

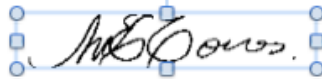
# Oil & Natural Gas Technology

DOE Award No.: DE-FE0013531

## Quarterly Research Performance Progress Report (Period ending 12/31/2013)

**Assessing the response of methane hydrates to environmental  
change at the Svalbard continental margin**  
Project Period (11/1/2013 to 10/31/2015)

Submitted by:  
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National Energy Technology Laboratory



Office of Fossil Energy

## **EXECUTIVE SUMMARY**

In November 2013, Oregon State University initiated the project entitled: **Assessing the response of methane hydrates to environmental change at the Svalbard continental margin.** In this project, we will take advantage of a unique opportunity to collect samples from two settings on the Svalbard continental margin, by participating in two expeditions to the region organized and co-funded by Germany and Norway. These expeditions target sites where methane plumes have been observed to emanate from the seafloor at the upper edge of gas hydrate stability (area 1) and over acoustic chimneys and seafloor pockmark structures in the Vestnesa Ridge (area 2). Our objectives related to examining and modeling the biogeochemistry of these sediments nicely dovetail with our colleagues' objectives to conduct detailed mapping, hydroacoustic surveys of methane plumes, heat flow measurements and quantification and characterization of gas hydrates in areas of contrasting methane flux characteristics.

To date we have began preparations for the expedition. We have conducted analyses of the various systems commercially available to measure methane and its isotopes at the conditions we expect to find. After careful evaluation we determined what the best equipment would be and are proceeding with the ordering process

## **PROGRESS, RESULTS, AND DISCUSSION**

1. During this quarter we completed the Program Management Plan, as requested in the contract. The plan was accepted by Sandra McSurdy

2. We have been conducting a series of conference calls with the German collaborators to ascertain cruise preparations (staffing, shipping, etc.) are proceeding according to plan.

3. We have been exploring the best options for instrumentation to measure concentration and isotopic composition of methane for our DOE- funded project. We became aware that the response time of the membrane in the DWGA is too long. The measurement of the gas itself is done in 5 minutes, but it takes a long time to get the required amount of gas through the membrane. Furthermore, due to the long time for an analysis of one sample we cannot effectively use it as a towed device from the ship. Other disadvantages relate to its operation range and calibration issues. Los Gatos Research also offers a broad range of analyzers for benchtop use that work with the same detection principle as the DWGA (OA-ICOS) but can be used onboard. These instruments can be equipped with a syringe injection port for discrete sample injection what simplifies the handling. There is no membrane that has to be carefully calibrated and gas standards can be easily injected via syringe, no additional calibration set-up is necessary, and sample analyses is quite fast. To replace the DWGA on the benchtop-mode LGR has offered a combination of two instruments for \$157,550, if purchased together (see quote). The MCI Range 3 has a concentration range from 1 ppm to 100 ppm and is extendable with a Dynamic Dilution System by 100x, so it ranges from 1 ppm – 10,000 ppm. For lower methane concentrations in the water column they offer a second instrument called Fast Greenhouse Gas Analyzer FGGA, it is able to detect concentrations from 10 ppb – 100 ppm. The FGGA comes as well with a syringe injection port and both instruments together cover the whole range of expected methane concentrations in the water column above cold seeps, and allow us to measure methane isotope composition at the higher concentration ranges. The quote from LGR includes \$1200 for shipping and handling, based on delivery in Germany. We now realize that we need shipping expenses to bring the instruments back, plus additional funds to deal with customs. Because the equipment will be de-

livered to Germany, then taken to Norway and then back to the US the best option is to obtain a Carnet-documentation that allows for international shipping through various custom offices. A obtain a quote of approximately \$1200 for one Carnet agent.

I discussed these issues with the program manager, and requested a budget change whereby funds from salary allocations were moved in support of new instrumentation, with no change to the final grant allocation. This request was approved by Sandra McSurdy on 2/5/14. We are proceeding to order the equipment through OSU's procurement office.

**MILESTONE STATUS**

We are well within our planned progress regarding Milestone 1:

**Title:** Complete preparations for expedition

**Planned Date:** July 1, 2014

**PROBLEMS OR DELAYS**

None

**PRODUCTS**

A complete PMP

This progress report

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