Remtech 2006

October 11 – 13, 2006

Alberta Economic Development

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Alberta's Oil & Gas Well Remediation Industry

Remediation Technologies Symposium
October 11 - 13, 2006
The Fairmont Banff Springs Hotel

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Presentation Overview

- Alberta's Remediation Industry
  - Industry Overview
  - Industry terms
  - Industry Snap Shot
- Alberta's Remediation Market Drivers
  - Drilling Activity
  - Regulatory Trends
  - Public Expectation
- Alberta's Remediation Products & Services
  - Future Trends
- Alberta Economic Development's Strategic Direction

Industry Overview

- Alberta's remediation industry has grown in response to the needs of the province's large oil & gas industry
- Over 400 Alberta companies have work related to soil remediation
  - Most of these companies are quite small
  - New larger firms are entering Alberta from eastern Canada and the U.S.
- Remediation projects are both knowledge and labour intensive work and require the use of heavy equipment
  - Labour shortages in key technical fields may constrain future growth
- Large open spaces allow for oil & gas operations spread across the landscape
  - Increasing surface fragmentation
  - Increasing urban interaction with oil & gas industry

Industry Overview

Markets

- Trends having greatest impact on markets: remediation & risk assessment technologies, environmental insurance, risk transfer mechanisms, labour shortages, long-term stewardship for sites and corporate accounting requirements.

Growth Prospects

- Remediation at oil and gas sites, the impact of land-use intense operations, growth opportunities for many years to come.

Challenges

- Key challenge to industry is technology development, commercialization, and adoption

- Old well bores are being recompleted for new uses such as Coalbed Methane and CO2 injection.

Industry Terms

- **Active Wells**: All wells that reported production or injection post 2004 Dec 31st or spud 2004 Dec 31st. (Includes all drilled & cased well bores)
- **Reclaimed Wells**: All wells issued reclamation certificates, exempt or pre 1963 exempt
- **Abandoned Wells**: Abandoned according to EUB guidelines
- **Inactive Wells**: All wells not abandoned that have not reported production or injection post 2004 Dec 31st. (excludes drilled & cased well bores)

Alberta Industry Snap Shot

Term	Well Bore Count
Active Wells	173, 695
Inactive Wells	48,257
Abandoned Wells	34,879
Reclaimed Wells	85,879

