



PRE-CONFERENCE WORKSHOPS

Tuesday, March 18, 2008

Pre-Conference Workshop A, 9AM-Noon

CARBON CAPTURE AND SEQUESTRATION UPDATES

Final Agenda

State regulators are increasingly concerned about the real-world viability of IGCC projects' capture plans. As one recent decision put it, "a plan for a plan" is not good enough. Many initiatives are now underway addressing the various cost, technical, economic and legal facets of the carbon capture and sequestration challenge. This workshop will provide a series of updates on developments in capture methods, how to develop a real sequestration project, how to communicate with the public about CCs, and Ohio's work on creating a CO₂ backbone connecting sources and sinks.

- 9-9:00 *Presentation:*
Technical Survey of Capture Methods, on the Market or in R&D
Dr. Michael L. Jones, *Senior Research Advisor*,
Energy and Environmental Research Center
- 9:00-9:45 *Presentation:*
Siting Considerations for Carbon Sequestration Projects
David Tomlinson, *Director of Power Services*,
Ecology & Environment, Inc.
- 9:45-10:15 *Refreshment Break*
- 10:15-10:45 *Presentation:*
Legal Liability – the Evolving Paradigm
Speaker To Be Announced
- 10:45-11:15 *Presentation:*
Best Practices for Public Outreach for CCS Projects
Sarah Wade, *Partner, AJW; Coordinator*, Outreach Working Group of
the Regional Carbon Sequestration Partnerships

11:15-11:45 *Presentation:*
C02 Pipeline Public-Private Partnerships
Klaus Lambeck, *Chief of Facilities, Siting and Environmental Analysis,*
Ohio Power Board

Tuesday, March 18, 2008, 1-5pm
Pre-Conference Workshop B

INNOVATIONS IN GASIFICATION TECHNOLOGIES AND PROCESSES

The gasification technology sector is entering into a period of ferment. a handful of major established systems are on the market, connected to most of the announced “mega-projects”. However, coming up in the wings are well over a dozen emerging or “advanced gasification systems” with various innovations, including the ability to use lower rank or wetter coals, operate at smaller scale or in transportable clusters, and gasify a variety of feedstocks, separately or combined. In light of high oil and natural gas prices, these “second generation” systems may address some of the design/build and financing challenges associated with multi-billion dollar projects. This workshop will offer an overview of the general process/pathways for polygen production, followed by an update on biomass gasification projects in Alberta, new gasifiers, and a fresh approach to carbon capture in power generation.

1:00-1:45 **Polygeneration of Chemicals from Coal-based Syngas**

Coal is becoming an increasingly important raw material for power and chemicals production. Attractive synergies can be obtained by combining production of chemicals and power. In an Integrated Gasification Combined Cycle (IGCC) plant, power is produced by burning synthesis gas produced by gasification of coal in a gas turbine. This synthesis gas is, however, also an excellent raw material for production of chemicals such as methanol, DiMethyl Ether (DME), gasoline, Substitute Natural Gas (SNG), hydrogen, ammonia and Fischer Tropsch (FT) diesel. By combining production of such chemicals and – in some cases - power, the plant becomes less sensitive to changes in the prices of the individual chemicals because alternative products may be produced.

The raw syngas produced by the coal gasification unit contains mostly hydrogen and carbon monoxide in a molar ratio close to one. The optimal H₂/CO ratio for production of chemicals depends on the final product. The optimal ratio is f.inst. infinite for ammonia and hydrogen, three for SNG, two for methanol and one for gasoline. This ratio is conveniently adjusted in a relatively simple shift unit upstream the Acid Gas removal unit.

This paper will present examples of attractive systems obtained by combination polygeneration of chemicals.

Anders N. Olsen, CEO, Haldor Topsoe Inc.

Niels R. Udengaard, Principal Technology Specialist, Haldor Topsoe Inc.

1:45-2:30

Air-Blown Gasification for Fuel Gas, IGCC and Integration with Existing PC Plants

Air-blown coal gasification has been used for many years for providing fuel gas. When integrating the gasification with a single step sulfur removal process, the system can provide economic and environmentally friendly gasification. The coal gas is acceptable for gas turbines and boilers. The modularity of air-blown gasification and the lack of a required air separation plant lends to a broad range of IGCC from 25 to 250 MW, and larger, for Greenfield and retrofit opportunities. Air-blown gasification offers several options to integrate with existing pulverized coal plants such as repowering older, smaller plants; integration of IGCC to increase output and reduce emissions; using gas turbine exhaust as make-up air for boiler draft plants; refueling natural gas fired plants for fuel economy and NOx control; and other project specific opportunities. Various examples and project profiles will be discussed. This presentation will explore many of the options of use of air-blown gasification and provide project status updates of various US and international air-blown gasification projects.

Dave Wakefield, President, EconoPower International (EPIC)

2:30-3:15

Diversified Energy's HydroMax Gasification Technology

HydroMax is a patented, breakthrough gasification technology that utilizes a unique chemical pathway to produce syngas (CO + H₂) and hydrogen (H₂) in separate and distinct streams, resulting in process and economic benefits. Several unique attributes of the HydroMax gasification technology result in significant operational and economic benefits compared to existing gasification approaches, including capital cost reductions, smaller gasification footprint, flexibility to utilize any carbon feedstock, flexible and tailored, and ability to accept high sulfur coals.

- 1) A brief overview of the HydroMax coal gasification technology*
- 2) An introduction to the HydroMax development team*
- 3) Previous test results and analyses including the January 2007 DOE funded tests*
- 4) Analyses conducted using models developed from AspenPlus® and a discussion of HydroMax performance compared to commercially available gasifiers*
- 5) A brief summary of the industrial applications being pursued and evaluated as candidate HydroMax entry applications including notional plant layouts and interfaces*
- 6) Progress status of DOD and State of California contracts*
- 7) Future development plans and activities.*

Philip Brown, President & CEO, Diversified Energy Corporation

3:15-3:30 Break

3:30-4:15 **ThermoEnergy Solution for Efficient Capture from Fossil Combustion**

Alex Fassbender, *President*, ThermoEnergy

4:15-4:45 **Plasma Gasification, a Proven Technology: Alter Nrg Corp.**

Alter Nrg's subsidiary Westinghouse Plasma Corp. (WPC) has developed a plasma gasification reactor (PGR) that is capable of converting a wide variety of feedstocks including waste materials, coal and petroleum coke into valuable synthesis gas (syngas) and an environmentally benign slag. The WPC technology is based on a plasma cupola design - a cupola is a vertical shaft furnace that is conventionally used in the foundry industry within a harsh operating environment for the re-melting of scrap iron and steel. The ability to accept heterogeneous, unsorted or unsized feedstocks reduces the capital required for feed handling prior to gasification. WPC owns a plasma gasification pilot plant located at the Westinghouse Plasma Center in Madison County, PA. Over 100 pilot tests have been completed on a wide range of feedstocks. WPC has also developed a plasma gasification simulation program which Alter Nrg is enhancing for design and modeling of gasification facilities. There are currently two WPC plasma gasification systems in commercial operation, both of which are located in Japan. In addition, the WPC plasma torch system is used within a foundry environment in Ohio to melt machine borings and metal scrap to form new engine parts.

Pieter van Nierop, *Senior Gasification Lead*, Alter NRG Corp.