An Overview of the Newfoundland and Labrador Oil and Gas Industry

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Overview

- Who is CAPP
- Oil and Gas 101
- NL Industry Overview
  - Offshore
  - Onshore
- Industry Benefits
- The Opportunity
- The Path Forward
- Conclusion
Canadian Association of Petroleum Producers (CAPP)

- Represents Canadian oil & gas sector (~ 100 member companies)
- Members explore for, develop and produce natural gas, natural gas liquids, crude oil, and oil sands throughout Canada
- Members produce about 90 per cent of Canada’s natural gas and crude oil
- Key focus areas:
  - Education
  - Communications & outreach
  - Policy & regulatory advocacy
  - Industry performance
Oil and Gas 101
Lifecycle of an oil and gas field

**Exploration**
- Seismic
- Exploration drilling
- Delineation drilling

**Development**
- Drilling wells
- Engineering
- Fabrication/construction

**Production**
- Recovering the resource
- Transportation to market

**Decommissioning/Abandonment**
- Completion of project
- Removal of installation

**Environment, Health and Safety**
What is a marine seismic survey?

- Uses sound energy to map geological structures under the seabed
- Vessels tow devices that use compressed air to produce pulses of high energy, low frequency sound waves
- Sound waves can penetrate more than 6,000 metres below the sea floor
- Travel through the water and into the rock layers beneath the seabed
- Bounce back to receivers (“hydrophones”) that measure strength and return time
Why are seismic surveys conducted?

- Seismic surveys provide information on the depth, position and shape of underground geological formations that may contain oil or gas.
- Data is processed to improve the quality and filter out background “noise”.
- End result is a detailed picture of the structures and rock formations in the survey area.
- Geophysicists look for specific features that could indicate whether oil or gas might be present:
  - Sedimentary basins
  - Faults
  - Ancient reefs or buried former beaches

Seismic Coverage
Offshore Atlantic Canada
Source: www.cnlopb.nl.ca
Seismic Surveys

Seismic vessel towing streamers

Seismic vessel

Seismic data
Drilling

- Once seismic and other data is interpreted to determine the best location to search for oil and gas resources, an exploration well is drilled.
  - Drilling is the only way to determine if oil or gas is actually present.

- In the offshore, exploration wells are drilled by Mobile Offshore Drilling Units (MODUs); 3 types:
  - Semi-submersibles
  - Jack-up rigs
  - Drill ships

- If a discovery is made, further drilling is typically required to determine the size of the discovery.
Offshore Drilling Rigs

Semi-submersible

Drill Ship

Jack-up
Development

● Getting from the exploration to development phase can take five to ten years if the discovery is commercial.

● If a company decides that a discovery warrants development, plans are submitted to regulators to outline the company’s proposed approach to develop the resource.

● Significant front-end engineering work must be completed to assess the various options for development.

● If development is approved by regulators, development and construction can begin and more wells are drilled.

Construction of the Hebron gravity based structure
(Credit: ExxonMobil Canada Properties)
Production

● Following construction and development and once all regulatory approvals are in place, production can begin.

● Oil and gas is produced offshore via fixed or floating platforms.

● Sometimes production can occur from subsea infrastructure.

● For onshore production, conventional drilling rigs that sit on top of the ground are used.
Sample Subsea Tie-back Project
Transportation by Tanker

- In NL, operators typically send crude oil to a transshipment terminal or it may be shipped directly to market.

- Transshipment is a two-stage transportation process for moving crude oil from the offshore storage facility to markets.

- Shuttle tankers carry the oil to a shore-based terminal where it is stored in heated tanks until it is shipped to market in a conventional tanker.
Decommissioning

• A well can produce for many years.

• For offshore projects, production life typically ranges from 10 – 20 years and beyond.

• Once the oil and gas reserves are depleted, the project is decommissioned, meaning that infrastructure is removed and the site is reclaimed and restored.
Regulatory Structure – NL Oil and Gas

● Offshore
  - Offshore industry is co-regulated by both the Government of Canada and the Government of NL through the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB)
  - The C-NLOPB has a 7 member board of directors - 3 of which are appointed by the NL government and 3 by the Federal government. The 7th member and chairman of the Board is jointly appointed by both governments.

