Oil & Natural Gas Technology

DOE Award No.: DE-FE0001466

Quarterly Report 1 (10/1/09 – 12/31/09)

Zero Discharge Water Management for Horizontal Shale Gas Well Development

Submitted by:

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Disclaimer:

Executive Summary:

An internal kick-off meeting was held among the WVU research team and representatives from subcontractors FilterSure and ShipShaper. Discussions included schedule
and milestone updates, specific task assignments,
identification of a suitable engineering firm, formation of an Industry Contact Group, and subcontract status. Subcontracts are expected to be in place by the end of January.

Improvements to the electrical and plumbing systems in our section of the high bay have been completed by the WVU Facilities Department in preparation for arrival of the PDU.

An Industry Contact Group is being assembled in order to gain information on operating parameters. A questionnaire is currently being developed to give us specific information on volumes of flow back water and water chemistry requirements for recycling of flow back water.

Samples of flow back water have been requested from the Industry Contact Group members, and will be analyzed for water chemistry, radioactivity, and particle size distribution.

Progress Report– Phase I

This progress report covers the progress of the Phase effort up to **12/31/09**. The report is organized by task as listed in the Statement of Project Objectives.

PHASE I /Budget Period 1

Task 1.0 – Project Management and Planning

An internal kick-off meeting was held at the National Research Center for Coal and Energy (NRCCE) at West Virginia University on November 17. The meeting included the WVU research team and representatives from subcontractors FilterSure and ShipShaper. Discussions included schedule and milestone updates, specific task assignments, identification of a suitable engineering firm, formation of an Industry Contact Group, and subcontract status. The group toured the NRCCE high bay to discuss PDU installation. Improvements to the electrical and plumbing systems in our section of the high bay have been completed by the WVU Facilities Department in preparation for arrival of the PDU. The PDU has been prepared for shipment to WVU from its New Jersey location.

Task 2.1 Develop Conceptual Process Train

This task involves the determination of operating parameters as well as critical treatment parameters. Progress has been made on both of these items. An Industry Contact Group is being assembled in order to gain information on operating parameters. A questionnaire is currently being developed to give us specific information on volumes of flow back water and water chemistry requirements for recycling of flow back water. Samples of flow back water have been requested from the Industry Contact Group members, and will be sent to the NRCCE analytical lab for analysis of water chemistry. Parameters to be measured include:

- Potassium
- Sodium
- Calcium
- Magnesium
- Iron
- Strontium
- Barium
- Chloride
- Sulfate
- Total Dissolved Solids
- pH
- Total Hardness
- TSS
- Oil/Grease

Steve Root from the WVU Radiation Safety Department will test for radioactivity, and Dr. Lance Lin from the WVU Department of Civil and Environmental Engineering will perform an analysis of particle size distribution for each sample. The particle size distribution analysis will be important for tailoring the filter media in the PDU for the specific frac water constituents.

Task 2.2 Develop Process Flow Model:

No progress has been made on this task.

Task 2.3 Identify Recycling Operational Requirements

No progress has been made on this task.

Task 2.4 Develop and Test Treatment Methods

A PhD level graduate student will be hired from the WVU Chemistry Department to work on the chemical precipitation portion of t.

Issues & Challenges:

The primary challenge encountered thus far has been the implementation of subcontracts. The WVU Office of Sponsored Programs has come to an agreement with DOE, resulting in a revised SOPO. Subcontracts were released at that time. Final subcontract modifications are underway, and subcontracts are expected to be in place by the end of January.

In addition, an approved chemical hygiene plan is required before work can begin at the University. We have met with the NRCCE Facilities Manager and WVU Environmental Health and Safety personnel in order to define and clarify waste disposal issues related to use of the PDU on campus. Our CHP is expected to be approved by the end of January.

Milestone Report:

No milestones were scheduled to be accomplished in the first quarter. We expect to be able to accomplish all milestones on schedule.

Cost Status Report:

Our subcontractors have incurred some costs through 12/31/09 but have not submitted invoices pending the formal signing of their subcontracts. Costs have been discussed with the subcontractors and are under control. The Federal portion of the project budget will not be exceeded.

Summary of Accomplishments:

The project is currently on schedule and on budget. A summary of the accomplishments thus far are listed below:

- An internal kick-off meeting was held at WVU, and included the WVU research team and representatives from subcontractors FilterSure and ShipShaper.
- Improvements to the electrical and plumbing systems in our section of the high bay have been completed by the WVU Facilities Department in preparation for arrival of the PDU.
- An Industry Contact Group is being assembled in order to gain information on operating parameters. A questionnaire is currently being developed to give us specific information on volumes of flow back water and water chemistry requirements for recycling of flow back water.
- Samples of flow back water have been requested from the Industry Contact Group members, and will be sent to analytical labs for analysis of water chemistry. The WVU Radiation Safety Department will test for radioactivity, and the WVU Department of Civil and Environmental Engineering will perform an analysis of particle size distribution.

