

CO₂ Capture at the Kemper County IGCC Project

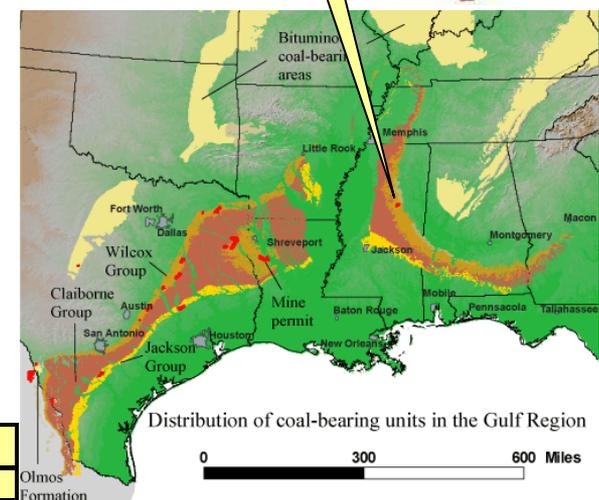


2010 NETL CO₂ Capture Technology Meeting

September 16th, 2010

Kemper County IGCC Overview

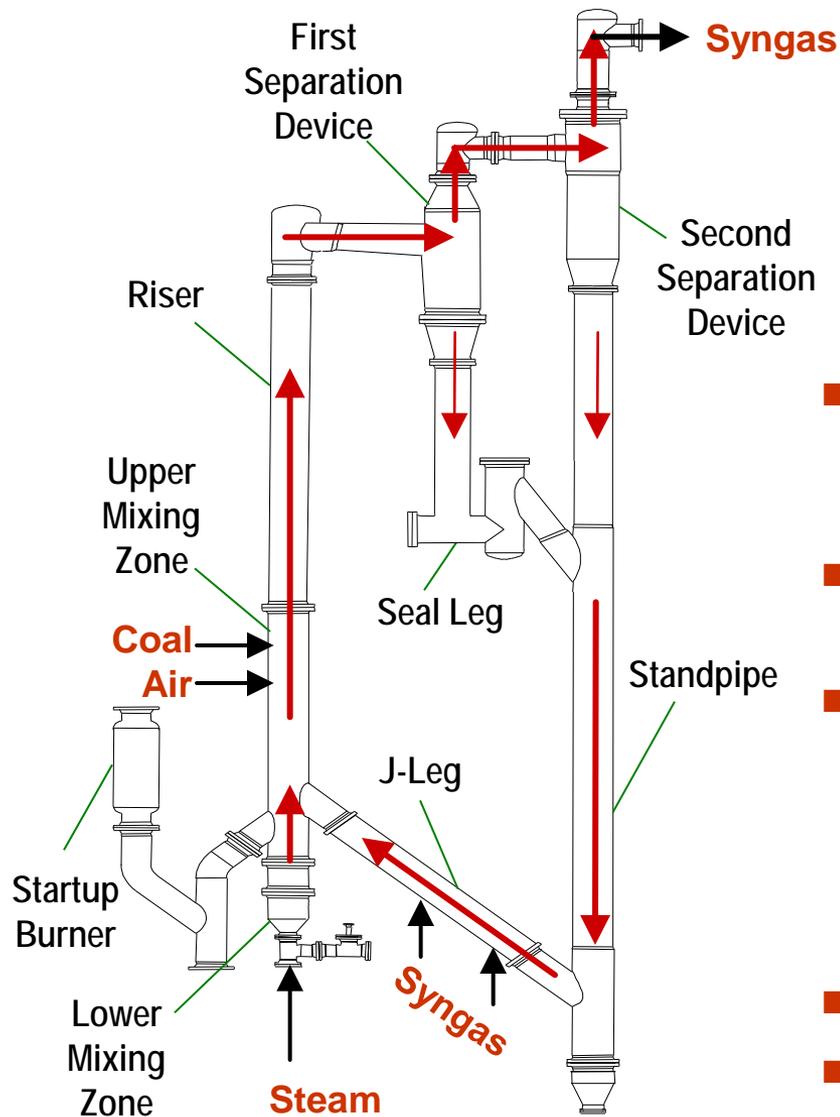
- 2x1 Integrated Gasification Combined Cycle (IGCC)
 - 2 TRansport Integrated Gasifiers (TRIG™)
 - 2 Siemens SGT6 - 5000F CTs
 - 1 Toshiba Steam Turbine (Tandem Compound Double Flow)
 - 582 MW peak and 524 MW on syngas
 - Selexol for H₂S and CO₂ removal
 - 65+% CO₂ capture (~800 lb/MWh emission rate)
 - Mine Mouth Lignite
- Owner & Operator: Mississippi Power
- Over \$2 billion capital investment
- Commercial Operating Date: May 2014
- Use treated effluent from Meridian as makeup water
- By-Products (TPY)
 - ~3,000,000 - Carbon dioxide used for EOR
 - ~135,000 - Sulfuric acid
 - ~20,000 - Ammonia