● Onshore
  - Government of NL regulates the onshore industry
  - Handles nominations and bidding processes and awards licences
Petroleum resources discovered on land are managed by the respective Provincial government.
NL Industry Overview
Newfoundland & Labrador Offshore

- **Three producing oil projects:** Hibernia, Terra Nova, White Rose
  - 23% of Canada’s conventional light crude production; 6.5% of Canada’s total crude oil production

- **Hebron will be the fourth major oil development**
  - 4,000 people working on Hebron development

- **Significant activity underway in 2014:**
  - Statoil planning 18-month drilling program; multiple wells in Flemish Pass
  - Husky Energy planning 1-2 wells in Flemish Pass and Jeanne d’Arc Basins
  - Planned seismic activity
  - Multi-billion dollar tie-back projects/expansions under development
Hibernia

- Operated by Hibernia Management and Development Company Ltd.; Interest Owners:
  - ExxonMobil Canada (33.125%), Chevron Canada Resources (26.875%), Suncor (20%), Canada Hibernia Holding Corporation (8.5%), Murphy Oil (6.5%) and Statoil Canada Ltd. (5%)

- Discovered in 1979; First Oil in November, 1997

- Total production (1997 – 2013) is 840* million barrels of total estimated recoverable reserves of 1.4 billion barrels* of oil

- Ongoing Projects:
  - Hibernia Southern Extension – hybrid production platform and subsea tiebacks
  - Ben Nevis Avalon Developments – hybrid production platform and subsea tiebacks

*Source: C-NLOPB Annual Report 2012-13
Hibernia Southern Extension (HSE)

- $2 billion subsea development with tiebacks to the Hibernia platform
- Project includes up to five production wells drilled from the platform supported by subsea water injectors.
- Also further developing the Ben Nevis Avalon (BNA) reservoir:
  - Producing from the BNA since 2000 but were limited by slot constraints.
  - Added additional wells to the HSE drill centre for further access to the BNA reservoir.
Terra Nova

- **Operated by Suncor; Interest Owners:**
  - Suncor (37.675%), ExxonMobil (19%), Statoil (15%), Husky Energy (13%), Murphy Oil (10.475%), Mosbacher (3.85%), Chevron (1%)

- **Discovered in 1984; first Oil in January 2002**

- **Total production (2002 - 2013) is 339* million barrels of estimated reserves of 506* million barrels of oil**

- **Ongoing projects:**
  - Planning extensive program on Northern Grand Banks
  - Focusing on new growth areas – West Flank and Far East

*C-NLOPB 2012-13 Annual Report*
White Rose

- **Operated by Husky Energy; Interest Owners:**
  - Husky Energy (72.5%), Suncor (27.5%)

- **Discovered in 1984; first oil in Nov. 2005**

- **203* million barrels produced of estimated reserves of 300* million barrels of oil, including White Rose Field, Southern Extension and South Avalon pool, North Amethyst**

- **Ongoing Projects:**
  - South White Rose Extension – $1.8 billion subsea tieback
  - West White Rose Extension (see next slide)
  - Exploration and delineation wells planned to further field expansion

*Source: C-NLOPB Annual Report 2012-13*
White Rose Extension Project

- Operated by Husky Energy; Interest owners:
  - Husky Energy (68.875%), Suncor (26.125%), Nalcor Energy Oil and Gas (5%)

- Discovered in 2006

- Full field development of West White Rose area
  - Wellhead platform
  - ~ $3 billion capital costs

- Timeline for Project:
  - Graving dock construction underway in Argentia, NL
  - Project sanction anticipated late 2014
  - Production anticipated 2017
Hebron - Newfoundland and Labrador's next development

- Operated by ExxonMobil; Interest Owners:
  - ExxonMobil (36%), Chevron (26.7%), Suncor (22.7%), Statoil (9.7%), Nalcor (4.9%)

- Discovered in 1980

- Estimated 700 million barrels of recoverable oil; 30+ year project life

- Development Plan and Benefits Plan approved in May 2012; Co-venturer project sanction received December 31, 2012

- Timeline for project:
  - 2014: Construction of GBS and topsides continuing
  - 2016: Integration, hook-up and commissioning
  - 2017: First oil

Graphic representation of completed Hebron topsides
Newfoundland and Labrador Onshore

- 40 onshore wells drilled since 1994 (none since 2012). No commercial production onshore.

- Three companies hold exploration licences and leases.

- Current Activity:
  - Black Spruce Exploration Corp. (BSE) planning exploratory drilling program in the Deer Lake Basin
  - BSE also has near-shore licences and hope to eventually drill onshore to offshore on two of those licences pending future regulatory approval
How does hydraulic fracturing stimulation work?

