Pilot Gasifier for PRB and Coal/Biomass Blends

Presented by Karl Libsch, P.E., Principal Engineer
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Project Participants

Prime Contractor / Gasifier Technology

Host Facility & Support

Equipment Supplier

Gas Analytics

Additional Local Service Providers:

- Richardson Construction (Laramie, WY)
- PUMA Steel (Cheyenne, WY)
Project Sponsors

U.S. Department of Energy/NETL
(via Western Research Inst.)
$250,000 Phase 1
$200,000 Phase 2

State of Wyoming
$ 560,000 Phase 1
$1.34 Million Phase 2

Emery Energy Company
$ 311,000 Phase 1
$1.14 Million Phase 2
Introduction

• Being constructed at the WRI Advanced Technical Center in Laramie
• Dry ash fixed bed gasifier
• Oxygen/steam blown – Air/steam capable
• Contains many nozzles to allow different modes of Operation
• Planned commissioning August 2010
Flowsheet
Feed System
Gasifier

19 feet

5 feet O.D.
Flare

• Enclosed Flare
• 4’ OD by 50’ tall
• 99.5% Destruction Efficiency
• 4 burners, 2 pilots
• Equipped with flame scanner, automatic reigniter
• Manufactured by Callidus, a Honeywell Company
Reformers in Series (3)

Low-temp plasma arcs

Followed by oxygen buffer
Sampling

• Feed
  – Volumetric tracking of feed rate
  – Periodic grab samples for feed analysis

• Continuous syngas monitoring - $\text{H}_2$, $\text{CO}$, $\text{CO}_2$, $\text{CH}_4$, $\text{O}_2$

• Tar and Oil
  – Idaho National Labs preparing analytical cart
  – Will condense tars and oils, dissolve in solvent, and analyze
Present Status

- Gasifier installed June 9th
- Feed system to arrive late July
- Commissioning / Start-up by August
- Primary Coal Tests in September / October
Scale up Modeling

• Using results of coal and coal /biomass operations, Emery will perform scale up modeling to evaluate:
  – Mid-size IGCC (50 to 200MWe)
  – Chemical/Fuels production
  – Complete preliminary economic analysis of above cases to determine best opportunities
Commercialization

• Seeking strategic partners to use / deploy technology in U.S. and foreign markets
• Plan to scale-up technology to pressurized reactor (~400+psi) and 500 ton/day (or greater) throughput
• PRB/Biomass blends opportunities in mid-west and east
• Eventually develop PRB project in Wyoming to produce power or fuels
• Coal repowering (30 to 100MWe)
• Near-term commercial Biomass Power applications (Colorado, California, Spain)
Thank you!

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