Source: AEUB, August 2006

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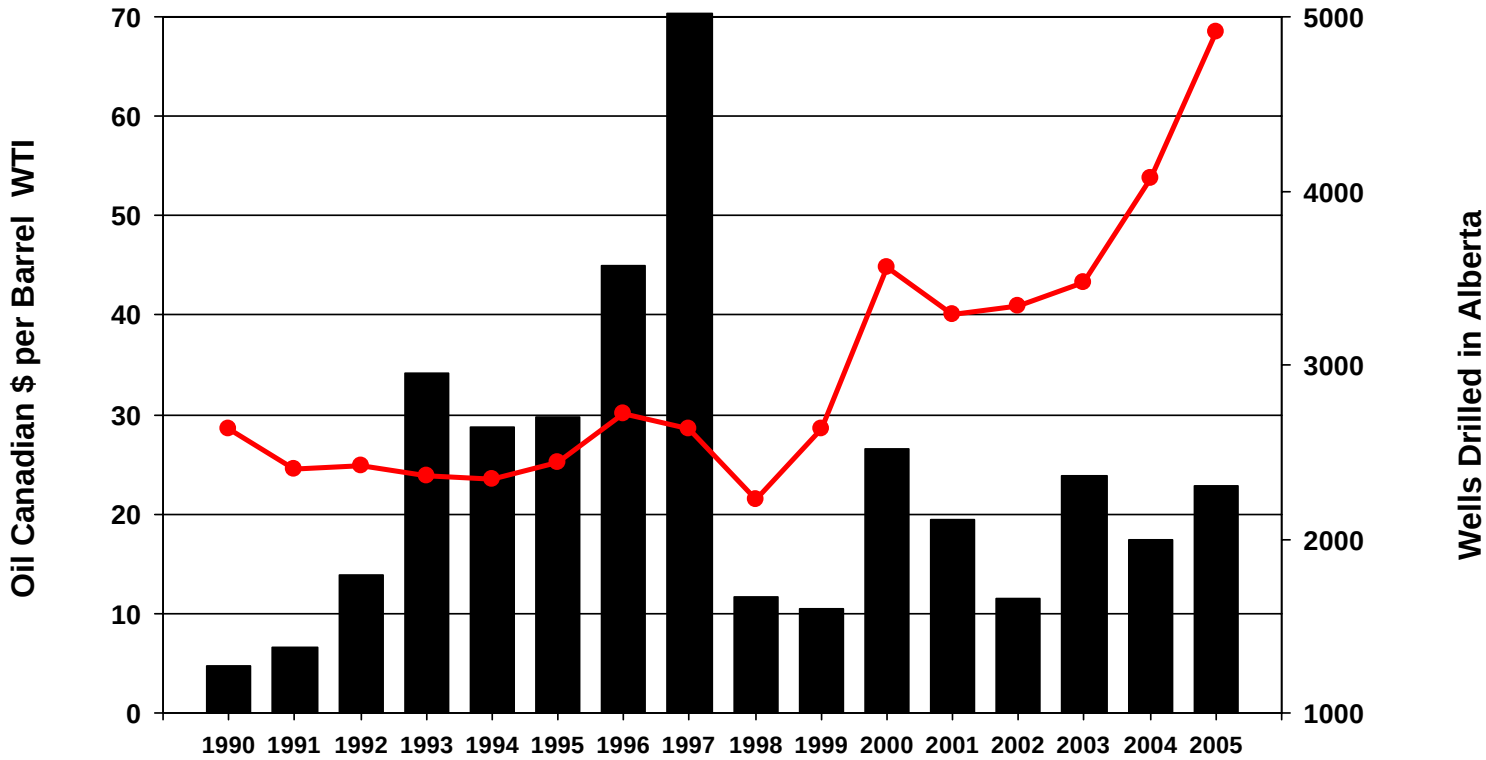
Market Drivers

- Drilling Activity
- Regulatory Trends
