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# Northern Oil and Gas Annual Report 2002

The management of oil and gas resources on Crown lands north of 60° N. latitude in the Northwest Territories, Nunavut and the northern offshore is a federal responsibility carried out by the Northern Oil and Gas Directorate of the Department of Indian Affairs and Northern Development.

Petroleum resource management on Crown lands is exercised under federal legislation. The *Canada Petroleum Resources Act* and its regulations govern the granting and administration of Crown exploration and production rights and set the royalty regime. The *Canada Oil and Gas Operations Act* governs the regulation of petroleum operations and associated benefits requirements. Land, royalty and benefit matters are managed by the Department on behalf of the Minister of Indian Affairs and Northern Development while the National Energy Board takes the lead role in approval of operations.

Information on the northern oil and gas regime may be found on the web at:  
<http://www.ainc-inac.gc.ca/oil/>



Published under the authority of the  
Honourable Robert D. Nault, P.C., M.P.  
Minister of Indian Affairs and  
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***Message from the Honourable Robert D. Nault  
Minister of Indian Affairs and Northern Development***

*As I reflect upon the accomplishments of 2002 and the current need for increased North American energy security, I am encouraged that the prospects are bright for the development of Mackenzie Delta natural gas fields later in this decade. I am also encouraged by the continued growth and development of the northern oil and gas sector.*

*I am pleased to report that in 2002, industry undertook seismic programs in the Mackenzie Delta, adjacent areas of the Beaufort Sea and in the central and southern areas of the Mackenzie Valley. Drilling took place in the Mackenzie Delta, central Mackenzie Valley and in the Fort Liard and Cameron Hills areas of the southern Northwest Territories. Natural gas production continued at the Ikhil field in the Mackenzie Delta, at several fields near Fort Liard and in the Cameron Hills. Oil production from the Norman Wells field – Canada's fourth largest oil field – continued as the field production profile began to edge downward.*

*I am particularly pleased that many Aboriginal people and other northerners responded positively to the employment and training opportunities arising from oil and gas exploration and development activities in 2002. I found it particularly encouraging that northern businesses – many of which are owned by Aboriginal Groups as a result of capacity building and joint ventures – were able to supply many of the goods and services required by the oil and gas industry.*

*Canada's northern oil and gas sector is well positioned to contribute to the North American energy supply. Bringing gas south would be a major project that would bring benefits to Canada and other parts of North America. The sustainable development of oil and gas activities in the North can be a key to improving the quality of life for many Canadians, in the North and elsewhere.*

*I invite you to consult this report for details on the development of Canada's northern oil and gas resources during the past year.*

*In accordance with section 109 of the Canada Petroleum Resources Act, I am pleased to table before Parliament, the Annual Report on the administration of oil and gas in the Northwest Territories, Nunavut and the northern offshore for the year ending December 31, 2002.*

*April 16, 2003*

*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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# NORTHERN OIL AND GAS ACTIVITIES

## OVERVIEW

### Oil and Gas Fundamentals and Significance for Northern Operations

Commodity prices for natural gas stabilized over the first quarter of 2002 with the average Alberta contract price remaining in the range \$3 to \$5 per GigaJoule (GJ). With storage levels at the end of summer high across the continent, only moderate price increases were expected over winter 2002/03. Towards year end, however, weather colder than the previous year was causing rapid draw down from storage and setting the stage for higher prices in the New Year. The Alberta market closed the year at \$5.25 per GJ.

Average sale price of Canadian crude at Edmonton did not differ much from 2001 but ended the year on an upward trend, reflecting global uncertainty regarding war in Iraq and industrial unrest in Venezuela. Higher oil prices can have two effects on exploration investment in the North: firstly, they may rekindle interest in northern oil resources, notably in the Beaufort Sea; and secondly, they may inhibit switching from natural gas to fuel oil as prices rise, creating firmer price outlooks for gas and improving the conditions for investment in major projects such as pipelines.

The decline in gas price in 2001 was followed by a weak 2002 drilling season in Western Canada, although this was not particularly reflected in North of 60 statistics. Drilling remains overwhelmingly gas-directed.

Canadian production declined slightly from 2001 levels and US production more significantly. However, this was matched by an easing of demand following the mild winter of 2001/2002. Uncertainty as to whether lower production is solely a market response or reflects an underlying decline in productive capacity strengthens the appeal of long term production increments from the offshore and the North. Certainly, firming prices towards year end for both oil and natural gas is expected to stimulate drilling in these higher cost operating environments.

<b>Commodity Prices</b>			<b>Average 2002</b>
	<b><u>Jan 2002</u></b>	<b><u>Dec 2002</u></b>	
Oil	<i>193.53</i>	<i>284.63</i>	253.53
Gas	<i>3.52</i>	<i>5.25</i>	3.83

Average Oil Prices: C\$ per m<sup>3</sup> at Edmonton  
 Average Natural Gas Prices: AECCO (C\$ per GJ)  
 Source: Natural Resources Canada

## Oil and Gas Resources

A recent review of published studies commissioned by the Northern Oil and Gas Directorate indicates that the northern Territories and Arctic Offshore host some 34% of Canada's remaining recoverable resources of natural gas of  $13.6 \times 10^{12} \text{ m}^3$  (482.3 trillion cubic feet), and 25% of the remaining recoverable oil resource of 5.5 billion cubic metres (34.3 billion barrels).

