

# Spill Prevention and Spill Response



BOP Stack



Containment Boom



# Legislative Requirements

- Regulations
  - Drilling and Production Regulations
  - Certificate of Fitness
  - Oil and Gas Debris and Spills Liability
  - Petroleum Installations
- Guidance
  - Drilling and Production Guidelines
  - Drilling Programs
  - Safety Plans
  - Incident Reporting and Investigation
  - Environmental Protection Plan
  - Physical Environmental Programs
  - Data Acquisition and Reporting
  - Financial Responsibility Requirements

# Environmental Assessment

- Strategic Environmental Assessment
  - Conducted by C-NLOPB prior to issuing exploration licences
  - Reviewed by federal and NL agencies, including fisheries, environment
  - Draft report published for public comment
  - Report available on C-NLOPB Web site
  - Includes overview of blowout risk and consequences

# Environmental Assessment

- Project Specific Environmental Assessment
  - Conducted in accordance with *Canadian Environmental Assessment Act* and *Accord Acts*
  - Documents published on C-NLOPB website in near-real time
  - Assessment documents reviewed by staff of C-NLOPB, environment and fisheries agencies of federal and NL governments
  - Includes potential effects due to accidental events, including blowouts

# Authorization Requirements

- Operations Authorization (OA)
  - Safety Plan
  - Environmental Assessment
  - Environmental Protection Plan
  - Contingency Plans
    - Offshore and Onshore Emergency Response Plans
    - Oil Spill Response Plan
    - Ice Management
    - Relief Wells
  - Certificate of Fitness
  - Operator's Declaration of Fitness
  - Letter of Compliance
  - Financial Responsibility
  - C-NL Benefits Plan

# Approval Requirements

- Approval to Drill a Well (ADW)
  - Formation Pressure and Fracture Gradient Evaluation
  - Barrier analysis to confirm two barriers at all times
  - Casing Program
  - Cementing Program
  - Drilling Fluids
  - Casing and Wellhead Pressure Testing
  - Formation Leak-Off Tests
  - BOP Configuration
  - BOP Pressure and Function Testing

# Safety Plans

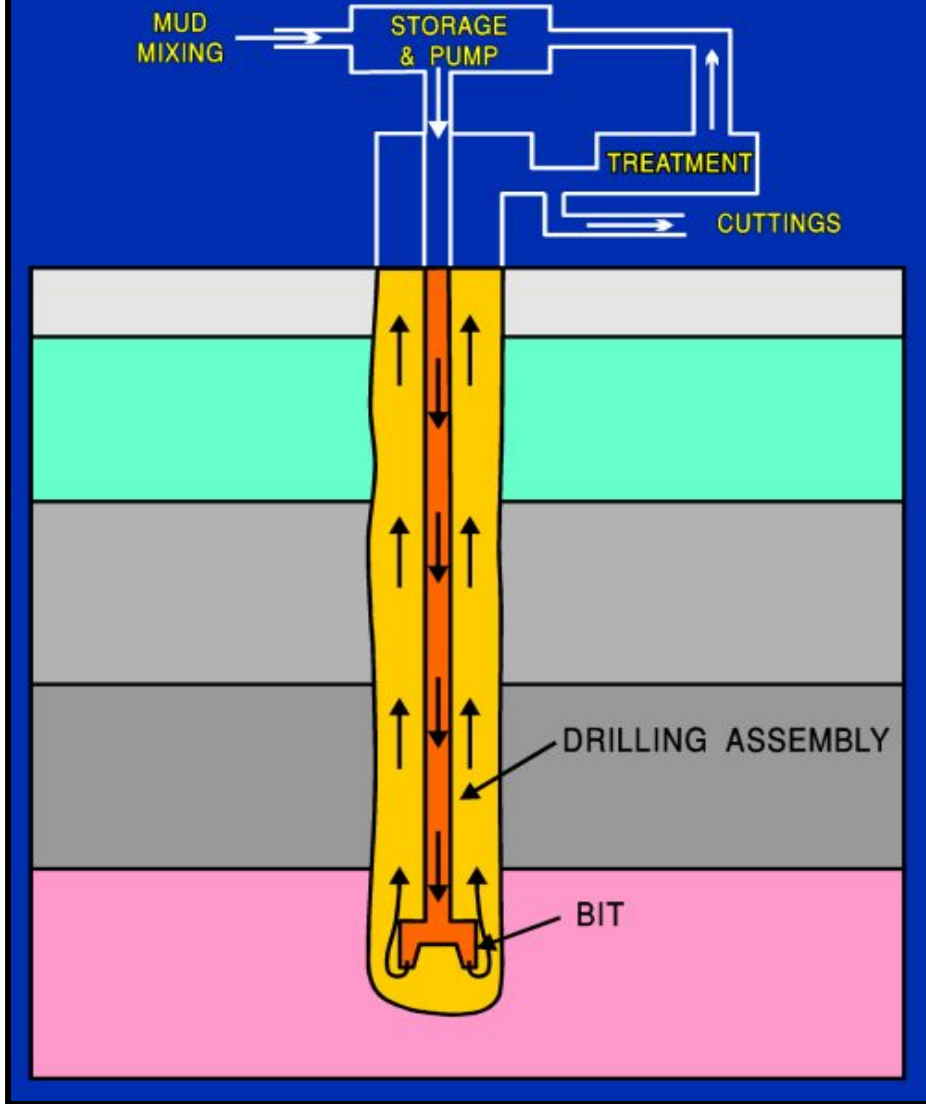
- Hazard Identification
- Risk Management
- Training and Competency of Personnel
- Details of Systems and Equipment, including Maintenance/Inspection/Testing
- Operational Procedures and Processes
- JOHSC
- Incident Reporting and Investigation
- Management Oversight/Monitoring