- Public Expectations

Drilling Activity - Oil



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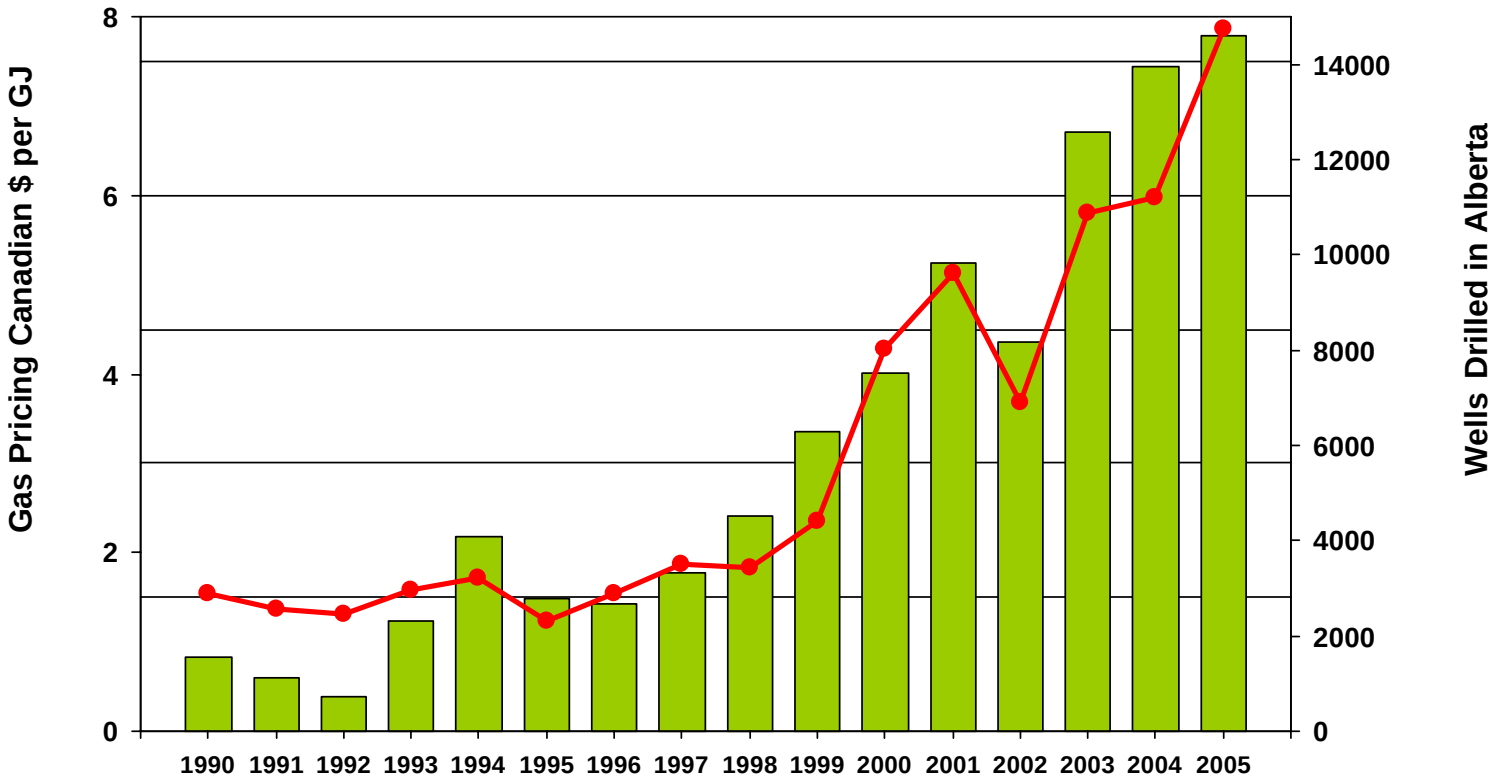
Drilling Activity - Gas



