Northwest Territories
Oil and Gas Activity Forecast
2012 - 2021

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Integrated Environments (2006) Ltd.
www.integrated-environments.com

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1.0 Summary and Introduction

This report was commissioned by the Government of the Northwest Territories to forecast Northwest Territory (NWT) oil and gas exploration and development activity, incremental to the current plans for the Mackenzie Gas Project (MGP), over a 10 year time frame from 2012 through 2021. Information was used as of July 4, 2011, after the release of the Northern Oil and Gas 2010-2011 Call for Bids results.

The report is divided into four main sections: Introduction, Forecast Assumptions, Industry Structure and Capacities, Forecasts and Appendices. Forecasts are divided into four regions of the NWT, the Beaufort Sea and Mackenzie Delta, Southern Mackenzie Delta, Central Mackenzie Valley and the Southern Mackenzie Valley.

For the purposes of this forecast nine different types of 'activity' are forecast: 2d seismic, 3d seismic, exploration wells, delineation wells, production (including injection) wells, pipeline (kilometers), gas conditioning facilities, gas processing facilities and, site closure activity. An activity is a single-year event on a license. A seismic line that crosses more than on Exploration License will be counted for each license it crosses. A single exploration well that takes three seasons (for example a deep offshore exploration well) will be reported as a single activity in each of the three years the well is being drilled.

Activity related to the MGP itself is not forecast in this report. For MGP-specific example activity in the Mackenzie Delta is anticipated to include 30-56 production (including disposal) wells and 190kms of pipeline over the three anchor fields over a three year period as well as 1,200kms of mainline pipeline.

There are two forecasts provided, set out as Base Case and Low Case forecast scenarios.

Base Case Forecast

The Base Case forecast is driven by the assumptions outlined in Section 2. The key assumptions are:

- MGP Decision to Construct December 2014 and in-service date of December 2019;
- NEB Arctic Review Report filed December 2011 that does not significantly alter costs and timelines for Beaufort Sea development; and
- No substantive policy, regulatory or land jurisdictional changes that affect industry activity.
- Natural gas distribution to the community ceases at the Norman Wells Proven Area in 2014 and oil production ceases in 2020.

On an NWT-wide basis activity is driven by four main areas; Beaufort Sea activity is expected to pick up in 2016 after regulatory and drill rig preparation following the NEB Arctic Review; Mackenzie Delta activity will begin in 2015 following the MGP Decision to Construct; development activity will occur in the Central Mackenzie Valley to feed the MGP and to look for oil to meet the distribution opportunity in the Norman Wells pipeline; and steady drilling and development is expected at the Cameron Hills area

of the Southern Mackenzie region. There is extended potential following the recent Exploration License Nominations in the Central Mackenzie Valley and interest in shale gas exploration in the Liard area.

NWT Base Case Forecast*

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometers)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012	10	2	2	1	4	10	0	0	3
2013	9	4	0	1	4	10	0	0	2
2014	9	9	1	0	5	10	0	0	2
2015	9	12	4	1	5	10	0	0	1
2016	7	11	5	6	14	10	0	0	1
2017	10	15	3	7	16	10	0	1	1
2018	11	17	5	6	14	441	3	1	1
2019	11	16	3	6	5	10	0	0	1
2020	10	17	5	3	6	10	0	0	1
2021	9	16	3	5	4	64	0	0	1

- MGP specific activities (Other field Production wells and pipelines are not included in the Forecast)

Low Case Forecast

The Low Case is driven by the following key assumptions:

- No MGP Decision to Construct during the forecast period;
- Arctic Review Report filed June 2012 that moderately adds to the costs and timelines for Beaufort Sea development;
- No substantive policy, regulatory or land jurisdictional changes that affect industry activity; and,
- No substantive movement on Land Claims in the Dehcho region.
- To foster production at the Norman Wells Proven Area, it is anticipated that two production (or development) wells will be undertaken (2014 and 2016) until the Low Case forecasted shut down in 2018.

On an NWT-wide basis activity is driven in four main areas. Beaufort Sea Activity will pick up in 2017 after the NEB Arctic Review; exploration activity will be focused on potential oil resources in the Central Mackenzie Valley to feed the Norman Wells pipeline; and ongoing activity is anticipated at the Cameron Hills field.

NWT Low Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometers)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure*
2012	9	1	2	1	3	7	0	0	3
2013	7	1	0	1	0	0	0	0	2
2014	6	4	1	1	4	7	0	0	2
2015	4	4	0	1	0	0	0	0	1
2016	5	4	0	2	4	7	0	0	1
2017	6	5	0	3	0	0	0	0	1
2018	5	7	0	2	3	7	0	0	1
2019	6	7	0	1	0	0	0	0	1
2020	5	8	0	2	3	7	0	0	1
2021	6	8	0	2	0	0	0	0	1

The information and conclusions presented are based on assessments of information in prior reports and other publicly available information. References are documented in the Appendix.

The information presented in this report cannot be construed to be an exhaustive and comprehensive forecast of all business activity expected during the next 10 years. Given the limited time available to undertake the task, several high level assumptions have been made in order to arrive at a reasonable assessment of potential oil and gas related activity in the NWT during the 10 year period from the beginning of 2012 until the end of 2021.

Information and forecasts presented in this report are estimates, accuracy of which is a function of the quality of the available data as of July 4, 2011 with the results of the Northern Oil and Gas 2010-2011 Call for Bids, and the circumstances at the time of its production. It is presented with the understanding that subsequent developments and new data may necessitate revision of the forecasts and any other data presented herein.

2.0 Assumptions in Forecasting Future Oil and Gas Activity

This forecast is framed by a series of industry plans, oil and gas price, land availability, regulatory process, fiscal framework and, project development design assumptions reviewed during March of 2011. The assumptions are also driven by the frontier nature of operating in the Northwest Territories, with limited infrastructure, a new and evolving regulatory regime and the costs of operations. Assumptions affecting the whole region are outlined below. Specific assumptions by region are also provided in each regional forecast.

2.1 Core Assumptions

Mackenzie Gas Project Development Timelines

Imperial Oil provided an updated project schedule to the NEB on March 15th, 2010 on behalf of the Mackenzie Gas Project (MGP). Further updates have been provided by the MGP which outline their estimate of a December 2013 Decision to Construct and a December 2018 in-service date. These timelines are dependent on sufficient progress on fiscal terms by June of 2011. A delay on fiscal terms could lead to a delay in the summer 2011 field programs, pushing the required regulatory steps to delay the Decision to Construct to December 2014, serving to further delay the project.

Base Case MGP Timelines

For the purposes of this forecast, the timelines for the Decision to Construct and In-Service date are one year later than the current MGP reported schedule. The Base Case MGP timelines are provided below.

March	2011	NEB Issues Certificate of Public Convenience and Necessity (CPCN)
Fall	2011	Fiscal Terms developed between MGP and Canada
December	2014	Proponents Decision to Construct
December	2015	Construction Commences
November	2019	In-service (operational) date

For the Low Case forecast it is assumed that the partners of the Mackenzie Gas Project withhold any Decision to Construct during the forecast period.

MGP Project Design

The capacity of the Mackenzie Valley Gas Pipeline can be increased from its initial capacity of 1.2 Bcfd to its maximum capacity of 1.8 Bcfd by installation of 10 additional compressor stations. Expansion is not assumed to occur during the forecast period. Section 3.1 describes MGP project design constraints in detail.

Alternative Export Options

The availability of petroleum export capacity has constrained exploration interest and development. The extent of development work undertaken is limited by the foreseeable ability to move oil and gas resources to market. A lot of fields have been discovered and Significant Discovery Licenses have been acquired. However, developmental and production drilling has not taken place.

This forecast does not contemplate any alternative oil or gas development and transmission options other than those already proposed through regulatory application. There remain conceptual ideas for oil tanker export out of the Beaufort Sea, gas transmission connected with export options from the Alaska (Prudhoe Bay area) fields, LNG export from the Mackenzie Delta and a gas pipeline from the Central Mackenzie Valley south to the Alberta mainline system.

Mackenzie Valley Highway

There is currently an active proposal, sponsored by the GNWT, under development for the construction of a Mackenzie Valley Highway from Wrigley to Inuvik and Inuvik to Tuktoyuktuk. Work is underway to develop an initial Project Description Report to facilitate Regulatory Screening in 2012. The proponents' timeline is provided below.

Jan 2012	Overall Project Description for Wrigley to Inuvik submitted to the MVLWB
Feb 2012 – Sept 2012	MVLWB Screening Process
Oct 2012– Dec 2012	MVEIRB Environmental Assessment Process
Oct 2012 – Aug 2014	Construction Permitting, Survey
Dec 2014 – Mar 2016	Construction

For the purposes of the forecast the Mackenzie Highway is not anticipated to affect the MGP timeline or development activity.

Oil and Gas Prices

Long term forecasters are predicting (March 2011) gas prices to consistently rise from $4.00 CDN per mm Btu to $7.50 CDN per mm Btu in real terms (AECO price[1]) and oil prices to stay at or just above $100/bbl (Edmonton Light). Forecasted estimates such as these are assumed to hold over the forecast period (GLJ Associates 2011).

Gas price (and fiscal terms) confidence would be expressed by the MGP decision to proceed for the Base Case Forecast. By proceeding with the project, the developers of the Mackenzie Valley Pipeline and Mackenzie Gas Gathering System are confirming their expectation that long term oil and gas prices

[1] The Alberta spot natural gas price is commonly referred to as the "AECO price."

(particularly the gas price) will be remain high enough over the life of the project to make investments in new northern developments attractive.

