The Need to Revise the Hydrogeology Component of Commercial *In-Situ* Oil Sands EIAs

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Presentation Overview

- What is an EIA?
- Why give this talk?
- Typical Terms of Reference (TOR)
- TOR subject to “interpretation”
- Where confusion starts
- A revised approach needed to simplify:
  - For author (preparing EIA)
  - For regulators/stakeholders (reviewing EIA)
- Questions
What is in an EIA?

- Comprehensive integrated assessment
- Multi-discipline study (e.g., air, soil, water, etc)
- Environmental/social/economic
- Take about 2 years
- Each discipline completes:
  - Baseline report (current conditions)
  - Impact assessment report (predicted conditions)
- Completed under a “TOR”
Why Give This Talk?

- The current EIA system promotes...
- Non-concise/confusing reports
- Written in “EIA-speak” (non-standard language)
- Little fun to prepare or review
- Situation expected to get worse...
- Lots more EIAs coming
- Many will be non-standard/emergent plays
- So shock/denial is the 1st step to salvation...
Why Give This Talk?

- The 7 Steps of an EIA (SPADORA)
  - 1 – Shock (denial)
  - 2 – Pain
  - 3 – Anger
  - 4 – Depression (reflection/loneliness)
  - 5 – Optimism (could get better)
  - 6 – Reconstruction (is it getting better?)
  - 7 – Acceptance (vs. hope)

- Yes sweet beautiful hope…
So You Just Finished the EIA

Step 8
So You Just Finished the EIA
Then…

[Image of an alarm clock ringing]
You Realize There’s Another One!
So Why Give This Talk?

- Let’s try and lift the fog…
- I promise this won’t hurt
EIA 101 (Boot Camp)

- Step 1: Baseline Report
- Step 2: Impact Assessment Report
Step 1: Complete Baseline Report

- Define “existing” conditions (in LSA/RSA)
  - Geology (structural tops, isopachs, etc)
  - Hydrogeology (hydraulic properties, GW flow directions, GW chemistry and age, GW – SW interaction, etc)
- Do this from “reservoir to surface”
Okay – So is There a Problem?

- Not really with Baseline report process
- Pretty straightforward
Step 2: Complete Impact Assessment

Surface facilities
Production and steaming
Wastewater disposal
GW Extraction

Existing and Approved Case
Application Case
Planned Dev. Case (Cumulative Impacts)
Okay – So is There a Problem?

- With Impact Assessment – yes, because…
  - TOR not clear
  - Inconsistent methods used
  - Approach/presentation variable
  - Causes us to focus efforts on issues that can only be resolved through monitoring

- Examples…
Surface Facilities - EIAs

- **In Past EIAs:**
  - Discuss CPF geology, GW flow rates, directions, fate of drips/drabs, etc.
  - We do all of this despite the fact that EPEA approval requires GW monitoring, so...

- **On Future EIAs:**
  - Propose to install MWs around the CPF
  - Finalize in discussion with AEW

- **Done**
Wastewater Disposal - EIAs

- **In Past EIAs**
  - Variable (modelling, text, other projects, etc)
  - We do all this despite the fact that disposal requires D051 approval, so…

- **On Future EIAs**
  - Refer to Volume 1 for background (e.g., hyd. isolation)
  - Refer to future D051 application
  - Finalize in discussion with ERCB

- Done
Production and Steaming - EIAs

- In Past EIAs
  - Typical approach may include 2-D modelling, 1-D modelling, simple analytical, text only, etc.
  - Inconsistency promotes confusion, so...

- On Future EIAs
  - Propose to install MWs
  - Finalize in discussion with AEW

✔️ Done
GW Extraction - EIAs

- In Past EIAs
  - TOR requires an assessment of changes to:
    - GW levels
    - GW quantity
    - GW quality
    - GW – SW interaction
  - Inconsistent definitions of degree of impact
GW Extraction – EIAs (cont’d)

- On Future EIAs
  - TOR to require assessment of changes to:
    - GW levels *(quantity by definition)*
    - GW quality
    - GW – SW interaction
    - Define how/where to “define” impact
      - Text vs. numerical, location of E+A case
    - Don’t link GW flow model to operation
    - Manage through GW monitoring
Why Give This Talk?

“…Those who don't know history are destined to repeat it”
(Eduard Burke, 1729-1797)

“…Two roads diverged in a wood, and I took the one less traveled by, and that has made all the difference”
(Robert Frost, 1874–1963)
Hydrogeology EIAs - Summary

- EIA process complex
- Can be confusing (but does not need to be)
- Opportunities to streamline the process
- Simpler for author/reviewers
- Simplification process transferable to other EIA disciplines

“...take the path less travelled...”
Closure

- Thank You
- Questions

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