REINHOLD ENVIRONMENTAL Ltd.

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Mountaineer Commercial Scale CO_2 Capture and Storage Project

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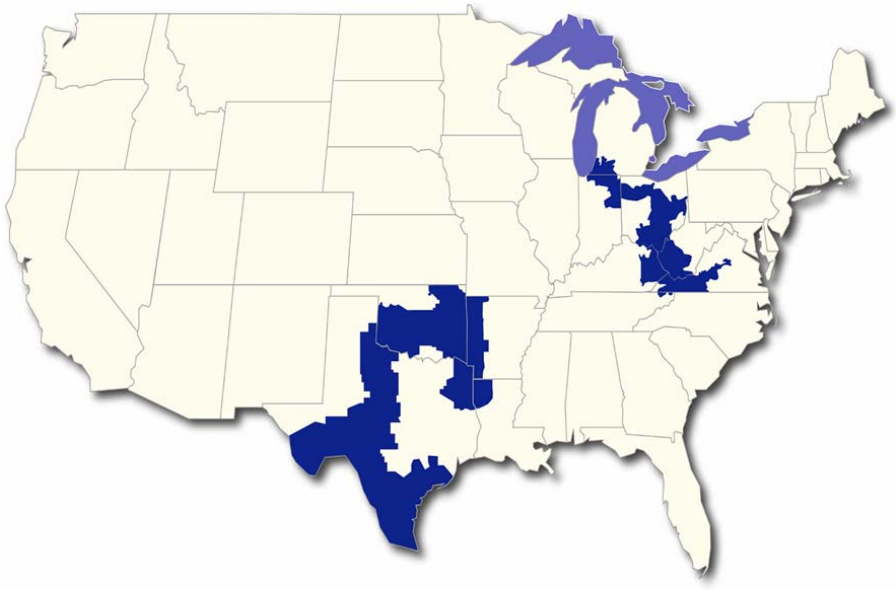
Agenda

- AEP Overview
- Mountaineer Plant
- Product Validation Facility (PVF) Overview
- MT CCS II – Commercial Scale CCS
  - Capture
  - Transport & Storage
  - Current Status
  - Future Plans
- Q & A

AEP Overview

- 5.2 million customers in 11 states
- Industry leading size and scale of assets:
  - #2 Domestic generation with 38,000 MW
  - #1 Transmission with 39,000 miles
  - #1 Distribution with 216,000 miles
- Coal & transportation assets
  - Over 8,400 railcars involved in operations
  - Own/lease and operate over 2,650 barges & 52 towboats
  - Coal handling terminal with 20 million tons of capacity
  - Consume 76 million tons of coal per year
- 18,900 employees



AEP Generation Capacity Portfolio			
Coal/ Lignite	Gas/ Oil	Nuclear	Other – (hydro, wind, etc.)
69%	20%	6%	5%