The most accessible of the northern resources lie along the length of the Mackenzie Valley, from the border with the Provinces at 60 degrees, north to the Mackenzie Delta. This region, comprising much of the Northwest Territories and adjacent offshore is estimated to contain 49% of the recoverable gas and 58% of the oil in northern Canada with the Beaufort Sea-Mackenzie Delta Basin by far the largest contributor to potential, and the southern NWT currently the largest contributor to gas production. Norman Wells in the central Mackenzie Valley continues

to be the only significant oil producer north of 60. Of the 53 discoveries in the Beaufort Sea/Mackenzie Delta Basin, major gas fields include Taglu, Parsons Lake and Niglintgak onshore with Amauligak an important discovery of oil and gas in the offshore. Comparable in scale but more remote and not currently under consideration for development, are the resources of the High Arctic, principally in the Sverdrup Basin, where past exploration efforts have already proved the existence of major gas fields at Drake Point and Hecla, as well significant oil resources.

At year end it seemed that a stand-alone Mackenzie Valley gas pipeline was front runner among concepts for arctic gas development in Canada and Alaska. Prospects for a pipeline to develop Canadian Arctic gas resources remained high at year end with promising signals that the regulatory approvals process could be triggered in the New Year.

### Discovered Resource Inventory\*

	Crude Oil $10^6 \text{ m}^3$	Million Barrels	Natural Gas $10^9 \text{ m}^3$	Trillion Cubic Feet
Northwest Territories	70.5	(443)	178.3	(6.3)
Nunavut	0.9	(6)	190.7	(6.7)
Arctic Offshore	193.0	(1214)	506.5	(17.9)
<b>Total</b>	264.4	(1663)	875.5	(30.9)

\*Compiled and integrated from several published sources which may under estimate or overestimate actual field resources



## OIL AND GAS MANAGEMENT

### Highlights

In 2002, the Directorate responded to concerns expressed by industry regarding the rapid escalation of northern exploration costs. The Directorate participated in a task force with members of the Canadian Association of Petroleum Producers having specific experience and interest in petroleum exploration North of 60. The principal recommendation of the task force was that allowable expenditures for all types of exploratory work on licences should be calculated on an 'at cost' basis, thereby assuring both currency of costs and equivalency between actual cost of work and expenditures deducted from the work bid deposit. The new 'at cost' approach will apply to licences issued pursuant to 2002 Calls.

A one-time upwards revision of drilling rates in Schedule III of existing exploration licences was also agreed. This adjustment reflects escalation in this major category of costs which could not have been reasonably anticipated and will reduce differences in the treatment of allowable costs for exploration licences of all vintages.

Northern operators also expressed concerns about potential difficulties in meeting licence commitments recognizing the uncertainty in synchronising regulatory approvals with seasonal operations.

Industry observed that the demanding northern operating environment can impose critical delays which can result in the lost of entire seasons of activity.

The Directorate has worked with companies to utilize the consolidation of exploration licences provided for in the Act to increase the flexibility for companies to adapt to elements of the northern operating environment. Consolidation of two or more exploration licences pursuant to s. 25(3) of the *Canada Petroleum Resources Act* is at the request of the Interest Owners of the original exploration licences and is on terms and conditions agreed to by the Minister and the Interest Owners. This provision of the Act enables companies to optimize exploration and operating efficiencies on lands acquired through a competitive Call for Bids by consolidating two or more exploration licences into a single licence. Overall work commitment and work expenditure bids remain unchanged. The greater efficiencies achievable under consolidation potentially translate into additional exploratory work, better exploration success, and more sustained economic activity. Consolidation provides flexibility to realise synergies which can improve environmental and operational safety, and ease logistical problems such as labour constraints and capacity of local business.

## Rights Issuance and Administration

The department provides industry with an annual opportunity to obtain exploration rights in N.W.T. and areas of Nunavut and the northern offshore. The exploration rights are made available on terms prescribed under the *Canada Petroleum Resources Act* and supported by northerners.

A Call for Nominations has preceded each Call for Bids. The Call for Nominations enables industry to specify blocks of land of interest. A single bid evaluation criterion - usually the total expenditure that a bidder would spend on exploration of the land block - is used to determine the successful bidder. DIAND consults with Aboriginal groups to ensure that their views are considered in the rights issuance process.

Crown rights are issued pursuant to an open, competitive bidding process. The bid criterion used is currently the dollar value of work proposed for the first period of the licence. A work program requirement of one well in the first period applies.

In accordance with the provisions of land claims settlement agreements, the department sought the views of aboriginal communities and organizations prior to rights issuance on the terms and conditions of the issuance and related matters. The department is also working towards establishing measures that would meet the needs and provide economic opportunities for those areas without a land claim settlement, primarily in the southern NWT. A single Call for Nominations was launched in November 2001 for three areas, that is, the Central Mackenzie Valley, the Mackenzie Delta/Beaufort Sea and Arctic

Islands of Nunavut and surrounding offshore areas, and closed on staggered dates in dates in December 2001 for the three areas. Three blocks were nominated, two in the Mackenzie Delta/Beaufort Sea area and one in the Central Mackenzie Valley. A Call for Bids was launched in January 2002 with bids received in May for two of the three parcels.

In the fall of 2002, Calls for Nominations were launched for three areas North of 60. One each in the Beaufort Sea/Mackenzie Delta, the Central Mackenzie Valley and for the Arctic Islands in Nunavut. The nominations process closed with only one parcel nominated in the Central Mackenzie Valley for which a Call for Bids was launched in January 2003 the results of which will be known in May 2003.

### Interests Issued in 2002

Two new exploration licences were issued as a result of a successful Call for Bids in the Beaufort Sea/Mackenzie Delta region, EL417 to Chevron Canada Resources and BP Canada Energy Company and EL418 to Devon ARL Corporation and Petro-Canada.

