



Oil Sands Construction Outlook

Reed Construction Data
Construction Industry Forecasts Conference

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Outline

- CERI Overview
- Introduction to Canada's Oil Sands
- Proposed Projects
- Possible Constraints
- Outlook
- Conclusions




Canadian Energy Research Institute (CERI)

- Independent non-profit Calgary-based research institute founded in 1975
- Sponsors
 - Provincial government
 - Federal government
 - Industry
 - University of Calgary
 - International associate sponsors




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CERI Activities

- Public Research
 - Oil
 - Natural Gas
 - Electricity
 - Energy - Environment
- Proprietary Studies
- Conferences
- Training
- Publications
 - Natural Gas Market Watch
 - World Oil Bulletin/Quarterly
 - Geopolitics of Energy




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Related CERI Studies

- **Study No. 107: *Current Supply and Costs of Natural Gas in Canada***
 - *Released June 2003*
- **Oil Sands Supply Outlook: *Potential Costs and Supply of Crude Bitumen and Synthetic Crude Oil in Canada***
 - *Underway with completion December 2003*




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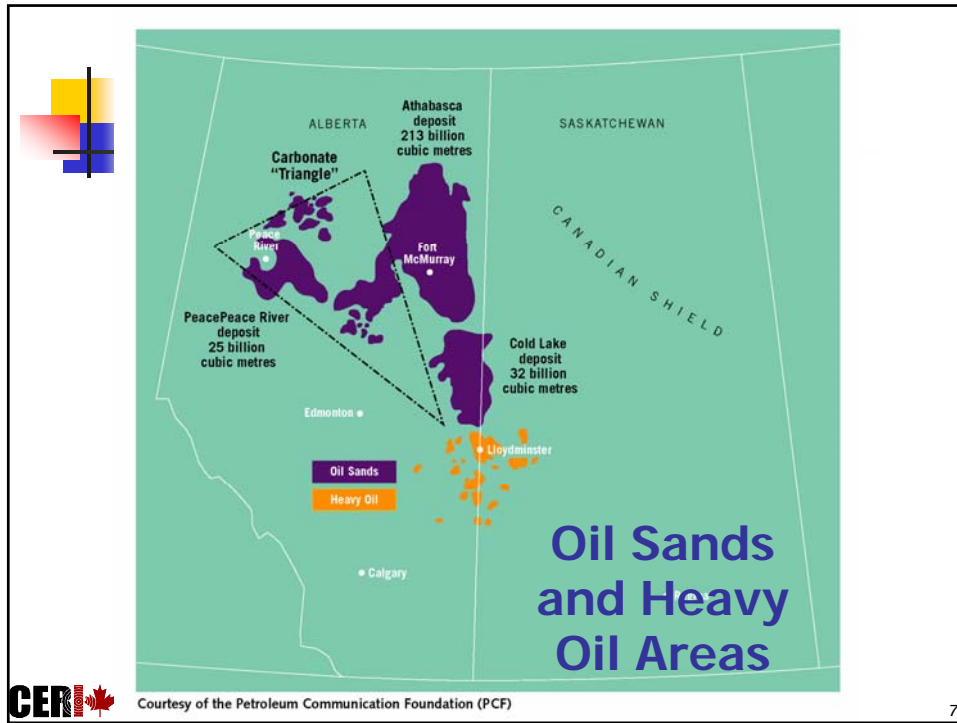


