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# Northern Oil and Gas Annual Report 1998

The management of oil and gas resources North of 60<sup>0</sup> N. latitude in the Northwest Territories is a federal responsibility. This responsibility is carried out by the Northern Oil and Gas Directorate of the Department of Indian Affairs and Northern Development.

Petroleum resource management on Crown lands north of 60<sup>0</sup>N. latitude is exercised under two federal statutes: the *Canada Petroleum Resources Act* (CPRA) and the *Canada Oil and Gas Operations Act* (COGOA). The CPRA governs the allocation of Crown lands to the private sector, tenure to the allocated rights, and the setting and collection of royalties. It is administered by the Minister of Indian Affairs and Northern Development. The COGOA regulates the industrial activities with respect to resource conservation, environmental protection and safety of workers. It is administered by the National Energy Board.

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Honourable Jane Stewart, P.C., M.P.  
Minister of Indian Affairs and  
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## Minister's Message

Achievements in the oil and gas industry are not marked by talk, but by results. I am pleased to note several significant achievements made by government, Northern Aboriginal groups and the private sector which are contained in this year's report.

In the Northwest Territories (N.W.T.), jobs and business opportunities were created in areas seeing active exploration such as Tulita and Norman Wells. Fort Liard and members of the Acho Dene Koe Band are taking advantage of opportunities in quickening exploration efforts in the southern N.W.T. Two more wells were drilled to assess the potential of the Ikhil Gas Field, a project pursued by the Inuvialuit Petroleum Corporation and its partners which will supply the town of Inuvik with natural gas.

In the Yukon, responsibility for oil and gas regulation was transferred to the territorial government in November 1998, ushering in a new era of northern independence and a host of ways to nurture the regional economy.

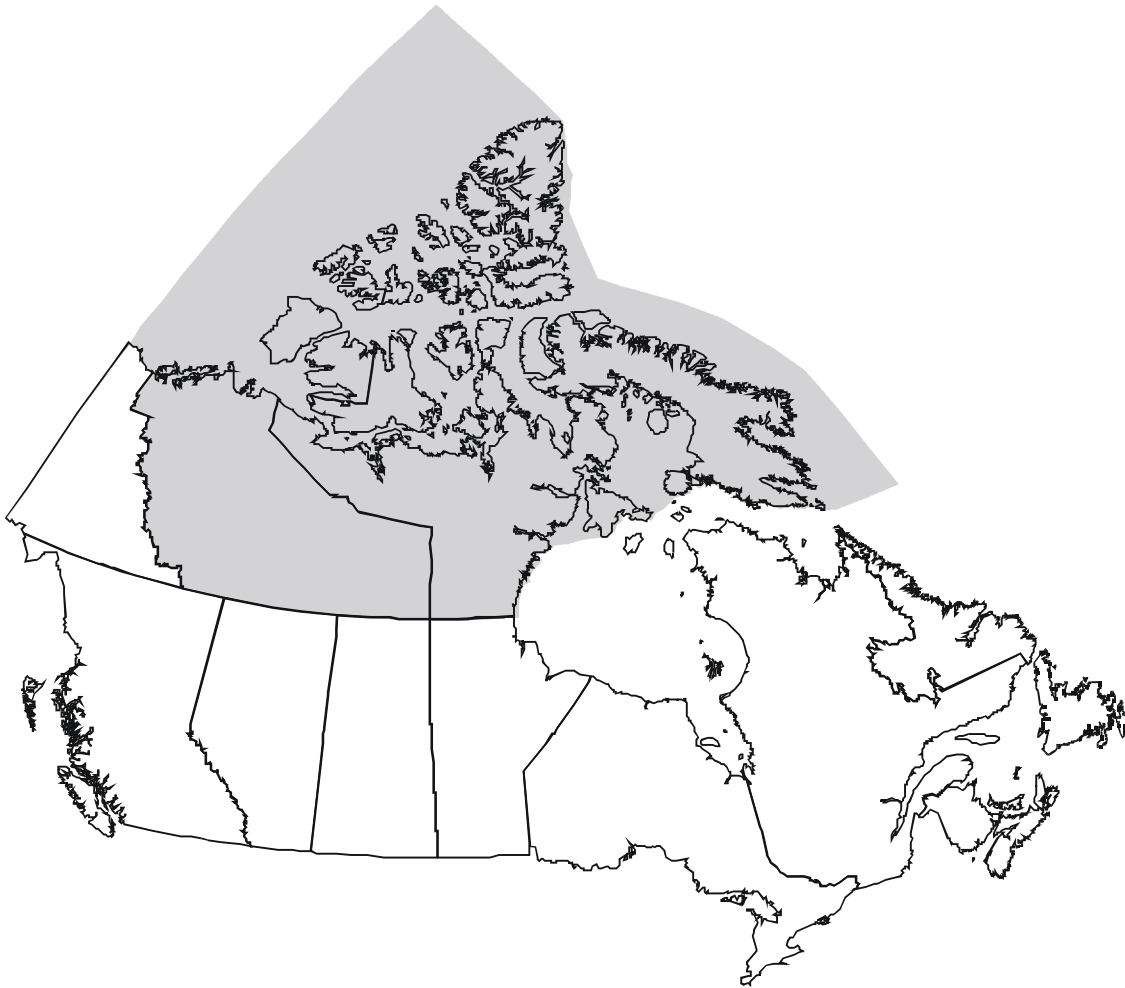
Since the North holds a quarter of Canada's discovered conventional oil reserves and 24 per cent of gas reserves, plus an estimated 40 per cent of Canada's undiscovered light crude and conventional gas potential, there are certain to be more opportunities to build upon in years to come.


Consistent with *Gathering Strength*, the Government of Canada, Aboriginal communities, territorial governments and the private sector are working together to explore and develop new opportunities in the oil and gas sector, resulting in a stronger industry and a more vibrant Northern economy. Well done!

