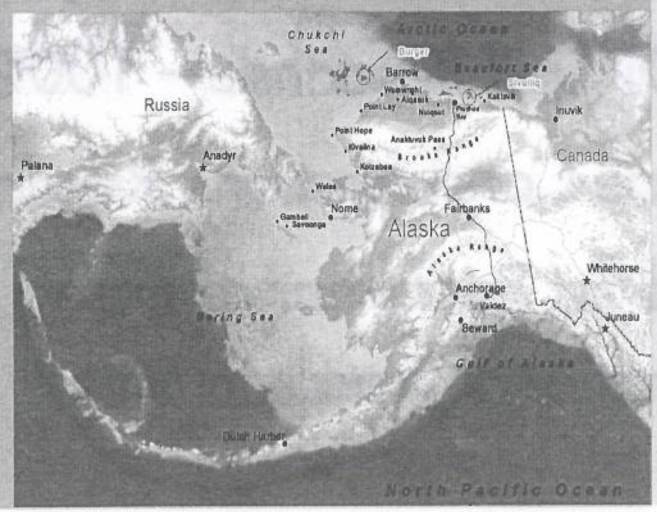
BENEFITS & COSTS OF PROPOSED ARCTIC EXPLORATION REGULATIONS



OVERVIEW

- Cost-Benefit Analysis of Top 3 Concerns Around Potential DOI Arctic Regulations
  1. Same Season Relief Rig
  2. Seasonal Limitation - Hydrocarbon Blackout
  3. Oil Spill Response – 100% Mechanical Recovery
- Unique Considerations Relating to Arctic Regulation
- Need for Performance-Based Regulations with International Trends in Mind

#1 SAME SEASON RELIEF RIG

HISTORY

- In 2012, Shell detailed its Same Season Relief Rig capacity in its Exploration Plan, which BOEM approved.

COST

- Annual Cost of Providing a Standby Same Season Relief Rig & Support Assets: **$250 mln.**
- NPV of **$2.1 Billion** Over 10 Years.

RECOMMENDATION

- New regulations should not prescribe a specific source control technology such as a SSRR.
- If a SSRR is prescribed in regulations, those regulations should also identify technologies that are equivalent to a SSRR, such as a capping stack, and provide a process for new technologies to be designated as equivalent.

NO BENEFIT

- Since DOI began keeping detailed incident records in 1971, **no drilling blowouts have been controlled by a relief well**, including Macondo and over 41,000 offshore wells were drilled during that period.
- Hierarchy of Well Control (After Proper Well Design): (1) Maintenance of Drilling Mud Systems; (2) BOP; (3) Capping Stack; and (4) Containment. *Relief rig isn't a well control tool, but a final application to plug/abandon well.*
- New capping technology and improved well integrity management reduce already low probability of loss of well control.

A SSRR adds 2.1 billion in cost with no demonstrated environmental benefit. Other technologies, such as a capping stack, provide equivalent or better opportunities for well control.

#2 SEASONAL DRILLING LIMITATION – HYDROCARBON BLACKOUT

HISTORY

- The BOEM conditioned its approval of Shell's Exploration Plan in 2012 on the cessation of drilling into hydrocarbon-bearing zones 38 days in advance of November 1. This was based on the assumption that an operator should be allotted time to drill a relief well before November 1.

COST

- Cost Assuming 38 Day Impact: **$ 456 million**
- NPV of **$3.9 billion** over 10 years

OTHER CONSIDERATIONS

- Other regions with seasonal risks, e.g. hurricanes in the Gulf, do not have end of season limitations.
- Arctic operators subject to existing regs that preclude passage through Bering Strait before July 1 (5 lost rig days) and limit ice management (average of 38 lost rig days).
- It only takes a week to deploy a capping stack.

NO BENEFIT

- Fixed end of season dates do not reflect operational capabilities.
- Relief wells should not be overemphasized where more effective solutions and new technologies are available and under development.

RECOMMENDATION

•Whether and if an operator is required to end its season should be driven by a holistic assessment of the assets it has in place.

•Regulations should acknowledge well control technologies that are equivalent to a same season relief rig.

The duration of an operator's season should be driven not be a calendar date, but by the ability of the operator to effectively manage and mitigate risks that are either present in the environment or reasonable likely to occur, as based on up-to-date assessments of site conditions.

#3 OIL SPILL RESPONSE – 100% MECHANICAL RECOVERY

HISTORY

- BSEE requires that Shell's OSRPs for the Beaufort/Chukchi Seas provide capacity for an operator to clean up 100% of its WCD with mechanical recovery equipment.
- Contrast with GoM where an operator is given 5% credit for natural dispersion, 10% credit for dispersants and 10% credit for in situ burning.