Canada's Oil Sands

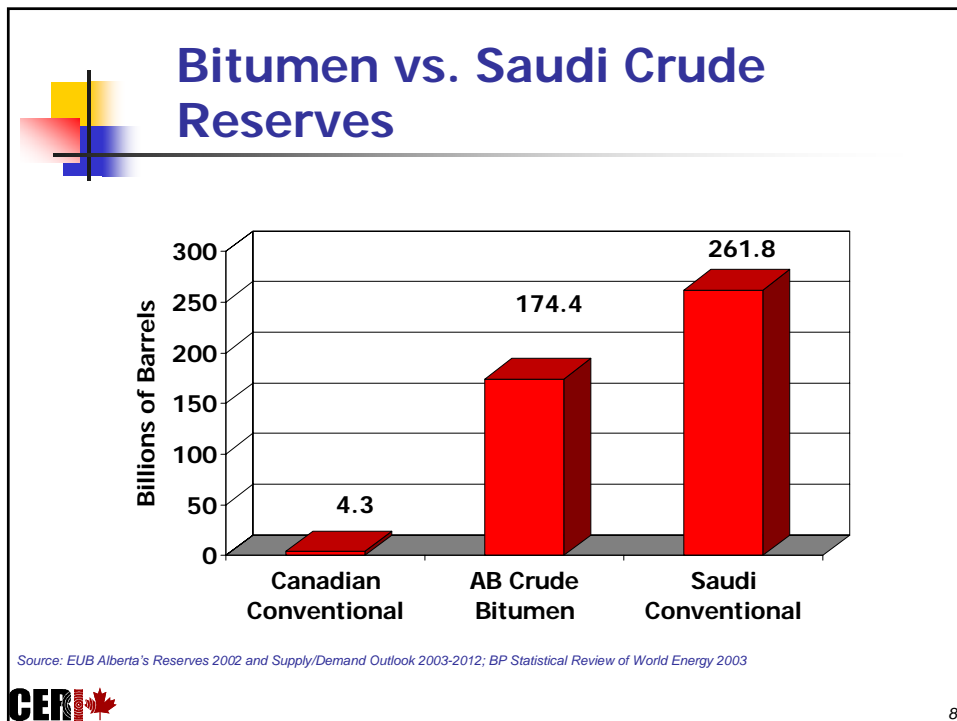
- **“Non-Conventional” Oil**
 - Bitumen saturated sands
 - At normal temperatures (10-20°C) bitumen is:
 - In a semi-solid state
 - Similar to tar
- **Enormous Resource Base**
 - World's largest bitumen deposit
 - Reserves match light conventional oil reserves in Saudi Arabia
 - Shallow reserves (<75m): surface mining
 - Deeper reserves(>75m): in situ recovery



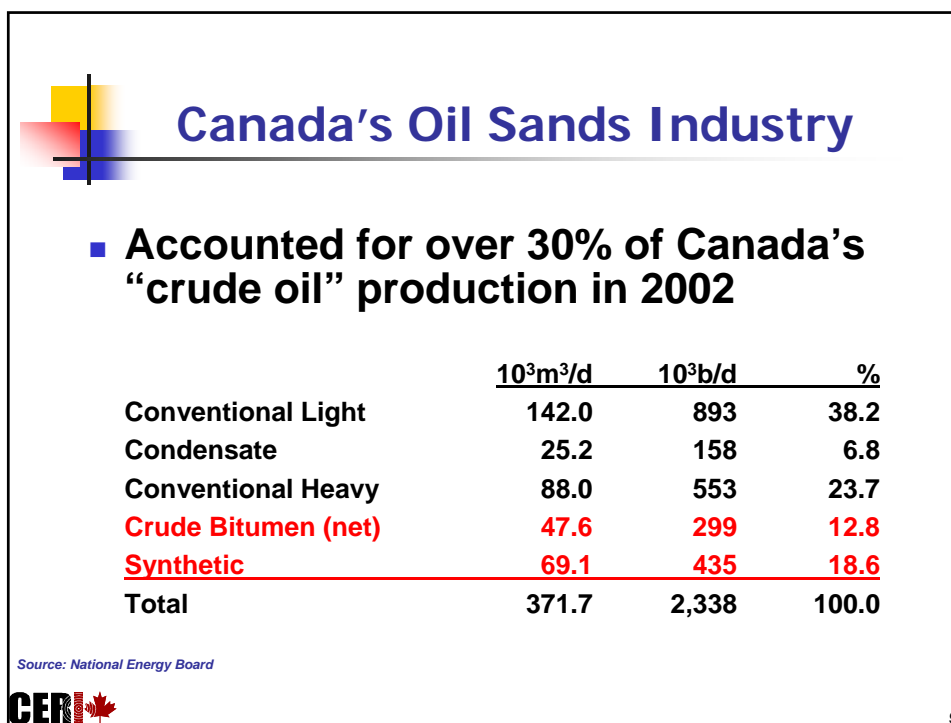

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Major Surface Mining Projects – Athabasca


