

## PROJECT SUMMARY/ABSTRACT

**Project Title:** Many Stars Site Characterization Study  
**Applicant:** Big Sky Carbon Sequestration Partnership (BSCSP)  
**Principal Investigator:** Dr. Lee Spangler  
**Major Participants:** Many Stars, LLC, Crow Nation, Schlumberger Carbon Services, Los Alamos National Laboratory, Lawrence Livermore National Laboratory, DOWL HKM

**Project Objectives and Description:** The Big Sky Carbon Sequestration Partnership Regional characterization project is scheduled to commence on January 1, 2010. The project activities are scheduled to occur over a 3-year period and be completed December 31, 2012. The BSCSP regional characterization application includes assessment of existing data, drilling of two characterization wells, and modeling of the sequestration potential of target formations to facilitate a carbon mitigation plan for a planned 50,000+ barrel per day coal-to-liquids plant.

The proposed study is the initial geologic characterization that is required for a large volume sequestration project planned as part of the carbon mitigation plan for the Many Stars Coal-to-Liquids (CTL) project being developed by AAEC and expected to be operational by 2016. The Many Stars CTL plant will produce between 8MM to 14MM tons of CO<sub>2</sub> per year and is designed to capture approximately 90% of the plant's CO<sub>2</sub> emissions. The CO<sub>2</sub> will be sequestered in saline aquifers and/or provided (sold) to oil and gas operators for enhanced oil recovery (EOR). The characterization study will investigate the technical feasibility of carbon storage in the Paleozoic saline formations near the proposed plant site that are the focus of this project. A secondary goal is to demonstrate that saline formations present in the subsurface of the northwestern PRB of Montana are viable and safe targets for sequestration of the region's CO<sub>2</sub> emissions. This project will improve understanding of injectivity, capacity and storativity in regionally significant formations and will promote commercialization of carbon sequestration projects, such as that currently being contemplated by the Many Stars CTL Project.

BSCSP plans to drill two characterization wells in an area that has a sufficient amount of existing seismic data to site the wells to access the thickest portions of the target formations at locations unaffected by faulting. Well data north and west of the site indicate a high probability of encountering approximately 600 feet of combined thickness of the upper and lower Mission Canyon Formation, Lodge Pole and Big Horn Formations. These formations have been identified as regionally important sinks within the larger PRB.

In this study, BSCSP will refine and add detail to the characterization of saline formations and capacity estimates for southeastern Montana. Efforts will focus on developing a better understanding of subsurface geologic characteristics such as faults, fractures, aquifer salinity, rock type, permeability, porosity, thickness, areal extent, and reservoir compartmentalization. Characterization activities will include acquiring and analyzing new data regarding rock characteristics and water chemistry using laboratory experiments and surface geologic characterization of outcrops. Samples from these outcrops as well as from cores and well-cuttings samples will be used to determine petrography, mineralogy, injectivity, porosity, and permeability. This data will be used to refine capacity estimates. BSCSP will prepare a best practices manual that describes approaches characterization studies to promote commercialization of CCS.

This region hosts vast reserves of coal and is of national economic significance. The proposed project would create employment for nearly 100 people during the seismic and drilling phases, exclusive of current BSCSP employees. Once Australian-American Energy Company proceeds with development of the CTL plant, 3,000 – 4,000 construction jobs would be available during construction and 700 to 900 positions would become available for operation of the plant and the coal mine supplying the plant.