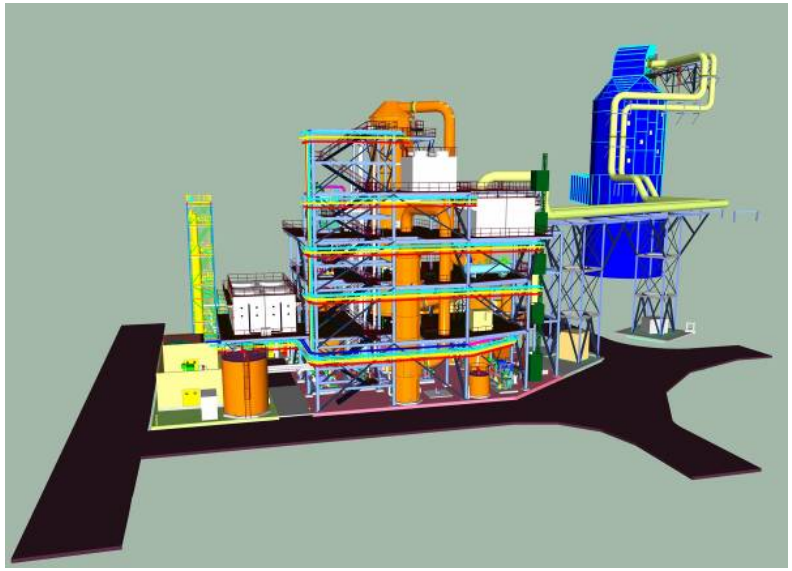
Mountaineer Plant

Mountaineer Plant

- Operated by Appalachian Power Company, a subsidiary of AEP.
- Located on State Route 62 near New Haven, West Virginia
- A single 1300 MW net pulverized coal plant
- Emission Controls
  - ESP – Original Equipment
  - SCR – Installed 2001
  - FGD and SO_3 Mitigation installed 2007
- Primary fuel is bituminous coal

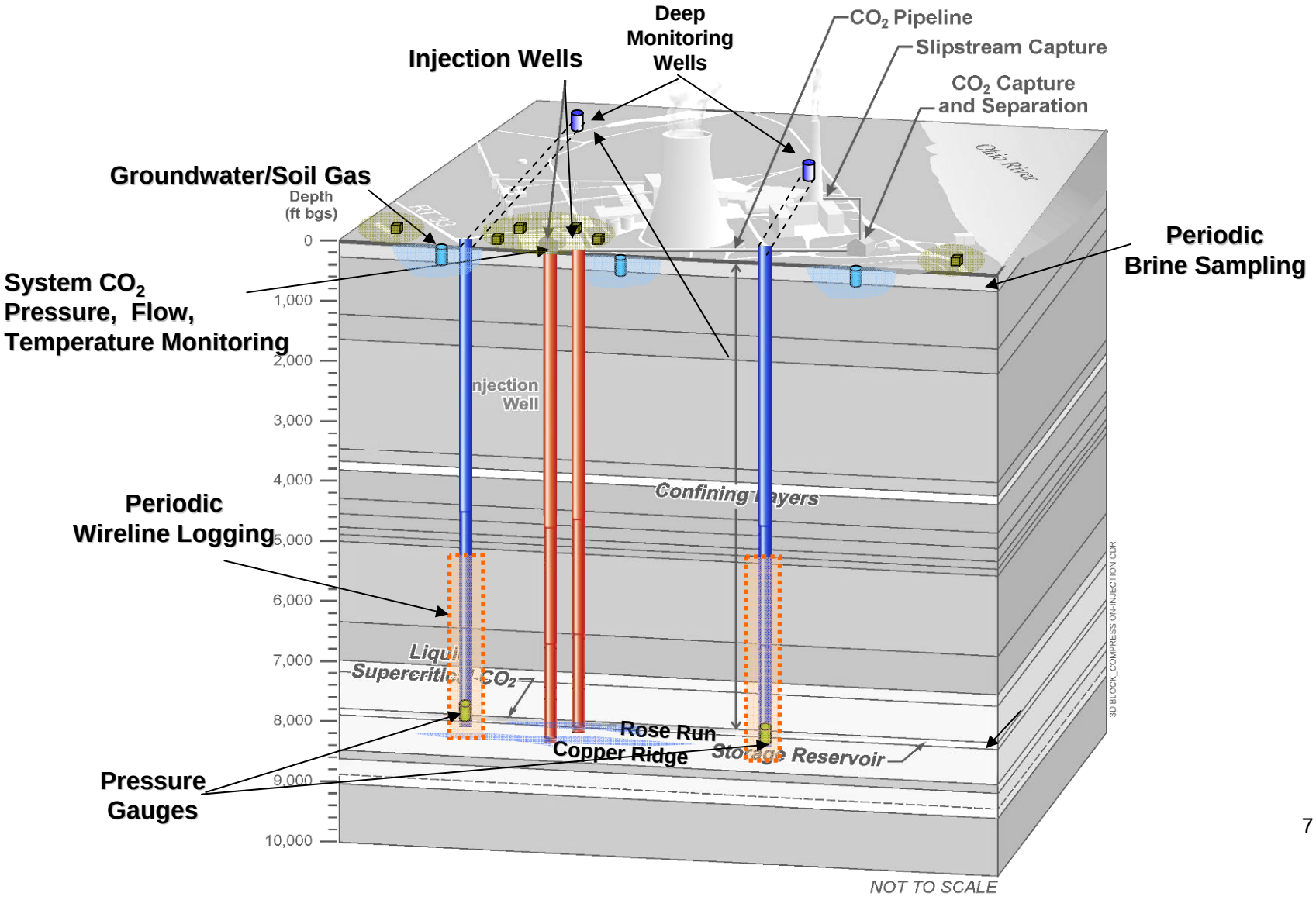
Mountaineer Carbon Capture Product Validation Facility Summary

