

**MEHC - PacifiCorp  
Integrated Gasification Combined Cycle Working Group**

**Thursday, January 25, 2007  
9:00 am – 2:00 pm (Pacific Time)  
10:00 am – 2:00 pm (Mountain Time)**

**Meeting Summary**

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| <b>California</b> | Not represented   |
| <b>Idaho</b>      | Harry Hall (IPUC),  |
| <b>Oregon</b>     | Ed Durrenberger (OPUC), Lowrey Brown (CUB).   |
| <b>Utah</b>       | Sam Liu (DPU), Cheryl Murray (CCS), Carol Revelt (UT-PSC), Charles Peterson (DPU), Regg Olsen (Utah DAQ), Rusty Ruby (Utah DAQ), Glade Sowards (Utah DAQ), Ron Daniels (Utah Energy Policy), Phil Powlick (Utah DNR), David Curtis (Univ. of Utah), Betsy Wolf (SLCAP), Kelly Francone (UAE), Becky Wilson (UT-PSC), John Harvey (UT-PSC), Jim Logan (UT PSC) Kevin Whitty (Univ. of Utah), David Curtiss (EGI – Univ. of Utah), Brian McPherson (SW Partnership on Carbon Sequestration) |
| <b>Wyoming</b>    | Bryce Freeman (WY-OCA)  |
| <b>PacifiCorp</b> | <b>Salt Lake City:</b> Nick Rahn, Ian Andrews, Greg Betenson, David Taylor, Jim Lacey<br><b>Portland:</b> Mike Liljenwall, Kyle Davis, Paul Wrigley, Teri Ikeda   |
| <b>Other</b>      | Pamela Tomski (Big Sky Carbon Sequestration Partnership), Kathy VanDame (Wasatch Clean Air Coalition), Roger Swenson (E-Quant), Yushi Nishi (Japan Geologic Survey), Norio Temma (Japan Geologic Survey), Rick Allis (Utah Geologic Survey), Blaine Rawson (Holmes Roberts Owens), Doug Hunter (UAMPS), Gary Merrill (Murray City Power), Frank Zhang (New Mexico Tech), Doug Campbell (PNM), Yi Sui (New Mexico Tech), Malcolm Anderson (So. California Edison).                         |
| <b>Phone-In</b>   | Gary Dodge (Hatch, James & Dodge), Eric Guidry (Western Resource Advocates), Steven Michel (Western Resource Advocates), Terri Carlock (IPUC), Lisa Schwartz (OPUC), Phil Carver (ODOE), Graciela Etchart (WUTC), Yohannes Mariam (WUTC).   |

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## **Introduction**

This was the seventh meeting of the Integrated Gasification Combined Cycle (IGCC) Working Group. The following presentations and discussions were made:

- “CO<sub>2</sub> Capture & Storage and the EPRI CoalFleet Program” by Neville Holt from the Electric Power Research Institute.
- PacifiCorp’s IGCC Efforts in 2006 (PacifiCorp)
- CO<sub>2</sub> Emissions Rates – PacifiCorp existing units – 2005 (PacifiCorp)
- Summary on SW Regional Partnership Conference (1/22-24)
- Regional IGCC projects – Xcel (PacifiCorp)
- IGCC Working Group Expectations for the Future - Group Discussion

## **Summary of Presentations**

The meeting was held in Salt Lake City and video-linked with PacifiCorp’s Portland office. A number of individuals also participated via phone. The meeting agenda and presentations were posted on the PacifiCorp IGCC Working Group site (<http://www.pacificorp.com/Article/Article66610.html>) on January 24, 2007.

The first presentation was made by Neville Holt, Technical Fellow of the Electric Power Research Institute (EPRI). Neville Holt joined EPRI in 1974 and is currently Technical Fellow–Advanced Coal Generation Technology. He is the technical lead for EPRI’s CoalFleet program of Future Coal Generation Technology Options. He is the recipient of Lifetime achievement awards from EPRI and the Gasification Technologies Council. In recent years he has been increasingly involved in generating technical and economic information and analysis on various options for reduction of CO<sub>2</sub> emissions to inform discussions of the Global Climate issue. Neville discussed the various technologies for CO<sub>2</sub> capture for coal-based power generation technologies and the current status in the evaluation and deployment of these technologies. He stressed the need for technologies to address both gasification and combustion based processes. Neville pointed out the various areas where development activities are ongoing and where additional research effort is needed.

Neville pointed out that chilled ammonia appears to be a promising technology for CO<sub>2</sub> capture for retrofit applications for pulverized coal plant in comparison to amine-based technologies. He expressed that additional testing beyond the planned one year of testing may be prudent.

