

A red and white helicopter is landed on a cleared area in a forest. Several workers in high-visibility orange and yellow vests and hard hats are standing around the helicopter. The ground is covered with low-lying green vegetation and some debris. The background is a dense forest of tall evergreen trees under a blue sky with scattered white clouds.

# Reclamation of Remote Oil Sand Exploration (OSE) Programs

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A bit of context.....

Where are the Oil Sands?

- Several locations around the globe (including Venezuela, the United States, Russia and Canada)
- This project centers around the Athabasca deposit in north eastern Alberta, Canada which is possibly the largest, most extensively developed, and most well known of the world's oil sand deposits

## History

- Small scale commercial development of the area began in 1920
- Large scale development began in the late 1960s / early 1970s
- Traditional approach has been through surface mining however in-situ methods can also be utilized
- Focus of this presentation relates to the exploratory stages of a project which is likely to involve in-situ methods in the future

## Boreal Forest

- The project site is located within the Boreal Forest Natural Region
- 28% or 552 million hectares of the world's boreal zone is in Canada
- Significant influence on the global environment particularly on climate through the storage of carbon and the purification of air and water



## Project Background

- Oil Sands Exploration (OSE) Project
- Approx. 100km north west of Fort McMurray, Alberta
- Project site covers an area of 750km<sup>2</sup>
- Ten separate OSE leases comprising approx. 500 individual sites
- Geological, engineering and environmental studies have been completed to support proposed future operations
- No in-situ oil recovery is currently being undertaken



## Project Objectives

- Reclamation of the OSE programs
- Compliance with regulatory requirements
- Maintenance and management of designated base areas

## Permits & Approvals

- Temporary Field Authorization
- Caribou Protection Plan
- Industrial Wildfire Control Plan
- Key Wildlife and Biodiversity Mitigation Zone
- Road Use
- Stakeholder Engagement



## Scope of Work

- Aerial Monitoring Inspections
- Ground Assessments
- Detailed Site Assessments
- Tree Planting
- Survival Rate Inspections
- Well Centre Subsidence
- Weed Management
- Sump Inspections
- Debris/Garbage Removal
- Directive 13 and 20 compliance

## Aerial Monitoring Inspections

- Coal & Oil Sands (OSE) Reclamation Requirements
- Overview of landscape, vegetation and soil conditions
- Approx. 50% of sites have been subject to an aerial monitoring inspection
- Digital imagery obtained from approx. 90% of sites following deployment of an aerial reconnaissance program
- Identification of ground assessment and/or mitigation requirements



## Ground Assessments

- 10% of sites within an OSE program require ground truthing
- Verify aerial observations
- Assessed as per either forested or peatland reclamation criteria
- Reclamation success determined through comparison to off-site undisturbed areas



## Detailed Site Assessments (DSA)

- OSE sites with greater than 25% soil disturbance require full landscape, vegetation and soil assessment
- Sites pass or fail based on comparison to control conditions (surrounding undisturbed areas)
- Again, assessed as per either forested or peatland reclamation criteria
- Approx. 2 sites per year during last three year period have been subject to a DSA



## Tree Planting

- Approx. 25,000 trees planted in past two years at approx. 30 sites
- Black & White Spruce, Jackpine and Lodgepole
- Planted between July 1 and August 31 with intention of achieving greatest survival success rate
- Densities followed applicable reclamation criteria of 2,000 stems per hectare
- Presence of grass was a key consideration
- Also utilized for erosion control purposes



## Survival Rate Inspections

- Post planting inspections required to assess trajectory success
- Approx. 25% of sites that had been planted in in past two years were inspected
- Key considerations are survival rates, plant health and growth
- Minimum of two growing seasons and acceptable trajectory required for the purposes of reclamation certificate applications





## Well Center Subsidence

- Subsidence at well centers is common
- Subsidence may not affect the forest ecosystem and may actually be beneficial
- Wide or deep subsidence does pose an issue and may negatively impact reclamation trajectory
- Four sites have required re-contouring in past two years
- Utilization of coarse woody debris and topsoil from surrounding area



## Weed Management

- Four predominant noxious weed species
- Scentless Chamomile, Perennial Sow Thistle, Common Tansy and Canada Thistle
- Approx. 60 sites have been subject to weed management in past two years
- Spot spraying and hand picking largely utilized
- Three specific sites required an all-terrain vehicle and boom sprayer to be utilized





## Sump Inspections

- Eight remote sumps
- Sumps constructed during the exploration phase
- A number of the sumps have subsidence issues
- Larger equipment will be required
- Re-contouring will need to be undertaken during winter months when winter road access can be established

## Debris/Garbage Removal

- Debris and garbage present to various areas at the project site particularly former camp areas and laydown areas
- A limited amount of debris (wooden planks, piping etc.) have been removed using ground access methods
- Significant amount remains





## Directive 13 and 20 Compliance

- Twenty wells subject to Directive 13 requirements
- Seven well locations subject to Directive 20 requirements



## Challenges – Climate and Stakeholders

### Climate

- Temperature ranges from as low as -50<sup>0</sup> celsius to +35<sup>0</sup> celsius
- Approx. 450mm to 550mm of precipitation
- Lightning storms and strong winds

### Stakeholders

- A requirement to inform a number of stakeholders (First Nations, other operators and trappers)



## Challenges – Access and Communication

### Access

- Remote
- Less than 10% of sites can be accessed by ground
- Predominantly helicopter access

### Communication

- Lack of cell coverage
- Satellite phones
- Two way radios



## Challenges – Forest Fire

### Forest Fire

- Significant risk of forest fires
- Air quality issues
- Poor visibility
- Recent events highlight this particular challenge



## Summary & Closing

- Reclamation of the OSE programs to be completed by 2019
- Over 250 sites reclaimed to date (comprising 4 separate OSE programs)
- Five larger sites will be maintained to facilitate future operations at the project site
- Number of sites is reducing and project is becoming somewhat more focused

# Questions?