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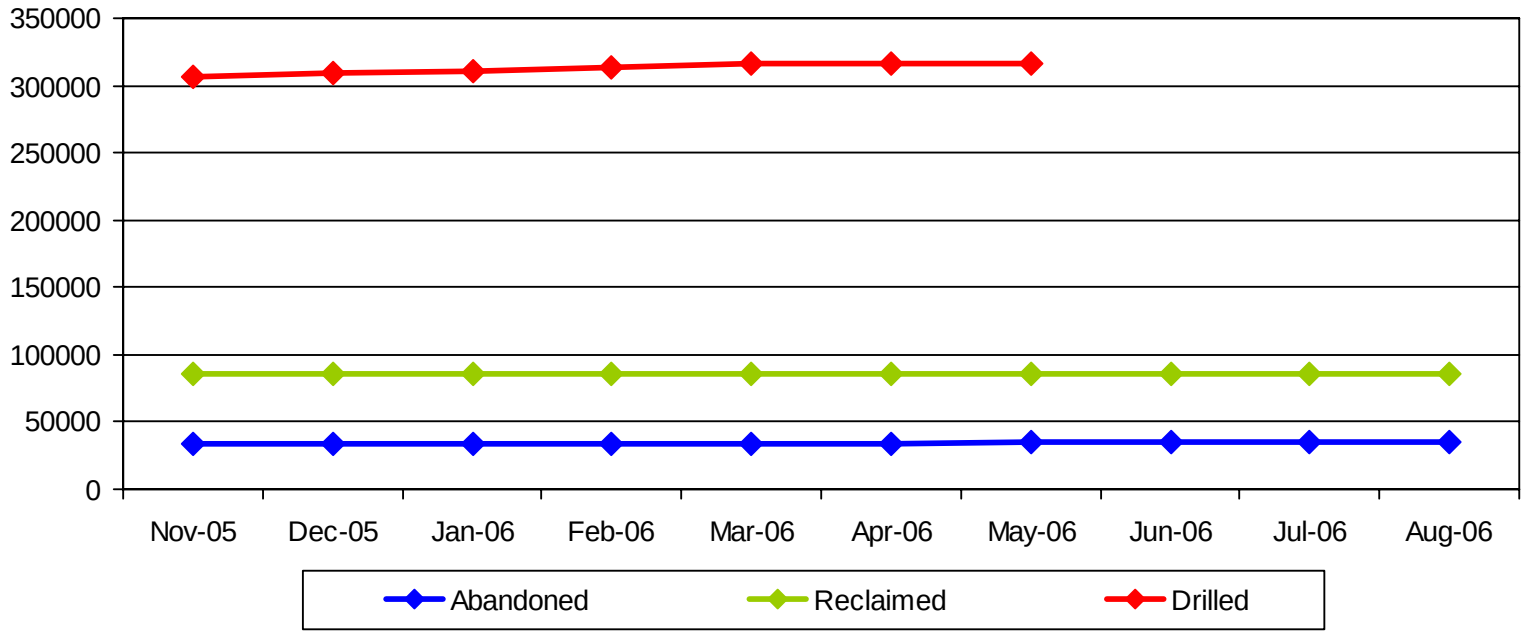
Cumulative Drilling, Abandonment & Reclamation Statistics