Location	New Haven, WV
Capacity	100,000 tonnes CO_2/yr
Size	≈ 54 MWt 79,798 Nm3/hr
CO_2 Storage	Deep geological formations
Upstream APC Equipment	ESP, SCR, WFGD, SO_3 Sorbent injection
Start-Up	3rd Qtr 2009
Fuel	Bituminous Coal
Reagent	Ammonium carbonate
Regeneration Energy	Steam – turbine extraction (HP Turbine Exhaust
Chiller Refrigerant	R410A
Byproduct	Ammonium sulfate (dilute water solution)



American Electric Power
Mountaineer Power Plant
CCS Product Validation Facility
New Haven, WV

Product Validation Facility Monitoring System



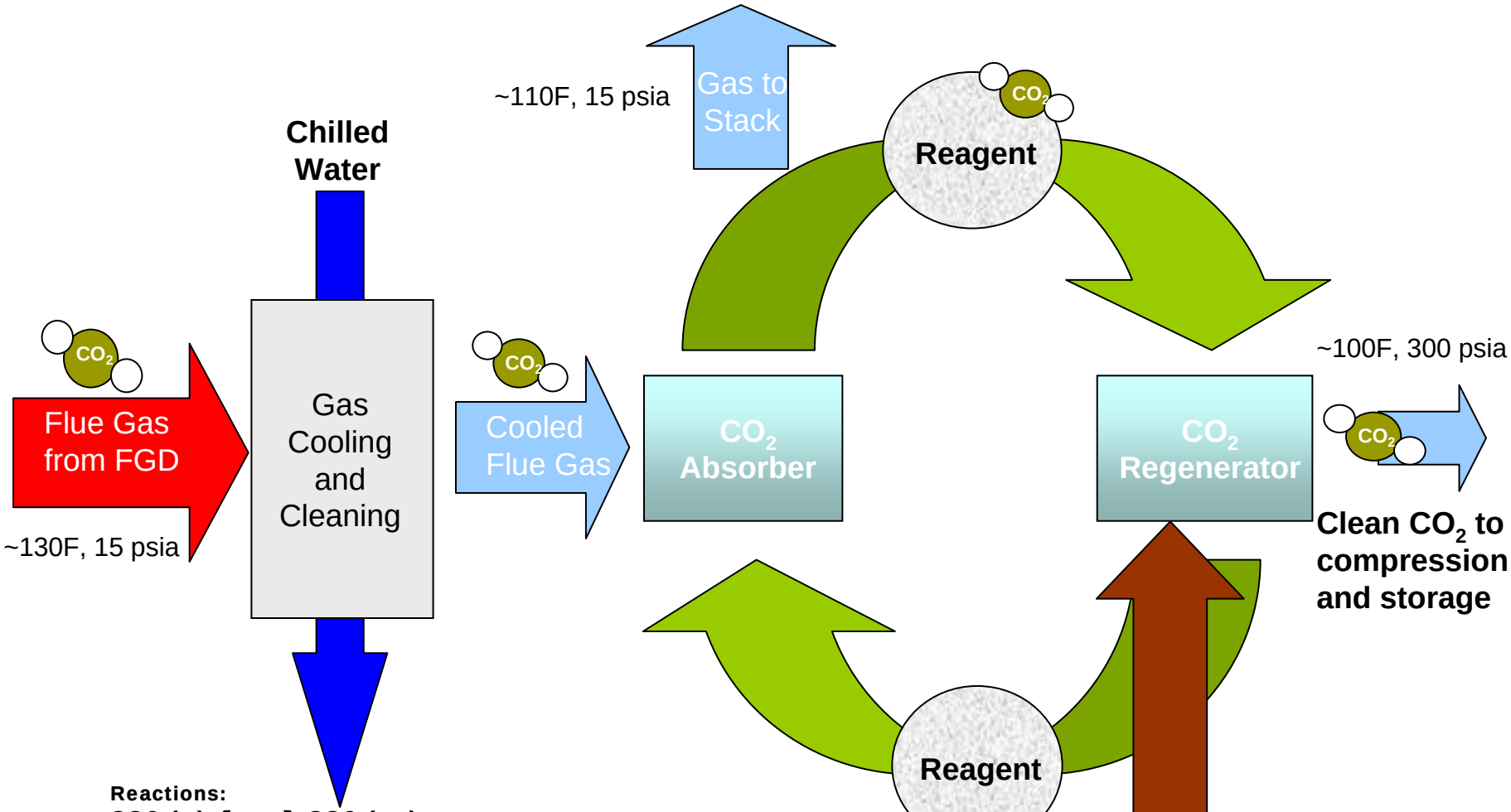
MT CCS II Project Overview

- Purpose: Advance the development of the Alstom Chilled Ammonia Process (CAP) CO_2 Capture technology and demonstrate CO_2 storage and monitoring technology at commercial scale
- Location: Mountaineer Power Plant and other AEP owned properties near New Haven, WV
- Preliminary cost estimate: $668 million
  - 50/50 DOE cost share up to $334M
- Project Objectives
  - 90% CO_2 removal from the stack gas
  - Minimize the increase in cost of electricity to $\leq$ 35%
  - Store 1.5 million metric tons of CO_2/year
  - Demonstrate commercial scale technology

Schedule and Phase I Critical Activities

- Schedule
  - Phase 1 Project Definition: present – 9/30/11
  - Phase 2 Design and Permitting: 10/1/11 – 12/31/12
  - Phase 3 Construction & Startup: 1/1/13 – 8/31/15
  - Phase 4 Operations: 9/1/15 and beyond
- Phase 1 Critical Activities
  - National Environmental Policy Act (NEPA) process
  - Geologic characterization study of proposed injection sites
  - Complete initial engineering & design
  - Detailed cost estimate (+/- 25%)
- Project Participants
  - AEP
  - DOE
  - Alstom
  - Battelle
  - WorleyParsons
  - Potomac Hudson
  - Geologic Experts Advisory Team

Alstom's Chilled Ammonia Process (CAP)



Reactions:

CO2 (g) ←==→ CO2 (aq)