<u>Operator</u>	<u>Upgrading</u>	<u>Capacity</u> (kb/d)	<u>Startup</u>
<u>Operating Projects</u>			
Suncor (w/ Millennium Expansion)	Yes	225	1967
Syncrude (w/ Stage 2 Expansion)	Yes	260	1978
AOSP (Muskeg River/Scotford)	Yes	155	2002
<u>Proposed Projects</u>			
Suncor (Voyageur Expansion)	Yes	275-325	2005-2012
Syncrude (Stage 3/4 Expansions)	Yes	200	2005-2008
AOSP (Jackpine Mine)	No	200	2010
CNRL (Horizon)	Yes	270	2007-2011
True North (Fort Hills)	No	190	205-2008
Synenco (Northern Lights)	Yes	80	2007
Imperial/ExxonMobil (Kearl Lake)	No	200	2012



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Major In Situ Projects – Athabasca

<u>Operator</u>	<u>Upgrading</u>	<u>Capacity (kb/d)</u>	<u>Startup</u>
<u>Operating Projects</u>			
EnCana (Foster Creek Phase 1)	No	25	2001
EnCana (Christina Lake Phase 1)	No	10	2002
Petro-Canada (MacKay River)	No	30	2002
<u>Projects Under Construction</u>			
Suncor (Firebag Phase 1)	Yes	37	2003
<u>Approved Projects</u>			
Deer Creek (Joslyn Phase 1)	No	2	2004
ConocoPhillips (Surmont Phase 1)	No	25	2006
Nexen/OPTI (Long Lake Phase 1)	Yes	35	2006

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Major In Situ Projects – Athabasca (continued)

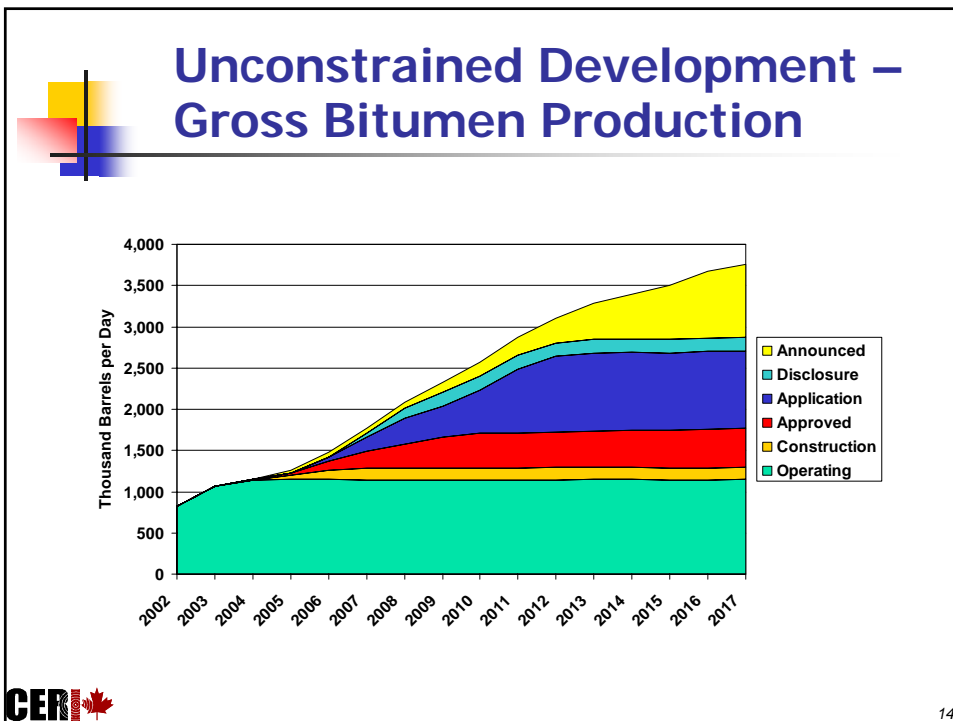
<u>Operator</u>	<u>Upgrading</u>	<u>Total Capacity (kb/d)</u>	<u>Startup</u>
<u>Proposed Projects</u>			
EnCana (Foster Creek Phases 2-3)	No	95	2007-2009
EnCana (Christina Lake Phases 2-3)	No	60	2004-2005
Suncor (Firebag Phases 2-4)	Yes	112	2006-2008
ConocoPhillips (Surmont Phases 2-4)	No	75	2009-2015
Nexen/OPTI (Long Lake Phase 2)	Yes	35	2006
CNRL (Kirby Phases 1-4)	No	60	2006+
Deer Creek (Joslyn Phases 2-4)	No	70	2006-2011
Devon (Jackfish)	No	35	2007
JACOS (Hangingstone)	No	50	2007
Petro-Canada (Meadow Creek)	No	80	2006
Petro-Canada (Lewis)	No	-	-