	Abandoned Licences	Reclaimed Well Licences	Drilled Well Licences
Nov 05	33451	85129	307117
Dec 05	33474	85245	308839
Jan 06	33567	85376	311157
Feb 06	33656	85469	313645
Mar 06	33940*	85572*	315967
Apr 06	34224	85675	316256
May 06	34591	85796	316959
June 06	34831	85879	N/A
July 06	35064	85950	N/A
Aug 06	35169	86024	N/A

*March 2006 data was not available. The figure presented represents the average of February and April's data

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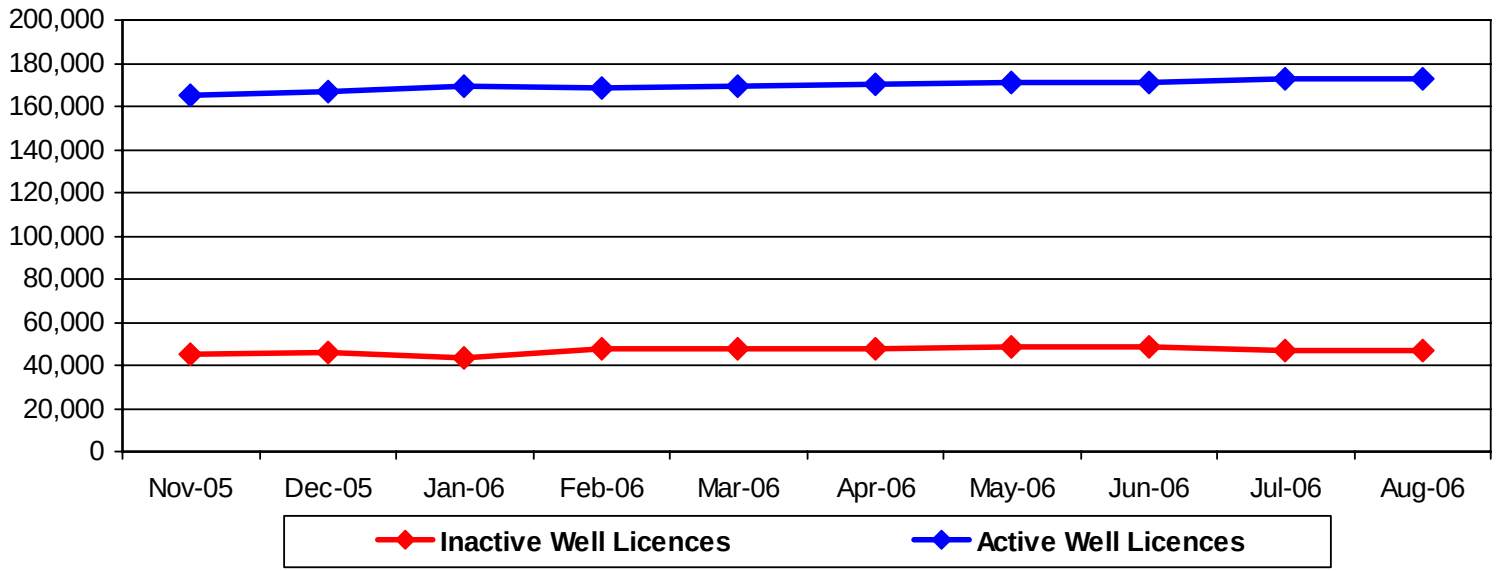
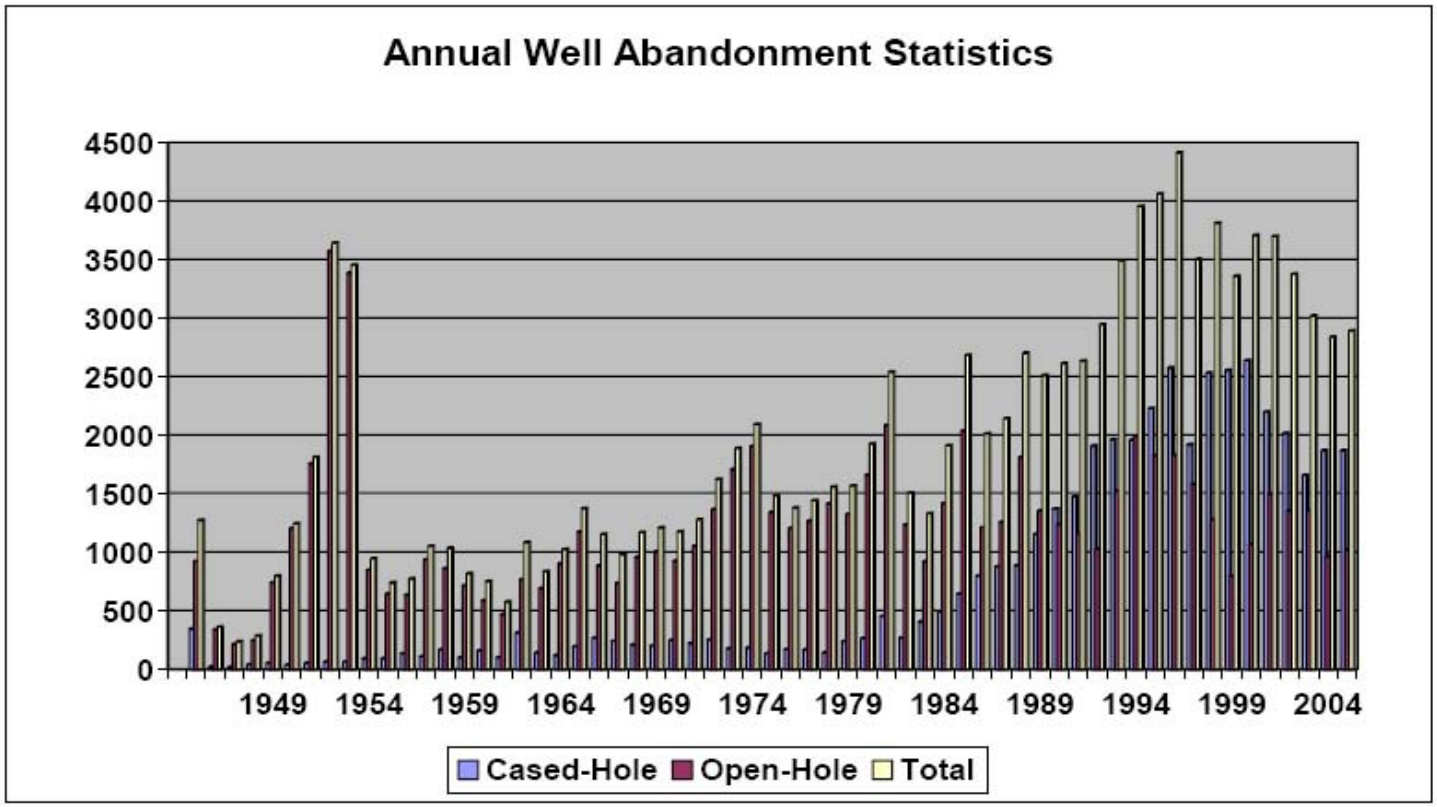
Total Inactive and Active Well Licence Statistics



	Inactive Well Licences	Active Well Licences
Nov 05	45,143	165,100
Dec 05	45,701	166,574
Jan 06	43,759	169,060
Feb 06	47,786	168,158
Mar 06	47,826	169,732
Apr 06	47,866	170,414
May 06	48,094	170,970
June 06	48,274	171,422
July 06	46,899	172,394
Aug 06	46,623	172,733