In addition, groups of four exploration licences and two exploration licences in the Beaufort Sea/Mackenzie Delta region were consolidated into two new exploration licences (EL419 to Petro-Canada and Anderson Resources Ltd. and EL420 to Devon ARL Corporation).

Four production licences were issued to Paramount Resources Ltd. in the Cameron Hills area of NWT. One significant discovery licence was issued to Paramount Resources Ltd. in the Fort Liard area of NWT.

<b>Land Status</b>					
	1998	1999	2000	2001	2002
<b>Number of Licences Issued</b>					
Mainland Territories	0	0	12	7	5
Mackenzie Delta & Beaufort Sea	5	5	9	0	4
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
Total	5	5	21	7	9
<b>Number of Active Licences</b>					
Mainland Territories	73	68	77	84	82
Mackenzie Delta & Beaufort Sea	70	75	84	84	82
Arctic Islands & Eastern Arctic Offshore	23	23	23	23	23
Total	166	166	184	191	187
<b>Lands Issued in Licences (in millions of hectares)</b>					
Mainland Territories	0	0	0.8	0.4	0.01
Mackenzie Delta & Beaufort Sea	0 <sup>1</sup>	0.31	0.7	0	0.50
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
Total	0 <sup>1</sup>	0.31	1.5	0.4	0.51
<b>Lands Relinquished or Surrendered (in millions of hectares)</b>					
Mainland Territories	0.1 <sup>2</sup>	0.4	0.2	0	0.4
Mackenzie Delta & Beaufort Sea	0	0	0	0	0.5
Arctic Islands & Eastern Arctic Offshore	0	0	0	0	0
Total	0.1 <sup>2</sup>	0.4	0.2	0	0.9
<b>Lands Held Under Licence (in millions of hectares)</b>					
Mainland Territories	1.6	1.4	2.2	2.6	1.9
Mackenzie Delta & Beaufort Sea	1.1	1.3	1.8	1.8	2.0
Arctic Islands & Eastern Arctic Offshore	1.3	1.2	1.2	1.2	1.2
Total	4.0	3.9	5.2	5.6	5.1

<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>Exploration Licences</b>							
<b>No.</b>	<b>Area (ha)</b>	<b>Representative *</b>	<b>Issue</b>	<b>Dates (y.m.d.) Well to be Drilled by</b>		<b>Expiry</b>	<b>Work Bid \$</b>
<b>Eastern Arctic Offshore</b>							
EL297 <sup>1*</sup>	931,640	CanNat Resources Inc.	1998.07.14	2007.07.14		2007.07.14	
<b>Beaufort Sea/Mackenzie Delta</b>							
EL317 <sup>2*</sup>	175,810	Talisman Energy Inc.	1986.10.05	n/a			n/a
EL329 <sup>2*</sup>	349,982	BP Canada Energy Resources	1987.09.05	n/a			n/a
EL384 <sup>3*</sup>	85,761	AEC West Ltd.	1997.01.06	2006.01.05		2006.01.05	-
EL385 <sup>3*</sup>	128,327	AEC West Ltd.	1997.01.06	2006.01.05		2006.01.05	-
EL393	72,474	Burlington Resources Canada	1999.09.18	2004.09.17		2008.09.17	35,550,000.00
EL394	73,155	Burlington Resources Canada	1999.09.18	2004.09.17		2008.09.17	42,375,000.00
EL403	75,650	Shell Canada	2000.08.15	2005.08.14		2009.08.14	35,000,000.00
EL404	73,608	BP Canada Energy	2000.08.15	2005.08.14		2009.08.14	76,675,288.00
EL405	76,307	Petro-Canada	2000.08.15	2005.08.14		2009.08.14	46,454,620.66
EL406	72,523	Petro-Canada	2000.08.15	2005.08.14		2009.08.14	81,876,595.88
EL407	71,515	Anadarko Canada Corp.	2000.08.15	2005.08.14		2009.08.14	2,421,350.84
EL417	18,912	Chevron Canada	2002.05.14	2007.05.13		2011.05.13	13,200,000.00
EL418	27,100	Devon ARL Corporation	2002.05.14	2007.05.13		2011.05.13	1,100,000.00
EL419	147,822	Petro-Canada	2002.04.18	2004.09.17	✓ <sup>5</sup>	2008.09.17	105,293,760.00 <sup>4*</sup>
EL420	338,469	Devon ARL Corporation	2002.08.15	2005.08.15		2009.08.14	224,069,655.56 <sup>4*</sup>
<b>Mainland - Southern NWT</b>							
EL363	6,064	Canadian Forest Oil	1995.01.23	1999.01.22	✓	2002.01.22	3,529,000.00
EL365	20,635	Canadian Forest Oil	1995.01.23	1999.01.22	✓	2002.01.22	1,500,000.00
EL367	24,382	Paramount Resources	1995.01.23	1999.01.22	✓	2002.01.22	1,768,600.00
EL369	25,737	Paramount Resources	1995.01.23	1999.01.22	✓	2002.01.22	8,765,580.00
EL380	25,606	Canadian Forest Oil	1996.04.10	2000.04.09	✓	2003.04.09	2,200,000.00
EL381	15,422	Paramount Resources	1996.04.10	2000.04.09	✓	2003.04.09	6,250,000.00
EL382	25,335	Paramount Resources	1996.04.10	2000.04.09	✓	2003.04.09	1,100,000.00
EL383	25,515	Paramount Resources	1996.04.10	2000.04.09	✓	2003.04.09	1,224,400.00