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The Honourable Jane Stewart, P.C., M.P.  
Minister of Indian Affairs and Northern Development

## Canada's Frontier Lands



 Area under the responsibility of the  
Minister of Indian and Northern Affairs Canada  
Zone qui relève de la compétence du ministre des  
Affaires indiennes et du nord canadien

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## OVERVIEW OF NORTHERN OIL AND GAS ACTIVITIES

The supply of a burgeoning market for natural gas in the United States continues to stimulate exploration and development of gas throughout the North American upstream sector. For western Canadian producers, an increase in export capacity with the construction of new pipelines is expected to allow prices to rise towards the significantly higher values seen in the eastern North American markets.

This is significant for Northern Canada where several gas plays are being pursued into the southern Territories and new discoveries will serve to augment the supply of gas from western Canada. Major undeveloped resources are also present in the Mackenzie Delta, Beaufort Sea and in the Arctic Islands, and other discoveries await development, for instance, in the Colville Hills north of Great Bear Lake. Potential developers of these resources watch the narrowing gap between price and cost of development, the latter driven down by improving technology.

The pace of exploration continued to mount in the Fort Liard area of the southern Northwest Territories. Six seismic programs were conducted comprising 171.4 km of new 2-D seismic and a 3-D seismic program shot by Chevron across the Liard F-25A significant discovery (SDL99; Purcell Energy Inc.) and surrounding exploration licence EL366 (an additional 94.5 kilometres).

Total kilometres of seismic of 266 km showed a minor reduction over the previous year. This trend continues the shift in exploration emphasis to exploratory drilling as operators work to fulfill their drilling commitments prior to expiry of the first 4-year period of many exploration licences.

A total of five new wells were commenced on exploration licences in the Fort Liard area in 1998. Four of these wells were operated by Paramount Resources Ltd. and were commenced in the period January to March.

Arrowhead O-15 on EL383 was drilled to final depth, plugged and suspended. The remaining three wells Netla M-23 (on EL368), Arrowhead N-65 (on EL383) and Liard F-36 (on EL381) were suspended over the summer and re-entered in the fall. Operations were continuing at year end.

Canadian Forest Oil spudded the Flett Rapids I-61 well on EL 365, signalling the entry of a new player in the Fort Liard area. (Ocelot remains representative on this licence.) Two additional wells, Paramount et al Bovie C-76, and Ranger Oil's Fort Liard P-66A, both spudded in 1997, were re-entered in late 1997 and operations continued into 1998.

During the course of 1998, certain companies issued press releases on the results of their drilling programs in the Northwest Territories\*.

In March, Ranger Oil Ltd. announced a large gas discovery at their Fort Liard P-66A well which the company estimated at over 200 billion cubic feet with significant upside potential. Testing operations through much of the year were aimed at confirming well productivity. The company has indicated that the well has the potential for commercial production and plans to move ahead quickly with a proposal for development. A pipeline link to the existing pipeline terminus at Pointed Mountain 25 km to the southwest is a likely component of such a development.

Paramount Resources Ltd. and partner Berkley Petroleum Corp. announced gas flow rates from their Arrowhead N-65 well. They also reported gas tested from a zone in the Bovie C-76 well. As positive results from exploration north of 60°N latitude in the Fort Liard area begin to emerge, they are confirming the viability of exploration plays extending north from British Columbia. The Maxhamish Lake area just south of 60°N latitude has seen active gas exploration and development and this is intensifying exploration efforts north of 60°N latitude, particularly on EL381.

The northward trend of exploration along EL369, anchored around Bovie Lake in the south and extending north through EL383 and EL367 and EL368 reflects the expectations for a group of plays associated with the edge of the main Middle Devonian carbonate complex, firmly established as a gas-prone trend further south in the Western Canadian Sedimentary Basin. Clearly this new wave of exploration and the discoveries which result from it, will act to lift the production capacity of the region to a point where new pipeline development becomes economic. Older discoveries, isolated from infrastructure, may become commercial as distances to infrastructure decrease.

The second focus of exploration activity in 1998 was in the central Mackenzie Valley. Exploration in this area is primarily for oil although deeper plays are likely gas prone.

The sustained downward trend of oil prices in the second half of 1998 reduced the income of oil producers and enthusiasm for oil exploration across the investment community. This factor is likely to have caused some companies to delay exploration expenditures in the central Mackenzie Valley.

Most operators continued with exploration programs already in train, with preparations underway at year end for another active operating season.

Two seismic programs were run by International Frontier Resources Ltd on EL391 and by Grey Wolf Exploration Inc across EL389 for a combined total of 129 km. Ranger Oil Ltd. drilled Nota Creek C-17 on EL390, spudded in December of 1997, to total depth, and commenced two new wells on EL372 and EL377 in February 1998. Bear Rock O-20 well (EL377) was junked and abandoned at shallow depth. Both the Nota Creek well and Little Bear M-39 on EL372 were plugged and suspended for possible re-entry but Ranger has indicated no plans to do so in operating season 98/99. Grey Wolf-Canaxas Deh Cho-1 B-25 was spudded in December 1998, initiating a two well drilling program for EL389 over the 98/99 winter operating season.

In the Mackenzie Delta, the Inuvialuit Petroleum Corporation and its partners are pursuing development of the Ikhil gas field to supply the town of Inuvik with natural gas. This year saw the drilling of two additional wells to further assess the potential of the field.

The Minister recommended that the Governor-in-Council consent to the development plan for this project. Consent was forthcoming in the spring of 1998, following the appropriate environmental reviews and the approval of the overall plan by the National Energy Board late in 1997.

Exploration activities, well abandonments and field development drilling resulted in expenditures of \$53.4 million in 1998, an increase of approximately 15% over the

previous year. The creation of jobs and business opportunities for northern communities was focussed in the areas seeing active exploration: Tulita and Norman Wells were the focus of industry contracting and expenditures in the Central Mackenzie Valley. The Fort Liard community and Acho Dene Koe Band work hard to supply services to the fast expanding exploration effort in the southern Northwest Territories.

