IEAGHG 8th Post Combustion Capture Conference

16th to 18th September 2025 Marseille, France

Membrane and solid adsorbent testing plus infrastructure upgrades at the Wyoming Integrated Test Center

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Abstract

The Wyoming Integrated Test Center (ITC) is a public and private partnership managed by the University of Wyoming School of Energy Resources and located at Basin Electric Power Cooperative's Dry Fork Station in Gillette, Wyoming. The ITC was initially funded by the state of Wyoming, Tri-State Generation and Transmission Cooperative, and the National Rural Electric Cooperative Association.

The ITC is one of two technology neutral post combustion CO2 capture test facilities in the United States and focuses on larger scale pilot projects that are typically 10 to 400+ tonnes per day of CO2. The ITC has hosted numerous projects that have scaled up from research performed at Southern Company's National Carbon Capture Center. These projects include the world's largest membrane based post combustion capture pilot by Membrane Techhnology and Research as well as another facilitated transport membrane project by GTI Energy and the Ohio State University.

Additional testing at the ITC included a thorough investigation of potential environmental impacts of supported amine sorbents by Kawasaki Heavy Industries and Japan Carbon Frontier Organization with funding from the Japanese Ministry of Environment.

Furthermore, the ITC has been selected as a host site for TDA Research's large scale solid adsorbent pilot which is in the FEED stage. The project would capture up to 500 tonnes per day of CO2 using TDA's proprietary sorbent and radial fixed bed technology which is currently being refined at smaller scale at the ITC.

Finally, the ITC has been selected for award negotiation by the U.S. Department of Energy (DOE) for infrastructure improvements including the ability to simulate a range of industrial gas compositions including natural gas combined cycle power plants. These upgrades will allow ITC to provide a broader range of capability to technology developers and reduce deployment costs by facilitating testing over a range of industrial conditions.

This paper will provide an update on testing activities, infrastructure improvements, and lessons learned from testing novel CO2 capture technologies. Additional lessons learned supporting technology development and completing environmental testing will be shared with the research community to help improve the effectiveness of future post combustion CO2 capture technology development.

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Keywords: Membranes; solid adsorbents; coal; natural gas; CO2 capture; environmental impacts; minimum 1 page, maximum 4 pages inclding diagrams and references.