<b>Exploration Licences</b>							
No.	Area (ha)	Representative *	Dates (y.m.d.)			Work Bid \$	
			Issue	Well to be Drilled by	Expiry		
<b>Mainland - Central Mackenzie Valley</b>							
EL373	99,560	Devlan Exploration	1996.03.27	2001.03.26	✓	2005.03.26	1,226,000.00
EL374	138,170	Devlan Exploration	1996.03.27	2001.03.26	✓	2005.03.26	1,042,000.00
EL386	114,737	Devlan Exploration	1997.05.05	2001.05.04	✓	2005.05.04	1,072,000.00
EL389	46,738	Canadian Abraxas	1997.05.05	2001.05.04	✓	2005.05.04	3,101,015.00
EL391	71,816	Northrock Resources	1997.05.05	2001.05.04	✓	2005.05.04	4,000,000.00
EL392	23,652	AEC West Ltd.	1997.05.05	2001.05.04	✓	2005.05.04	8,466,460.00
EL397	134,565	Northrock Resources Ltd.	2000.08.01	2004.07.31		2008.07.31	16,580,000.00
EL398	133,480	AEC West Ltd.	2000.08.01	2004.07.31		2008.07.31	1,000,000.00
EL399	120,496	Paramount Resources	2000.08.01	2004.07.31		2008.07.31	8,400,000.00
EL400	118,060	Canadian Natural Resources Limited	2000.08.01	2004.07.31		2008.07.31	17,500,000.00
EL401	128,584	EOG Resources Canada Inc.	2000.08.01	2004.07.31	✓	2008.07.31	12,750,000.00
EL402	128,718	Devon ARL Corporation	2000.08.01	2004.07.31		2008.07.31	1,243,789.00
EL412	68,772	Canadian Forest Oil	2001.09.18	2005.09.17		2009.09.17	1,867,911.00
EL413	80,464	Devlan Exploration	2001.09.18	2005.09.17		2009.09.17	2,000,000.00
EL414	84,880	Paramount Resources	2001.09.18	2005.09.17		2009.09.17	10,750,000.00
EL415	83,216	Hunt Oil	2001.09.18	2005.09.17		2009.09.17	1,260,000.00
EL416	80,510	Northrock Resources Ltd.	2001.09.18	2005.09.17		2009.09.17	1,526,430.00

✕ These representatives are current to date of draft i.e. March 2003

<sup>1\*</sup> Amended per 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> Consolidation per s. 25(3) of the CPRA

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

✓<sup>5</sup> Note that on consolidated licences, one well may not be sufficient to hold all lands in the consolidated licence, depending on the terms of consolidation.

**Exploration Licences Issued as a Result of Calls for Bids since 1994**

Southern NWT (Fort Liard)	8 in January 1995 6 in April 1996	all for 7 years (4+3)
Central Mackenzie Valley	8 in May 1995 6 in March 1996 7 in May 1997 6 in August 2000 5 in September 2001	for 9 years (5+4) for 9 years (5+4) for 8 years (4+4) for 8 years (4+4) for 8 years (4+4)
Mackenzie Delta / Beaufort Sea	4 in September 1999 9 in August 2002 2 in May 2002	all for 9 years (5+4)

**Benefits**

The oil and gas sector continued to demonstrate its potential to become a significant component of the northern economy. High levels of exploration and development activity near Fort Liard and in the Cameron Hills and in the Mackenzie Delta and central Mackenzie Valley have created significant employment, training and procurement opportunities for Northerners and northern firms.

Fort Liard has experienced high levels of employment and business contracting as a result of continued and new oil and gas activities. Northerners and northern firms have continued to respond positively and benefit from the opportunities arising from oil and gas activity. The seasonal nature of employment fits well with the dual traditional/wage economy of many communities.

The number of exploration wells drilled in the NWT region reached the highest level since the late 1990s. Additionally, the Colville Lake area saw the first oil and gas exploration activity in a number of years. The Department's Yellowknife-based Petroleum Development and Benefits Division continued to have the lead responsibility for the administration of benefits plans in NWT, working closely with the Northern Oil and Gas Directorate to complete the transition begun in 2001. Division staff met with the Inuvialuit, First Nations and northern communities to better understand their benefits issues and concerns and to increase public understanding of the *Canada Oil and Gas Operations Act* benefits plan requirement.

## Environmental Considerations

### Consultations

Before issuing calls for nominations, consultations are held with northern Aboriginal groups to identify areas of environmental sensitivity, including ones holding special interest for cultural or spiritual reasons. DIAND also consults with other federal departments and territorial government agencies.

Environmental considerations also play an important role when issuing land use permits, water licences and all work authorizations.

The terms and conditions of the calls for nominations and bids reflect the results of this consultation process.

### Regulatory Road Map

Three separate regulatory guides, which outline the framework for authorizing oil and gas exploration and production activities were produced in 2002. These guides include the Sahtu Settlement Area, the Gwich'in Settlement Area and the offshore Beaufort Sea Region.

Each of these documents build upon similar regulatory road maps for the southern Mackenzie Valley of 2000, and the Inuvialuit Settlement Region (Mackenzie Delta) in 2001, and completes the goal of a five part series of road maps for the Northwest Territories and offshore areas.

### Environmental Studies Research Funds (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

The northern 2002 ESRF study program was comprised of \$529,290, and included funding for a number of programs, including a *Cumulative Effects* study, which will build on experiences gained in Atlantic Canada and other countries. A *Heritage Resources* examination for the Mackenzie Delta, a mapping project which will identify historic and cultural sites, has begun, and as a first step, a literature review is underway.