Exploration License Oil and Gas Land Sales

Annual federal land and periodic settlement land sales continue to be held for the Inuvialuit and Gwich'in regions, and in the Sahtu Region. In the Dehcho region no land sales are anticipated to occur in the Low Case forecast. Limited federal land sales are anticipated to occur in the Base Case Forecast. In the Dehcho region federal land sales will make land available throughout the Dehcho region in accordance with the Draft Dehcho Land Use Plan in the Base Case forecast.

INAC Oil and Gas License information was obtained from the INAC Northern Oil and Gas website. This information was not reviewed to determine omissions, errors or discrepancies that may exist. Licenses are provided in the Appendix.

Exploration License Terms

Drilling deposits will be used to extend the first well Phase One work requirement for a number of Exploration Licenses to await the results of the MGP Decision to Construct before investing in exploration activity. This will delay drilling in the early term of both the Base Case and Low Case Forecasts.

With the potential for the MGP to be built, Exploration Licenses may have been acquired as an 'option' on the pipeline. With the ability, under the CPRA, to extend the first well requirement in Phase One of an EL through annual penalties of $1 million, companies may be delaying their investment decision in the next three to four years to await confirmation of MGP progress.

Policy Parameters

Land use plans are approved by respective Sahtu and Dehcho Land Use Planning authorities that provide for reasonable development of existing or new lands made available for exploration in the Base Case Forecast. The current regulatory and fiscal framework (royalties and taxation) does not substantively change.

Arctic Review

The NEB initiated a review of safety and environmental requirements for offshore drilling in the Arctic environment in response to issues arising from the BP Macondo Well failure in the Gulf of Mexico. This Arctic Offshore Drilling Review aims to examine the best information available on the hazards, risks and safety measures associated with offshore drilling in the Canadian Arctic.

The NEB aims to use results from the review to inform its decisions on future applications for offshore drilling in the Arctic. At the end of the Arctic Offshore Drilling Review, the Board will prepare a report on safety and environmental protection requirements for offshore drilling in the Canadian Arctic under the *Canada Oil and Gas Operations Act (COGOA)* in compliance with the *Canada Oil and Gas Drilling and Production Regulations (COGDPR).*

Given the potential for changes to requirements under the COGOA and COGDPR it is anticipated that Exploration Lease and Significant Discovery License holders will delay their investment decisions until the Arctic Review results are fully understood.

The NEB put out its first Call for Information in September 2010 and has given participants up to April 01 2011 to provide their responses to information gathered. The NEB anticipates releasing its Arctic Review Public Report in December 2011.

For the Base Case forecast it is assumed that the NEB will issue its report in December 2011 and for the Low Case forecast, June 2012.

Land Claims, Devolution and Boundary Claims

Land jurisdiction, governance and management are subject to change during the forecast period.

It is anticipated that outstanding Land Claims Agreements will be reached at an Agreement-in-Principle stage with the Dehcho First Nations and Acho Dene Ko First Nation in the Base Case Forecast. An Agreement is not anticipated for the Katlodeeche First Nation. For the Low Case Forecast settlements are not anticipated. Settlement of Land Claims Agreements in the Dehcho will facilitate the development of the MGP in the Base Case Forecast.

The NWT, Canadian and Tribal governments are under talks to devolve federal land, water and mineral resource jurisdiction and management, including oil and gas resources. It is anticipated that a full understanding of devolution will be reached during the forecast period in the Base Case Forecast. For the Low Case Forecast progress on devolution will not be completed. Devolution of authourity is not expected to affect the pace of oil and gas development during the forecast period.

Under the 1993 Canada Yukon Oil and Gas Accord, the federal government made a commitment to complete a shared offshore management regime and revenue sharing arrangement in the Beaufort Sea with Yukon. It is anticipated that significant advancement in discussions on offshore management will not take place until a Canada – NWT Onshore Devolution agreement is reached. Any changes to offshore jurisdiction or management are not expected to immediately affect oil and gas activity. It is not anticipated that any change in Beaufort Sea offshore jurisdiction or management will occur during the forecast period.

The Canada and US both claim an overlapping section of the Beaufort Sea along and adjacent to the 141st Meridian. Two Exploration Licenses are currently held up in this boundary claim. No movement on settling the offshore boundary claims between the US and Canada in the Beaufort Sea is anticipated.

3.0 Industry Structure and Capacities

3.1 Mackenzie Gas Project Design Capacities

The MGP design capacities will influence the pace and extent of gas-driven exploration and development in the Inuvialuit, Gwich'in and Sahtu regions. Overall capacity will ultimately govern the drive to explore and develop gas.

A graphical representation of the major facilities of the proposed Mackenzie Gas Project, based on information contained in regulatory filings, is presented in Figure 1 – Mackenzie Gas Project Gas Sources and Sales Rates. The gas conditioning facilities at the Niglintgak and Taglu fields, and the Inuvik Gas Plant, are designed with surplus capacity, as is the Mackenzie Valley Gas Pipeline which has a required capacity of 830 mmscfd and an initial design capacity of 1.2 Bcfd. Proponents have noted in regulatory filings that other gas may be tied in to the Anchor Fields and that facilities have been designed to accommodate this (Figure 2).[2,3,4]

With ten additional compressor stations, the capacity of the Mackenzie Valley Pipeline can be expanded to 1.8 Bcfd. The compressor stations required for future expansion are not part of the Proponents' regulatory application. As illustrated in Figure 1, the facilities included in the Proponent's Mackenzie Gas Project include:

- Anchor fields - Niglintgak, Taglu and Parsons Lake;
- Mackenzie Gas Gathering System - gas gathering pipelines, a gas processing facility near Inuvik, and a natural gas liquids pipeline from the Inuvik gas processing facility to Norman Wells; and
- Mackenzie Valley Gas Pipeline – pipeline and compression facilities required to move gas from the Inuvik gas processing facility to the Northwest Territories – Alberta border.

Expansion of the Mackenzie Valley Pipeline from 1.2 Bcfd to 1.8 Bcfd will be significantly influenced by the nature of future gas finds (Figure 3). Future expansion will be fairly easy if a large gas field near the pipeline is discovered, and more difficult if a number of small fields need to be developed and connected. The schedule for expansion of the capacity of the pipeline from 1.2 Bcfd to 1.8Bcfd is driven by the constraints on the approval and construction of new compressor stations on the Mackenzie Valley Pipeline, little change in the timing of the overall development is expected. Expansion is anticipated to begin in 2022, after the Base Case or Low Case Forecast periods.

[2] August 2004 Application For Approval Of The Development Plan for Niglintgak Field, Shell document NDPA-P1, Sections 4.4.2, 5.1.1, 5.4.1, 8.2.1
[3] August 2004 Application For Approval Of The Development Plan for Parsons Lake, ConocoPhillips/Exxon Mobile document PLDPA-P1, Sections 1.5.2.10, 4.3.6.3, 7.1.1, 7.2.2, 7.2.3
[4] August 2004 Application For Approval Of The Development Plan for Taglu Field, Imperial Oil document TDPA-P1, 3.3.4.

Figure 1: Mackenzie Gas Project

Gas Sources and Sales Gas Rates

(from regulatory filings)

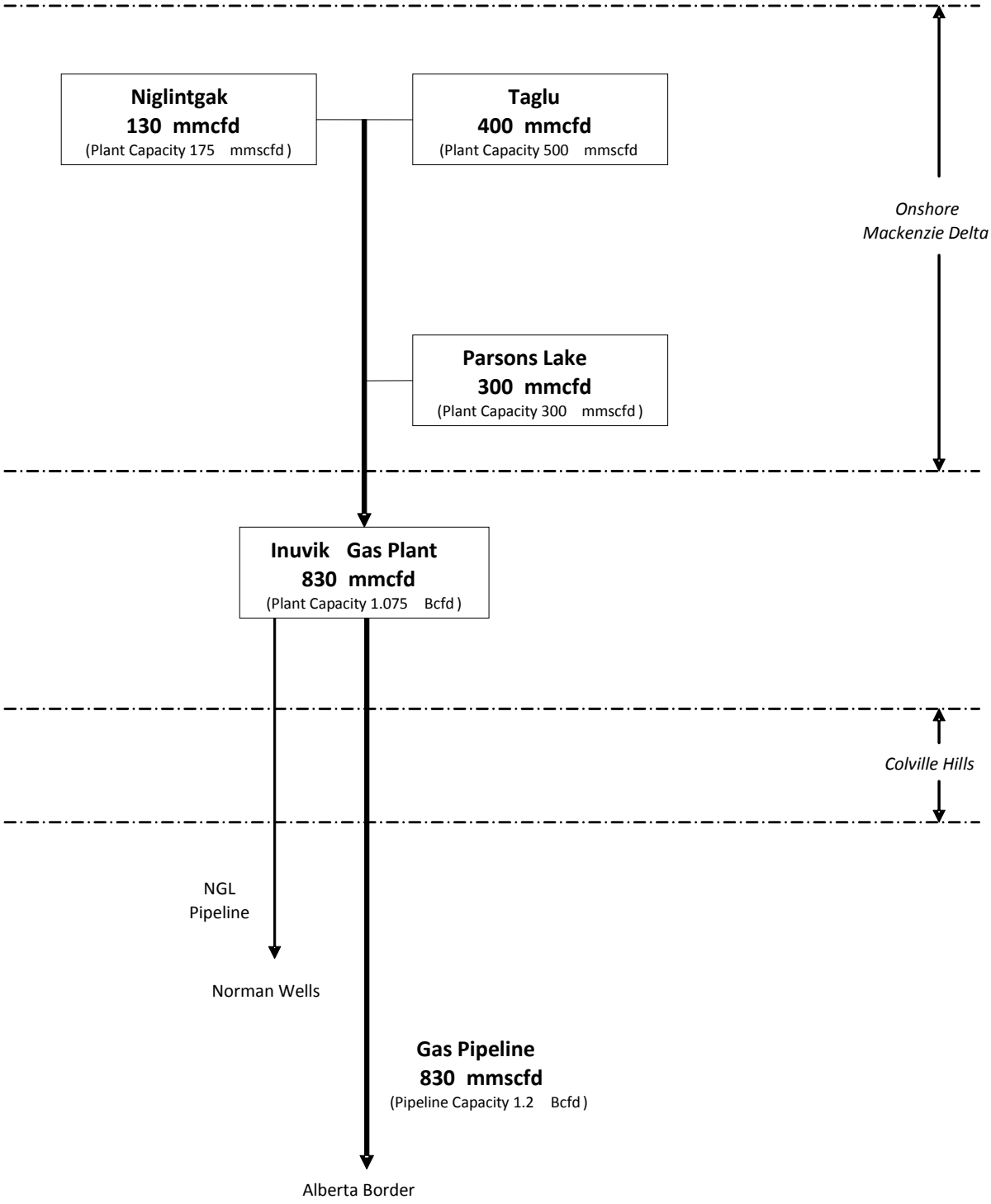


Figure 2: Base Case - 1.2 Bcfd (2019)

