

BELL CREEK TEST SITE WELLBORE LEAKAGE DATA COLLECTION INITIATED

Plains CO₂ Reduction Partnership Phase III Task 4 – Milestone M8

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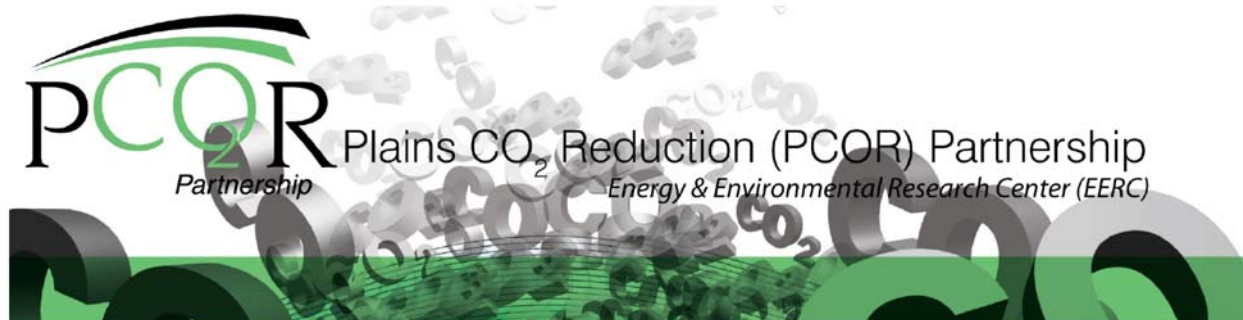
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BACKGROUND

The Plains CO₂ Reduction Partnership is working with Denbury Resources Incorporated (DRI) to determine the efficacy of developing a robust and practical monitoring, verification, and accounting (MVA); risk management; and simulation project associated with a commercial-scale injection of carbon dioxide (CO₂) for the purpose of simultaneous enhanced oil recovery (EOR) and storage of CO₂. A technical team that includes DRI, the Energy & Environmental Research Center (EERC), and others will conduct a variety of activities to determine the baseline geological characteristics and potential for leakage through existing wellbores in the vicinity of the injection site and surrounding areas. DRI will carry out the injection process while the EERC will conduct baseline characterization, modeling, and MVA activities at the site. The project, which will be conducted in the Bell Creek oil field in Powder River County in southeastern Montana, will provide insight regarding the impact of miscible CO₂ flood tertiary recovery on oil production and successful CO₂ storage sequestration within a sandstone reservoir in the Cretaceous Muddy Formation. The Bell Creek Project will be a unique opportunity to develop a set of cost-effective MVA protocols for large-scale CO₂ storage associated with an EOR operation.

The Bell Creek oil field is an ideal candidate for a CO₂ tertiary recovery project because of a number of factors. The primary reason is its depth of 4500 feet, which results in temperature and pressure conditions that will maintain the injected CO₂ in a supercritical state and allow for miscibility of the CO₂ in the oil. The secondary reason is the average permeability of the Bell Creek reservoir is 900 millidarcies, and its porosity averages 24 percent, allowing for high CO₂ injection rates and a fairly rapid production response. With respect to potential wellbore leakage, there are hundreds of existing wellbores in the Bell Creek oil field and many others in close proximity to the oil field. Identification and examination of data related to drilling, completion, operation and, where applicable, plugging of these existing wellbores is necessary to determine the potential for wellbore leakage and develop monitoring and mitigation plans to eliminate or minimize associated risks.

Wellbore Leakage Data Collection Initiated

A variety of activities focused on determining the potential for wellbore leakage in the Bell Creek oil field (Figure 1) and the surrounding area were initiated in the first quarter of Phase III – Year 4. These activities include the following:

- Publicly available well log data were obtained from the Montana Board of Oil and Gas Conservation.
- Well log data were used to identify the tops of key formations within the Bell Creek oil field and its surrounding area (Figure 2). Specifically, the tops for the Cretaceous Muddy Formation, which serves as the reservoir rock for the Bell Creek oil field, were identified. Potential seal formations were also identified.
- The well log data were used to create thickness isopach maps and identify major structural elements of the Bell Creek oil field.
- The acquisition of publicly available data on well drilling, completion, operation, and abandonment was initiated.
- A request for nonpublicly available data on well drilling, completion, operation, and abandonment was submitted to DRI. DRI is in the process of compiling its Bell Creek well data into a format that can be shared with the EERC.

