**Table 3-5: Project Investment by Project Component**

Component	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)
Niglintgak	36	155	107	49	346
Taglu	92	106	218	76	492
Parsons Lake	33	106	191	199	528
Lateral pipelines	140	213	157	39	549
Inuvik area facility	115	174	128	32	448
NGL pipeline	121	183	135	34	472
Gas pipeline	754	1,145	841	210	2,950
Compression facilities	118	179	132	33	462
Total	1,409	2,261	1,907	671	6,247

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Table 3-6 shows project investment by region in the Northwest Territories. It shows that \$1.9 billion, 31%, of the total investment of \$6.2 billion for facilities and infrastructure will be located in the ISR. About \$1.1 billion, 17%, will be in the GSA and \$1.7 billion, 27%, will be located in the SSA. The remaining \$1.6 billion, 25% will be located in the DCR.

**Table 3-6: Project Capital Investment in the Northwest Territories by Region**

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total	1,409	100	2,261	100	1,907	100	671	100	6,247	100
ISR	301	21	580	26	672	35	362	54	1,915	31
GSA	276	20	419	19	308	16	77	11	1,079	17
SSA	433	31	657	29	483	25	121	18	1,694	27
DCR	398	28	605	27	444	23	111	17	1,559	25
ICCs	0	0	0	0	0	0	0	0	0	0

NOTE:  
Figures are in millions of constant \$2003  
Numbers might not add up because of rounding

Although all of the project components, valued at \$6.2 billion, are physically located in the Northwest Territories regions, most of the capital spending on goods and services needed to construct the project components will go to businesses located outside the Northwest Territories. This is because of capacity constraints of the regions in the Northwest Territories to undertake such a large project, given the small population base and workforce, and the limited number, size and scope of local businesses and contractors. As a result, the economic activity associated with direct purchases outside the Northwest Territories regions will go to where the goods or services are produced.

In the analysis, two sources of information were used to determine the locations of purchase and production for capital expenditures:

- information provided by the project proponents regarding the likely locations of major purchases
- the Statistics Canada I-O Model, which was used to assign all trade flow not otherwise assigned by the project proponents

Table 3-7 shows an estimate of the project capital investment made outside and inside the Northwest Territories. It is estimated that about \$5.3 billion, 86%, of the total capital investment will be spent on purchases of goods and services outside the Northwest Territories. These include such goods and services as line pipe, block valves, compressor facility materials and equipment, module fabrication of Niglintgak barge gas conditioning facility, camp manufacturing, engineering, pipeline construction contractors and joint venture contractors based outside the Northwest Territories. In total, about \$894 million of capital investment could be spent in the Northwest Territories regions. However, not all of these expenditures will be retained in the regions because some Northwest Territories businesses that provide goods and services to the project will purchase some of their inputs from businesses located outside the Northwest Territories.

**Table 3-7: Project Capital Investment in the Northwest Territories**

Investment	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total	1,409	100	2,261	100	1,907	100	671	100	6,247	100
Spending outside the NWT	1,241	88	1,986	88	1,610	84	517	77	5,354	86
Spending in the NWT	168	12	275	12	297	16	154	23	894	14
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding										



### 3.1.3.4 Employment and Income – Construction

Project construction will require a large workforce with a variety of skills, and most of the construction work will take place during four winter construction seasons. Given this construction scenario, the limited number of available and interested Aboriginal and other northern workers, and the capacity limitations of the available Northwest Territories labour force, even with implementation of the planned training employment and capacity development program, many of the required skills will not be readily available in the regions. As a result, much of the required project labour will have to be brought in from outside the Northwest Territories.

In the analysis, two sources of information were used to determine the location of purchase and production for employment and income:

- information provided by the project proponents regarding the likely locations of major purchases
- trade flows in the Statistics Canada I-O Model that was used to assign all trade flows not otherwise assigned by the project proponents. The trade flow in the Statistics Canada I-O Model was also used to estimate locations of indirect and induced production.

Table 3-8 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the northern labour force potentially available to the project. Labour force participation is provided, along with employment and unemployment rates using the *want a job* definition of unemployed Northwest Territories residents. The unemployed meeting the *want a job* definition represents the primary northern labour pool available to the project.

**Table 3-8: 2002 Labour Force Indicators for the Northwest Territories**

Indicator	Percentage (%)
Participation rate	84.3
Employment rate	70.6
Unemployment rate	16.3
SOURCE: GNWT Bureau of Statistics (2002a)	

Table 3-9 shows an estimate of the size of the labour pool during the construction period before project effects. The estimate was developed using a demographic model to project population change, and applying the *want a job* rates from the 2002 survey results (see Table 3-8. cited previously).

**Table 3-9: Estimated Labour Force in the Northwest Territories – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	43,104	44,093	44,679	44,569	44,111
Net migration (No.)	0	602	213	-408	102
Population 15+ (No.)	32,879	33,928	34,629	34,794	34,058
Labour force (No.)	27,765	28,635	29,220	29,390	28,753
Employed (No.)	23,265	23,983	24,474	24,627	24,087
Unemployed (No.)	4,501	4,652	4,745	4,763	4,665
Not in labour force (No.)	5,114	5,293	5,410	5,404	5,305
Participation rate (%)	84.4	84.4	84.4	84.5	84.4
Employment rate (%)	70.8	70.7	70.7	70.8	70.7
Unemployment rate (%)	16.2	16.2	16.2	16.2	16.2
NOTE: Numbers might not add up because of rounding					

Before project effects in the Northwest Territories, it is estimated that there will be 4,501 unemployed *want a job* persons in 2006–2007. Over the four-year construction period, the number of available unemployed will average 4,665. It is also expected that a peak of 815 persons could migrate into the Northwest Territories during 2007–2008 through 2008–2009 because of the project, and half these people will leave the region when the construction period ends in 2009–2010. Some of the in-migrants are included among the unemployed that *want a job*.

Table 3-10 shows an estimate of the projected maximum labour pool available in the Northwest Territories regions to fill project-related direct, indirect and induced jobs. The annual average of 4,665 unemployed persons from Table 3-9, cited previously, has been adjusted to reflect the number of unemployed persons that *want a job* and who are willing to do rotational work. The adjustment for willingness to do rotational work adjustment was applied to about half of the unemployed workforce because this condition only applies to direct project jobs which make up about half of the total number of project-related jobs created. Rotational work refers to employment at a location or under circumstances that makes it necessary for an employee to work away from home for a specified period.

**Table 3-10: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Northwest Territories**

Indicator	2006	2007	2008	2009	Average
Total unemployed persons (No.)	4,501	4,652	4,745	4,763	4,665
Will do rotational work (%)	62	65	63	60	63
Total unemployed persons adjusted for rotational work (No.)	2,790	3,039	3,009	2,846	2,921
NOTE: Percentages have been rounded to the nearest whole number, and the adjusted number of unemployed people might not add up because of rounding					

Most direct project employment for Northwest Territories residents will be camp-based rotational work, so only those unemployed persons who are willing to do rotational work have been included in the available labour pool for this type of employment. Exceptions to this general rule could occur at Inuvik, Norman Wells and Fort Good Hope, where large construction camps and worksites will be located near these communities and daily travel to work from home is possible. In addition, the willingness to accept rotational work will not apply to project-related indirect and induced employment opportunities because it is assumed that these jobs will be located in local communities in the study regions. These labour pool considerations are reflected in Table 3-10, cited previously.

It is estimated that during construction, an average of 2,921 Northwest Territories persons per year will be available to seek work on the project or related spin-off employment opportunities in northern communities.

The employment requirement by job type and occupation for each project component was compared with the expected skills of the local labour force to derive an estimate of direct project employment demand for each region.

The Statistics Canada I-O Model was used to estimate total project-generated demand for indirect and induced employment in the Northwest Territories. The territorial estimates were then allocated to regions using project expenditure data.

The Statistics Canada I-O Model, as with all input-output models, is not subject to capacity constraints. This means that the model operates as if all demand for employment can be met, based on the normal market share, regardless of the scale of the project or the size of the available labour force. In general, this assumption does not present problems, but in the case of very large projects imposed on a relatively small economy, the new economic activity creates demand beyond what the regional or territorial market can satisfy.

In cases when capacity is exceeded, new investments will normally be triggered to increase regional business capacity or, in the case of labour shortages, in-migration of workers into the area. However, for this project with a seasonal and relatively short construction period, it is unlikely that regional investors will build up capacity that could not be sustained after construction is complete, nor will many persons permanently relocate to the Northwest territories when they could secure direct jobs on the project from their primary residence in the south, and fly to and from the project on a work rotation basis. A more likely scenario will be that regional producers and the labour market will produce up to capacity and the remainder of the market demand will be satisfied through increased imports from outside the Northwest Territories.

Table 3-11 shows modelled direct, indirect and induced employment estimates in the Northwest Territories regions and more likely employment estimates after the constraints described above are taken into consideration along with the *available*

*labour force* in the Northwest Territories. The employment estimates include direct jobs on the project and all jobs in businesses supplying goods and services to the project and its employees.

**Table 3-11: Total Estimated Employment Demand in the Northwest Territories**

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the NWT without labour supply constraints	Direct	830	3,138	2,569	146	6,683	1,671
	Indirect	1,537	2,344	2,372	995	7,248	1,812
	Induced	457	698	684	289	2,128	532
	Total	2,823	6,180	5,626	1,431	16,059	4,015
Estimated project employment demand in the NWT with labour supply adjustments	Direct	563	1,282	1,168	146	3,160	790
	Indirect	466	540	507	373	1,886	472
	Induced	190	224	209	110	733	183
	Total	1,218	2,047	1,885	630	5,779	1,445
NOTES: Numbers might not add up because of rounding							

It is estimated that with no limits to the size of the available labour force, the project will generate an average annual demand for 4,015 jobs in the Northwest Territories during construction. However, when *available labour force* is taken into account, the average annual demand for jobs in the Northwest Territories decreases to 1,445. This represents the maximum number of workers in all regions projected to be available to meet the demand for project direct, indirect and induced jobs, assuming that project-related training is made available in the Northwest Territories regions before and during the construction period.

Project-related employment will lead to a rise in household income in the Northwest Territories. Table 3-12 shows this data.

**Table 3-12: Estimated Project-Related Labour Income in the Northwest Territories**

Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	26	63	60	8	157	39
Indirect	27	32	30	22	111	28
Induced	8	10	9	5	31	8
Total	61	105	99	35	300	75
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding						

It is estimated that project construction will lead to an increase of \$300 million in labour income in the Northwest Territories over the construction period. This will consist of \$157 million in direct project-related income and another \$111 million indirect income, and \$31 million induced income earned by those producing goods and services for the project and its employees.

Table 3-13 shows the effects of project-related employment on the Northwest Territories labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 1,445 jobs over the construction phase.

**Table 3-13: Estimated Project Effects on the Labour Market in the Northwest Territories**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	43,104	44,093	44,679	44,569	44,111
Net migration (No.)	0	602	213	-408	102
Population 15+ (No.)	32,879	33,928	34,629	34,794	34,058
Labour force (No.)	29,007	29,907	30,517	30,697	30,032
Employed (No.)	24,483	26,030	26,359	25,257	25,532
Other employed (No.)	23,265	23,983	24,474	24,627	24,087
Project employment (No.)	1,218	2,047	1,885	630	1,445
Unemployed (No.)	4,524	3,877	4,158	5,440	4,500
Not in labour force (No.)	3,873	4,021	4,113	4,098	4,026
Participation rate (%)	88.2	88.1	88.1	88.2	88.2
Employment rate (%)	74.5	76.7	76.1	72.6	75.0
Unemployment rate (%)	15.6	13.0	13.6	17.7	15.0

NOTE:  
Numbers might not add up because of rounding

It is estimated that the labour force participation rate in the Northwest Territories will increase from 84.3% in 2002 to 88.2% during construction because it is assumed that more people will be drawn into the labour force as the project draws closer. New training programs will become available and expectations for employment opportunities in the local communities will increase, leading to greater involvement in the labour market.

The estimated number of project-related jobs will increase the employment rate from 70.6% to an average of 75.0% in the Northwest Territories over the construction period, and the unemployment rate will fall from 16.3% to an average of 15.0% during the same period. However, the noticeable increase in the unemployment rate in 2009–2010 is an incomplete representation of the labour market situation in that year because although construction activity is complete, the project has not ended. It will then enter the next phase, which includes start-up and ongoing operations employment, described separately in Section 3.1.3.5, Effects – Operations.

**3.1.3.5 Effects – Operations**

The period 2009 to 2030 was selected as the most relevant time frame for this analysis because it is of sufficient duration to provide a good representation of the economic effects of operations. The year 2009 represents start-up of field production, with gas flowing in 2010.

The effects of operations were analyzed using:

- direct annual expenditures in the Northwest Territories
- direct, indirect and induced employment and labour income for the Northwest Territories

**3.1.3.6 Expenditures – Operations**

Table 3-14 shows average annual operating expenditures, and ongoing capital and drilling expenditures for the project, from operations start-up in 2009 and onward to 2030.

**Table 3-14: Annual Average Project Direct Operating Costs, and Ongoing Capital and Drilling Costs in the Northwest Territories**

<b>Costs</b>	<b>2009–2015 (\$M)</b>	<b>2016–2020 (\$M)</b>	<b>2021–2025 (\$M)</b>	<b>2026–2030 (\$M)</b>	<b>2009-2030 (\$M)</b>
Operating costs	136	144	144	141	141
Drilling costs	39	66	4	0	28
Total	175	210	148	141	169
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding					

During the early years of operations from 2009 to 2015, it is estimated that annual operating costs will average \$136 million. Over all years of the project, the annual operating costs will average about \$141 million. Included in the annual project operating expenditures are:

- employee and contract maintenance personnel costs at the operations facilities and control centres
- head office support
- transportation of personnel, supplies, equipment and materials
- replacement or upgrade of equipment and facilities
- property taxes
- right-of-way fees

Ongoing capital expenditures include such things as future anchor field pad development and compression, and periodic turnaround activities and equipment replacement. In addition, future drilling campaigns are proposed at both Parsons Lake and Taglu. These activities will result in estimated annual average expenditures of up to \$66 million during the period from 2016 to 2020.

In total, annual average operating, capital and drilling expenditures in the Northwest Territories are expected to range from \$141 to 210 million from 2009 to 2030 and average \$169 million during this period.

### Operations – Employment and Income

Table 3-15 shows the estimated effects of operations, and ongoing capital and drilling expenditures on direct, indirect and induced employment in the Northwest Territories.

**Table 3-15: Annual Average Direct, Indirect, Induced and Total Employment for Operations, and Ongoing Capital and Drilling Activities in the Northwest Territories**

Indicator	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	210	272	120	115	182
Indirect	220	244	225	213	225
Induced	88	127	81	77	93
Total	518	643	426	405	500
NOTE: 1 Because of capacity constraints in the Northwest Territories, not all direct employment will be filled by Aboriginal and other northern residents Numbers might not add up because of rounding					

Annual average direct employment associated with operations and future capital and drilling will range from 115 to 272 jobs annually, and average 182 jobs during 2009 to 2030. The peak of 272 direct jobs will occur during the years when capital and drilling activities are taking place in addition to normal operations.

Total employment in the Northwest Territories, including direct as well as spin-off indirect and induced employment, will range from 405 to 643 jobs annually, and average 500 jobs during 2009 to 2030. Aboriginal and other northern residents are expected to fill many of these positions. However, because of the need for knowledgeable, experienced and qualified workers during operations, some of these jobs will be filled by people from outside the Northwest Territories.

To address the shortfall of qualified labour in the Northwest Territories and help build labour force capacity in the regions, technical and trades training programs will be developed and delivered to qualified and interested Northwest Territories

residents before and during operations. With implementation of these training programs, it is expected that northern participation in the direct operations, capital and drilling employment opportunities will increase throughout the life of the project.

Table 3-16 shows the labour income generated from the above-mentioned project-related direct and spin-off indirect and induced jobs in the Northwest Territories. It is estimated that annual average direct labour income will range from about \$11 to 24 million and average about \$17 million during the period from 2009 to 2030. During the same period, total direct, indirect and induced labour income generated in the Northwest Territories will range from about \$36 to \$69 million with an annual average of about \$47 million.

**Table 3-16: Annual Average Direct, Indirect and Induced Labour Income in Northwest Territories**

Indicator	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Average (\$M)
Direct	18.9	24.1	11.2	10.8	16.5
Indirect	15.8	28.7	12.9	12.4	17.3
Induced	13.2	15.9	12.9	12.3	13.5
Total	48.0	68.7	36.9	35.5	47.3
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding					

### 3.1.3.7 Effects on Northern Employers and Wages

Very noticeable effects on some northern employers and wages will ultimately result from:

- the size of the project, and associated labour and procurement demands
- high wage earning potential over a brief but concentrated construction and drilling schedule
- benefits agreements between the project, Aboriginal organizations and the GNWT
- national media coverage of the project

Evidence of this was provided during 2000 to 2001 when petroleum exploration activity was elevated in the BDR and DCR, and more recently in the SSA. With the emphasis on northerner recruitment and hiring, and the attraction of higher wages associated with petroleum exploration, some northern residents left existing jobs within the community, hospitality and service sectors to pursue work in the petroleum industry. This resulted in communities, local businesses and



other local employers having to fill the vacated positions. Given capacity constraints with qualified labour force in the North, many of the vacated positions had to be filled from the south. Higher wages, relocation and accommodation subsidies were sometimes necessary to attract qualified people to the North, given the:

- distance of the Northwest Territories from other regions in Canada
- higher cost of living
- housing shortages in the North

The project will be much larger than the mini exploration booms. Construction will span a period of four years, but most work will be concentrated during two brief but intense winter construction seasons in 2007–2008 and 2008–2009. Because of the size of the project, the large construction workforce and the range of skills required, it is probable that some qualified northern residents will leave existing jobs to fill some of the positions created by the project. This will occur even though the targeted northern labour force is the unemployed that *want a job*. There is no way of quantifying, with any degree of accuracy, how significant an issue this will be in local communities and regional centres in the Northwest Territories, but it is expected to occur during construction, during 2007–2008 and 2008–2009 in particular. The demand for qualified direct employees and contractors during operations will be less than 2% of the demand for qualified direct workers during construction. Again, there could be some northerners attracted to newly created long-term operations and maintenance jobs created by the project, but given the specialized nature of the work, it is expected that the number of qualified people leaving existing northern employment to fill the new jobs will be manageable.

A consequence of qualified northern residents leaving existing jobs to pursue construction employment on the project could be a shortage in critical skills in northern communities. These might include:

- management
- administration
- maintenance trades and equipment operators
- hospitality sector workers

As was the case during recent exploration activity peaks, affected local employers will be faced with the challenge of increasing wages to retain employees, carrying on with a smaller workforce or recruiting replacements for the vacated positions. The situation will be especially difficult if the vacated positions are ones that involve community management and administration employees or persons responsible for delivery of key public and community services, where resource shortages already exist and budget constraints are an ongoing issue.

Recognizing the current capacity constraints in Northwest Territories communities, it is likely that many replacement workers for vacated managerial,

administrative and skilled positions will be recruited from the south. Inducements, such as higher wages, and subsidization of moving and living expenses might be necessary to attract qualified replacement workers. This will have implications for the employers' budgets and ongoing operations.

Effects on employers and wages during operations and maintenance of the project will be negligible. Project operations will generate on average 140 jobs in the Northwest Territories, some of which will be maintenance contractor positions. Given the specialized and technical nature of the operations workforce, and the intent to use existing maintenance contractors in the regions if possible, it is expected that there will be very few qualified northern residents leaving existing employers in the North to take up operations positions.

### 3.1.4 Mitigation Measures

To build business capacity, and optimize project-related procurement and expenditures within the Northwest Territories, a conceptual procurement plan has been developed and is presented in Section 3.1.4.1, A Northern Procurement Plan.

To build capacity and optimize employment of Aboriginal and non-Aboriginal residents in the Northwest Territories, a conceptual program is also provided. This program includes principles and strategies that address education, training and employment.

Successful implementation of the plan will require project leadership by way of a project proponent employment and training coordination function, and the partnership, cooperation, support and involvement of:

- Aboriginal organizations
- northern communities
- education and training institutions
- relevant territorial and federal government agencies
- industry organizations
- contractors
- unions

Measures to reduce southerners migrating to the Northwest Territories on speculation that this will improve their chances of securing project employment are addressed in Section 3.3.4, Mitigation Measures – Construction.

### 3.1.4.1 A Northern Procurement Plan

The project proponents are committed to using Aboriginal, other northern and other Canadian suppliers of goods and services if they are:

- able to meet or exceed specified safety, environmental, technical and quality standards, and project timing requirements
- internationally cost competitive at the place and time where the goods or services are required

Recognizing that construction and operations will primarily occur in the Northwest Territories, the project proponents will give preference to qualified, competitive Aboriginal and other northern businesses for certain goods and services. In some instances, Aboriginal or other northern businesses might be invited to bid first.

#### Principles

The project proponents will:

- provide full and fair opportunity for Aboriginal and other northern businesses to participate in business opportunities
- comply with relevant land claim settlements, and benefits and access agreements
- ensure that project procurement policies are consistent with the Indian and Northern Affairs Canada (INAC) Northern Benefits Statement of Principles, where applicable
- foster development of Aboriginal and northern business and human capacity that provides long-term benefits to the project proponents, such as meeting long-term sustained demand for goods and services
- ensure that suppliers of goods and services meet the project proponents' commitments to use Aboriginal and northern businesses

#### Strategy

The project proponents will:

- assess northern market supply capacities, including the potential to grow to meet specific needs
- provide lead time for Aboriginal and other northern businesses to develop the ability to qualify and effectively compete for the work

- pre-qualify Aboriginal and other northern businesses, and offer feedback and assistance in understanding how to fill gaps in their qualifications
- hold workshops on bidding procedures, safety management and fitness for duty, including alcohol and drug policies, to help Aboriginal and other northern businesses effectively pursue business opportunities
- facilitate northern sourcing by structuring work packages and subpackages, where appropriate, to better align with the capacities of qualified northern businesses
- require bidders on major contracts to submit, as part of their bid, a local content plan that specifies how they will optimize participation of Aboriginal and other northern businesses in executing their work
- give particular emphasis to local content plans when evaluating bids and subsequently awarding work and supply packages for the project
- continue open communications with Aboriginal and other northern businesses about project requirements, including timing, and specification of goods and services required by the project
- supply information about Aboriginal and other northern businesses to potential contractors, in support of local content plans
- offer to communicate with unsuccessful bidders to help them bid more effectively in the future
- support transferring technology and knowledge to Aboriginal and northern businesses
- monitor implementation of local content plans to ensure that procurement contractor commitments are met, and adhere to terms in the benefits and access agreements

#### **3.1.4.2 Education and Training for Employment**

This section outlines the principles and strategies that will be used to develop Aboriginal and other northern workers for, and employ them in, positions associated with construction and operations.

## Principles

The project proponents are committed to the following:

- providing Aboriginal people and northern residents who are qualified, or who take the steps necessary to become qualified for work on the project, with the opportunity to work during construction, consistent with:
  - relevant land claims settlement agreements
  - benefits and access agreements
  - provisions of applicable human rights legislation
  - the Canadian Charter of Rights and Freedoms
  - the INAC Northern Benefits Statement of Principles
- recognizing the role and responsibilities of governments, and cooperating with governments as they carry out their responsibilities
- early identification and communication of project employment opportunities
- taking a leadership role in the Pipeline Operations Training Committee (POTC), an initiative to develop and implement a system for early identification of education and training for potential trades and technical workers for pipeline operations and production operations for the three anchor fields

In 2004, the POTC initiative was used as the cornerstone for the oil and gas industry's Aboriginal Skills Employment Partnership (ASEP) application to secure funding for support and development of Aboriginal workers for long-term jobs arising from a major project, and including opportunities from other projected activities in the oil and gas sector in the Northwest Territories. The oil and gas industry ASEP application group includes members from the Sahtu Dene Council, Inuvialuit Regional Corporation, Deh Cho First Nations, Gwich'in Tribal Council, GNWT, Shell, ConocoPhillips, the Aboriginal Pipeline Group and Imperial Oil.

## General Strategy

The project proponents understand that contractors, unions, communities, educational institutions and government agencies share responsibility for developing and recruiting workers. They will take a leadership role, where appropriate, in coordinating:

- the participation of Aboriginal, government and educational institutions with business and industry organizations to:
  - promote understanding of northern employment opportunities relating to the project, and to the petroleum and pipeline industries

- support worksite and life skills training and programs for workers
- develop business management skills
- the participation of northern community organizations, contractors, labour groups and training agencies to effectively use government training support programs to assist with the timely development, communications and delivery of applicable training programs
- the participation of contractors, labour organizations, and oil and gas companies in the affected regions, to provide early and ongoing training opportunities, particularly for jobs and skills that will be sustainable after construction
- training of workers to operate northern production facilities and pipeline operations, through the POTC

The project proponents will participate in:

- identifying and communicating training and education requirements for project employment
- discussions with training institutions, school organizations and government agencies to share industry-specific needs to allow them to develop appropriate curricula, if required
- initiatives to encourage students to complete secondary school
- ensuring, where feasible, that qualified disadvantaged individuals or groups have full and fair access to training and employment opportunities without incurring unreasonable hardship for the project proponents
- encouraging northern and other contractor participation in providing meaningful employment for Aboriginal and other northern workers

The project proponents are committed to working with contractors, northern businesses, communities and government agencies to identify and capture opportunities for employment by:

- working with employment officers and staff in local communities, Aboriginal organizations and government agencies to help recruit qualified Aboriginal and other northern employees
- designing and implementing hiring practices to provide opportunities for qualified Aboriginal and other northern residents, such as considering equivalency to education requirements for some jobs

- working with major contractors, labour groups and subcontractors to identify and develop potential training opportunities and initiatives
- requiring contractors and subcontractors to structure Aboriginal and northern employment policies and plans, complete with reporting and monitoring systems, to comply with the project proponents' benefits plans and agreements, and with their commitments to use Aboriginal and other northern workers
- establishing on-the-job support systems and resources to help develop worksite and life skills

### **Strategy – Education**

The project proponents will communicate employment and career opportunities and educational requirements by:

- emphasizing that completion of high school could lead to employment and career opportunities with the project, and elsewhere in the oil and gas production and pipeline industries
- working with contractors and schools to reduce the number of students leaving school for short-term construction employment, and recognizing Northwest Territories legislation for age requirements on construction sites
- recommending modification of school programming to allow for participation in the project that might include school leaves and some credit for work experience
- consulting with government and educational institutions with regard to developing equivalencies
- coordinating support from the project and available government funding for education and training of potential operations and construction workers, through the processes of the POTC and ASEP initiatives
- promoting job market understanding by various means, such as providing:
  - employment and career opportunities information
  - summer employment and job shadowing opportunities
- requiring key contractors to provide priority access to their training and employment opportunities for Aboriginal and northern workers that might:
  - provide a high degree of sustainability after construction
  - be transferable into other industrial sectors
  - offer opportunity for advancement

### **Strategy – Training**

The project proponents will:

- work with construction and pipeline contractors, and within other oil and gas industry initiatives to provide training opportunities before and during construction, and into operations activities. The project proponents will ensure that project managers, contractors and unions support hiring, training and retention of Aboriginal and other northern workers.
- work with local communities to identify training candidates and training requirements
- communicate information about training program graduates to potential contractors
- facilitate development and implementation of support systems and resources for workers to help them adapt to the requirements and conditions of wage employment. Support systems will include life skills training, such as money management, workplace orientation and access to addiction counselling.
- support government programs to provide assistance to families and communities of workers
- require workers and managers to attend cultural awareness training

### **Strategy – Construction**

The project proponents will:

- maintain job responsibilities and budget within the project associated with the education and training for employment opportunities to coordinate, liaise and negotiate with northern communities, Aurora College, territorial and federal government agencies, contractors, and unions regarding training and employment
- coordinate construction worker training with project labour, contracting and procurement strategies
- continue to meet to discuss and seek input, support and funding for a training and employment strategy for all phases of the project with:
  - affected northern communities
  - Aurora College
  - government agencies
  - pipeline contractor associations



- individual contractors
- relevant national and international trade unions
- take a leadership role in the development and coordinated use of new or existing community-focused databases, or both, of potential project workers. The databases are intended to facilitate plans for training and employment of qualified workers, primarily for the construction period. The databases will be subject to privacy and other applicable laws.

