



2006 11 21

From Vision to Value: CO2 Capture, Transportation, and Injection for Enhanced Hydrocarbon Recovery

Date: Tuesday, November 21, 2006
7:30 a.m. – 5:30 p.m.

Location: Hyatt Regency Calgary
700 Centre Street, Calgary, AB

EVALUATION SUMMARY

103 participants attended the Forum

41 Evaluation forms were returned for a response rate of 40%

1. Did this forum meet your objectives?

- 100% of respondents answered “Yes”

1b. What needs do you have that still need to be met?

- Alberta CO2 EOR Field pilots? Only Apache Zama presented
- Cost of CO2 Separation – Gas Hydrates Methods (John Ripmeester, NRC Ottawa)
- Reservoir / Seal Characterization
- More specific data on pilots – technical challenges
- Not enough on innovation or research and technology development. Presentations too general
- Would like more “Roadmap” type of direction – learnings, pit falls, etc...
- More sharing of what is not worked in industry – will highlight some of areas of focus required

2. Please Rate the Forum Timing on a scale from 1 (poor) to 5 (very good)

- 34% of respondents rated the Forum Timing “Very Good”
- 56% of respondents rated the Forum Timing “Good”
- 10% of respondents rated the Forum Timing “Satisfactory”

3. Please Rate the Presentation Content on a scale from 1 (poor) to 5 (very good)

- 49% of respondents rated the Presentation Content “Very Good”
- 41% of respondents rated the Presentation Content “Good”
- 10% of respondents rated the Presentation content “Satisfactory”



4. Please Rate the Presentation Topics on a scale from 1 (poor) to 5 (very good)

- 39% of respondents rated the Presentation Topics “Very Good”
- 49% of respondents rated the Presentation Topics “Good”
- 12% of respondents rated the Presentation Topics “Satisfactory”

5. Please Rate the Forum Speakers on a scale from 1 (poor) to 5 (very good)

- 37% of respondents rated the Forum Speakers “Very Good”
- 54% of respondents rated the Forum Speakers “Good”
- 7% of respondents rated the Forum Speakers “Satisfactory”
- 2% of respondents did not answer this question

6. Which presentation did you find the most valuable?

- 12% of respondents selected “Keynote Address: Provincial Government Vision for CO₂”
- 37% of respondents selected “Vision from ARC Resource Ltd.”
- 20% of respondents selected “Vision from CAPP”
- 15% of respondents selected “Vision from Alberta Energy and Utilities Board”
- 20% of respondents selected “CO₂ HER Advanced Screening in the Real World”
- 7% of respondents selected “International Test Centre for CO₂ Capture”
- 7% of respondents selected “IFP Technologies Canada Inc.”
- 7% of respondents selected “CO₂ Cutting Edge”
- 37% of respondents selected “Experience with CO₂ EOR at Weyburn”
- 17% of respondents selected “NOVA Chemicals CO₂ Experience”
- 29% of respondents selected “ICON CCS”
- 29% of respondents selected “Update on Apache Zama and Midale CO₂ EHR Projects”
- 7% of respondents selected “All”



7. Please suggest topics or presentations to be covered at future presentations and whom might present these

- Issues presumed in less successful EOR (comments made re collaboration of Devon Swan Hills and Pennwest, Pembina). i.e. what are some of the pitfalls? How can we be smarter? Learn more from “mistakes” than easy successes.
- Serious talk about what it will take to effectively manage GHG in Canada – Big scale – CO₂ storage in deep aquifers, biggest CCS potential
- Environmental lobby groups
- International Projects – John Gale
- Initiatives in other countries
- Economics of EOR in more detail
- CO₂ pipeline technical aspects – EPC firm or pipeline company
- Evaluation of costs to produce in EOR CO₂ floods
- CO₂ pipelines – experiences
- Technical details modeling of EOR – CO₂ processes (from lab to model)
- Review of various CO₂ technologies and costs of capture from various sources – ICO₂N
- International CO₂ production and issues and trading – IEA; DOE
- Compression – CO₂
- Progress on development of infrastructure for CCS (capture, etc...). Benefits of standards for CCS
- Legal Issues – Alan Harvie
- Mature oilfields EOR in general
- CO₂ base tar sands recovery
- New energy sources for non – GHG energy supply
- Economics of CCS
- Enhanced CBM recovery
- Start to finish with a CO₂ flood in a pool – Geologist’s model
- All case studies presented by operators – ARC, EnCana and Apache
- EGR – CSEMP
- Advances in geological modeling – e.g. landmarks for EOR
- List of “have to” for CO₂ storage – IEA group
- Challenges in EOR at Joffre and Pennwest, their pilot responses



