

CHO March 9, 2005 Working Session – Draft Notes

Action Items:

- **Bruce to send strawdog document to Jerry for presentations on March 21**
- **Other presentations for March 21 to be sent to Bruce**

Introductions:

Brian Wagg, CFER

- Various project in CHO, reservoir mechanisms in 1990
- Tank cleaning work, progressive cavity pumps
- Flowlining vs. trucking HO – 4 phases of a JIP
- Future? Low recovery needs improvement

Al Smandych, EUB

- 25yrs + experience
- technical advisor for GHG, liaison with CCC
- future? Push ahead G60 initiative
- find technology to capture and conserve

Jerry Scholar, Husky

- Techn. Application for corp. benefit
- Spent time at SRC in production operations
- Future? Trucking costs, cold flow processes IOR/EOR, Oilsands, Nuclear

Brian McKeage, Husky

- Technical services group eng and facilities
- Artificial lift expert
- Future? Why go to so much effort to recover oil when you just flare it?
- Believes industry has taken steps backwards instead of forwards
- Part of team trying to resurrect PAD development

Don Towson, IRAP

- 30 yrs+ in-situ oil exp.
- Interest in CHO, assist SMEs in technology development
- Future? Maturing resource and declining in next 30 years
- Challenge is getting additional 80% and environmental aspects in recovery

Bruce Peachey, New Paradigm Engineering

- CHO, EOR, vent gas reduction from all sources, pipeline to reduce fugitives
- GHG reduction issue as an economic solution
- Future? 10 yrs. Rid ourselves of CHO econ. Challenges; 20 yrs. Find technologies that work thru spirit of innovation

Brian Kristoff, SRC

- EOR in steam and thermal/horizontal wells exp.
- EOR reservoir side vs. production side focus
- Weyburn CO2 project involvement, VAPEX for HO
- Future? CHO to Sask is like oilsands to AB, so incremental recovery very important

How much CHO is coming from CHOPS? Most wells are set up for sand.

CHO may not have enough time for much R&D but rather may need to adopt ideas from other, similar areas. Are regional reps making the case to head office to implement more R&D? Key to making an R&D case may be to involve aspects of GHG reduction. California, China, Venezuela seem to have strong R&D focus in this area.

Next Steps:

1. what do we know today? Define CHO situation today?
 - Need more geotechnical involvement
 - wormhole distribution trends being accounted for in reservoir utilization?
 - Defining area of influence for in-fill drilling
 - Do we have technology to measure and what does it look like
 - Is there a preferential wormhole direction?
 - Well testing could be backed up by 3D seismic
 - If we produce sand, can we produce oil?
 - HO is perceived as 'black magic' – mechanism is not fully understood as everyone has different solutions to the same issue
 - Oil is being recovered too fast for stress formations to have time to adjust
 - Most R&D is looking at foam and fluid properties – lots of info available from production data as a starting point.
 - Economic evaluations may change with Kyoto in effect
2. Keys areas with potential to improve sustainable and low GHG recovery of the CHO resource:
 - Understand Reservoir process - 7 votes
 - i. Understand wormholes
 - ii. Drainage areas
 - iii. Interaction of hydraulics/fluid/foam/sand
 - Venting behaviour
 - i. Consistent measurement techniques
 - ii. Variability of gas flow/breakout
 - iii. Impact of annulus pressure
 - iv. Gas cap effect

Top R&D potential

- Water - 4 votes

- i. Bottom water breakthrough
- ii. Identify which zone water is coming from / source identification
- iii. Impact on near-wellbore
- iv. Wax treatments to shut off waterflow / other techniques
- v. DHOWS with uphole injection and sand

- Well servicing

- i. How long to run a dry pump before it fails
- ii. Clear operational guidelines
- iii. Lack of tools/ resources to monitor and control wells
- iv. Perforation interval

- Drive Systems

- i. Electrification
- ii. Power generation from vent gas
- iii. Downhole drives

- Tanks - 1 vote

- i. Heater efficiency
- ii. Vapour recovery
- iii. Tank design (separation & sand handling) – 2 votes
- iv. Alternative systems

- Transportation

- i. Truck efficiency (scheduling & optimization, GPS)
- ii. Flowlines (sand transport, design)

- Product Improvement

- i. Partial upgrading
- ii. In-situ upgrading

March 21st Workshop

Top areas to present on as follows – 20 minute presentation each:

1. Reservoir Recovery Process (Brian & Ron @ C-FER)
2. Transportation (Jerry @ Husky)
3. Flowlines (Jerry @ Husky with help from Brian)

Top R&D potential