The databases will be compiled from in-community interviews with individuals interested in gaining employment during project construction and operations. The interviews should be conducted by, or under the direction of, the project, using a standard interview questionnaire developed for the project. Information collected will include education levels, training, certificates or licences and work experiences. This information will go into a master community-specific database retained by the project. The databases will be used for:

- early and ongoing discussions with Aurora College, industry operators and contractors to identify the skill requirements to be captured in the community potential worker databases
- reviewing and identifying skill requirements, specific training needs and steps required to implement community-based and regional training programs
- determining project-related education and training needs in each community, and working with the communities and regions to provide access to them
- provide information to contractors on bid lists for preconstruction and construction work packages, along with the message of the project's commitment to optimize training and employment opportunities for qualified Aboriginal and other northerners, and the need for a local-content plan
- work with the POTC and ASEP initiatives to coordinate the education and training resources to develop qualified workers in time for work during construction and operations
- prioritize the range of training offered, giving special consideration to skills that are transferable and portable beyond the project
- work with Aurora College, municipalities and the GNWT to identify and use civil projects that might provide work experience opportunities for potential construction workers, e.g. equipment operators, site supervisors, safety advisors, where practical

- collaborate with relevant project contractors, GNWT Apprenticeship and Occupational Trades Division and educational institutions to develop and implement systems to capture, record and provide credit for applicable qualifying work hours for apprentices
- work with the existing Aurora College program and offer trainee positions on current project field programs to provide additional opportunities for training in areas, such as basic labourer skill, construction trades, heavy equipment operation and truck driving
- request that Aurora College work with the affected communities to develop training in basic labourer skills, construction trades, heavy equipment operation and truck driving, using local capital projects as training venues wherever possible. Community contributions might be in-kind provisions of training space, tools, and equipment that does not include a built-in markup.
- request that Aurora College adult educators in the communities provide literacy and math upgrading and basic trades preparation training in conjunction with practical training
- work with Aurora College, contractors and community resources to provide nonapprentice training and experience, e.g., heavy equipment operators and expeditors, where practical, for the individuals to be hired by contractors for construction work
- work with Aurora College and community adult educators to consider scheduling the classroom sessions for apprenticeship training during the summer, when space is available in local communities and when instructors are potentially available outside their regular training program commitments
- require key contractors to work with the project, community resource personnel, Aboriginal organizations, Aurora College and others that might add value in recruiting and hiring qualified workers
- communicate training program details and expectations to candidates to promote their commitment to completing the program, and to verify that the training is consistent with their future employment or career objectives
- use experienced northern trainers, where practical
- assist in providing a student liaison when training is away from the home community, as appropriate. The responsibilities of this individual include:
  - assisting students with personal and family issues
  - chaperoning trainees away from home communities

- helping remove barriers that might prevent students from attending classes and completing the training program

### **Strategy – Preparation for Operations**

The project proponents will:

- contribute to Aboriginal and other northern capacity development by enhancing opportunities to participate in natural gas field and pipeline operations employment opportunities as qualified and skilled workers
- enhance understanding of, and preparedness for, project-related training opportunities by working with:
  - appropriate territorial and federal government departments
  - Aboriginal organizations
  - existing government training agencies
  - secondary and postsecondary education institutions
- use public and private training resources, including Aurora College, Petroleum Industry Training Services (PITS) and training contractors, where appropriate
- support applicable industry, government and Aboriginal organization collaborative training opportunities
- provide information about training opportunities and project proponent expectations to all study area communities
- participate with the GNWT, Aboriginal organizations, Aurora College and other industry operators in the recruitment and selection process
- support opportunities for qualified mature students for pretechnical training or direct entry into the Northern Alberta Institute of Technology (NAIT) or the Southern Alberta Institute of Technology (SAIT)
- provide mentoring to trainees while on the worksite
- support existing Aboriginal student support programs at NAIT and SAIT
- provide, in collaboration with the members of the POTC, applicable and relevant employment opportunities for trades apprentices enrolled in POTC-sponsored training
- continue to ensure operation training requirements are reflected in the activities of the POTC, which consists of representatives of the project,

industry, Aurora College, territorial and federal government agencies, Aboriginal organizations and the Aboriginal Pipeline Group

POTC activities include:

- identifying and recruiting 13 trade apprentices, with the first intake of six apprentices in mid-2004 as employees of participants or contractors. The key trades desired are: electrician and instrumentation, millwright, and heavy-duty mechanic.
- identifying and recruiting 38 technical candidates for programs at NAIT and SAIT. The first candidates for the Aurora pretechnical program were accepted for fall 2004, and on successful completion, will begin programs at either NAIT or SAIT in fall 2005.
- continuing intakes for the trades and technical streams in the following two years to enable accepted applicants to complete the employment programs required for operations and maintenance of the anchor fields, pipeline and associated facilities. Many of the newly trained workers are expected to be involved in start-up of the respective operations. Others will earn experience in project proponents' existing operations that might enable them, at a later date, to join the operating and maintenance workforce for the territorial operations.
- providing and coordinating offers of employment for qualified apprentices, technical summer students and graduates

### 3.1.4.3 Employment

#### Principles

The project proponents will:

- emphasize preferential employment of qualified Aboriginal and other northern residents during all phases of the project
- promote Aboriginal and other northern worker involvement in a range of skilled, unskilled, technical and professional job classifications, and provide opportunities for advancement on the basis of qualifications and performance
- provide ongoing support for Aboriginal and other northern hires that recognizes cultural differences at the worksites and in camps
- provide a workplace where all individuals are treated in a fair, equitable and respectful manner while working on the project

### Strategy

The strategy identifies the specific mechanisms and initiatives that the project proponents will use to optimize northern hiring objectives. To this end, the project proponents will:

- encourage and support efforts by the territorial government to set up community-based training programs in personal finance and money management, focusing on informed consumption, savings and investment choices for increased incomes
- provide in-camp training programs in personal finance and money management, focusing on informed consumption, savings and investment choices for increased incomes consistent with programs offered in the communities by the territorial government
- require contractors and subcontractors to:
  - meet the obligations undertaken by the project proponents as part of benefits and access agreements for preferential hiring and employment of qualified Aboriginal and other northern workers
  - provide cultural awareness training to workers and managers
  - respect the rights of local communities to privacy
  - provide, if requested, the opportunity for Aboriginal artisans to display and sell their handicrafts in the camps, reducing potential social disruption caused by project workers visiting local Aboriginal communities in search of handicrafts
  - support worksite and life skills training and programs for workers
  - articulate hours of work, work schedules, transportation to and from points of hire, transportation between camps and worksites, and camp lifestyle rules
- communicate employment opportunities and skill requirements to interested organizations, government agencies and communities, in an open, transparent and timely fashion, using such resources as local and regional print, radio and television media, and Internet-based electronic tools. This will be carried out in cooperation with Aboriginal and other community organizations and institutions.
- give priority to hiring qualified Aboriginal and other northern residents from study area communities

- encourage Aboriginal and other northern worker recruitment and employment for construction and operations by:
  - supporting development and use of existing and potential new databases as key sources of information about potential construction and operations workers
  - providing worker return transportation from designated points of hire to project work locations
  - providing flexible work schedules, to accommodate traditional harvesting and other Aboriginal cultural, family and community needs, where practical, recognizing that work flexibility will be limited in the peak winter construction seasons
  - considering equivalency to education or training in meeting qualification requirements for some construction and operations jobs
  - supporting programs to offer, where appropriate, pre-employment training to northern residents who do not have the required qualifications
  - providing formal worksite support programs and resources, and work with communities to promote development and retention of northern workers
  - providing, where required, on-the-job support, such as:
    - workplace essential skills upgrading
    - a workplace mentor program
    - an Aboriginal-worker liaison program
    - cultural awareness training
    - pre-employment safety training
    - life skills guidance, such as money management, and alcohol and substance abuse prevention
- ensure that camp meals periodically include country food, e.g., fish, moose and caribou, that has been government-inspected or purchased from an inspected facility
- ensure contractors and subcontractors include the above-mentioned mechanisms and initiatives in their construction and execution plans

#### 3.1.4.4 Northern Employment and Wages

The project proponents, local communities, chambers of commerce and Human Resources Skills Development (HRSD) will require information sharing, and to the extent practical, joint planning, to determine effective mitigation for the possible loss of qualified and employed northern workers to the project and potential wage increases, which is one consequence of this issue. This will also be necessary to recognize the potential extent of the effects in local communities and strategies designed to reduce the adverse effects.

The project will:

- continue discussions between project proponents, local communities, Aboriginal organizations, chambers of commerce, major contractors, unions and HRSD regarding construction workforce requirements, a strategy(s) to meet the workforce requirements, and how to reduce adverse implications for northern communities, businesses and governments
- work with their prime contractors and potentially affected communities, where feasible, to develop ways to share use of local utilities and infrastructure maintenance service providers in recognition of the communities' reliance on these services

The project recommends that local chambers of commerce, and public and community service providers develop a unified strategy on:

- how to retain key personnel with critical skills required by the project
- how to identify, attract and retain qualified replacement workers to fill jobs vacated by those in the local workforce that leave to pursue project employment
- working with HRSD offices in the North and south to identify replacement workers with the required skill sets and experience

#### 3.1.5 Procurement, Employment and Regional Economic Effects – Inuvialuit Settlement Region

In this section, the focus is on examination of procurement, employment and regional economic effects in the ISR, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in the ISR for goods, services and labour will be linked to project components and activities located in the region. This includes:

- the three anchor fields, and associated drilling and production facilities

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- the gathering system that transports natural gas and NGLs from the anchor fields to the Inuvik area facility
- the Storm Hills pigging facility
- infrastructure sites located at Camp Farewell, Swimming Point, Lucas Point and Tununuk Point (Bar-C)
- granular extraction

Procurement and employment opportunities exist for qualified businesses and labour force in the ISR and other regions where the project will be located. However, given the small population base and resulting capacity limitations in the region, significant project-related employment and capital expenditures for goods and services are expected to go to sources located outside the study area.

See Section 3.1.3.2, Measures of Regional Economic Effects for more details on project sourcing of goods and services, associated employment, and methods used in the analysis.

**3.1.5.1 Assessment and Management of Project-Specific Effects – Construction**

**Expenditures – Construction**

The main construction and drilling activities will occur over the four-year period from 2006–2007 to 2009–2010. Capital and drilling activity that takes place after 2009–2010 is included in Section 3.1.5.2, Assessment and Management of Project-Specific Effects – Operations.

As shown in Table 3-17, \$1.9 billion, or 31%, of the total project capital investment from 2006–2007 to 2009–2010 will be spent in the ISR.

**Table 3-17: Project Capital Investment in the Inuvialuit Settlement Region**

Indicator	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total investment	1,409	100	2,261	100	1,907	100	671	100	6,247	100
ISR	301	21	580	26	672	35	362	54	1,915	31 <sup>a</sup>
Spending outside the ISR	279	93	508	88	553	82	247	68	1,587	83 <sup>b</sup>
Spending in the ISR	22	7	71	12	119	18	116	32	328	17 <sup>b</sup>

NOTES:  
a Percentage of total project investment  
b Percentage of ISR portion of total investment  
Figures in millions of constant \$2003  
Numbers might not add up because of rounding



Although more than \$1.9 billion of the project capital investment will be located or put in place in the ISR, only part of the value of goods and services (capital spending) used during construction in the region will be purchased in the ISR. Much of the direct expenditures will take place outside the region. This is because of the capacity constraints in the region to undertake such a large project, given the small population base and workforce, and the limited number, size and scope of local businesses and contractors. As a result, the economic activity associated with the direct purchases outside the region will go to where the goods or services are produced. See Section 3.1.3.2, Measures of Regional Economic Effects for more details on sources of goods and services and employment, and methods used in the analysis. It is estimated that about \$1.6 billion, or 83%, of the total ISR capital expenditures of \$1.9 billion will be made outside the ISR. The remaining \$328 million, 17%, of capital spending will occur in the ISR.

### Employment and Income – Construction

Construction of the project components located in the ISR will require a large workforce with a variety of skills, and most of the construction work will take place during four winter construction seasons. Given these construction circumstances and the capacity limitations of the available ISR labour force, many of the skills required will not be readily available in the region. As a result, it is expected that much of the required labour will be brought in from outside the region and the Northwest Territories.

Table 3-18 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the labour force in the ISR potentially available to the project. Labour force participation is provided, along with employment and unemployment rates using the *want a job* definition of unemployment. ISR residents that meet the unemployed *want a job* definition represent the primary regional labour pool available to the project.

**Table 3-18: Labour Force Indicators for the Inuvialuit Settlement Region – Before Project Effects**

Indicator	Percentage (%)
Participation rate	65.6
Employment rate	46.7
Unemployment rate	28.9
SOURCE: GNWT Bureau of Statistics (2002a)	

Although the unemployed *want a job* individuals are the primary available regional labour pool for the project, there are other ISR residents that are available and qualified, and that will seek project employment. These people are currently employed in various capacities in ISR communities and businesses. They have not been included in the demographic modelling because there is no way of accurately predicting their numbers.

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Table 3-19 shows an estimate of the size and composition of the regional labour market during construction before project effects. The forecast was developed using a demographic model to estimate population change, and applying the *want a job* rates from the 2002 survey results to the population projections.

**Table 3-19: Estimated Labour Force in the Inuvialuit Settlement Region – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	2,005	2,028	2,049	2,070	2,038
Population 15+ (No.)	1,651	1,664	1,677	1,689	1,670
Net migration (No.)	0	0	0	0	0
Labour force (No.)	1,084	1,092	1,101	1,109	1,096
Employed (No.)	771	777	783	788	780
Unemployed (No.)	313	315	318	320	317
Not in labour force (No.)	567	572	576	580	574
Participation rate (%)	65.6	65.6	65.6	65.6	65.6
Employment rate (%)	46.7	46.7	46.7	46.7	46.7
Unemployment rate (%)	28.9	28.9	28.9	28.9	28.9

NOTE:  
Numbers might not add up because of rounding

In 2006–2007, before project effects, it is estimated that there will be 313 unemployed persons in the region potentially available for project-related employment. The number of unemployed is expected to remain almost constant throughout construction.

Table 3-20 shows a forecast of the maximum labour pool that could be available to fill direct project jobs and jobs in other businesses that will supply goods and services to the project and its employees. The annual average of 317 unemployed persons has been reduced to 261 to take into account only those unemployed persons who will be willing to do rotational work, because nearly all direct employment in the ISR will be rotational.

**Table 3-20: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Inuvialuit Settlement Region**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total unemployed persons (No.)	313	315	318	320	317
Will do rotational work (%)	82	82	82	82	82
Total unemployed persons adjusted for rotational work (No.)	258	260	262	264	261

NOTE:  
Percentages have been rounded to the nearest whole number, and the adjusted number of unemployed people might not add up because of rounding

The willingness to do rotational work was applied to about half of the unemployed workforce that *want a job* because this condition only applies to direct project jobs, which make up about half of the total number of project-related jobs created.

It is estimated that during project construction, an annual average of 261 persons will be potentially available to seek project employment and related work.

An estimate of direct employment demand for the region was developed by comparing the job type and occupation requirements for each project component located in the region with the expected skills of the local labour force.

The Statistics Canada I-O Model was used to estimate the total demand generated by the project for indirect and induced employment in the Northwest Territories. The territorial estimates were then broken down into regions using project expenditure data.

Table 3-21 shows direct, and modelled indirect and induced employment estimates in the ISR, and more probable employment estimates after taking into consideration the constraints of the available labour pool and existing businesses in the ISR. The employment estimates include direct jobs on the project, and all jobs in businesses supplying goods and services to the project and its employees. The regional distribution of the Statistics Canada I-O Model results was allocated on the basis of each region's share of total capital expenditures.

**Table 3-21: Project Employment Demand in the Inuvialuit Settlement Region**

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the ISR without labour supply constraints	Direct	59	145	566	39	809	202
	Indirect	216	527	784	663	2,189	547
	Induced	99	209	272	199	780	195
	Total	374	881	1,622	901	3,778	945
Estimated employment demand in the ISR with labour supply adjustments	Direct	59	145	201	39	445	111
	Indirect	40	40	40	41	160	40
	Induced	20	20	20	20	80	20
	Total	118	205	262	100	685	171
NOTE: Numbers might not add up because of rounding							

It is estimated that with no limits to the size of the available labour force or business capacity, the project will generate an average annual demand of 945 jobs for residents of the ISR during construction. However, when *available labour force* is taken into account, the average annual demand for jobs in the ISR decreases to 171.

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Project-related employment will lead to a rise in household income in the region, as shown in Table 3-22.

**Table 3-22: Estimated Project-Related Labour Income in the Inuvialuit Settlement Region**

Type of Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	2	9	12	3	26	6
Indirect	3	3	3	3	11	3
Induced	1	1	1	1	3	1
Total	5	13	16	7	40	10

NOTES:  
Figures in millions of constant \$2003  
Numbers might not add up because of rounding

It is estimated that project construction will lead to an increase of about \$40 million in labour income in the region throughout the construction period. This will consist of \$26 million in direct project-related income and another \$14 million earned by workers producing goods and services for the project and its employees.

Table 3-23 summarizes the effects of project-related employment on the regional labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 171 jobs over the construction period.

**Table 3-23: Estimated Project Effects on the Labour Market in the Inuvialuit Settlement Region**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	2,005	2,028	2,049	2,070	2,038
Net migration (No.)	0	0	0	0	0
Population 15+ (No.)	1,651	1,664	1,677	1,689	1,670
Labour force (No.)	1,288	1,298	1,308	1,317	1,303
Employed (No.)	889	982	1,045	888	951
Other employed (No.)	771	777	783	788	780
Project employment (No.)	118	205	262	100	171
Unemployed (No.)	399	316	264	429	352
Not in labour force (No.)	363	366	369	372	367
Participation rate (%)	78.0	78.0	78.0	78.0	78.0
Employment rate (%)	53.9	59.0	62.3	52.6	56.9
Unemployment rate (%)	31.0	24.3	20.1	32.6	27.0

NOTE:  
Numbers might not add up because of rounding

It is estimated that the labour force participation rate in the region will increase from 65.6% in 2002 to 78.0% during construction because it is assumed that more people will be drawn into the labour force as the project draws closer. New training programs will become available and expectations for employment opportunities in the local communities will increase, leading to greater involvement in the labour market.

The effect of project-related employment opportunities in the region will increase the employment rate from an average of 46.7% (see Table 3-19, shown previously) to 56.9% in the ISR during the construction period. Over the same period, the unemployment rate will decrease from an average of 28.9% to 27.0%. However, the noticeable increase in the unemployment rate in 2009–2010 is an incomplete representation of the labour market situation in that year because although construction activity is complete, the project has not ended. It is entering the next phase, which includes start-up and ongoing operations employment, described separately in Section 3.1.5.2, Assessment and Management of Project-Specific Effects – Operations.

**Mitigation Measures – Construction**

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Construction, all apply to the ISR.

**Residual Effects – Construction**

With timely implementation of the mitigation measures identified previously, business and labour force capacity in the ISR could be expected to expand. There will be substantial capital investment and project-related procurement in the region that could represent about 31% of total project capital expenditures in the Northwest Territories (see Table 3-17, shown previously). In addition, labour force participation and employment rates are expected to increase, as will employment and labour income.

The capital expenditures, procurement and employment effects will occur throughout the four-year construction period, but will be most apparent during the winter construction months. The increase in capacity among regional businesses and the labour force is expected to continue well beyond construction. Table 3-24 shows that these effects are expected to be positive, and high magnitude.

**Table 3-24: Procurement, Employment, Income and Regional Economic Effects – Construction Effect Attributes for the Inuvialuit Settlement Region**

Region	Effect Attribute			Significant
	Direction	Magnitude	Geographic Extent	
ISR	Positive	High	Regional and beyond regional	Yes

**3.1.5.2 Assessment and Management of Project-Specific Effects – Operations**

The assessment of project-specific operations effects includes an evaluation of direct, indirect and induced employment, and labour income in the region. Both employment and labour income are generated directly or indirectly from operations, and ongoing capital and drilling activities scheduled over the life of the project.

**Employment and Income – Operations**

The three anchor fields and the gathering system needed to transport the natural gas and NGLs from the anchor fields to the Inuvik area facility and beyond are all located in the ISR.

Table 3-25 shows the estimated effects of operations, and ongoing capital and drilling expenditures on direct, indirect and induced employment in the ISR.

**Table 3-25: Annual Average Direct, Indirect, Induced and Total Employment in the Inuvialuit Settlement Region**

Type of Demand	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	136	207	54	49	113
Indirect	8	19	5	5	9
Induced	4	10	3	2	5
Total	148	236	62	56	127
NOTE: Numbers might not add up because of rounding					

Annual average direct employment associated with anchor fields and gathering pipelines operations, and future capital and drilling work at the anchor fields will range from 49 to 207 jobs annually, and average 113 jobs from 2009 to 2030. The peak annual average of 207 direct jobs will occur during the years when capital and drilling activities are taking place in addition to normal operations.

Total employment in the ISR, including direct as well as spin-off indirect and induced employment, will range from 56 to 236 jobs annually, and average 127 jobs from 2009 to 2030. Regional residents are expected to fill many of these positions. However, because of the need for knowledgeable, experienced and qualified workers for anchor field operations, some of these jobs will be filled by people from outside the region and the Northwest Territories. To help build labour force capacity in the region, technical and trades training programs will be developed and delivered to regional residents before and during operations. With implementation of these training programs, it is expected that regional

participation in the direct operations, capital and drilling employment opportunities will increase throughout the life of the project.

Table 3-26 presents the estimated labour income associated with the jobs described previously in Table 3-25. It is estimated that annual average direct labour income will range from about \$4 to 18 million and average about \$10 million from 2009 to 2030. During the same period, annual total direct, indirect and induced labour income generated in the Northwest Territories will range from about \$5 to 19 million, with an annual average of about \$10 million.

**Table 3-26: Annual Average Direct, Indirect and Induced Labour Income in the Inuvialuit Settlement Region**

Type of Demand	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Annual Average (\$M)
Direct	11.5	17.6	4.6	4.2	9.6
Indirect	0.4	1.0	0.3	0.2	0.5
Induced	0.2	0.4	0.1	0.1	0.2
Total	12.2	19.0	4.9	4.5	10.3
NOTES: Figures are millions of constant \$2003 Numbers might not add up because of rounding					

### Mitigation Measures – Operations

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Operations, all apply to the ISR.

### Residual Effects – Operations

With timely and ongoing implementation of the mitigation measures described previously, business and labour force capacity in the region will increase. There will be ongoing operations and maintenance expenditures, and also ongoing capital and drilling expenditures, and project-related procurement in the region. Regional labour force participation in direct and spin-off employment will be small compared with the GSA and the ICCs.

Table 3-27 shows that operations effects in the ISR are expected to be positive and low magnitude.

Table 3-27: Operations Expenditures, Employment, Income and Regional Economic Effects – Operations Effect Attributes for the Inuvialuit Settlement Region

Region	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
ISR	Positive	Low	Regional and beyond regional	Long term	No

### 3.1.6 Procurement, Employment and Regional Economic Effects – Gwich'in Settlement Area

In this section, the focus is on examination of procurement, employment and regional economic effects in the GSA, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in the GSA for goods, services and labour will be linked to project components and activities located in the region. These include:

- the Inuvik area facility
- parts of NGL and gas pipeline spreads E1 and D1 (see Volume 2, Figure 4-7 for details)
- infrastructure sites, including a large camp near Campbell Lake

Procurement and employment opportunities exist for qualified GSA businesses and labour force in the GSA, and in other regions where the project will be located. However, given the small population base and resulting capacity limitations in the GSA, significant project-related employment and capital expenditures for goods and services are expected to be sourced outside the region.

See Section 3.1.3.2, Measures of Regional Economic Effects, for more details on project sourcing of goods and services, associated employment, and methods used in the analysis.

#### 3.1.6.1 Assessment and Management of Project-Specific Effects – Construction

##### Expenditures – Construction

Most project construction will occur over the four-year period from 2006–2007 to 2009–2010. Ongoing construction and drilling activity after 2009–2010 is discussed in Section 3.1.6.2, Assessment and Management of Project-Specific Effects – Operations.

The Inuvik area facility is located in the GSA, along with about 40% of the NGL pipeline and about 15% of the natural gas pipeline. As shown in Table 3-28, this



represents about \$1.1 billion, or 17%, of the total project capital investment for 2006–2007 to 2009–2010.

**Table 3-28: Project Capital Investment in the Gwich'in Settlement Area**

Indicator	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total investment	1,409	100	2,261	100	1,907	100	671	100	6,247	100
GSA	276	20	419	19	308	16	77	11	1,079	17 <sup>a</sup>
Spending outside the GSA	180	65	291	69	199	65	57	74	726	67 <sup>b</sup>
Spending in the GSA	96	35	128	31	109	35	20	26	353	33 <sup>b</sup>

NOTES:  
a Percentage of total project investment  
b Percentage of ISR portion of total investment  
Figures in millions of constant \$2003  
Numbers might not add up because of rounding

The small labour supply, and the limited size and number of businesses in the region, i.e., the lack of capacity of the region to undertake such a large project, will require construction contractors to hire employees, and purchase goods and services from outside the region. The economic activity associated with the direct purchases outside the region will flow to where the goods or services are produced.