COST

- Depending on the formation daily WCD, incremental costs incurred due to disparity between credit in GoM and AK is between **17 million** (25k daily WCD) and **over 51 million** (75k daily WCD) per season.
- 10 Year NPV between **145 million** and **435 million**.
- This cost rises exponentially as you enter plays with higher daily WCDs.

NO BENEFIT

- Increased operational footprint, vessels, air emissions, etc.
- Depending on spill characteristics and metaocean conditions, dispersants and in situ burning are more effective at cleaning up an oil spill than is mechanical recovery equipment.

RECOMMENDATION

•Arctic oil spill response regulations should account for an operator's full suite of response and source control tools.

A100% mechanical recovery requirement leads to increasing costs and environmental impacts (less recovery of oil) as operators enter plays with higher daily WCDs.

UNIQUE CONSIDERATIONS RELATING TO ARCTIC REGULATION

Season Length

- **In Effect, Regulators Have Reduced the Season Length in Alaska by Three-Quarters Compared to the Gulf of Mexico**
- No Lease Stipulations Prescribing Number of Days/Year Leases can be Explored, but in 2012, Shell Not Permitted to Pass Through Bering Strait Before July 1 (MMPA Regs) & Required to Stop Drilling into Hydrocarbons by Sept. 24 **(85 Days)**

Fixed Costs

- **$1.5 billion** to Drill 100 Days a Season ($15 million per Drilling Day)
- **80% of Cost is Fixed**: $12 Million Spent with no Return per Lost Day
- These Fixed Costs are Difficult to Justify, Especially Given Other Opportunities Around the World

Higher Baseline Regulatory Cost

- Existing Arctic-specific regs add **$360 million/yr** in lost drilling time, **$47 million/yr** in operating cost and took **$58 million** to establish;
- These regulations include those promulgated by the USFWS/NMFS under the MMPA and by EPA under the CWA

Economic Benefits to the Nation

- Per BOEM (June, 2012): $20 - $27/barrel in net economic benefit to nation (net revenue minus financial/environmental cost), or $23.5 Billion per Billion Barrels of Oil Equivalent
- Times 1 billion barrels in each of Beaufort, Chukchi totals over **$47 billion in Net Present Value (NPV) over 50 years.** ***This is based on a very conservative estimate of volumes in the Beaufort & Chukchi.***

PERFORMANCE-BASED VS. PRESCRIPTIVE REGULATIONS

Need for Harmonization with International Standards

USA
- Prescriptive Regulations

Incorporation of Industry Standards

- Multiple Agencies ,Regulations and Jurisdictions

Canada
- Hybrid Approach

Blend of Traditional Prescriptive and Performance Based

One Regulatory Agency, One Primary Governing Act

UK
- Performance Based

Focus on minimization of hazards and risks to "as low as reasonably practicable"

One Main Statute

Greenland
- Performance Based
- Adoption and Application of International Best Practices
- One Primary Regulatory Act

Norway
- Performance/Risk Based
- Guidelines and Recommended Standards
- Multiple Statutes

In Canada, NEB Ruling has Cleared Path for SSRR Equivalency Application by Chevron

Based on information from, **"Comparing the Arctic Offshore Oil and Gas Drilling Regulatory Regimes of the Canadian Arctic, the U.S., the U.K., Greenland and Norway.** Reviewed conducted for the Canadian National Energy Board by The Pembina Institute. 2011 www.pembina.org/pub/2227

OVERVIEW – TOP THREE CONCERNS

Potential Regulation	Cost	Benefit	Recommendation
1. Same Season Relief Rig	$2.1 Billion (10 Year NPV)	No demonstrated benefit as no historical use of SSRR to control a well. Also, new technology is better able to quickly control a well.	Do not prescribe in regulations a specific source control technology such as a SSRR. Alternately, allow for equivalency.
2. Hydrocarbon Blackout	$3.9 Billion (10 Year NPV)	No demonstrated benefit as an operator should be permitted to operate so long as it is equipped to do so safely.	Employ a risk-based approach to end of season.
3. 100% Mechanical Recovery	145 Million - 435 Million (10 Year NPV)	Negative impact to environment due to increased operational footprint and availability of alternative tools likely to increase oil recovery.	Permit operators to craft oil spill response plans that account for their full suite of spill response and source control tools.

CONCLUSIONS

1. Frontier Areas such as the Arctic OCS are Most Safely, Effectively & Efficiently Regulated by Performance-Based Regulations
2. The Baseline for Cost-Benefit of the DOI's Arctic Regulations must not include Non-Regulated "Policy Calls" the Agency has Previously Imposed on Shell
3. More Costly Regulations Do Not Equate to Better Protection of People & the Environment
4. Cost Attributed to New Arctic Regulations Need to be Realistic and Based on Actual Operator Costs