Mitigating Environmental Impacts in the Offshore Oil and Gas Industry

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Overview

● Who is CAPP?

● Oil and Gas Lifecycle

● Mitigating Environmental Impacts:
  ▪ Exploration
  ▪ Development
  ▪ Production
  ▪ Decommissioning

● Conclusion/ Continuous Improvement
Canadian Association of Petroleum Producers

Represents large and small producer member companies

Members explore for, develop and produce natural gas, natural gas liquids, crude oil, and oil sands throughout Canada

Produce about 90 per cent of Canada’s natural gas and crude oil

Part of a national industry with revenues of about $120 billion per year

Associate members provide a wide range of services that support the upstream crude oil and natural gas industry
Lifecycle of an offshore oil and gas field

Exploration → Development → Production → Decommissioning/Abandonment

Seismic
Exploration drilling
Delineation drilling

Drilling wells
Engineering
Fabrication/construction

Recovering the resource
Transportation to market

Completion of project
Removal of installation

Environment, Health and Safety
Environmental Management of Offshore Oil and Gas Activities

- Planning begins before any activity is approved/occurs and continues to be a priority throughout each stage of the oil and gas lifecycle

- Involves/considers:
  - Multiple applicable acts/regulations with specific mandates (Offshore Accord Act, Fisheries Act, Canadian Environmental Assessment Act, Canadian Environmental Protection Act...)
  - Multiple regulators (Offshore Petroleum Boards, Canadian Environmental Assessment Agency, DFO, Environment Canada...)
  - Strategic environmental assessments (SEA) from regulators before Calls for Bids
  - Environmental assessment for seismic, drilling, production, decommissioning activities
  - Environmental protection plan – developed and submitted to regulators
  - Environmental effects monitoring plan: verify EA predictions
Exploration - Marine Seismic Surveys

- Offshore oil and gas industry follows rigorous environmental standards
  - Regulators approve seismic survey work and establish conditions for every survey conducted to ensure surveys are conducted safely, with minimal impact on the marine environment through careful planning and oversight

- During Environmental Assessment process the types of wildlife that may be present in an area where activity will take place are identified and mitigation measures implemented

- Use of FLOs and picket/chase vessels during seismic programs help identify and minimize interactions with commercial fishing operations
Operators adhere to the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment

- Outlines requirements that must be met during the planning and conduct of marine seismic surveys in order to minimize impacts
- Examples:
  - Marine mammal observers are trained to identify marine mammals and turtles that could be present in the area where the seismic survey will take place
  - Seismic equipment powered down (e.g. air source arrays) if an endangered or threatened species is observed in the water (as outlined in Species at Risk Act)

Research on the impact of seismic surveys on marine life has been conducted for many years and is ongoing

- Research shows that surveys conducted with recommended mitigation measures in place are unlikely to pose significant risk of mortality to marine organisms
- To date, research has identified no long-term adverse effects on marine mammal populations
Specific mitigations are outlined for construction and development sites (onshore and marine) based on the types of facilities and equipment to be used at each site:

- Floating concrete support barges are equipped with double-walled fuel storage tanks and inspected regularly.
- Topsoil and organic materials removed during sloping are re-spread over disturbed area to promote re-vegetation.
- Sediment is removed from water pumped from excavations or work areas, or any runoff or effluent directed out of the project site; sediment removed by settling ponds, filtration or other suitable treatment before discharging to a waterbody or other ecological sensitive area.

*Hebron Construction – Bull Arm, NL*
Development / Production - Drilling

- **Low-toxicity water-based muds used for drilling where practicable**
  - Low toxicity synthetic-based muds used according to Offshore Waste Treatment Guidelines (outlines specifics re: use, treatment and disposal)
  - Oil-based muds recovered and recycled or transported to shore for disposal

- **Produced water is separated from produced oil and gas and is treated before being discharged**

- **Specialized equipment is used to prevent loss of containment and discharge into the sea, including blowout preventers**
Production - Environmental Effects Monitoring (EEM)

- Evaluate the effectiveness of actions to reduce effects, provide early warning of changes in the environment, and assist in identifying R&D needs.

- Programs generally comprised of sampling marine sediments, water and fish at various sites.

- EEM results are submitted to regulators for review and approval and are made available to the public.

- To date, EEM programs submitted by Atlantic Canada offshore operators show minimal localized impacts within predicted levels approved during EA process.
Production - Spill Prevention & Response

- **Spill Prevention Measures include:**
  - Identifying and analyzing potential risks and designing/implementing engineering controls and establishing procedures to reduce or eliminate hazards
  - Monitoring, maintaining and repairing equipment
  - Using comprehensive internal and external reviews, inspection, testing and audit programs of facilities, equipment and processes
  - Training workers to recognize and respond to potential emergencies
  - Using global standards
  - Evaluating and implementing new research and technology as they become available

- **While industry’s focus is on preventing environmental incidents proper preparation is crucial and contingency plans are developed to ensure adequate response measures are in place in the event of an environmental emergency**
Tiered Oil Spill Response

- Operators have developed the following three-tiered oil spill response structure that enables them to effectively respond to different types of events
  - Tier 1
    - Equipment and resources that are maintained offshore on either the installation or support vessel (Operator Equipment)
  - Tier 2
    - Equipment and resources that are maintained onshore that can be mobilized to support the offshore response (Operator Equipment and Eastern Canada Response Corporation)
  - Tier 3
    - Equipment and resources that are not available locally but that can be accessed nationally or internationally (International Resources including OSRL and the Global Response Network)
Tier 1 Oil Spill Response

Sorbent Boom and Pom Poms

Single Vessel Side Sweep (SVSS) System
Tier 2 Oil Spill Response

NorLense 1200-R Boom Deployment
Tier 2 Oil Spill Response

Transrec 150 Skimmer
Tier 3 Oil Spill Response
Decommissioning - Environmental Considerations

- Project management and planning related to decommissioning can start several years before a project ceases production
  - Involves cementing and abandoning wells and removing infrastructure

- Treated the same as all other phases of the oil and gas lifecycle from an environmental management perspective
  - Environmental Assessments and Environmental Protection Plans developed
  - Mitigations identified for any potential adverse impacts on the environment
  - Example: Marine Mammal Observers may be used to ensure that marine mammals are not in the area during activities that could result in harm or displacement of these species

- Monitoring of sites following the abandonment of wells and removal equipment occurs (seabed and environmental monitoring), as outlined by relevant guidelines and plans
Conclusion

● Need for energy and economic benefits must be balanced with environmental protection

● Achieved through environmental management and mitigation

● Industry committed to continuous improvement
  ▪ Evaluate new equipment and technology as it becomes available
  ▪ Regularly conduct training exercises
  ▪ R&D
For More information

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