The annual call for nominations for the Beaufort Sea and Mackenzie Delta region closed in April 1998 with no nominations being received.

*\*NOTE:*

*In evaluating the results of recent drilling, readers should note that the Canada Petroleum Resources Act requires that government guards privileged information submitted by companies in the course of operations. Information on New wells may not be released prior to two years following the end of operations without the permission of the company.*

<b>Overview of Northern Oil and Gas Activities, 1998</b>	
Lands held under licence as of year-end (millions of hectares).....	3.9
Licences active as of year-end..... 166 (includes exploration, significant discovery and production licences)	
Licences issued during the year .....	2
Natural gas production (millions of cubic metres).....	609.8
Oil production (millions of cubic metres)..... 1584.6	
Exploration, development and abandonment expenditures (\$millions).....	53.4
Oil and gas revenues received in 1998 (\$millions)..... (royalties, rentals, fees, deposit forfeitures)	7.0

<b>Discovered Resource Inventory</b>		
	<b>Crude Oil</b> (millions of m <sup>3</sup> )	<b>Natural Gas</b> (billions of m <sup>3</sup> )
Mainland Territories	39	35
Mackenzie Delta and Beaufort Sea	240	360
Arctic Islands and Eastern Arctic Offshore	66	416
<b>Total</b>	<b>345</b>	<b>811</b>

**NORTHERN OIL AND GAS RESOURCES**

The North holds about 25 percent of Canada's remaining discovered conventional oil and 24



percent of remaining discovered gas. The importance of the northern basins is even more evident when one considers undiscovered conventional oil and gas resources (see table). The North is estimated to contain roughly 40 percent of both Canada's undiscovered conventional light crude oil potential and its undiscovered conventional gas potential. Discovered resources in the mainland Northwest Territories and Yukon, the Mackenzie Delta-Beaufort Sea, and the Arctic Islands, including the eastern Arctic offshore, Nunavut, amount to some 345 million cubic metres of oil and 811 billion cubic metres of natural gas.

One-third of northern Canada (north of 60°N latitude) is covered by sedimentary rock. The northern part of the Western Canada Sedimentary Basin, the most important petroleum producing basin in Canada, extends

into the southern Northwest Territories and southeastern Yukon between the Rocky Mountains and the Canadian Shield. Further north the basin thins, linking a series of sub-basins forming a prospective corridor leading northwards down the Mackenzie valley.

Other major northern basins are the Mackenzie Delta/Beaufort Sea, the Arctic Islands basins, Hudson Bay and Foxe Basin, and the continental shelf bordering the eastern margin of the continent in Baffin Bay, Davis Strait and the northern Labrador Sea. The North has seen relatively little production of its oil and natural gas compared to southern Canada. To date, most oil production has been from the Norman Wells field in the central Mackenzie Valley. Gas is currently being produced from two fields close to the territorial border with British Columbia; Kotaneelee field in Yukon, and Pointed Mountain Field in the Northwest Territories.

<b>Northern Remaining Resources as Percentage of Total Canadian Remaining Resources*</b>				
	<b>Recoverable Conventional Light Crude Oil</b>		<b>Recoverable Conventional Natural Gas</b>	
	Discovered	Undiscovered	Discovered	Undiscovered
<b>Mainland Territories</b>	2%	1%	1%	4%
<b>Mackenzie Delta / Beaufort Sea</b>	18%	21%	12%	15%
<b>Arctic Islands/Eastern Arctic Offshore</b>	5%	16%	13%	21%
<b>Northern Canada Total</b>	25%	38%	26%	40%

\* As of end 1996: source - National Energy Board.

## **OIL AND GAS MANAGEMENT**

### **Rights Issuance**

Rights issuance was limited in 1998 to the

annual call for nominations in the Mackenzie Delta and Beaufort Sea area which was launched in January. The call for nominations

closed on April 10, 1998 with no new posting requests received.

Consultation on rights issuance however, was undertaken particularly with respect to benefit plans requirements following the May 1997 closing of the Central Mackenzie Valley Call for Bids. A review of the issue is ongoing.

The department also continued consultation with the Nunavut Tungavik Inc. regarding the issuance of exploration rights in Nunavut. There is positive progress and a Call for Nominations may be realized in 1999 following consultations with the Government of Nunavut.

### **Northern Benefits**

When exploration and development are undertaken in northern Canada, the proponent must ensure full and fair access to employment, training and business opportunities for northerners, and give first consideration to qualified individuals resident in regional communities.

Economic benefits from renewed oil and gas exploration activity are being realized in the Northwest Territories, focussed on the communities of Inuvik, Fort Liard and the Sahtu communities of Tulita and Norman Wells.

### **Environmental Considerations**

Prior to issuing Calls for Nominations consultations are held with Northern aboriginal groups to identify areas of environmental sensitivity, including those holding special interest for cultural or spiritual reasons to Northern aboriginal groups. Some of these areas are then either excluded from the lands

available for nomination or are flagged as being subject to certain terms and conditions at the activity permitting stage. Environmental considerations also play an important role in regard to the issuance of land use permits, water licences and all work authorizations.

### **The Environmental Studies Research Fund (ESRF)**

Under the *Canada Petroleum Resources Act*, the ESRF finances environmental and social studies related to the exploration and development of oil and gas resources on frontier lands. The program is funded through levies paid by interest holders. Levies have not been imposed since 1994 as no new projects were initiated. Since its inception in 1983, the ESRF has published 135 reports which are available from the National Energy Board.

### **Canada-Yukon Oil and Gas Accord**

Following the 1993 signing by the Federal and Yukon governments of the Canada-Yukon Oil and Gas Accord, full authority over the administration and control of onshore oil and gas resources and a small adjoining offshore area was transferred, through a federal Order-in-Council, to the Commissioner of the Yukon Territory on November 19, 1998. This transfer followed royal assent on May 12, 1998 of the *Canada-Yukon Oil and Gas Accord Implementation Act*.