# Oversight of Drilling Operations

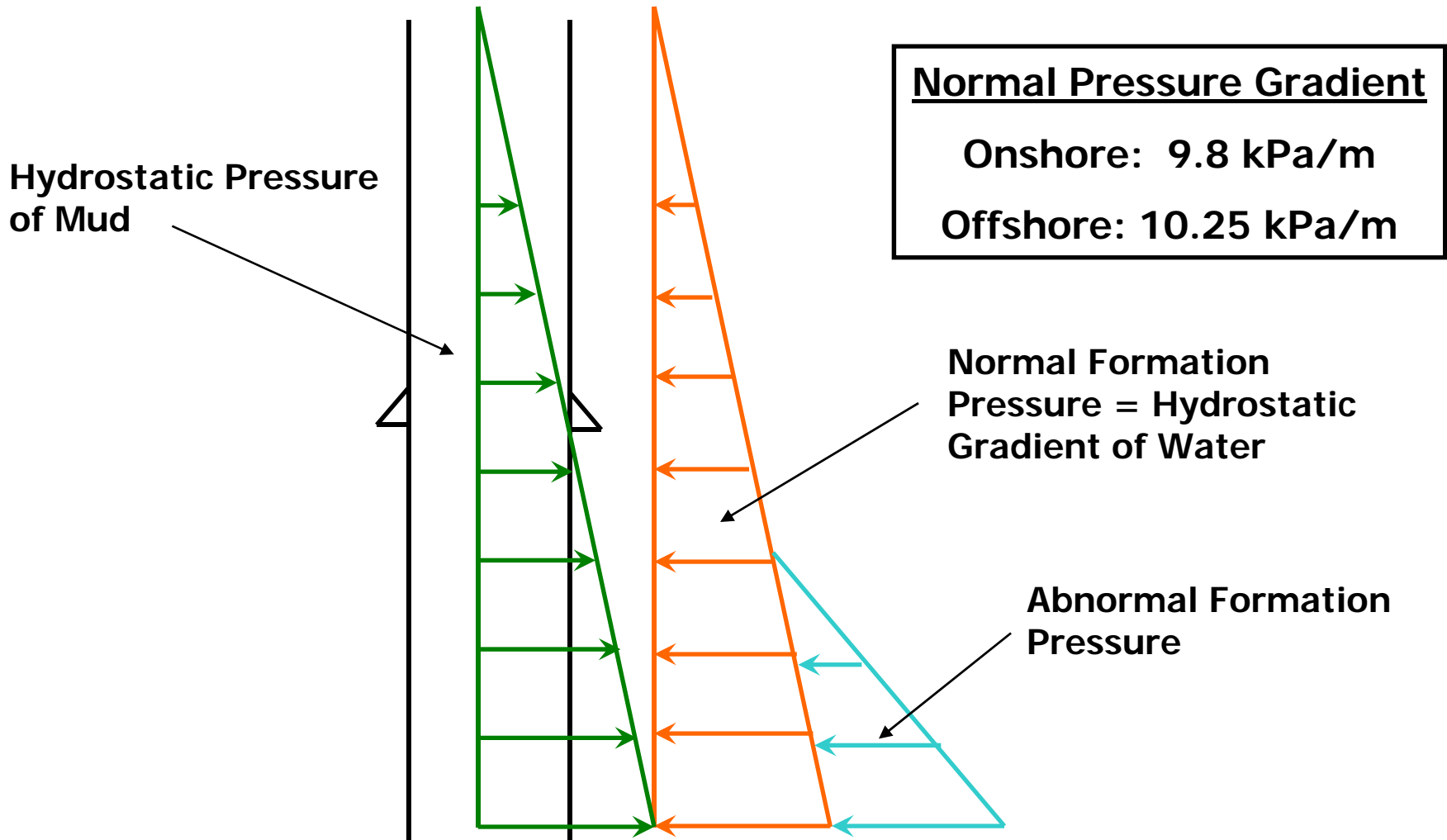
- At Operations Application Level
- At ADW Submission/Review
- During Operations
  - Daily Drilling, Geologist and Log Reports
    - Reviewed by a number of C-NLOPB Staff
    - Copies provided to NL Dept of Natural Resources for Exploration and Delineation Wells
  - Inspections
  - Audits



