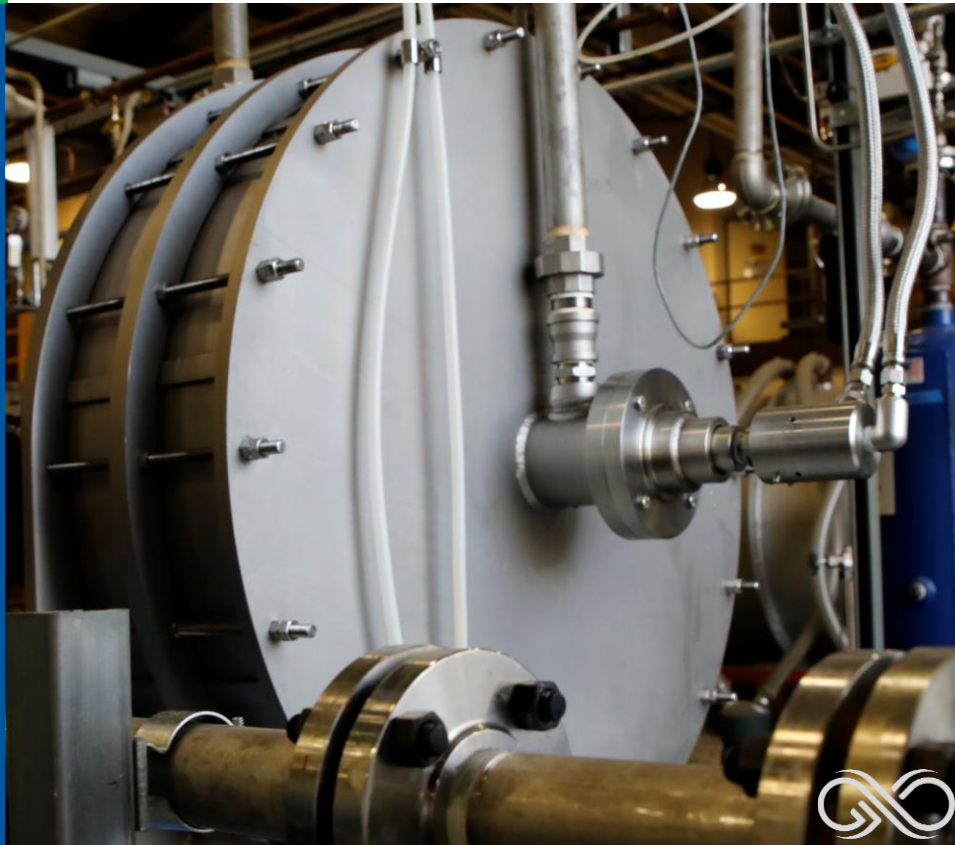




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ROTA-CAP™: Engineering-Scale Testing of Carbon Capture Technology in Industrial Iron and Steel Production

Osman M. Akpolat, GTI Energy

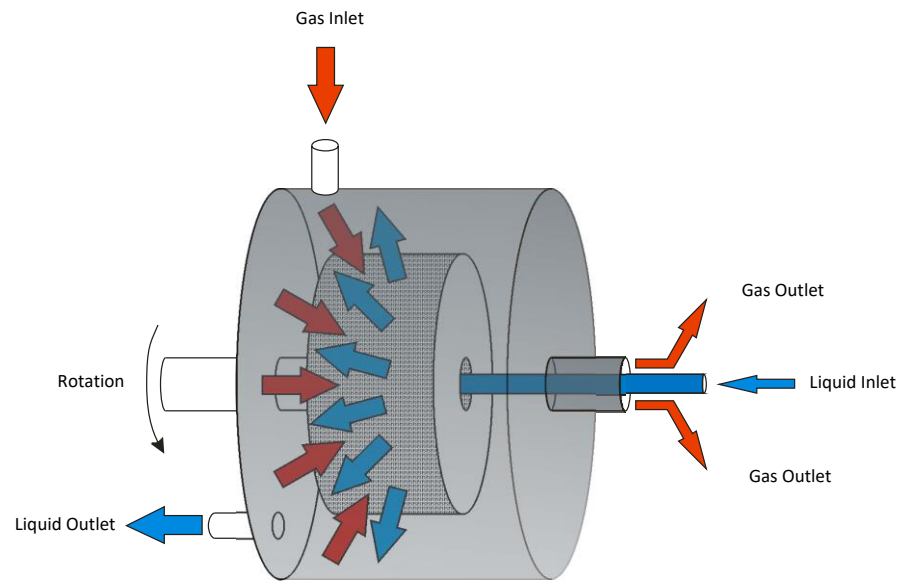
U.S. Department of Energy
National Energy Technology Laboratory
Carbon Management Project Review Meeting
August 5th -August 9th , 2024