The territorial *Yukon Oil and Gas Act* now provides for the administration and regulation of onshore oil and gas exploration and development in Yukon. This important

milestone in Yukon's political development is a significant step in creating jobs and diversifying the economy.

## Expenditures & Royalties

Exploration activities, well abandonments and field development drilling resulted in expenditures of \$ 53.4 million in 1998, an increase of \$ 6 million over the previous year.

Royalties received from industry on northern oil and natural gas production amounted to about \$7 million during 1998. From this amount, the Sahtu and Gwich'in First Nations received a share in fulfilment of royalty sharing provisions in their land claim settlement agreements.

<b>Oil and Gas Revenues Received (\$)</b>					
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>Royalty</b>	7 455 222	7 633 984	13 967 952	9 887 982	6 967 456
<b>Rentals</b>	7 818	7 818	7 525	7 818	7 818
<b>Issuance/Registration Fees</b>	17 897	4 621	14 907	22 464	2 052
<b>Work Deposit Forfeitures</b>	1 050 119	10 576 840	649 000	0	0
<b>Total</b>	<b>8 531 056</b>	<b>18 223 263</b>	<b>14 639 384</b>	<b>9 918 264</b>	<b>6 977 326</b>

## DEVELOPMENT AND PRODUCTION

### Norman Wells

The Norman Wells oil field, operated by Imperial Oil, extends beneath the Mackenzie River at 65°20' N. latitude. The undeveloped resources of the Mackenzie Delta and offshore Beaufort Sea lie 500 km downstream to the North. Gas discoveries in the Colville Hills are some 200 km to the north-northeast.

The town of Norman Wells occupies the eastern bank of the river adjoining the production facilities. The neighbouring communities are Tulita, 85 km upstream and Fort Good Hope, 147 km downstream. The field is the current terminus of the Norman Wells pipeline. The 30 cm (12") diameter line, running from the Norman Wells field to Zama, Alberta, 866 km to the south is now operated by Enbridge Inc.

Norman Wells production in 1998 was 1.562 x 10<sup>6</sup> cubic metres, a slight decline over the previous year. The 132.8 x 10<sup>6</sup> cubic metres of gas produced with the oil was used for local power generation, re-injection into the field to maintain pressure and a minor amount was flared. The final three wells of a development program begun in 1997 were drilled in 1998. These three injection wells were drilled as part of a program to optimize recovery of known reserves.

### Pointed Mountain

The Pointed Mountain gas field operated by Amoco, entered production in 1972. Peak production approaching 1.0 x 10<sup>9</sup> cubic metres per year in the mid-1970s was followed by decline to a production plateau at about one tenth of this flow in 1988. Rates of this order continued until 1994 when production again began to show significant decline. Total gas produced in 1998 was 25.2 x 10<sup>6</sup> cubic metres, 74% of the 1997 figure, continuing a pattern of declining production. Two wells in the field which had been suspended for several years due to reduced reservoir pressure were abandoned in 1998. Gas from the remaining producing well flows through a raw gas pipeline to Fort Nelson, B.C., where it enters the Westcoast system.

### Bent Horn

The abandonment of the producing well and production facilities at the Bent Horn Oil field on Cameron Island in the Arctic Islands was completed in 1998. Final site clean-up is planned for 1999.

## **Kotaneelee**

The Kotaneelee gas field is operated by Anderson Oil and Gas. The field lies 11 km north of the border with British Columbia and some 30 km southwest of the Pointed Mountain gas field. The producing field lies entirely within Yukon.

After producing a small amount of gas in 1979 and 1980, the field was shut-in until 1991. Production peaked in 1992. From 1993 to 1997, the field has been in gentle decline.

In 1998, however, total production of natural gas was  $451.8 \times 10^6$  cubic metres. This represents a 12% boost over 1997 production due to a successful re-completion of the B-38 well. Gas is produced from two wells and enters the raw gas pipeline running south from the Pointed Mountain field.

## **Chance Field, Yukon**

Northern Cross (Yukon) Ltd. re-entered and evaluated two previously drilled wells at the Chance oil and gas discovery on the Eagle Plain of northern Yukon.

## **Ikhil Gas Field**

The 1983 Ikhil K-35 gas discovery lies some 50 km north of the town of Inuvik. A team of three companies comprising the Inuvialuit Petroleum Corporation, AltaGas Services Ltd. and Enbridge Inc. are undertaking a project to develop this field to supply Inuvik with natural gas.

The Governor in Council consented to Part 1 of the Development Plan for the field in 1998, following earlier approval of the Plan by the National Energy Board. The developer subsequently received authorization to construct a 6" pipeline and facilities for the production of gas from the Ikhil reservoir.

IPC drilled two wells to delineate the Ikhil reservoir in 1998. One well penetrated the reservoir and was suspended as a potential producer. The second has been plugged and abandoned. At the end of 1998, preparations were underway to commence laying pipe early in the new year. Gas is expected to flow to commercial and residential customers in the second half of 1999.

## STATISTICAL OVERVIEW

The following statistics summarize oil and gas activities under the management of the Northern Oil and Gas Directorate. A breakdown is also provided by region. The exploration, development, production and resource inventory statistics below and reported previously are provided courtesy of the National Energy Board. Discovered resource totals are estimates of original recoverable volumes and do not reflect production; totals have been rounded; crude oil includes condensates. Licences include exploration, significant discovery and production licences as well as leases.