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Major In Situ Projects – Cold Lake & Peace River

<u>Operator</u>	<u>Upgrading</u>	<u>Capacity (kb/d)</u>	<u>Startup</u>
Operating Projects			
CNRL (Primrose & Wolf Lake)	No	57	1996
CNRL (Others)	No	6	1985+
Imperial Oil (Cold Lake Phases 1-13)	No	125	1985+
Shell (Cadotte Lake)	No	12	1975
Proposed Projects			
BlackRock (Orion)	No	20	2005+
Husky (Tucker)	No	30	2006
Imperial Oil (Cold Lake Phases 14-16)	No	30	2006



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Issues/Potential Constraints

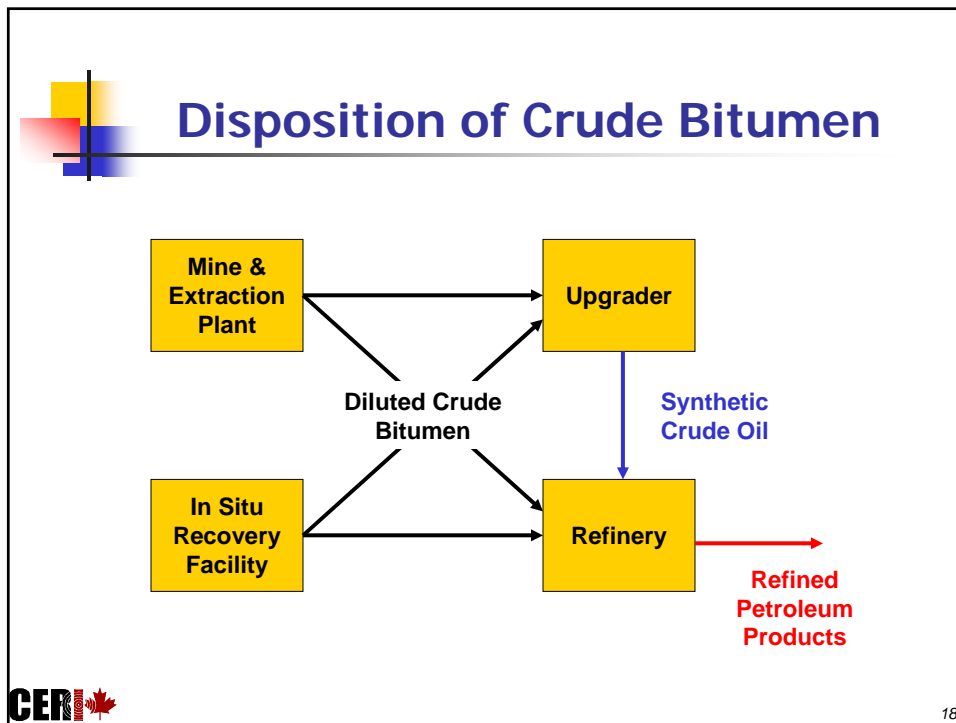
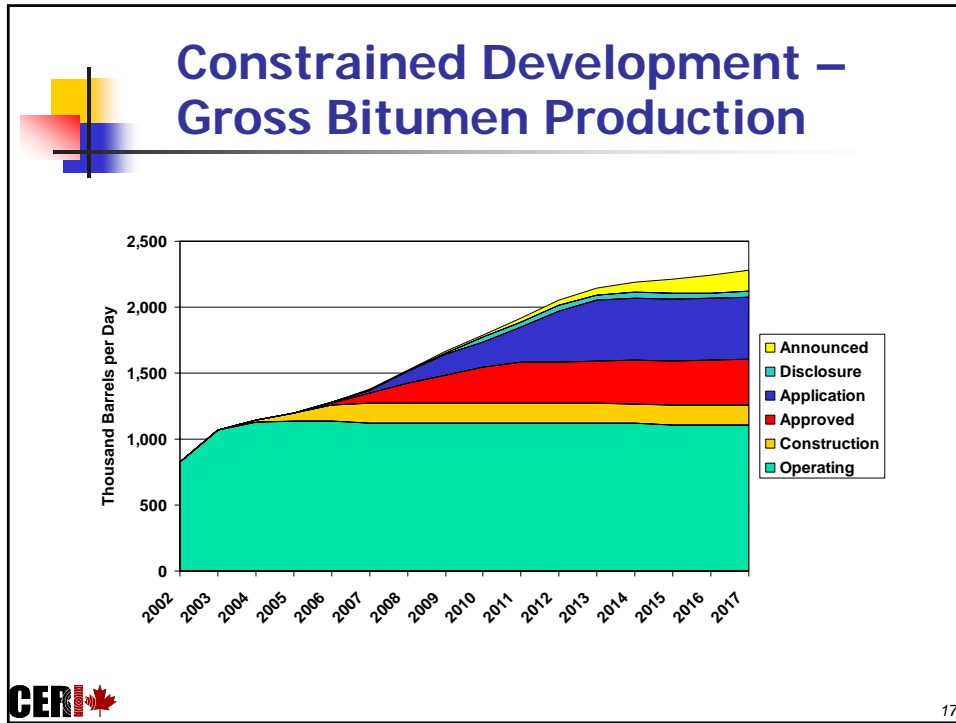
- **Product Pricing**
 - Global/North American Oil Prices
 - Marketability of Crude Bitumen and Synthetic Crude Oil
- **Capital Costs**
 - Recent Cost Overruns
 - Suncor Millennium, AOSP, Syncrude Stage 3
- **External Energy and Feedstock Requirements and Prices**
 - Natural Gas
 - Alternatives
- **Environmental Impact**

