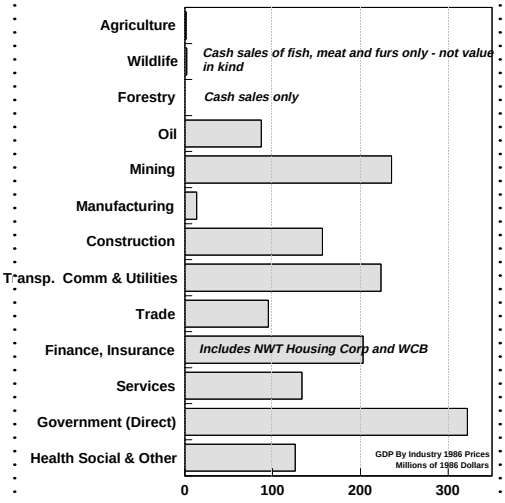
OIL AND GAS

The Oil & Gas sector has a long history in the NWT. Greater exploration and development is expected as existing world supplies diminish.

1. THE NWT PETROLEUM INDUSTRY TODAY

The Northwest Territories has extremely high oil and natural gas potential. Past exploration of the NWT has resulted in the discovery of more than 1.75 billion barrels of oil and 15 trillion cubic feet of natural gas. The oil industry consists of two components: the *upstream* or producing sector and the *downstream* or transmission, refining and marketing sector. Representatives of the upstream sector include oil and gas exploration and developing companies and associated service companies which find, drill for, and produce petroleum. The downstream is composed of pipeline systems, gas distribution utilities, petroleum refineries, oil product wholesalers, petrochemical companies, and service stations which transport, refine, and sell these commodities. Economic development of these resources would benefit all NWT residents through more jobs and business opportunities, increased infrastructure and higher government revenues which help to maintain social programs.

The lack of both pipeline and road infrastructure in the NWT is a main deterrent to development of the upstream sector. Until the completion of the Norman Wells oil pipeline, production from the Norman Wells field was



WHAT'S INSIDE

used to supply local demand. In addition to the normal geological and financial risks of oil and gas exploration, development of northern petroleum resources are also hindered by higher operating and drilling costs, environmental concerns, harsh working conditions, and a fairly new northern labour pool with limited industry experience. Other factors that influence the economics of NWT oil and gas development include: the regulatory and fiscal environment, security of land access, the distance of reserves from market, and of course, the price of the commodity.

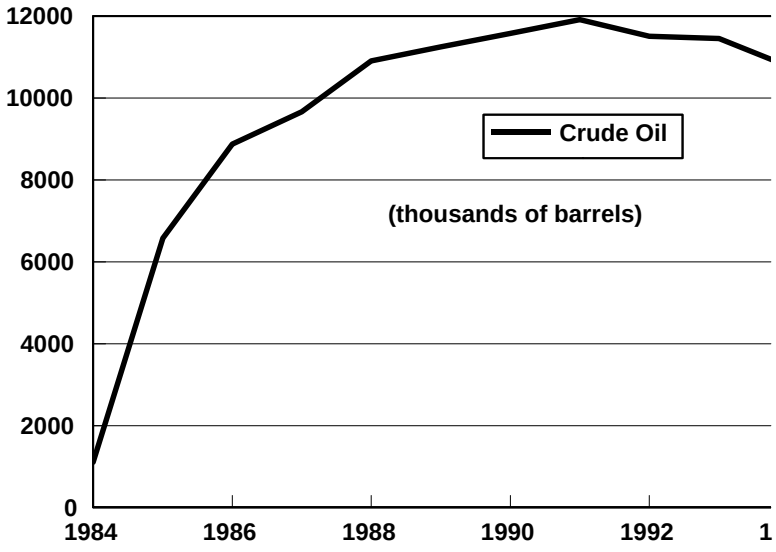
The NWT can benefit greatly from oil and gas exploration and development. A wide spectrum of direct and indirect jobs would be created for northern workers. Northern companies would benefit from increased business related to a developing oil industry. Petroleum industry contributions to the NWT economy are already significant: the value of crude oil and natural gas production was $215 million in 1995, making a contribution of approximately 10% to the NWT's Gross Domestic Product for that year.

1.1 Producing Oil and Gas Fields

In 1996, petroleum production in the Northwest Territories originated from two fields: the Norman Wells oil field operated by Imperial Oil Resources Ltd. and Amoco Canada's Pointed Mountain gas field in the Fort Liard area. PanArctic Oil's Bent Horn field in the Arctic Islands was shut down in 1996. Total revenues earned from these fields in 1995 was $215 million with $193 million coming from Norman Wells field alone. These fields provide NWT residents access to a spectrum of direct and indirect jobs as well as business opportunities for NWT companies.