<b>Oil and Gas Production</b>					
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>Oil Production (thousands of m<sup>3</sup>)</b>					
Norman Wells	1730.0	1697.6	1631.8	1584.6	1561.7
Bent Horn	52.9	35.3	39.6	0	0
<b>Total</b>	<b>1782.9</b>	<b>1732.9</b>	<b>1671.4</b>	<b>1584.6</b>	<b>1561.7</b>
<b>Gas Production (millions of m<sup>3</sup>)</b>					
Pointed Mountain	63.6	65.9	47.2	33.9	25.2
Norman Wells	123.9	129.8	132.4	135.5	132.8
Kotanelee	471.1	442.9	427.5	404.5	451.8
<b>Total</b>	<b>658.6</b>	<b>638.6</b>	<b>607.1</b>	<b>573.9</b>	<b>609.8</b>

<b>Activity Status</b>					
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>Licences issued</b>	<b>0</b>	<b>10</b>	<b>11</b>	<b>9</b>	<b>2<sup>1*</sup></b>
<b>Wells spudded</b>	<b>4</b>	<b>3</b>	<b>7</b>	<b>13</b>	<b>14</b>
<b>Metres drilled</b>	<b>6 471</b>	<b>4850</b>	<b>12 677</b>	<b>17 163</b>	<b>18 081</b>
<b>Wells terminated</b>	<b>4</b>	<b>3</b>	<b>6</b>	<b>12</b>	<b>13</b>
<b>Geophysical programs run</b>	<b>0</b>	<b>3698</b>	<b>15</b>	<b>8</b>	<b>11</b>
<b>Reflection seismic (km)</b>	<b>0</b>		<b>922</b>	<b>449</b>	<b>395</b>
<b>Rig-months</b>	<b>5</b>	<b>3</b>	<b>5</b>	<b>20</b>	<b>23</b>
<b>Industry Expenditures (\$million)</b>	<b>12.4</b>	<b>16.6</b>	<b>50</b>	<b>46.9</b>	<b>53.4<sup>2*</sup></b>

<sup>1</sup> \* Two significant discovery licences issued

<sup>2</sup> \* Does not include expenditures at Mallik 2L-38 scientific research well

## STATISTICAL OVERVIEW cont'd

<b>Exploration Licences</b>							
No.	AREA (in ha)	REPRESENTATIVE	DATES (y.m.d.)			WORK BID	
			Issue	Well to be drilled by	Expiry		
<b>Eastern Arctic Offshore</b>							
EL 297 <sup>1*</sup>	931 640	CanNat Resources Inc.	1998.07.14	2008.07.14		2008.07.14	
<b>Beaufort Sea/Mackenzie Delta</b>							
EL 317 <sup>2*</sup>	175 810	Talisman Energy Inc.	1986.10.05	n/a		n/a	
EL 329 <sup>2*</sup>	349 982	Amoco Canada Resources	1987.09.05	n/a		n/a	
EL 384 <sup>3*</sup>	85 761	Husky Oil Operations	1997.01.06	2006.01.05		2006.01.05	
EL 385 <sup>3*</sup>	128 327	Husky Oil Operations	1997.01.06	2006.01.05		2006.01.05	
<b>Mainland - Southern NWT</b>							
EL 362	20 918	Ranger Oil Limited	1995.01.23	1999.01.22		2002.01.22	\$1 838 075
EL 363	9 864	Ranger Oil Limited	1995.01.23	1999.01.22	✓	2002.01.22	\$3 529 000
EL 364	13 357	Ranger Oil Limited	1995.01.23	1999.01.22		2002.01.22	\$1 278 934
EL 365 <sup>4*</sup>	20 635	Ocelot Energy Inc.	1995.01.23	1999.01.22	<sup>4</sup> *	2002.01.22	\$1 500 000
EL 366	11 839	Chevron Canada Resources Limited	1995.01.23	1999.01.22		2002.01.22	\$1 201 200
EL 367	24 382	Shell Canada Limited	1995.01.23	1999.01.22		2002.01.22	\$1 768 600
EL 368 <sup>4*</sup>	23 085	Paramount Resources	1995.01.23	1999.01.22	<sup>4</sup> *	2002.01.22	\$2 800 000
EL 369	25 737	Shell Canada Limited	1995.01.23	1999.01.22	✓	2002.01.22	\$8 765 580
EL 378	23 145	Husky Oil Operations	1996.04.10	2000.04.09		2003.04.09	\$3 154 000
EL 379	24 420	Norcen Energy Resources	1996.04.10	2000.04.09		2003.04.09	\$6 388 731
EL 380	25 606	Paramount Resources	1996.04.10	2000.04.09		2003.04.09	\$2 200 000
EL 381	21 236	Unocal Canada Exploration Limited	1996.04.10	2000.04.09	✓	2003.04.09	\$6 250 000
EL 382	25 335	Ocelot Energy Inc.	1996.04.10	2000.04.09	✓	2003.04.09	\$1 100 000
EL 383	25 515	Shell Canada Limited	1996.04.10	2000.04.09		2003.04.09	\$1 224 400

(See notes following page)

<b>Exploration Licences</b>						
No.	AREA (in ha)	REPRESENTATIVE	DATES (y.m.d.)			WORK BID
			Issue	Well to be drilled by	Expiry	
<b>Mainland - Central Mackenzie Valley</b>						
EL 371	75 196	Foxboro Ltd.	1995.06.08	2000.06.07	2004.06.07	\$1 150 000
EL 372	88 693	Ranger Oil Limited	1995.05.18	1999.05.17	2003.05.17	\$3 215 000
EL 373	99 560	Grand River Resources	1996.03.27	2001.03.26	2005.03.26	\$1 226 000
EL 374	138 170	Grand River Resources	1996.03.27	2001.03.26	2005.03.26	\$1 042 000
EL 375	3 508	Murphy Oil Company	1996.03.27	2000.03.26	✓ 2004.03.26	\$2 806 000
EL 376	86 156	Canadian 88 Resources	1996.03.27	2000.03.26	2004.03.26	\$1 200 000
EL 377 <sup>5*</sup>	47 693	Ranger Oil Limited	1996.03.27	2000.03.26	<sup>5</sup> * 2004.03.26	\$3 069 000
EL 386	114 737	Grand River Resources	1997.05.05	2001.05.04	2005.05.04	\$1 072 000
EL 387	128 575	AEC West Ltd.	1997.05.05	2001.05.04	2005.05.04	\$9 482 688
EL 388	30 696	Murphy Oil Company	1997.05.05	2001.05.04	2005.05.04	\$2 831 080
EL 389 <sup>4*</sup>	46 738	Canadian Abraxas Petroleum Limited	1997.05.05	2001.05.04	<sup>4</sup> * 2005.05.04	\$3 101 015
EL 390	50 938	Ranger Oil Limited	1997.05.05	2001.05.04	✓ 2005.05.04	\$6 200 000
EL 391	71 816	International Frontier Resources Ltd.	1997.05.05	2001.05.04	2005.05.04	\$4 000 000
EL 392	133 518	AEC West Ltd.	1997.05.05	2001.05.04	2005.05.04	\$8 466 460

