Alberta’s Upstream Oil and Gas Reclamation and Remediation

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Outline

• Context
• Legislation/Roles and Responsibilities
• Remediation and Reclamation Programs
• Challenges
Context
Environmental impacts

Live cycle stages

Lease preparation
Drilling & Drilling Waste Disposal
Production
Abandonment
Reclamation & Remediation

Environmental Impact

- Soil stripping
- Compaction
- Soil loss
- Contaminants
- On-site disposal
- Spills
- Wellbore leaks
- Aboveground infrastructure
- Soil conservation
- Drilling waste disposal
- Spill prevention
- Waste management
- Cement casing
- Remove infrastructure

Regulatory Requirements

- Groundwater protection
- Drilling waste disposal
- Reclamation and remediation

EPEA
OGCA
EPEA
Roles and Responsibilities & Legislation
Who Does What

- ESRD is responsible for developing reclamation and remediation legislation and policies
- Alberta Energy Regulator (AER) implements legislation and policies
- AER took over regulation of the entire life cycle in April 2014
  - Licensing through abandonment phases from the Energy Resources Conservation Board
  - Reclamation phase from Alberta Environment and Sustainable Resource Development (ESRD)
Legislation

• Acts provide overarching authority
  – Oil and Gas Conservation Act
  – Environmental Protection and Enhancement Act

• Regulations provide detailed requirements
  – Oil and Gas Conservation Regulation
  – Conservation and Reclamation Regulation
  – Remediation Certificate Regulation
Supporting Policies

- Detailed guidance is found in criteria, guidelines and Directives, for example:
  - Alberta Tier I and 2 soil and groundwater remediation guidelines
  - 2010 Reclamation Criteria for Wellsites and Associated Facilities
  - Directive 20 Well Abandonment
  - Directive 50 Drilling Waste Management
Reclamation Legislation

- Reclamation requirements apply to **Specified Land**:
  - Soil conservation during site construction
  - Specified land must be reclaimed
  - The operator must obtain a Reclamation Certificate
  - A reclamation certificate is required to surrender a surface lease
Reclamation Legislation

• *Specified land* is defined to include:
  – Wellsites, batteries, industrial pipelines, oil production sites
  – Exploration operations (coal or oilsands)
  – Municipal pipelines
  – Mines, sand and gravel pits, borrow pits, quarries, peat extraction
  – Electrical transmission lines and telecommunication towers
  – Roads and railway lines
  – Plants, e.g. chemical plants, refineries, etc.
Reclamation Legislation

• The goal for reclamation is Equivalent Land Capability:

The ability of the land to support various land uses after conservation and reclamation is similar to the ability that existed prior to an activity being conducted on the land, but that the individual land uses will not necessarily be identical.
Remediation Legislation

• Remediation requirements apply to all land
• Substance releases that have caused, may cause, or are causing a significant adverse effect are prohibited
• If a substance is released that has caused, may cause, or is causing an adverse effect must be:
  – Reported to AER or ESRD
  – Remediated
Remediation Legislation

- Adverse effect is defined as impairment of or damage to:
  - Environment
  - Human health
  - Safety
  - Property
Remediation and Reclamation Programs
Upstream Oil and Gas Activity Flowchart

- Active Operation
- Waste disposal
  - Spill response

Activity is Abandoned (Dismantled)

- Phase 1 ESA
  - Paper Review

- Phase 2 ESA
  - Soil Sampling & Delineation

Remediation to meet Alberta Tier 1 or Tier 2 Guidelines

- Reclamation
  - Topsoil Replaced, Revegetated

- Eligible for a Reclamation Certificate
Life Cycle for Reclamation and Remediation

- Plan construction to avoid sensitive areas
- Conserve soil during site construction
- Minimize spills during operation and report and remediate spills
- Apply for remediation certificate to reduce liability (voluntary)
- Apply for a reclamation certificate at closure
Active Operations

- AER activities include
  - Inspections
  - Enforcement
  - Spill response
Abandonment

• Wellbore is plugged with cement to prevent leakage
• Wellbore is cut and capped ~1m belowground
• Surface facilities are removed
Remediation Management
Phase 1 Environmental Site Assessment

• Purpose of Phase 1 ESA:

  – Provides information on what was on the site prior to abandonment
  – Identify potential sources of contamination
Phase 1 ESA
General Site Information:

• Surface Location (sensitive areas, drilling depth)
• Drilled and Abandoned vs. Produced
• Oil vs. Gas
• Pipelined vs. Tanked and Trucked
• Single Well vs. Multi Well vs. Battery
• Date of Construction/Abandonment/Reclamation.
Records Review:

• Production Information
  – Historical or Current infrastructure
  – Flare Pits, Other pits, Flare stack
  – Tanks
  – Herbicides, Sterilants used
Records Review:

• Environmental Information
  – Spills / Releases (from File or AER search)
  – Remediation Activities Completed
Aerial Photo Review

- Can be Hit and Miss
- Can be used for pre-disturbance
- Directs further investigation
Landowner/Operator Interviews

• Communication is key
• Points of Contact
  – Landowner
  – Occupant…grazing lessee, FMA holder, etc
Site Visit
Phase 2 ESA

• If Phase 1 ESA indicates there is potential for contamination, a Phase 2 ESA is required
  – Includes intrusive sampling of soil and groundwater if there is a potential for groundwater contamination

• Samples are analyzed by an independent lab

• Determines if contamination is present
Remediation

• Remediation means clean-up of contaminated soil and groundwater
• Remediation is conducted if Phase 2 ESA found contamination at the site
• Remediation includes physical removal of contaminated soil and/or groundwater
Remediation Cont.