Gas Sources and Sales Gas Rates
(inferred from regulatory filings)

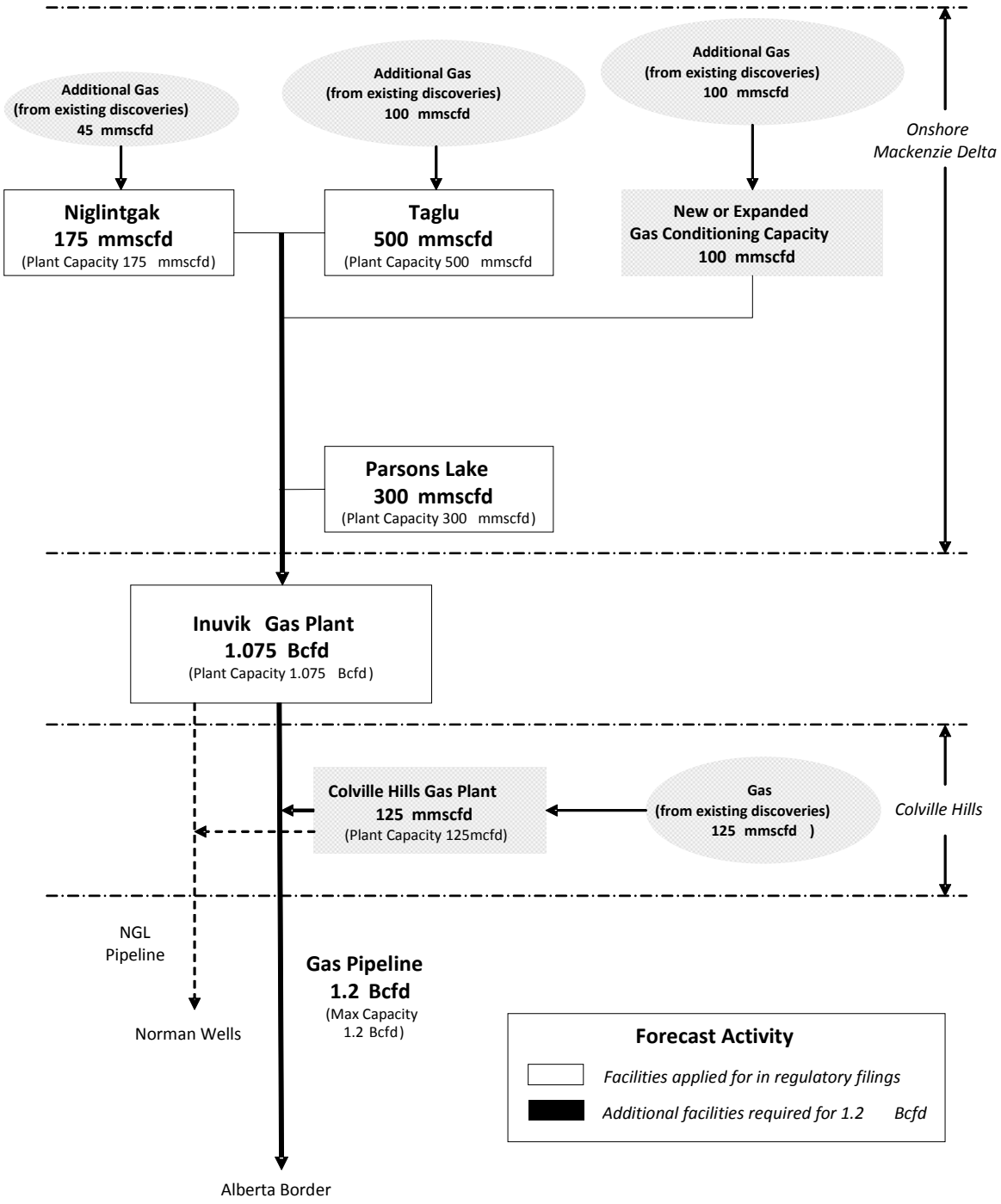
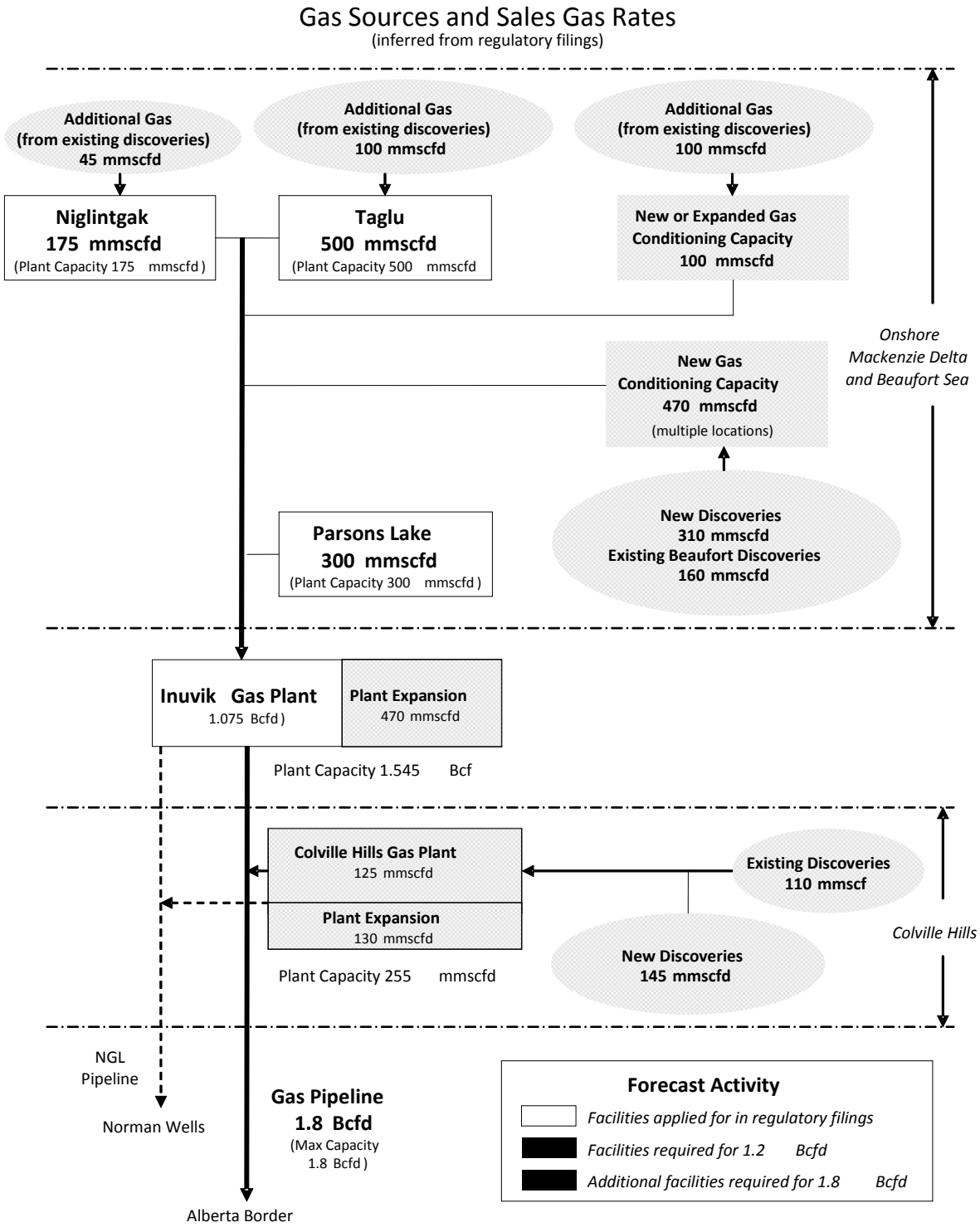


Figure 3: Future MGP Expansion to 1.8 Bcfd



Note: Diagram assumes the expansion of gathering system and tran smission pipelines as required

3.2 Project Activity Logistical and Capacity Constraints

Project activity levels in the NWT are limited by the logistics of mobilizing and operating equipment and resources and the available capacity of equipment to operate within different regions.