8. Would you be interested in attending a similar event in future?

- 95% of respondents answered “Yes”
- 2.5% of respondents answered “no”
- 2.5% of respondents did not answer this question

9. Are you interested in presenting at a future forum or conference?

- 49% of respondents answered “No”
- 17% of respondents did not answer this question
- 34% of respondents answered “Yes”. These respondents were:
 - John Selby (Boreal Laser Inc)
 - Kirk Osadetz (Geological Survey / NRCan)
 - Jim Kenny (Cimarron Engineering)
 - Marcia Coueslan (University of Calgary)
 - Brad Ward (Baker Hughes Centrilift)
 - Inga Hipse (Canadian Standards Association CSA – or someone from CSA)
 - Alan Harvie (Macleod Dixon LLP)
 - Tayfun Babadagli (University of Alberta)
 - Amin Badamchizadeh (University of Calgary)
 - Bill Jackson (Apache Canada)
 - Bernie Philip (ARC)
 - Malcolm Wilson (Energy INet)
 - Dave Hassan (EnCana)
 - Blaine Hawkins (Alberta Research Council)

10. What new collaborative industry initiatives are needed by industry and gov't?

- CO2 credits, royalties and regulations for CO2 capture and storage
- Resolve uncertainties as to path forward, starting with formal regulatory requirements
- National GHG and CO2 policy
- Keep focus on CCS for now, still embryo phase
- Cost-sharing formula for CO2 capture and EOR maximization
- Methods that reduce the cost of CO2 production and transport at details of geological characterization (i.e. cost only versus cost benefit)
- Capture cost reduction initiatives
- Development of standards using a consensus process. Please check www.csa.ca website for the CSA report on opportunities for



standards development areas for CO2 capture and storage. Also education of public on CCS to begin nursing a comfort level to this technology. Please send more information for a possible CSA involvement

- Look at well integrity for storage – particularly cement degradation, development of models for risk of cement degradation
- Current CO2 CCS RFP quite interesting

11. Would you like us to contact you to participate on the CO2C?

- 46% of respondents answered “No”
- 17% of respondents did not answer this question
- 37% of respondents answered “Yes”. These respondents were:
 - Surindar Singh (Alberta Energy Research Institute – already a member)
 - Carlos Estrada (Nexen Inc.)
 - John Selby (Boreal Laser Inc)
 - Marcia Coueslan (University of Calgary)
 - Alan Harvie (Macleod Dixon LLP)
 - Tayfun Babadagli (University of Alberta)
 - Amin Badamchizadeh (University of Calgary)
 - Garth Ayres (Inter Pipeline Fund)
 - Dave Peet (Devon Canada Corporation)
 - Susan Cole (Enhance Energy)
 - Pierre Martin (Air Liquide Canada Inc.)
 - John McGinnis (Alberta Economic Development)
 - Kirk Osadetz (Geological Survey / NRCan)
 - Inga Hipsz (Canadian Standards Association CSA)
 - Malcolm Wilson (Energy INet)

12. How did you hear about the forum?

- 54% of respondents answered “PTAC email”
- 2% of respondents answered “On PTAC CO2 Committee”
- 15% of respondents answered “PTAC website”
- 2% of respondents answered “CAPP”
- 20% of respondents answered “word of mouth”
- 2% of respondents answered “Daily Oil Bulletin”
- 10% of respondents answered “Other”
- 7% of respondents did not answer this question



13. Please provide any general comments:

- Way too many people on steering committee – effective committee max 10
- Very timely. Good speakers; excellent content
- I'm interested in becoming a funding partner to the CO2 RFP
- Very well run, great to see international flavor. Is attendee list available?
- Need serious discussion around the 500lb gorilla in the room...who will pay!
- Well organized, good meeting room, A/V equipment and refreshments
- Informative
- Several presentations did not include slides in handouts, could they be made available to us VIA PTAC's Website? This was mentioned at the end that they would be available
- Include participants (Attendees List) – this was provided at the end
- Tremendous need today for inter-industry collaboration and industry government collaboration to ensure long term low cost clean energy
- Very well organized workshop. Would have liked to received a list of participants and a handout of speakers biographies
- Room needs to be warmer. Some presentations missing, is it possible to get presentations digitally?
- Good event. I continue to learn a great deal about the issue
- Well organized; excellent speakers; excellent location and good food!
- Presentation package was very useful, however many of the charts were difficult to read in black and white, color slides would have been helpful
- Well done, a lot of information for a 1 day format. i.e. efficient. Print of participants, need all up to date presentations
- Good Job!
- This session strayed into sequestration a bit. Guy Boutilier talked a bit but didn't say much. CO2 quality was a question – not part of the main discussion