Norman Wells is the fourth-largest producing oil field in Canada with estimated remaining reserves of 150 million barrels. Commercial production at Norman Wells began in the 1920's, but production then was small and for local use only. In the 1940's, Norman Wells was viewed as a strategic petroleum reserve as a

Crude Oil Production from Norman Wells, 1984-1995



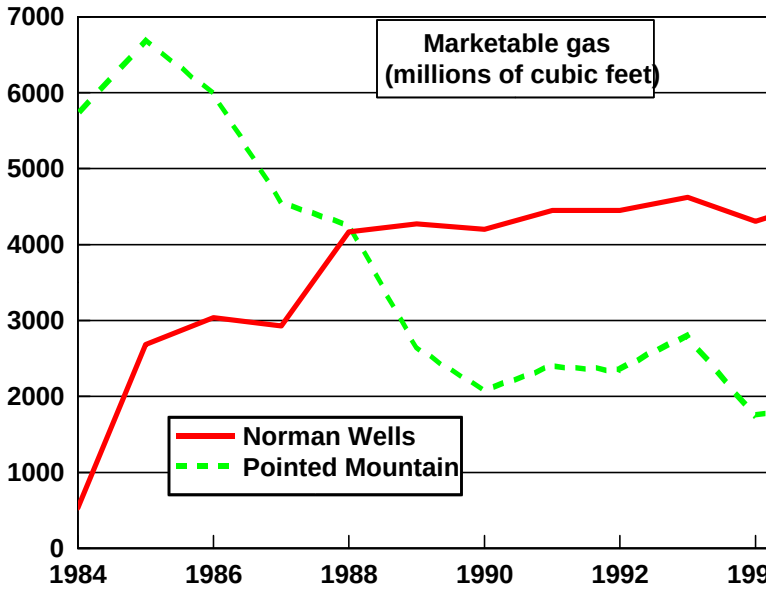
source of supply for the Pacific war effort. For a short period, the oil was shipped through the Canol pipeline to Whitehorse and then onto Skagway, Alaska. Following the war, the demand for Norman Wells oil diminished and the Canol pipeline was abandoned. In the early 1980's, Imperial Oil decided to develop the Norman Wells field to full capacity. Interprovincial Pipeline Ltd. agreed to build and operate the pipeline from Norman Wells to Zama, Alberta. In 1985, the first barrel of oil was shipped down the Norman Wells pipeline and into the major oil transmission lines of southern Canada. Today, Norman Wells produces approximately 30 000 barrels per day with production expected to continue, on a declining basis, until 2020.

The Federal Government currently holds a 1/3 net profit interest in the Norman Wells field, as well as collecting a 5% royalty on the 2/3 of gross revenues that accrue to Imperial. This arrangement netted the federal government approximately $88 million dollars in 1996, not including corporate and personal income tax.

Pointed Mountain is a natural gas discovery made by Amoco Canada in 1972, northwest of Fort Liard. In 1995, cumulative production from the field reached 300 billion cubic feet. Yearly production from the field is in decline, with economic reserves a few years away from being depleted. The gas is transported to market through Westcoast Energy's pipeline system.

The Bent Horn oil development in the Arctic Islands did produce approximately 350 000 barrels a year from a single producing well on Little Cornwallis Island. The production was stored in on-site storage tanks until loaded into a double-hulled oil tanker for summer transport to Montreal. Production of arctic island crude oil is restricted to these seasonal tanker shipments, thereby limiting the economic oil potential of the region.

Figure 1: Petroleum Production from Norman Wells and Pointed Mountain, 1984-95



2. Global and National Trends

The oil industry is the most globally integrated industry in the world. Oil and natural gas production from the NWT must compete with production from virtually around the world. There are many factors that determine the competitiveness of NWT petroleum: geology; distance to markets; fiscal regime; regulatory regime; and pipeline transportation infrastructure. The geology of the NWT has demonstrated high oil and gas potential and the fiscal and regulatory regimes are extremely competitive with other jurisdictions. The main negative factors affecting NWT competitiveness in oil and gas production are the distance to markets and the lack of viable and abundant transportation infrastructure.

There are over 500 exploration and production companies in Canada. There are also hundreds of associated businesses including engineering firms, seismic and drilling companies, service rig operators, as well as many other technical, scientific, service and supply companies. In 1995, approximately 166 000 Canadians were directly employed by the industry and an additional 29 000 indirect jobs are estimated. Besides being an important employer in Canada, the oil industry provides Canada with an abundance of energy reserves that allow Canada to be a significant net exporter of oil and gas, mostly to the United States. In 1995, the energy trade balance for the upstream sector was over $12 billion accounting for a large proportion of Canada's total trade balance of over $29 billion. Canadian exports of crude oil totalled $9 billion in 1995, while natural gas exports were worth $5.5 billion. A total of $12.7 billion dollars was spent on oil and gas exploration and development in 1995.

On a global basis, Canada is one of the larger non-OPEC oil producers. In 1997, Canada's production of crude oil and equivalent is estimated at 2.54 million bd; seventh after: the United States (8.41), the Former Soviet Union (7.30), Mexico (3.49), Norway (3.39), United Kingdom (3.17), and China (3.13). Total world oil production is about 75 million bd, of which OPEC countries produce close to 27 million bd. Conventional light crude oil production in Alberta has been in decline in recent years, but this has been offset by increased non-conventional oil sands production and conventional heavy crude. Considering this, and as long as world-wide demand for oil continues increasing at the annual rate of some 3.4%, as in 1996, Canadian oil companies will seek out conventional light crude oil reserves. To do so, as in the past, companies will begin to look beyond the mature plays of Alberta and into the untapped potential of the NWT. With the international oil price remaining strong and exploration once again taking off, the NWT may be on the verge of another upswing in petroleum activity.