Logistics

The ability to coordinate logistics and marshal development capacity in the NWT is influenced by:

- The location of operations;

Operations in the Beaufort Sea are a logistical challenge unlike any of the onshore areas. Beaufort Sea projects proximate to landfast ice are well served by the Mackenzie Delta. Projects further out are dependent on a shipping and offshore ice-specific fleet that can deal with moving ice and seasonal limitations.

Operations on the Mackenzie Delta are served by the Dempster Highway to Inuvik and barging operations from Hay River to Inuvik. Access to specific locations on the Delta does vary depending on location.

Operations in the Central Mackenzie Valley - Sahtu region are the most constrained and are directly dependent on summer barging and winter roads for operations.

Operations in the southern Mackenzie Valley – the Liard and Cameron Hills area are accessible by road and winter road and are the least constrained.

- The need for most of the construction and drilling activity to take place in the short winter operation season (frozen ground) from January to April;

- Seasonal transportation constraints imposed by a short summer barging season and a short season when winter roads can be used; and

- Transportation capacity constraints that will exist during the period when the Mackenzie Gas Gathering System and the Mackenzie Valley Gas Pipeline are under construction.

Construction of the Mackenzie Gathering System and the Mackenzie Valley Pipeline will stretch construction and transportation resources in the North to the highest levels ever experienced. While planning activities are in progress to increase the capacities of the resources needed for the construction of the Mackenzie Gas Project there is some possibility that shortages of transportation and construction resources will delay the installation of the additional facilities needed to fill the pipeline to its initial design capacity (for one to two years).

Capacity

Onshore Drilling Capacity

There are 5 purpose-built Arctic class rigs that have been utilized in the NWT, Mackenzie Delta, four triples and one large double. All of these rigs are currently in Alberta or British Columbia. A new rig could be commissioned in a 12 to 18 month period, which would provide enough time to build rig capacity (if desired) to meet forecasted drilling requirements for the Base Case forecast.

On average each rig is capable of drilling 2 exploration wells or 4 to 5 development wells per season. This capacity will be reduced during the construction of the Mackenzie Gas Project when one conventional rig will be used to drill the production wells at Niglintgak (2017). Mackenzie Gas Project drilling at the Parsons Lake and Taglu fields will be done with new purpose built rigs. No limitations exist on drilling rigs for work in the Central and Southern Mackenzie Valley as rigs from Alberta and British Columbia are easily moved into the area.

The main drilling constraint, other than rig availability, is the three or four month season to drill on frozen ground. For exploration and development wells, the drilling season in the Mackenzie Delta typically runs January to April while the season in the Sahtu and Dehcho regions is shorter, typically January to March.

A Mackenzie Valley Highway will not change the length of the drilling season, and costs for drilling may be less as stand by and year round rentals would be reduced. However, rig mobilization and de-mobilization costs to and from sites in North America would have to be factored in.

Offshore Drilling Capacity

The availability of offshore drilling equipment and ice breakers and service vessels will limit drilling activity in the Beaufort Sea during the 10 year period of this forecast. Current Exploration Licenses are in different water depth and ice zones requiring different types of offshore drilling rigs and support vessels.

The Shallow Shelf area, proximate to the Delta and beyond, requires operations in less than 25 meters of water and a bottom-founded and moored drill rig that can operate for 85 days in open water and 120 days in winter. Existing drill rigs such as the SCDC could operate in the Shallow Shelf. 37 wells have been drilled at this depth.

The Deep Shelf area requires moored drilling rigs capable of operating in 25-100meters of water with multi-year ice intrusions. 48 wells have been drilled at this depth. The Slope requires dynamically positioned drilling rigs capable of operating in 100 – 1,200 meters of water in multi-year ice. New drill rigs and potentially support vessels are required to explore in the Shelf.

3.3 Exploration and Development Timeline Constraints

The pace of oil and gas activity is governed by the time used to work through each exploration and development stage. Timeline estimates shown below are indicative of the schedule requirements for individual activities and may not be additive. The overall development schedule may be reduced by undertaking activities concurrently, or it may be extended if activities are delayed past a related winter construction season. For example the explorer might chose to do some of the detailed design and procurement activities concurrently with the regulatory review process to reduce the development schedule, although this would be taking on more regulatory risk than normal.

As the MGP transmission pipeline has the longest construction time, even after the Proponents have received all approvals, the development of wells and upstream facilities will not proceed until the latest date that ensures they are finished in time to supply gas to the pipeline (as this minimizes construction risk and capital interest costs).

Onshore Timeline Constraints

Typical onshore NWT operational timelines are illustrated in Table 1. An understanding of the operational pace of activity is used to estimate the rate at which development activity can ramp-up.

Offshore Timeline Constraints

Offshore operational timelines are illustrated in Table 2. The main timeline differences for offshore operations are the length of time to complete a well (up to three years) and the development of new equipment and drill rigs to operate in certain, particularly deeper offshore and multi-year ice zones of the Beaufort.

Table 1: Illustrative Timelines for Exploration and Development Activities, Onshore NWT

Onshore Exploration and Development Activity	Elapsed Time (years)[5]
Determine area of interest and obtain exploration license/ interest	0 to 2
2D or 3D Seismic Survey (to define targets – mostly 3D in Delta area)	1
Exploration Drilling (to meet first well commitment)	1
Delineation Drilling (one or more wells if exploration well successful)	1
3D Seismic Survey (to define reservoir structure)	1-2
Seismic Interpretation 3D geological modeling reservoir simulation modeling	1
Feasibility Study Assess Reserves Assess Markets Determine Economic Feasibility (conceptual engineering, budget costing and economic modeling) Assess Regulatory Environment	1
Regulatory Review Process / Project Definition Reservoir Engineering Drilling and Completions Engineering Cost and Schedule Engineering Construction Engineering Environmental Fieldwork and Engineering Business and Economics Analysis Environmental Impact Assessment Public Consultations Socio-economic Assessment Preparation of Regulatory and Permit Applications	2
Regulatory Approval/Corporate Decision To Proceed	0+
Detailed Design/Procurement	1 to 2
Construction Establish Infrastructure (camps, storage areas, foundations, roads, barge landing, airstrip) Development Drilling Facilities Construction (gas conditioning / processing plants, permanent camps, shops and warehouses)	3
Start-up/Commissioning	0.5
Operation	10+

[5] Some activities may take place concurrently

Table 2: Illustrative Timelines for Exploration and Development Activities, Offshore NWT

Offshore Exploration and Development Activity	Elapsed Time (years)[6]
Determine area of interest and obtain exploration license/ interest	0 to 2
2D or 3D Seismic Survey (to define targets)	1 - 2
Contract Drill Rig and Support Fleet	1-3
Build and Prepare Shorebase and Mobilize Materials	1
Exploration Drilling	1 – 3
Delineation Drilling (one or more wells if exploration well successful)	1 - 3
3D Seismic Survey (to define reservoir structure)	1-2
Seismic Interpretation 3D geological modeling reservoir simulation modeling	1
Feasibility Study Assess Reserves Assess Markets Determine Economic Feasibility (conceptual engineering, budget costing and economic modeling) Assess Regulatory Environment	1
Regulatory Review Process / Project Definition Reservoir Engineering Drilling and Completions Engineering Cost and Schedule Engineering Construction Engineering Environmental Fieldwork and Engineering Business and Economics Analysis Environmental Impact Assessment Public Consultations Socio-economic Assessment Preparation of Regulatory and Permit Applications	2
Regulatory Approval/Corporate Decision To Proceed	0+
Detailed Design/Procurement	1 to 2
Construction Establish Infrastructure (camps, storage areas, foundations, roads, barge landing, airstrip) Development Drilling Facilities Construction (gas conditioning / processing plants, permanent camps, shops and warehouses)	3
Start-up/Commissioning	0.5

[6] Some activities may take place concurrently

4.0 Forecasts

4.1 Beaufort Sea/ Mackenzie Delta - Inuvialuit Settlement Region

Near term activity in the Beaufort Sea will be primarily driven by both the outcome of the Arctic Offshore Drilling Review and decisions on the MGP. Certainty over the terms for exploration and development and the potential for transportation options will significantly influence interest in the Beaufort Sea.

There are currently 14 Exploration Licenses and 43 Significant Discovery Licenses in the Beaufort Sea (Appendix B). Two of these ELs are tied up in international jurisdictional border claims along the Alaska/Yukon boundary. From 10 of these ELs, BP Exploration, Chevron Canada, ConocoPhillips Canada, Imperial Oil Resources Ventures and Shell Canada all took out interests between 2006 and 2010. A new area of interest with many of these Bids has come in the outer continental shelf area.

There were no bids on nominated parcels in 2009, and one bid in 2010. The recent results of the Call for Bids, saw 2 parcels to the west of the Mackenzie Delta awarded at a work proposal bid value of $2,000,000.00.
Significant coordination for future development is required to ensure staging areas and equipment are in place for the Beaufort Sea, which will benefit all explorers in the region once re-established. The potential for production related activity from SDLs may arise from ConocoPhillips review of their Amauligak property. No regulatory applications have been filed for this to date.

Activity on the Mackenzie Delta (and near shore Beaufort Sea) is almost exclusively driven by decisions on whether to proceed with the Mackenzie Gas Project. There may be activity to support the Ikhil Gas Pipeline to support gas to Inuvik. There are currently seven ELs on public lands, five of which are held by MGM Energy and 2 (most recently awarded) held by Arctic Energy & Minerals Limited.

4.1.1 Base Case Activity Forecast

Beaufort Sea

For Beaufort Sea projects, the key assumption is that the findings of the NEB Arctic Review are filed as forecast by the NEB December 2011. The NEB produces safety and environmental protection requirements for offshore drilling that does not significantly add to the cost and timelines for drilling in the offshore. This provides guidance to existing Exploration License holders to proceed with their regulatory and drilling plans.