DOE Contract No. DE-FE0032466

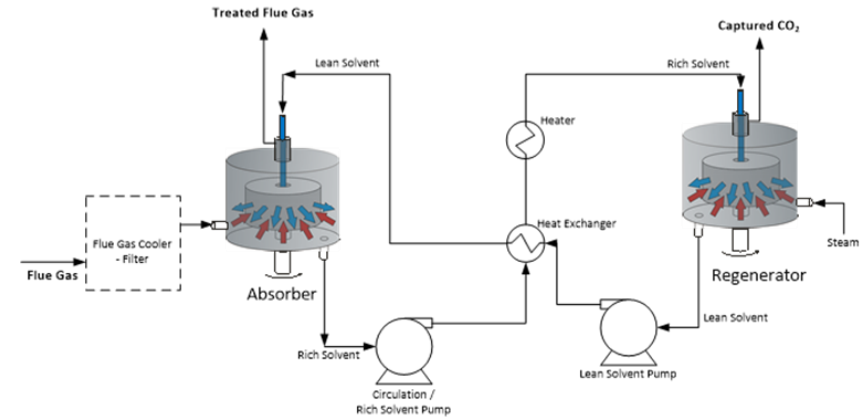


ROTA-CAP™ – Process Intensification (PI)

- ROTA-CAP™ uses compact rotating packed bed (RPB) absorbers and regenerators for contacting flue gas with an advanced solvent for carbon capture



COUNTER CURRENT CONTACT



ROTA-CAP™ Absorber and Regenerator

DE-FE0032466 – Host Site and Team

- Project host site: **U. S. Steel’s Edgar Thomson** industrial iron and steel production facility in Braddock, PA.
- ROTA-CAP testing skid will be designed, fabricated, and tested with **blast furnace stove stack gas** (~20% CO₂ vol.).
- **LETA**, are investors in technologies critical to reducing carbon emissions from industry and meeting international climate commitments. They invest in technologies that significantly reduce carbon emissions.
- **Holcim**, a leading cement producer, will help consult and provide input from the perspective of CO₂ capture technology users and assess potential future applications in the cement industry.
- **Enbridge**, the largest gas distribution utility in the Americas, that provide decarbonization solutions to their customers, will help consult and provide input from the perspective of users across highly-relevant industrial sectors.

KEY PERSONNEL / ORGANIZATIONS

Mr. Osman Akpolat, Dr. Shiguang Li, Dr. Elizabeth Kocs / GTI Energy

Ms. Brenda Petrilena, Mr. Neil Pergar / U. S. Steel



DE-FE0032466 - Project Summary

PROJECT SUMMARY

- Test an engineering-scale ROTA-CAP CO₂ capture system on real flue gas conditions at U. S. Steel's Edgar Thomson industrial iron and steel production facility in Braddock, PA
- Design, fabricate, and test at 3TPD scale with blast furnace stove stack gas.
- Develop validated process models and use them to establish and modify the experimental plan.
- Operate continuously and at steady-state for a minimum of two months with $\geq 95\%$ carbon capture efficiency and 95% CO₂ purity.
- Perform engineering reviews to de-risk the mechanical design of the rotating equipment.



RPB pilot testing at 3 TPD scale at iron and steel production facility and scale up of dual RPB single shaft design to further intensify carbon capture process.

Period of Performance: August 2024 to October 2027

BP 1: 8/1/2024 – 5/31/2025

BP 2: 6/1/2025 – 7/31/2026

BP 3: 8/1/2026 – 10/31/2027

FUNDING SUMMARY

Federal Funds Requested	\$7,000,000
Cost Share	\$1,750,000
Total Project Cost	\$8,750,000



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