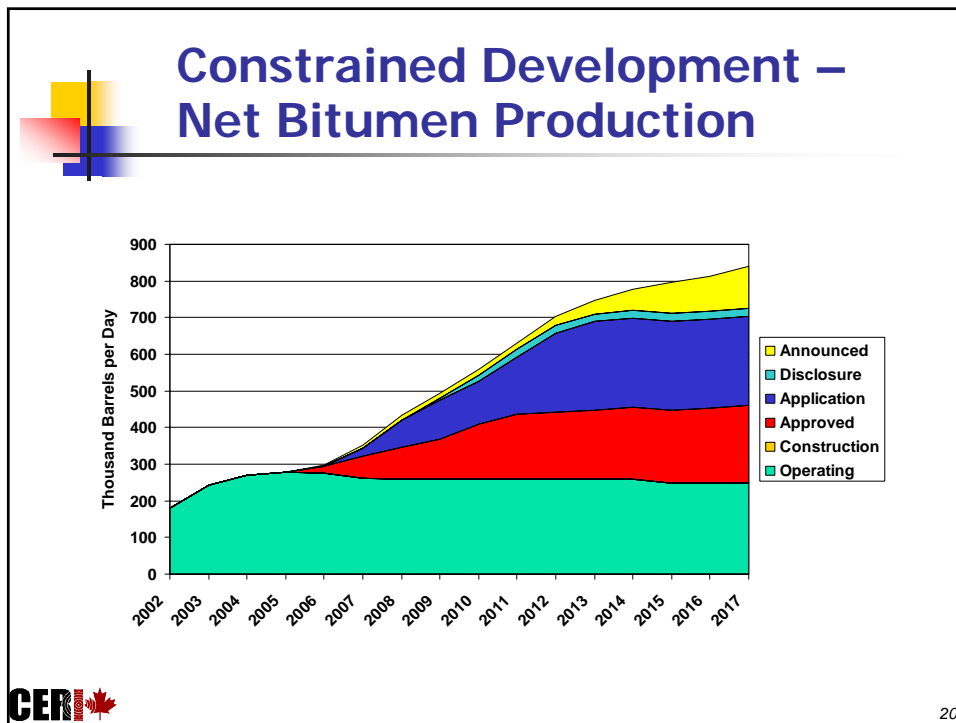
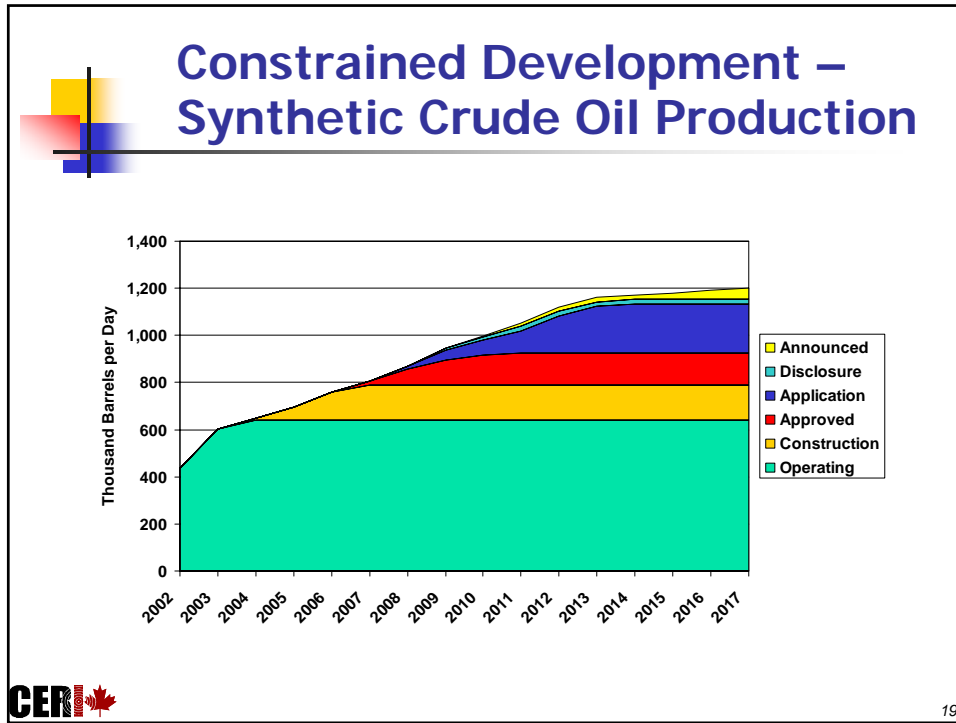