<sup>1\*</sup> Amended per s.s 26 (4) of the CPRA, originally issued pursuant to the Canada Oil and Gas Land Regulations.

<sup>2\*</sup> Under work prohibition orders.

<sup>3\*</sup> Land Exchange for Cape Bathurst Former Permits

<sup>4\*</sup> Well being drilled at year end

<sup>5\*</sup> Well drilled did not reach sufficient depth to evaluate prospective horizon as described in the geological prognosis in the application for Authority to Drill a Well

✓ Well requirement met as of year end. The drilling of one (1) exploratory or delineation well prior to the end of Period 1 of the term is a condition precedent to obtaining tenure to Period 2.



<b>Land Status</b>					
	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>
<b>Number of Licences Issued</b>					
Mainland Territories	0	10	11	7	0
Mackenzie Delta & Beaufort Sea	0	0	0	2	2
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>10</b>	<b>11</b>	<b>9</b>	<b>2</b>
<b>Number of Licences Active</b>					
Mainland Territories	53	63	74	81	73
Mackenzie Delta & Beaufort Sea	72	69	68	70	70
Arctic Islands & Eastern Arctic Offshore	23	23	23	23	23
<b>Total</b>	<b>148</b>	<b>155</b>	<b>165</b>	<b>174</b>	<b>166</b>
<b>Lands Issued in Licences (in millions of hectares)</b>					
Mainland Territories	0	0.3	0.5	0.6	0
Mackenzie Delta & Beaufort Sea	0	0	0	0.2	0 <sup>1*</sup>
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0.3</b>	<b>0.5</b>	<b>0.8</b>	<b>0</b>
<b>Lands Relinquished or Surrendered (in millions of hectares)</b>					
Mainland Territories	0	0	0	0	0.1 <sup>2*</sup>
Mackenzie Delta & Beaufort Sea	0 <sup>*1</sup>	0.1	0.1	0	0
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
<b>Total</b>	<b>0<sup>*1</sup></b>	<b>0.1</b>	<b>0.1</b>	<b>0</b>	<b>0.1<sup>2*</sup></b>
<b>Lands Held Under Licence (in millions of ha)</b>					
Mainland Territories	0.2	0.5	1	1.6	1.6
Mackenzie Delta & Beaufort Sea	1.1	1	0.9	1.1	1.1
Arctic Islands & Eastern Arctic Offshore	1.3	1.3	1.3	1.3	1.3
<b>Total</b>	<b>2.6</b>	<b>2.8</b>	<b>3.2</b>	<b>4.0</b>	<b>4.0</b>

<sup>1</sup> \* Less than 0.1 million hectares

<sup>2</sup> \* Adjustment to Mainland Territories by deletion of eight licences totalling 25 529 hectares in Yukon

<b>Regional Activity</b>					
	1994	1995	1996	1997	1998
<b>Mainland Territories</b>					
<b>Wells spudded</b>					
Exploratory/delineation	0	0	1	6	8
Development	4	3	6	7	3
<b>Wells terminated <sup>*1</sup></b>					
Exploratory/delineation	0	0	0	5	3
Development	4	3	6	7	3
<b>Metres drilled</b>					
Exploratory/delineation	0	0	1 309	11 281	13 389
Development	0	4 850	11 368	5 882	2 307
Rigs active	0	1	2	6	15 <sup>*3</sup>
Geophysical programs run	0	8	15	7	11
Reflection seismic (km)	0	698	921.5	449	395
Total money spent (millions of \$)	12.8	16.47	33.25	43.55	49.7
<b>Mackenzie Delta &amp; Beaufort Sea</b>					
Wells spudded	0	0	0	0	3 <sup>*2</sup>
Wells Terminated	0	0	0	0	3
Metres drilled	0	0	0	0	2 385
Rigs Active	0	0	0	1	3 <sup>*3</sup>
Geophysical programs run	0	0	0	1	0
Reflection seismic (km)	0	0	0	199	0
Total money spent (millions of \$)	4	0.04	3.5	3.05	3.7
<b>Arctic Islands &amp; Eastern Arctic Offshore</b>					
Wells spudded	0	0	0	0	0
Wells terminated	0	0	0	0	0
Metres drilled	0	0	0	0	0
Rigs Active	0	0	0	0	0
Geophysical programs run	0	0	0	0	0
Reflection seismic (km)	0	0	0	0	0
Total money spent (millions of \$)	0	0.1	13.0	0	0

<sup>\*1</sup> In the Mainland Territories, where exploratory operations are generally restricted to the winter months, a well is deemed to be terminated in the year in which it reaches total depth, even though it may be re-entered in the following year for testing.

<sup>\*2</sup> Includes Mallik 2L-38 scientific research well

<sup>\*3</sup> Re-entries and use of different rigs to conduct testing programs are increasing the number of active rigs.