While Canada's natural gas industry has been challenged by depressed gas prices at the field, the growth in gas production and especially in exports has been extraordinary. Gas exports have risen from less than 50 billion cubic metres in 1991 to over 80 billion cubic metres in 1996: a growth rate of close to 15% per year, and exports continue to expand as more pipeline capacity is installed. The production and exports of natural gas liquids has also increased rapidly.

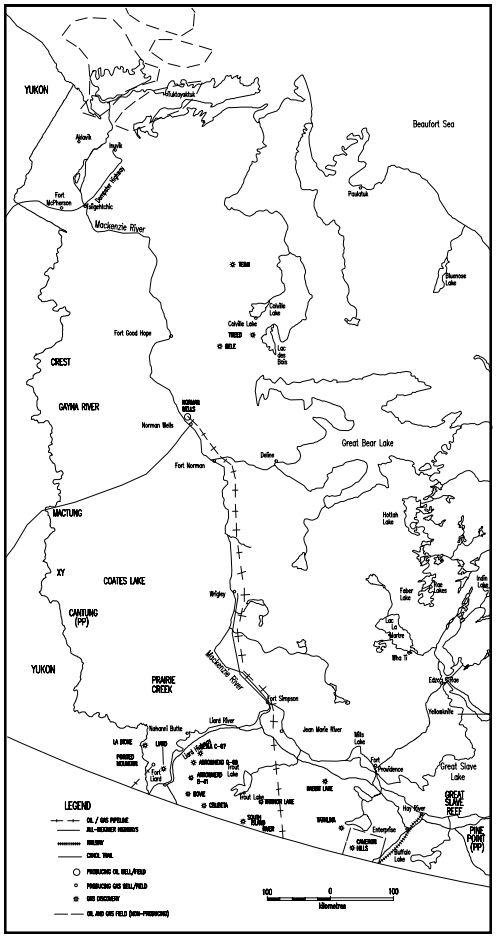
Overall, the Canadian petroleum industry has been extremely buoyant during the past ten years. Its recent growth stems in large part from its exports of crude oil and natural gas to the United States. Notably, the US production of crude oil has been in significant decline for a number of years. Meanwhile, US demand for oil has continued to increase (+2.6% in 1996). The prospects for the Canadian industry remain excellent. It is time for the NWT to participate more in this growth.

3. Ingredients for Success

3.1 Introduction

Petroleum development in the the NWT is still in its relative infancy, but it is on the verge of an exploration boom. One positive aspect regarding the NWT petroleum industry is the high geolocical potential of the area. Given that the area is also relatively unexplored, companies see the NWT containing larger fields than what is currently being discovered in the mature basins of Alberta and B.C.. The lack of both pipeline and road infrastructure in the NWT are main deterrents to development of NWT petroleum.

NWT Petroleum Resources



3.2 Natural Resources

The Northwest Territories has extremely high oil and natural gas potential. Past exploration of the NWT has resulted in the discovery of over 1.75 billion barrels of oil and 15 trillion cubic feet of natural gas. The estimated total recoverable oil and gas reserves in the NWT are much larger. The petroleum-bearing areas of the NWT are located in, but are not restricted to, the western NWT stretching from the Deh Cho to the Mackenzie Delta / Beaufort Sea. The lack of pipeline infrastructure results in the need for larger discoveries as exploration moves north in the NWT. This is demonstrated by the abundance of discovered reserves in the Mackenzie Delta that are still not as economic as small pools in Alberta.

From 1977 to 1994, a moratorium on the issuance of exploration rights for oil and natural gas was in place in the Mackenzie Valley and southern NWT. This moratorium was, in part, a response to the recommendation of the Berger Commission that no more oil and gas exploration be pursued until outstanding land claims had been settled. Exploration licences issued before the imposition of the moratorium were still honoured and resulted in several significant discoveries being made in this area in the late 1970's and the 1980's. However, the lack of ongoing exploration for so many years has severely reduced the prospects for developing any discoveries; it has also limited the knowledge of petroleum geology in the NWT when compared to northern British Columbia and Alberta.

While DIAND has stated that it will not open lands for bidding in areas where the aboriginal peoples do not wish it, the moratorium was lifted in 1994. Oil and gas exploration rights for Crown subsurface lands are now offered annually by DIAND, under CPRA legislation. Nominations and rights issuances have taken place in the Inuvialuit, Gwich'in, and Sahtu regions. These regions have settled land claims. Rights have also been issued in the Fort Liard area of the Deh Cho, following a request by

Fort Liard Band Council, in their effort to encourage economic development and job creation. Further rights nominations and issuances in the Deh Cho region will depend on affirmation by the local Band Councils.