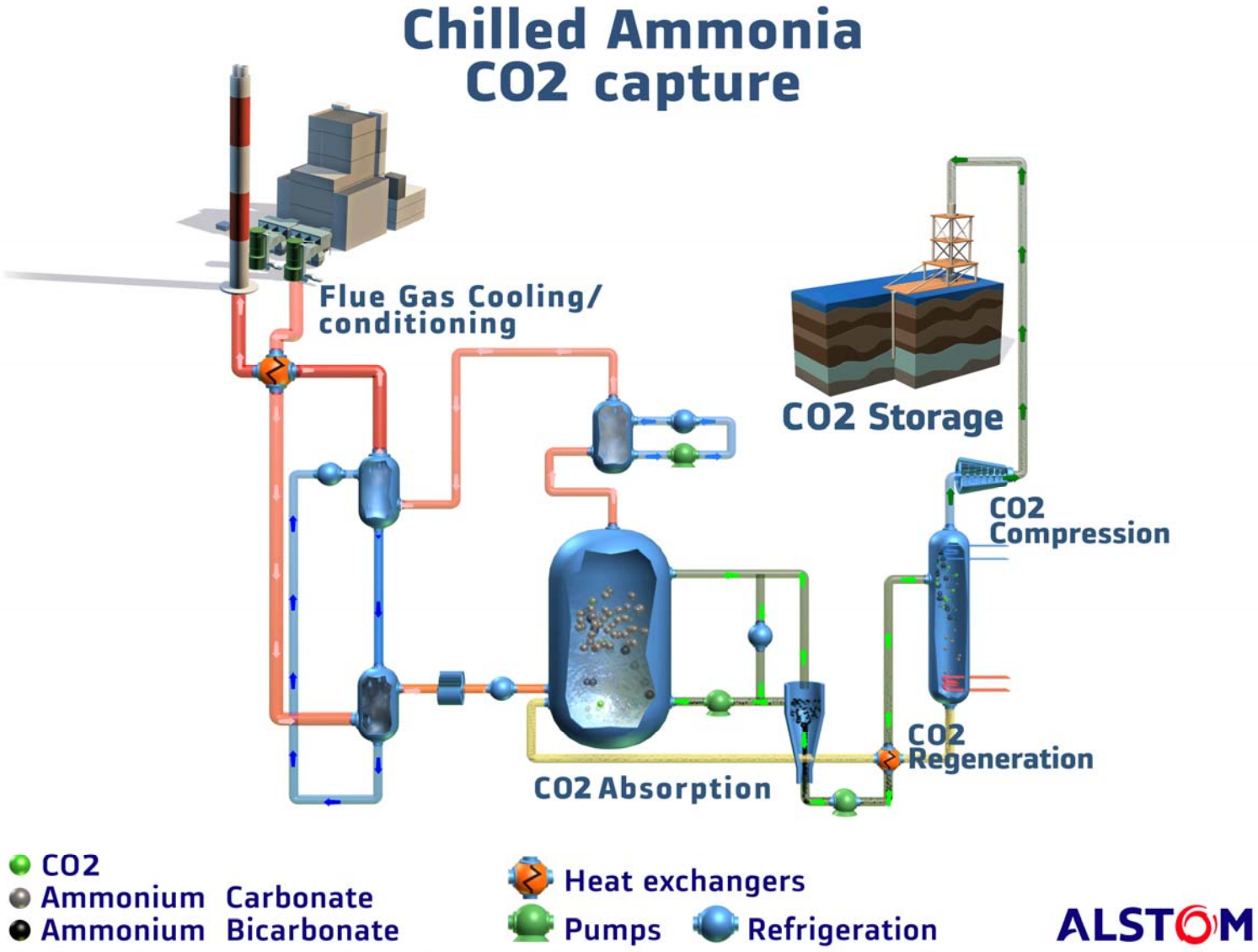
(NH4)2CO3 (aq) + CO2 (aq) + H2O ←==→ 2(NH4)HCO3 (aq)

(NH4)HCO3 (aq) ←===→ (NH4)HCO3 (s)