## WELL ACTIVITY

### Exploratory and Delineation Drilling

#### New Wells

<p><b>CDN Forest Oil Flett Rapids I-61</b></p> <p>at: 60°40'40.94"N 123°26'33.96"W  re: Exploration Licence 365  Mainland NWT : Fort Liard Area,</p>	<p><b>Spud: 1998.11.13 (Nabors #24E)</b>  <b>(3200m Proposed total depth)</b>  <b>Drilling</b>  <b>Metres drilled assigned to1998: 2110 m</b></p>
<p><b>Paramount et al Liard F-36</b></p> <p>at: 60°05'27.54"N 123°22'00.56"W  re: Exploration Licence 381  Mainland NWT : Fort Liard Area</p>	<p><b>Spud: 1998.03.03 (Akita #15)</b>  <b>Rig released: 1998.03.28</b>  <b>Re-entered: 1998.12.23 (Cenalta #32)</b>  <b>(2330m Proposed total depth)</b>  <b>Drilling</b>  <b>Metres drilled assigned to1998: 1565 m</b></p>
<p><b>Paramount et al Netla M-23</b></p> <p>at: 60°19'55.40"N 123°05'12.13"W  re: Exploration Licence 368  Mainland NWT : Fort Liard Area</p>	<p><b>Spud: 1998.03.06 (Precision #622)</b>  <b>Rig released: 1998.03.19</b>  <b>Re-entered: 1998.12.17 (Precision #379)</b>  <b>(2330m Proposed total depth)</b>  <b>Drilling</b>  <b>Metres drilled assigned to1998: 1889 m</b></p>
<p><b>Paramount et al Arrowhead O-15</b></p> <p>at: 60°24'53.694"N 123°02'31.174"W  re: Exploration Licence 383  Mainland NWT : Fort Liard Area</p>	<p><b>Spud: 1998.02.14 (Precision #622)</b>  <b>Rig released: 1998.03.24</b>  <b>(3000m Proposed total depth)</b>  <b>Plugged and suspended</b>  <b>Metres drilled assigned to1998: 1455 m</b></p>
<p><b>Paramount et al Arrowhead N-65</b></p> <p>at: 60°34'45.897"N 122°57'18.623"W  re: Exploration Licence 383  Mainland NWT : Fort Liard Area</p>	<p><b>Spud: 1998.01.15 (Nabors #16)</b>  <b>Rig released:1998.03.22</b>  <b>2925m Total depth</b>  <b>(2865m Proposed total depth)</b>  <b>Plugged and suspended:</b>  <b>Re-entered: 1998.12.12 (Cenalta #42)</b>  <b>Metres drilled assigned to1998: 2925 m</b></p>

<p><b>Grey Wolf-Canaxas Deh Cho-1 B-25</b></p> <p>at: 65°14'01.23"N 126°34'32.26"  re: Exploration Licence 389  Mainland NWT : Central Mackenzie Valley</p>	<p><b>Paramount et al Liard F-36</b></p> <p>at: 60°05'27.54"N 123°22'00.56"W  re: Exploration Licence 381  Mainland NWT : Fort Liard Area</p>
<p><b>Ranger Bear Rock O-20</b></p> <p>at: 64°59'47"N 125°17'47.25"W  re: Exploration Licence 377  Mainland NWT : Central Mackenzie Valley</p>	<p><b>Paramount et al Netla M-23</b></p> <p>at: 60°19'55.40"N 123°05'12.13"W  re: Exploration Licence 368  Mainland NWT : Fort Liard Area</p>
<p><b>Ranger et al Little Bear M-39</b></p> <p>at: 64°48'58"N 126°22'22"W  re: Exploration Licence 372  Mainland NWT : Central Mackenzie Valley</p>	<p><b>Paramount et al Arrowhead O-15</b></p> <p>at: 60°24'53.694"N 123°02'31.174"W  re: Exploration Licence 383  Mainland NWT : Fort Liard Area</p>

#### Wells Re-entered or Continued in 1998

<p><b>Paramount et al Bovie C-76</b></p> <p>at: 60°15'14.83"N 122°59'22.34"W  re: Exploration Licence 369  Mainland NWT : Fort Liard Area</p>	<p>Spud: 1997.01.16 (Kenting Rig #22E)  Rig released: 1997.03.30  Re-entered: 1997.12.18 (Alberta Gold #30)  Rig released: 1998.03.07  3221m Total depth  (3220m Proposed total depth)  Plugged and suspended:  Metres drilled assigned to 1998: 0 m</p>
<p><b>Ranger Fort Liard P-66A</b></p> <p>at: 60°35'55.66"N 123°41'25.31"W  re: Exploration Licence 363  Mainland NWT : Fort Liard Area</p>	<p>Spud: 1997.07.14 Precision #426E  Rig released: 1998.03.27  3500m Total depth  (3489m Proposed total depth)  Plugged and suspended:  Re-entered: 1998.07.05 (TESTING)  Metres drilled assigned to 1998: 0 m</p>