Exploration Activity

Exploration drilling will be driven by the renewed exploration interest in the continental shelf area of the Beaufort Sea and areas adjacent to the Mackenzie Delta. It is anticipated that lease penalties will be used to extend Period One (the well requirement) within the nine year lease delaying drilling to the end of the terms. Industry will also seek further extensions related to the uncertainty caused by the Arctic Review; it is assumed that EL expiry will be extended by two years to cover the length of time covered by the NEB review on same season relief well capability for oil and gas drilling operations in the Beaufort Sea and the NEB Arctic Review.

For the purposes of this forecast, exploration activity is anticipated to consist of an annual offshore 2D seismic program to 2015 then two programs per year forward. An annual offshore well is anticipated from 2017 to the end of the forecast period.

Development Activity

No development or production drilling is anticipated. One potential development that is not forecast is a revisit to the Amauligak field.

Shore base preparation and upgrades is anticipated to begin in Tuktoyuktuk in 2013.

Mackenzie Delta

There are currently five exploration licenses in the Mackenzie Delta, one expiring in 2015 and four in 2020. The MGM Energy Chevron/BP Farmout Agreement was restructured in 2009 providing that MGM would not be required to drill the final three wells or complete additional seismic until after the Decision to Construct the MGP. This, combined with the payment of EL penalties to delay Period One of the Licenses will delay activity until after the DTC.

Inuvik Block 2 exploration license, under license from the Inuvialuit Lands Administration, was extended with a commitment to drill at least one well prior to July 2015 or pay a $5 million penalty.

For Mackenzie Delta projects, the key assumption is that the Decision to Proceed on the MGP is made by the MGP on December 31, 2014 with a pipeline in-service date of the fall of 2019. It is expected that the ramp-up to develop the MGP and related gas fields will put some capacity constraints on available service and drill rig support for exploration activities until after 2019.

Exploration Activities

Exploration drilling on the Delta will be renewed in 2015 buoyed by an understanding of MGP fiscal terms in 2012 and following the Decision to Construct on the MGP. It is anticipated that an exploration well will be undertaken between 2014 and 2016 and then increasing to three wells after 2018 and after the development constraints of building MGP related facilities in the Delta.

Production drilling will be focused on preparing the Niglingtak, Parsons Lake and Taglu fields for production with four wells forecast per year starting in 2017.

It is anticipated that onshore, 2D seismic activity will begin with one program in 2014 and two programs per year starting in 2015 and 3 in 2016.

Development Activities

Development drilling will be renewed in 2016 to prove up existing finds.

The GLJ gas supply study identified the need for an additional 245mmscfd of Mackenzie Delta production required when the pipeline commences operation (now assumed to be 2019). Future production is assumed to come from different areas of the Mackenzie Delta:

- 145 mmscfd from the development and connection of already discovered reserves adjacent to the Niglingtak and Taglu anchor fields, utilizing gas conditioning plants at those facilities;
- 100 mmscfd will come from other sources in the Delta and will require its own gas conditioning plant.

The connection of the 145 mmscfd to the Niglingtak and Taglu gas conditioning plants is forecast to require an additional 7 development wells (at 25 mmscfd per well) and some short gathering pipelines (at 5 km per well).

The connection of the remaining 100mmscfd is forecast to involve 5 new development wells from two production pads, and the construction of a 30 km pipeline to connect production.

The plateau production rates of the additional resources are assumed to be 15 years.

There is the potential for Ikhil gas field development activity. The need and level activity will be determined by Altagas after they finish their well testing results in June 2011.

It is anticipated that commitments to develop the shore base and harbor at Tuktoyuktuk will not be made until the Winter of 2012, after the NEB Arctic Review Report is filed.

Development activity of the MGP itself is not forecast. However it is scheduled to include 30-56 production (including disposal) wells and 190kms of pipeline over the three anchor fields over a three year period.

Table 3: Beaufort Sea/ Mackenzie Delta Base Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometers)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012	1								
2013	2								
2014	3	1							
2015	3	4	4						
2016	3	5	4	2					
2017	4	7	3	2	4				
2018	4	7	4	2	4	65			
2019	4	7	3	2	4				
2020	4	8	4	2					
2021	4	8	3	2					

* The activity forecast does not include the activity that forms part of the MGP anchor fields

4.1.2 Low Case Activity Forecast

Beaufort Sea

For Beaufort Sea projects, the key Low Case assumption is that the NEB Arctic Review is filed by the NEB September 2012. The NEB produces safety and environmental protection requirements for offshore drilling that moderately add to the cost and timelines for drilling in the offshore.

Exploration Activities

Exploration drilling will be driven by exploration interest in the continental shelf area of the Beaufort and areas adjacent to the Mackenzie Delta and moderated by the effects of the Arctic Review. It is anticipated that lease penalties will be used to extend Period One (the well requirement) within the nine year lease delaying drilling to the end of the terms to manage risk. Industry will also seek further extensions related to the uncertainty caused by the Arctic Review; however, this forecast does not make a prediction on any extension related to the Arctic Review.

For the purposes of this forecast exploration activity it is anticipated that a 2D seismic program will be run under speculation, by GX Beaufort Span and to plan exploration and for each offshore exploration well throughout the forecast period and an annual offshore well from 2019 to the end of the forecast period.

Development Activities

It is anticipated that commitments to develop the shore base and harbor at Tuktoyuktuk will not be made until the fall of 2012, after the Arctic Review Report is filed.

Mackenzie Delta

For Mackenzie Delta projects, the key assumption is that the Decision to Proceed on the MGP is not made during the forecast period.

Exploration Activity

No exploration activity is anticipated during the forecast period. Exploration Licenses will lapse.

Development Activity

There is the potential for Ikhil gas field development activity. The need and level activity will be determined by Altagas after they finish their well testing results in June 2011.

Table 4: Beaufort Sea/ Mackenzie Delta Low Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometres)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure*
2012	1								
2013	1								
2014	2								
2015	1								
2016	1								
2017	1	1							
2018	1	2							
2019	1	2							
2020	1	3							
2021	1	3							

4.2 Southern Mackenzie Delta - Gwich'in Settlement Region

There are currently no Exploration Licenses or Significant Discovery Licenses in the Southern Mackenzie Delta region. The plays in this region remain conceptual and some activity may return if there is a significant uptick in interest in the region and the MGP proceeds.

4.2.1 Southern Mackenzie Delta Activity Base Case Forecast

With a Decision to Construct the MGP made in 2014 it is anticipated that the Gwich'in Tribal Council will seek Calls for Nomination on their Settlement Lands in 2015.

Exploration Activity

It is anticipated that two parcels will be nominated on either Canadian or Gwich'in lands fostering a well per year from 2017 to the end of the forecast period.

Development Activity

The 1075mmscfd Inuvik Gas Processing Facility is set to be built south of Inuvik in the Gwich'in Settlement Region, to process gas from the three anchor fields into the main gas pipeline.

Table 5: Southern Mackenzie Delta Base Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometres)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012									
2013									
2014									
2015									
2016									
2017	1							1	
2018	1	1							
2019	1								
2020	1	1							
2021									

4.2.2 Southern Mackenzie Delta Activity Low Case Forecast

With no planned activity on the Mackenzie Gas Project, no activity or interest is raised in the Southern Mackenzie Delta region.

4.3 Central Mackenzie Valley – Sahtu Settlement Region

The Central Mackenzie Valley has been the most active region for some time, and will likely stay that way until a decision to proceed with the MGP. The main drivers for the region are continued activity on the Norman Wells Proven Area, the search for oil to access the IPL (Enbridge) oil line out of Norman Wells and the interest in gas resources to connect to the MGP system.

The recent results of the Call for Bids saw 11 parcels awarded in the Tulita District. Work proposal bids totaled $534,192,015.48.There are now 24 active Exploration Licenses in the region and 20 Significant Discovery Licenses. There are also 6 COGLA Licenses governing the Norman Wells Proven Area. Active exploration in the region has found significant gas discoveries in the Colville Hills and, recently both oil and gas discoveries in the Summit Creek and Stewart Lake area west of the Mackenzie River across from Tulita. The recent interest expressed in the Call for Nominations shows a continued interest in the Tulita and Norman Wells area and a new interest in the liquids-prone Devonian era Canol/Hare shale play.

The Norman Wells area was first discovered in the 1920s and began refining petroleum products for local use in 1933. Full production commenced in 1985 after the field was expanded and an 870 km pipeline was built to transport up to 25,000 bbl/d to Zama, Alberta. With the natural decline in field production the availability of surplus capacity will increase exploration interest for oil and liquids in the region.

A Decision to Construct the MGP in 2014 will regenerate overall exploration interest in the region as well as focus the development of existing fields to supply gas into the MGP system.

4.3.1 Central Mackenzie Valley Activity Base Case Forecast

For Central Mackenzie Valley Activity the key assumptions relate to the timing of Norman Wells Proven Area wind down, the Decision to Construct the MGP and the pace of development influenced by Sahtu Land Corporations which may influence the availability of exploration lands. MGP production and tie in is assumed for the Base Case Forecast.

Colville Hills

Exploration Activity

There are four current Exploration Licenses in the Colville Hills region. Land was not available for bid in the 2011 Call for Nominations. It is anticipated that land will be made available to bid in 2012 and subsequent years.

It is anticipated that a single exploration well will be drilled 2012 through 2014 and three exploration wells will be drilled between 2015 and 2020, after the MGP Decision to Construct and more land has been made available. One in four exploration wells is assumed to be successful and for each successful well, two delineation wells will be drilled. One 2D seismic program is anticipated for each exploration well.