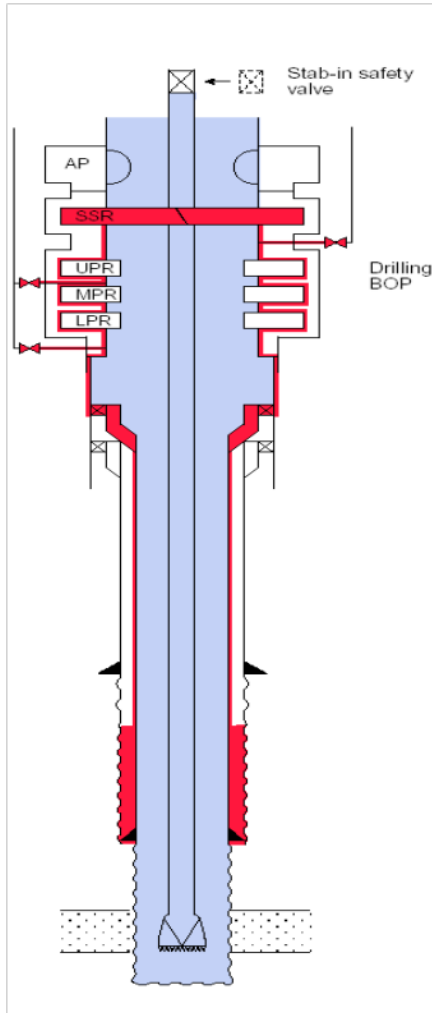
# Drilling Mud Circulation



# Formation Pressures



# Well Barriers



Well barrier elements	See Table	Comments
<b>Primary well barrier</b>		
1. Fluid column	1	
<b>Secondary well barrier</b>		
1. Casing cement	22	
2. Casing	2	Last casing set.
3. Wellhead	5	
4. High pressure riser	26	If installed.
5. Drilling BOP	4	