Even though almost \$1.1 billion of the project capital investment will be located in the GSA, only a part of the value of goods and services needed to construct the project will actually be purchased in the GSA. Most of the direct project expenditures will take place outside the region.

It is estimated that \$726 million, 67%, of the capital expenditures will be made outside the GSA. The remaining \$353 million, 33%, of capital investment will take place in the GSA.

### **Employment and Income – Construction**

Construction of the project components located in the GSA will require a large workforce, and most work will take place during four winter construction seasons. Given these construction realities and the capacity limitations of the available GSA labour force, many of the required skills will not be readily available in the region. As a result, it is expected that much of the required labour will be brought in from outside the region and the Northwest Territories.

Table 3-29 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the labour force in the GSA potentially available to

the project. Labour force participation is provided, along with employment and unemployment rates, using the *want a job* definition of unemployment. GSA residents that meet the unemployed *want a job* definition represent the main regional labour pool available to the project.

**Table 3-29: Labour Force Indicators for the Gwich'in Settlement Area – Before Project Effects**

Indicator	Percentage (%)
Participation rate	74.5
Employment rate	61.4
Unemployment rate	17.5
SOURCE: GNWT Bureau of Statistics (2002a)	

Although those in the unemployed *want a job* category are the primary regional labour pool for the project, there are other GSA residents who are available and qualified, and will seek project employment. These people are currently employed in various jobs in GSA communities and businesses. They have not been included in the demographic modelling because there is no way of accurately predicting their numbers.

Table 3-30 shows the estimated size and composition of the regional labour market during construction before project effects. This forecast was developed using a demographic model to estimate population change, and applying the *want a job* rates from the 2002 survey results to the population projections.

**Table 3-30: Estimated Labour Force in the Gwich'in Settlement Area – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	5,366	5,627	5,858	5,648	5,625
Net migration (No.)	0	237	213	-225	56
Population 15+ (No.)	4,395	4,614	4,813	4,651	4,618
Labour force (No.)	3,275	3,437	3,586	3,465	3,441
Employed (No.)	2,700	2,834	2,957	2,857	2,837
Unemployed (No.)	574	603	629	608	603
Not in labour force (No.)	1,121	1,176	1,227	1,186	1,178
Participation rate (%)	74.5	74.5	74.5	74.5	74.5
Employment rate (%)	61.4	61.4	61.4	61.4	61.4
Unemployment rate (%)	17.5	17.5	17.5	17.5	17.5
NOTE: Numbers might not add up because of rounding					

Some project-related in-migration was factored into the estimate on the assumption that some skilled and experienced employees in the region will resign their jobs and seek project-related employment. This will lead to vacancies that will likely not be able to be filled from within the region and therefore create a demand for southern employees to move north. It was assumed that about half of these in-migrants will leave the territory at the end of construction in 2009–2010 and the remainder will stay in the North.

It is expected that over two peak winter construction seasons, i.e., 2007–2008 and 2008–2009, 450 persons could migrate to the GSA because of the project. However, it is assumed that half of these persons will leave the region when construction ends in 2009–2010. It was further assumed that all new in-migrants of labour-force age will be available to participate in construction.

Before project effects in 2006–2007, it is estimated that there will be 574 unemployed persons in the region. Because of in-migration and an increase in labour force participation, the number of unemployed people available during the construction period is expected to increase to an annual average of 603 people.

Table 3-31 shows an estimate of the maximum labour pool that could be available to fill direct construction jobs, and jobs in other businesses that supply goods and services to the project and its employees.

**Table 3-31: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Gwich'in Settlement Area**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total unemployed persons (No.)	574	603	629	608	603
Will do rotational work (%)	65	76	75	54	67
Total unemployed persons adjusted for rotational work (No.)	372	459	469	328	407
NOTE: Percentages have been rounded to the nearest whole number and the adjusted number of unemployed persons might not add up because of rounding					

The annual average of 603 unemployed persons has been adjusted to reflect the number of unemployed persons who would or would not be willing to do rotational work. The willingness to do rotational work was applied to about half of the unemployed workforce that *want a job* because this condition only applies to direct project jobs, which make up about half of the total number of project-related jobs created.

Table 3-31, shown previously, indicates some fluctuation in the percentage of unemployed workers that are willing to do rotational work. This fluctuation is attributed to the in-migration of 450 people to the region, some of whom will be of labour-force age and willing to undertake direct project rotational work.

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A further consideration in estimating the size of the available unemployed labour pool was the location of the Inuvik area facility and a large pipeline construction camp tentatively proposed near Campbell Lake. Because the Inuvik area facility and camp are within daily commuting distance of Inuvik, this could eliminate the need for some rotational work in the region and potentially increase the size of the available labour pool in the GSA.

As illustrated in Table 3-31, shown previously, it is estimated that an annual average of 407 GSA residents will be available to seek direct construction employment, and employment in businesses that provide goods and services to the project and its workforce.

An estimate of direct employment demand for the region was derived by comparing the job types and occupation requirements for each project component in the region to the expected skills of the regional labour force.

Statistics Canada’s I-O Model was used to estimate the total project-related demand for indirect and induced employment in the Northwest Territories. The territorial estimates were then broken down into regions using project expenditure data.

Table 3-32 shows direct, and modelled indirect and induced employment estimates in the GSA, and more realistic employment estimates that take into consideration the constraints of the available labour pool and existing businesses in the region. The employment estimates include direct project employment, and new jobs in businesses supplying goods and services to the project and its employees. The regional distribution of the model results was allocated on the basis of each region’s share of total capital expenditures.

**Table 3-32: Project Employment Demand in the Gwich'in Settlement Area**

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the GSA without labour supply constraints	Direct	499	1,986	1,277	60	3,822	956
	Indirect	906	1,174	1,001	181	3,263	816
	Induced	228	300	249	46	822	206
	Total	1,633	3,459	2,528	287	7,907	1,977
Estimated employment demand in the GSA with labour supply adjustments	Direct	232	287	293	60	872	218
	Indirect	93	115	117	181	506	127
	Induced	46	57	59	46	208	52
	Total	372	459	469	287	1,586	397
NOTE: Numbers might not add up because of rounding							

It is estimated that with no limits to the size of the available labour force or business capacity, the project will generate an annual average demand of 1,977 jobs for residents of the GSA during construction. However, when available labour force constraints are taken into account, the annual average demand for jobs in the GSA decreases to 397.

Project-related employment will lead to a rise in household income in the region, as shown in Table 3-33.

**Table 3-33: Estimated Project-Related Labour Income in the Gwich'in Settlement Area**

Type of Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	12	13	14	3	41	10
Indirect	6	7	7	11	30	8
Induced	2	2	2	2	9	2
Total	19	22	23	16	80	20

NOTES:  
 Figures in millions of constant \$2003  
 Numbers might not add up because of rounding

It is estimated that project construction will generate \$80 million in labour income in the region throughout the construction period. This will consist of \$41 million in direct project-related income and another \$39 million earned by employees producing goods and services for the project and its employees.

Table 3-34 summarizes the effects of project-related employment on the regional labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 397 jobs over the construction phase.

It is estimated that the labour force participation rate in the region will increase from 74.5% in 2002 to 78.0% during construction because it is assumed that more people will be drawn into the labour force as the project draws closer. New training programs will become available and expectations for employment opportunities in the local communities will increase, leading to greater involvement in the labour market.

**Table 3-34: Estimated Project Effects on the Labour Market in the Gwich'in Settlement Area**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	5,366	5,627	5,858	5,648	5,625
Net migration (No.)	0	237	213	-225	56
Population 15+ (No.)	4,395	4,614	4,813	4,651	4,618
Labour force (No.)	3,428	3,599	3,754	3,627	3,602
Employed (No.)	3,072	3,294	3,426	3,144	3,234
Other employed (No.)	2,700	2,834	2,957	2,857	2,837
Project employment (No.)	372	459	469	287	397
Unemployed (No.)	356	305	328	484	368
Not in labour force (No.)	967	1,015	1,059	1,023	1,016
Participation rate (%)	78.0	78.0	78.0	78.0	78.0
Employment rate (%)	69.9	71.4	71.2	67.6	70.0
Unemployment rate (%)	10.4	8.5	8.7	13.3	10.2
NOTE: Numbers might not add up because of rounding					

The estimated project-related jobs will increase the employment rate from an average of 61.4% (see Table 3-30, shown previously) to 70.0% in the GSA during construction, and the unemployment rate will decrease from an average of 17.5% to 10.2% during the same period. However, the noticeable increase in the unemployment rate in 2009–2010 is an incomplete representation of the labour market situation in that year because although construction activity is complete, the project has not ended. It is entering the next phase, which includes start-up and ongoing operations employment, described separately in Section 3.1.6.2, Assessment and Management of Project-Specific Effects – Operations.

### **Mitigation Measures – Construction**

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Construction, all apply to the GSA.

### **Residual Effects – Construction**

With timely implementation of the mitigation measures described previously, business and labour force capacity in the region will expand. There will be capital expenditures and project-related procurement in the region that could represent up to 17% of total project capital expenditures in the Northwest Territories (see Table 3-28, shown previously). In addition, labour force participation and employment rates will increase because of increased employment and labour income.

Effects on individual GSA communities have not been calculated. However, it is assumed that Inuvik will experience more of the procurement, employment and labour income effects than the smaller and more distant GSA communities because of its size, location and function as a regional transportation and administrative centre.

The capital expenditures, procurement and employment effects occurring during project construction will generate additional capacity among regional businesses and the labour force, and some of this incremental capacity is expected to carry over into operations. Table 3-35 shows that construction effects are expected to be positive, and high magnitude.

**Table 3-35: Procurement, Employment, Income and Regional Economic Effects – Construction Effect Attributes for the Gwich'in Settlement Area**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
GSA	Positive	High	Regional and beyond regional	Short term	Yes

### 3.1.6.2 Assessment and Management of Project-Specific Effects – Operations

The assessment of project-specific operations effects includes an evaluation of direct, indirect and induced employment, and labour income in the region. Both employment and labour income are generated because of operations, and ongoing capital and drilling activities scheduled over the life of the project.

#### Employment and Income – Operations

The Inuvik area facility and a portion of the NGL and natural gas pipelines are located in the GSA. The Inuvik area facility is both a processing facility and a control centre for the production of natural gas and NGLs at the anchor fields.

As shown in Table 3-36, annual average direct employment associated with operation of the Inuvik area facility and the control centre for the anchor fields will range from 37 to 40 jobs annually, and an average of 38 jobs from 2009 to 2030.

Total employment in the GSA during operations, including direct as well as spin-off indirect and induced employment, will range from 112 to 230 jobs annually, and average 149 jobs from 2009 to 2030. Residents of the region are expected to fill many of these positions. However, because of the knowledge, experience and skills required for many of the positions, some will be filled by people from outside the region and the Northwest Territories.

**Table 3-36: Annual Average Direct, Indirect, Induced and Total Employment in the Gwich'in Settlement Area**

Type of Demand	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	40	37	37	37	38
Indirect	68	129	52	50	74
Induced	34	64	26	25	37
Total	142	230	115	112	149
NOTE: Numbers might not add up because of rounding					

To help build labour force capacity in the region, technical and trades training programs will be developed and delivered to regional residents before and during operations. With implementation of these training programs, it is expected that regional participation in the direct operations employment opportunities will increase throughout the life of the project.

Table 3-37 presents the estimated labour income associated with the jobs described previously in Table 3-36. It is estimated that annual average direct labour income will be about \$4 million from 2009 to 2030. During the same period, annual total direct, indirect and induced labour income generated in the region will range from about \$7 to 13 million, with an annual average of about \$9 million.

**Table 3-37: Annual Average Direct, Indirect and Induced Labour Income in the Gwich'in Settlement Area**

Type of Demand	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Annual Average (\$M)
Direct	4.0	3.7	3.7	3.7	3.8
Indirect	3.5	6.6	2.7	2.6	3.8
Induced	1.4	2.7	1.1	1.0	1.6
Total	8.9	13.0	7.5	7.3	9.1
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding					

### Mitigation Measures – Operations

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Operations, all apply to the GSA.



### Residual Effects – Operations

With timely and ongoing implementation of the mitigation measures described previously, business and labour force capacity in the region will expand. There will be ongoing operations and maintenance expenditures, and project-related procurement in the region and elsewhere in the Northwest Territories. Regional labour force participation in direct operations employment, and ongoing capital and drilling activities will represent about half the total project direct operations employment in the Northwest Territories. In addition, there will be long-term spin-off jobs created in the region. Table 3-38 shows that operations effects are expected to be positive, and moderate magnitude.

**Table 3-38: Procurement, Employment, Income and Regional Economic Effects – Operations Effect Attributes for the Gwich'in Settlement Area**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
GSA	Positive	Moderate	Regional and beyond regional	Long term	Yes

#### 3.1.7 Procurement, Employment and Regional Economic Effects – Sahtu Settlement Area

In this section, the focus is on examination of procurement, employment and regional economic effects in the SSA, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in the SSA for goods, services and labour will be linked to project components and activities located in the region. This includes:

- two compressor stations, near Little Chicago and Norman Wells
- parts of NGL and gas pipeline spread D1, and all of spreads D2 and C1 (see Volume 2, Figure 4-7 for details)
- all of gas pipeline spread C2 and part of spread B1
- seven infrastructure sites, including:
  - camps
  - fuel storage
  - pipe and materials stockpiles
  - equipment storage
  - barge landings and, in some instances, airstrips

Procurement and employment opportunities also exist for qualified businesses and labour force in the SSA and other regions where the project is located. However,

because of the small population base and resulting capacity limitations in the SSA, significant employment and capital expenditures for goods and services are expected to be sourced outside the region.

See Section 3.1.3.2, Measures of Regional Economic Effects for more details on project sourcing of goods and services, associated employment, and methods used in the analysis.

### 3.1.7.1 Assessment and Management of Project-Specific Effects – Construction

#### Expenditures – Construction

Project construction will occur over the four-year period from 2006–2007 to 2009–2010. Construction that occurs after 2009–2010 is included in Section 3.1.7.2, Assessment and Management of Project-Specific Effects – Operations, which describes operations effects.

About 60% of the NGL pipeline, about 40% of the gas pipeline and two of the facilities will be located in the SSA. As shown in Table 3-39, this represents about \$1.7 billion, 27%, of the total project capital investment for 2006–2007 to 2009–2010.

**Table 3-39: Project Capital Investment in the Sahtu Settlement Area**

Indicator	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total investment	1,409	100	2,261	100	1,907	100	671	100	6,247	100
SSA	433	31	657	29	483	25	121	18	1,694	27 <sup>a</sup>
Spending outside the SSA	420	97	635	97	462	96	116	96	1,633	96 <sup>b</sup>
Spending in the SSA	13	3	23	3	21	4	4	4	61	4 <sup>b</sup>

NOTES:

a Percentage of total project investment  
b Percentage of ISR portion of total investment  
Figures in millions of constant \$2003  
Numbers might not add up because of rounding

The small labour force, and limited size and number of businesses in the region will make it necessary for construction contractors to recruit workers, and purchase goods and services outside the region. The economic activity associated with direct purchases outside the region will be leaked to where the goods or services are produced.

Even though nearly \$1.7 billion of project capital investment will be located or put in place in the SSA, only a very small part of the value of goods and services

needed for construction will be purchased in the SSA. Most of the direct project expenditures will take place outside the region.

It is estimated that \$1.6 billion, 96%, of the total value of capital expenditures will be made outside the SSA. The remaining \$61 million, 4%, of capital spending will occur in the SSA. These expenditures within the region will be subject to further leakages as the businesses in the SSA supplying these goods and services will buy inputs from businesses outside the region.

### Employment and Income – Construction

Construction of the project components located in the SSA will require a large workforce, and most work will take place during four winter construction seasons. Given these construction realities and the capacity limitations of the available SSA labour force, many of the skills required will not be readily available in the region. As a result, it is expected that much of the required labour will have to be brought in from outside the region and the Northwest Territories.

Table 3-40 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the labour force in the SSA potentially available to the project. Labour force participation is provided, along with employment and unemployment rates, using the *want a job* definition of unemployment. SSA residents that meet the unemployed *want a job* definition represent the main regional labour pool available to the project.

**Table 3-40: Labour Market Indicators for the Sahtu Settlement Area – Before Project Effects**

Indicator	Percentage (%)
Participation rate	79.6
Employment rate	62.6
Unemployment rate	21.4
SOURCE: GNWT Bureau of Statistics (2002a)	

Although those in the unemployed *want a job* category are the primary regional labour pool for the project, there are other SSA residents who are available and qualified, and will seek project employment. These people are currently employed in SSA communities and businesses. They have not been included in the demographic modelling because there is no way of accurately predicting their numbers.

Table 3-41 shows the estimated size and composition of the regional labour market during construction before project effects. This forecast was developed using a demographic model to estimate population change, and applying the *want a job* rates from the 2002 survey results to the population projections.

**Table 3-41: Estimated Labour Force in the Sahtu Settlement Area – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	2,661	2,784	2,806	2,779	2,757
Net migration (No.)	0	100	0	-50	13
Population 15+ (No.)	1,958	2,082	2,119	2,112	2,068
Labour force (No.)	1,559	1,658	1,687	1,681	1,646
Employed (No.)	1,225	1,302	1,326	1,321	1,293
Unemployed (No.)	334	355	362	360	353
Not in labour force (No.)	399	425	432	431	422
Participation rate (%)	79.6	79.6	79.6	79.6	79.6
Employment rate (%)	62.6	62.6	62.6	62.6	62.6
Unemployment rate (%)	21.4	21.4	21.4	21.4	21.4

NOTE:  
Numbers might not add up because of rounding

It is expected that during the peak winter construction season in 2007–2008, 100 persons could migrate to the SSA because of the project. It is assumed that half of these persons will leave the region when construction ends in 2009–2010. It is further assumed that all new in-migrants of labour-force age will be available to participate in project-related employment.

Table 3-42 shows an estimate of the maximum labour pool that could be available to fill direct project jobs, and jobs in other businesses that will supply goods and services to the project and its employees. Before project effects in 2006–2007, it is estimated that there would be 334 unemployed persons in the region. Because of in-migration, the number of unemployed available during construction is expected to increase to an annual average of 353 people.

**Table 3-42: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Sahtu Settlement Area**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total unemployed persons (No.)	334	355	362	360	353
Will do rotational work (%)	87	90	87	86	87
Total unemployed persons adjusted for rotational work (No.)	291	320	315	308	308

NOTE:  
Percentages have been rounded to the nearest whole number and the adjusted number of unemployed persons might not add up because of rounding

The annual average of 353 unemployed persons has been adjusted to reflect the number of unemployed persons who indicated in the 2002 regional harvesting and employment survey that they would or would not be willing to do rotational work. The willingness to do rotational work was applied to about half of the

unemployed workforce that *want a job* because this condition only applies to direct project jobs, which make up about half of the total number of project-related jobs created.

There is some fluctuation in the percentage of unemployed workers willing to do rotational work. This fluctuation is attributed to the in-migration of 100 people to the region, some of whom will be of labour-force age and willing to undertake direct project rotational work.

A further consideration factored into the estimate of the available unemployed labour pool was that a large pipeline and compressor station camp and staging area will be located near Norman Wells, and a second large pipeline construction camp and staging area will be located near Fort Good Hope. The locations of the camps and staging areas will be within daily commuting distance of Norman Wells and Fort Good Hope, potentially negating the need for rotational work by the available unemployed labour force in these communities.

It is estimated that during construction, an annual average of 308 people will be available to seek direct project employment, and jobs in businesses that provide good and services to the project and its workforce.

An estimate of direct employment demand for the region was derived by comparing the job type and occupation requirements for each project component located in the region to the expected skills of the local labour force.

The Statistics Canada I-O Model was used to estimate the total employment demand that will be generated by the project for indirect and induced employment in the Northwest Territories. The territorial estimates were then broken down into regions using project expenditure data.

Table 3-43 shows direct, and modelled indirect and induced employment estimates in the SSA, and more probable employment estimates, after taking into consideration the constraints of the available labour pool and existing businesses in the region. The employment estimates include direct project jobs, and new jobs in businesses supplying goods and services to the project and its employees.

It is estimated that with no limits to the size of the available labour force or business capacity, the project will generate an annual average demand of 367 jobs for residents of the SSA during construction. However, when available labour force is taken into account, the annual average demand for jobs in the SSA decreases to 190.

Table 3-43: Project Employment Demand in the Sahtu Settlement Area

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the SSA without labour supply constraints	Direct	74	366	265	15	719	180
	Indirect	113	222	207	42	584	146
	Induced	37	63	56	11	166	42
	Total	223	651	527	68	1,469	367
Estimated employment demand in the SSA with labour supply adjustments	Direct	74	209	213	15	511	128
	Indirect	45	42	43	42	171	43
	Induced	22	21	21	11	76	19
	Total	141	272	277	68	758	190
NOTE: Numbers might not add up because of rounding							

Project-related employment will lead to a rise in household income in the region, as shown in Table 3-44.

Table 3-44: Estimated Project-Related Labour Income in the Sahtu Settlement Area

Type of Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	3	11	11	1	27	7
Indirect	2	3	3	2	11	3
Induced	1	1	1	0	3	1
Total	7	15	15	4	41	10
NOTES: Figures in millions of constant \$2003 Numbers might not add up because of rounding						

It is estimated that project construction will lead to an increase of \$41 million in labour income in the region throughout the construction period. This will consist of \$27 million in direct project-related income, and another \$14 million earned by employees producing goods and services for the project and its employees.

Table 3-45 shows the effects of project-related employment on the regional labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 190 jobs over the construction phase.

It is estimated that the labour force participation rate in the region will remain constant at 79.6% during construction. Project-related jobs could increase the employment rate from an average of 62.6% (see Table 3-41, shown previously) to 71.7% in the SSA during construction, and the unemployment rate will decrease

from an average of 21.4% to 9.9% during the same period. For the years 2007–2008 and 2008–2009, a constraint was imposed where the unemployment rate was not allowed to fall below 5%, as this rate was considered to be *full employment*. There is also a noticeable increase in the unemployment rate in 2009–2010 to 17.4%, but this is an incomplete representation of the labour market situation in that year because although construction activity is complete, the project has not come to an end. It is entering the next phase, which includes start-up and ongoing operations employment, described separately in Section 3.1.7.2, Assessment and Management of Project-Specific Effects – Operations, for the SSA.

**Table 3-45: Estimated Project Effects on the Labour Market in the Sahtu Settlement Area**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	2,661	2,784	2,806	2,779	2,757
Net migration (No.)	0	100	0	-50	13
Population 15+ (No.)	1,958	2,082	2,119	2,112	2,068
Labour force (No.)	1,559	1,658	1,687	1,681	1,646
Employed (No.)	1,366	1,575	1,603	1,389	1,483
Other employed (No.)	1,225	1,302	1,326	1,321	1,293
Project employment (No.)	141	272	277	68	190
Unemployed (No.)	193	83	84	292	163
Not in labour force (No.)	399	425	432	431	422
Participation rate (%)	79.6	79.6	79.6	79.6	79.6
Employment rate (%)	69.7	75.6	75.6	65.8	71.7
Unemployment rate (%)	12.4	5.0	5.0	17.4	9.9
NOTE: Numbers might not add up because of rounding					

### Mitigation Measures – Construction

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Construction, all apply to the SSA.

### Residual Effects – Construction

With timely implementation of the mitigation measures identified previously, business and labour force capacity in the SSA will expand. There will be substantial capital expenditures and project-related procurement in the region that could represent in the order of 27% of total project capital expenditures in the Northwest Territories (see Table 3-39, shown previously). In addition, labour force participation and employment rates will increase, and employment and labour income are expected to increase substantially.

Effects on specific SSA communities have not been calculated. However, it is expected that Norman Wells and, to a lesser extent, Fort Good Hope might experience greater procurement, employment and labour income effects than the other SSA communities. This is attributed to Norman Wells' role as a regional centre and transportation hub for the SSA, and the closeness of both Norman Wells and Fort Good Hope to camps, staging and marshalling sites, and project activities in the region.

The duration of capital expenditures, procurement and employment effects will be most noticeable during the winter construction season of 2007–2008. However, the economic effects will continue throughout the four-year construction period. The increase in capacity among regional businesses and the labour force is expected to continue well beyond construction. Table 3-46 shows that construction effects are expected to be positive, and high magnitude.

**Table 3-46: Procurement, Employment, Income and Regional Economic Effects – Construction Effect Attributes for the Sahtu Settlement Area**

Region	Effect Attribute			Significant
	Direction	Magnitude	Geographic Extent	
SSA	Positive	High	Regional and beyond regional	Yes

### 3.1.7.2 Assessment and Management of Project-Specific Effects – Operations

The assessment of project-specific operations effects includes an evaluation of direct, indirect and induced employment, and labour income in the region. Both employment and labour income are generated because of operations activities scheduled over the life of the project, and ongoing capital and drilling activities scheduled over the life of the project.

#### Employment and Income – Operations

Norman Wells, the designated base for ongoing operations and maintenance of the natural gas pipeline and related facilities, is located in the SSA, along with portions of the NGL and gas pipelines and four compressor stations.

As shown in Table 3-47, annual average direct employment associated with operations and maintenance of the pipelines and associated facilities will range from 24 to 31 jobs annually, and average 27 jobs from 2009 to 2030.

Total employment in the SSA during operations, including direct as well as spin-off indirect and induced employment, will range from 36 to 40 jobs annually, and average 38 jobs from 2009 to 2030. Residents of the region are expected to fill some of these positions. However, because of the knowledge, experience and



skills required for many of the positions, some will be filled by people from outside the region and the Northwest Territories.

**Table 3-47: Annual Average Direct, Indirect, Induced and Total Employment in the Sahtu Settlement Area**

Type of Demand	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	31	23	24	24	27
Indirect	6	8	8	8	7
Induced	3	4	4	4	4
Total	40	35	36	36	38
NOTE: Numbers might not add up because of rounding					

To help build labour force capacity in the region, technical and trades training programs will be developed and delivered to regional residents before and during operations. With implementation of these training programs, it is expected that regional participation in the direct operations employment opportunities will increase throughout the life of the project.

Table 3-48 presents the estimated labour income associated with the jobs described previously Table 3-47. It is estimated that annual average direct labour income will be just under \$3 million from 2009 to 2030. During the same period, annual total direct, indirect and induced labour income generated in the region will average just over \$3 million.