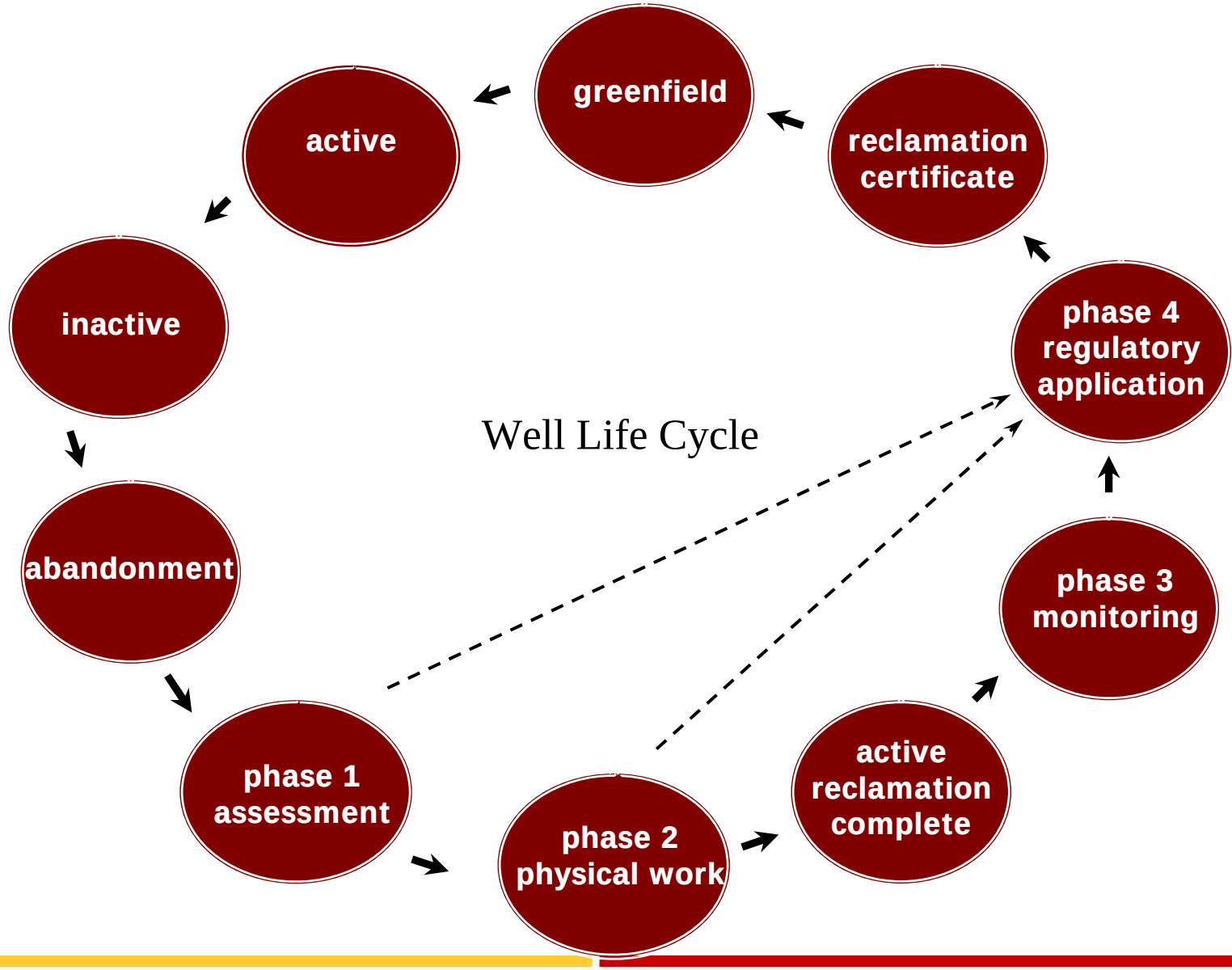


How big is this Market opportunity?

