Oil & Natural Gas Technology

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Quarterly Progress Report

April 1, 2009- July 31, 2009

Characterization of Methane Degradation and Methane-Degrading Microbes in Alaska Coastal Water

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EXECUTIVE SUMMARY

This National Energy Technology Laboratory (NETL) project, "Characterization of Methane Degradation and Methane-Degrading Microbes in Alaska Coastal Water", began on October 1, 2008. The third quarter was mostly dedicated to planning for the upcoming expedition in September 2009 to sample Alaska coastal waters. We have been working with expedition leaders (mostly Dr. Rick Coffin) and close colleagues, including Dr. Leila J. Hamdan (Naval Research Lab) and Dr. Tina Treude, at the Leibniz Institute of Marine Sciences, Germany. In addition to planning, supplies have been ordered and are about to be shipped to Seattle, along with other equipment. We also have been working with the US Coast Guard, directly or indirectly, on details about facilities on the USCG Polar Sea for the expedition.

The third quarter of this project was also used for another activity that eventually will help support the NETL-supported work. We were successful in obtaining support from the Community Sequencing Program of the Department of Energy to do metagenomic sequencing of four samples to be collected by this NETL project. The sequence data would provide different insights into methane degradation and related processes in the Arctic.

Progress Report

Task 1: Project Management Plan

This task is completed.

Task 2: Cruise Logistics and Planning

Planning for the September expedition to sample Alaska coastal waters is now coming to an end. Nearly all supplies have been purchased and will be shipped from Delaware about August 4. They are scheduled to arrive in Seattle in mid-August, in time to be loaded on the Polar Sea before she leaves for Alaska. Other supplies, mostly chemicals, will be shipped directly from various manufacturers to Seattle.

We also worked on obtaining a lab van for doing the radioactive work ("rad van"). This portable van is required by the Nuclear Regulatory Commission for work with radioactive material on oceanographic ships. Obtaining this van was a nontrivial logistical problem that was further complicated by the usual concerns, misconceptions, and genuine confusion about working with radioactive compounds. A solution was found and a van is now loaded on the ship.

The Data Collection/Sampling and Analysis Plan was completed and submitted during this period of the project. This document briefly outlines the current plan for obtaining samples to examine rates, microbes, and their genetic material during the September expedition. The document sums up current ideas about what microbial and

chemical parameters should be measured as part of our efforts to understand methane degradation in the Alaska coastal system.

Other Tasks

Tasks 3-7 are scheduled to be completed during upcoming budget periods. Completion of these tasks will depend on the expedition to Alaska coastal waters in September 2009.

During this budget period, we received word about the success of a proposal to DOE's community sequencing program (http://www.jgi.doe.gov/CSP/) to obtain metagenomic sequence data from samples collected as part of the NETL-supported work. The community sequencing program would provide direct sequence data about microbes in Alaska samples with varying methane concentrations. The data would potentially give many new insights into methane degradation at no additional cost to this project. During this budget period, we worked with CSP staff on the legal documents to formalize this collaboration and on the scientific procedures for obtaining DNA of sufficient quality for their sequencing pipeline.

Delays and other problems

There have been no major delays or problems.

Conclusions

The third quarter of this project was devoted to continue to plan for the fall expedition and to order (or prepare to order) the necessary supplies required for this field work. The project is proceeding on schedule and has not encountered any significant problems.

Cost Status

The table below gives the project expenses for the second quarter as originally budgeted ("Original") and actual expenditures ("Actual"), as of July 29, 2009.

Third Quarter Budget

	Original		Actual	
Personnel	$	14,930	$	8,423
Benefits		3692		2864
Permanent Equipment		0		0
Expendable Supplies		5000		2249
Travel		2500		1970
Subtotal		26122		15506
Indirect costs (53%)		13844		8218
Total	$	39,966	$	23,724

There is one large difference between the Original and Actual budgets and a couple smaller ones. The large difference is in personnel costs. The graduate student originally scheduled to work on this project will not do so until the next budget period when samples come back for analysis in the Delaware lab. Among the smaller differences, the Expendable Supply expenses seem less than originally planned, but several large orders will be placed over the next few days (week of August 3) for direct shipment to the Polar Sea in Seattle. The two airline tickets purchased during this budget period were less than the Original Budget, but there will be additional travel expenses during the trip to meet the ship in Barrow, Alaska.

Products

• Revised Web site

A Web site was set up outlining work in the Arctic by Kirchman lab, including the NETL project (http://www.ocean.udel.edu/cms/dkirchman/Arctic/).

• Contacts and lectures with the general public

Kirchman's seminars on climate change in polar environments are available on his Arctic web site.

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