# BOP Specific Requirements

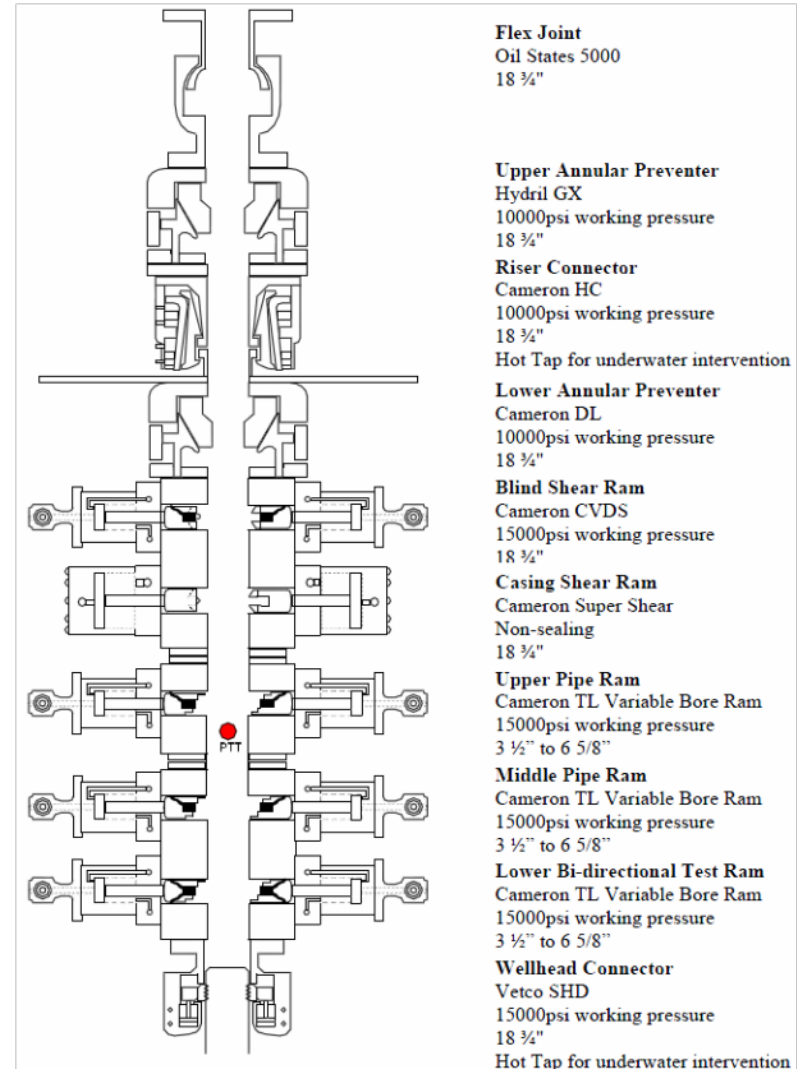
- BOP Stack Configuration and Operating Limits
- Capacity and Redundancy in BOP Control System
- Deepwater considerations
  - Hydrates
  - Cold Temperature
- Pressure and Function Test Procedures and Frequency
- Test Verification via review of Daily Report Information and records review during Audits
- Modes of Activation
  - 1 of 3 backup systems in shallow water (anchored vessel)
  - 2 of 3 systems in deep water (dynamically positioned vessel)