Kemper Lignite Composition				
		Average	Min	Max
Heat Content	btu/lb	5,290	4,765	5,870
Moisture	%	45.5	42	50
Ash	%	12.0	8.6	17
Sulfur	%	1.0	0.35	1.7

TRIG™

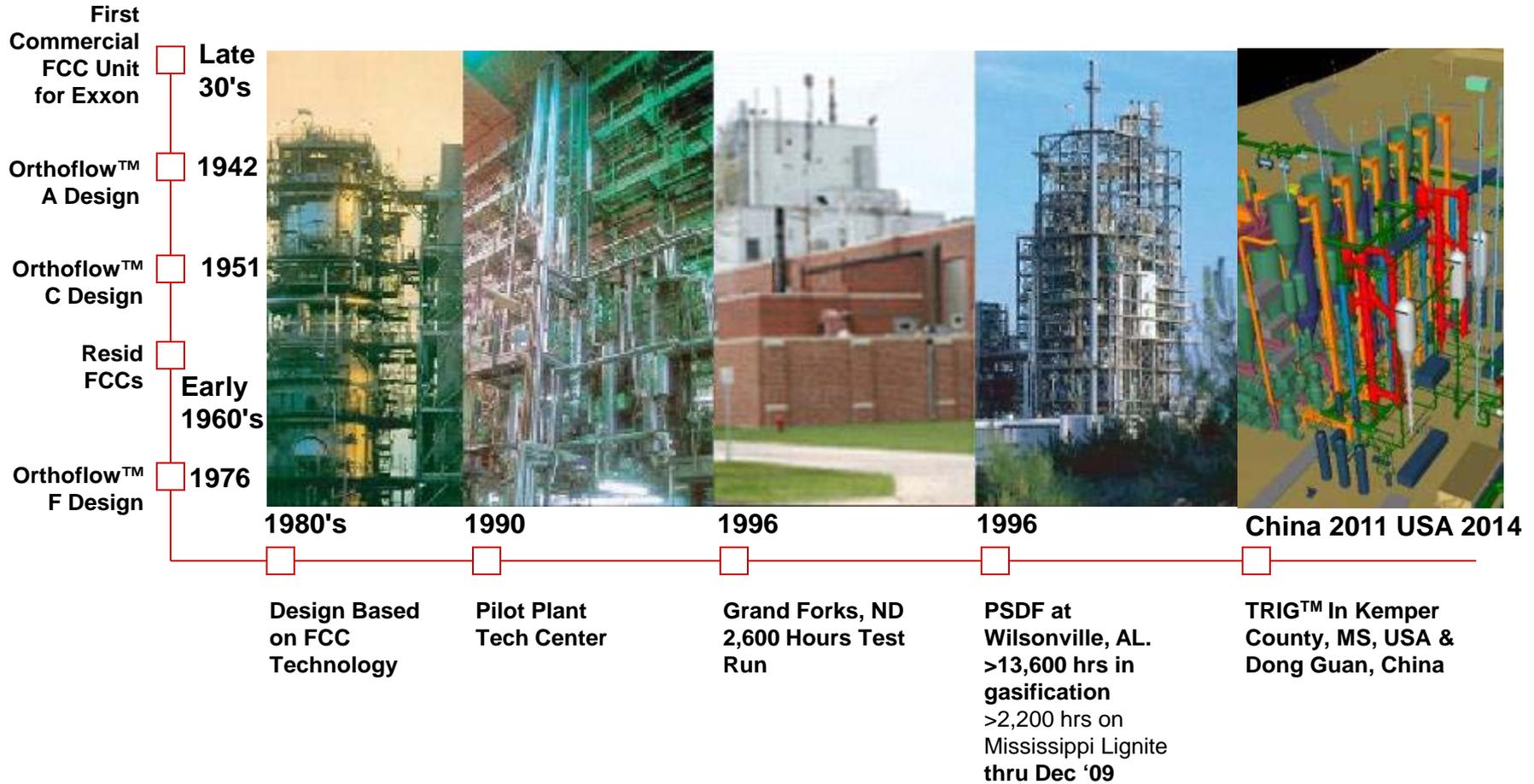
Attributes/ Advantages



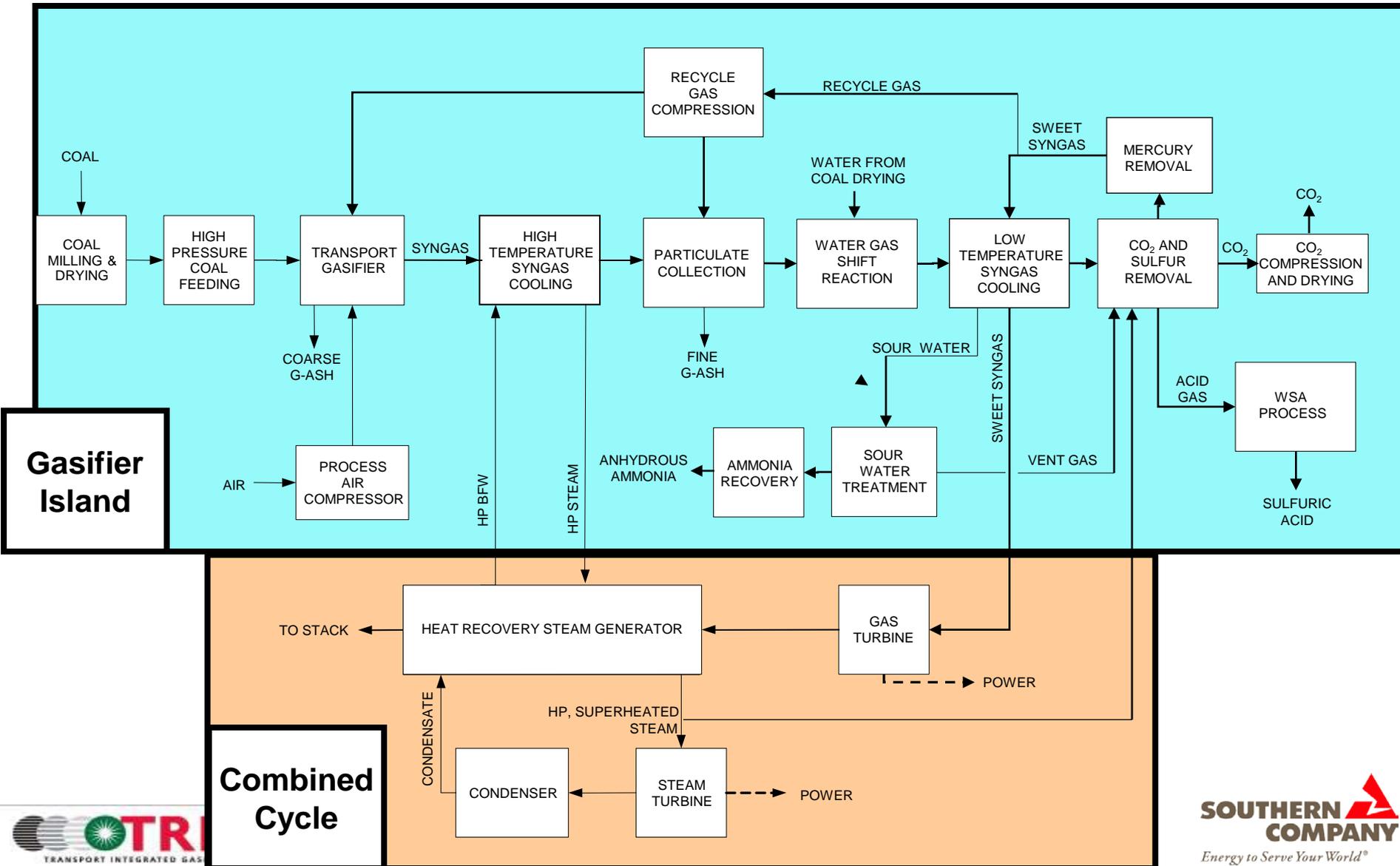
- **Simple, Well Established Design**
 - Based on technology in use for 70 years
- **Air-Blown Design for Power Generation**
- **Moderate Gas Temperatures**
 - Less expensive materials of construction
 - 10-20 year refractory life
 - No slag – ash leaves as a powder
- **Dry Feed ideal for High Moisture Fuels**
- **Lower Cost Carbon Capture Compared to PC**