- Approximately 4,000 cubic metres (4 million litres) of water used to fracture each stage of a well
  - Water amounts may vary depending on type and location of reservoir.
  - Total water used at the 4 major shale plays in the USA is less than 1% of total water usage in each state

- Fracture stimulation fluid consists of 98.5% water/sand and 1.5% chemical additives

- All chemical additives are disclosed by industry to regulators before hydraulic fracturing occurs
Exploration Activity and Future Potential

- **Significant exploration activity in recent years**
  - Major discoveries in Flemish Pass in recent years
  - Exploration activity expected in Flemish Pass, Jeanne d’Arc Basin

- **Increasing exploration activity is key to future of NL industry**

- **Government of NL estimates NL’s oil and gas potential at:**
  - More than 6 billion barrels of oil
  - More than 60 trillion cubic feet of gas
Bringing Substantial Benefits to NL

- Directly employs 6,000 - 7,000 people (thousands more indirectly)
- Supports over 500 local supply/service companies
- Accounts for ~30% of total provincial revenues in NL (helps pay for roads, schools, hospitals)
- Cumulative expenditures since 1995 - over $28 billion
- Represents 28% of GDP in NL
- Spin-off benefits for other industries
The Newfoundland and Labrador Offshore is a Challenging Environment

- Production facilities located > 300 km offshore
- Travel time by helicopter = 2 hrs
- Travel time by supply vessel = 16 hrs
- Mean annual temp = 5.8°C
- Fog
  - 40% Winter
  - 84% June/July
- Severe Seas in Winter
- Waves up to 30 m reported
- Winds up to 224 kph
- 412 icebergs (avg #/year)
  - 600,000 tonnes (avg)
  - 10,000,000 tonnes (max)
Newfoundland and Labrador’s Opportunity - Challenges

● Huge opportunity for growth
  ▪ Offshore still relatively underexplored
  ▪ Undeveloped oil and gas discoveries
  ▪ Potential for tight oil development offshore Western NL

● Increasing costs for offshore development (new discoveries in deep water; lack of infrastructure for future gas development)

● Increasing public pressure related to energy development (‘social licence’)
  ▪ resource conservation, safety and potential environmental impacts
  ▪ Government of NL undergoing review of hydraulic fracturing
Communication Outreach: Processes, Practices & Responsibility

Even in a banner year for exploration, we never lose sight of safety.

“Everyone’s really excited about what’s on the horizon.”
—Chloe Casson, CHOPS Technician, CAPP Ltd.

SAFETY TRAINING in Atlantic Canada’s Offshore Oil and Gas Industry

WHAT SAFETY TRAINING IS REQUIRED TO WORK ON AN OFFSHORE INSTALLATION IN ATLANTIC CANADA?

The following safety training courses are mandatory to work on an offshore installation in Atlantic Canada:
- Basic Survival Training - Provides training in the knowledge and skills necessary to assist offshore crew in providing emergency care for themselves and others in a survival situation.
- Hazardous Substances (HS) Awareness training - Personnel shall be aware of the hazards associated with hazardous substances (e.g., gas and the appropriate response measures to be taken around it).
- Marine Response/Rescue Information System (MRI) training - Provides safety on the offshore handling, use, storage, and disposal of hazardous materials in the workplace.
- Navigator (Muriel) training - Provides training on the safe handling, use, storage, and disposal of hazardous materials in the workplace.
- Marine Response/Rescue Information System (MRI) training - Provides safety on the offshore handling, use, storage, and disposal of hazardous materials in the workplace.
- Navigator (Muriel) training - Provides training on the safe handling, use, storage, and disposal of hazardous materials in the workplace.

HOW DOES THE INDUSTRY TRAIN FOR POTENTIAL EMERGENCIES?

Keeping people safe is the first consideration in all aspects of offshore oil and gas activity. All employees have the skills necessary to do their jobs safely by undergoing relevant and appropriate training. This is one of the ways the industry ensures to keep employees safe.

Even in a banner year for exploration, we never lose sight of safety.

Photo above: Testing of the facility on the helideck of an offshore installation. The operation is being supervised by Mr. Technician.
The Path Forward

● Companies are committed to:
  • Responsible energy development and meet or exceed regulatory requirements and industry best practices
    • Strong safety culture
    • Minimizing environmental impact of operations
  • Accountability and transparency related to performance
  • Scientific research and continuous improvement

● Need to work collaboratively with governments to find ways to continue to boost exploration activity and encourage developments.

● Building a sustainable industry means continued benefits for future generations.
For More information

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