• In some cases, contaminated soil is treated and returned to site
• Remediation “cleans-up” any spills or releases which may have occurred during the operation of a wellsite or facility
• Alberta Tier 1 and 2 soil and groundwater remediation guidelines are used to establish remediation objectives, e.g. “Is it clean enough?”
Reclamation Objective

During the reclamation phase the site is to be returned to Equivalent Land Capability:

– Re-establish contour of the site
– Replace topsoil and subsoil
– Re-establish vegetation
Reclamation Criteria

When reclamation is complete the site is assessed to see whether it meets AER requirements:

– 2010 Reclamation Criteria for Wellsites and Associated Facilities
  • Cultivated land
  • Forested land
  • Native Grassland
  • Peatland
Reclamation: Cultivated Lands

- Includes:
  - Lands managed under conventional, minimum or zero till practices for agricultural purposes;
  - Land use changed from peatland, forested land or grassland to cultivated land is included here;
  - Trees planted for short rotation forestry (i.e., tree farms), tame forages, tame pasture, hay lands or areas seeded to perennial agronomics.
Landscape Assessment

• Landscape criteria are assessed on the site as a whole from several vantage points
• Compare site with pre-disturbance conditions or adjacent lands
• No interference with normal land use is allowed
• No negative impact on or off lease is allowed
**Cultivated Topsoil: Implementation Dates**

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*No assessment point onsite can be less than 80% of the lowest control measurement*
Applying for a Reclamation Certificate

• Operator must prepare a package with:
  – Application Form
  – Phase 1 ESA
  – Drilling waste disposal evaluation
  – Phase 2 ESA (if required)
  – Remediation report (if required)
  – Reclamation assessment
Applying for a Reclamation Certificate

• Operator must give landowner a copy of the application package 30 days before the package is submitted to the AER
• If landowner has concerns, contact Operator and ask them to address the problem
  – If the Operator is unwilling to address the problem, fill in a Complaint Form and send to AER
Notification of Application and Decision

• Applications are subject to *Responsible Energy Development Act* notification requirements
• Posted to the AER website
• Statement of concern
• Notice of decision will be posted on AER’s website
Appeals

• One-year timeframe to appeal decision
• Reclamation certificates cancelled due to a failed audit or substantiated complaint can be appealed
• Alternative Dispute Resolution
• RegulatoryAppeal@aer.ca
After the Certificate is Issued

• If problems appear after the appeal period has expired, a complaint can be lodged with the AER.
• Obligations after reclamation certificate is issued:
  – 25 year liability for surface reclamation problems
  – Lifetime liability for contamination problems
Reclamation Assurance
Site Audit

• Two types of field audits:
  – Surface reclamation audit during growing season (conducted by Field staff)
  – Contamination at depth audit (coordinated by head office staff-conducted by consultant)

• Random site selection + targeted sites

• Approx. 15% of sites certified will be audited
  – 10% Surface Audit
  – 5% Random and Targeted audits for sub-surface
Remediation Certificate Program

• Voluntary certificate program for sites that have undergone remediation
• Independent from reclamation certificate program
• Provides closure of regulatory liability against changing clean-up standards
• Remediation must occur to be eligible for a certificate
• Closure based AENV remediation requirements
• Certificate issued for remediated area only, not site
Remediation Certificate Program Assurance

- Still under development
- Approximately 10% audit rate
- Audit program to check compliance
- A failed audit or substantiated complaint may result in cancellation of the certificate
Professional Sign-off

- Professional sign off is required for all reclamation and remediation certificate work
- Provides assurance that work meets AER’s requirements for contamination assessment, remediation, and reclamation work
- To sign off, the professional must:
  - Be a member of one of 7 professional regulatory organizations
    • Agrologists, biologists, chemists, engineers, foresters, forestry technologists, professional technologists
  - Have a minimum five years verifiable experience
  - Carry professional liability (errors and omissions) insurance
Challenges
Land and Oil and Gas - Life Cycle

- Site Construction
- Mineral Rights
- Non-industrial Land Base
  - Forestry
  - Agricultural
- Oil and gas production
- Abandonment
- Reclamation
  - Urban
  - Recreation
Reclamation Drivers

• Lease payments
  – Surface lease must be maintained until a reclamation certificate is issued

• Licensee Liability Rating
  – AER program that calculates assets to liability ratios
  – If ratio falls below 1 security is required to restore ratio to 1

• No regulated timelines for reclamation
Drilled, Reclaimed and Abandoned Wells in Alberta, 1963-2011

Cumulative Number of Wells

- Drilled, not Abandoned or Reclaimed
- Abandoned, not reclaimed
- Reclaimed and exempt

Fiscal Year End

Drilled, Reclaimed and Abandoned Wells in Alberta, 1963-2011
Orphan Well Program

• Orphan Well Program deals with liabilities left by defunct companies
  – Industry funded
  – Industry/government Board of Directors
  – AER administered
  – Managed by Orphan Well Association
  – Does not typically accept reclamation or remediation costs for reclamation exempt sites and sites that are already certified
Public Transparency

• ESRD State of the Environment Report
  – Reclamation statistics

• Environmental Site Repository
  – Public access to contaminated sites and reclamation certificate files
  – All file information is available for download
  http://www.esar.alberta.ca/esarmain.aspx
Thank You
&
Questions