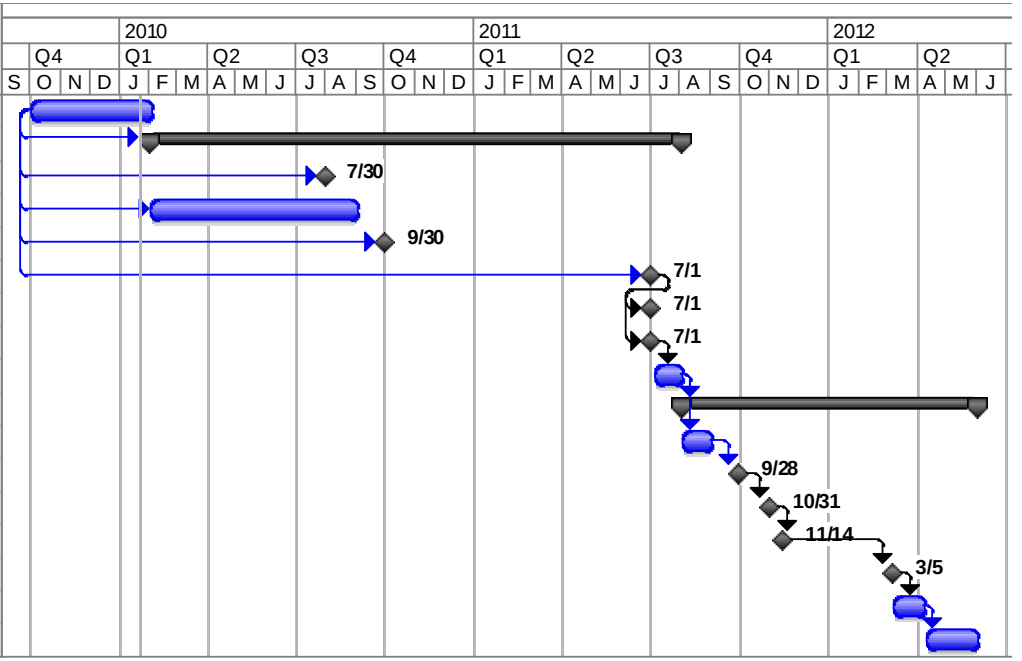
Appendix A: Cost Status Report

Source	Federal $ Received	Federal Expended	Remaining	Cost Share	Cost Share Expended	Remaining	Total Project Value	Total Expended	Total Remaining
SALARIES:	65,015.86		65,015.86	21,381.32		21,381.32	86,397.18	-	86,397.18
BENEFITS:	14,196.17		14,196.17	5,772.96		5,772.96	19,969.13	-	19,969.13
SUPPLIES:	5,504.00		5,504.00	-		-	5,504.00	-	5,504.00
							-		
TRAVEL:	3,000.00		3,000.00	-		-	3,000.00	-	3,000.00
							-		
SUBK:	435,890.00		435,890.00	350,600.00		350,600.00	786,490.00	-	786,490.00
	-			-			-		
OTHER DIRECT COSTS:	15,000.00		15,000.00	-		-	15,000.00	-	15,000.00
							-		
TOTAL DIRECT COSTS:	538,606.03	-	538,606.03	377,754.28	-	377,754.28	916,360.31	-	916,360.31
INDIRECT COSTS: F&A @ 46.5	71,012.94		71,012.94	12,626.75		12,626.75	83,639.69	-	83,639.69
TOTAL:	609,618.97	-	609,618.97	390,381.03	-	390,381.03	1,000,000.00	-	1,000,000.00

Appendix B: Milestone Status Report

No milestones were scheduled to be accomplished in the first quarter. Milestones are shown in the Gantt chart below, indicated with diamonds.

Task Name	Start	Finish
Task 1.0 Project Management Plan	10/1/09	2/1/10
Task 2.0 Phase I Process Development	**2/1/10**	**8/1/11**
Subtask 2.1 Develop Conceptual Process Train	2/1/10	7/30/10
Subtask 2.2 Develop Process Flow Model	2/1/10	8/31/10
Subtask 2.3 Identify Recycling Operational Requirements	2/1/10	9/30/10
Subtask 2.4 Develop and Test Treatment Methods	2/1/10	7/1/11
Treatment Method Development Final Recommendations	7/1/11	7/1/11
Subtask 2.5 Preliminary Cost Estimate/Development of Decision Criteria	3/14/11	7/1/11
Subtask 2.6 Decision to Proceed	7/4/11	8/1/11
Task 3.0 Phase II Mobile Unit Design, Test, and Evaluate	**8/2/11**	**5/31/12**
Subtask 3.1 Finalize System Design and Costs	8/2/11	8/31/11
Subtask 3.2 Fabricate Mobile Treatment Unit (MTU)	9/1/11	9/28/11
Subtask 3.3 Install the MTU	9/29/11	10/31/11
Subtask 3.4 MTU Testing and Startup	11/1/11	11/14/11
Subtask 3.5 MTU Operations, Monitoring, and Maintenance	11/15/11	3/5/12
Subtask 3.6 MTU Decommissioning	3/6/12	4/6/12
Subtask 3.7 MTU Demonstration Report	4/9/12	5/31/12



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