

MINUTES: ACID GAS INJECTION PROTOCOL EXPERT MEETING

8th Floor, 505-2 Street SW Calgary, AB

November 8, 2007

9-11am

Invited: Anne Marie Thompson (Senior Programs Engineer, Natural Resources Canada), Bill Gunter (Principal Scientist CCS, Alberta Research Council), Bill Jackson (Manger Joint Venture, APACHE Canada Ltd), Dave Moffat (Senior Project Manager, Spectra), Ed Steadman (University of North Dakota Energy & Environment Research Center), Jon Mitchell (Lead Environmental Strategies, Encana), Keith Driver (Vice President Operations, Baseline Emission Management), Paul Nelson (Taylor NGL), Rod Sikora (Manager Environment, Keyera), Duncan Rotherham (Principle, ICF), Aaron Schroeder (Associate, ICF), Stefan Bachu (Senior Advisor, Alberta Energy Utility Board), Tony Irwin (Contractor, Spectra), Wayne Hillier (Senior Environmental Engineer, Husky)

Attended in Person: Bill Jackson (BJ), Keith Driver (KD), Rod Sikora (RS), Duncan Rotherham (DR), Aaron Schroeder (AS), Oliver Bussler (OB), Kate Page (KP)

Attended by Conference Call: Wayne Hillier (WH)

Written comments provided by: Keith Driver.

KP: Opened the meeting with a review of the agenda (attached), welcomed the people in attendance and initiated a round table of introductions. KP outlined the rational for EPCOR's interest in acid gas injection which is the Taylor NGL offset project in Turin, Alberta. KP also provided an overview of the process of developing protocols within the Alberta Offset System and highlighted the purpose of the meeting, namely the technical review of the draft quantification protocol developed by ICF and circulated in advance of the meeting.

The floor was opened and WH indicated that he would only be available for the first hour of the meeting. Given the time constraint, WH was asked to provide his comments on the draft protocol.

WH:

Identified four issues for discussion, two of which had been identified as items c) and d) in the agenda:

- 1) Applicability of Protocol: Would like to ensure that the protocol is sufficiently flexible to be applicable to new facilities (grass roots) as well as existing facilities. The concern being that an existing facility should be allowed to keep the Claus unit to obtain elemental sulphur and steam but also include an injection system for H₂S and CO₂.
- 2) Recycling of CO₂: Inquired how recycling of CO₂ is addressed in the protocol. Recycling results from CO₂ being re-extracted from active wells.
- (3) Permanence: Inquired how permanence is confirmed.

Applicability of Protocol

RS: It's important to keep the protocol as broad and flexible as possible so that both grass roots and existing facilities may be captured.

DR: Three elements will be within the protocol. The first will cover the existing facility with Claus unit which will allow facilities that are post-grandfathered to utilize protocol. The second will allow facilities that have shutdown the Claus unit and currently inject into a geological reservoir. The third will cover situations where the Claus unit is kept for sulphur and steam while some of the acid gas is also injected into a geological reservoir.

RS: The Claus unit is not the best option for all facilities. Depending on the quantity released will determine the best technology for the facility to implement – example: 1-5 tons flare, 5-50 tons low cat (average in Alberta), etc. It was suggested that Jim Spangle be contacted at EUB to determine some guidelines relating to the quantity and technology that is used.

KD: Include list within the protocol to provide flexibility to allow the Project Proponent to justify the technology used.

DR: The protocol will have a tiered approach with thresholds. This puts the onus on the user of the protocol to justify the technology use.

Recycling of CO₂

RS: Suggested that the recycling reservoir be kept within the Project SS's

KD: Explanation that due to precedent from other protocols, that CO₂ concentrations in a reservoir could be substantiated with 3 years of data (to be conservative).

DR: Discount from the emission reduction calculation any CO₂ that is extracted from an active well (without substantiating to keep simple) or could establish baseline concentrations per well and discount any values in excess of the baseline concentration.

RS: This should be introduced as a flexibility provision as there is confidence in the gas mix and don't require a justification.

DR: Both options will be included in the protocol.

Permanence

DR: Confirmation of permanency is substantiated via regulation requirements imposed by the Alberta Energy and Utilities Board for acid gas injection projects.

WH: Supportive of this approval as it's not necessary to impose a strict monitoring program to confirm permanency. Husky has been conducting a study at one of its sites which is proving that the injection plume moves very little once sequestered in the reservoir. (Referenced work with ARC/NRCan/Spectra/Husky to monitor with 3D Seismic and its cost is roughly \$800,000).

KD: Provided background information on the EOR Protocol. The EOR Protocol is approved by Alberta Environment and covers the issue of permanency in a similar manner. It was suggested that the acid gas injection protocol should follow suit given that this protocol has been approved.

DR: Will review the EOR Protocol for the wording around this issue.

WH left the call after 45 minutes and referenced that his questions/concerns had been adequately addressed.

Other issues discussed:

The other two issues (c and d) on the agenda were discussed below.

KD: Suggested that the protocol should include a thorough definition of "acid gas injection" and "reservoir"

DR: Will send out draft definitions for review and comment.

DR: Raised the question of whether the multi-stage Claus process an energy user or producer?

RS: Claus unit is an energy producer. Comparison of fuel gas shows increase in energy production. CAPP produced a study in the '90's called Integrated options which determined the Claus energy equivalent (tonnes of sulphur = quantity of gas)

KD: Wondered whether this issue is material.

DR: Depending on the size of the project then it'd count. ICF is to review the exothermic factor.

RS: Include generator and Claus unit.

KD: Both could be covered by EOR if you separate the boundaries of the project.

DR: In terms of the scope of the document, P7 will be modified to read as upset flaring not reference flaring B5 is to include incineration; B6 to read upset flaring

RS: P5 includes compression and dehydration as it runs with separate dehydration which is a step after aiming system (with closed process don't worry about this).

RS: Referenced his work with PERRL and the Protocol developed under this federal program and suggested reviewing it.

DR: ICF will review protocol which was developed with assistance from Pembina.