**Table 3-48: Annual Average Direct, Indirect and Induced Labour Income in the Sahtu Settlement Area**

Type of Demand	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Annual Average (\$M)
Direct	3.1	2.3	2.4	2.4	2.7
Indirect	0.3	0.4	0.4	0.4	0.4
Induced	0.1	0.2	0.2	0.2	0.2
Total	3.5	2.9	3.0	3.0	3.2
NOTES: Figures are millions of constant \$2003 Numbers might not add up because of rounding					

### Mitigation Measures – Operations

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Operations, all apply to the SSA.

### Residual Effects – Operations

With timely and ongoing implementation of the mitigation measures described above, business and labour force capacity in the region will expand. There will be ongoing operations and maintenance expenditures, and project-related procurement in the region and elsewhere in the Northwest Territories. Regional labour force participation in direct, indirect and induced jobs is expected to be small. Table 3-49 shows that operations effects are expected to be positive, and low magnitude.

**Table 3-49: Operations Expenditures, Employment, Income and Regional Economic Effects – Operations Effect Attributes for the Sahtu Settlement Area**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
SSA	Positive	Low	Regional and beyond regional	Long term	No

#### 3.1.8 Procurement, Employment and Regional Economic Effects – Deh Cho Region

In this section, the focus is on examination of procurement, employment and regional economic effects in the DCR, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in the DCR for goods, services and labour will be linked to project components and activities located in the region. This includes:

- two compressor stations, near Blackwater River and Trail River
- part of gas pipeline spread B1, and all of spreads B2, A1 and A2 (see Volume 2, Figure 4-7 for details)
- one heater station, located near Trout River
- nine infrastructure sites that could include:
  - camps
  - fuel storage
  - pipe and materials stockpiles
  - equipment storage
  - barge landings and, in some cases, airstrips

Procurement and employment opportunities exist for qualified DCR businesses and labour force in the DCR and other Northwest Territories regions where the project will be located. However, given the nature of most of the capital investment in the DCR, such as pipeline and compressor supplies, materials and installation, coupled with the limited scope and capacity of businesses and the

economy in the region, significant project-related capital expenditures and associated employment for goods and services are expected to go to sources located outside the region and the Northwest Territories.

See Section 3.1.3.2, Measures of Regional Economic Effects, for more details on project sourcing of goods and services, associated employment, and methods used in the analysis.

### 3.1.8.1 Assessment and Management of Project-Specific Effects – Construction

#### Expenditures – Construction

Most project construction will occur over the four-year period from 2006–2007 to 2009–2010. Construction after 2009–2010 is included in Section 3.1.8.2, Assessment and Management of Project-Specific Effects – Operations, which describes operations effects.

About 45% of the gas pipeline and half of the compression facilities are located in the DCR. As shown in Table 3-50, this represents close to \$1.6 billion, or 25%, of the total project capital investment for 2006–2007 to 2009–2010.

**Table 3-50: Project Capital Investment in the Deh Cho Region**

Indicator	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total investment	1,409	100	2,261	100	1,907	100	671	100	6,247	100
DCR	398	28	605	27	444	23	111	17	1,559	25 <sup>a</sup>
Spending outside the DCR	388	97	587	97	428	96	108	97	1,511	97 <sup>b</sup>
Spending in the DCR	11	3	17	3	16	4	3	3	48	3 <sup>b</sup>

NOTES:  
a Percentage of total project investment  
b Percentage of ISR portion of total investment  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Because of the small population base and workforce, and the limited number, size and scope of local businesses and contractors, it will be necessary for the selected construction contractors to recruit their workforce, and purchase goods and services from outside the region. The economic activity associated with the direct purchases outside the region will be leaked to where the goods or services are produced.

Although nearly \$1.6 billion of capital investment in project infrastructure will be located or put in place in the region, only a small part, amounting to about

\$48 million, will be spent on purchases of goods and services in the region. Most of the direct project expenditures will take place outside the region. The expenditures within the region will be subject to further leakages because businesses in the DCR that are supplying these goods and services will buy inputs from businesses outside the region.

### Employment and Income – Construction

Construction of project components located in the DCR will require a large workforce with a variety of skills, and most work will take place during the four winter construction seasons. Given this construction scenario and the capacity limitations of the DCR labour force in terms of required skills, it is expected that much of the construction labour will have to be brought in from outside the region and the Northwest Territories.

Table 3-51 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the DCR labour force potentially available to the project. Labour force participation is provided, along with employment and unemployment rates using the *want a job* definition of unemployment. DCR residents that meet the unemployed *want a job* definition represent the main regional labour pool available to the project.

**Table 3-51: Labour Force Indicators for the Deh Cho Region – Before Project Effects**

Indicator	Percentage (%)
Participation rate	77.7
Employment rate	56.8
Unemployment rate	26.9
SOURCE: GNWT Bureau of Statistics (2002a)	

Although those in the unemployed *want a job* category are the primary regional labour pool for the project, there are other residents in the region who will be available and qualified, and will seek project employment. These people are currently employed in DCR communities and businesses. They have not been included in the demographic modelling because there is no way of accurately predicting their numbers.

Table 3-52 shows the estimated size and composition of the regional labour market during construction before project effects. This forecast was developed using a demographic model to estimate population change, and applying the *want a job* rates from the 2002 survey results to the population projections. In addition, some project-related in-migration was factored into the estimate. The level of in-migration was based on the assumption that some skilled and experienced employees in the region will leave existing jobs and seek project-related employment.

**Table 3-52: Estimated Labour Force in the Deh Cho Region – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	3,551	3,720	3,748	3,705	3,681
Net migration (No.)	0	140	0	-70	18
Population 15+ (No.)	2,680	2,837	2,877	2,857	2,813
Labour force (No.)	2,083	2,206	2,237	2,221	2,187
Employed (No.)	1,522	1,611	1,634	1,623	1,597
Unemployed (No.)	561	594	603	599	589
Not in labour force (No.)	596	631	640	636	626
Participation rate (%)	77.7	77.7	77.7	77.7	77.7
Employment rate (%)	56.8	56.8	56.8	56.8	56.8
Unemployment rate (%)	26.9	26.9	26.9	26.9	26.9
NOTE: Numbers might not add up because of rounding					

It is expected that during the peak winter construction season in 2007–2008, 140 people could migrate to the DCR because of the project. It is assumed that half of these people will leave the region when construction ends in 2009–2010. It is further assumed that all new in-migrants of labour-force age will be available to participate in project-related employment.

Before project effects in 2006–2007, it is estimated that there will be 561 unemployed persons in the region. Because of in-migration and a slight increase in labour force participation, the number of unemployed persons available during construction is expected to increase to an annual average of 589 people.

Table 3-53 shows an estimate of the maximum labour pool that could be available to fill direct project jobs, and jobs in other businesses that will supply goods and services to the project and its employees.

**Table 3-53: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Deh Cho Region**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total unemployed persons (No.)	561	594	603	599	589
Will do rotational work (%)	82	86	82	81	83
Total unemployed persons adjusted for rotational work (No.)	462	510	496	483	488
NOTE: Percentages have been rounded to the nearest whole number and the adjusted number of unemployed persons might not add up because of rounding					

The annual average of 589 unemployed persons has been adjusted to reflect the number of unemployed persons who have indicated that they would be willing to do rotational work. The willingness to do rotational work was applied to about half of the unemployed workforce that *want a job* because this condition only applies to direct project jobs, which make up about half of the total number of project-related jobs created.

Table 3-53, cited previously, indicates some fluctuation in the percentage of unemployed workers that are willing to do rotational work. This fluctuation is attributed to the in-migration of 140 people to the region, some of whom will be of labour-force age and willing to undertake direct project rotational work.

It is estimated that during construction, an annual average of 488 persons will be available to seek direct project employment, and work with businesses that provide goods and services to the project and its workforce.

An estimate of direct employment demand for the region was derived by comparing the job type and occupation requirements for each project component in the region to the expected skills of the local labour force.

The Statistics Canada I-O Model was used to estimate the total employment demand that will be generated by the project for spin-off jobs in the Northwest Territories. The territorial estimates were then broken down into regions using project expenditure data.

Table 3-54 shows the results from the model for the estimated number of persons who will be employed from the region to work on project-related jobs, subject to no capacity limits. The employment estimates include direct project jobs and new jobs in businesses supplying goods and services to the project and its employees.

**Table 3-54: Project Employment Demand in the Deh Cho Region**

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the DCR without labour supply constraints	Direct	62	269	189	10	530	132
	Indirect	84	156	150	31	421	105
	Induced	27	40	36	8	111	28
	Total	173	465	375	49	1,062	266
Estimated employment demand in the DCR with labour supply adjustments	Direct	62	269	189	10	530	132
	Indirect	71	78	76	31	257	64
	Induced	36	39	38	8	120	30
	Total	169	387	303	49	907	227
NOTE: Numbers might not add up because of rounding							

It is estimated that with no limits to the size of the available labour force or business capacity, the project will generate a demand for an annual average of 266 jobs in the DCR during construction. However, when available labour force is taken into account, the region could meet an annual average demand of up to 227 jobs.

In the DCR, after taking into account supply constraints, there is a surplus of available labour during all four years of construction activities. These people could potentially work in other Northwest Territories regions where project-related labour shortages exist.

Project-related employment will lead to a rise in household income in the region, as shown in Table 3-55.

**Table 3-55: Estimated Project-Related Labour Income in the Deh Cho Region**

Type of Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	3	12	9	0	24	6
Indirect	4	4	4	2	14	4
Induced	1	2	2	0	5	1
Total	8	18	15	3	44	11

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

It is estimated that construction will lead to an increase of \$44 million in labour income in the region throughout construction. This will consist of \$24 million in direct project-related income, \$14 million in indirect income and \$5 million in induced income earned by employees producing goods and services for the project and its employees.

Table 3-56 gives the effects of project-related employment on the regional labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 227 jobs over the construction period.

It is estimated that the labour force participation rate in the region will increase slightly from 77.7% in 2002 to 78.0% during construction because it is assumed that some additional people will be drawn into the labour force as the project draws closer. New training programs will become available and expectations for employment opportunities in the local communities will be raised, leading to greater involvement in the labour market.

**Table 3-56: Estimated Project Effects on the Labour Market in the Deh Cho Region**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	3,551	3,720	3,748	3,705	3,681
Net migration (No.)	0	140	0	-70	18
Population 15+ (No.)	2,680	2,837	2,877	2,857	2,813
Labour force (No.)	2,090	2,213	2,244	2,229	2,194
Employed (No.)	1,691	1,998	1,937	1,672	1,824
Other employed (No.)	1,522	1,611	1,634	1,623	1,597
Project employment (No.)	169	387	303	49	227
Unemployed (No.)	400	215	307	557	370
Not in labour force (No.)	590	624	633	629	619
Participation rate (%)	78.0	78.0	78.0	78.0	78.0
Employment rate (%)	63.1	70.4	67.3	58.5	64.9
Unemployment rate (%)	19.1	9.7	13.7	25.0	16.9
NOTE: Numbers might not add up because of rounding					

Project-related jobs could increase the employment rate from an average of 56.8% (see Table 3-52, shown previously) to 64.9% in the DCR during construction. During the same period, the unemployment rate will decrease from an average of 26.9% to 16.9%. The noticeable increase in the unemployment rate in 2009–2010 is an incomplete representation of the labour market situation in that year because although construction activity is complete, the project has not ended. It is entering the next phase, which includes start-up and ongoing operations employment, described separately in Section 3.1.8.2, Assessment and Management of Project-Specific Effects – Operations.

### Mitigation Measures – Construction

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Construction, all apply to the DCR.

### Residual Effects – Construction

A sizeable part of the project activity will be located in the DCR, including:

- two compressor stations
- a heater station
- several pipeline spreads
- several infrastructure sites
- several borrow sites



With timely implementation of the mitigation measures described previously, business and labour force capacity will expand. About 25% of the capital expenditures and project-related procurement will be in the region (see Table 3-50, shown previously). In addition, labour force participation and employment rates will increase, and employment and labour income are expected to increase substantially.

The duration of capital expenditures, procurement and employment effects will be most noticeable during the 2007–2008 winter construction season. However, economic effects will continue throughout the four-year construction period. The increase in capacity among regional businesses and the labour force will continue well beyond construction. Table 3-57 shows that construction effects are expected to be positive, and high magnitude.

**Table 3-57: Procurement, Employment, Income and Regional Economic Effects – Construction Effect Attributes for the Deh Cho Region**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
DCR	Positive	High	Regional and beyond regional	Short term	Yes

### 3.1.8.2 Assessment and Management of Project-Specific Effects – Operations

The assessment of project-specific operations effects includes an evaluation of direct, indirect and induced employment, and labour income in the region. Both employment and labour income are generated because of operations, and ongoing capital and drilling activities scheduled over the life of the project.

#### Employment and Income – Operations

Two compressor stations, a heater station and about 45% of the natural gas pipeline will be located in the DCR. Although Norman Wells in the SSA has been designated as the operations and maintenance centre for the gas pipeline and related facilities located in the DCR.

Table 3-58 shows that the annual average direct employment associated with operations and maintenance of the gas pipeline and associated facilities in the DCR will be four to five positions in the DCR from 2009 to 2030.

Total employment in the DCR during operations, including direct as well as spin-off indirect and induced employment, will range from 6 to 8 jobs annually, and average 7 positions from 2009 to 2030. Residents of the region are expected to fill most, if not all, of these positions. However, the knowledge, experience and skill requirements for the available positions could result one or more jobs being filled by people from outside the region and the Northwest Territories.

Table 3-58: Annual Average Direct, Indirect, Induced and Total Employment in the Deh Cho Region

Type of Demand	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	4	5	5	5	4
Indirect	1	2	2	2	2
Induced	1	1	1	1	1
Total	6	8	8	8	7
NOTE: Numbers might not add up because of rounding					

To increase labour force capacity in the region, technical and trades training programs will be developed and delivered to regional residents before and during operations. With implementation of these training programs, it is expected that regional participation in the direct operations employment opportunities will increase throughout the life of the project.

Table 3-59 presents the estimated labour income associated with the jobs described in Table 3-58, cited previously. It is estimated that annual average direct labour income in the DCR will be about \$500,000 throughout 2009 to 2030. During the same period, annual total direct, indirect and induced labour income in the region will average about \$1 million.

Table 3-59: Annual Average Direct, Indirect and Induced Labour Income in the Deh Cho Region

Type of Demand	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Annual Average (\$M)
Direct	0.4	0.5	0.5	0.5	0.4
Indirect	0.1	0.1	0.1	0.1	0.1
Induced	0.0	0.0	0.0	0.0	0.0
Total	0.5	0.6	0.6	0.6	0.6
NOTE: Figures are millions of constant \$2003 Numbers might not add up because of rounding					

### Mitigation Measures – Operations

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Operations all apply to the DCR.

### Residual Effects – Operations

With timely and ongoing implementation of the mitigation measures described previously, business and labour force capacity in the region could expand.

However, qualified DCR residents interested in pursuing project-related employment will likely have to relocate to the SSA or GSA, where most of the project-related employment opportunities will be located. Regional labour force participation in direct operations employment will be very small, about four or five jobs, and only one or two additional indirect and induced jobs in the region are expected. Table 3-60 shows that operations effects are expected to be positive and low magnitude.

**Table 3-60: Operations Expenditures, Employment , Income and Regional Economic Effects – Operations Effect Attributes for the Deh Cho Region**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
DCR	Positive	Low	Regional and beyond regional	Long term	No

**3.1.9 Procurement, Employment and Regional Economic Effects – Industrial and Commercial Centres in the Northwest Territories**

In this section, the focus is on examination of procurement, employment and regional economic effects in the industrial and commercial centres (ICCs) in the Northwest Territories, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Expenditures made in the ICCs of Hay River and Yellowknife for goods, services and labour will be linked to module assembly and other indirect activities taking place in or adjacent to these centres in the Northwest Territories. These include:

- module assembly at Hay River
- logistics needed to transport project fuel, pipe, modules, camps and equipment to the required locations
- other labour, goods and services required by the project

Procurement and employment opportunities exist for qualified industrial and commercial businesses and labour force in the ICCs as well as other Northwest Territories regions where the project is located. However, given the nature of most of the expenditures in the ICCs, e.g., module assembly, transportation, logistics, warehousing and wholesale, and capacity limitations of the local economy and businesses in the centres, a large portion of project-related expenditures and associated employment for goods and services will go to locations outside these centres and the Northwest Territories.

See Section 3.1.3.2, Measures of Regional Economic Effects for more details on project sourcing of goods and services, associated employment, and methods used in the analysis.

### 3.1.9.1 Assessment and Management of Project-Specific Effects – Construction

#### Expenditures – Construction

Most project construction will occur over the four-year period from 2006–2007 to 2009–2010, although the majority will take place during the winter months of 2007–2008 and 2009–2010. Construction that occurs after 2009–2010 is included in Section 3.1.9.2, Assessment and Management of Project-Specific Effects – Operations.

Table 3-61 indicates that although there will be no project components located or put in place in or near the ICCs, it is estimated that about \$103 million in capital expenditures will be made in the ICCs in the Northwest Territories. The capital expenditures will result from assembling some anchor field and pipeline facilities modules in Hay River and providing other services to support project construction in other regions of the Northwest Territories. These services include warehousing, logistics and transportation of project fuel, pipe, modules, construction equipment and materials, and camps.

**Table 3-61: Project Capital Investment in the Industrial and Commercial Centres in the Northwest Territories**

Indicator	2006–2007		2007–2008		2008–2009		2009–2010		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Project total investment	1,409	100	2,261	100	1,907	100	671	100	6,247	100
ICCs <sup>1</sup>	0	0	0	0	0	0	0	0	0	0 <sup>a</sup>
Spending outside the ICCs	0	0	0	0	0	0	0	0	0	0 <sup>b</sup>
Spending in the ICCs <sup>1</sup>	26	2	35	2	32	2	10	2	103	2 <sup>b</sup>
NOTES: a Percentage of total project investment b Percentage of ISR portion of total investment 1 Although there will be no put-in-place capital infrastructure in the ICCs, there will be capital expenditures for module assembly, logistics and transportation Figures are millions of constant \$2003 Numbers might not add up because of rounding										

#### Employment and Income – Construction

Construction will require a significant amount of labour and will involve workers with a variety of skills. As construction is short term, and many of the skills

required for module assembly, logistics and transportation will not be readily available in the ICCs, it is expected that there will be a shortage of labour, and some of the required labour will have to be brought in from the south and housed in camps.

Table 3-62 shows the 2002 Northwest Territories labour force indicator statistics used to determine the size of the labour force in the ICCs potentially available to the project. Labour force participation is provided, along with employment and unemployment rates using the *want a job* category. The ICC residents that meet the unemployed *want a job* definition represent the main regional labour pool available to the project. Compared with the other Northwest Territories regions, the participation and employment rates are noticeably higher and the unemployment rate is distinctly lower in the ICCs.

**Table 3-62: Labour Force Indicators for the Industrial and Commercial Centres in the Northwest Territories – Before Project Effects**

Indicator	Percentage (%)
Participation rate	89.1
Employment rate	76.8
Unemployment rate	13.8
SOURCE: GNWT Bureau of Statistics (2002a)	

Table 3-63 shows the estimated size and composition of the regional labour market during construction before project effects. This forecast was developed using a demographic model to estimate population change, and applying the *want a job* rates from the 2002 survey results to the population projections. In addition, some project-related in-migration was factored into the estimate because it is assumed that more people will be drawn into the labour force as the project draws closer. New training programs will become available and expectations for employment opportunities in the local communities will be raised, leading to greater involvement in the labour market.

It is expected that during the winter construction season in 2007–2008, 125 people could migrate to the ICCs because of the project. It is assumed that half of these people will leave the region when construction ends in 2009–2010. It was further assumed that all new in-migrants of labour-force age will be available to participate in construction.

Although those in the unemployed *want a job* category are the primary regional labour pool for the project, there are other residents in the ICCs who are available and qualified, and will seek project employment. These people are currently employed in the communities and businesses. They have not been included in the demographic modelling because there is no way of accurately predicting their numbers.

**Table 3-63: Estimated Labour Force in the Industrial and Commercial Centres in the Northwest Territories – Before Project Effects**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	29,521	29,935	30,218	30,368	30,010
Net migration (No.)	0	125	0	-63	16
Population 15+ (No.)	22,195	22,730	23,144	23,486	22,889
Labour force (No.)	19,765	20,242	20,610	20,914	20,383
Employed (No.)	17,047	17,458	17,776	18,038	17,580
Unemployed (No.)	2,718	2,784	2,834	2,876	2,803
Not in labour force (No.)	2,430	2,489	2,534	2,571	2,506
Participation rate (%)	89.1	89.1	89.1	89.1	89.1
Employment rate (%)	76.8	76.8	76.8	76.8	76.8
Unemployment rate (%)	13.8	13.8	13.8	13.8	13.8
NOTE: Numbers might not add up because of rounding					

It is estimated that before project effects in the ICCs, there will be 2,718 unemployed persons that *want a job* in 2006–2007. The number of unemployed will rise because of in-migration over construction, and is projected to average 2,803.

Table 3-64 shows an estimate of the projected maximum labour pool that will be available for direct project employment and work in other businesses that will supply goods and services to the project and its employees. As shown, the maximum available unemployed persons who *want a job* has been adjusted because some of the direct employment will be camp-based and require rotational work. As a result, unemployed persons who indicated that they would be willing to undertake rotational work were included in the available labour and those that said they would not be willing to do rotational work were not included. However, because the module assembly, logistics and some transportation-related work will take place in or near the ICCs, the available local labour force was increased somewhat because they could potentially commute to work daily. The willingness to do rotational work was applied to about half of the unemployed workforce that *want a job* because this condition only applies to direct project jobs, which make up about half of the total number of project-related jobs created.

It is projected that during construction, about 1,457 persons will be available to seek project-related work.

Statistics Canada's I-O Model was used to estimate the total employment demand that will be generated by the project for indirect and induced employment in the Northwest Territories. The territorial estimates were then broken down into regions using project expenditure data.

**Table 3-64: Estimated Maximum Potential Labour Pool Available for Project-Related Work in the Industrial and Commercial Centres in the Northwest Territories**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total unemployed persons (No.)	2,718	2,784	2,834	2,876	2,803
Will do rotational work (%)	52	54	52	51	52
Total unemployed persons adjusted for rotational work (No.)	1,407	1,490	1,467	1,464	1,457

NOTE:  
Percentages have been rounded to the nearest whole number and the adjusted number of unemployed persons might not add up because of rounding

The estimate of direct employment demand for each region was derived by taking the employment requirement by job type and occupation for each segment of the project and comparing it to the expected skills of the local labour force.

Table 3-65 shows the results from the model for the estimated number of persons who will be employed from the ICCs to work on project-related jobs, subject to no capacity limits. The employment estimates include direct project jobs, and new jobs in businesses supplying goods and services to the project and its employees.

**Table 3-65: Project Employment Demand in the Industrial and Commercial Centres in the Northwest Territories**

Indicator	Type of Demand	Number of Jobs					
		2006–2007	2007–2008	2008–2009	2009–2010	Total	Average
Modelled employment demand in the ICCs without supply constraints	Direct	136	372	272	23	802	201
	Indirect	217	265	230	78	791	198
	Induced	66	87	71	25	249	62
	Total	419	723	574	127	1,842	461
Estimated employment demand in the ICCs after supply adjustments	Direct	136	372	272	23	802	201
	Indirect	217	265	230	78	791	198
	Induced	66	87	71	25	249	62
	Total	419	723	574	127	1,842	461

NOTE:  
Numbers might not add up because of rounding

It is estimated that with and without consideration of limits on the size of the available labour force or business capacity, the project will generate a demand for an annual average of 461 jobs in the ICCs during construction.

As shown in Table 3-66, the project-related employment and business opportunities in and near the ICCs will lead to an increase of \$94 million in labour income throughout the construction period. This will consist of \$39 million in direct project-related income and another \$45 million in indirect and

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\$10 million in induced income earned by employees producing goods and services for the project and its employees.

**Table 3-66: Estimated Project-Related Labour Income in the Industrial and Commercial Centres in the Northwest Territories**

Type of Demand	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
Direct	7	17	14	1	39	10
Indirect	13	15	13	4	45	11
Induced	3	4	3	1	10	3
Total	22	36	29	7	94	24

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Table 3-67 gives the effects of project-related employment on the ICC labour market during construction. It is estimated that project-related employment will generate a demand for a potential maximum annual average of 461 jobs over the construction phase.

**Table 3-67: Projected Project Effects on the Labour Market in the Industrial and Commercial Centres in the Northwest Territories**

Indicator	2006–2007	2007–2008	2008–2009	2009–2010	Average
Total population (No.)	29,521	29,935	30,218	30,368	30,010
Net migration (No.)	0	125	0	-63	16
Population 15+ (No.)	22,195	22,730	23,144	23,486	22,889
Labour force (No.)	20,641	21,139	21,524	21,842	21,286
Employed (No.)	17,466	18,181	18,349	18,165	18,040
Other employed (No.)	17,047	17,458	17,776	18,038	17,580
Project employment (No.)	419	723	574	127	461
Unemployed (No.)	3,176	2,958	3,175	3,677	3,246
Not in labour force (No.)	1,554	1,591	1,620	1,644	1,602
Participation rate (%)	93.0	93.0	93.0	93.0	93.0
Employment rate (%)	78.7	80.0	79.3	77.3	78.8
Unemployment rate (%)	15.4	14.0	14.7	16.8	15.3

NOTE:  
Numbers might not add up because of rounding

It is estimated that the labour force participation rate in the region will increase slightly from 89.1% in 2002 to 93.0% during construction because it is assumed that some additional people in the ICCs will be drawn into the labour force as the project draws closer. New training programs will become available and



expectations for employment opportunities in the local communities will be raised, leading to greater involvement in the labour market.

Project-related jobs will raise the average employment rate from 76.8% (see Table 3-63, shown previously) to 78.8% in the ICCs over the construction period. During construction, the unemployment rate will rise from an average of 13.8% to 15.3%. However, the noticeable increase in the unemployment rate in 2009–2010 is an incomplete representation of the labour market situation in that year because although the construction activity is complete, the project has not ended. It is entering the next phase, which includes start-up and ongoing operations employment. These are described separately in Section 3.1.9.2, Assessment and Management of Project-Specific Effects – Operations.

### Mitigation Measures – Construction

The mitigation measures described in Section 3.1.4, Mitigation Measures, under Strategy – Construction, all apply to the ICCs in the Northwest Territories.

### Residual Effects – Construction

With timely implementation of the mitigation measures, business and labour force capacity will expand. There will be capital expenditures and project-related procurement in the ICCs that could represent up to 2% of project capital expenditures in the Northwest Territories. In addition, labour force participation and employment rates will increase slightly, as will employment and labour income.