Building upon the resurgence of oil and gas activity in the north and anticipating the need for continuing new research, the ESRF Management Board continued their study program for 2002, funded by a levy of between zero and seventeen cents per hectare. This levy was agreed to by industry representatives and approved by the Minister.

A project to identify *Biophysical Information and Research Gaps* analysis related to oil and gas exploration, development and a potential pipeline in the Mackenzie Valley is also underway. In this regard, two northern

workshops are planned next year. Disposal of waste discharges in the north related to drilling sites is also being reviewed, and a technical advisory team consisting of industry, consultants and government has been reviewing past waste discharge practices. This team is also reviewing today's latest technological advances, examining applicable legislation, planning a workshop, and will

make recommendations to update the disposal process of northern waste discharges.

The ESRF is managed by the National Energy Board on behalf of the Minister. Further information may be obtained from the ESRF website at [www.esrfunds.org](http://www.esrfunds.org).

## EXPLORATION ACTIVITY IN THE NORTH

Expenditures on exploration activities totalled \$271 million. This total includes cost of geophysical and geological programs, exploratory, development and field development drilling, and well abandonments.

Eighty-nine per cent of this expenditure was in the Mackenzie Delta and shallow Beaufort sea and most of the remainder in the central and southern NWT.

### Northern Operations

Thirteen new wells were commenced in 2002, the same as the previous year. However, total metres drilled increased to 27 617 m from the 17 400 m for 2001. This total includes 6497 m drilled for four development wells in Cameron Hills, one delineation well on the Tuktoyaktuk Peninsula and two scientific test wells to test hydrate potential on the Mackenzie Delta.

Two wells were drilling in the NWT on January 1, 2002, one in the southern NWT and one on the Tuktoyaktuk Peninsula. Both were completed by early February.

Winter well operations ended on April 6, 2002 in the southern NWT and continued until April 25 on the Mackenzie Delta. There were no summer well operations.

With late freeze up in western Canada no new wells had spudded by year end.

In 2002, the National Energy Board authorized a total of 30 geophysical, geological and environmental field programs. This total comprised 21 seismic acquisition programs totalling 2506 km of 2-dimensional (2D) and 4060 km of 3D seismic, 69370 km of aeromagnetic survey, two geological/geochemical sampling programs and one seismic reprocessing program which involved no field component. Two field environmental studies were also conducted and two field tests to evaluate fish responses to seismic sources. Overall levels of geophysical and geological operations were sustained but with a focus on the Mackenzie Delta and a decline in activity elsewhere.



## Southern Northwest Territories

Three exploratory wells were drilled in the Fort Liard area east of the Liard River in 2002. Anadarko drilled Netla A-68 on lands held by SDL13 using Akita Rig #50. The well was plugged and suspended at a total depth of 2942 m. Paramount and Berkely drilled and suspended the West Arrowhead C-02 well on EL383 to 694 m using Precision Rig #55. Paramount also drilled the Bovie F-66 well to a total depth of 3362 m on the Bovie anticline using Akita Rig #58. The well has been suspended.

Paramount also began new drilling in the Cameron Hills to build reserves for oil and gas development. The company contracted two rigs; Shetah Rig #14 and Precision Rig #117. Three development wells, C-74, H-03, I-73 and one well designated exploratory (N-28) were drilled, all to targets in the depth range

1600 to 1700 metres. The N-28 well was completed as a gas well.

Five seismic programs were conducted in the southern NWT in the region of Fort Liard and Nahanni Butte. Two 3D surveys were conducted in the Fort Liard area, by Anadarko and by Paramount. Paramount also ran a 3D and a 2D program in the Cameron Hills.

Apart from these exclusive company operations, Explor Data Ltd. acquired a small 2D program on a non-exclusive basis.

Totals of 329 km of 2D seismic and 1109 km of 3D seismic were shot using geophysical contractors Veritas, Trace Exploration and Western Geco. In addition to seismic operations, Fugro Airborne Surveys flew a non-exclusive aeromagnetic survey.

## Central Mackenzie Valley

Only one well was drilled in the Central Mackenzie Valley in 2002. The exploratory well, EOG et al Devo Creek P-45 was drilled to 2594 m on EL401 using Akita Rig#51. This well met the work program requirement for the first period of this licence.

No industry operated geophysical or geological programs were conducted in this region in 2002. However, the fifth phase of the Geological Survey of Canada's aeromagnetic survey program covering the Mackenzie Corridor was conducted over an

area extending from the Peel Plateau (NWT) into Yukon. The high-resolution aeromagnetic data will assist assessment of geological structure and development of potential targets for hydrocarbon exploration.

The recent survey, flown in the spring of 2002, consisting of 28 400 line kilometres of traverse and control lines, was monitored by the GSC and carried out by Fugro Airborne Surveys. Results are published in GSC Open Files 1538-1545.

## Nunavut, the Northern Offshore and Eastern Arctic Offshore

Following up on the activity of the previous year in the Davis Strait between Greenland and Canada, marine seismic company TGS-NOPEC returned and acquired a further 200 km of 2D marine seismic in Canadian waters. Also during the summer, the same company ran a second program in the

Labrador Sea which ran north into waters offshore Baffin Island. No oil and gas exploration was undertaken in Nunavut, or in northern offshore waters of the High Arctic. One program to reprocess existing seismic data was authorized.

## Beaufort Sea - Mackenzie Delta Basin

The Mackenzie Delta region saw a major upswing in exploration activity in 2002. After re-entry and testing, Petro-Canada abandoned the Kurk M-15 well on EL395 which was drilled to total depth in 2001. Petro-Canada with partner Devon Canada then spudded the Kugpik L-46 well on the same licence using Akita/Equatak Rig #60. The well was plugged and suspended at 3005 m.

