INTERNATIONAL CCS KNOWLEDGE CENTRE

CARBON CAPTURE TEST FACILITY 'REAL WORLD' TECHNOLOGY VALIDATION AND EVALUATION

The International CCS Knowledge Centre offers a unique, 'real-world' opportunity to test existing and new technology innovations, including associated knowledge and understanding, to improve operational efficiency of capture systems.

At the International CCS Knowledge Centre, we provide the ability to test technology advancements, so that challenges can be overcome – leading to the development and rapid commercialization of next generation post-combustion capture technologies.

The Carbon Capture Test Facility (CCTF) is a demonstration-scale test facility that enables long-term technology evaluation utilizing up to 120T/day of CO₂ captured directly from the Shand Power Station, a coal-fired power generating facility operated by SaskPower near Estevan, Saskatchewan, Canada. Technologies at Technology Readiness Levels (TRL) 4 to 7 may be tested at the facility.

THE CCTF IS FULLY INSTRUMENTED = EFFECTIVE PERFORMANCE PREDICTIONS

The CCTF is fully instrumented and enables testing and sampling to serve as a foundation for effective process control tool development and process simulation model development to ensure effective performance predictions.

The following capabilities are available:

• In-line laser interference monitoring of scrubbed flue gas constituents prior to capture solvent system

- Manual gas sampling ports on each major component (downstream) – scrubber, desorber, reflux drum – for probe analysis with portable equipment or sample collection for lab analysis
- 18 sample ports for solvent collection and analysis
- In-line monitoring of T, P, mass flow rate
- Manual stack monitoring and sampling



The CCTF can be used to test the long-term performance of amine solvents for carbon capture, following FGD/ DCC SO₂ capture. The system includes:

- solvent absorber
- solvent desorber
- reboiler
- reflux drum
- solvent reclaimer



Figure 1 - CCTF Process Flow Diagram

AVAILABLE TEST VARIATIONS

The following test variations are possible, potentially with equipment reconfiguration:

- capture solvent testing (amine or non-amine based)
- solvent absorber tower packing
- custom SO₂ capture system
- introduction of contaminants into combustion flue gas to determine impact on carbon capture efficiency and solvent degradation (*e.g. to mimic reaction pathways*)
- combustion flue gas conditioning to remove problematic constituents from capture systems
- parametric testing using different flue gas flow rates, different solvent circulation rates

ANTICIPATED OUTCOMES

The outcomes of testing at the CCTF will help determine energy requirements, lifecycle costs, combustion flue gas conditioning requirements (if any), solvent operating costs under different operating conditions, and safety and environmental impacts of process streams including the capture unit's flue gas emitted to the atmosphere.

CAPACITY & KNOWLEDGE TRANSFER

The International CCS Knowledge Centre through the learnings offered at the CCTF offers a unique opportunity to train future CCS experts on 'real-world' operations in an industrial environment.

To conduct a test variation or campaign at the CCTF, contact the International CCS Knowledge Centre at:

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