The duration of capital expenditures, procurement and employment effects will be most noticeable during the winter construction season in 2007–2008. However, the economic effects will continue throughout the four-year construction period. The increase in capacity among regional businesses and the labour force will continue well beyond construction. Table 3-68 shows that construction effects are expected to be positive, and moderate magnitude.

**Table 3-68: Procurement, Employment, Income and Regional Economic Effects – Construction Effect Attributes for NWT ICCs**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
ICCs	Positive	Moderate	Regional and beyond regional	Short term	No

### 3.1.9.2 Assessment and Management of Project-Specific Effects – Operations

The assessment of project-specific operations effects includes an evaluation of indirect and induced employment, and labour income in these communities. No

direct employment or income is expected because the ICCs are located too far from project infrastructure to enable direct employment from these centres during operations.

### Employment and Income – Operations

Although there is no project infrastructure located in the ICCs, it is expected that some of the ongoing logistical and transportation services required during project operation will be based in, or maintain corporate headquarters in, the ICCs.

There is no annual average direct employment in the ICCs associated with operations and maintenance of the anchor fields or pipelines and associated facilities. However, as shown in Table 3-69, annual average indirect and induced spin-off employment will range from 135 to 206 jobs annually, and average 179 jobs from 2009 to 2030. Allocation of these Statistics Canada I-O Model-generated employment estimates have been weighted toward the ICCs because of capacity constraints in the other regions of the Northwest Territories.

**Table 3-69: Annual Average Direct, Indirect, Induced and Total Employment in NWT ICCs**

Type of Demand	Number of Jobs				Annual Average
	2009–2015	2016–2020	2021–2025	2026–2030	
Direct	0	0	0	0	0
Indirect	136	87	158	149	133
Induced	46	48	48	45	47
Total	182	135	206	194	179
NOTE: Numbers might not add up because of rounding					

Labour income associated with the employment presented in Table 3-69 is shown in Table 3-70. It is estimated that annual average total indirect and induced labour income generated in the region will range from about \$20 to 33 million, and average about \$24 million from 2009 to 2030.

**Table 3-70: Annual Average Direct, Indirect and Induced Labour Income in NWT ICCs**

Type of Demand	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Annual Average (\$M)
Direct	0	0	0	0	0
Indirect	11.4	20.6	9.5	9.1	12.5
Induced	11.4	12.6	11.5	11.0	11.6
Total	22.9	33.2	21.0	20.1	24.1
NOTE: Figures are millions of constant \$2003 Numbers might not add up because of rounding					

### Mitigation – Operations

The mitigation measures in Section 3.1.4, Mitigation Measures, describe a range of actions that could be implemented by the project to build business and labour capacity, and enhance project-related procurement and employment opportunities. These measures are primarily applicable to regions where project infrastructure and facilities are located.

### Residual Effects – Operations

With timely and ongoing implementation of the mitigation measures described previously, business and labour force capacity in the ICCs might expand. Direct ongoing operations and maintenance expenditures or employment and project-related procurement are not expected in the ICCs. Instead, it is expected that there will be significant spin-off employment and income associated with providing indirect goods and services to ongoing operations in the Northwest Territories. This is because the ICCs, especially Yellowknife, are the primary wholesale, expediting, air transportation, supply, service and financial centres in the Northwest Territories. Table 3-71 shows that operations effects are expected to be positive, and low magnitude.

**Table 3-71: Operations Expenditures, Employment, Income and Regional Economic Effects – Operations Effect Attributes for the Industrial and Commercial Centres in the Northwest Territories**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
ICCs	Positive	Low	Local	Long term	No

### 3.1.10 Procurement, Employment and Regional Economic Effects – Dene Tha’ First Nation in Northwestern Alberta

In this section, the focus is on examination of procurement, employment and regional economic effects on the Dene Tha’ First Nation (DTFN) in northwestern Alberta, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in northwestern Alberta, including the DTFN traditional land use area, will be linked to NGTL-owned facilities, activities or both located in this area of Alberta. These include:

- the NGTL interconnect facility
- NGTL’s gas pipeline spread known as the Northwest Mainline, Dickins Lake Section

- infrastructure sites for camps, fuel and equipment storage
- rail sidings and laydown areas for pipe storage
- the logistics required to transport project camps, fuel, pipe, equipment and granular materials to locations where they are required
- other labour, goods and services required by the project

**3.1.10.1 Assessment and Management of Project-Specific Effects – Construction**

Considering that the proposed 66 km of the pipeline in northwestern Alberta traverses a part of the DTFN traditional territory, and that a Community Cooperation Protocol Agreement has been signed by TransCanada Pipelines and the DTFN, it is expected that pipeline construction and related activities will generate economic benefits for members of the DTFN. The economic benefits could include training, employment and business opportunities, which will increase the existing capacity of the Dene Tha’ labour force and businesses.

Previous pipeline projects located in or traversing Dene Tha’ traditional territory have created economic opportunities for the DTFN. The benefits have included:

- right-of-way clearing contracts
- camp and catering contracts
- training and employment of individuals for pipeline installation work
- pipeline inspection and monitoring
- band liaison
- wildlife monitoring

It is reasonable to assume that these types of economic opportunities will again be provided to qualified and competitive Dene Tha’ businesses and qualified band members.

Effects on the DTFN are expected to be positive, low magnitude, and regional and beyond regional in extent (see Table 3-72).

**Table 3-72: Procurement, Employment and Regional Economic Effects – Construction Effect Attributes for the Dene Tha’ First Nation**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
DTFN	Positive	Low	Regional and beyond regional	Short term	No

**3.1.10.2 Assessment and Management of Project-Specific Effects – Operations**

Because the northwestern Alberta section represents a very small addition to the existing NGTL pipeline in Alberta, there is already a control centre, a regional operations and maintenance base, and resources in place to oversee and maintain the integrity of the pipeline system. As a result, incremental direct, indirect and induced employment and labour income will be negligible, amounting to less than one full-time equivalent job and up to \$30,000 a year in annual labour income.

No operations effects are expected (see Table 3-73).

**Table 3-73: Procurement, Employment and Regional Economic Effects – Operations Effect Attributes for the Dene Tha’ First Nation**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
DTFN	Neutral	No effect	Regional	Long term	No

**3.1.11 Procurement, Employment and Regional Economic Effects – Industrial and Commercial Centres in Northwestern Alberta**

In this section, the focus is on examination of procurement, employment and regional economic effects in the ICCs in northwestern Alberta, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

Capital expenditures made in the ICCs of northwestern Alberta ICCs of High Level, Rainbow Lake and Zama City for goods, services and labour will be linked to project components, activities or both located adjacent to these centres and in this region of Alberta. These include:

- the NGTL interconnect facility
- NGTL’s gas pipeline spread known as the NGTL Northwest Mainline, Dickins Lake Section
- infrastructure sites for camps, fuel and equipment storage
- rail sidings and laydown areas for pipe storage
- the logistics required to transport project camps, fuel, pipe, equipment and granular materials to locations where they are required
- other labour, goods and services required by the project

**3.1.11.1 Assessment and Management of Project-Specific Effects – Construction**

The northwestern Alberta section of the pipeline will be constructed during winter 2008–2009. This section of pipeline will run from the termination point of the pipeline at the Northwest Territories–Alberta boundary to NGTL’s existing Northwest Mainline junction near the Bootis Hills meter station in northwestern Alberta. The total capital cost of this section is \$86.2 million, of which \$58.6 million will be spent on purchasing goods and services from Alberta businesses and \$27.6 million will be spent outside Alberta. The value of expenditures that will be retained in the northwestern Alberta ICCs has not been determined (NGTL 2004).

It is estimated that construction of the northwestern Alberta pipeline section will generate a peak of 400 direct jobs for Alberta residents during winter 2008–2009. The project will also generate 525 indirect and 260 induced jobs, for a total of 1,186 jobs in the province. Labour income associated with this project-related employment is expected to exceed \$48 million (NGTL 2004).

Any construction effects are expected to be positive, low magnitude, and regional and beyond regional in geographic extent (see Table 3-74).

**Table 3-74: Procurement, Employment and Regional Economic Effects – Construction Effect Attributes for the Industrial and Commercial Centres in Northwestern Alberta**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
ICCs	Positive	Low	Regional and beyond regional	Short term	No

**3.1.11.2 Assessment and Management of Project-Specific Effects – Operations**

Because the northwestern Alberta section represents a very small addition to the existing NGTL Northwest Mainline in Alberta, there is already a control centre, a regional operations and maintenance base, and resources in place to oversee and maintain the integrity of the pipeline system. As a result, incremental direct, indirect and induced employment and labour income will be negligible, amounting to less than one full-time equivalent job and about \$30,000 a year in annual labour income.

No operations effects are expected (see Table 3-75).

**Table 3-75: Procurement, Employment and Regional Economic Effects – Operations Effect Attributes for the Industrial and Commercial Centres in Northwestern Alberta**

Region	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
ICCs	Neutral	No effect	Regional	Long term	No

### 3.2 National Economic Effects

*Key Question: How will the project affect the Canadian national economy?*

#### 3.2.1 Assessment Approach

The purpose of this section is to present and discuss the economic project effects on the national, provincial and territorial economies. Previous sections assessed these effects on the various regions of the study area. This section will address these effects primarily at the Canadian and Northwest Territories levels. It will also identify southern provincial-level effects. However, emphasis will be placed only on the main affected areas for each of the key indicators assessed.

##### 3.2.1.1 Effect Pathways

The project effects were analyzed using four valued key indicators:

- gross domestic product (GDP)
- employment
- labour income
- government revenue

Estimates of these economic effects were determined from simulations using Statistics Canada’s I-O Model and a tax model developed by Ellis Consulting Services.

The model simulations provide estimates of the direct effects associated with on-site construction of the pipeline and anchor fields, and with the effects generated by the *spin-off* from this activity. The spin-off economic effects are referred to as *indirect* and *induced*, and are the result of multiplier effects on the Northwest Territories and provincial economies in Canada.

Direct effects are derived from employment and production generated by direct project expenditures. Indirect effects include the economic activity associated with firms and their employees that are in the production chain that supplies goods and services to the businesses supplying the direct requirements. Induced effects result from spending wages, after withdrawing a part for taxes and savings, earned by those employees involved in direct and indirect production, on

consumer goods and services. This spending increases the demand for commodities and production.

All dollar values presented in this analysis are measured in constant 2003 dollars. All employment or jobs are expressed in person-years.

The expected influences of the project on the Northwest Territories and national economies are shown in Figure 3-2.

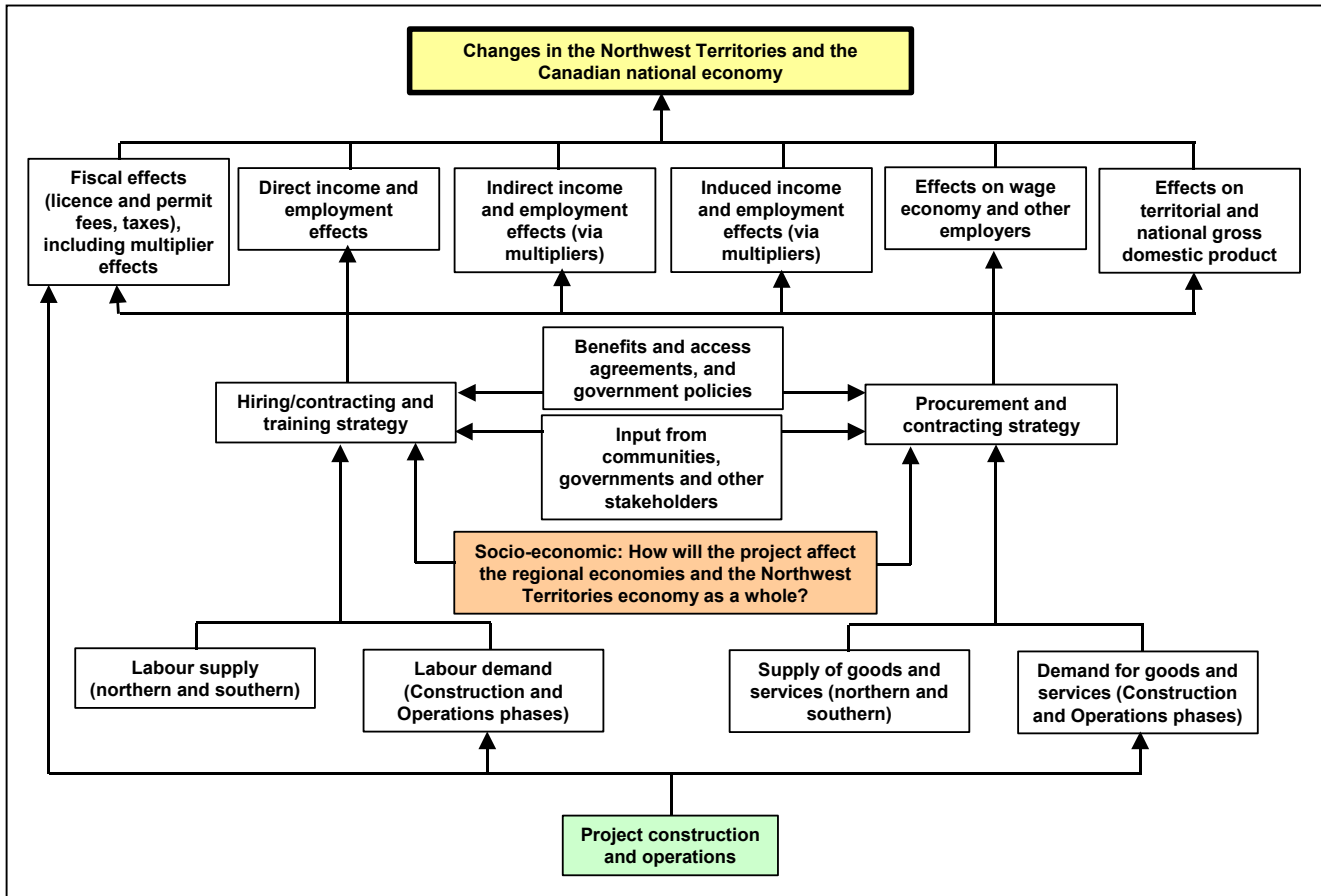


Figure 3-2: Project Effect on the Northwest Territories and Canadian Economies

### 3.2.1.2 Expenditures – Construction

Although construction will have significant benefits to the Northwest Territories, most of the economic effects resulting from construction will accrue to the southern provinces. This is because the Northwest Territories has a very underdeveloped industrial base and limited labour force, and relies heavily on imports from the southern provinces.

The economic effects of construction will be caused by the level of capital expenditure made by the project proponents. The main construction period will



cover four years, i.e., 2006–2007 to 2009–2010, and during this period the estimated project expenditures will be \$6.3 billion. All of the project infrastructure, with the exception of the northwestern Alberta portion, costing \$86 million, will be located in the Northwest Territories. The northwestern Alberta portion will be constructed in 2008–2009. Table 3-76 shows the level and the location of spending by year.

**Table 3-76: Direct Project Expenditures by Location**

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	5	0	12	1	9	0	2	0	28	0	7	0
Quebec	47	3	105	5	80	4	20	3	252	4	63	4
Ontario	153	11	339	15	257	13	66	10	815	13	204	13
Alberta	700	50	1,014	45	1,072	54	347	52	3,133	49	783	49
Other Canada	68	5	151	7	114	6	29	4	362	6	91	6
Northwest Territories	168	12	275	12	297	15	154	23	894	14	223	14
Foreign	266	19	366	16	164	8	53	8	849	13	212	13
Total	1,409	100	2,261	100	1,993	100	671	100	6,334	100	1,583	100

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Almost half, or \$3.1 billion, of the expenditures will be made in Alberta, whereas \$894 million, 14%, will be made in the Northwest Territories. The foreign sector and Ontario will be the next largest spending locations, each with 13% of direct project expenditures.

It should be noted that even though a good is purchased in the Northwest Territories or one of the southern provinces, it does not mean that it is produced in that jurisdiction. For example, a purchase order could be given to a local supplier in the Northwest Territories for small power tools. Although a Northwest Territories wholesaler will sell these tools, they will not be produced in the Northwest Territories, and will likely be produced in a province, such as Ontario. In this case, the only economic activity that takes place in the Northwest Territories is the wholesale mark-up, or margin, of the tools and part of the transportation costs. The remainder of the value will accrue to the province where actual production takes place. The input-output model used for this economic analysis has a system of trade flows that permit tracing this type of activity. The model will assign the value of each type of economic activity to the province or territory where it is typically produced.

**3.2.1.3 Expenditures – Operations**

Table 3-77 shows the average annual resource revenue, pipeline tariff and operating expenditures of the project for 2009 to 2030. These represent the main operating revenue and expenditure categories that will generate the economic effects of operations, and include operating and ongoing drilling program costs.

**Table 3-77: Annual Average Project Direct Operating Costs**

<b>Cost</b>	<b>2009–2015 (\$M)</b>	<b>2016–2020 (\$M)</b>	<b>2021–2025 (\$M)</b>	<b>2026–2030 (\$M)</b>	<b>Annual Average (\$M)</b>
Resource revenue	1,364	1,567	1,389	751	1,276
Pipeline tariff	498	503	393	296	430
<b>Ongoing costs</b>					
Operating costs	136	144	144	141	141
Construction and drilling	39	66	4	0	28
<b>Total costs</b>	<b>175</b>	<b>210</b>	<b>148</b>	<b>141</b>	<b>169</b>
NOTES: Figures are millions of constant \$2003 Numbers might not add up because of rounding					

Over the operating period of 2009 to 2030, the fields together will earn an annual average of \$1.3 billion in resource revenue or income, and the pipeline tariff will average \$430 million per year.

During initial operations in 2009 to 2015, it is estimated that operating costs of the project will average \$136 million annually. Over the entire operations phase from 2009 to 2030, it is estimated that the annual average costs will be \$141 million per year.

Ongoing construction and drilling costs will average \$39 million annually during 2009 to 2015 and \$66 million annually during 2016 to 2020.

**3.2.1.4 Mitigation and Management of Effects**

The effects of any major development expenditures on the Canadian and provincial or territorial economies are a function of the incidence of expenditure and the structure of the economy at the time. They depend on the capacities of the various sectors of the economy in the regions where expenditures are made and the linkages with other areas that might contribute goods and services as inputs or receive outputs. These linkages have been modelled by Statistics Canada based on economic data at a particular point in time, and this model provides the basis for the projections of effects presented in this section. However, to use the model, predictive allocations of expenditures were made by province and territory (and

offshore), based on knowledge of demands for goods and services, and the relative existing capabilities of these areas to meet these needs.

The actual results achieved will no doubt vary from these projections because the structure of the economy changes slightly over time. In addition, actual project spending decisions will depend on the results of the competitive tendering and purchasing process. Therefore, these effects are not amenable to direct mitigation or management other than that described in previous sections related to managing employment and procurement opportunities.

### **3.2.1.5 Effect on Diversification**

Historically, economic development in the Northwest Territories has been largely dependent on gold mining, government and sporadic petroleum exploration and development. There has always been a desire to diversify the economy so that it is less affected by the boom-and-bust cycles and government spending. This project will help contribute to diversification in at least two main ways:

- throughout construction and operations, the Aboriginal and other northern business communities will have the opportunity to build business capacity. This could be accomplished through establishing joint ventures and alliances with distributors, and expanding existing and establishing new northern businesses to meet the purchasing demands for construction and operations. This will help strengthen and broaden the economy of the Northwest Territories.
- the capacity built and skills learned by the Aboriginal and other northern labour force could be transferred to other areas of the economy to promote further expansion and diversification

### **3.2.2 Effects on Gross Domestic Product**

GDP is a generally accepted basic measure of economic activity and performance. It describes the total value of all goods produced and services provided within a defined economic region in a year. The GDP project effects on the economies of the Northwest Territories, the provinces and Canada as a whole are described in this section.

#### **3.2.2.1 Construction**

The effect of project expenditures on GDP is an accepted key indicator of general economic effects of large capital projects, such as this one. Table 3-78 presents the estimated effects of project construction on national direct GDP by region and province, and for the Northwest Territories. For this assessment, direct GDP is assumed to include all direct project labour income, regardless of the location of employee residence. For indirect and induced effects, labour income follows the

concept of gross national product and is therefore attributed to the region or province where the employee lives and maintains a residence. It is expected that southern-based employees will fly in and out of the Northwest Territories, and reside in a camp while working on the project.

**Table 3-78: Direct Gross Domestic Product at Basic Prices**

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	6	1	28	2	28	2	4	1	65	2	16	2
Quebec	16	3	48	4	46	4	11	4	121	4	30	4
Ontario	38	6	93	8	84	7	24	8	240	7	60	7
Alberta	390	63	617	52	637	54	170	54	1,815	55	454	55
Other Canada	43	7	122	10	113	10	27	9	305	9	76	9
Northwest Territories	122	20	273	23	265	23	79	25	739	22	185	22
Total	615	100	1,181	100	1,173	100	316	100	3,285	100	821	100

NOTES:  
 Figures are in millions of constant \$2003  
 Numbers might not add up because of rounding

The largest effect during construction will be in Alberta, where \$1.8 billion, 55%, of direct GDP will be generated. The next largest effect will be in the Northwest Territories, where \$739 million, 22%, of direct GDP will be created.

It is estimated that \$3.3 billion in direct GDP will be generated in Canada from construction from 2006–2007 to 2009–2010. On average, it is predicted that GDP in Canada will rise by \$821 million annually.

Project construction will also produce national indirect GDP effects. Although construction will have significant benefits for the Northwest Territories, most of the economic effects resulting from construction will accrue to the southern provinces because the Northwest Territories has a very underdeveloped industrial base and relies heavily on imports from the southern provinces.

The largest indirect effect during construction will be in Alberta, where \$772 million, 43%, in indirect GDP will be generated. The next largest effect will be in Ontario, where \$378 million, 21%, of total indirect GDP will be created. It is estimated that \$144 million, 8%, in indirect GDP will accrue to the Northwest Territories.

In total, it is estimated that \$1.8 billion in indirect GDP effects will be generated in Canada because of project construction. On average, it is predicted that indirect GDP in Canada will rise by \$444 million annually during construction because of indirect effects.

Finally, project construction will also produce national induced GDP effects. The largest such effect during construction will be in Alberta, where \$1.1 billion, 54%, of induced GDP will be generated. The next largest effect will be in Ontario, where \$423 million, 21%, of induced GDP will be created. It is estimated that \$159 million, 8%, of induced GDP will accrue to the Northwest Territories.

It is estimated that \$2 billion in induced GDP will be generated in Canada because of project construction. On average, it is predicted that GDP in Canada will rise by \$500 million annually because of induced effects.

Table 3-79 shows the total GDP effects of project construction in Canada. The largest effect during construction will be in Alberta, where \$3.7 billion, 52%, of total GDP will be generated. The next largest effect will be in the Northwest Territories and Ontario, where about \$1 billion of total GDP, or an annual average of \$260 million, will be created in each jurisdiction. It is estimated that \$7.1 billion in GDP, or an annual average of \$1.8 billion, will be generated in Canada because of project construction.

**Table 3-79: Total Gross Domestic Product at Basic Prices**

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	14	1	43	2	42	2	9	1	108	2	27	2
Quebec	72	5	167	7	145	6	44	6	429	6	107	6
Ontario	186	13	395	16	344	14	116	16	1,041	15	260	15
Alberta	827	58	1,227	49	1,235	52	378	51	3,666	52	916	52
Other Canada	130	9	300	12	266	11	81	11	778	11	194	11
Northwest Territories	187	13	372	15	364	15	118	16	1,041	15	260	15
Total	1,416	100	2,505	100	2,396	100	746	100	7,062	100	1,766	100

NOTES:  
 Figures are in millions of constant \$2003  
 Numbers might not add up because of rounding

GDP effects will be generated in a wide range of industries in Canada. The two largest of these will be the finance and professional, and the scientific and technical services industries. In each of these industries, over \$1 billion will be created. Large GDP effects will also be generated in the industries of manufacturing, \$860 million, transportation and warehousing, \$706 million, and construction, \$544 million.

In the Northwest Territories, the largest effects will be in the industries of construction, \$464 million, and transportation and warehousing, \$270 million.

As might be expected, Alberta and Ontario will receive the greatest benefits from total increases in GDP generated by the project because of their strong capacities in the oil and gas, e.g., Alberta, and manufacturing, e.g., Ontario, sectors. The Northwest Territories will benefit primarily from the direct GDP effects.

### 3.2.2.2 Operations

Table 3-80 presents the estimated average annual effect of operations on direct GDP in the Northwest Territories. It is estimated that an annual average of \$724 million in direct GDP will be generated in the Northwest Territories from operations from 2009 to 2030.

**Table 3-80: Annual Average Operating Direct Gross Domestic Product at Basic Prices**

Location	2009–2015	2016–2020	2021–2025	2026–2030	Annual Average
Northwest Territories	749	945	864	325	724
NOTES: Figures are in millions of constant \$2003 Numbers might not add up because of rounding					

Project operations will also generate indirect and induced GDP effects. Although operations will have important benefits to the Northwest Territories, well over half of the indirect economic effects and nearly three-quarters of the induced effects resulting from operations will accrue to the southern provinces.

In terms of indirect GDP effects of operations, the Northwest Territories will experience the greatest benefit, an annual average of \$22 million, or 42%. The next largest effect will be in Ontario, where \$11 million, 21%, annually in indirect GDP will be created. It is estimated that an annual average of \$52 million in indirect GDP will be generated in Canada.

The largest induced GDP effects of operations will be in Ontario, where an annual average of \$13 million, 30%, of induced GDP will be generated. The next largest effect will be in the Northwest Territories and Alberta, each with an annual average of \$12 million, 28%, of induced GDP. In total, it is estimated that an average of \$43 million in induced GDP will be generated annually in Canada as a whole.

The total effects of operations on the GDP are shown in Table 3-81. The largest effect will be in the Northwest Territories, where an annual average of \$758 million, 93%, of total GDP will be generated. The next largest effect will be in Ontario, where an average of \$24 million, 3%, of total GDP will be created annually. It is estimated that an average of \$819 million in total GDP will be generated annually in Canada.

Table 3-81: Annual Average Operating Total Gross Domestic Product at Basic Prices

Location	2009–2015		2016–2020		2021–2025		2026–2030		Annual Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	1	0	1	0	1	0	1	0	1	0
Quebec	6	1	7	1	6	1	6	1	6	1
Ontario	24	3	26	2	23	2	22	5	24	3
Alberta	25	3	24	2	14	1	13	3	20	2
Other Canada	11	1	12	1	11	1	10	3	11	1
Northwest Territories	782	92	985	93	897	94	357	87	758	93
Total	849	100	1,054	100	952	100	409	100	819	100

NOTES:

Figures are millions of constant \$2003  
Numbers might not add up because of rounding

### 3.2.3 Employment Effects

Using employment as a key indicator is central to any understanding of the economic effects of a project, as most of the foregoing analysis shows. The project effects on job creation in the Northwest Territories, the provinces and Canada are described in the following sections.