# Riser Specific Requirements

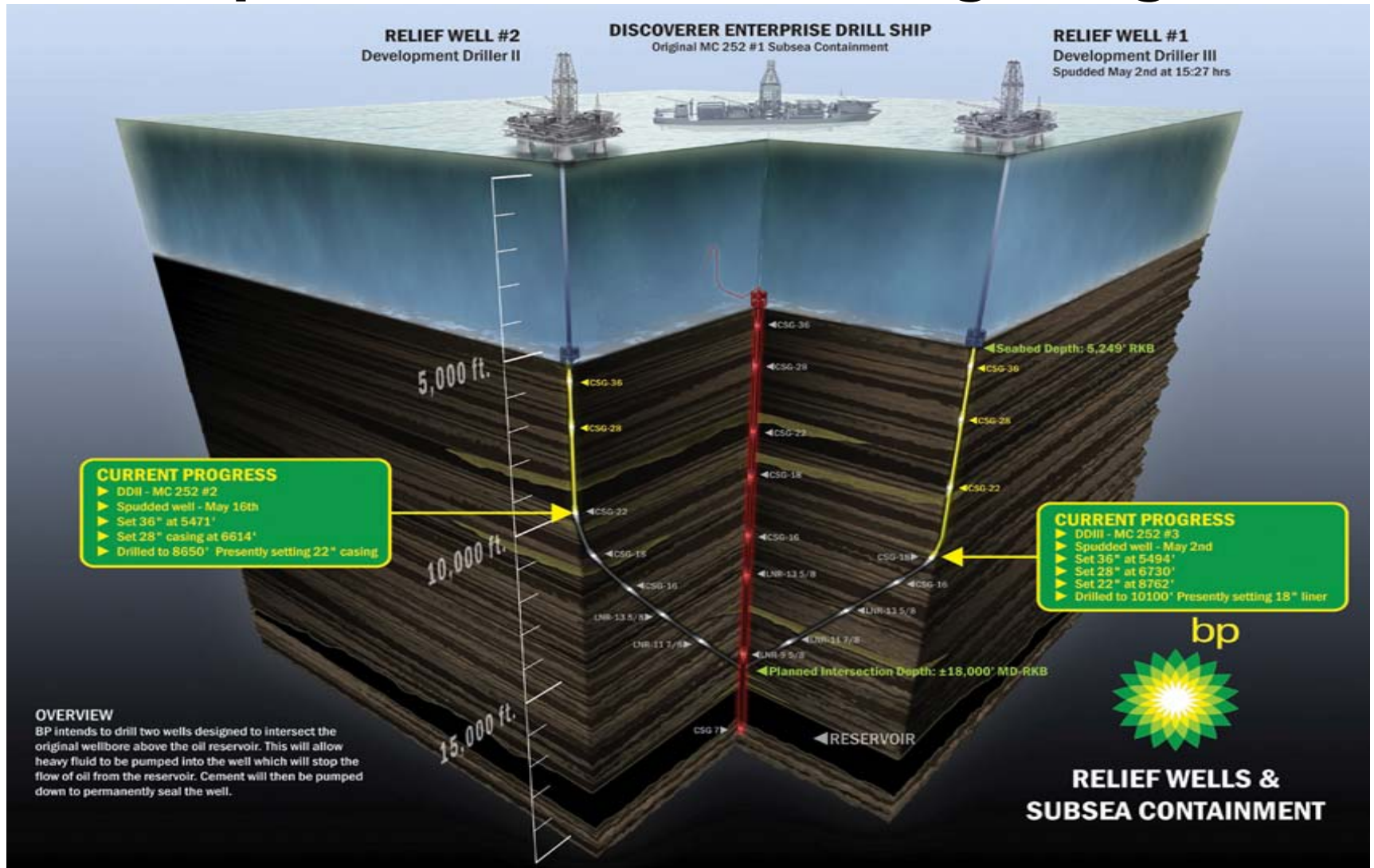
- Drillsite specific Riser Analysis and Weak Point Assessment
- Riser Margin
- Emergency and Planned Disconnect Procedures
- Drift-Off Management



# BOP Stack



# Sample Relief Well Drilling Program



Source: <http://www.deepwaterhorizonresponse.com/go/doctype/2931/54691/Horizon>  
 May 24, 2010 Update

# Additional Oversight for 2010 Chevron Orphan Well

- Oversight Team established
- Field reports on testing activity
- Monitor DWH developments for lessons learned
- Audits and inspections every three to four weeks.
- Operations time-out
- C-NLOPB observer at specific times during the drilling program
- Spill response ready for rapid deployment before penetrating targets
- Review well termination program



# IRF and NSOAF Best Practices

- International Regulators Forum
  - CNLOPB part of IRF
  - IRF committee activity
  - Upcoming IRF conference (program changes) and IRF meeting
- North Sea Offshore Authorities Forum – Wells Working Group
  - Well Operations Engineering meeting in Norway
  - Member country responses to GoM (not enough info available to define immediate and root causes about what happened)

