Additional Capabilities to Carbon Capture Demonstration Unit

2020 Internship Showcase

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Background

- RTI International is developing a CO_2 capture system for natural gas (NG) and coal-fired power plants

- New operative chemical is promising, but the system needs further validation before future scale-up.
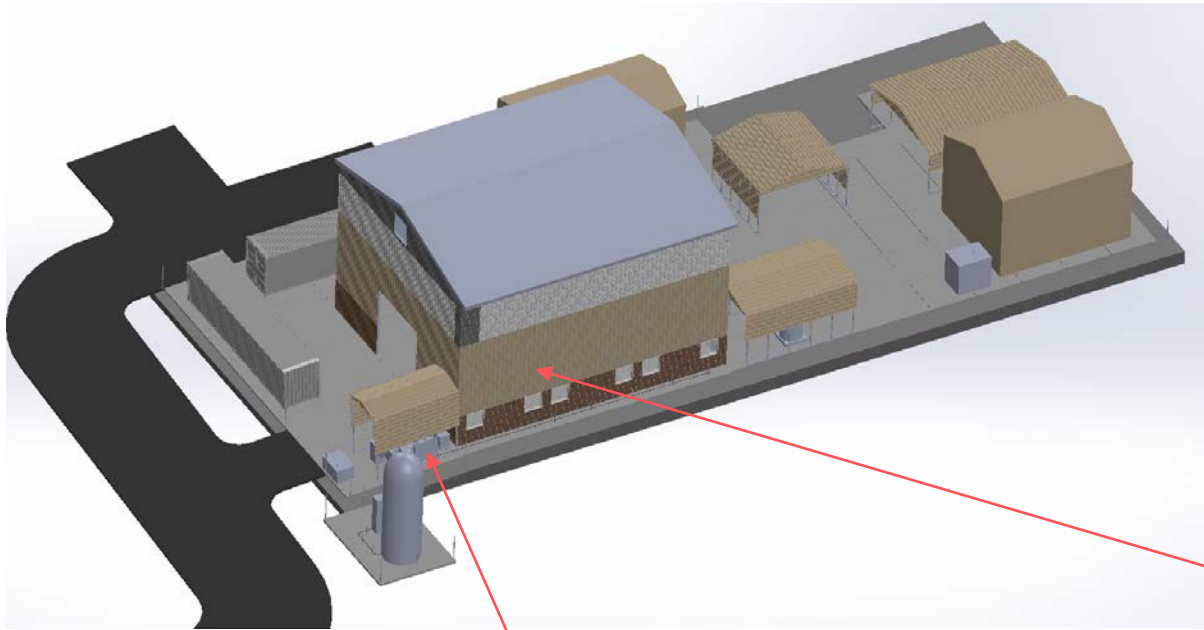
- Current testing is at bench scale.

Carbon Capture Demonstration Unit Addition Goals

- Improve the system fidelity in representing actual operating condition
- Switch from simulated to real flue gas
- Add small-scale coal and NG burners

- Where do we put the burners?

- How do we integrate them with the existing system?
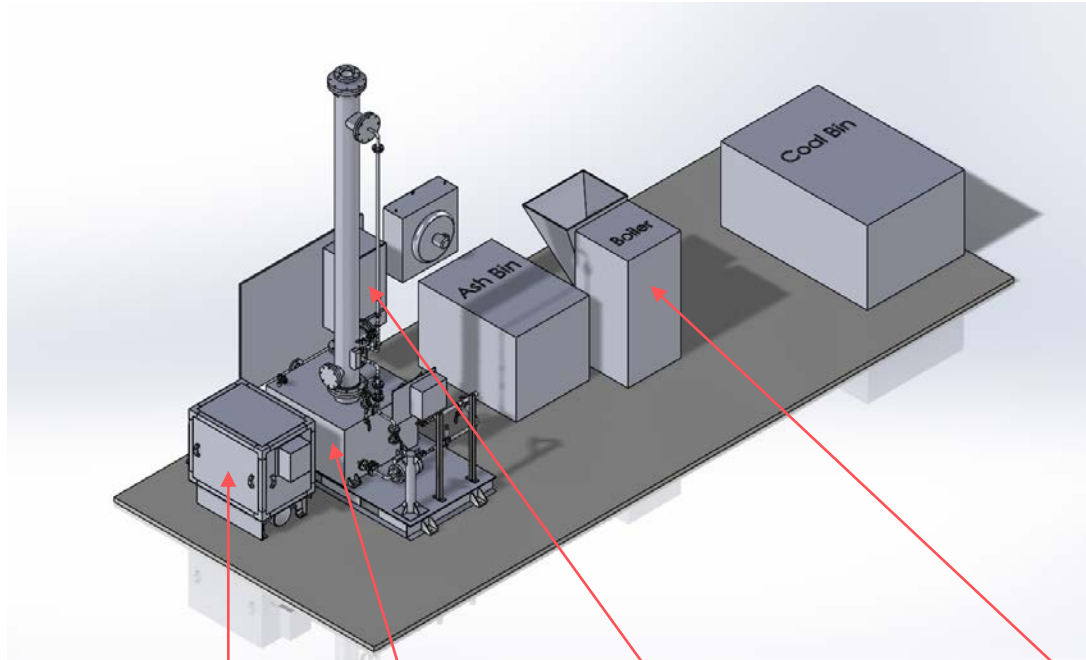
Burner Addition Placement

Burner addition

o Test facility rough 3D model

o Used to place burner system and size shed

Energy Technology Design Facility—test stand primary housing

Burner Addition Layout

o Burner addition layout subassembly

o Used to determine component placement within allocated space

o Interconnects not shown

Blower

NG Burner

Coal Burner

Direct Contact Cooler

Additional Deliverables

o Cumulative design and installation document

- Compiled information from supplier documentation

- Record of design decisions

o Supporting spreadsheets

- Emission predictions to determine CO_2 and contaminant output

- Heat sink performance

- Pipe sizing calculations for designing interconnects

Acknowledgments

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o RTI University Collaboration Office

o Dr. Marty Lail

o Dr. Paul Mobley

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o Dr. Jak Tanthana

o Lucas Cody

Image Sources

- Exhaust stack: https://www.gettyimages.com/detail/photo/industrial-factory-chimney-emitting-smoke-and-gas-royalty-free-image/1206052423?adppopup=true

- Burning coal: https://www.gettyimages.com/detail/photo/fire-in-stove-royalty-free-image/1180261651

- 3D models and their images were created by the presentation author.

Thank you

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