In a reversal of roles, Devon with partner Petro-Canada completed drilling a delineation well at Tuk M-18 with the Akita/Equatak Rig#63. The well was drilled to 2962 m on Inuvialuit private lands and subsequently announced as a gas discovery by the company with potential reserves of 200 to 300 billion cubic feet.

A nearby location, Tuk B-02, classified as exploratory, was drilled as a follow-up but was subsequently plugged and abandoned.

Two further wells were drilled at Mallik on the Mackenzie Delta to complete a three well program operated by Japex Canada Ltd. in collaboration with the Geological Survey of Canada to test the productive capability of gas hydrates.

Fifteen seismic programs were conducted in the Mackenzie Delta region in 2002, a 50% increase of the strong activity of the previous winter. The seismic programs included nine 3D programs of which four included a 2D component, plus a further six 2D programs.

Totals of 2951 km of 3D and 1613 km of 2D seismic were acquired. All were exclusive programs shot to evaluate existing licences. One offshore operation conducted by Devon Canada completed a seismic program commenced the previous year for offshore licences now consolidated into EL420. The geophysical contractors used for these operations were Veri-Illuq Geophysical Ltd, Delta Trace and Western Geco.

In addition to these programs Western Geco undertook field environmental tests to investigate potential effects of seismic operations in the Mackenzie River. One geological field party into the Richardson Mountains, one geochemical sampling program and two environmental field programs were also conducted.

## DEVELOPMENT AND PRODUCTION

Total natural gas production from the Northwest Territories declined by 19% in 2002 from the peak reached in the previous year despite new production from field development at Cameron Hills.

New field development drilling by Chevron Canada in the Liard Field, approved at end

2002, is expected to boost production from this important field.

At year end five gas fields were in production and one oil field (Norman Wells). Of the gas fields, one (Ikhil) is producing for local consumption, and four are shipping gas south from the NWT.

<b>2002 DRILLING STATISTICS</b>										
WELL NAME	LAT	LONG	CLASS <sup>1</sup>	TD (m)	Metres drilled in 2002 (m)	SPUD DATE	RR DATE	STATUS <sup>2</sup>	RIG	LICENCE <sup>3</sup>
<b>Southern Territories</b>										
Anadarko Netla A-68	60.78539	-122.69414	EX	2035	2030	23/Feb/02	22/Mar/02	P&S	Akita 55	SDL013
Paramount Anadarko Bovie F-66	60.25551	-122.95943	EX	3370	3362	05/Jan/02	06/Apr/02	P&S	Akita 58	EL369
Paramount Anadarko Bovie J-76	60.26233	-122.98319	EX	3350	2847	22/Dec/01	27/Feb/02	SUSP	Akita 58	EL369
Paramount Berkley West Arrow head C-02	60.52003	-123.01956	EX	694	694	27/Dec/01	08/Jan/02	SUSP	Precision55	EL383
Paramount et al Cameron C-74	60.05371	-117.49087	DV	1626	1626	08/Mar/02	26/Mar/02	OIL SUSP	Precision117	PL13
Paramount et al Cameron H-03	60.03993	-117.50214	DV	1662	1658	22/Feb/02	29/Mar/02	OIL SUSP	Shehtah14	SDL103
Paramount et al Cameron I-73	60.04575	-117.47347	DV	1638	1623	08/Feb/02	20/Feb/02	OIL SUSP	Shehtah14	PL04
<b>Central Mackenzie Valley</b>										
EOG et al Devo Creek P-45	65.41450	-127.62886	EX	2600	2594	05/Jan/02	15/Mar/02	SUSP	Akita51	EL401
<b>Mackenzie Delta</b>										
Devon PC Tuk B-02	69.35314	-133.01600	EX	3187	3173	17/Feb/02	16/Apr/02	P&A	Akita63	IN
Devon PC Tuk M-18	69.29739	-133.07628	DL	2962	2759	24/Dec/01	30/Mar/02	SUSP	Akita63E	IN
Japex/JNOC/GSC Mallik 3L-38	69.46064	-134.66156	Other	1188	689	25/Dec/01	08/Jan/02	P&A	Akita15	EL393
Japex/JNOC/GSC Mallik 4L-38	69.46132	-134.65970	Other	1188	1184	11/Jan/02	24/Jan/02	P&A	Akita/Equatak	EL393
Japex/JNOC/GSC Mallik 5L-38	69.46097	-134.66064	Other	1166	1162	25/Jan/02	14/Mar/02	P&A	Akita15	EL393
PC Anderson Kurk M-15	69.07682	-135.33302	EX	3093	3093	07/Jan/02	16/Feb/02	P&A	Akita15	EL395
PC Devon Kugpik L-46	68.92821	-135.45359	EX	3014	3005	11/Mar/02	25/Apr/02	P&A	Akita60	EL419
<sup>1</sup> Class EX=exploratory, DL=delineation, DV=development <sup>2</sup> Status P&S=plugged and suspended, PROD=production, IN= injection, SUSP=suspended <sup>3</sup> Licence EL=Exploration Licence, SDL=Significant Discovery Licence, PL=Production Licence, PAA=Proven Area Agreement-Norman Wells, IN=Inuvialuit Lands										

## Mackenzie Delta

### Ikhil (Field Code G005)

The Ikhil gas field is operated by AltaGas. The field lies in the Mackenzie Delta, 50 km north of Inuvik, NWT. Originally discovered in 1983, the field remained undeveloped until 1999. The reservoir is in the Taglu sands (Reindeer Formation) of Eocene age at a depth of about 1100 m. Gas is delivered through a buried 120 mm (6") pipeline to Inuvik where it is used for electricity generation and town supply.