Development Activity

Development activity to supply an estimated 125 mmscfd of gas into the Mackenzie Gas Pipeline is anticipated to start in 2016. Three of the Colville Hills fields are expected to be developed for production. 18 production wells will be developed, six at each field, with an overall average production rate of 7 mmscfd. Each field will have its own gas conditioning plant and connected by an average 7km long pipeline from individual well pads. The three gas conditioning plants are each connected, by 30km of pipeline, to a central pipeline gathering point and then connected through a 150km pipeline to a gas processing facility proximate to the MGP right-of-way close to Fort Good Hope.

It is anticipated that at least one well will be remediated and abandoned in the Colville Hills area during the forecast period.

Tulita/ Deline Districts

Exploration Activity

There are currently 19 ELs in the Tulita/ Deline Districts, including the awarded parcels under the 2011 Call for Bids results from July 4, 2011..

A 600km seismic line is being planned for 2011 crossing many of the new EL's and one 3D seismic on EL 462. It is anticipated that two exploration wells will be drilled 2012 (Husky), four in 2013 and up to six to eight exploration wells will be drilled annually between 2015 and 2020, after the MGP Decision to Construct and more land has been made available. One in four exploration wells is assumed to be successful and for each successful well, two delineation wells will be drilled. One 2D seismic program is anticipated for each exploration well. One 3D seismic is assumed to occur every two years, with two in 2012.

Development Activity

Proven oil and gas fields at Summit Creek and gas at Stewart Lake have the potential for future tie-ins to the MGP and IPL Norman Wells pipeline. However it is likely that license holders will await more fields proven up in the area before they mount a plan to transport the petroleum resources the 100 – 150 kilometers to Norman Wells and across the Mackenzie River. Development activity to tie in existing gas finds into the MGP or oil into the oil pipeline is not anticipated during the forecast term.

Norman Wells Proven Area

Imperial Oil keeps up a steady development program to maintain and further develop the Norman Wells field. For the purposes of this Forecast it is anticipated that there will be two production wells drilled every third year to enhance production in this field.

Imperial Oil has an ongoing site remediation and abandonment program. It is anticipated that site remediation and abandonment activity will occur on an annual basis throughout the forecast period.

Table 6: Central Mackenzie Valley Base Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometers)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012	8	2	2						2
2013	6	4							1
2014	6	8	1		2				1
2015	5	8		1					1
2016	4	6	1	3	6				1
2017	4	7		4	8				1
2018	5	7	1	3	6	366	3	1	1
2019	5	7		4					1
2020	4	6	1	1	2				1
2021	4	6		3					1

4.3.2 Central Mackenzie Valley Activity Low Case Forecast

For Central Mackenzie Valley activity the key assumptions relate to the timing of Norman Wells Proven Area wind down, the Decision to Construct the MGP and the pace of development preferred by Sahtu land Corporations which may affect the availability of exploration lands. Production and tie-in is not assumed for the Low Case Forecast.

For the Low Case forecast it is assumed that natural gas distribution to the community ceases at the Norman Wells Proven Area ceases in 2013 and oil production ceases in 2018. It is also assumed that the Kasho Got'ine Land District periodically ask that lands not be called for Nominations, and the federal government agrees to withhold Nominations under the *Canadian Petroleum Resources Act.*

Colville Hills

Exploration Activity

There are four current Exploration Licenses in the Colville Hills region. Land was not available for bid in the 2011 Call for Nominations.

It is anticipated that no exploration wells will be drilled 2012 through 2014 and one exploration well will be drilled between 2015 and 2020, after the MGP Decision to Construct and more land has been made available. One in four exploration wells is assumed to be successful and for each successful well, two delineation wells will be drilled. One 2D seismic program is anticipated for each exploration well.

Development Activity

It is anticipated that at least one well will be remediated and abandoned in the Colville Hills during the forecast period.

Tulita/ Deline Districts

Exploration Activity

There are currently 19 ELs in the Tulita/ Deline Districts, including the awarded parcels under the 2010-2011 Call for Bids results from July 4, 2011.

It is anticipated that a single exploration well will be drilled 2012 through 2013 and four exploration wells will be drilled between 2015 and 2020, after more land has been made available. One in four exploration wells is assumed to be successful and for each successful well, at least two delineation wells will be drilled. One 2D seismic program is anticipated for each exploration well. Two 3D seismic are planned for 2012 and another is forecast for 2014.

Development Activity

No development activity is anticipated, with the exception of the Norman Wells Proven Area.

Norman Wells Proven Area

Imperial Oil has an ongoing site remediation and abandonment program. It is anticipated that site remediation and abandonment activity will occur on an annual basis throughout the forecast period.

Table 7: Central Mackenzie Valley Low Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometers)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure*
2012	11	1	2						2
2013	5	3							1
2014	4	6	1	1	1				1
2015	2	4		1					1
2016	4	4		2	1				1
2017	4	4		4					1
2018	4	4		2					1
2019	4	4		3					1
2020	4	4		3					1
2021	4	4		2					1

4.4 Southern Mackenzie Valley – Dehcho Settlement Region

Activity in the Southern Mackenzie Valley is not directly influenced by the MGP as gas or oil resources in the region have their own distribution network into pipeline networks into British Columbia and Alberta.

Activity in the region will be driven by progress and status of land claim negotiations between the Government of Canada who are negotiating with a number of different parties:

- Dehcho First Nations (Framework Agreement started Land Claims process in 2001);
- Acho Dene Ko First Nation (Fort Liard) (Framework Agreement started Land Claims process in 2008);
- Katlodeeche First Nation (Hay River) (Framework Agreement started Land Claims process in 2010); and,
- Northwest Territories Métis Nation(Framework Agreement started Land Claims process in 1996).

The next step for all of these processes is to reach an Agreement in Principle which would then be followed by a Final Land Claims Agreement.

The 2003 Dehcho Interim Measures Agreement between Canada, the GNWT and Dehcho First Nations provides that "Canada will not initiate any new issuance cycle for oil and gas exploration licenses under the *Canada Petroleum Resources Act* in the Dehcho territory without the support of the affected Dehcho First Nation(s)'.

The status of the Draft Interim Dehcho Land Use Plan will be important to outline how oil and gas activity would potentially proceed and operate within the region. The current draft has not been approved. The Draft limits the potential areas for development and, within those areas, the way that activity can occur.

The Southern Mackenzie Valley has two main areas at play, the Liard Basin and the Cameron Hills region.

There are no current, active Exploration Licenses in the Dehcho Region. The recent Call for Nominations process did not include any land offerings in the region.

The timeframe for exploration and development is shorter in the Dehcho region and an illustrative schedule is provided below in Table 8.

Table 8: Illustrative Schedule for Exploration and Development Activities in the Dehcho Region

Period	Activity
Year 1	Exploration licenses issued
Year 2	2D seismic shot
Year 3	Seismic evaluated Exploration well drilled
Year 4	Additional 2D or 3D seismic shot
Years 5, 6 and7	Delineation wells drilled
Years 6 and 7	Application preparation and approval of Significant Discovery and Production Licenses
Year 8	Drill additional production wells Pipeline construction to put wells into production.

4.4.1 Southern Mackenzie Valley Activity Base Case Forecast

For the Base Case Forecast it is assumed that an agreement is reached on the development of the pipeline corridor with Canada, the Dehcho and the MGP. It is also assumed that the Interim Measures Agreement is renewed and that specific and periodic land sales are held. No Final Land Claims Agreement is expected to be concluded during the forecast period.

Liard

Exploration Activity

Exploration drilling will be driven by the renewed exploration interest in the potential of and to further geological understandings gathered from shale gas activity south of the border in the BC Horn River region. For the purposes of this forecast exploration activity will follow a Call for Nominations/ Call for Bids process initiated in 2016. It is anticipated that two wells per year will be drilled from 2018 through to the end of the forecast period. Seismic activity will occur at an annual rate from 2012 forward.

Development Activity

Interest in future development of existing licenses clearly remains as lease holders have not sold their licenses or facilities and left the region. Delineation drilling to prove out the potential for shale gas is anticipated on one company's existing Significant Discovery Licenses in 2012 and 2013. Follow-up programs on other leases may occur from 2016 on once there is a signal that new exploration land has been posted for bid.

Site abandonment and remediation activity is anticipated at the Pointed Mountain Field north of Fort Liard. The Pointed Mountain Gas Field and Plant began production in 1972 and was shut down in a few

years ago after producing over 350 bcf of gas. BP (or its new potential owner Apache) is currently seeking approval of its Decommissioning and Reclamation of the field with the Mackenzie Valley Land and Water Board. It is anticipated that this work will occur over a two year period in the early part of the forecast period.

Cameron Hills

Exploration Activity

No further exploration activity is anticipated in the Cameron Hills area during the forecast period.

Development Activity

Paramount's Cameron Hills operation has filed plans for up to 36 more wells over the next 6-8 years. The viability of the plans has been subject to reduced momentum from increased regulatory and crown consultation court challenges as well as project economics and the quality of recent results. Development drilling is anticipated to occur at a rate of four wells per year with 10 kms of pipeline tie-ins per year throughout the forecast period.

Site abandonment and remediation activity is anticipated at wells drilled in Hay River in the 1920's and 1940's. INAC NT Region's Contaminants and Remediation Directorate (CARD) is in the process of cleaning up seven abandoned gas wells just outside the Town of Hay River. A plan for remediation is in place and a contractor has begun the premeditative work. Work is expected to be completed in 2012.