3.2.1 The Southern Mackenzie Valley: Deh Cho

Fort Liard has allowed two rounds of nomination and bidding for exploration licences in their area of the Deh Cho: one in 1994 and another in 1995. The 1994 bidding process awarded eight exploration licences covering a total of 149,817 hectares. The winning companies in 1994 proposed to spend $22.68 million over the seven-year term of the exploration licence. In 1995, exploration licences were issued for six more parcels in the Fort Liard area. These licences covered 145,257 million hectares with companies committed to spening $20.32 million exploration dollars. Fort Liard decided against opening lands for a 1996 round of nominations and bids.

As a result of the increased exploration in Fort Liard, three exploratory wells are to be drilled on the exploration licences held by Ranger Oil Ltd., Unocal, and Paramount Resources. Positive results from these drilling programs may create an exploration surge in the area. This could encourage the Deh Cho First Nations and the Government of Canada to settle the outstanding land claim in order to allow Deh Cho residents and businesses to benefit from the increased opportunities that petroleum activity would present.

Exploration programs in the 1960's and 1970's resulted in 20 significant oil and gas discoveries in the Deh Cho region. As mentioned above, Pointed Mountain is the only operating field in the region, but the other 19 Significant Discovery Licences (SDL's) span across the southern Deh Cho from Fort Liard in the west to Cameron Hills in the east. Information on six of these SDL's is still confidential, but the other 13 SDL's are estimated to contain 167 billion cubic feet of natural gas. To date, no concrete proposals have been announced to develop any of these discoveries, but this could change depending on the success of the current drilling programs near Fort Liard.

In comparison with northern Alberta and British Columbia, the Deh Cho is still relatively unexplored. There have only been 800 exploratory wells drilled in the Deh Cho, which is much less than the thousands of wells drilled just south of the 60th parallel. Since most of the oil and gas plays of northern Alberta and B.C. span across the border into the NWT, the Deh Cho region is estimated to have very high oil and gas potential. In June, 1996, the National Energy Board released a resource assessment of the natural gas potential of the southern NWT. The study estimates that the Deh Cho contains over 6 trillion cubic feet of undiscovered natural gas. These results highlight the tremendous economic potential of natural gas development for the NWT. The Deh Cho is also well positioned in terms of pipeline infrastructure because of the strong competitive situation that exists between the two major pipeline companies, Nova and Westcoast. As discoveries are made, these companies will compete for the throughput, to the benefit of natural gas development in the area.

The oil potential of the Deh Cho has not been studied as in-depth as natural gas, but significant oil resources have been discovered in the Cameron Hills area. In 1993, Paramount Resources completed a three-well, extended production test and a three-dimensional seismic program. Paramount currently holds a Production Licence in the area, but full production is not possible until pipeline infrastructure is constructed.

Although exploration activity is bound to be influenced by external factors such as the price of natural gas and oil, and the availability of transportation systems, if the Deh Cho region were fully open for business, there could be renewed exploration activity similar to that in northern Alberta and B.C.

3.2.2 The Central Mackenzie Valley: The Sahtu and Gwich'in Regions

The central Mackenzie Valley, is a relatively unexplored area with high oil and natural gas potential. To date, only 400 exploration wells have been drilled in the region, with one significant oil discovery at Norman Wells, and three significant natural gas discoveries in the Colville Lake area. This lack of economic success does not adequately represent the potential for this area as a majority of the wells drilled were part of the Norman Wells exploration and delineation program of the 1970's and 1980's. Given the size of the land area and the low amount of exploratory wells drilled, the central Mackenzie Valley region must be considered a highly prospective area for petroleum development, especially oil development.

Since lifting the moratorium in 1994, the central Mackenzie Valley has seen increasing interest from the oil industry. In 1994, five parcels were nominated for bidding, but only two of these parcels received bids meeting the minimum bid requirement of $1 million in proposed exploration work. In 1995, five parcels were again nominated. All of these received sufficient bids to allow the awarding of exploration licences. Some of these exploration licences partially cover Sahtu and Gwich'in surface rights lands.

Of the seven outstanding exploration licences in the area, Exploration Licence 375 (Murphy Oil Ltd.) is the only parcel where an exploratory well will be drilled in the winter of 1996/97. Seismic and other pre-drilling research is being carried out on the other parcels: no drilling plans have been announced.

On May 1, 1997, the 1996 Call for Bids will be closed. The winners of the 11 nominated parcels will be granted exploration licences. Parcel 1 is located in the Gwich'in area, covering Gwich'in surface lands and located close to the three existing exploration licences in the area. Parcel 2 is northeast of Colville Lake on crown surface lands. Parcels 4, 5 and 6 are large, connected parcels, located south of the Smith Arm of the Great Bear Lake. These parcels are partially over areas of Sahtu surface lands. The remaining 6 parcels (3, 7, 8, 9, 10, and 11) are located in the Norman Wells and Fort Norman areas, close to existing exploration licences and the Norman Wells pipeline. These parcels are at least partially on Sahtu surface lands.