Development of the Transport Coal Gasifier for Power and Chemical Production

TRIG™ Leverages Long History of Fluid Catalytic Cracking (FCC) Expertise



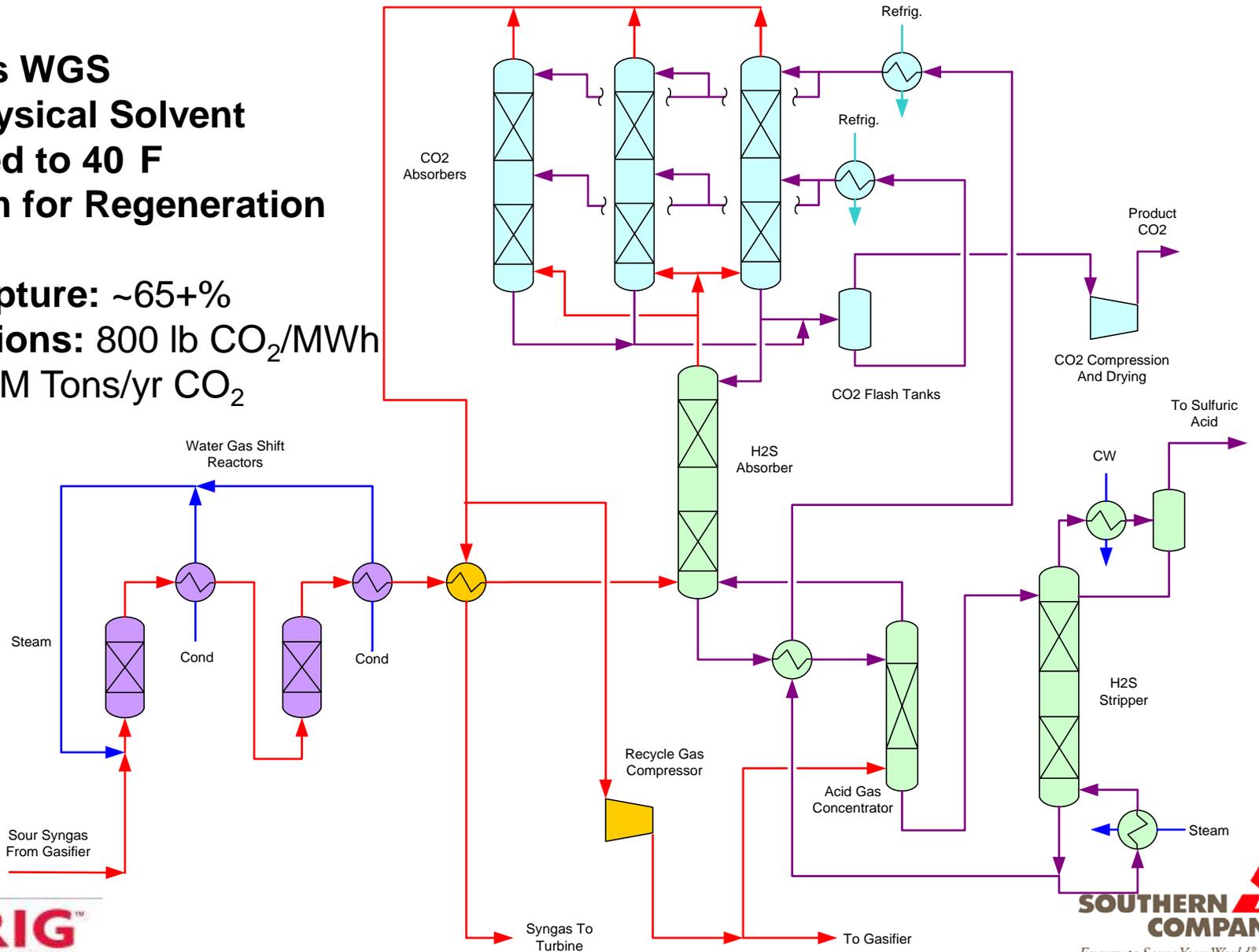
Summary Flow Diagram



CO₂ Capture Scheme

Two Stages WGS
Selexol Physical Solvent
Refrigerated to 40 F
Less Steam for Regeneration