Neville provided comparisons of CO<sub>2</sub> capture costs based on a number of different studies, including the recent public study performed by Burns & McDonnell for CPS Energy (San Antonio). He indicated that in today’s market EPRI has been challenged to keep capital cost pricing estimates current; however in relative terms the results of these

studies appear reasonable. Much of the work that has also been done with specific technology vendors is performed under non-disclosure agreements which further frustrate EPRI's ability to obtain and/or publish recent cost estimates. Some of the other major points Neville raised during his presentation included:

- CO<sub>2</sub> capture needs to be addressed in the initial design phase of an IGCC plant; just "leaving space" will not adequately address the multiple process issues when CO<sub>2</sub> capture is required.
- Selexol is "more ready" for CO<sub>2</sub> capture than MDEA
- Sour shift is "more ready" than sweet shift for CO<sub>2</sub> capture
- Even with high CO<sub>2</sub> cost penalties, there still may not be sufficient cost driver to shift from pulverized coal technology to IGCC based on the expected capital costs and performance
- The United States needs to begin large scale geologic sequestration testing with CO<sub>2</sub> quantities at 5 or 6 locations in excess of 1 million tons per year (per location).
- Has not seen much interest in CO<sub>2</sub> carbon capture and storage in China; there is significantly more interest in Europe. The United States will need to get more serious in order to get China serious.
- Low capital cost quench systems for IGCC is needed to address elevation and coal quality issues. Even then, IGCC at elevation may not be competitive with a supercritical plant with chilled ammonia if that technology is determined to be viable.

PacifiCorp provided a summary of its IGCC development work during 2006. PacifiCorp provided a copy of the emissions rates for its existing plants as reported to and by the US Environmental Protection Agency in 2005.

After lunch David Curtiss with the SW Regional Partnership provided an overview its conference that was held in the 3-day period prior to the IGCC Working Group Meeting. A copy of his presentation is posted on the IGCC Working Group webpage.

PacifiCorp provided an overview of Xcel's plan to develop an IGCC project in Colorado that will incorporate some level of CO<sub>2</sub> capture and storage. A summary of the facilitating legislation in Colorado was presented.

The closing session was devoted to identifying the focus for future IGCC Working meetings. From PacifiCorp's perspective, it has met the initial intent of the MEHC acquisition commitment, but is looking for feedback from the participants to map out the direction of the IGCC Working Group.

It was proposed that the meetings be held quarterly; that idea appeared to be acceptable to all.

## **Future Meeting Topics**

The group identified the following as potential topics or areas of interest for the next meeting:

1. An update on Alstom's chilled ammonia process. **A meeting has been scheduled for March 13, 2007 at 1:30 PM in Salt Lake City at PacifiCorp's North Temple Office (NTO). Alstom will be providing an update on its development activities on the chilled ammonia project. Due to scheduling issues with NTO Room 130K on that date, the meeting will not be video-conferenced but will be teleconferenced.** To attend the Voice Conference: Call 503-813-5600 (toll free #800-503-3360), follow the instructions provided and enter the Meeting ID: 20070313 when prompted. Password: 20070313. For Meeting Place help, contact the Corporate Help Desk at 503-813-5555 or 800-423-7840.
2. An update on the Wyoming Infrastructure Authority's process to select a gasification project partner in Wyoming to seek federal co-funding for a high elevation, low rank coal project.
3. An update on the X-cel IGCC project.
4. Updates on development of IGCC projects in the United States.
5. Presentations by other gasification technologies
6. Mitigating sequestration liability
7. Status of CO2 sequestration sinks in Utah, Wyoming, Oregon, and Washington

**PLEASE FORWARD IDEAS FOR FUTURE TOPICS FOR IGCC WORKING GROUP MEETINGS TO IAN ANDREWS ([Ian.Andrews@pacificorp.com](mailto:Ian.Andrews@pacificorp.com), 801-220-4286).**

### Proposed Scheduled Meeting Date for next IGCC Working Group Meeting

**The next IGCC Working Group Meeting is scheduled for the morning of Thursday, April 26, 2007 starting at 10:00 AM (Mountain), 9:00 AM (Pacific).**

The meetings in Salt Lake City will be held in room 130 K at the North Temple Office, 1407 West North Temple, Salt Lake City, Utah.

The meetings in Portland will be held in PacifiCorp's offices in room 956 at the Lloyd Center Tower, 825 NE Multnomah, Portland, Oregon.

A video-link will connect the two meetings. A proposed agenda and dial-in information will be circulated in the meeting notices.