With the Norman Wells oil pipeline operating at 60% capacity, there is an immediately available capacity for about 25,000 barrels per day of oil production. If a discovery were close to the pipeline, the cost would be minimal compared to the price of the oil, and the prospects for development would be comparable to a discovery in northern Alberta. The economics would depend mostly on the field's development and production costs. In the future, as the Norman Wells production declines, more capacity will become available.

If exploration were successful and the Norman Wells line were filled to capacity, additional capacity would be required. For this to occur, there would have to be sufficient discovered economic reserves to support the additional pipeline capacity over the long term. An optimistic scenario might include a larger than 12 inch diameter loop that would provide adequate capacity for large scale development of the region, plus the Mackenzie Delta, and even the Beaufort Sea (e.g. the Amauligak oil field).

Besides the oil field at Norman Wells, there are three significant natural gas discoveries in the Colville Lake area, all held under significant discovery licences. These discoveries were made in the 1970's and 1980's on exploration rights issued before the moratorium and contain estimated reserves of 450 billion cubic feet. Despite the size of these discoveries, they are still not large enough to be economically produced given the distance to market and the lack of pipeline infrastructure. If in the foreseeable future the price of natural gas rises

dramatically, or there are more significant gas discoveries made in the area, or a gas pipeline to the Mackenzie Delta is constructed, then the Colville Hills discoveries may become economic to produce.

3.2.3 The Mackenzie Delta and Beaufort Sea: The Inuvialuit Region

Since the last exploration well was drilled in 1992, there has been little or no exploration activity in the Mackenzie Delta and Beaufort Sea. The main reason for this lack of activity is the distance to market and the lack of a viable pipeline transportation system.

Future exploration may be on the horizon with the recent issuance of two exploration licences (EL 384 and EL 385) to a Husky Oil-Gulf Oil joint venture. These companies received the licences in exchange for the surrender of 21 former exploration licences in the Cape Bathurst region. The former permits were issued on land for which the Inuvialuit received subsurface title in their land claim settlement. These new exploration licences are for nine years, with the last four years contingent on the company drilling an exploratory well in the first five years. The companies have indicated that they will not be conducting any new on-site exploration activity for two years, in order to evaluate existing seismic data for the area.

Past exploration of the area has demonstrated the vast oil and natural gas potential as 250 exploratory wells have resulted in 62 Significant Discovery Licences. These discoveries represent an estimated oil reserve of about 1.5 billion barrels and estimated natural gas reserve of 12 trillion cubic feet. However, much of this oil is inaccessible, for example in the deeper waters of the Beaufort Sea, or is in reservoirs of poor quality. The Minerals, Oil and Gas Division of RWED is in the process of completing an in-depth analysis of the economics of developing the more promising oil discoveries in the region. The preliminary analysis shows that if several of the existing Delta onshore discoveries (5 or 6) could be developed and produced within a few years of each other, their economics would be very close to supporting a 12 inch diameter extension of the Norman Wells pipeline to the Delta. One additional onshore discovery of about 100 million barrels recoverable would tip the balance. The economics could also be positive if it were feasible to develop and produce the offshore Amauligak field, bringing its production to shore through a trenched pipeline, either somewhat after or before the group of smaller onshore fields. In these scenarios, the oil production would use up the excess capacity of the existing Norman Wells pipeline. This would, of course, be of significant benefit to the Norman Wells field operator, Imperial Oil.

The situation, however, is catch-twenty-two: the smaller scale development of existing onshore reserves, that could most benefit from the excess capacity on the Norman Wells pipeline, would yield only marginal returns to the respective investors. In today's economic circumstances, including international oil prices, the returns would not be sufficient to cover the risks; on the other hand, there are not enough discovered reserves onshore for the construction of a large-diameter pipeline from the Delta to Zama, Alberta. However, full-scale development of Mackenzie Delta/Beaufort Sea oil will therefore require new discoveries in the central Mackenzie Valley or in the Delta region, in order to provide the threshold economies of scale required to fund a full, large-diameter pipeline extension..

The economics for supporting the extension of the oil pipeline system to the Delta rest on either:

- one or more of additional onshore discoveries adding up to about 100 million barrels, with the throughput taking advantage of the existing and future excess capacity on the Norman Wells pipeline;

- or on a significant large scale discovery, in the order of 500 million barrels, onshore or in the shallow waters of the Beaufort Sea, that would support a large diameter pipeline and looping of the Norman Wells line.

About 18 months ago two proposals for development of the Amauligak oil field, 65 kilometres offshore from Tuktoyaktuk, were being promoted. One was seasonal and the other year-round, but both would use ice-breaking tankers to shuttle oil to the Bering Straight. Recently, however, Amoco has announced that it wishes to sell all the offshore equipment of Canadian Marine Drilling, and Gulf has said that it wants to sell the Moliqpak drilling structure. The sale and removal of this offshore infrastructure reduces the prospects for early development of offshore oil reserves.

