INTERNATIONAL EFFORTS OF THE NATIONAL CARBON CAPTURE CENTER

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The National Carbon Capture Center (NCCC) at the Power Systems Development Facility (PSDF) is a cost-effective, flexible test center for evaluating the critical components of advanced CO₂ capture and power generation technologies. Hosting technology developers from around the world, including premier research organizations, universities, and engineering firms, the NCCC offers state-of-the-art facilities, an expert staff, and a proven track record. Managed and operated by Southern Company for the U.S. Department of Energy (DOE), the center was established in 2009 to build on the experience and infrastructure in place at the PSDF, which successfully developed the Transport Integrated Gasification process for commercialization.

The NCCC facilities include the Post-Combustion Carbon Capture Center (PC4), located at Alabama Power’s E.C. Gaston power plant, and a pilot coal gasification plant, which houses pre-combustion CO₂ capture test sites. Evaluation of developing technologies using coal-derived gas under industrial conditions provides critical information on material and process suitability for scale-up to commercial applications. Because of the ability to operate under a wide range of flow rates and process conditions, research at the NCCC can simultaneously evaluate a number of technologies at various levels of maturity, thereby accelerating the pace of development.

Reduction of CO₂ emissions is an international issue, requiring international solutions. The NCCC has been active in establishing test collaborations with international groups, supporting technology developers from seven countries to date. The NCCC has also assumed leadership and is the current host site of the Carbon Capture International Test Center Network (ITCN). Formed in 2012 in collaboration with DOE’s Office of Fossil Energy, the ITCN facilitates knowledge-sharing among carbon capture test facilities around the world to accelerate the commercial deployment of carbon capture technologies.

ITCN membership includes operators of major CO₂ capture test sites—CO2CRC’s Otway Research Project, CSIRO’s Loy Yang and Tarong test centers, E.ON’s Wilhelmshaven power plant, Huaneng’s Clean Energy Research Institute, KEIR’s Hadong and Boryeong test centers, Norway’s CO₂ Technology Centre Mongstad, SaskPower’s Shand Power Station, SINTEF’s Tiller facility, the U.K.’s Pilot-Scale Advanced Capture Technology facilities, and from the USA, the NCCC, the University of North Dakota Energy & Environment Research Center, and the University of Kentucky Center for Applied Energy Research.

The shared knowledge of the ITCN is expected to contribute significantly to the development of cost-effective, commercial CO₂ capture technologies. With semi-annual workshops, ITCN members have tackled critical issues of post-combustion capture such as emissions and degradation of amine-based solvents, permitting requirements, and control of aerosol formation. Results of the in-depth studies conducted by the network will be published for public benefit.

This presentation will detail the international collaboration efforts and future plans of the NCCC and the ITCN.