Alberta's Upstream Oil and Gas Reclamation and Remediation

March 2015

Kevin Ball Alberta Energy Regulator Gordon Dinwoodie Alberta Environment and Sustainable Resource Development



Outline

- Context
- Legislation/Roles and Responsibilities
- Remediation and Reclamation Programs
- Challenges



Context



Oil and Gas Growth in Alberta





Environmental impacts

Live cycle stages



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

Government

of Alberta

- -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:

Government

of Alberta

- -Reported to AER or ESRD
- -Remediated



Remediation Legislation

 Adverse effect is defined as impairment of or damage to:

Government

of Alberta

- -Environment
- -Human health
- -Safety
- -Property



Remediation and Reclamation Programs



Upstream Oil and Gas Activity Flowchart





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)

Government

of Alberta

• 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







Government of Albe??a

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

Government

of Alberta

- 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

BEFORE January 1, 1983	BETWEEN Jan 1, 1983 and April 30, 1994	AFTER April 30, 1994
< 40% variance	< 30% variance between	< 15% variance
between lease mean	lease mean and control	between lease mean
and control mean	mean	and control mean

*No assessment point onsite can be less than 80% of the lowest control measurement



Cultivated Lands Vegetation Assessment





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



Government of Albe³⁹a

Appeals

- One-year timeframe to appeal decision
- Reclamation certificates cancelled due to a failed audit or substantiated complaint can be appealed
- Alternative Dispute Resolution
- <u>RegulatoryAppeal@aer.ca</u>



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





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

Government

of Alberta

No regulated timelines for reclamation





Freedom To Create. Spirit To Achieve.

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

http://esrd.alberta.ca/focus/state-of-the-environment/stateof-the-environment-reporting.aspx

- 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



Freedom To Create. Spirit To Achieve.