Production in 2002 was  $14.8 \times 10^6 \text{ m}^3$  (0.5 billion cubic feet - bcf) with cumulative production totalling  $42.3 \times 10^6 \text{ m}^3$  (1.5 bcf). The field produces from two wells (K-35 and J-35). Clear annual peaks in production reflect high local demand over the winter months.

## Southern Northwest Territories

### Pointed Mountain (Field Code G003)

The field was shut-in October 2001 and throughout 2002.

### Canadian Natural Resources Limited Fort Liard "P-66A" (Field Code G008)

The field was shut-in throughout 2002.

### Chevron Fort Liard "K-29" (Field Code G007)

The Liard field, operated by Chevron Canada, is located in the foothills northwest of Fort Liard NWT and west of the Liard River. The gas reservoir is the Devonian Nahanni

## Central Mackenzie Valley

### Norman Wells (Field Code G001)

The Norman Wells oil field, operated by Imperial Oil Resources, extends beneath the Mackenzie River at 65°20' N latitude. The oil reservoir is a reef of the Devonian Kee Scarp Formation. The field is the starting point of the Norman Wells oil pipeline.

Production in 2002 was  $1375 \times 10^3 \text{ m}^3$  (8.6 million barrels). By end 2001, cumulative production from Norman Wells field reached  $33.5 \times 10^6 \text{ m}^3$  (210.7 million barrels). Solution gas produced with the oil is used for plant fuel and re-injected.

### Paramount Southeast Fort Liard "N-01" (Field Code G009)

Annual production was  $61.9 \times 10^6 \text{ m}^3$  (2.2 bcf) and rates from the single well in the field were sustained throughout the year. By year end cumulative production from the field stood at  $95.1 \times 10^6 \text{ m}^3$  (3.4 bcf).

Formation in a foothills structure about 3000 m below surface. The gas is slightly sour.

Gas flows through a 46 km pipeline to BP Canada Energy's Pointed Mountain facility where it joins the current northern terminus of the Westcoast pipeline system.

A water disposal line connects the field to a water disposal well at Mackay Lake O-80. The field produces from three wells K-29, M-25 and F-25A.

Total field production in 2002 was 834.1 x 10<sup>6</sup> m<sup>3</sup> (29.4 bcf) and cumulative field production to the end of 2002 was 2537.8 x 10<sup>6</sup> m<sup>3</sup> (89.6 bcf). Towards the end of 2002 production rates were reduced to stabilize rising water production.

Field production at year end was about half of the peak flows at the end of 2001.

### Paramount Fort Liard "F-36" (Field Code G006)

This field, operated by Paramount Resources, is located 25 km southeast of Fort Liard NWT. Gas is produced from the Mississippian Mattson Formation about 2000 m below surface.

Twenty-four kilometres of 324 mm (12") pipeline (the "Shiha Pipeline") carries the gas south to a processing plant near Maxhamish Lake, British Columbia.

Two wells (F-36 and O-35) were producing at the end of 2002. Production in 2002 totalled 38.8 x 10<sup>6</sup> m<sup>3</sup> (1.4 bcf) for a total cumulative production of 177.9 x 10<sup>6</sup> m<sup>3</sup> (6.3 bcf). Field production has shown steady decline throughout the year.

## Oil and Gas Production

	1997	1998	1999	2000	2001	2002
Oil Production (thousands of m <sup>3</sup> )						
Norman Wells <sup>1*</sup> (G001)	1584.6	1561.7	1549.1	1434.3	1432.20	1375.4
Cameron Hills (G010)	-	-	-	-	-	1.1
<b>Total</b>	<b>1584.6</b>	<b>1561.7</b>	<b>1549.1</b>	<b>1434.3</b>	<b>1432.20</b>	<b>1376.5</b>
Gas Production (millions of m <sup>3</sup> )						
Norman Wells <sup>1*</sup> (G001)	135.5	132.8	126.5	125.6	130.20	123.3
Pointed Mountain (G003)	33.9	25.2	21.0	17.1	9.10	Shut-in
Ikhil (G005)	-	-	3.3	10.0	13.20	14.8
Paramount Fort Liard (G006 - "F-36")	-	-	-	66.3	71.80	38.8
Chevron Fort Liard (G007 - "K-29")	-	-	-	490.1	1213.60	834.1
CNRL Fort Liard (G008 - "P-66A")	-	-	-	60.1	1.80	Shut-in
Paramount Southeast Fort Liard (G009-"N-01")	-	-	-	-	33.20	61.9
Cameron Hills (G010)	-	-	-	-	-	124.1
<b>Total</b>	<b>169.4</b>	<b>158.0</b>	<b>150.8</b>	<b>769.20</b>	<b>1472.90</b>	<b>1197.0</b>

<sup>1\*</sup>Note: Field code "G00X" assigned by the National Energy Board

## New Field on Production in Southern Northwest Territories

### Paramount Cameron Hills (Field Code G010)

The Cameron Hills are located in the southern NWT just north of 60° and west of the Mackenzie Highway. Oil and gas discoveries resulted from a phase of exploratory drilling in the late 1980s and early 1990s but although a development plan focussed on oil production was filed in 1991, development was not pursued at that time.