# Production Installations

- Drilling activity regulated same as exploration wells
- Different systems in place for production
  - Two Barriers
  - Production Tree
  - Downhole Safety Valve



# C-NLOPB Spill Response Role

- **Operators Responsible for Emergency Response**
- **Lead government agency for drilling, production installations on site, e.g.:**
  - Hibernia, Terra Nova, White Rose production platforms, subsea installations, loading systems
  - Drilling units on site (e.g., Stena Carron at Lona O-55)
- **Resource agency in all other cases, e.g.:**
  - Drilling unit off-site
  - Supply vessels
  - Shuttle tankers



# Interaction with Other Agencies

## **Accord Act paragraph 46 (1):**

**The Board shall, to ensure effective coordination and avoid duplication of work and activities, conclude with the appropriate departments and agencies . . . Memoranda of understanding in relation to (a) environmental regulation; (b) emergency measures; . . . and (f) such other matters as are appropriate.**

- MOUs in place with environment, fisheries, energy departments of Canada & NL
- MOUs are in the process of being updated

# Spill Response Requirements

- All spills prohibited
- Contingency plans required
  - Also annual field countermeasures exercise
- Operator must report spills to C-NLOPB
- Operator must take “all reasonable measures” to respond to and mitigate spill
- Operator financially responsible for all “actual loss or damage” resulting from spill
  - Up to prescribed limit, without proof of fault or negligence
  - Unlimited liability where fault or negligence proved
- C-NLOPB Chief Conservation Officer has authority to intervene in response

# Financial Responsibilities Requirements

## Existing:

- \$30 M direct access
- \$70 M available
- \$250 M financial capability

## Proposed:

- \$100 M direct access with option for industry to develop a \$250 M fund
- \$1 B financial capability

# Spill Response – Typical Planning Elements

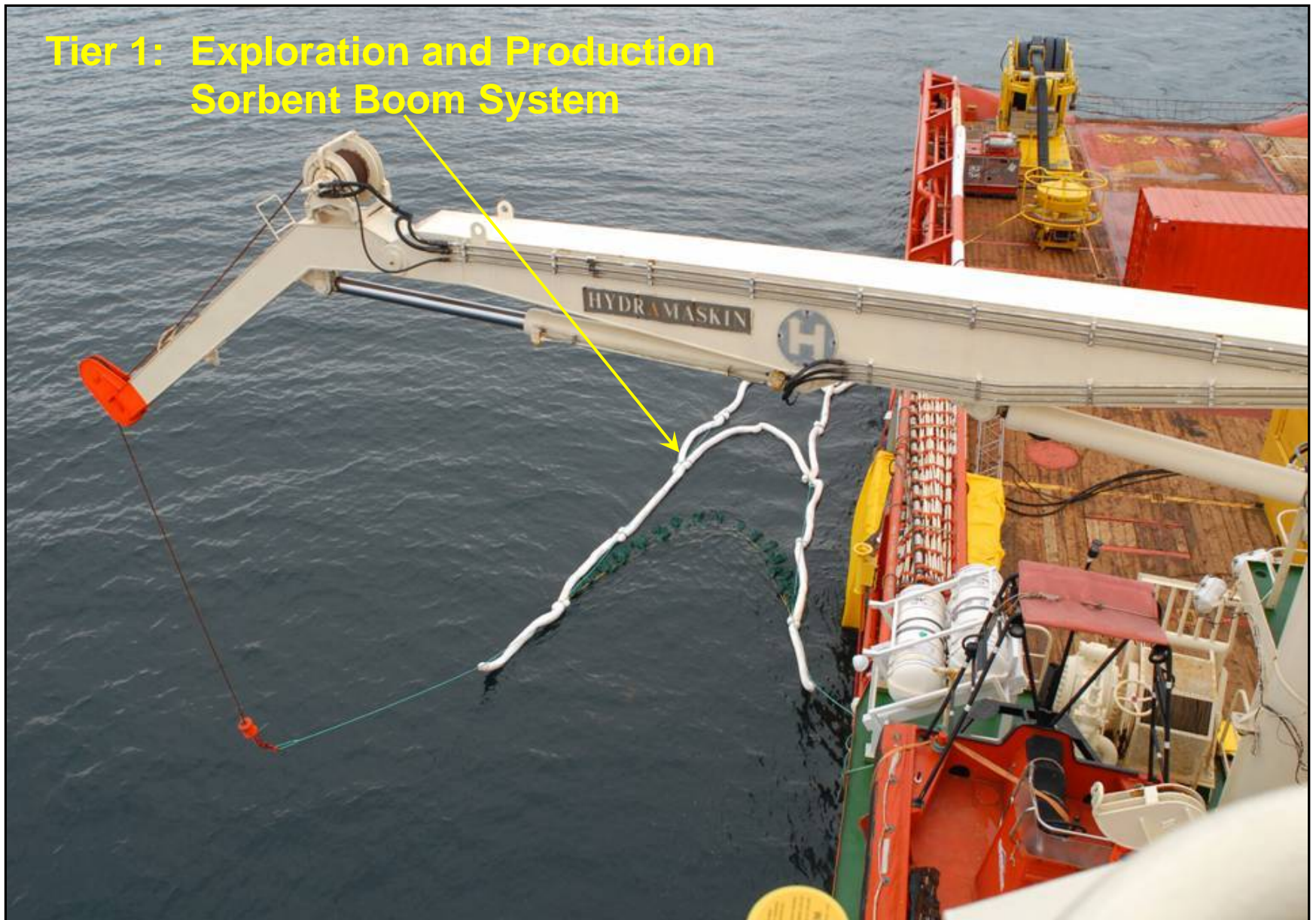
- **Tiered Response Structure**
  - Tier 1: In-field / at-site resources
  - Tier 2: NL / regional resources (e.g., ECRC, CCG NL)
  - Tier 3: National/international resources (e.g., OSRL)
- **Command/Control Structure**
- **Communications/Notification Procedures**
- **Identification of Resource Personnel and Organizations**
- **Provision for Personnel Training**
- **Resource Sharing Arrangements with Other Operators**