Table 9: Southern Mackenzie Valley Base Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometres)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012				1	4	10			1
2013	1			1	4	10			1
2014					4	10			1
2015	1				4	10			
2016				1	4	10			
2017	1			1	4	10			
2018	1	2		1	4	10			
2019	1	2		1	4	10			
2020	1	2			4	10			
2021	1	2			4	10			

4.4.2 Southern Mackenzie Valley Activity Low Case Forecast

For the Base Case Forecast it is assumed that an agreement is not reached on the development of the pipeline corridor with Canada, the Dehcho and the MGP. It is also assumed that the Interim Measures Agreement is renewed and that specific and periodic land sales are held. No Final Land Claims Agreement is expected to be concluded during the forecast period.

Liard

Exploration Activity

Exploration drilling will be driven by the renewed exploration interest in the potential to extend activity and geological understandings gathered from the activity south of the border in the BC Horn River region. However, under the Low Case forecast new exploration land is not made available under the Canada *Petroleum Resources Act.*

Development Activity

Site abandonment and remediation activity is anticipated at the Pointed Mountain Field north of Fort Liard.

The Pointed Mountain Gas Field and Plant began production in 1972 and was shut down recently after producing over 350 bcf of gas. BP is currently seeking approval of its Decommissioning and Reclamation of the field with the Mackenzie Valley Land and Water Board. It is anticipated that this work will occur over a two year period in the early part of the forecast period.

Cameron Hills

Exploration Activity

No further exploration activity is anticipated in the Cameron Hills area during the forecast period.

Development Activity

Paramount's Cameron Hills operation has filed plans for up to 36 more wells over the next 6-8 years. The viability of the plans has been subject to reduced momentum from increased regulatory and crown consultation court challenges as well as project economics and the quality of recent results. Development drilling is anticipated to occur at a rate of three wells every second year with 7 kms of pipeline tie-ins per well throughout the forecast period.

Site abandonment and remediation activity is anticipated at wells drilled in Hay River in the 1920's and 1940's. INAC NT Region's Contaminants and Remediation Directorate (CARD) is in the process of cleaning up seven abandoned gas wells just outside the Town of Hay River. A plan for remediation is in place and a contractor has begun the premeditative work. Work is expected to be completed in 2012.

Table 10: Southern Mackenzie Valley Low Case Forecast

YEAR / ACTIVITY	2D Seismic Programs	Exploration Wells	3D Seismic Programs	Delineation Wells	Production Wells	Pipeline (kilometres)	Gas Conditioning Facilities	Gas Processing Facilities	Site Closure
2012				1	3	7			1
2013	1			1					1
2014					3	7			1
2015	1								
2016					3	7			
2017	1			1					
2018		1		1	3	7			
2019	1	1							
2020		1			3	7			
2021	1	1							

APPENDICES

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Canadian Association of Petroleum Producers
www.capp.ca

GNWT – Industry Tourism and Investment
www.gov.nt.ca/ITI

Northern Oil and Gas Canada
www.ainc-inac.gc.ca/nth/og/index-eng.asp

Mackenzie Gas Project
www.mackenziegasproject.com

Mackenzie Valley Land and Water Board

www.mvlwb.com

Appendix A: References Continued

Mackenzie Valley Environmental Impact Review Board
www.mveirb.nt.ca

MGM Energy
www.mgmenergy.com

National Energy Board
www.neb.gc.ca

Paramount Resources Ltd.
www.paramountres.com

Appendix B: INAC Oil and Gas Licenses

Note: The following INAC Oil and Gas License information was obtained from the INAC Northern Oil and Gas website. This information was not reviewed to determine omissions, errors or discrepancies that may exist.

Beaufort Sea: Exploration Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
EL317	Talisman Energy Inc.	05/10/1986		175,810
EL329	BP Canada Energy Resources Company	05/09/1987		349,981
EL435	Shell Canada Limited	03/05/2006	02/05/2015	99,942
EL446	Imperial Oil Resources Ventures Limited	01/10/2007	30/09/2016	205,321
EL447	ConocoPhillips Canada Resources Corp.	01/09/2007	31/08/2016	103,711
EL448	Chevron Canada Limited	31/12/2007	30/12/2016	108,185
EL449	Imperial Oil Resources Ventures Limited	01/12/2008	30/11/2017	202,380
EL450	MGM Energy Corp.	03/06/2008	02/06/2017	41,323
EL451	BP Exploration Operating Company Limited	01/12/2008	30/11/2017	205,359
EL452	ConocoPhillips Canada Resources Corp.	01/12/2008	30/11/2017	196,497
EL453	BP Exploration Operating Company Limited	01/12/2008	30/11/2017	203,635
EL460	Chevron Canada Limited	05/01/2011	04/01/2020	205,946
	Arctic Energy & Minerals Limited	07/04/2011	06/04/2020	90,381
	Arctic Energy & Minerals Limited	07/04/2011	06/04/2020	120,814

Beaufort Sea: Significant Discovery Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
SDL037	BP Canada Energy Resources Company	24/09/1987		8,034
SDL038	BP Canada Energy Resources Company	12/08/1987		6,620
SDL039	BP Canada Energy Resources Company	12/08/1987		12,182
SDL040	BP Canada Energy Resources Company	12/08/1987		5,190
SDL041	BP Canada Energy Resources Company	01/09/1987		10,059
SDL047	BP Canada Energy Resources Company	21/08/1987		4,104
SDL048	BP Canada Energy Resources Company	21/08/1987		1,740
SDL049	BP Canada Energy Resources Company	21/08/1987		7,627
SDL051	Imperial Oil Resources Limited	22/04/1987		2,368
SDL053	Imperial Oil Resources Limited	22/04/1987		888
SDL054	Imperial Oil Resources Limited	01/05/1987		9,768
SDL055	Imperial Oil Resources Limited	22/04/1987		2,072
SDL058	Imperial Oil Resources Limited	22/04/1987		7,168

SDL083	ConocoPhillips Canada Resources Corp.	22/02/1989		11,692
SDL084	ConocoPhillips Canada Resources Corp.	22/02/1989		6,244
SDL085	ConocoPhillips Canada Resources Corp.	22/02/1989		1,396
SDL086	ConocoPhillips Canada Resources Corp.	22/02/1989		12,181
SDL087	ConocoPhillips Canada Resources Corp.	22/02/1989		3,872
SDL088	ConocoPhillips Canada Resources Corp.	22/02/1989		7,133
SDL089	BP Canada Energy Company	13/11/1989		10,512
SDL091	Imperial Oil Resources Limited	04/05/1990		7,488
SDL095	Imperial Oil Resources Limited	04/05/1990		11,051
SDL096	ConocoPhillips Canada Resources Corp.	19/07/1990		353
SDL097	ConocoPhillips Canada Resources Corp.	19/07/1990		1,059
SDL110	Imperial Oil Resources Limited	30/01/1992		891
SDL111	Imperial Oil Resources Limited	30/01/1992		891
SDL112	Imperial Oil Resources Limited	30/01/1992		1,485
SDL113	BP Canada Energy Resources Company	25/03/1993		4,787
SDL114	BP Canada Energy Resources Company	25/03/1993		4,795
SDL115	Imperial Oil Resources Limited	11/07/1994		3,000
SDL116	Imperial Oil Resources Limited	10/06/1998		2,700
SDL126	ConocoPhillips Canada Resources Corp.	01/08/2005		16,618
SDL130	Devon NEC Corporation	26/04/2007		14,458
SDL132	MGM Energy Corp.	13/11/2007		1,228
SDL133	MGM Energy Corp.	13/11/2007		1,228
SDL134	MGM Energy Corp.	13/11/2007		1,220
SDL135	MGM Energy Corp.	13/11/2007		610
SDL136	MGM Energy Corp.	17/01/2008		924

Mackenzie Delta: Exploration Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
EL434	MGM Energy Corp.	03/05/2006	02/05/2015	56,624
EL456	MGM Energy Corp.	05/01/2011	04/01/2020	73,391
EL457	MGM Energy Corp.	05/01/2011	04/01/2020	67,284
EL458	MGM Energy Corp.	05/01/2011	04/01/2020	75,244
EL459	MGM Energy Corp.	05/01/2011	04/01/2020	74,618

Mackenzie Delta: Significant Discovery Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
SDL014	Chevron Canada Limited	05/09/1987		1,824
SDL015	Chevron Canada Limited	05/09/1987		304
SDL016	Chevron Canada Limited	05/09/1987		610
SDL017	Shell Canada Limited	18/08/1987		1,866
SDL018	Shell Canada Limited	18/08/1987		3,366
SDL019	Shell Canada Limited	18/08/1987		3,665
SDL025	Nytis Exploration Company Inc.	09/02/1988		1,216
SDL026	Nytis Exploration Company Inc.	09/02/1988		912
SDL027	Nytis Exploration Company Inc.	09/02/1988		906
SDL028	Nytis Exploration Company Inc.	09/02/1988		1,809
SDL029	AltaGas Ltd.	01/09/1987		626
SDL030	ConocoPhillips Canada (North) Limited	17/06/1987		2,173
SDL031	Shell Canada Limited	17/06/1987		306
SDL032	ConocoPhillips Canada (North) Limited	17/06/1987		30,117
SDL033	Shell Canada Limited	01/09/1987		3,087
SDL034	Shell Canada Limited	17/06/1987		1,232
SDL035	Shell Canada Limited	17/06/1987		2,446
SDL036	Shell Canada Limited	17/06/1987		1,842
SDL050	Imperial Oil Resources Limited	22/04/1987		8,197
SDL052	Imperial Oil Resources Limited	22/04/1987		2,997
SDL056	Imperial Oil Resources Limited	01/05/1987		2,410
SDL057	Imperial Oil Resources Limited	01/05/1987		1,812
SDL059	Imperial Oil Resources Limited	07/05/1987		612
SDL060	Imperial Oil Resources Limited	22/04/1987		1,515
SDL061	Imperial Oil Resources Limited	22/04/1987		4,504
SDL062	Imperial Oil Resources Limited	07/05/1987		4,012
SDL063	Imperial Oil Resources Limited	22/04/1987		6,089
SDL064	Imperial Oil Resources Limited	07/05/1987		5,854
SDL065	Imperial Oil Resources Limited	22/04/1987		5,081
SDL092	Imperial Oil Resources Limited	04/05/1990		3,915
SDL093	Imperial Oil Resources Limited	04/05/1990		2,462
SDL094	Imperial Oil Resources Limited	04/05/1990		607
SDL100	Shell Canada Limited	29/11/1990		2,763
SDL131	MGM Energy Corp.	05/01/2006		8,508
SDL137	MGM Energy Corp.	16/09/2008		612
SDL144	Suncor Energy Inc.	16/09/2008		5,862
SDL146	MGM Energy Corp.	23/04/2009		7,090