#### 3.2.3.1 Construction

Project construction will generate direct employment effects in the Northwest Territories and Canada as a whole. Direct job effects are assigned to the region, province or territory where the employee is expected to live and maintain a permanent residence. As shown in Table 3-82, the largest effect during construction will be in Alberta, where about 10,200 direct jobs, 51%, will be created. The next largest effect will be in the Northwest Territories, where about 3,200 jobs, 16%, will be created. In the other provinces and territories in Canada, it is estimated that construction will provide residents with about 6,800 jobs.

In total, it is estimated that about 20,300 direct jobs will be generated in Canada because of project construction, or about 5,100 jobs annually.

Project construction will also create national indirect and induced employment effects. The largest of these will be in Alberta, where 38,600 indirect, 64%, and 19,900 induced, 60%, jobs will be generated. The next largest effect will be in Ontario, where about 8,000 indirect, 13%, and 6,700 induced, 20%, jobs will result. It is estimated that about 1,900 indirect, 3%, and 700 induced, 2%, jobs will accrue to residents of the Northwest Territories.

Table 3-82: Direct Project Employment by Residency (Jobs)

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Atlantic	109	6	603	7	572	7	73	8	1,357	7	339	7
Quebec	109	6	603	7	572	7	73	8	1,357	7	339	7
Ontario	109	6	603	7	572	7	73	8	1,357	7	339	7
Alberta	813	42	4,836	53	4,231	51	364	42	10,245	51	2,561	51
Other Canada	218	11	1,207	13	1,144	14	146	17	2,715	13	679	13
Northwest Territories	563	29	1,319	14	1,197	14	146	17	3,225	16	806	16
Total	1,922	100	9,173	100	8,288	100	875	100	20,257	100	5,064	100

NOTE:  
Numbers might not add up because of rounding

In total, 93,600 indirect and induced jobs will be generated in Canada as a whole during construction. This averages to about 23,400 jobs annually.

Total national employment effects during construction are summarized in Table 3-83. Again, Alberta and Ontario will experience the largest effects, with about 68,700 jobs in Alberta, 60%, and 16,000 jobs in Ontario, 14%. It is predicted that about 5,900 jobs will accrue to Northwest Territories residents. It is estimated that 113,900 jobs will be generated in Canada as a whole during construction, averaging 28,500 jobs annually.

Table 3-83: Total Project-Related Employment by Residency (Jobs)

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Atlantic	290	1	955	2	890	2	199	2	2,334	2	583	2
Quebec	1,191	5	2,864	7	2,466	6	717	6	7,238	6	1,809	6
Ontario	2,823	13	6,114	15	5,316	14	1,785	15	16,038	14	4,009	14
Alberta	14,679	65	24,373	58	22,774	60	6,853	59	68,680	60	15,569	60
Other Canada	2,250	10	5,302	13	4,718	12	1,473	13	13,743	12	3,436	12
Northwest Territories	1,218	5	2,094	5	1,922	5	630	5	5,865	5	1,466	5
Total	22,452	100	41,701	100	38,087	100	11,657	100	113,896	100	28,474	100

NOTE:  
Numbers might not add up because of rounding

These jobs will occur in a wide range of industries. The construction industry will experience the largest growth, generating 21,800 jobs. The second largest industry affected will be professional and technical services, with 19,400 jobs, followed by finance, insurance and real estate, with 17,600 jobs. Manufacturing industries will provide 13,500 jobs. In the Northwest Territories, the largest growth will be felt in



the construction industry, about 3,800 jobs, and the transportation and warehousing industry, about 900 jobs.

### 3.2.3.2 Operations

Table 3-82, shown previously, shows the estimated effect of operations and ongoing drilling programs on direct employment by region or province and the Northwest Territories.

For operations, direct employment is assigned to the region, province or territory where the employee is expected to live and maintain a permanent residence. Initially, some operations employees will be southerners that will maintain primary residences in Alberta and return home on a prescribed work rotation schedule. While working on the project, these employees might live in camp accommodation at the remote project facilities or in staff housing in Northwest Territories communities, and fly in and out to their primary residences in Alberta. As training progresses and more Northwest Territories residents become qualified, northerners will replace the southern employees until northerners fill most of the jobs. Some other operations employees recruited from the south will move to the Northwest Territories and establish residency. These employees have been considered as Northwest Territories employees for this analysis.

Table 3-84 shows that from 2009 to 2030, operations will generate an annual average of 191 direct jobs in the Northwest Territories. Residents of the Northwest Territories are expected to fill 138 of these direct jobs, 72%, and Alberta residents might fill 53 of the jobs, or 28%.

**Table 3-84: Annual Average Direct Operations Employment (Jobs)**

Location	2009–2015		2016–2020		2021–2025		2026–2030		Annual Average	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Alberta	93	43	48	17	27	21	26	21	53	28
Northwest Territories	126	57	233	83	102	79	98	79	138	72
Total	220	100	281	100	129	100	124	100	191	100
NOTE: Numbers might not add up because of rounding										

Operations activity will also result in indirect and induced employment. The largest such effect will be in the Northwest Territories, where an annual average of 225 indirect, 36%, and 93 induced, 23%, jobs will be generated. The next largest effect will be in Ontario, where an annual average of 131 indirect, 21%, and 99 induced, 28%, jobs will be created. In Alberta, an annual average of 114 indirect, 18%, and 103 induced, 29%, jobs will be created. In total, it is

estimated that an annual average of 633 indirect and 356 induced jobs will be generated in Canada as a whole.

Total operations employment effects are summarized by region in Table 3-85. The Northwest Territories will experience the largest effects, with an annual average of 456 jobs, or 39%. The next largest effect will be in Alberta, where 270 jobs, 23%, will be created. In Ontario, it is estimated that 230 jobs, 19%, will be generated. The effects on Canada as a whole will result in an annual average of 1,180 jobs from 2009 to 2030.

**Table 3-85: Annual Average Total Operations Employment (Jobs)**

Location	2009–2015		2016–2020		2021–2025		2026–2030		Annual Average	
	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)	(No.)	(%)
Atlantic	8	1	9	1	8	1	8	1	8	1
Quebec	68	5	73	5	68	7	65	7	69	6
Ontario	228	18	245	17	227	22	219	23	230	19
Alberta	374	30	342	24	167	16	155	16	270	23
Other Canada	147	12	162	11	144	14	137	14	147	12
Northwest Territories	434	34	603	42	408	40	388	40	456	39
Total	1,260	100	1,435	100	1,021	100	973	100	1,180	100
NOTE: Numbers might not add up because of rounding										

### 3.2.4 Effects on Labour Income

Although job creation is central to measuring economic effects, it is generation of labour income that will most directly affect various aspects of group and individual quality of life. These effects are described below for the Northwest Territories, the provinces and Canada as a whole.

#### 3.2.4.1 Construction

Table 3-86 shows the estimated effects of construction on national direct labour income by region or province and in the Northwest Territories. The largest effect will be in Alberta, where \$427 million, 49%, of direct labour income will be earned during construction. The next largest effect will be experienced in the Northwest Territories, where \$157 million, 18%, of total direct labour income will be earned.

Table 3-86: Direct Labour Income by Residency (Gross National Product)

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	4	6	25	7	25	7	3	8	57	7	14	7
Quebec	4	6	25	7	25	7	3	8	57	7	14	7
Ontario	4	6	25	7	25	7	3	8	57	7	14	7
Alberta	28	38	193	51	194	51	11	34	427	49	107	49
Other Canada	8	11	50	13	50	13	6	17	114	13	29	13
Northwest Territories	26	34	63	17	60	16	8	24	157	18	39	18
Total	76	100	381	100	380	100	34	100	870	100	218	100

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

It is estimated that \$870 million in direct labour income will be generated in Canada during 2006–2007 to 2009–2010. On average, it is predicted that direct labour income in Canada will rise by \$218 million annually.

Project construction will also produce indirect and induced labour income effects. The most substantial such effects will be felt in Alberta, where \$1.6 billion in indirect and \$578 million in induced labour income will be generated. It is estimated that indirect and induced labour income in the Northwest Territories will increase by \$142 million.

It is estimated that \$2.7 billion in indirect and \$1.1 billion in induced labour income will be generated in Canada during construction. On average, it is predicted that indirect and induced labour income in Canada will rise by \$959 million annually.

The effects of construction from 2006–2007 to 2009–2010 on total labour income are shown in Table 3-87. The largest effect will be in Alberta, where \$2.5 billion, 54%, will be generated. Very important income effects will also be experienced in the Other Canada region, where the increase will be \$815 million, 17%, and in Ontario, where it is estimated at \$653 million, 14%. The Northwest Territories is expected to see an increase in income of \$300 million, 6%. The total effect on labour income is estimated to be \$4.7 billion in Canada as a whole during construction, or an average of \$1.2 billion annually.

Table 3-87: Total Labour Income by Residency (Gross National Product)

Location	2006–2007		2007–2008		2008–2009		2009–2010		Total		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	10	1	36	2	36	2	7	1	89	2	22	2
Quebec	46	5	113	7	99	6	28	6	285	6	71	6
Ontario	114	13	249	15	218	14	72	15	653	14	163	14
Alberta	600	66	876	52	819	52	234	49	2,529	54	632	54
Other Canada	80	9	321	19	313	20	102	21	815	17	204	17
Northwest Territories	61	7	105	6	99	6	35	7	300	6	75	6
Total	911	100	1,700	100	1,583	100	477	100	4,670	100	1,168	100

NOTES:

Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Labour income during the construction period will accrue to a wide range of industries, but the effects will be most pronounced in construction, at \$927 million; professional and technical services, at \$796 million; finance, insurance and real estate, at \$629 million; manufacturing, at \$625 million; and transportation and warehousing, at \$363 million. In the Northwest Territories, the largest labour income effect will be in the construction industry, at \$191 million, and the transportation and warehousing industry, at \$50 million.

### 3.2.4.2 Operations

Initially, several operations and ongoing drilling employees will be southerners, who it is assumed will maintain a primary residence in Alberta and work in the Northwest Territories on a rotational basis. As training progresses and more residents of the Northwest Territories become qualified, Aboriginal and other northerners will replace the southern employees, until Northwest Territories residents earn almost all of the employment and labour income.

The estimated direct labour income effects of operations are shown in Table 3-88. Northwest Territories residents will earn an annual average of \$12.5 million, 72%, in direct labour income, while Alberta residents will earn \$4.9 million, 28%, during 2009 to 2030. Over the life of the project, the amount earned by Northwest Territories residents will gradually increase from 57% in 2009 to 2015 to an annual average of 72% over the 20 years. It is estimated that an annual average of \$17.4 million in direct labour income will be generated during operations.

**Table 3-88: Annual Average Operating Direct Labour Income**

Location	2009–2015		2016–2020		2021–2025		2026–2030		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Alberta	8.5	43	4.4	18	2.6	21	2.5	22	4.9	28
Northwest Territories	11.4	57	20.6	82	9.5	79	9.1	78	12.5	72
Total	19.9	100	25.0	100	12.1	100	11.7	100	17.4	100

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

Operations will also result in increases to indirect and induced labour income in Canada and the Northwest Territories. Most of these effects will be in the Northwest Territories, where an annual average of \$15.5 million in indirect and induced labour income will be generated from 2009 to 2030. The next largest effects will accrue to Ontario, at \$9.3 million, and Alberta, at \$7.8 million. In total, it is estimated that an annual average of \$41.0 million in indirect and induced labour income will be generated in Canada because of operations.

The total labour income effects of project operation are shown in Table 3-89. The largest effects will be experienced in the Northwest Territories, where \$28 million, 48%, in total labour income will be generated. The next largest effect will be in Alberta with \$13 million, 22%, and Ontario with \$9 million, 16%, in total labour income being accrued. It is estimated that an annual average of \$59 million in total labour income will be generated in Canada as a whole during 2009 to 2030 operations.

**Table 3-89: Annual Average Operating Total Labour Income**

Location	2009–2015		2016–2020		2021–2025		2026–2030		Average	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Atlantic	0	0	0	0	0	1	0	1	0	1
Quebec	3	4	3	4	3	5	2	5	3	4
Ontario	9	15	10	14	9	19	9	19	9	16
Alberta	18	29	15	21	8	15	7	15	13	22
Other Canada	6	9	6	9	6	11	5	11	6	10
Northwest Territories	27	42	38	53	24	49	23	49	28	48
Total	63	100	73	100	50	100	48	100	59	100

NOTES:  
Figures are millions of constant \$2003  
Numbers might not add up because of rounding

### 3.2.5 Effects on Government Revenue

In addition to the employment and income effects, additional benefits from the project will accrue to the territorial, provincial and federal governments through higher revenue. This higher revenue will be derived from taxes paid by the personal and business sectors.

The personal and business sectors will pay direct and indirect taxes. Direct taxes include income taxes, surcharges, and contributions to the Canadian pension plan and employment insurance. Indirect taxes include goods and services tax (GST), gasoline, liquor, tobacco, other sales taxes, and various licences, fees and permits. The business sector pays corporate income taxes and royalties, and indirect taxes, such as fuel and property taxes.

These important revenue flows to the territorial, provincial and Canadian governments are described in the following sections.

#### 3.2.5.1 Construction

In addition to the household and business sectors, the territorial, provincial and federal governments will benefit from the project through higher revenue. This higher revenue will be derived from personal and business direct taxes. In this section, only personal tax effects are presented. There is inadequate data on which to base estimates of the business and corporate taxes related to construction activity as these taxes will be dependent on head office locations and tax status of many contractors and suppliers, and these variables cannot be reliably predicted at this time. As a result, this is a gap in the economic analysis.

#### Effect on Government Revenue

The estimated effects of project construction on territorial and federal government revenue are shown in Table 3-90. This activity is expected to result in an increase in business and personal direct and indirect tax revenue of \$55.1 million for the GNWT and \$81.3 million for the federal government during construction. In total, over \$136.4 million in direct and indirect tax revenue will be generated by activity in the Northwest Territories.

Table 3-91 presents a summary of the total estimated effect on government revenue from project construction from all related activity in Canada.

Table 3-90: Northwest Territories Taxes for Construction

Type of Tax	2006–2007 (\$M)	2007–2008 (\$M)	2008–2009 (\$M)	2009–2010 (\$M)	Total (\$M)	Average (\$M)
<b>Direct Taxes – Federal</b>						
Corporate income tax	–	–	–	–	–	–
Personal income tax	7.5	12.7	11.7	4.5	36.5	1.9
EI and CPP contributions	6.9	12.3	12.0	3.7	34.9	8.7
Subtotal federal	14.5	25.0	23.8	8.2	71.4	10.6
<b>Direct Taxes – Territorial</b>						
Corporate income tax	–	–	–	–	–	–
Personal income tax	3.1	5.2	4.8	1.9	14.9	3.7
Payroll tax (NWT)	1.0	4.6	4.5	1.6	11.8	2.9
Northern cost of living tax credit	-0.8	-1.4	-1.3	-0.5	-4.0	-1.0
Subtotal territorial	3.3	8.4	8.0	3.0	22.7	5.7
<b>Total Direct Taxes</b>	<b>17.7</b>	<b>33.4</b>	<b>31.7</b>	<b>11.2</b>	<b>94.1</b>	<b>23.5</b>
<b>Indirect Taxes – Federal</b>						
Goods and services tax	1.6	2.8	2.7	0.9	8.0	2.0
Other excise taxes	0.2	0.4	0.4	0.1	1.2	0.3
Air transport tax	0.1	0.2	0.2	0.1	0.7	0.2
Subtotal federal	2.0	3.5	3.3	1.1	9.9	2.5
<b>Indirect Taxes – Territorial</b>						
Fuel tax	3.6	3.9	4.0	3.9	15.4	3.9
Motor vehicle licences and permits	0.2	0.3	0.3	0.1	1.0	0.2
Other licences, fees and permits	0.1	0.2	0.2	0.1	0.5	0.1
Tobacco tax	0.7	1.2	1.2	0.4	3.4	0.8
Profits of liquor commission	0.6	1.0	1.0	0.3	2.8	0.7
Miscellaneous	1.9	3.3	3.0	1.0	9.3	2.3
Subtotal territorial	7.1	10.0	9.6	5.8	32.4	8.1
<b>Total Indirect Taxes</b>	<b>9.1</b>	<b>13.4</b>	<b>12.9</b>	<b>6.9</b>	<b>42.3</b>	<b>10.6</b>
<b>Grand Total Taxes</b>	<b>26.9</b>	<b>46.8</b>	<b>44.6</b>	<b>18.1</b>	<b>136.4</b>	<b>34.1</b>
Federal	16.5	28.4	27.1	9.3	81.3	20.3
Territorial	10.4	18.4	17.6	8.8	55.1	13.8
NOTES: – = data not available CPP = Canadian pension plan EI = employment insurance GST = goods and services tax Figures are millions of constant \$2003 Numbers might not add up because of rounding						

Table 3-91: Total Taxes by Region for Construction (2006–2007 to 2009–2010)

Type of Tax	NWT (\$M)	Alberta (\$M)	Other Canada (\$M)	Total (\$M)	Annual Average (\$M)
<b>Direct Taxes – Federal</b>					
Corporate income tax	–	–	–	–	–
Personal income tax	36.5	278.4	230.4	545.3	136.3
EI and CPP contributions	34.9	356.8	215.2	606.9	151.7
Subtotal federal	71.4	635.1	445.7	1,152.2	288.0
<b>Direct Taxes – Provincial or Territorial</b>					
Corporate income tax	–	–	–	–	–
Personal income tax	14.9	126.9	90.0	231.9	58.0
Payroll tax (NWT)	11.8	0	0	11.8	2.9
Provincial tax credit (NWT)	-4.0	0	0	-4.0	-1.0
Medicare premiums (Alberta)	0	40.8	0	40.8	10.2
Subtotal provincial or territorial	22.7	167.8	90.0	280.4	70.1
<b>Total Direct Taxes</b>	<b>94.1</b>	<b>802.9</b>	<b>535.6</b>	<b>1,432.6</b>	<b>358.1</b>
<b>Indirect Taxes – Federal</b>					
Goods and services tax	8.0	74.9	48.9	131.7	32.9
Other excise taxes	1.2	11.2	7.4	19.8	4.9
Air transport tax	0.7	6.2	4.4	11.2	2.8
Subtotal federal	9.9	92.2	60.7	162.8	40.7
<b>Indirect Taxes – Provincial or Territorial</b>					
Amusement	0	0	3.5	3.5	0.9
Gasoline tax	15.4	9.2	5.8	30.4	7.6
Motor vehicle licences and permits	1.0	8.7	2.4	12.1	3.0
Other licences, fees and permits	0.5	4.4	1.1	6.0	1.5
Tobacco tax	3.4	35.8	20.7	59.9	15.0
Profits of liquor commission	2.8	41.3	21.0	65.1	16.3
Miscellaneous	9.3	110.5	11.9	131.6	32.9
Subtotal provincial or territorial	32.4	209.8	66.3	308.6	77.1



Table 3-91: Total Taxes by Region for Construction (2006–2007 to 2009–2010) (cont'd)

Type of Tax	NWT (\$M)	Alberta (\$M)	Other Canada (\$M)	Total (\$M)	Average (\$M)
<b>Total Indirect Taxes</b>	42.3	302.0	127.0	471.4	117.8
<b>Grand Total Taxes</b>	<b>136.4</b>	<b>1,104.9</b>	<b>662.7</b>	<b>1,903.9</b>	<b>476.0</b>
Federal	81.3	727.3	506.3	1,314.9	328.7
Provincial or territorial	55.1	377.6	156.3	589.0	147.3

NOTES:  
 – = data not available  
 CPP = Canadian pension plan  
 EI = employment insurance  
 Figures are in millions of constant \$2003  
 Numbers might not add up because of rounding

The project will have a considerable effect on Alberta provincial and federal government revenue from activity generated by project construction in the province and from Alberta residents working in the Northwest Territories. Project construction is expected to result in an increase in tax revenue of \$377.6 million for the Government of Alberta and \$727.3 million for the federal government during construction. In total, over \$1.1 billion in tax revenue will be generated by activity in Alberta.

Project construction is expected to result in an increase in direct federal tax revenue of \$1.2 billion. At the same time, the territories and the provinces will receive \$280 million in direct taxes.

It is estimated that the GNWT will receive about \$15 million in personal income taxes, the Government of Alberta \$127 million and other provincial governments in Canada \$90 million. In total, after provincial tax credits and premiums are included, the GNWT will receive \$23 million, the Government of Alberta will receive \$168 million and the governments in the rest of Canada will receive \$90 million.

The federal government will also receive \$163 million in indirect taxes, comprising \$132 million in GST payments, \$20 million in other excise taxes and \$11 million in air transport taxes.

The GNWT will receive an estimated \$32 million in indirect taxes, the Government of Alberta \$210 million, and provincial governments in the rest of Canada \$66 million.

In total, provincial and territorial governments will receive \$309 million in indirect taxes.

### Effect on Net Government of the Northwest Territories Revenue

Grants and transfers from the Government of Canada make up most of the GNWT's revenue. However, when the GNWT experiences an increase in revenue, it can reduce the amount the GNWT receives from the federal government through the Formula Financing Grant (FFG).

The project will generate large tax revenue for both the federal government and the GNWT during construction. The GNWT will retain only a part of this gross revenue because part of the tax revenue will reduce the FFG. This has the effect of raising the federal government's share, at the expense of the GNWT's share.

Table 3-92 shows estimates of the net effects on GNWT revenue after FFG effect is taken into account. GNWT Finance, Fiscal Policy Division supplied the retention rates.

**Table 3-92: Estimated Net Effect of Personal Taxes on Government of the Northwest Territories Revenue During Construction**

Effect	Federal		GNWT		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Gross effect	81.3	60	55.1	40	136.4	100
Net effect	126.5	93	9.8	7	136.4	100
NOTES: Figures are in millions of \$2003 Numbers might not add up because of rounding						

The GNWT, on a gross basis, will receive \$55 million, 40%, of total tax revenue earned in the Northwest Territories, while the federal government will receive \$81 million, 60%. After the FFG effect is taken into account, it is estimated that the GNWT's revenue will fall to \$10 million, 7%, and federal government net revenue will rise to \$127 million, 93%.

#### 3.2.5.2 Operations

The estimated effect on GNWT and federal government revenue from operations is shown in Table 3-93. Operations activity is expected to result in an average increase in tax revenue of \$122 million for the GNWT and \$278 million for the federal government annually during 2009 to 2030 operations. In total, an average of \$400 million in tax revenue will be generated annually by activity in the Northwest Territories.

Table 3-93: Annual Average Northwest Territories Taxes for Operations

Type of Tax	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Average (\$M)
<b>Direct Taxes – Federal</b>					
Corporate tax	101.4	148.5	135.5	57.9	113.3
Royalties	72.6	221.8	261.4	106.0	157.0
Personal income tax	4.2	5.6	3.4	3.3	4.0
EI and CPP contributions	2.5	3.1	2.2	2.1	2.4
Subtotal federal	180.8	379.0	402.5	169.3	276.7
<b>Direct Taxes – Territorial</b>					
Corporate tax	55.0	80.5	73.5	31.4	61.5
Personal income tax	1.8	2.4	1.5	1.4	1.7
Payroll tax (NWT)	0.5	0.8	0.4	0.4	0.5
Cost of living tax credit	-0.3	-0.4	-0.3	-0.3	-0.3
Property tax	48.3	56.0	57.3	60.0	57.2
Subtotal territorial	105.2	139.3	132.4	93.0	120.5
<b>Total Direct Taxes</b>	<b>286.0</b>	<b>518.3</b>	<b>534.9</b>	<b>262.3</b>	<b>397.3</b>
<b>Indirect Taxes – Federal</b>					
Goods and services tax	0.7	0.9	0.6	0.6	0.7
Other excise taxes	0.1	0.2	0.1	0.1	0.1
Air transport tax	0.1	0.1	0.1	0.1	0.1
Subtotal federal	0.9	1.2	0.7	0.7	0.9
<b>Indirect Taxes – Territorial</b>					
Gasoline tax	0.1	0.1	0.1	0.1	0.1
Motor vehicle licences and permits	0.1	0.1	0.1	0.1	0.1
Other licences, fees and permits	0.0	0.1	0.0	0.0	0.0
Tobacco tax	0.2	0.3	0.2	0.2	0.2
Profits of liquor commission	0.3	0.4	0.2	0.2	0.3
Miscellaneous	0.8	1.0	0.7	0.6	0.7
Subtotal territorial	1.5	1.9	1.3	1.2	1.4
<b>Total Indirect Taxes</b>	<b>2.4</b>	<b>3.1</b>	<b>2.0</b>	<b>1.9</b>	<b>2.3</b>
<b>Grand Total Taxes</b>	<b>288.4</b>	<b>521.4</b>	<b>536.9</b>	<b>264.3</b>	<b>399.5</b>
Federal	181.7	380.1	403.3	170.1	277.6
Territorial	106.7	141.2	133.7	94.2	122.0
NOTES: EI = employment insurance CPP = Canadian pension plan CPP = Canada Pension Plan EI = employment insurance Figures are in millions of constant \$2003 Numbers might not add up because of rounding					

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The total estimated effect on government revenue from operations from all related activity in Canada is shown in Table 3-94. Annual average tax revenue from operations are expected to result in an increase of \$127 million for the provincial and territorial governments in Canada, and \$286 million for the federal government over the period 2009 to 2030. Total annual tax revenue will increase to an average of \$413 million because of project operations activity in Canada.