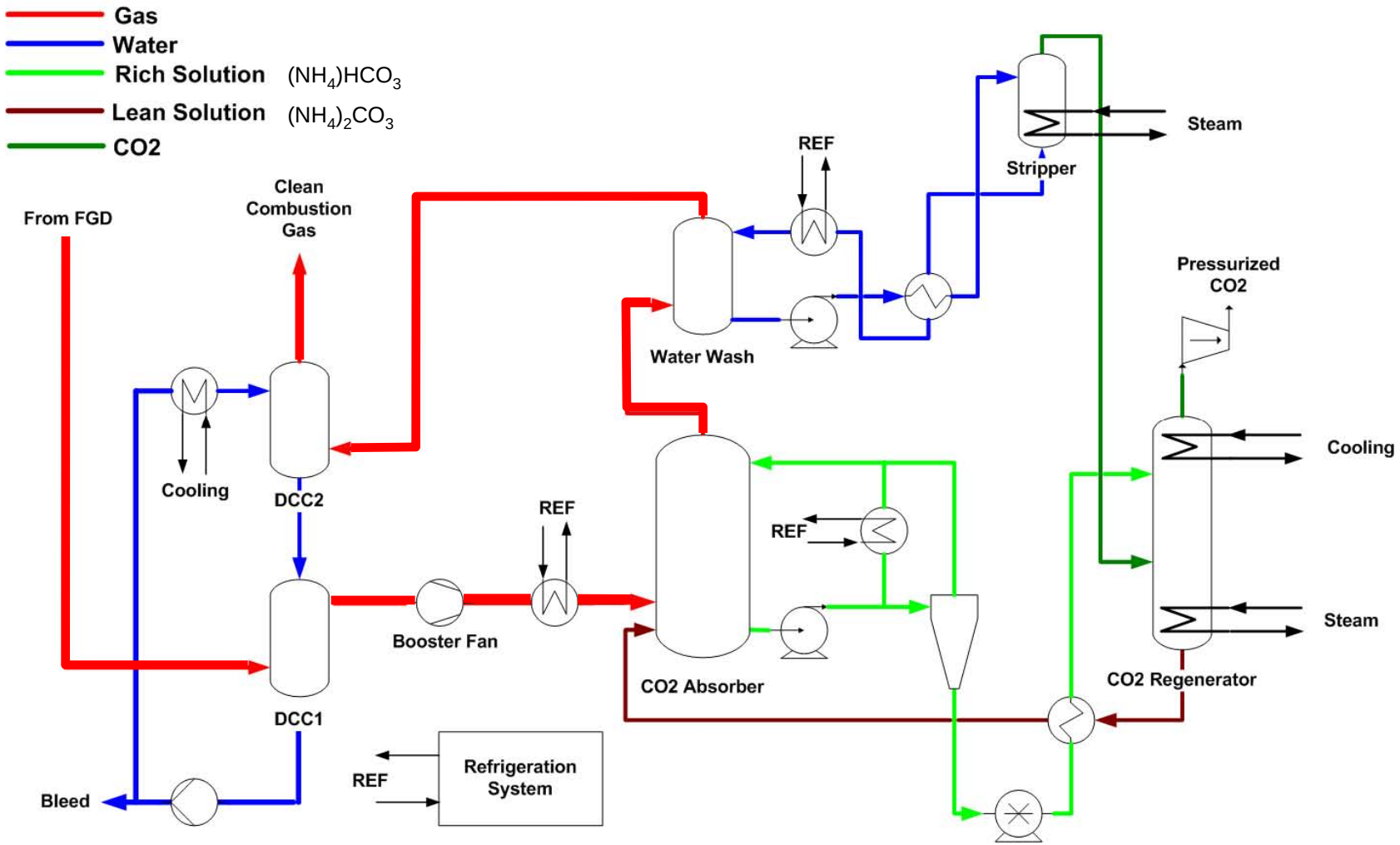
(NH4)2CO3 ←===→ (NH4)NH2CO2 + H2O

Graphics courtesy of Alstom Power

Alstom's Chilled Ammonia Process



Alstom CAP Schematic

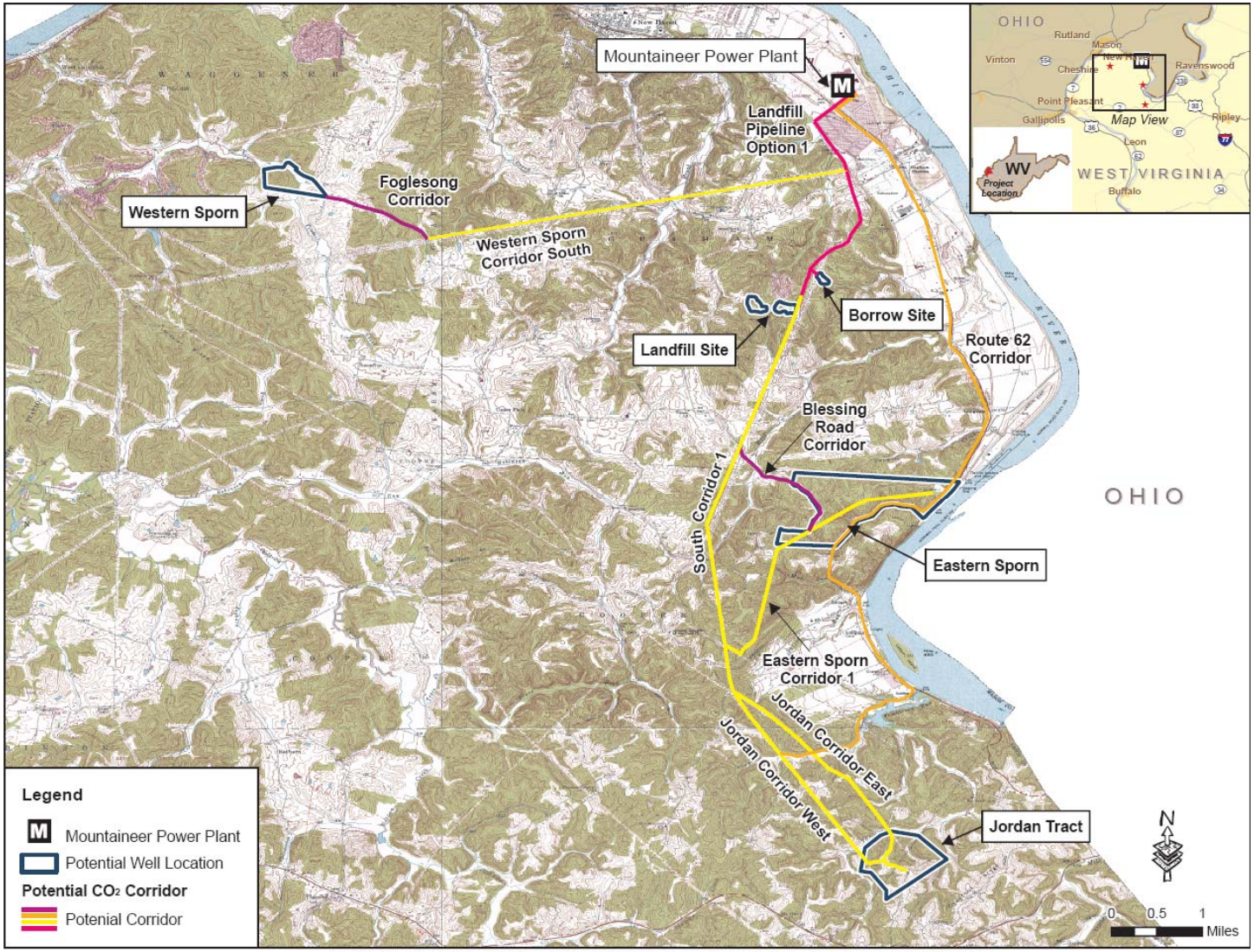


CAP Advantages and Challenges

- CAP Advantages
  - Lower energy demand than traditional CO_2 capture technologies (including compression)
  - Reagent supply availability
  - More tolerable of trace flue gas contaminants
  - Usable by-product

- CAP Challenges
  - Minimize energy demand
  - Minimize footprint
  - Simplify operations complexity