Mackenzie Delta: Production Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
PL06	AltaGas Ltd.	23/06/1999	22/06/2024	2,506
PL25	MGM Energy Corp.	17/09/2008	16/09/2033	917

Central Mackenzie Valley: Exploration Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
EL431	Suncor Energy Inc.			
EL436	Talisman Energy Inc.	10/05/2006	09/05/2015	84,353
EL437	Talisman Energy Inc.	10/05/2006	09/05/2015	85,993
EL438	Talisman Energy Inc.	10/05/2006	09/05/2015	87,183
EL439	Talisman Energy Inc.	10/05/2006	09/05/2015	82,820
EL440	MGM Energy Corp.	10/05/2006	09/05/2015	87,872
EL441	Husky Oil Operations Limited	10/05/2006	09/05/2015	88,452
EL442	MGM Energy Corp.	10/05/2007	09/05/2016	63,312
EL443	Husky Oil Operations Limited	10/05/2007	09/05/2016	91,116
EL444	BG International Limited	10/05/2007	09/05/2016	74,604
EL445	BG International Limited	10/05/2007	09/05/2016	79,240
EL454	MGM Energy Corp.	01/12/2008	30/11/2017	82,100
EL455	MGM Energy Corp.	05/01/2011	04/01/2020	80,240
	MGM Energy Corp.	07/04/2011	06/04/2011	82,643
	MGM Energy Corp.	07/04/2011	06/04/2011	86,602
	MGM Energy Corp.	07/04/2011	06/04/2011	85,288
	Shell Canada Limited	07/04/2011	06/04/2011	87,948
	Shell Canada Limited	07/04/2011	06/04/2011	87,117
	Shell Canada Limited	07/04/2011	06/04/2011	26,533
	Imperial Oil Resource Ventures Limited	07/04/2011	06/04/2011	88,848
	Imperial Oil Resource Ventures Limited	07/04/2011	06/04/2011	90,632
	Husky Oil Operations Limited	07/04/2011	06/04/2011	87,748
	Husky Oil Operations Limited	07/04/2011	06/04/2011	87,034
	ConocoPhillips Canada Resources Corp.	07/04/2011	06/04/2011	87,495

Central Mackenzie Valley: Significant Discovery Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
COGLA Licenses				
11490	Imperial Oil Resources Limited	20/10/1914	20/10/2019	122
11491	Imperial Oil Resources Limited	20/10/1914	20/10/2019	185
11493	Imperial Oil Resources Limited	20/10/1914	20/10/2019	200
18428	Imperial Oil Resources Limited	10/03/1921	10/03/2026	32
18804	Imperial Oil Resources Limited	10/03/1921	10/03/2026	77
51054	Imperial Oil Resources Limited	05/04/1922	05/04/2027	38
CPRA Licenses				
SDL006	BP Canada Energy Resources Company	15/02/1987		7,367
SDL023	Suncor Energy Inc.	28/09/1987		18,267
SDL024	Suncor Energy Inc.	28/09/1987		11,420
SDL042	BP Canada Energy Resources Company	24/09/1987		2,024
SDL138	Husky Oil Operations Limited	20/02/2008		1,405
SDL139	Husky Oil Operations Limited	20/02/2008		1,122
SDL140	Husky Oil Operations Limited	25/07/2008		4,480
SDL141	MGM Energy Corp.	05/08/2008		1,800
SDL142	MGM Energy Corp.	05/08/2008		2,051
SDL143	MGM Energy Corp.	29/07/2008		1,757
SDL145	Suncor Energy Inc.	18/06/2009		1,032

Southern Mackenzie: Significant Discovery Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
COGLA Licenses				
529-R-69	Canadian Forest Oil Ltd.	30/05/1969	30/05/2011	3,208
703-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	4,800
704-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	638
705-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	5,104
707-R-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	1,600
708-R-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	1,600
709-R-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	638
710-R-70	Canadian Forest Oil Ltd.	06/02/1970	06/02/2012	1,595
838-70	Canadian Forest Oil Ltd.	26/11/1970	26/11/2012	5,132
CPRA Licenses				
SDL001	BP Canada Energy Company	15/02/1987		645

SDL002	BP Canada Energy Company	15/02/1987		1,938
SDL003	BP Canada Energy Company	15/02/1987		642
SDL004	BP Canada Energy Company	15/02/1987		321
SDL007	Paramount Resources Ltd.	15/02/1987		1,292
SDL008	Paramount Resources Ltd.	15/02/1987		1,938
SDL010	Paramount Resources Ltd.	15/02/1987		646
SDL011	Phillips Petroleum Canada Ltd.	15/02/1987		3,771
SDL012	EnCana Corporation	15/02/1987		13,025
SDL013	Canadian Natural Resources Limited	15/02/1987		5,688
SDL090	Canadian Natural Resources Limited	10/01/1990		319
SDL098	Canadian Natural Resources Limited	10/01/1990		2,547
SDL099	Paramount Resources Ltd.	29/11/1990		640
SDL101	Paramount Resources Ltd.	07/12/1990		323
SDL103	Paramount Resources Ltd.	07/12/1990		2,260
SDL104	Paramount Resources Ltd.	07/12/1990		968
SDL105	Paramount Resources Ltd.	07/12/1990		283
SDL106	Paramount Resources Ltd.	07/12/1990		1,612
SDL107	Paramount Resources Ltd.	07/12/1990		966
SDL108	Paramount Resources Ltd.	07/12/1990		322
SDL109	Paramount Resources Ltd.	07/12/1990		5,139
SDL119	Canadian Natural Resources Limited	22/02/2000		636
SDL120	Canadian Natural Resources Limited	22/02/2000		636
SDL121	Canadian Natural Resources Limited	21/01/2002		1,270
SDL122	Paramount Resources Ltd.	30/04/2003		1,605
SDL123	Paramount Resources Ltd.	25/10/2005		969
SDL124	Canadian Natural Resources Limited	25/10/2005		2,571
SDL125	Canadian Natural Resources Limited	25/10/2005		2,238
SDL127	Canadian Natural Resources Limited	08/04/2003		640
SDL128	Canadian Natural Resources Limited	08/04/2003		3,517
SDL129	Canadian Natural Resources Limited	08/04/2003		6,362
SDL138	Husky Oil Operations Limited	20/02/2008		1,405
SDL139	Husky Oil Operations Limited	20/02/2008		1,122
SDL140	Husky Oil Operations Limited	25/07/2008		4,480
SDL141	MGM Energy Corp.	05/08/2008		1,800
SDL142	MGM Energy Corp.	05/08/2008		2,051
SDL143	MGM Energy Corp.	29/07/2008		1,757
SDL145	Suncor Energy Inc.	18/06/2009		1,032

Southern Mackenzie: Production Licenses				
Title	**Representative**	**Issue Date**	**Expiry Date**	**Area (Ha)**
PL03	Paramount Resources Ltd.	13/02/1990	13/02/2015	80
PL04	Paramount Resources Ltd.	16/06/1992	16/06/2017	323
PL05	Paramount Resources Ltd.	02/12/1992	02/12/2017	322
PL07	Paramount Resources Ltd.	18/01/2000	17/01/2025	1,292
PL08	Paramount Resources Ltd.	18/01/2000	17/01/2025	3,230
PL09	Paramount Resources Ltd.	27/03/2000	26/03/2025	4,150
PL10	Canadian Natural Resources Limited	26/04/2000	25/04/2025	3,818
PL11	Paramount Resources Ltd.	17/04/2001	16/04/2026	320
PL12	Paramount Resources Ltd.	02/05/2001	01/05/2026	1,292
PL13	Paramount Resources Ltd.	07/02/2002	06/02/2027	1,292
PL14	Paramount Resources Ltd.	07/02/2002	06/02/2027	4,517
PL15	Paramount Resources Ltd.	07/02/2002	06/02/2027	3,220
PL16	Paramount Resources Ltd.	07/02/2002	06/02/2027	1,930
PL17	Paramount Resources Ltd.	10/03/2003	09/03/2028	1,292
PL18	Paramount Resources Ltd.	27/03/2003	26/03/2028	966
PL19	Paramount Resources Ltd.	05/02/2004	04/02/2029	1,935
PL20	Paramount Resources Ltd.	13/05/2004	12/05/2029	969
PL21	Paramount Resources Ltd.	13/05/2004	12/05/2029	323
PL22	Paramount Resources Ltd.	13/05/2004	12/05/2029	322
PL23	Paramount Resources Ltd.	13/05/2004	12/05/2029	283
PL24	Paramount Resources Ltd.	13/05/2004	12/05/2029	966