Carbon Capture: ~65+%
CO₂ Emissions: 800 lb CO₂/MWh
Yield: >3 MM Tons/yr CO₂

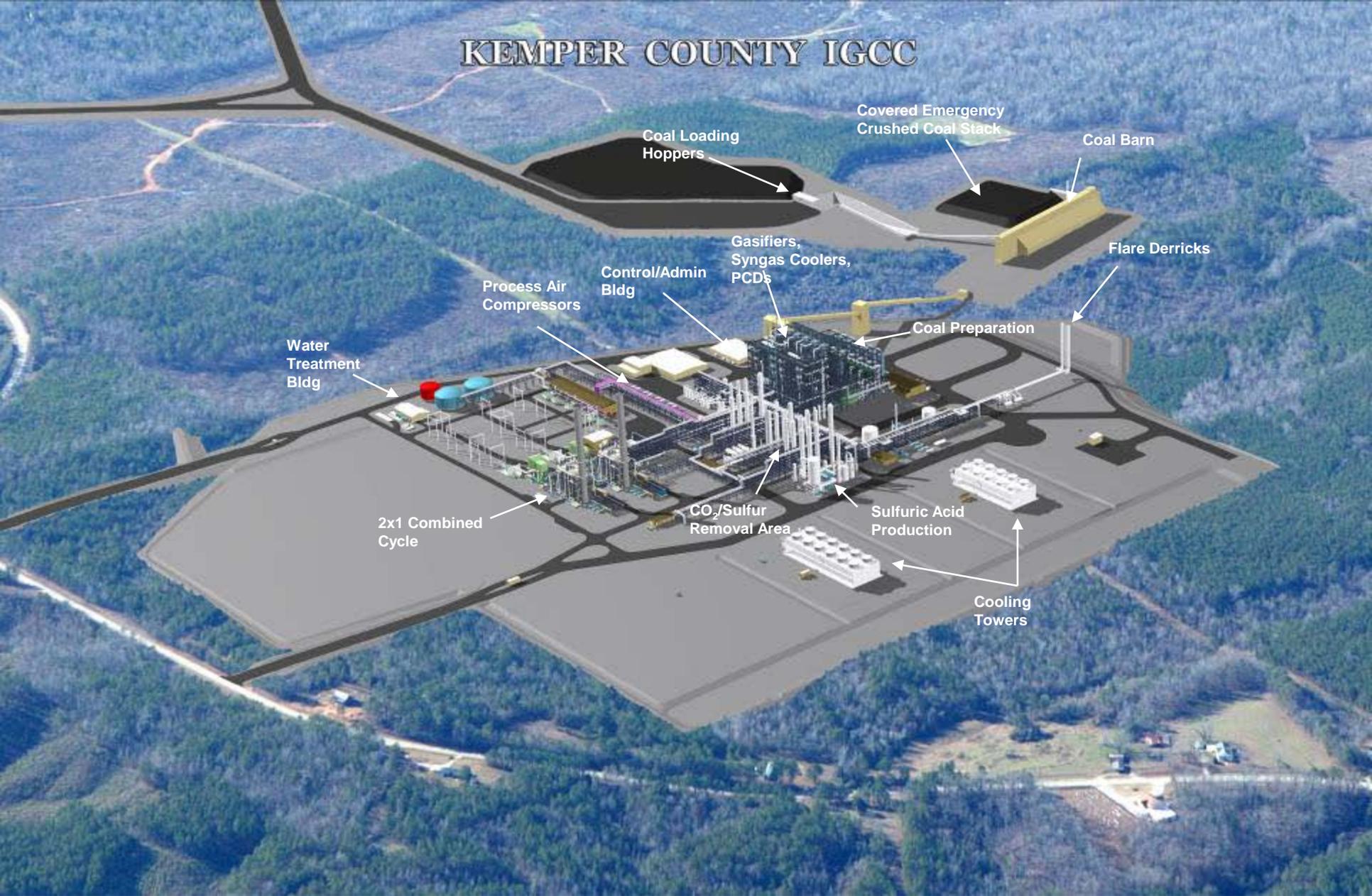


Project Status

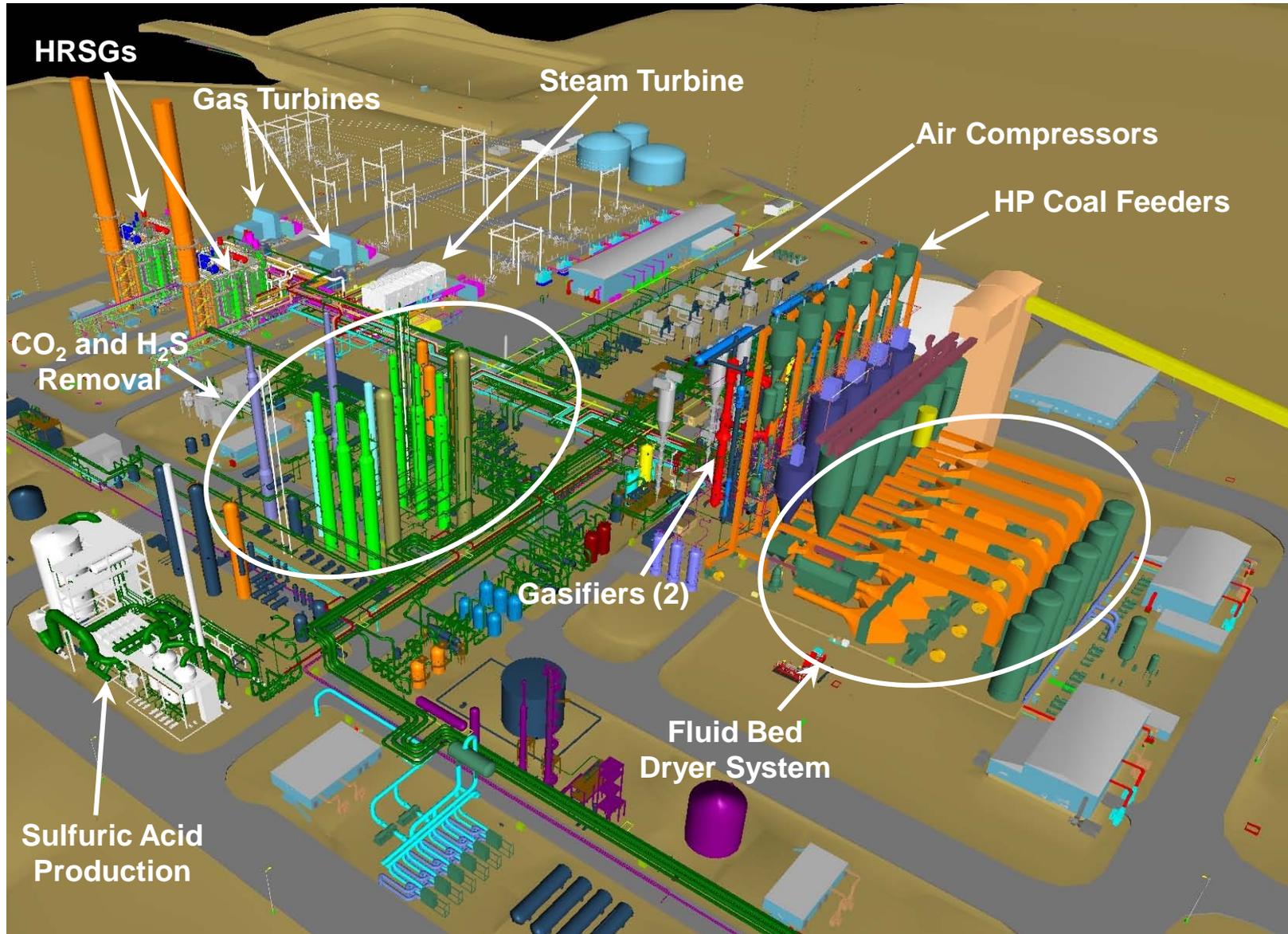
- On June 3, 2010, the Mississippi Public Service Commission certified the project.
- Construction began after PSC certification.
- DOE has issued a Record of Decision on for the NEPA process.
- MDEQ issued the final PSD permit on March 9, 2010.
- **Procurement:** Most major equipment awarded or awards pending.
- **Construction:** Land clearing underway.