Paramount Resources Limited filed an amended development plan for gas and oil production from the Cameron Hills on behalf of themselves and Marathon Canada Limited in November 2000. The applicants received approval for their amended development plan

from the National Energy Board on January 9, 2002, subject to consent from the Governor in Council with respect to Part I of the Plan. The Order in Council granting consent (P.C. 2002-64) was issued on January 25, 2001. Small volumes of oil and gas were produced from three oil wells and two gas wells in March, and commercial gas production from six wells commenced in earnest in April. At year end cumulative gas production had reached  $124.1 \times 10^6 \text{ m}^3$  (4.4 bcf) from five producing wells. Gas enters a small diameter pipeline which runs 15 km to a central processing plant near Bistcho Lake, Alberta.

## ROYALTIES

Royalties on northern oil and natural gas production were \$24,163,942 in calendar year 2002. This is a slight decrease of 9.4% or \$2,506,493 from the 2001 royalties. Some of the decrease is due in part to a decrease in sales prices from those that were encountered in 2001 in addition to production declines that are associated with small pools and subsequently more aggressive depletion.

It should be noted that the royalties that are collected are net of any outstanding Investment Royalty Credit (IRC) balances that must be depleted prior to companies making royalty payments. It is anticipated that as companies continue to explore and make application for certification of expenses that contribute to their IRC pools, the royalties payable will continue to be conservative in relation to activity until an infrastructure is in place in

the Mackenzie Delta that will allow for significant production of otherwise shut-in resources.

The Sahtu and Gwich'in First Nations also received a share of the royalties in fulfilment of royalty - sharing provisions in their land claim settlement agreements.

Royalties administration continues to be an evolving process given that the legislation, regulations and guidelines including the forms used for royalty submission are still in the infancy stages of implementation.

We have gained much experience over the past few years, arriving now at a stage that necessitates a modernizing and streamlining of the royalty regulations and the administration.

In mid 2002, Northern Oil and Gas undertook two concurrent studies:-

- i) a review of the royalty legislation, regulations and guidelines and
- ii) a review of the royalty assurance process.

Preliminary meetings have already occurred with industry as the first step to developing issues papers and options that will be discussed with stakeholders that include industry, northern aboriginal groups, northern governments, and petroleum associations. These issues are anticipated to be available for discussion by April 2003.

During 2002, Northern Oil and Gas also undertook to provide industry with an interim solution for electronic submission preparation using spreadsheet software and workbooks. This solution has provided us with the experience from which we are now undertaking a formal strategic plan that will form the basis for infrastructure development to accommodate electronic filing of royalties, electronic royalty management, administration and forecasting.

The Directorate is looking forward to meeting the challenges of streamlining and modernizing a legislative, regulatory and royalty administration system that encourages and supports oil and gas development in the north.

### Oil and Gas Revenues Received (\$)

	1997	1998	1999	2000	2001	2002
Royalty*	9,887,982	6,967,456	7,138,169	13,433,264	24,656,709	21,751,369
Rentals	7,818	7,818	3,245	2,800	993	2,621
Issuance/Registration Fees	22,464	2,052	16,766	51,589	12,733	17,800
Work Deposit Forfeitures	0	0	289,874	1,342,385	0	2,392,150
<b>Total</b>	<b>9,918,264</b>	<b>6,977,326</b>	<b>7,448,054</b>	<b>14,830,038</b>	<b>24,670,435</b>	<b>24,163,940</b>

\*Royalties that are collected are net of any outstanding Investment Royalty Credit balances which amounted to \$1,210,473 in 2002.

## FURTHER INFORMATION

### Northern Oil and Gas Directorate

Please check our website first! [www.ainc-inac.gc.ca/oil](http://www.ainc-inac.gc.ca/oil)

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.

**Mailing** address:

Northern Oil and Gas Directorate  
Department of Indian and Northern Affairs  
OTTAWA ON K1A 0H4 Canada

Courier Only:

**Northern Oil and Gas Directorate**

6th Floor, 10 Wellington Street

Gatineau QC K1A 0H4

Telephone: (819) 997-0877

Fax: (819) 953-5828

Internet: <http://www.ainc-inac.gc.ca/oil>

Information on the resource management regime, calls for nominations and bids and other related information: Rights Issuance and Policy - Telephone: (819) 953-8529.

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

Information on northern exploration history and geological/geophysical activities: Senior Petroleum Geologist - Telephone: (819) 953-8722.

Information on Benefits Plan requirements associated with new exploration programs on land in the Northwest Territories is available from the department's Northwest Territories Regional office - Telephone: (867) 669-2618; and for Nunavut and northern offshore the information is available from the Northern Oil and Gas Directorate - Telephone: (819) 994-0348.

Information on royalty policy and royalty submissions: Manager, Fiscal Policy and Royalty Administration - Telephone: (819) 953-9488.

### **Petroleum Development and Benefits Division**

Northwest Territories Regional Office  
Department of Indian and Northern Affairs  
4914-50th Street, P.O. Box 1500  
Yellowknife, NWT X1A 2R3  
Telephone: (867) 669 2618  
Fax: (867) 669-2409



## Other Sources of Information

Through the offices of the National Energy Board at the address below, 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 provides the Secretariat for the Environmental Studies Research Funds Management Board.

National Energy Board (NEB)  
444 Seventh Avenue SW  
Calgary AB T2P 0X8  
Telephone: (403) 292-4800  
Fax: (403) 292-5503

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:

Institute of Sedimentary and Petroleum Geology  
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  
Geological Survey of Canada Atlantic  
Bedford Institute of Oceanography  
P.O. Box 1006  
Dartmouth NS B2Y 4A2  
Telephone: (902) 426-6127  
Fax: (902) 426-4465  
Email: [hardy@agc.bio.ns.ca](mailto:hardy@agc.bio.ns.ca)