

PROJECT REPORT ON DOE AWARD DE-FE0006011

**Development of real time geophysical data acquisition and processing
toolbox to monitor flood performance**

Project report period: April 1, 2011 through June 31, 2011

SUBMITTED TO

**U.S. Department of Energy
National Energy Technology Laboratory**

DOE award number and name of the recipient.

DOE AWARD NUMBER: DE-FE0006011
Recipient: Sky Research, Ashland, Oregon

Project title and name of the project director/principal investigator.

Project title: Development of Real Time Semi-autonomous Geophysical Data Acquisition and Processing System to Monitor Flood Performance

Project PI: Dr. Roelof Versteeg

Date of report and period covered by the report.

Date of Report: July 29, 2011

Period covered by report: Q2, 2011 (April 1, 2011 through June 30, 2011)

Executive Summary

The project started on February 1, 2011, and this report covers the second three month period of the project. During this period the main emphasis was on initiating the modeling effort, both of the CO₂ EOR injection using the PNNL modeling framework and of the geophysical modeling on the resulting models. In addition the literature review was completed and submitted to DOE (May 1), and continuing discussions were held with two companies (Chaparral Energy and Kinder Morgan) about obtaining site access. As a result of these discussions Kinder Morgan has provided a verbal commitment to allowing site access. Over the next months the project team and Kinder Morgan will evaluate three possible sites to select the best possible site. A formal letter documenting this agreement is currently being drafted by Kinder Morgan. When it is received it will be provided to the DOE program office.

In this period Task 2.2 was completed. This is a literature study titled " Geophysical sensing of CO₂ EOR injection: a review". This literature study provides an inventory and associated discussion of geophysical sensing and monitoring of CO₂ EOR. This literature study was submitted to DOE on May 1, 2011 for review and comment. The project team is currently working on turning this into a manuscript which can be published.

Modeling effort

The modeling effort has two parts. The first part is the modeling of specific CO₂ EOR scenarios for a range of different systems using the PNNL Stomp code. The second part is the modeling of the

geophysical signal using a range of forward geophysical models. For the first part, Signe White at PNNL has worked on setting up a simple representative model which can be used to test and verify model output and grid coupling. These models will be taken by Dr. Pasion, who has started (in collaboration with Dr. Versteeg) to set up a geophysical modeling framework which will be used to methodically run all models. The two groups have exchanged detailed information about model grids, data structures, parameters to be modeled and coupling strategies and will start exchanging modeling results in the coming month

Non-Federal Share	4,594	11,940														
Total Planned (Federal and Non-Federal)	23,316	59,718	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cumulative Baseline Cost	23,316	83,034	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316	23,316

Year 1, Q1 Variance Analysis and Recommendation	Variance: Positive variance to original plan due delayed subcontractor engagement (which also affected abilities of Sky staff to fully engage) and staffing/vacation issues at subcontractor in Q2
	Recommendation: Variance self-correcting in out-periods as resources now available and engaged, equipment schedule refined/subcontractor fully engaged; milestones to be achieved on schedule.

SCHEDULE/MILESTONE STATUS

Task number	Task name	Project Milestone number and name	Planned start date	Planned end date	Actual Start Date	Actual End date	Comment
2.1	Test site commitment	1. Test site commitment	2/1/11	4/1/11	2/1/11		Verbal commitment obtained from Kinder Morgan - awaiting letter
2.2	Literature Study	2. Literature study	2/1/11	5/1/11	2/1/11	5/1/11	Report submitted to PM
2.4	Geophysical Forward Model coupling to CO2 induced changes in physical properties	3.Forward Model coupling	5/1/11	12/31/11	5/1/11		CO2 EOR and geophysical modeling effort started
2.5	Sensing Modality and Geometry Selection	4.Modality selection	7/1/11	12/31/11			
3.2	System Construction and Testing	5.Prototype completion	11/1/11	5/1/11			
4.1	TDEM Processing Code Development	6.TDEM inverse code	11/1/11	8/1/12			
4.3	CO ₂ -EOR Model Linking with Geophysical Framework Output	7.Model linking	2/1/12	5/1/13			
5.2	System Deployment and Data Collection	8.System deployment	11/1/12	2/1/13			
6	Data Analysis	9. Data analysis completion	2/1/13	2/1/14			

Any changes in approach or aims and reasons for change.

No changes in approach or aims of this project occurred

Actual or anticipated problems or delays and actions taken or planned to resolve them.

We currently have a commitment from Kinder Morgan to allow for site access. Kinder Morgan will provide us a letter documenting this commitment. Over the next months we will be investigating which of their three possible sites is best suited.

We have had a relatively slow start associated with people being on vacation and on leave with the modeling effort. We anticipate that (as we can develop and do modeling in parallel for the CO2 EOR modeling and the geophysical modeling) we will be able to catch up on this effort.

Any absences or changes of key personnel or changes in consortium/team arrangement.

No absences or changes of key personnel or changes in consortium/team agreement occurred

A description of any product produced or technology transfer activities accomplished during this reporting period

A literature review was completed on May 1, 2011.