<p><b>Ranger Nota Creek C-17</b></p> <p>at: 65°06'01"N 126°02'56"W  re: Exploration Licence 390  Mainland NWT : Central Mackenzie Valley</p>	<p>Spud: 1997.12.24 (Shetah Rig #1)  Rig released: 1998.03.16  1953m Total depth  (1940m Proposed total depth)  Plugged and suspended:  Metres drilled assigned to 1998: 1953 m</p>
<p><b>IPC Ikhil J-35</b></p> <p>at: 68°44'35.58"N 134°08'34.93"W  re: Significant Discovery Licence 29  Mackenzie Delta</p>	<p>Spud: 1998.02.27 (Roll'n #14)  Rig released: 1998.03.20  Plugged and suspended  Metres drilled assigned to 1998: 1160 m</p>
<p><b>IPC Ikhil K-35 (RE)</b></p> <p>at: 68°44'43.68"N 134°09'16.07"W  re: Significant Discovery Licence 29  Mackenzie Delta</p>	<p>Spud:  Re-entered: 1998.01.31  (Roll'n #14.Frontier #8)  Suspended  Re-entered: 1999.02.06 (Frontier #8)  Completion</p>
<p><b>IPC Ikhil N-26</b></p> <p>at: 68°45'55.22"N 134°06'37.21"W  re: Significant Discovery Licence 29  Mackenzie Delta</p>	<p>Spud: 1998.03.27 (Roll'n #14/Frontier #8)  Rig released: 1998.04.05  (1200m Proposed total depth)  Plugged and abandoned  Metres drilled assigned to 1998: 1225 m</p>
<p><b>Japex JNOC GSC Mallik 2L-38</b></p> <p>Scientific research well to test gas hydrates  at: 69°27'38.57"N 134°34'24.60"W  Mackenzie Delta</p>	<p>Spud: 1998.02.16 (Shetah #7-E)  Rig released:1998.03.28  1550m (1140m Proposed total depth)  Plugged and abandoned  Metres drilled assigned to 1998: 1150 m</p>
<p><b>Socony Mobil WM Chance YT G-08</b></p> <p>at: 66°07'18.10"N 137°30'50.80"W  Yukon</p>	<p>Spud: 1967.12.14  Re-entered: 1998.03.18  (Cenalta#122)  Plugged and suspended:: 1998.03.24</p>
<p><b>Canoe River Chance YT J-19</b></p> <p>at: 66°08'31.20"N 137°32'28.02"W  Yukon</p>	<p>Spud: 1967.12.14  Re-entered: 1998.03.11  (Cenalta#122)  Plugged and suspended: 1998.03.17</p>

**Development Drilling**

<b>Imp. Norman Wells P-39X</b> Mainland NWT :Norman Wells Area	<b>Injection Well</b> Spud: 1998.06.24 (Shehtah #1) Rig released: 1998.06.30 Metres drilled assigned to 1998: 713 m
<b>Imp. Norman Wells N-38X</b> Mainland NWT :Norman Wells Area	<b>Injection Well</b> Spud: 1998.07.12 (Shehtah #1) Rig released: 1998.07.20 Metres drilled assigned to 1998: 804 m
<b>Imp. Norman Wells O-33X</b> Mainland NWT :Norman Wells Area	<b>Injection Well</b> Spud: 1998.07.04 (Shehtah #1) Rig released: 1998.07.10 Metres drilled assigned to 1998: 790 m

**Abandonments and Work-overs**

<b>Pan Am Pointed Mountain K-45A</b> Pointed Mountain Gas Field	<b>Re-entered: 1998.06.18 (Trimat#7)</b> <b>Plugged and abandoned: 1998.07.11</b>
<b>Amoco A-4 Pointed Mountain A-55</b> Pointed Mountain Gas Field	<b>Re-entered: 1998.07.12 (Trimat#7)</b> <b>Plugged and abandoned: 1998.07.17</b>
<b>Columbia et al KotaneeleeYT B-38</b> Yukon: Kotaneelee Gas Field	<b>Re-entered: 1998.06.05 (Trimat#7)</b> <b>Work-over:</b> <b>Returned to production 1998.08.03</b>

## **SOURCES OF INFORMATION**

### **Northern Oil and Gas Directorate**

Many sources of information on oil and gas, environmental and land use matters originate with the Department of Indian Affairs and Northern Development. To obtain specific information, please include the appropriate contact listed in the sources below with the general mailing address for the department.

**Northern Oil and Gas Directorate**  
Department of Indian Affairs and Northern Development  
OTTAWA, Ontario, Canada K1A 0H4

Information on the resource management regime, calls for nominations and bids and other related information is available from: Chief, Rights Issuance and Policy-  
Telephone (819) 994-1606.

Information on registration procedures and regulations, exploration, significant discovery and production licences, transfers, notices and maps is available from: Rights Administrator /Registrar-  
Telephone (819) 953-8490.

Information on northern exploration history and geological/geophysical activities is available from:  
Staff Geologist -Telephone (819) 953-8722.

Other relevant departmental information and publications such as *Land Use Regulations*, *Environmental Operating Guideline Handbooks* and land claim settlement agreements are available from the department's Enquiries Kiosk, by calling (819) 997-0380 or by Fax (819) 953-3017.

**Northern Oil and Gas Directorate**  
**Department of Indian Affairs and Northern Development**

Street Address: 6th Floor, 10 Wellington Street, Hull, Quebec  
Telephone:(819) 997-0877  
Fax: (819) 953-5828  
Internet: <http://www.inac.gc.ca/oil/index.html>

## Other Sources of Information

### National Energy Board

444 Seventh Avenue S.W.,  
Calgary AB T2P 3H2  
Telephone: (403) 292-4800  
Fax: (403) 292-5503

Through the offices of the NEB, information on the following is available:

- the Regulatory Support Office has information on exploration, development, production, pipeline transportation and export;
- the Frontier Information Office provides access to maps, technical information, geological and geophysical reports, well history reports and records; and
- the Environmental Directorate has information relating to the Environmental Studies Research Funds.

**The Geological Survey of Canada's Institute of Sedimentary and Petroleum Geology, provides public viewing and sampling facilities for cores and samples, and information on wells drilled North of 60° at its offices at 3303-33rd Street NW, Calgary AB T2L 2A7.  
Telephone: (403) 292-7000 Fax: (403) 292-5377**

**Information on wells drilled in the Baffin Bay – Davis Strait region is available from:**

**Core Storage and Laboratory,  
Atlantic Geoscience Centre, Bedford Institute of Oceanography,  
Dartmouth NS B2Y 4A2  
Telephone: (902) 426-6127 Fax: (902) 426-6186**

Information concerning Program on Energy Research and Development (PERD) is available from:  
Office of Energy Research and Development,  
Natural Resources Canada,  
580 Booth Street, Ottawa ON K1A 0E4  
Telephone: (613) 995-8860 Fax: (613) 995-6146