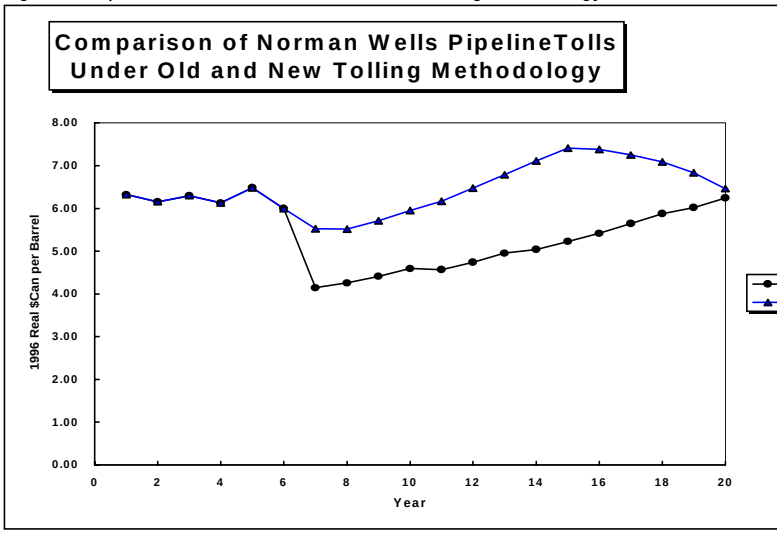
Development of the abundant natural gas resources is still considered quite far into the future. Large reserves and insufficient export capacity in southern Canada has led to an over-supply problem in Alberta and B.C., with field-gate prices being lower than those found in other competitive basins of North America. The markets for Canadian export gas have been expanding rapidly, and if the many new export pipeline projects come online, the markets will expand further. Eventually the over-supply situation in the provinces will be eliminated. Only then, as gas prices in Alberta increase, will the economics of Delta gas improve.

The Ikhil project to supply Inuvik with natural gas is presently under consideration. The project is being initiated by the Inuvialuit Petroleum Corporation in order to provide Inuvik with a less expensive energy source than diesel oil. They are in the process of drilling a test well to determine the reserves available from the Ikhil discovery. Depending on the results, IPC will decide if it will proceed with the project.

3.3 Human Resource Development

The emerging NWT oil and gas industry can give a boost to NWT labour and businesses. In order to capture the full economic benefit of development, training programs have been developed to help NWT residents prepare for careers in the oil and gas industry. The exploration programs currently under way in the

Fig. 1: Comparison of Tolls under Old and New Tolling Methodology



NWT provide hundreds of person-years of employment and increased activity could create thousands of person-years.

Employment opportunities in the NWT oil and gas industry can be delineated along the field development timeline, from the initial slashing of shrub and trees for seismic lines, to the seismic program, to the drilling of an exploratory well and subsequent development wells, and the start of production. This process can take a number of years with signifcant person years of employment for NWT residents. There would also be job opportunities with pipeline companies in building pipeline laterals to new discoveries and the expansion of existing transmission pipelines for exporting petroleum from the NWT. As an example, the Norman Wells pipeline employed approximately 800 people over the three-year construction phase.

Employment at Norman Wells consists of 69 permanent employees, of which 23% are aboriginal northerners, 12% are non-aboriginal northerners, and 65% are southerners. Almost all employees now live in the Norman Wells area or surrounding Sahtu communities as Imperial has moved away from the fly-in, fly-out operations of the past. This has benefitted the Sahtu communities and businesses by maintaining high paying permanent jobs in the area. In 1990, Imperial established a Northern Development Training Program to provide on-the-job-training for aboriginal residents in Sahtu communities. Imperial employs graduates from the program in the place of southern workers, whenever possible. A six-week summer work experience program provides summer employment for grade 11 and 12 students from the Sahtu.

The opportunity for NWT businesses from oil and gas development is extremely positive. Oil companies require many broad and specialized services for their oil exploration and production operations. The increased activity will provide opportunities to existing NWT business and help foster the creation of new and diverse businesses, creating significant new employment and income.

3.4 Capital & Investment

As stated earlier, the petroleum industry spent $12.7 billion on oil and gas explotration and development in Canada in 1995. In the NWT, the lifting of the moratorium and the subsequent issuance of exploration rights will produce a dramatic increase in exploration spending over the next 5 years. The nature of the bid process is such that the awarding of an exploration licence goes to the company that proposes to spend the most on exploring the particular parcel, the minimum amount to be spent on each exploration licence is therefore known. Proposed exploration expenditures on the 14 exploration licences awarded in the Fort Liard region total $20.32 million. Most of the expenditures per parcel will cover extensive seismic work and do not neccessarily include the costs to drill an exploration well. Therefore, promising seismic results will most likely result in drilling programs being initiated, resulting in increased spending in the region above the amount put forth in the bids.

In the Central Mackenzie Valley, the proposed spending on exploration on the seven outstanding exploration parcels from the last two rounds of bids totals $13.7 million. With the 1996 Call for Bids having 11 parcels avaiable for exploration licences, the expenditures estimate for the Central Mackenzie Valley should be significantly higher.

The Norman Wells field has also seen increased capital investment over the last two years, as Imperial began a delineation drilling program to increase the production from the field.