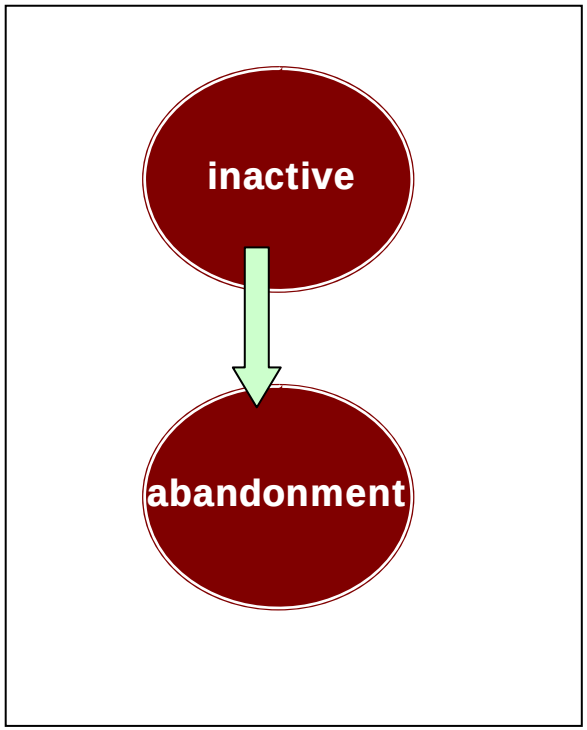
- 35,000 wells currently abandoned/unreclaimed to be remediated at an average cost of $25,000 results in an inventory of $850 million of work to be done
- Each year wells continue to move from active to inactive to abandoned. Each year new wells are drilled
- All 173,000 active wells will eventually be remediated

Regulatory Trends

- Environmental Self Management/New Management Approaches
- limits of command and control regulation recognized
- regulatory reform in government
- industry self-regulation
- voluntary programs
- market mechanisms
- taxes and fiscal incentives


Well Life Cycle
greenfield
active
inactive
abandonment
phase 1 assessment
phase 2 physical work
active reclamation complete
phase 3 monitoring
phase 4 regulatory application
reclamation certificate

Regulatory Trends



Regulatory Drivers focus on health, safety, and environmental concerns

Public Expectations

- Public becoming increasingly involved in oil and gas development in Alberta
  - Partly driven by the closer proximity of Albertans to oil and activity, increased environmental awareness in general, and the significant amount of recent drilling and associated energy activities

- More activist population in regards to oil and gas development
  - Increased interventions at EUB hearings by both concerned individuals and recently municipalities
  - The formation of more coordinated and sophisticated stakeholder associations like Synergy Alberta and Surface Rights Groups

Alberta Industry Technologies

- Site clean-up and remediation
- Air sparing
- Bioremediation
- Containment – Barrier Walls
- Containment – Caps
- Flushing
- In Situ Chemical Oxidation
- Incineration
- In-Well air sparing
- Monitored natural attenuation
- Multi-phase extraction
- Permeable reactive barriers
- Phytoremediation
- Soil vapour extraction
- Soil washing
- Solidification stabilization
- Thermal desorption

Current Trend affecting the pace of remediation

- Remediation and risk assessment technologies
- Long term stewardship for sites with institutional and engineering controls
- Corporate accounting requirements- eg. Petro-Canada has taken a proactive position in applying risk based management to inactive wells in Alberta

Future Trends

- Need to move from labour intensive & large equipment to technology driven industry
- Competing demands for surface use leading to more land usage consultation
- Large number of industrial and commercial sites will need to be remediated or better environmentally managed
- New nanotechnology in the product development pipeline – nanoparticles for pollutant absorption

AED's Strategic Direction

Key Initiatives

- Promote technology verification, demonstration and commercialization in key sub-sectors of remediation, water treatment, and climate change.
- Support partnerships with industry which promote capacity building and growth in domestic and export markets.
- Analyze existing environmental technology roadmaps and address gaps
- Work with industry and government to address skilled labour shortages.

How should we address this opportunity?

- Alberta firms- Can continue to develop services and technologies that create cost effective solutions and reduce risk
- Oil and Gas firms- Have realistic plans to remediate sites in a sustainable manner
- Regulators-Continue to work with stakeholders to streamline approval processes and remove regulatory uncertainty

For further information contact:

Norm Jede
Director
Environmental Products and Services
Alberta Economic Development
780-427-6483
norm.jede@gov.ab.ca

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