CO_2 Transport & Storage

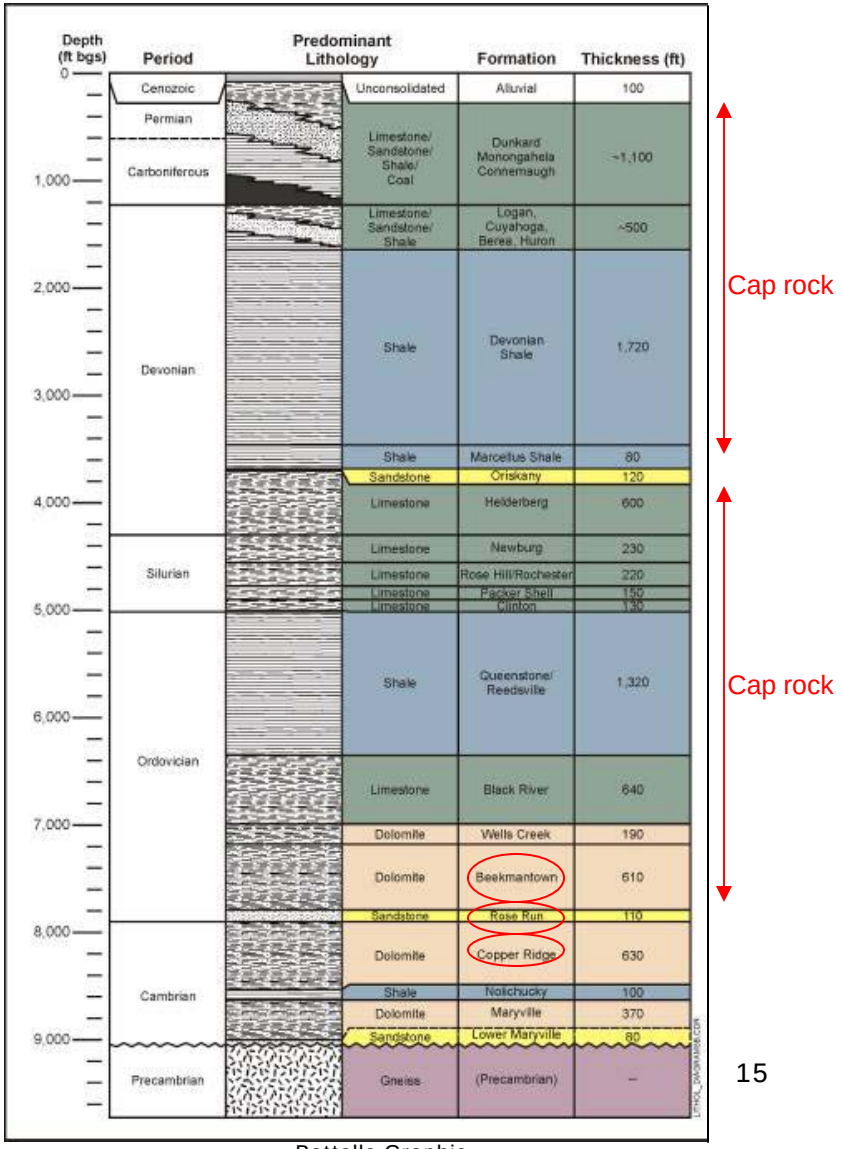


Mountaineer Power Plant and Potential Well Locations and Corridors Topographic Map
USGS 1:24,000 Topographic Quadrangles: Cheshire (38082-H1), Mount Alto (38081-G8), and New Haven (38081-H8)

Local Geology

- 2003 site characterization study funded by the DOE identified two feasible injection reservoirs with several thousand feet of excellent cap rock
  - Rose Run Sandstone
  - Copper Ridge B-Zone

- Test project validating CO_2 model



Battelle Graphic

CO_2 Transport and Storage Challenges

- Advantages
  - Appears to be the only commercially viable option in this area
- Challenges
  - UIC Permit guidelines
    - Materials of construction
    - Monitoring requirements
  - Public acceptance
    - Mineral rights ownership
    - Pipeline Right of Way
    - Overcome Not in my back yard (NIMBY)
  - CO_2 long term liability

Project Status

- Project status as of December 31, 2010
  - Completed Conceptual Process Design Basis, Process Flow Diagrams and Full Load Mass/Energy Balance
  - Selected CAP process equipment location on plant site
  - Determining plant interface and BOP tie-in locations
  - Finalizing Environmental Impact Statement (EIS) to satisfy NEPA
  - Completed reagent and refrigerant selection studies
  - Began characterization well drilling at Borrow Area site (12/20) and began preparation activities at Jordan Tract.
  - Developing Phase I cost estimating template

Future Plans

- Phase I:
  - Public release of EIS
  - Complete Phase I activities
  - Evaluate effect of pending Class VI UIC guidelines
- Operate 235MW facility starting in 2015
- Evaluate future CO_2 regulations and regulatory climate
- Evaluate retrofitting 100% of Mountaineer flue gas stream w/ CCS
- Evaluate CO_2 storage options across fleet including deep saline and EOR

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Q & A