# Oil Spill Response: Tier 1

- All Support Vessels: Exploration and Production
  - 100+ m Sorbent Boom
  - GPS/Satellite spill tracking buoys
  - Spill sampling kit
- In-Field Resources, Each Production Site
  - Single-Vessel Side Sweep (SVSS) system
    - 60 m of 2.1m boom
    - Weir skimmer [100 m<sup>3</sup>/hr capacity (15,000 bbl/d)]
    - Outrigger arm



## Tier 1: Exploration and Production Sorbent Boom System



Tier 1: Production  
Single-Vessel Side Sweep  
System



# Oil Spill Response: Tier 2 and 3

- Tier 2: Regional Capacity
  - ECRC Donovans - available 24/7/365
  - CCG Donovans - available 24/7/365
  - Large-Capacity Skimmer Systems
    - 2 Transrec 150s at ECRC
    - 1 Transrec 200 at CCG
    - 53,000 bbl/d fluid throughput each
  - Unsheltered-Waters Boom Systems
    - Two 400 m Norlense 3.4 m booms (at ECRC)
    - 370 m NOFI 2.4 m boom (at ECRC)
- Tier 3 – Canada, International
  - Example: OSRL depot in Southampton, UK
  - Capable of responding anywhere in the world via cargo aircraft

## Tier 2: Exploration and Production Norlense Boom



## Tier 2: Exploration and Production Norlense Boom



## Tier 2: Exploration and Production Transrec Skimmer System



# Information Disclosure

- Public Disclosure of Information
  - Oil Spill “Tombstone” Data
    - Per incident, for spills >1 liter
    - Quarterly, for spills ≤ 1 liter
  - Environmental Effects Monitoring
    - Development drilling / Production
  - Environmental assessment reports and documents
  - Contingency Plans
- Legislation
  - Section 119

**For more information go to:**

**[www.cnlopb.nl.ca](http://www.cnlopb.nl.ca)**

**Twitter: @CNLOPB**