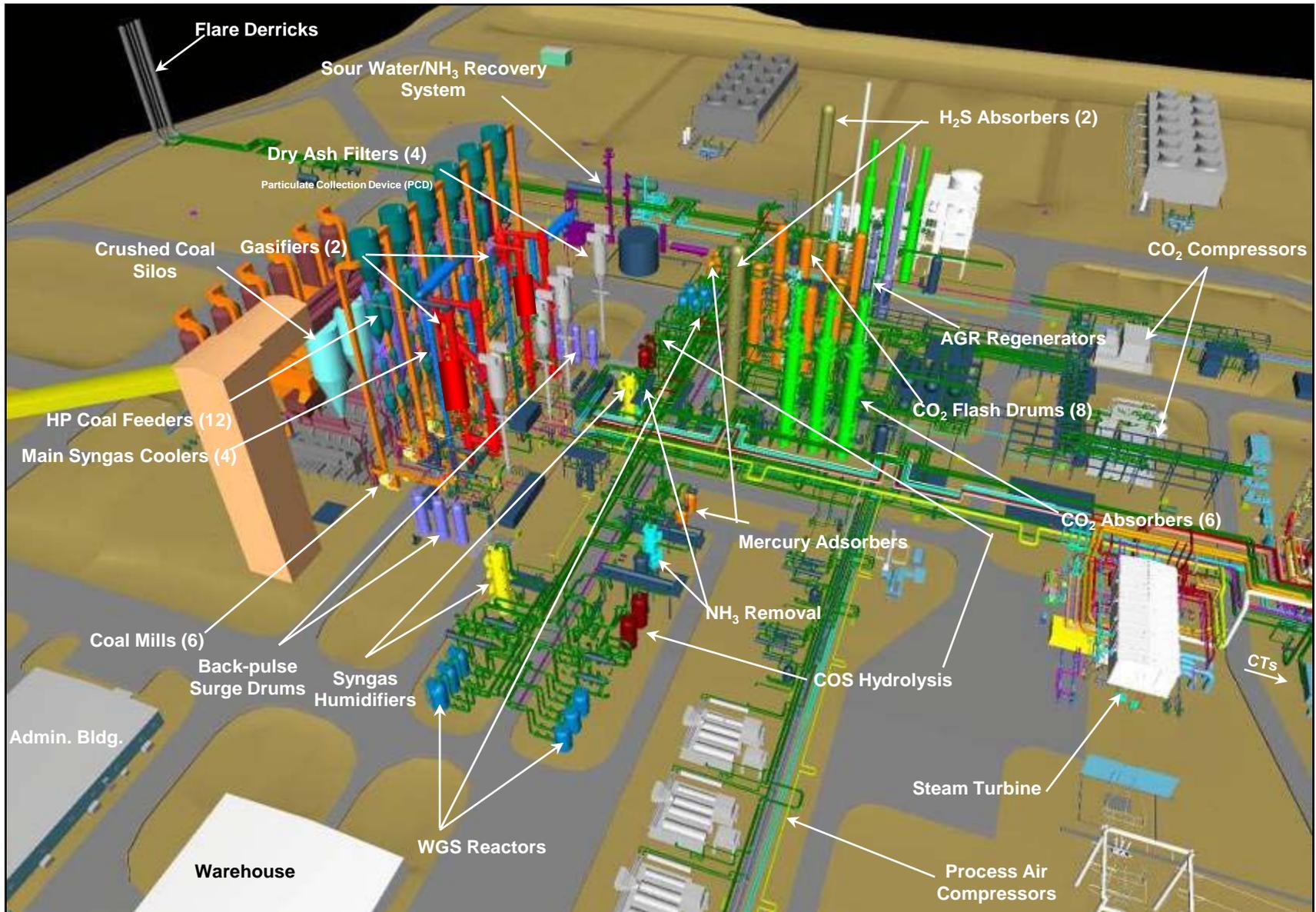
KEMPER COUNTY IGCC



Kemper County TRIG™ 3-D Perspective



Kemper County TRIG™ 3-D Perspective



Summary

- The Transport Gasifier, a key component of the Kemper County IGCC project, provides superior performance for power generation from high moisture, high ash coals due to its dry feed, moderate temperatures, and air-blown design.
- The facility will use Selexol coupled with two stages of water-gas-shift reaction, resulting in a CO₂ emission rate of 800 lb/MWh (a nominal 65% reduction).
- The Kemper County IGCC project is a large undertaking with high visibility and will help set the stage for future coal-based power generation.