Overview of the Fort Nelson CCS Project

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The Plains CO_2 Reduction (PCOR) Partnership, led by the Energy & Environmental Research Center (EERC), and Spectra Energy Transmission (SET) are investigating the feasibility of a carbon capture and storage (CCS) project to mitigate carbon dioxide (CO_2) emissions produced by SET's Fort Nelson Gas Plant (FNGP), British Columbia, Canada. The gas stream produced by FNGP will include up to 5% hydrogen sulfide (H2S) and, therefore, is referred to as "sour" CO_2. The proposed injection target is a carbonate formation at a depth of approximately 2200 meters, with thick overlying shales serving as seals. The Fort Nelson CCS project provides a unique opportunity to develop a set of cost-effective, risk-based monitoring, verification, and accounting (MVA) protocols for injection of at least 1 million metric tons of sour CO_2 a year. The results of the Fort Nelson activities will provide insight regarding 1) the behavior of sour CO_2 in a carbonate reservoir, 2) the effects of large-scale sour CO_2 injection and storage on wellbore integrity, and 3) the effectiveness of selected MVA techniques. Results suggest that the geology in the vicinity of FNGP is amenable to large-scale geologic storage of CO_2. However, additional work must be done to confirm the integrity and capacity of the proposed storage reservoir. An iterative update process including site characterization, modeling and simulation, risk assessment, and MVA, is being conducted to ensure regulatory compliance and project safety.

The Gas Plant:

- The Fort Nelson gas plant has a 1 Bcf/d raw gas processing capacity – largest facility of its kind in North America.
- Spectra Energy gathering and processing assets are strategically positioned in the growing Horn River Basin, processing both conventional and unconventional shale gas resources.
- The proposed Fort Nelson CCS project is a potential solution to mitigate CO_2 emissions as shale gas productions grows.

Integrated CCS Opportunity:

- Fort Nelson gas plant is currently capture ready.
- CCS completes the capture process (CO_2 point source and sink in relative close proximity).
- Potential to inject up to 2.2 Mt/year when plan is at full operating capacity.
- If approved, under the current plan injection is scheduled to begin in 2016.

Status

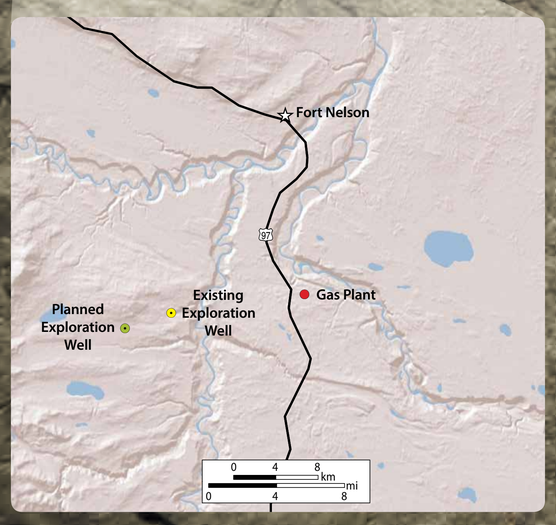
- Drilled exploration well winter 2008/2009
- Cored and logged exploration well
- Laboratory analysis of core
  - Petrological
  - Geomechanical
  - Geochemical
- Reentered the exploration well for testing in winters of 2009/2010 and 2011/2012
- Acquired existing 2-D and 3-D seismic data
- Completed two rounds of modeling
- Completed two rounds of risk assessment
- Developed surface & shallow subsurface MVA plan

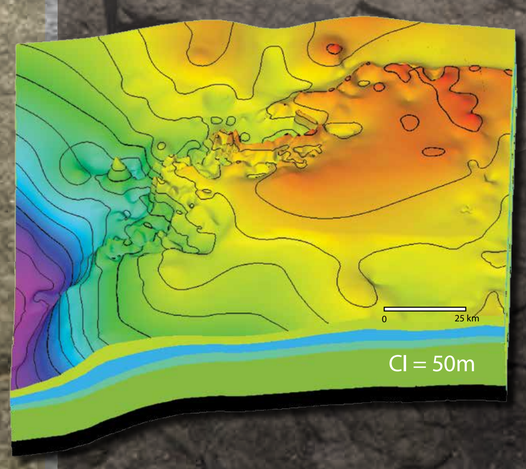
Next Steps

- Continue developing deep subsurface MVA plan based on modeling and risk assessment results
- Drill a second xploration well
- Shoot 3-D seismic survey
- Test materials from second xploration well for geomechanical, geochemical, and petrophysical properties
- Update geologic model based on additional data
- Rerun predictive simulations
- Conduct a third round of risk assessment
- Adjust MVA plan

An integrated approach to site characterization, modeling, and risk assessment can:

- Lead to an effective site specific monitoring program.
- Identify data gaps in site characterization.
- Increase the likelihood of project success by identifying and mitigating potential risks.





Feasibility testing and modeling to date shows the capability of delivering the following.

Required storage capacity

- Hydrogeology – supports capacity
- Modeling – 50+ years of injection
- Existing water disposal schemes

Permeability and injection capability

- 600+ mD permeability (in situ testing)
- Low number of injection wells required
- Good pressure dissipation

Excellent containment

- Stable tectonics
- 1800+ ft thick, impervious shale cap rock
- Postinjection – large pressure falloff in 10 years; reduces to near-preinjection pressures in 40 years

PCOR Partnership 2003 – Present