3.5 Infrastrucutre

3.5.1 Transportation of Natural Gas

Existing Infrastructure

Natural gas from the Pointed Mountain field near Fort Liard is transported by a pipeline extension from the Westcoast system. The gas is processed in Fort Saint John and then shipped to southern markets. This pipeline extension is estimated to be operating at about 20% of throughput capacity, leaving an abundance of spare capacity for new developments. The markets for this gas are B.C., the northwest United States, and California.

Future Developments

With the northern end of the Nova pipeline system extending to just south of the 60th parallel and looking to expand, a competition between Westcoast and Nova for southern Mackenzie Valley gas is developing. Since Westcoast has existing infrastructure in the Fort Liard area, they have the advantage in capturing any new discoveries in the south western NWT, especially west of the Liard River. Nova is well-positioned to capture new gas from the Cameron Hills area. The Trout Lake area just north of the Alberta-B.C. border will be where both systems will most likely compete for reserves. This area has the highest expected gas potential.

Both Nova and Westcoast possess shipping advantages and disadvantages for NWT gas. In terms of regulatory efficiency, the fact that NWT gas shipped by Westcoast would make it subject to only one regulatory authority (NEB) and lessens the regulatory complexity. For Nova, the system within Alberta is regulated by the AEUB, while export systems are regulated by the NEB. NWT gas shipped to Nova would be initially under NEB jurisdiction. Once in Alberta, the AEUB would have jurisdiction, and then once the gas enters an export pipeline, the NEB would regain jurisdiction. This shifting regulatory jurisdiction, if not coordinated between the two authorities, could be a burden to NWT gas shipped in the Nova system.

Although the regulatory environment is complex for the Nova system, the existing Nova postage stamp tolls are lower than Westcoast tolls. The system through Alberta also provides for easier access to a multitude of export markets. Even with a two-zone tolling methodology, Nova could probably still provide lower tolls for NWT gas than Westcoast.

The recent deregulation of natural gas prices, more flexible pipeline regulations, and the increased requirement for gas transmission as markets have expanded, has brought about upheaval and restructuring of the pipeline industry, and it is not over yet. With Westcoast and Nova competing with each other and new pipelines being proposed, NWT gas has become strategically important to both companies. By expanding into the NWT, both companies seek to offset any declines of throughput from southern reserves, or declines from new competing pipelines. These companies would also be well positioned for future expansion to capture any new gas from development in the Mackenzie Delta / Beaufort Sea area.

3.5.2 Transportation of Oil

Existing Infrastructure

The Norman Wells oil pipeline from Norman Wells to Zama, Alberta is the only oil pipeline currently operating in the NWT. The 12-inch diameter pipeline transports all production from the Norman Wells field and is currently operating at 60% capacity. The pipeline is owned and operated by IPL (NW) and the oil field is owned and operated by Imperial Oil.

On October 30, 1995, the GNWT launched a complaint against IPL (NW), before the NEB, that the Norman Wells tolls were unreasonably high. The toll methodology was extremely inflexible and caused the tolls to be exces-

sively high in comparison with the tolls charged on comparable southern pipelines. Through the process of a Settlement Conference, a full-fledged NEB hearing into the tolls was avoided and a new tolling methodology has been agreed upon by all parties. The signing of the final agreement will occur upon approval by IPL's and Imperial's Boards of Directors. The new agreement will lower the tolls by approximately 35%, and will also lead to a more flexible tolling structure. These lower tolls improve the economics of NWT oil development. The negotiations have provided the foundation for the development of a new working relationship between the GNWT and the companies involved, with the commitment of all parties to participate in a NWT oil and gas working group.

Future Developments

The Norman Wells pipeline provides immediate transportation infrastructure for NWT oil, but there are other transportation options for oil found in the southern Mackenzie Valley. Regional liquids lines expanding from Alberta may connect to southern NWT oil. This would provide competition for the Norman Wells pipeline, for transmission north of Zama. Oil discoveries in the central Mackenzie Valley and further north may make use of the existing excess capacity in the Norman Wells pipeline, of some 25,000 barrels per day.

3.5.3 Road Infrastructure

Petroleum resource development in the NWT will create the need for more road infrastructure to benefit further exploration and development. An example would be the extension of the Mackenzie Valley highway to Norman Wells, to facilitate the movement of capital into the region. The highway could be extended further down the valley in response to successful exploration in these regions and the need for an extension of the Norman Wells pipeline. The investment in such strategic infrastructure will help reduce the costs of further development and create an even more positive investment climate for the petroleum industry, due to savings on logistical costs and easier access to resources.

3.6 Markets and Sales

All petroleum production in the NWT would be open to the markets currently served by Alberta and B.C. production. These include Canada as far east as Quebec, the northeastern, midwestern and western United States. Even though NWT oil and gas is currently considered to be far from markets, those markets are the largest energy consuming markets in the world.

3.7 Regulations and Taxation

Regulation of NWT oil and natural gas is shared between the federal Department of Indian Affairs and Northern Development (DIAND) and the National Energy Board (NEB). DIAND has jurisdiction over the rights issuance process and the royalty regime. The engineering integrity and safety of oil and gas operations, from exploration to development and production, are regulated by the NEB.