**Table 3-94: Annual Average Total Taxes for Operations**

Type of Tax	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	Average (\$M)
<b>Direct Taxes - Federal</b>					
Corporate tax	101.4	148.5	135.5	57.9	113.3
Royalties	72.6	221.8	261.4	106.0	157.0
Personal income tax	9.1	9.8	6.5	6.2	7.8
EI and CPP contributions	7.0	7.3	5.2	5.0	6.0
Subtotal federal	190.2	387.3	408.6	175.2	284.1
<b>Direct Taxes – Provincial or Territorial</b>					
Corporate Tax	55.0	80.5	73.5	31.4	61.5
Personal income tax	3.9	4.1	2.7	2.6	3.3
Payroll tax (NWT)	0.5	0.8	0.4	0.4	0.5
Property tax (NWT)	48.3	56.0	57.3	60.0	57.2
Provincial tax credit (NWT)	0.2	0.2	0.1	0.1	0.1
Medicare premiums (Alberta)	0.2	0.2	0.1	0.1	0.1
Subtotal provincial or territorial	108.1	141.8	134.1	94.6	122.7
<b>Total Direct Taxes</b>	<b>298.3</b>	<b>529.1</b>	<b>542.8</b>	<b>269.8</b>	<b>406.8</b>
<b>Indirect Taxes – Federal</b>					
Goods and services tax	0.9	1.0	0.7	0.7	0.8
Other excise taxes	0.2	0.2	0.2	0.2	0.2
Air transport tax	1.4	1.2	0.9	0.9	1.1
Subtotal federal	2.4	2.5	1.7	1.7	2.1
<b>Indirect Taxes – Provincial or Territorial</b>					
Amusement tax	0.1	0.1	0.1	0.1	0.1
Gasoline tax	0.2	0.2	0.1	0.1	0.1
Motor vehicle licence and permits	0.1	0.2	0.1	0.1	0.1
Other licence, fees and permits	0.5	0.5	0.3	0.3	0.4

Table 3-94: Annual Average Total Taxes for Operations (cont'd)

Type of Tax	2009–2015 (\$M)	2016–2020 (\$M)	2021–2025 (\$M)	2026–2030 (\$M)	2009–2030 (\$M)
Tobacco tax	0.7	0.7	0.5	0.5	0.6
Profits of liquor commissions	1.1	1.0	0.6	0.6	0.8
Miscellaneous	2.7	2.7	1.8	1.7	2.2
Subtotal provincial	5.3	5.3	3.5	3.3	4.3
<b>Total Indirect Taxes</b>	7.8	7.8	5.3	5.0	6.3
<b>Grand Total Taxes</b>	<b>306.1</b>	<b>536.9</b>	<b>548.0</b>	<b>274.8</b>	<b>413.1</b>
Federal	192.7	389.8	410.4	176.9	286.2
Provincial or territorial	113.4	147.1	137.6	98.0	127.0

NOTES:  
 CPP = Canadian pension plan  
 EI = employment insurance  
 Figures are millions of constant \$2003  
 Numbers might not add up because of rounding

### Effect on Net GNWT Revenue

As described previously, grants and transfers from the Government of Canada make up most of GNWT revenue. When the GNWT experiences an increase in revenue, it can have the effect of reducing the amount the GNWT receives from the federal government through the FFG. Table 3-95 shows an estimate of the net effect on GNWT revenue after the change to the FFG is taken into account.

Table 3-95: Estimated Net Effect of Personal Taxes on Government of the Northwest Territories Revenue During Operations

Effect	Federal		GNWT		Total	
	(\$M)	(%)	(\$M)	(%)	(\$M)	(%)
Gross effect	277.6	69	122.0	31	399.6	100
Net effect	377.8	95	21.8	5	399.6	100

NOTES:  
 Figures are in millions of \$2003  
 Numbers might not add up because of rounding

The GNWT, on a gross basis, will receive \$122 million, 31%, of total tax revenue earned in the Northwest Territories during operations, while the federal government will receive \$278 million, 69%. After FFG effect is taken into account, it is estimated that the GNWT's revenue will fall to \$22 million, 5%, and federal government net revenue will rise to \$378 million, 95%.

### 3.2.6 Determination of Significance

The large-scale nature of the project, conducted in the context of the relatively small and still developing study area economy, means that all key economic indicators will be affected to a high degree and most will respond in a similar fashion. Although the effects on the national economy as a whole will be proportionally smaller, again the attributes of most key indicators will be affected in a similar way. For this reason, the determination of significance for GDP, employment and labour income will be summarized separately for construction and operations effects. Table 3-96 shows that construction effects are expected to be positive, and high magnitude in both the Northwest Territories and Canada as a whole.

**Table 3-96: National Gross Domestic Product, Employment and Income Effects – Construction Effect Attributes for the Northwest Territories and Canada**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Northwest Territories	Positive	High	Regional and beyond regional	Short term	Yes
Canada	Positive	High	National	Short term	Yes

Table 3-97 shows that operations effects are expected to be positive, and high magnitude in the Northwest Territories, and positive, but low magnitude in Canada as a whole.

**Table 3-97: National Gross Domestic Product, Employment and Income Effects – Operations Effect Attributes for the Northwest Territories and Canada**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Northwest Territories	Positive	High	Regional and beyond regional	Long term	Yes
Canada	Positive	Low	National	Long term	No

The residual project effects on government revenue are far more complicated to assess. The project will represent an important new revenue source for the GNWT during both construction and operations. However, as the analysis of the net effects shows, after the change to the FFG is considered, the nominal increase in tax revenue is not substantial in relation to existing totals.

Similarly, it can and should be argued that total tax revenue to the federal government from Northwest Territories sources during construction, and especially, operations, will very substantially increase because of the project.

However, relative to total federal government revenue streams, these amounts will not represent large-scale effects.

Although these factors dominate the effect attributes, it seems clear that the project will:

- stimulate an important structural change in the Northwest Territories economy
- increase territorial self-sufficiency
- reduce dependence on southern subsidies

Table 3-98 shows that construction effects are expected to be positive, and low magnitude in both the Northwest Territories and Canada as a whole.

**Table 3-98: Government Revenue Effects –Construction Effect Attributes for the Northwest Territories and Canada**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Northwest Territories	Positive	Low	Regional and beyond regional	Short term	No
Canada	Positive	Low	National	Short term	No

Table 3-99 shows that operations effects are expected to be positive, and low magnitude for both the Northwest Territories and Canada as a whole.

**Table 3-99: Government Revenue Effects – Operations Effect Attributes for the Northwest Territories and Canada**

Region	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Northwest Territories	Positive	Low	Regional and beyond regional	Long term	No
Canada	Positive	Low	National	Long term	No

See Section 4.5, Governance, for further discussion of these issues.

### 3.3 Demography

*How will the project affect existing birth, death, and in- and out-migration rates?*

The major concern in this section is with increases in population of such magnitude as to overburden community infrastructure and services. Birth, death and migration rates might all increase or decrease with project effects. However, the issues scoping process suggests that while population movement could be affected by the project, little or no effect is expected on birth and death rates. The result is that population mobility is the valued component assessed in this section.

3.3.1 Effect Pathways

The effect pathway diagram in Figure 3-3 illustrates the projected influence of the project on birth, death, and in- and out-migration rates. All aspects of field development and project construction, which will create demands for labour, and needed goods and services, might initially affect all three rates. These demands will create an inflow of southern workers, both those with employment contracts and those looking for work, and with some bringing their families. As well, northern workers will be hired and purchases made from northern businesses. These directly employed southern and northern workers will contribute to indirect and induced income and employment effects. Quality-of-life expectations will be affected by increased demands for labour, goods and services, and by the direct, indirect and induced income and employment effects.

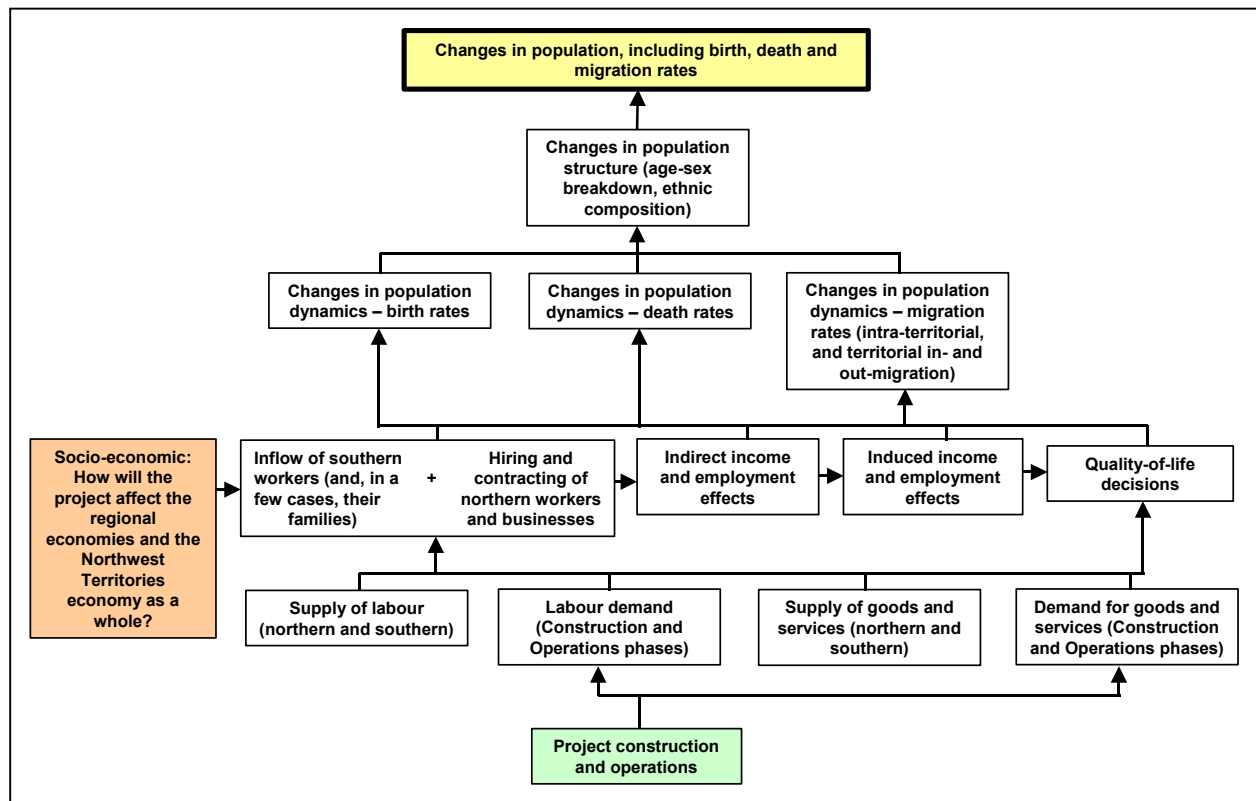


Figure 3-3: Project Effects on Population, including Birth, Death, and In- and Out-migration Rates

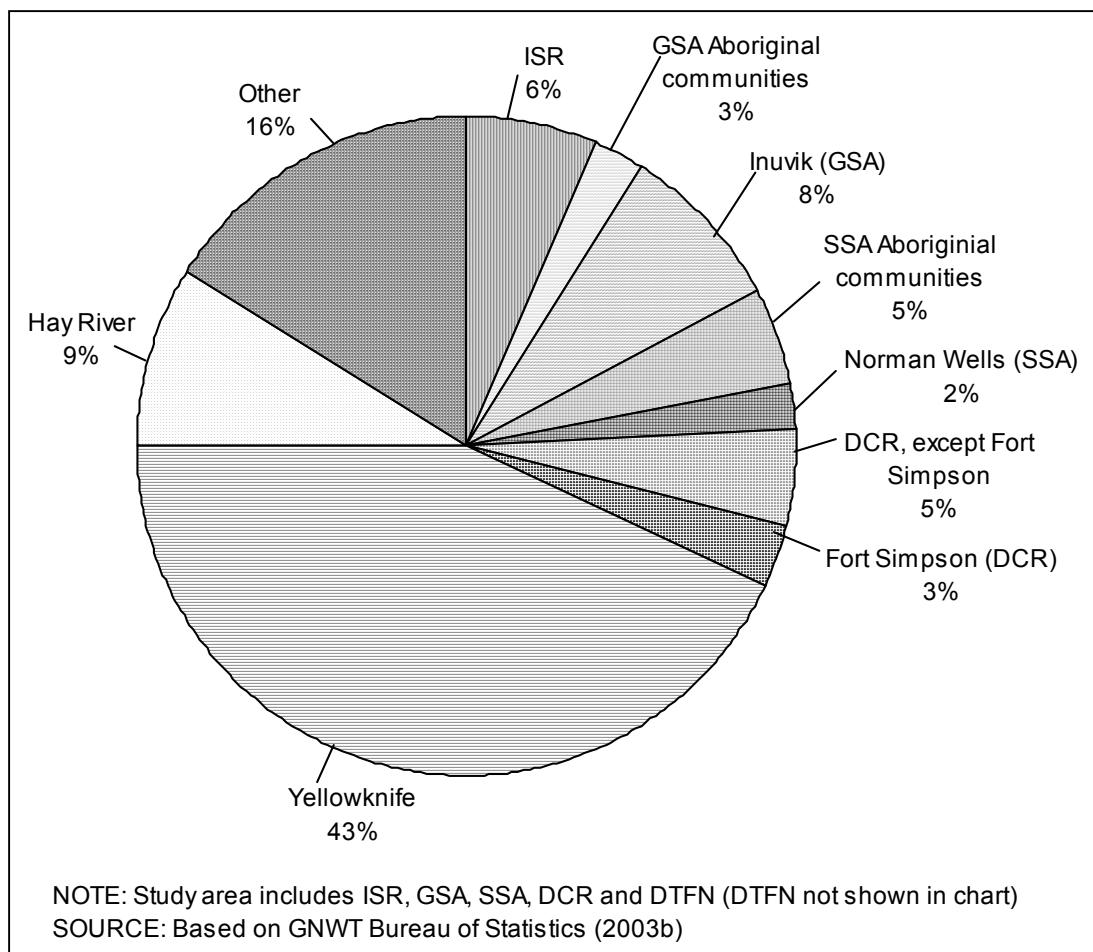
The importance of population change to the socio-economic impact assessment (SEIA) is as a key link between economic opportunities and social effects. Increases in population will increase demands on a wide range of public services and could affect social conditions. These effects will be addressed in subsequent sections.



This analysis of the effect pathways for project effects on in-migration from the provinces and population movement within the Northwest Territories is largely conceptual; there are empirical indicators for only a few of the links. As a result, the following analysis is largely based on current baseline information, the experience of other development projects, self-evident logic and years of relevant observations by the assessment team.

### 3.3.2 Existing Baseline Conditions

The relevant and currently available demographic baseline data is found in Volume 4, Socio-Economic Baseline. Information on the total populations of the study area regions and elected communities is found in Table 3-100 and Figure 3-4. Both the Statistics Canada 2001 census count figures and the GNWT Bureau of Statistics 2003 population estimate figures are included. The census count figures are likely under-enumerated. The GNWT figures are based on adjusted 2001 census data.



**Figure 3-4: Composition of the Northwest Territories Population by Region (2003 Population Estimates)**

Table 3-100: 2000 Population Estimates, Gender Distribution (2001 Census Count) and 2001 Census Count Populations

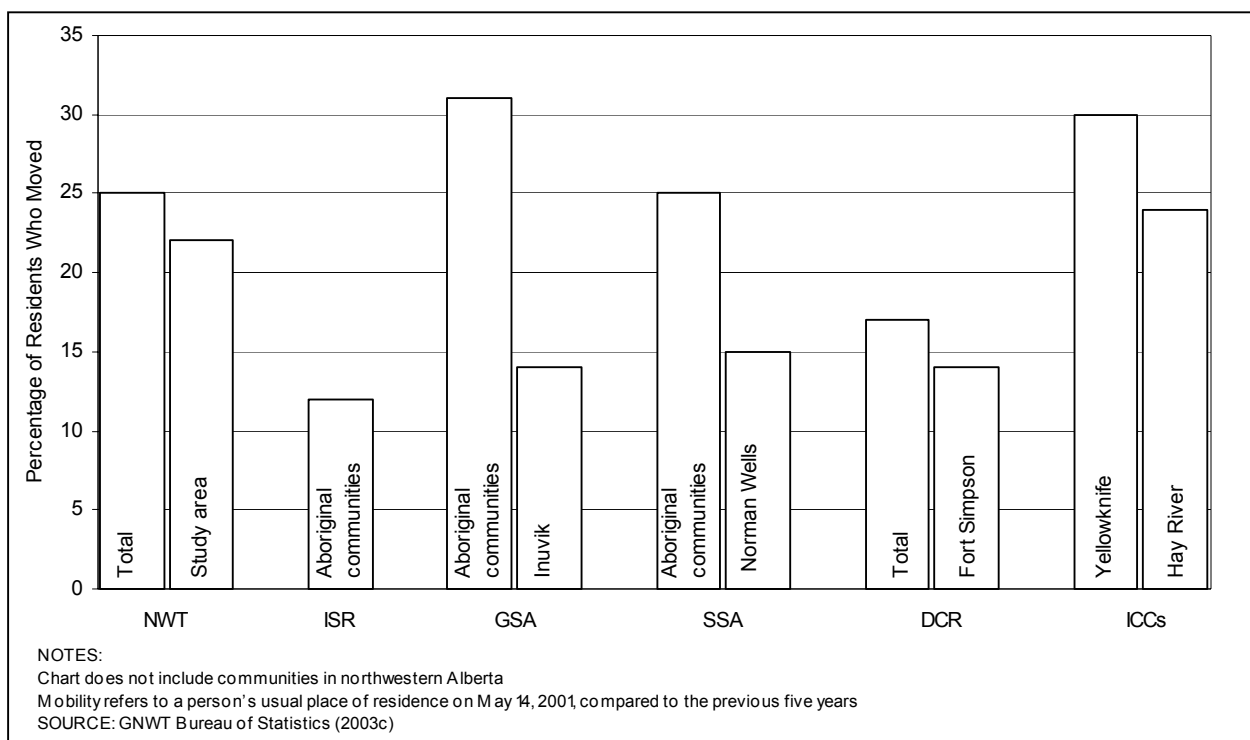
Location	2001 Census Count (Males)	2001 Census Count (Females)	2001 Census Count <sup>1</sup> (Total)	2003 Estimated Populations <sup>2</sup>
Northwest Territories	19,120	18,250	37,360	41,872
ISR total	1200	1160	2,360	2,506
GSA total	1950	1905	3,855	4,450
GSA Aboriginal communities total	485	475	960	1,015
SSA total	1220	1105	2,330	2,504
SSA Aboriginal communities total	–	–	1,660	1,707
DCR total <sup>3</sup>	1,645	1,475	3,115	3,388 <sup>a</sup>
Tuktoyaktuk	490	440	930	990
Inuvik	1,465	1,430	2,895	3,435
Norman Wells	345	320	666	797
Fort Good Hope	300	250	549	540
Tulita	242	231	473	489
Fort Simpson	610	550	1,160	1,237
Yellowknife	8,330	8,210	16,540	18,673
Hay River	1,805	1,710	3,510	3,620
DTFN total	815	755	1,570	–
High Level	1,785	1,665	3,440	–
Rainbow Lake	545	435	975	–
Zama City	80	65	145	–
NOTES: – = data not available 1 Census count figures 2 Estimated by the GNWT Bureau of Statistics from 2001 census count data 3 Does not include data for West Point Reserve Numbers might not add up because of rounding				
SOURCES: GNWT Bureau of Statistics (2003b), Statistics Canada (2001)				

Males outnumber females within the Northwest Territories and slightly outnumber females within the study area. On average, males outnumber females within all the larger and non-Aboriginal communities. If females outnumber males, it is generally within the smaller Aboriginal communities.

Because data is randomly rounded, caution must be exercised when interpreting data for very small communities, e.g., Nahanni Butte, Trout River, Jean Marie River and Kakisa.

The 2001 census mobility status data is presented in Table 3-101 and Figure 3-5 for the four settlement areas and selected communities. This data shows that the rates of total migrants in the Aboriginal communities are not small, but it is not possible to differentiate between the Aboriginal and non-Aboriginal migrants nor between males in females in these communities. Most of the Aboriginal communities have 10% or more non-Aboriginal residents. Most are GNWT or regional employees who:

- often transfer between communities, e.g., RCMP
- have rather high turnover rates, e.g., nurses
- are specialists newly arrived from the south



**Figure 3-5: Five-year Mobility Status of Residents in the Northwest Territories (2001)**

It is also true, however, that the people in many Aboriginal communities are no more than two generations removed from an on-land settlement pattern, when they did not live in fixed communities. The extent to which this affects the current elevated mobility rates is not known.

The migrant percentages for the Aboriginal communities are rather tightly clustered at 15% for the SSA, and 14% each for the GSA and DCR. The ISR rate is only 12%, likely explainable by the relative isolation of Sachs Harbour, Holman and Paulatuk and, to some extent, Tuktoyaktuk. The rates for the regional centres are much higher, ranging from 22% in Fort Simpson where only 31% of the population is non-Aboriginal, to 48% in Norman Wells where 71% is non-

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Aboriginal. The rate for Yellowknife is 30% and for Hay River 24%, which is again reflective of the larger non-Aboriginal populations. This data does not, however, inform us as to the *net* migration effect because it does not tell us how many people *out-migrated* in the same period.

**Table 3-101: Five-year Mobility<sup>1</sup> Status of Residents in the Northwest Territories Study Area (2001)**

Location	Total Migrants <sup>2</sup> (%)	Intra-territorial Migrants <sup>3</sup> (%)	Inter-provincial Migrants <sup>4</sup> (%)
Northwest Territories	25	7	19
NWT study area <sup>5</sup>	22	8	13
ISR total	12	6	5
GSA total	31	11	19
GSA Aboriginal communities total	14	7	7
SSA total	25	9	15
SSA Aboriginal communities total	15	9	7
DCR total	17	6	10
DCR, except Fort Simpson	14	5	8
Aklavik	12	7	6
Tuktoyaktuk	12	7	7
Inuvik	36	13	24
Norman Wells	48	11	37
Fort Good Hope	16	7	9
Tulita	15	9	5
Fort Simpson	22	7	15
Yellowknife	30	5	26
Hay River	24	9	16
<p>NOTES:</p> <p>Percentages for intraterritorial and interprovincial migrants might not sum to the total migrants percentages because of the census practice of randomly rounding frequencies</p> <p>1 Relationship between a person's usual place of residence on May 14, 2001 compared with the previous five years</p> <p>2 Individuals moving to a different community</p> <p>3 Individuals moving among communities in the Northwest Territories</p> <p>4 Individuals moving between provinces and territories, and international migrants</p> <p>5 Northwest Territories study area includes all communities in the ISR, GSA, SSA and DCR</p> <p>Numbers might not add up because of rounding</p>			
<p>SOURCE: GNWT Bureau of Statistics (2003d)</p>			

In common with Canada-wide and worldwide trends, birth rates in the study area are declining. Life expectancy is increasing because of falling rates of accidental deaths and improved health care. However, as the birth rate falls and the average age of the population increases, the death rate will begin to rise.

In 2002, Ellis Consulting Services projected the populations for Inuvik, Norman Wells, Hay River and Yellowknife for 2002 through 2011, extrapolating from then current birth and death rates, and using considered assumptions about the effects of oil and gas, and diamond mining demands for labour. However, much more is now known about these factors, and therefore these projections should be reviewed with caution (Ellis 2004, personal communication). The projections for 2002, 2006 and 2009, seen in Table 3-102, show that strong, continuous growth is projected for Inuvik, with a 16% increase between 2002 and 2009. Somewhat less rapid growth is projected for Yellowknife, 11%, and Hay River, 10%, during this period. Virtually no growth is expected in Norman Wells, where no more than an 11-person increase is expected between 2002 and 2009. These population projections did not differentiate between Aboriginal and non-Aboriginal populations, nor between the male and female populations for these communities.

**Table 3-102: Projections of Population Size in the Regional Centres**

Regional Centre	Projected Populations, by Year			2002–2009 Increase (%)
	2002 (No.)	2006 (No.)	2009 (No.)	
Inuvik	3,234	3,547	3,760	16
Norman Wells	732	739	743	1.5
Hay River	3,892	4,154	4,297	10
Yellowknife	18,456	19,424	20,508	11
SOURCE: Ellis Consulting Services (2002a, b, c, d)				

### 3.3.3 Assessment and Management of Project-Specific Effects – Construction

With the loosening of social controls that could accompany project-related activity, there might be some increase in out-of-wedlock births. However, with construction lasting for only four years, the number of such births will have only a marginal effect on birth rates and the female work force. Project-induced effects on death rates will also be negligible.

As only negligible project-induced effects are expected on birth and death rates in the Northwest Territories, no relevant mitigation will be required and no further attention will be given to these components of demographic change. The following discussions focus on project effects on population mobility.

Project activities will create direct, indirect and induced employment opportunities during construction. Direct employment will involve construction associated with the anchor fields, gathering system, gas processing plant, pipeline and associated facilities. The workers recruited by the project for these activities will be accommodated in construction camps.

There will also be transient specialists called to the project area to do a specific job. During construction, some will be housed in construction camps, but others

will need to be in a regional centre. These specialists will create high demand for the hotels, and this in turn will induce additional demand for hotel cleaning and kitchen staff.

The local businesses that obtain project-related contracts will create indirect employment for additional workers at a time of likely labour shortage. Indirect employees recruited or attracted from elsewhere will require housing and food services. Supplying these expanded needs will induce additional employment. There might also be some speculative in-migrants, who will themselves require housing and food services.

Some of the people in each of these categories will require the attention of the RCMP or the services of GNWT HSS.

Thus, despite application of common-practice mitigation measures targeting southerners, described in the following section, numbers of provincial migrants will be attracted to the Northwest Territories. Some will be attracted by the lure of the North. In addition, awareness that Inuvik is in the centre of extensive project-related activity in the BDR might cause some to drive up the Dempster Highway in search of employment. Some will be ill prepared for the situation in which they will then find themselves.

Speculative in-migration is more an emotional response than a considered act, and therefore its magnitude is very difficult to estimate. For this assessment, the following factors were considered:

- estimates of temporary in-migration to Inuvik related to the elevated winter 2001–2002 exploration activity
- response of the Northwest Territories labour market and the population of Yellowknife to diamond mine construction in recent years
- experience of the assessment team related to the actual effects of the Norman Wells project

These factors were used to estimate reasonable in-migration effects for the main regional activity centres of Inuvik, Norman Wells, Fort Simpson and Hay River. The quantitative basis for making projections was the existing labour force of these communities. The following assumptions were used to develop an initial proxy estimate, which was then adjusted to account for the above factors:

- the most likely scenario is that new indirect and induced labour force demands will be expressed by a subset of existing key occupations
- these key occupations were extracted from the total labour force and used as a base number

- it was assumed that between 5% and 33% of existing employees in key occupations, depending on total direct demand in the area, might move to direct project opportunities and be replaced by new in-migrants
- it was assumed that 25% of these new in-migrants will bring their families and the rest will be single
- it was assumed that new residents will form households with similar characteristics to those enumerated in the 2001 census, i.e., the number of employees per household and the average household size will be similar
- it was assumed that peak in-migration will occur in the same year as peak direct construction employment demand in each region
- it was assumed that the increase in population will be temporary and will tend to drop off somewhat to a level consistent with operations employment levels

In addition, despite application of the common-practice mitigation measures directed at Northwest Territories residents, described in the following section, some northern residents will be attracted from their outlying home communities by interest in employment opportunities. Some might be drawn by the excitement associated with the project. Numbers of Aboriginal migrants might be drawn to a study area community, near the pipeline or pipeline facilities, where they have relatives who might provide accommodations. Females, both Aboriginal and non-Aboriginal, will also be interested in direct and indirect employment resulting from the proposed project. This could cause some females with families or other responsibilities to migrate from their home communities to another or to a project site, in some cases leaving their families without proper child or other care. Information related to issues caused by female mobility is found in Section 4, Infrastructure and Community Service, and Section 5, Individual, Family and Community Wellness.