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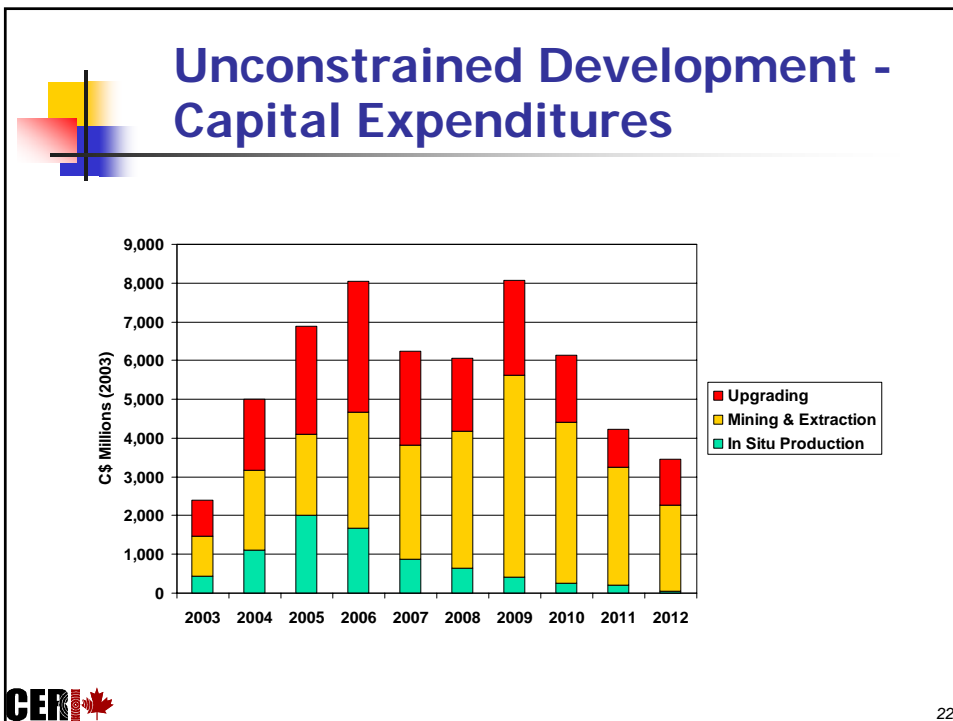
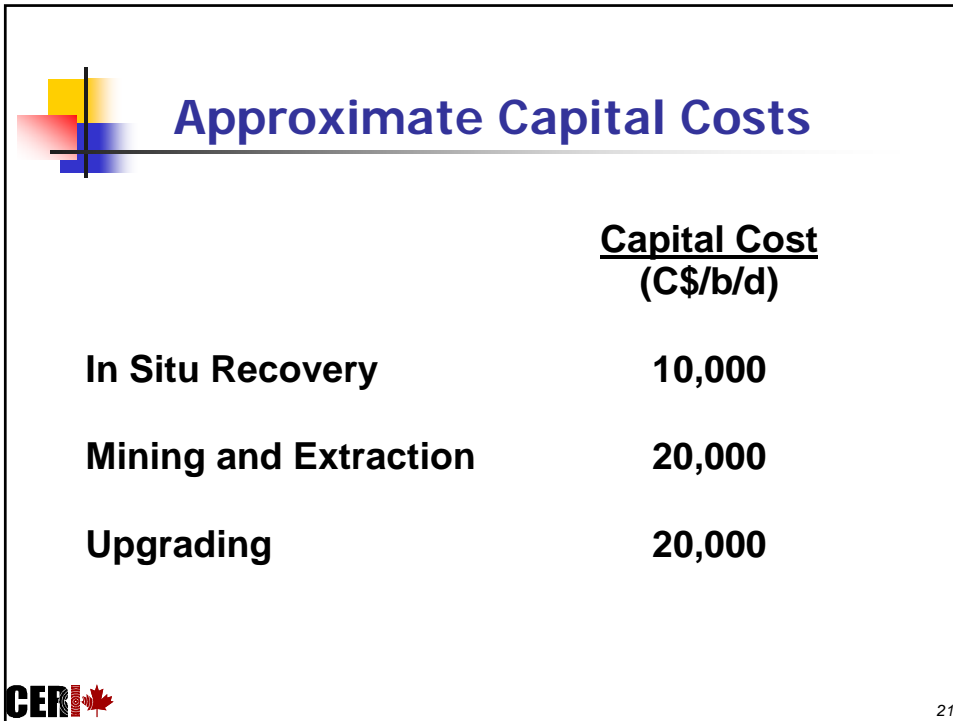
Constrained Development Assumptions