The Federal Government introduced the Canada Petroleum Resources Act (CPRA) in 1987, pertaining to oil and gas rights management on Crown land. The Frontier Lands Petroleum Royalty Regulations are pursuant to this Act and were introduced in December 1991. They detail the royalty regime that is to be applied to oil and gas production in all lands in Canada still under federal jurisdiction. Essentially, today this means the NWT.

Regulations for oil and gas activity and field practices are pursuant to the Canada Oil and Gas Operations Act and the National Energy Board Act. The regulation of the two main pipelines in the NWT, since they cross over the border to British Columbia and Alberta, is also under the jurisdiction of the NEB. A small propane pipeline system in Hay River is regulated by the NWT PUB.

3.7.1 Petroleum Rights Management

The issuance of petroleum rights to Crown lands in the NWT is controlled by the Northern Oil and Gas Directorate of DIAND. Exploration rights issuance is a two-stage process. First, DIAND initiates a Call for Nominations.

During this phase, interested companies nominate parcels of NWT land that they believe have oil and gas potential. Once the Call for Nominations close, DIAND offers the nominated parcels in a Call for Bids. Any company is then free to bid for the exploration rights to the parcels. The Act stipulates that the Call for Bids must contain a sole criterion for assessing bids. The actual criterion is established by the Minister. For example it may be cash bonus or work bonus. Thus far, DIAND has set the criterion as the maximum amount that is proposed to be spent on exploration (i.e., a work bonus). The Act limits the maximum length of an exploration licence to nine years. DIAND's policy has been to provide slightly longer term licences in the more northerly regions. Typically, licences have been seven years in the Deh Cho region; eight years in the Sahtu; and nine years in the Gwich'in and Inuvialuit regions. DIAND has otherwise, however, included similar conditions in all exploration licences. One condition has been the requirement for companies to drill at least one exploratory well in the first four (Deh Cho and Sahtu) or five (Gwich'in and Inuvialuit) years, in order to retain the exploration licence for the remaining years. There has also been a minimum work-bid requirement of $1 million. In the event of a discovery, the conditions set for the exploration licence carry forward to ensuing licences, and hopefully to a production licence.

When a discovery is made, the company must apply for it to be recognized and declared as a Significant Discovery Area (SDA) by the NEB. The company can then apply to DIAND for a Significant Discovery Licence (SDL). The SDL's that have been issued by DIAND allow the licencee company to hold the area and the rights to its potential production, in perpetuity. There are currently 116 outstanding SDL's in the NWT. When deciding to produce a discovery, companies must apply for a Production Licence.

3.7.2 Frontier Lands Royalty Regime

The Frontier Lands Petroleum Royalty Regulations were designed to be competitive with other royalty regimes in Canada and, specifically, to be responsive to the profitability of each individual oil or gas development in the North. The structure of the regime calls for an initial graduated royalty rate, starting at 1% of gross revenues from a field, and culminating at 5% of gross revenues. The rate is increased by 1% for every 18 months of production, or until project pay out has been reached. After pay out, the royalty is the greater of 5% of gross revenues or 30% of net revenues.

The frontier royalty regime is geared to the profitability of an oil or gas field. This is notably different from the existing provincial royalty regimes for conventional production. Generally, they assess a royalty which is a percentage of gross revenues, with only limited recognition for the profitability of the field. By not taking profitability into account, marginal pools that would be economic before paying the royalty may become uneconomic after the royalty. For frontier lands, since the royalty is closely related to the profitability of a field, economically marginal oil and gas pools are more likely to be developed. This is a competitive advantage for oil and gas activity in the NWT compared with other producing provinces in Canada.

4. Conclusions

Oil products and natural gas will continue to be in growing demand in North America, both for energy and for petroleum-based products. Southern Alberta is becoming increasingly depleted of conventional oil and gas. Exploration has moved steadily northward in the last two decades. In the future, investment in oil and gas exploration in the NWT should yield high returns for companies. It should also provide significant employment benefits through exploration and development phases.

The development of the vast and valuable petroleum resources will greatly benefit the NWT economy and may eventually provide for the NWT to be economically self-sufficient. The building of new infrastructure directly resulting from resource development will benefit both further resource development and diversification of the NWT economy.

The petroleum industry is showing increasing interest in oil and gas exploration in the NWT. Exploration is increasing and four new exploratory wells will be drilled in the winter of 1996/97. As exploration continues and new discoveries are made, more infrastructure will follow, which will create an even more positive environment for economic discoveries. The resolution of key land claims has allowed for exploration once again and has put the NWT on the verge of a new era of oil and gas development.

The domestic use of NWT petroleum resources, in the NWT, could also contribute to the economic viability of activities such as mining. It could likewise lessen the high costs of energy used in the scattered communities of the NWT. Currently, the lack of infrastructure and small centres of demand make such use generally uneconomic. The Ikhil project, for serving the town of Inuvik with natural gas may hopefully be the first exception. The increase of mining developments and growing populations may also make the economics of domestic petroleum projects more feasible.