The CCP Collaboration Project –
Phase 3 Results and Phase 4 Plans

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NorTex CO₂ EOR Symposium Meeting
5th October 2015
CCS is the only technology that could enable continued large-scale use of fossil fuels in a tightly carbon constrained world.
CCP4 “Advancing CCS technology deployment and knowledge for the oil and gas industry”

“Project Delivery Focus”

“Field/plant access for pilot/demo’s”

“Company Expert Collaboration”

“Mid TRL level technology development”

“Independent Verification of Cost and Performance”

“Global network of external partners”

“Technology Agnostic”

“Effectively managed and run”

CCP1
2000-2004
Screening/proof of concept

CCP2
2004-2009
Intensive development

CCP3
2009-2014
Demonstration phase

CCP4
2014-2019
Further Advancement
CCP3 Capture Program

**Program Objective:** Move CCS towards commercial deployment by
- Increasing technical and cost knowledge
- Development support for technologies to reduce CO₂ capture costs by 20-30%

**Scenarios**
- Refinery: FCC, heaters and boilers (H& Bs), SMR
- Heavy Oil: Once-through steam generators (OTSGs)
- NGCC

**Approach**
- Perform independent assessment of novel capture technologies
- Support lab, bench and pilot scale studies
- Carry out detailed economic assessment of select technologies

**Results at a Glance**
- 21 Technical Studies by Foster Wheeler
- 2 Demonstrations (oxy-fired FCC, oxy-fired OTSG)
- 4 bench/pilot projects (oxy-burner testing, Pd membrane, CLC, enzyme post-C)
- 1 pilot test post-C solvent screening program (EERC)
- 5 preliminary evaluations of novel technologies
- 24 in-house economic evaluations

Images courtesy of Petrobras and Cenovus Energy Inc.
CCP3 Storage Program

Program Objective: Verify Safe and Secure Storage by
- Verifying subsurface processes
- Risk assessment & economic analysis of storage

Approach
- Support lab, bench and pilot scale studies
- Carry out detailed desk-top studies and economic assessment

Results at a glance
- The Field Trialing effort laid out in 2009 was ambitious but accomplished with the exception of a microseismic trial.
- CCP3 began the first systematic approach to contingencies, ranging from modeling/simulation to experiments and a detailed bench/field test design.
- Subsurface processes studies involving experiments revealed phenomena that may be worth further investigation:

Successful diagnosis of pressure bleed off issue – i.e., DTS showed fluid influx above packer due to off depth perforations, not the MBM assembly (B Freifeld, LBNL & R Trautz, EPRI)
Program Objective: Inform the development of legal and policy frameworks through by

- Technical and economic insights
- Project experience of regulatory processes

Results at a Glance

- Local community benefit sharing Study, 2011 - Local community benefit sharing can help to address the potential imbalance between local costs vs. national or international benefits associated with some major developments
- Regulatory Study, 2012 – Update of regulatory issues facing CCS projects, documented lessons learned and found that pathways for approval do exist
Knowledge Sharing
www.co2captureproject.org

Conferences

Public engagement
www.ccsbrowser.com

- UNFCCC (Side events)
  - COP 16/17/18/19 in MX, ZA, QA, PL
- GHGT (Sponsor/Exhibitor/Presenter)
  - GHGT10/11/12 in USA, JP, NL
- CCUS Conference (Partner/Exhibitor/Presenter)
  - March 2009-2014 in Pittsburgh, PA
- CSLF (Recognized Project/Exhibitor/Presenter)
  - 4-7th November 2013 in Washington, DC
- CO2 Conference Week (Sponsor/Presenter)
  - December 2012-2014 in Midland, TX
Tactical Demonstration (short-medium term)
Capture: Incremental Improvement Technologies, NG Treating
SMV: Pilot/Demo scale of scientific fundamentals, Utilization
P&I: Regional Incentives & Global Regulations
Comms: Industry Knowledge Sharing

Strategic Deployment (medium-long term)
Capture: Breakthrough Technologies, NG Power/Cogen
SMV: Basin Scale Development and Operation
P&I: FOAK to NOAK Pathway
Comms: External Stakeholder Engagement

Advancing CCS
CCP Conclusions

• Post combustion capture technologies have seen some recent improvements, but what does the future look like versus alternatives, and will this achieve the end goal?

• There are some promising technology solutions to dramatically reduce capture costs & cost effectively verify safe/secure storage at scale, so R&D needs to continue

• CCP looks to build on its experience & expertise, welcome new partners and collaborate with others to ensure success
Questions?

CCP is the oil and gas industry’s answer to find & develop cost effective and sustainable CCS technologies

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