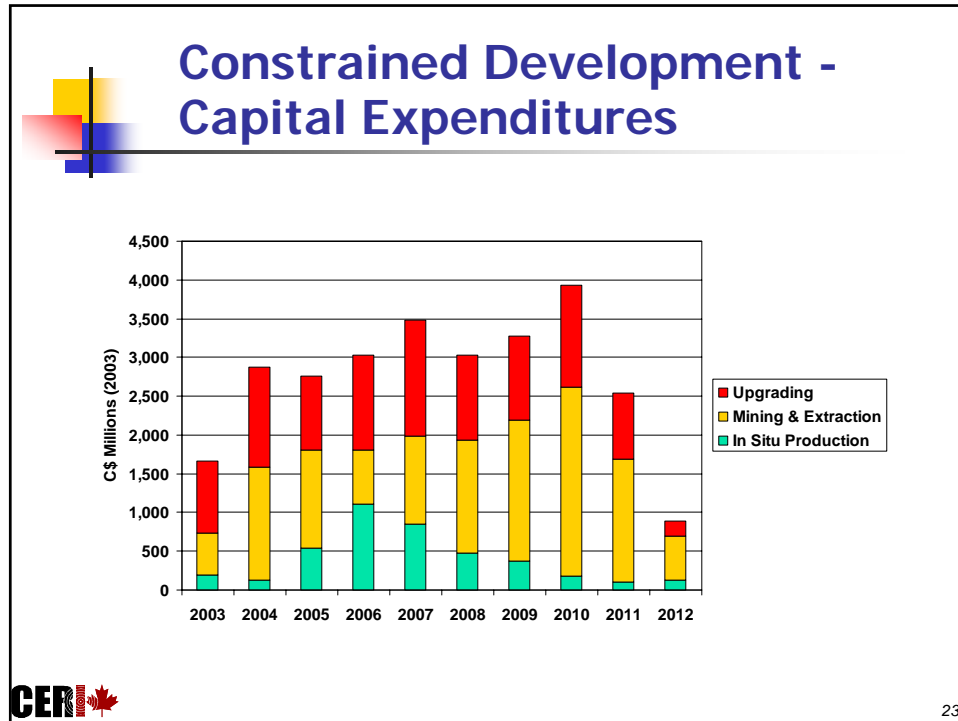
<u>Classification</u>	<u>Probability</u> (%)	<u>Delay</u> (years)
Operating	100	0
Construction	100	0
Approved	75	1
Application	50	2
Disclosure	25	2
Announced	25	2


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Conclusions

- Canada's Oil Sands are already an important source of North American oil
- Canada's Oil Sands have tremendous potential
- Development of this resource faces many challenges
- Annual capital expenditures of \$2-5 billion for new projects are expected over the next decade

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