

Oil & Natural Gas Technology

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Quarterly Report

April 1 2010 to June 30 2010

Heat Flow and Gas Hydrates on the Continental Margin of India: Building on Results from NGHP Expedition 01

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Progress Report

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SUMMARY:

In October 2008, graduate student Peter Kannberg and Professor Anne Trehu began working on the National Energy Technology Laboratory (NETL) funded project entitled *Heat flow and gas hydrates on the continental margin of India: Building on results from NGHP expedition 01*. This project is designed to complete analysis, interpretation and modeling of downhole temperature data that were acquired in spring 2006 at 21 sites drilled in gas hydrate-bearing sediments on the continental margin of India. In addition to finding several rich gas hydrate deposits, this expedition provided a number of important new insights into the geologic conditions leading to such deposits. One new insight is that buried channels and turbidite deposits are important for providing pore space in which hydrate crystals can nucleate. We hypothesize that these channels also have an influence on fluid flow and transport of methane into and through the gas hydrate stability zone (GHSZ). The objective of this project is to construct a map or regional heat flow by using the borehole data to calibrate heat flow estimates derived from observations of a bottom simulating reflection (BSR) in regional seismic data. Expedition NGHP 01 confirmed that the BSR near the boreholes reflected the base of the GHSZ on the eastern continental margin of India and in the Andaman Sea. We will then use these observations to model fluid flow and collaborate with sedimentologists working on the cores recovered from these boreholes to test this hypothesis. The project also supports development of human resources for hydrate studies by supporting tuition for Kannberg to take courses leading to a Masters degree in oceanography and geophysics.

The seventh quarter was primarily spent finishing a manuscript that was submitted to the peer-reviewed journal **Marine Geophysical Research** on June 18, 2010. This manuscript documents in detail how the heat flow maps on Indian margin were constructed and interprets presents a comparison of apparent heat flow as a function of depth in the three regions studied here to results from other locations around the globe. We have also begun quantitative numerical modeling of the effects of sedimentation, erosion and topography on the apparent heat flow. Results of those analyses will be presented in the quarter 8 report.

Table 1. Project costing profile for Budget Period 6.

	April (planned)	April (actual)	May (planned)	May (actual)	June (planned)	June (actual)
PI salary & fringe benefits	1,627	527	1,627	525	1,627	521
GRA salary & fringe benefits	2,271	2,501	2,271	2,192	2,271	2,192
Computer subscription	250	250	250	250	250	250
Travel and supplies		0		0		0
Tuition	2,172	3,258	0	0	0	0
Indirect Costs	1,908	1,515	1,908	1,371	1,908	1,369
	7,510	8,051	5,341	4,338	5,341	4,332

PUBLICATIONS, CONFERENCE PRESENTATIONS AND OTHER PRODUCTS:

- A manuscript was submitted to **Marine Geophysical Researches** during this project period: P.K. Kannberg and A.M. Trehu, Heat flow on the Indian margin: results from NGHP Expedition 01, 10 pages, 15 figures.

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