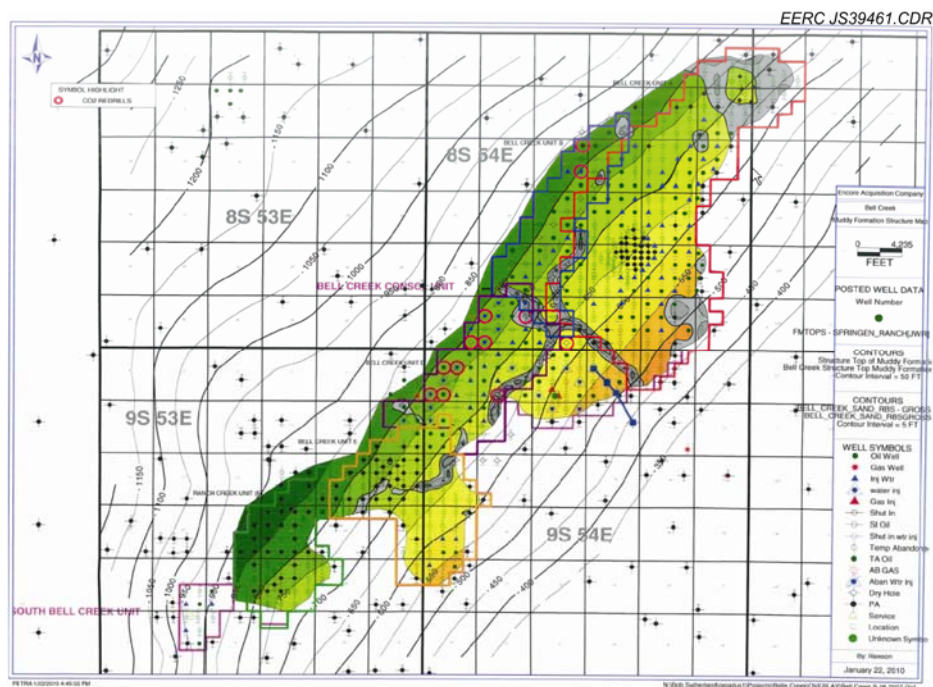


Figure 1. Plan view map of the Bell Creek oil field.

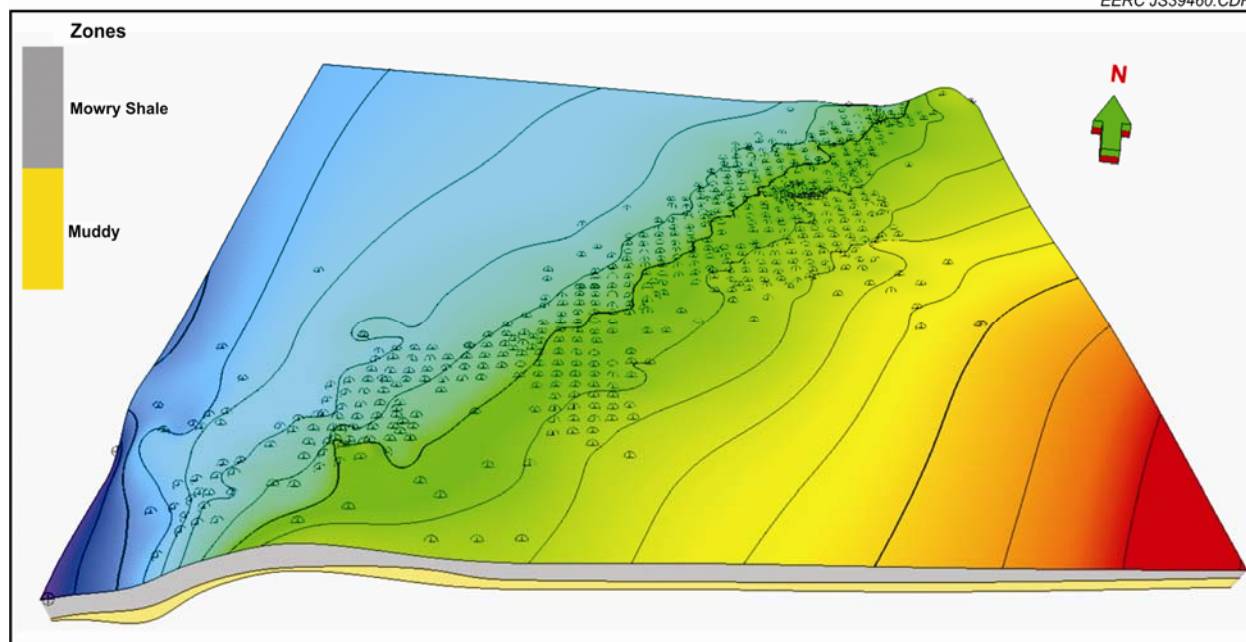


Figure 2. 3-D geologic model (vertical exaggeration 10×) of the Bell Creek area showing well locations.