Improving Safety on Seismic Operations using Structured Planning and Execution

Outline
- Introduction to Terre de Grace: bp operated oilsands property
- Improving Safety in Seismic Operations
  - Stage Gate Approach applied to seismic operations with deliberate focus on increased planning time
  - Assuring safety management systems of contractors
  - Impact of bp field HSE representatives
- Post Appraisal
- Conclusions and Observations

BP Canada Oil Sands Leases
Scope of 2011/12 3D

- 35 sq. km. area
- 444 km Source Line
- 663 km Receiver Line
- 56,600 shots
- 35 sq. km. area
- 663 km Receiver Line
- 644 km Source Line
- 300+ people on site
- 300+ people on site
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Terre de Grace 3D Objectives

- Image Middlebury target formation.
  - Target depth 350 ft to 7000 ft (100m to 2100m in water areas to the North)
  - Greyscale seismic image with a strong impedance contrast
- Achieve approximately 10-fold at target area to:
  - Provide an accurate structural image of the Middlebury formation to optimally position 3D producer pairs
  - Provide quality data for inversion and reservoir descriptions
  - Ensure reliable stratigraphy detection through good quality gradient impedance volumes

Stage Gate Approach

- Mulching and Slashings: zero recordable injuries or incidents
Stage Gate Approach: Client Impact

Planning
- Pre-Main Planning
- Main Planning
- Post Planning
- Main Maintenance
- Post Main Maintenance
- Renovate
- Home Bar

Preparation

Planning

Planning

Planning

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Personnel Loading Curve

Assuring Contractor Safety Management Systems

Drilling, hand drilling and survey: zero acceptable injuries or incidents
Assuring Contractor Safety Management Systems

bp expects that contractor safety systems will be equal to or better than bp systems.

Quality of contractor HSE systems are verified by:
- Audit at the contractor head office level
- Audit at local contractor organization level

Project specific HSE plans are developed by contractor
- Assured by bp HSE staff
- Contractor staffing to support the HSE plan is verified

Impact of bp Field HSE Representatives

Recording Crew: one recordable illness (frostbite) and one Medical Treatment on frostbite

• No recordable events on 2011 2D
• 145,398 Exposure Hours

Monitor proactive measures included in contractor systems
- Interactive hazard card programs
- Incentive awards, recognition, positive reinforcement

Verify compliance with contractor HSE requirements
- Interaction with contractor HSE professionals
- Monitor procedure measures included in contractor systems
- Handed out programs
- Behavior based system inputs
- Contractor follow-up on identified hazards
- Encourage positive safety behaviors
- Incentive awards, recognition, positive reinforcement
- Initiate and/or participate in safety stand downs

Audit at local contractor organization level

Audit at the contractor head office level

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Post-Appraisal

- Structured review of program design, execution and outcome
- Lessons learned are shared with contractors and bp global seismic operations community

Conclusions

- A clearly defined framework of expectations around Health and Safety is effective in managing contractor performance in this area
- As the client company, bp has the biggest impact in the planning stages of a program
- A strong client presence in the field helps to keep everyone focused on delivering the Health and Safety goals of the project
- bp will continue to develop HSE management systems in an effort to reduce Health and Safety incidents to zero