### 3.3.4 Mitigation Measures – Construction

The mitigation measures targeting potential southern in-migrants, based on common practices for influencing population movements associated with large development projects, will seek to convince the in-migrants that there will be few employment opportunities that can be accessed only in the Northwest Territories. This will involve the following procedures or actions:

- southern workers will be hired for project- and production-related positions in selected provincial cities, from contractor lists and via media advertising for positions in the Northwest Territories. Hiring in the North will be restricted to Aboriginal and other northerners, that is Northwest Territories, Nunavut and Yukon residents that meet the definition of a northern resident.

- HRSD offices will publicize this restriction. They will also provide the message that the only direct project hiring in the North will be of qualified people that have lived in the North for at least one year and have a Northwest Territories medical card.
- this message will also be publicized through television and radio news programs, and newspaper advertisements

The mitigation measures targeting potential migrants from within the Northwest Territories will emphasize that the prospects of good employment will be as good in their home communities as in the more central locations to which they might be attracted. This will involve the following actions:

- project representatives will continue to visit every community in the study area, on more than one occasion, to describe the employment opportunities available, and the terms and conditions of employment
- project or community representatives will interview interested individuals and document qualifications and interests in relevant databases. Interested parties will be able to provide new or updated information for the databases.
- project or community representatives will provide database information to project contractors
- employment procedures for northern residents will be described in English and Aboriginal language news programs, and the dates when project representatives are scheduled to visit the individual communities will be advertised in advance
- transportation to and from the point of hire on a rotational work schedule will be provided, as will accommodation at job sites
- information will be provided regarding housing availability and rental costs in communities to which Northwest Territories residents might be attracted

### **3.3.5 Assessment and Management of Project-Specific Effects – Operations**

Most employment numbers and opportunities generated by the project will end once construction, associated cleanup and site restoration activities are complete. The long-term jobs will involve operation and maintenance of the field, gathering system and pipeline facilities. This activity will be highest in the BDR, and will include system management, technician, operator and maintenance staff, and some trainees.



Currently, it is expected that many of the initial full-time operations staff and up to 50% of the operations and maintenance contractor staff will rotate from the south, but some will choose or be asked to relocate to the North.

Prediction of the demographic implications of project effects for operations differs somewhat from that for construction. While it is still in-migration that is of concerns, it is not the phenomenon of speculation but rather the more rational reaction of the labour force to stable long-term employment opportunities. It is expected that these effects will be expressed primarily in the regional operations centres of Inuvik, Norman Wells and Fort Simpson, and the ICCs of Hay River and Yellowknife. Section 3.1, Procurement, Employment and Regional Economic Effects outlines the likely extent of northern direct, indirect and induced employment opportunity, and expected participation during operations. To translate these projections into potential population effects, the following conservative assumptions were made:

- all new direct jobs for northerners will create a corresponding in-migration response, either because of northerners from outlying communities moving in to the regional centres to take this work or because these people will be leaving existing positions that in turn will need to be *backfilled* by new migrants to these locations
- about 50% of indirect and induced jobs will be filled by new migrants for similar reasons, but at a lower level because the jobs will be less skilled and more likely to be filled by the existing but expanded (because of construction experience) local labour force
- new residents will form households with similar characteristics to those enumerated in the 2001 census
- in-migration and increases in total population will transition quite rapidly from construction levels to a longer-term, stable state following construction in Norman Wells and Fort Simpson, but it will be a slower adjustment process in Inuvik because of ongoing field drilling and construction activity

The assumptions are considered conservative in population effects terms because they tend to provide for a margin of over-estimation that should enable planners to adequately account for any potential detrimental implications.

Based on these assumptions, the initial transitional population effect on the study area could be about 470 people during 2009 to 2015. This effect will stabilize during early operations and by 2021 to 2025, should reach a level of about 420 people. About 60% of this effect should occur in Inuvik and a further 30% in the ICCs during the transitional period. However, in the longer term, this distribution should change to about 50% for Inuvik and 40% for the ICCs. In each

case, only about 10% of the population effect can be expected to occur in the SSA and DCR.

The long-term, stable contribution of these levels of population effects to these economies and communities should be easily accommodated in the time frames available, and should require no mitigation and represent no residual effect during operations.

### **3.3.6 Demography – Inuvialuit Settlement Region**

In this section, the focus is on examination of project effects on demography and population mobility in the ISR, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

#### **3.3.6.1 Assessment and Management of Project-Specific Effects – Construction**

There will be many project-induced employment and business opportunities in the ISR, driven by construction activities relating to the three anchor fields, the gathering lines in the vicinity of Inuvik, and the gas and NGL pipelines running south. As a result, the highest concentration of employment opportunities for job-seeking southern and Northwest Territories migrants will be found in this area.

Yellowknife and Hay River are both much more easily accessible from the south by road. However, awareness that Inuvik is in the centre of project-induced activity in the BDR might cause some to drive up the Dempster Highway to seek employment. These southern job seekers will likely avoid the Aboriginal communities, knowing that work will be found in the larger communities. As a result, there should be little or no migration of southerners to ISR communities. The effects of in-migration on Inuvik are discussed in Section 3.3.7, Demography – Gwich'in Settlement Area.

In addition, despite application of the common-practice mitigation, some ISR migrants might be attracted from their outlying home communities by the excitement or employment opportunities associated with the project. Some might be drawn to a conveniently located community, where relatives can provide accommodation. Sachs, Harbour, Paulatuk or Holman residents might go to relatives in Tuktoyaktuk, others might go to Aklavik or Inuvik.

#### **Mitigation Measures – Construction**

The mitigation measures related to construction described in Section 3.3.4, Mitigation Measures – Construction, all apply to the ISR.

### Residual Effects – Construction

A sizeable part of project activity, e.g., anchor field development, gathering lines and extensive borrow site development and logistic activity, and the associated air of excitement will be in the ISR. Accordingly, although the ISR communities should experience no noticeable in-migration of southerners, it will not be possible to eliminate all movement of Inuvialuit to Tuktoyaktuk and Aklavik. This movement is expected to be moderate in Tuktoyaktuk. The duration of effects will be largely limited to the winter periods, roughly November through March, during construction. Table 3-103 shows that construction effects in the ISR as a whole and Aklavik are expected to be adverse and low magnitude. However, effects in Tuktoyaktuk are expected to be moderate magnitude.

**Table 3-103: Population Mobility – Construction Effects Attributes for the Inuvialuit Settlement Region**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
ISR total	Adverse	Low	Regional	Short term	No
Tuktoyaktuk	Adverse	Moderate	Regional	Short term	No
Aklavik	Adverse	Low	Regional	Short term	No

### 3.3.6.2 Assessment and Management of Project-Specific Effects – Operations

As the bulk of the operations and maintenance jobs and business opportunities created during operations will relate to field development and the Inuvik area facility, the greatest population effect is expected in Inuvik as the regional administrative, commercial and industrial centre for the BDR. As Inuvik lies within the GSA, see Section 3.3.7.2, Assessment and Management of Project-Specific Effects – Operations, for a discussion of this effect for the GSA. No operations effects are expected to occur in ISR communities (see Table 3-104).

**Table 3-104: Population Mobility – Operations Effect Attributes for the Inuvialuit Settlement Region**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
ISR total	Neutral	No effect	Regional	Long term	No

### 3.3.7 Demography – Gwich'in Settlement Area

In this section, the focus is on examination of project effects on demography and population mobility in the GSA, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

### 3.3.7.1 Assessment and Management of Project-Specific Effects – Construction

Project-induced employment and business opportunities will be greatest in the BDR, and will focus on Inuvik. The prospects of direct, indirect and induced employment opportunities, and the adventure of travelling to the North, will attract some southerners to the BDR. Some northern residents will also likely be attracted by the excitement of the project and the prospect of employment. Inuvik will be the preferred destination, particularly of those who might find accommodation there with relatives.

The information in Table 3-101, shown previously, indicates that in 2001, 24% of the Inuvik population had arrived from the provinces and 13% had come from elsewhere in the Northwest Territories during the previous five years. Some of these residents who arrived from the provinces within the previous five years might tell their relatives and friends of indirect or project-induced job opportunities, thus spurring some additional in-migration from the south. However, this does not inform us of how many people out-migrated in the same period.

Only 14% of the GSA Aboriginal populations had moved during the five years preceding 2001, including the 7% who had come from outside the Northwest Territories, most likely non-Aboriginal residents. This data further supports the judgement that Inuvik will be the destination of most population movement in the BDR.

#### Mitigation Measures – Construction

The mitigation measures related to construction described in Section 3.3.4, Mitigation Measures – Construction, all apply to the GSA.

#### Residual Effects – Construction

It will not be possible to eliminate all population movement to Inuvik. Although this growth in population could be viewed by some as disruptive and will increase the demand for some public services, it will also be viewed positively because of the potential for an increased tax base, and the new skills and capacity that it represents. Therefore, the direction of the effect is both adverse and positive.

Based on the factors and assumptions described in Section 3.3.3, Assessment and Management of Project Effects – Construction, it is estimated that the population of Inuvik could increase by a maximum of 450 people in the peak activity year of 2008. It is further estimated that 240 of these people will be single adults.

As Table 3-105 shows, the project effects are expected to induce a noticeable increase in the population of Inuvik. However, the magnitude of effects on the local populations in other GSA communities will be low. The duration of these effects will be limited to construction.

**Table 3-105: Population Mobility – Construction Effects Attributes for the Gwich'in Settlement Area**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
GSA total	Adverse	Low	Regional	Short term	No
Inuvik	Positive and adverse	High	Local	Short term	No

**3.3.7.2 Assessment and Management of Project-Specific Effects – Operations**

As the bulk of the operations and maintenance job and business opportunities created during operations will relate to field development and the Inuvik area facility, the greatest population effects also will be experienced in Inuvik as the regional administrative, commercial and industrial centre for the BDR.

As anchor field development will continue into early operations, the economic effects that could drive population migration to Inuvik will make a transition that initially includes ongoing drilling and construction to a more steady operations state. For this reason, two scenarios are presented. The first, or transitional period, is related to the labour force demands expected during 2009 to 2015, and the second is related to 2021 to 2025.

Based on these demands, detailed in Section 2, Project Expenditures and Section 3.1, Procurement, Employment and Regional Economic Effects, and the assumptions outlined in Section 3.3.5, Assessment and Management of Project-Specific Effects – Operations, it is expected that the population of Inuvik will transition from the 450-person peak construction increase to a level of about 280 people more than pre-project levels. By the time steady-state operations are reached, these increments are expected to further attenuate to about 200 persons. It is important to note that these effects do not include *normal* growth that could occur because of factors other than the project.

The long-term, stable contribution of these levels of population effects to the local economy and community should be easily accommodated in the time frames available, and should require no mitigation and represent no residual adverse effect during operations. In fact, as can be seen in Table 3-106, this long-term population is expected to have a net positive effect.

**Table 3-106: Population Mobility – Operations Effect Attributes for the Gwich'in Settlement Area**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Inuvik	Positive	Low	Local	Long term	No

### 3.3.8 Demography – Sahtu Settlement Area

In this section, the focus is on examination of project effects on demography and population mobility in the SSA, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

#### 3.3.8.1 Assessment and Management of Project-Specific Effects – Construction

There will be many project-induced employment and business opportunities in the SSA, as there will be in all the study area regions. However, interest in employment might well be driven by the closeness of project facilities and activities to Fort Good Hope and Norman Wells – both with 1,350-person camps, equipment and fuel storage, pipe stockpile, and barge-landing sites nearby, and Tulita – with equipment and fuel storage, pipe stockpile, barge-landing, and contractor staging and marshalling sites nearby. Norman Wells will have a great deal of construction activities, as well as compressor station facilities and the NGL and natural gas pipelines in this area.

The project sites and related activities in the SSA are not expected to attract substantial migration from outside or inside the Northwest Territories because the SSA communities are accessible only by air or winter road from Wrigley. However, this will be less true of migration within the SSA. Specifically, some Colville Lake and Déline residents, particularly those who earlier lived in Fort Good Hope or possibly Norman Wells, might be attracted back by employment or the excitement of the unusual activity. Again, recruiting and hiring will be available in every community.

The information on five-year mobility status shown previously in Table 3-101 shows that in 2001, 37% of the Norman Wells population had arrived from the provinces and only 11% had come from elsewhere in the Northwest Territories during the previous five years. Some of these new residents will tell their relatives and friends of project-created job opportunities, thus spurring some limited in-migration from the south. However, this does not inform us of how many people out-migrated in the same period.

The 9% of the population who were in-migrants to Fort Good Hope from outside the Northwest Territories during the five years before 2001 were likely most non-Aboriginal people. However, 7% of the movers were territorial in-migrants. The local employment opportunities might provide a basis for attracting relatives of the permanent Fort Good Hope local residents.

#### Mitigation Measures – Construction

The mitigation measures related to construction described in Section 3.3.4, Mitigation Measures – Construction, all apply to the SSA.

**Residual Effects – Construction**

A sizeable part of the project activity in the SSA will be in the vicinity of Norman Wells and Fort Good Hope. It will not be possible to eliminate all population movement and the project effects. If they occur, they are expected to be adverse. Some non-Aboriginal Norman Wells residents might advise their relatives of remunerative job opportunities, possibly offering temporary accommodation as well.

Based on the factors and assumptions described in Section 3.3.3, Assessment and Management of Project-Specific Effects – Construction, it is estimated that the population of Norman Wells could increase by a maximum of 100 people in the peak activity year of 2007. It is further estimated that 60 of these people will be single adults.

Accordingly, the project could induce a high-magnitude increase in the population of Norman Wells during construction. However, in Fort Good Hope, the effects on the local populations should be no more than moderate. The duration of these effects will be short-term and local in extent (see Table 3-107).

**Table 3-107: Population Mobility – Construction Effects Attributes for the Sahtu Settlement Area**

Location	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
SSA total	Adverse	Low	Local	Short term	No
Norman Wells	Adverse	High	Local	Short term	No
Fort Good Hope	Adverse	Moderate	Local	Short term	No

**3.3.8.2 Assessment and Management of Project-Specific Effects – Operations**

As only about 10% of the operations and maintenance jobs created during operations will relate to the activities of the Norman Wells operations centre, only a minor population increase is expected in Norman Wells as the regional administrative, commercial and industrial centre for the SSA. Regional business opportunities could also stimulate some population growth through in-migration to fill indirect and induced jobs.

Based on these demands, detailed in Section 2.0, Project Expenditures and Section 3.1, Procurement, Employment and Regional Economic Effects, and the assumptions outlined in Section 3.3.5, Assessment and Management of Project-Specific Effects – Operations, it is expected that the population of Norman Wells will transition from the 100-person peak construction increase to a level of about 40 people more than pre-project levels. It is important to note that these effects do not include normal growth that could occur because of factors other than the project.

The long-term, stable contribution of these levels of population effects to the local economy and community should be easily accommodated in the time frames available, and should require no mitigation and represent no residual adverse effect during operations. In fact, as can be seen in Table 3-108, this long-term population increase is expected to have a net positive effect.

**Table 3-108: Population Mobility – Operations Effect Attributes for the Sahtu Settlement Area**

Location	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
Norman Wells	Positive	Low	Local	Long term	No

### 3.3.9 Demography – Deh Cho Region

In this section, the focus is on examination of project effects on demography and population mobility in the DCR, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

#### 3.3.9.1 Assessment and Management of Project-Specific Effects – Construction

There will be considerable project-induced business opportunities and employment in the DCR, but on a far smaller scale than in the BDR. Moreover, alternative employment opportunities are accessible to DCR residents. As a result, there will be relatively fewer job-seeking Aboriginal people and perhaps southerners that might seek to relocate.

The project sites and related activities in the DCR are expected to attract only modest migration from outside the Northwest Territories. This might also be true of DCR Aboriginal migration. Only a few people from some of the very small outlying communities who either have relatives or lived at one time in Fort Simpson will likely be attracted back by employment or by the excitement of the project activity. Furthermore, the economic analysis for the DCR (see Section 3.1.8.1, Assessment and Management of Project-Specific Effects – Construction) suggests that the DCR could be an exporter of labour to other Northwest Territories regions during construction. This will also reduce in-migration effects.

Most of those attracted by pipeline-related activities, Aboriginal and southern job seekers alike, will be drawn to Fort Simpson because it will be the centre of activity in the DCR. There will be project activity near Wrigley, Jean Marie River and Trout Lake, but these are small Aboriginal communities with little or no accommodations. Accordingly, they will attract few, if any, speculative job seekers.

Information in Table 3-101, shown previously, indicates that in contrast to the GSA and SSA, the DCR has experienced relatively low five-year averaged in-



migration, at 17%. More than half of these people were from outside the Northwest Territories, no doubt most non-Aboriginal people working for the GNWT, or local governments or businesses.

**Mitigation Measures – Construction**

The mitigation measures related to construction described in Section 3.3.4, Mitigation Measures – Construction, all apply to the DCR.

**Residual Effects – Construction**

Such activity and associated excitement as the project will stimulate in the DCR will be in the vicinity Fort Simpson, and it might not be possible to eliminate all population movement to this community. Based on the factors and assumptions described in Section 3.3.3, Assessment and Management of Project-Specific Effects – Construction, it is estimated that the population of Fort Simpson could increase by a maximum of 140 people in the peak activity year of 2007. It is further estimated that 75 of these people will be single adults.

Table 3-109 shows that project effects are expected to have no more than a moderate effect on population size in Fort Simpson. Population effects will be essentially undetectable in other DCR communities. The duration of effects will be limited to construction.

**Table 3-109: Population Mobility – Construction Effects Attributes for the Deh Cho Region**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
DCR	Adverse	Low	Regional	Short term	No
Fort Simpson	Adverse	Moderate	Local	Short term	No
Wrigley, Jean Marie River, Trout Lake	Adverse	Low	Regional	Short term	No

**3.3.9.2 Assessment and Management of Project-Specific Effects – Operations**

None of the operations and maintenance employment positions will be located in the DCR. However, regional businesses could benefit from the long-term purchasing and contracting opportunities generated by the project, particularly for maintaining the facilities and parts of the right-of-way located in the DCR. Precise estimates of local purchasing requirements have not yet been determined, but these opportunities do represent an important long-term addition to the local economy. It is expected that these opportunities will be largely met by existing or new northern businesses, and will not be substantial enough to trigger noticeable in-migration from outside the region.

Based on the demands, detailed in Section 2.0, Project Expenditures and Section 3.1, Procurement, Employment and Regional Economic Effects, for contracted operations and maintenance work, and the assumptions outlined above in Section 3.3.5, Assessment and Management of Project-Specific Effects – Operations, it is expected that the population of Norman Wells will transition from the 140-person peak construction increase to a level of only 11 people more than pre-project levels. The result is that there will be virtually no detectable residual population effects, and therefore no mitigation is required (see Table 3-110).

**Table 3-110: Population Mobility – Operations Effect Attributes for the Sahtu Settlement Area**

Location	Effect Attribute			Duration	Significant
	Direction	Magnitude	Geographic Extent		
Fort Simpson	Neutral	No effect	Local	Long term	No

### 3.3.10 Demography – Industrial and Commercial Centres in the Northwest Territories

In this section, the focus is on examination of project effects on demography and population mobility in the ICCs in the Northwest Territories, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

#### 3.3.10.1 Assessment and Management of Project-Specific Effects – Construction

Although project-induced employment and business opportunities will be greatest in the BDR, there could be substantial increased activity in Yellowknife stimulated by the GNWT, federal government agencies, other governance activities and business growth. Hay River will likely experience substantially increased storage, stockpiling, module assembly, fabrication and shipping activity. Therefore, although diamond mine employment is readily accessible to residents of both communities, they could be expected to experience some increased in-migration.

Yellowknife might see increased numbers of both male and female government, business and possibly project personnel. The resulting service sector expansion will attract some southern job seekers and some people from Aboriginal communities in the area. An increase in project-induced positions in Hay River will lead to growth in the transportation, manufacturing and service sectors. Such opportunities, and the location of Hay River as the first community in the Northwest Territories that southern in-migrants will encounter, will cause some to remain there. Likewise, any DCR Aboriginal people, drawn by presumed project opportunities, might find Hay River attractive because of relatives and friends among the more than 40% of the population who are Aboriginal.

The 2001 census information in Table 3-101 (shown previously) indicates that both Yellowknife and Hay River have mid-range five-year average mobility rates, 30% for Yellowknife and 24% for Hay River. In both cases, over two-thirds of this mobility was from outside the Northwest Territories, no doubt by non-Aboriginal in-migrants. However, this does not inform us of how many people out-migrated in the same period.

Among these residents who arrived from the provinces within the previous five years, there will be some who will tell their relatives and friends of indirect or project-induced job opportunities, thus spurring possible in-migration from the south. However, in contrast to the diamond mining projects that provide incentives to workers who move north, the project will discourage in-migration, at least for construction when the adverse effect risk is highest.

The Aboriginal residents of Yellowknife, Hay River and the adjacent Aboriginal communities will also know of new, interesting indirect or project-induced job opportunities, and will tell their relatives living elsewhere. Project effects on the populations in both communities must thus be expected, but will likely be more pronounced in Hay River.

### Mitigation Measures – Construction

The mitigation measures related to construction described in Section 3.3.4, Mitigation Measures – Construction, all apply to the ICCs in the Northwest Territories.

### Residual Effects – Construction

Table 3-111 shows that a sizeable part of the project-induced employment at the southern end of the pipeline will be centred in Hay River, and to a lesser extent in Yellowknife. The effects in both communities, with mitigation in place, could be a noticeable increase in population during construction.

**Table 3-111: Population Mobility – Construction Effects Attributes for Industrial and Commercial Centres in the Northwest Territories**

Location	Effect Attribute				Significant
	Direction	Magnitude	Geographic Extent	Duration	
Yellowknife	Positive and adverse	Low	Local	Short term	No
Hay River	Adverse and positive	Low	Local	Short term	No

Based on the factors and assumptions described in Section 3.3.3, Assessment and Management of Project-Specific Effects – Construction, it is estimated that the population of Hay River could increase by a maximum of 125 people in the peak

activity year of 2007. It is further estimated that 65 of these people will be single adults. As in the case of Inuvik, the potential exists for this effect to be both adverse and positive in direction.

### 3.3.10.2 Assessment and Management of Project-Specific Effects – Operations

While none of the operations and maintenance employment positions will be located in the ICCs, regional businesses are likely to benefit from the long-term purchasing and contracting opportunities generated by the project.

Based on the demands, detailed in Section 2.0, Project Expenditures and Section 3.1, Procurement, Employment and Regional Economic Effects, for indirect and induced economic opportunities that could be expressed in the ICCs, and the assumptions outlined above in Section 3.3.5, Assessment and Management of Project-Specific Effects – Construction, it is expected that the populations of the ICCs will increase by about 165 people compared with pre-project levels. It is not possible to predict the distribution between Yellowknife and Hay River.

As Table 3-112 shows, the result is that there will be virtually no detectable residual population effects and therefore no mitigation is required. It is important to note that these effects do not include normal growth that could occur because of factors other than the project.

**Table 3-112: Population Mobility – Operations Effect Attributes for the Industrial and Commercial Centres in the Northwest Territories**

Location	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
ICCs	Neutral	No effect	Regional	Long term	No

### 3.3.11 Demography – Dene Tha' First Nation in Northwestern Alberta

In this section, the focus is on examination of project effects on demography and population mobility on the DTFN in northwestern Alberta, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

#### 3.3.11.1 Assessment and Management of Project-Specific Effects – Construction

Because of the relative abundance of job opportunities, facilities and services now found in northwestern Alberta, project-induced opportunities are expected to be relatively less noticeable than in other regions. Accordingly, although some DTFN people now living far from the DTFN communities might be drawn back by some increase in employment opportunities, the project is expected to have only marginal effects on the mobility of the Dene Tha'.

**3.3.11.2 Assessment and Management of Project-Specific Effects – Operations**

NGTL does not expect that operations and maintenance staff, in addition to their existing organization, will be required in northwestern Alberta as a result of the facilities being considered in this assessment. However, regional businesses could benefit from the long-term purchasing and contracting opportunities generated by the project, particularly for maintaining facilities and parts of the right-of-way located in the area. Precise estimates of local purchasing requirements have not yet been determined, but these opportunities will likely represent only a marginal addition to the local economy. It is expected that these opportunities will be met by the substantial existing regional service industry and will not be large enough to trigger in-migration from outside the region. Therefore, no mitigation should be required and there should be no residual effects during operations.

**3.3.12 Demography – Industrial and Commercial Centres in Northwestern Alberta**

In this section, the focus is on examination of project effects on demography and population mobility in the ICCs in northwestern Alberta, but the discussions on effect pathways, data, assessment of effects and mitigation are also relevant.

**3.3.12.1 Assessment and Management of Project-Specific Effects – Construction**

The project-generated opportunities in northwestern Alberta will be at quite low levels in comparison to existing economic activity. In addition, the regional economy is already very well adjusted to these types of projects. Therefore, it is not expected that construction will stimulate a noticeable effect on the populations of High Level, Rainbow Lake or Zama City (see Table 3-113).

**Table 3-113: Population Mobility – Construction Effects Attributes for Industrial and Commercial Centres in Northwestern Alberta**

Location	Effect Attribute			Significant	
	Direction	Magnitude	Geographic Extent		
High Level, Rainbow Lake and Zama City	Positive	Low	Local	Short term	No

**3.3.12.2 Assessment and Management of Project-Specific Effects – Operations**

None of the operations and maintenance employment positions will be located in northwestern Alberta. However, regional businesses could benefit from the long-term purchasing and contracting opportunities generated by the project, particularly for maintaining facilities and parts of the right-of-way located in the area. Precise estimates of local purchasing requirements have not yet been determined, but these opportunities will likely represent only a marginal addition to the local economy. It is expected that these opportunities will be met by the

substantial existing regional service industry and will not be large enough to trigger in-migration from outside the region. Thus, no mitigation should be required and there should be no residual effects during operations.

### **3.3.13 Prediction Confidence**

The inherently uncertain nature of speculative in-migration makes the construction effect predictions contained herein subject to a relatively low level of confidence. The operations effects are based on more reliable predictions of migrant response to longer-term and more stable economic conditions. The assumptions used in both cases were selected to provide planners with a high-side scenario so the error, if any, should not result in unexpected implications.