

Frontier Basins Geologic Assessment Program

FY2007 Request: \$300,000
Reference No: 41413

AP/AL: Appropriation

Project Type: Planning

Category: Natural Resources

Location: Statewide

Contact: Nico Bus

House District: Statewide (HD 1-40)

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Estimated Project Dates: 07/01/2006 - 06/30/2010

Brief Summary and Statement of Need:

Several central and southern Alaskan sedimentary basins have energy resource potential but remain poorly understood. This CIP request will fund a major effort to increase the collection and availability of critical geologic data in these poorly understood areas. This funding will be distributed across at least three sub-projects, each of which will result in published datasets and interpretations to diversify and increase exploration investment across the state: 1) Geochemical studies of hydrocarbon occurrences and source rock units, 2) Petrographic studies of oil and gas reservoir quality in the Bristol Bay region, and 3) Petrographic studies of oil and gas reservoir quality of the Cook Inlet Basin.

Funding:	<u>FY2007</u>	<u>FY2008</u>	<u>FY2009</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012</u>	<u>Total</u>
Gen Fund	\$300,000						\$300,000
Total:	\$300,000	\$0	\$0	\$0	\$0	\$0	\$300,000

<input type="checkbox"/> State Match Required	<input checked="" type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input type="checkbox"/> Phased - underway	<input type="checkbox"/> On-Going
0% = Minimum State Match % Required		<input type="checkbox"/> Amendment	<input type="checkbox"/> Mental Health Bill	

Operating & Maintenance Costs:

	<u>Amount</u>	<u>Staff</u>
Project Development:	0	0
Ongoing Operating:	0	0
One-Time Startup:	0	0
Totals:	0	0

Additional Information / Prior Funding History:

This is a new capital project request.

Project Description/Justification:

The State of Alaska is one of the most hydrocarbon prolific regions in North America, yet remains one of the least explored for oil and gas. Several sedimentary basins with excellent oil and gas potential are present outside the North Slope, and to date, remain critically under-explored. There is now heightened interest in exploring these poorly understood regions, due to the combined effects of strong oil and gas prices, a change in the balance of new players and independent companies relative to long-standing Alaskan producers, progress toward an Alaskan gas pipeline, and the resumption of leasing in the onshore Bristol Bay region. This CIP request will fund a major effort to increase the collection and availability of critical geologic data in these poorly understood areas, consistent with the responsibilities of the Division of Oil & Gas for oil and gas leasing and licensing, and promoting the exploration and development of these energy resources. This funding will be distributed across at least three sub-projects, each of which will result in published datasets and interpretations to diversify and increase exploration investment across the state. The end result of this work will address the timely delivery of geological and geophysical information to support resource development, attract new industry, and provide for continued economic growth within the state of Alaska.

- ? **Geochemical studies of hydrocarbon occurrences and source rock units:** This sub-project will contract to obtain modern geochemical analyses and interpretations of hydrocarbon occurrences and source rocks, primarily those in the Alaska Peninsula/Bristol Bay region. Fundamental uncertainties remain regarding the degree of connectivity between the Mesozoic and Tertiary petroleum systems, regional distribution and richness variations of various Tertiary and Mesozoic source rock units, the timing and level of thermal maturation, and the potential

for accumulation of biogenic methane, all of which can be addressed through modern geochemical and basin modeling techniques. Analyses will include both well and outcrop samples, in keeping with the goal of further integrating surface and subsurface geologic studies. This project will provide new information on the oil and gas system in the Bristol Bay state lease sale area and help promote lease purchases and drilling activity.

- ? **Petrographic studies of oil and gas reservoir quality in the Bristol Bay region:** This effort will utilize in-house expertise to analyze rocks from outcrops and cores to determine the reservoir quality of sandstones the Alaska Peninsula/Bristol Bay area. Analytical work (compositional, scanning electron microscopy, electron probe microanalysis, x-ray diffraction, fluid inclusion, and thermal maturation) will be contracted to outside vendors as appropriate. Data will be compiled and interpreted by DOG staff. Various aspects of this project include delineation of these sandstones' sediment source (provenance), documenting chemical and physical changes with burial (diagenesis), determining the relative importance of compaction versus cementation to reservoir quality, and the timing of cementation relative to hydrocarbon migration. The overall goal will be to decipher the makeup and history of the rocks as a fundamental constraint in determining the petroleum potential of the basin and promote exploration activity through reduced geologic risk.

- ? **Petrographic studies of oil and gas reservoir quality of the Cook Inlet Basin:** This sub-project is a petrographic study of Mesozoic sandstones in Cook Inlet to determine their reservoir potential. The primary mechanism of porosity reduction in Cook Inlet is cementation by pore filling minerals of the zeolite group. Certain zeolites are regionally extensive in Mesozoic sandstones, which are typically assumed to constitute "economic basement" in this basin. Zeolite cements form as a by-product of the temperature-controlled alteration of plagioclase feldspars, and understanding the timing of zeolite cementation relative to hydrocarbon migration is critical to evaluating the petroleum potential of the basin's older reservoir candidates. If hydrocarbon generation and migration occurred before regional zeolite formation, it is possible that there are oil and gas accumulations where reservoir quality has been preserved in Mesozoic sandstones, but have been overlooked by past exploration. The temperature of zeolite formation can be obtained through fluid inclusion analysis, and can be related to the thermal history of the basin to determine the time of cementation. The modeled thermal history also suggests timing of migration to compare with cementation. Analytical work (compositional, fluid inclusion and thermal maturation) will be contracted to outside vendors as appropriate. Basin modeling will be conducted by DOG staff with the acquisition of appropriate software. Items to acquire will include basin modeling software, reservoir quality modeling software, and image analysis software. Understanding the cementation history of this stratigraphic section will assess the reservoir potential of an under-explored part of the Cook Inlet and has the potential to open a new round of exploration for oil and gas in the deeper parts of the basin.

Why is this Project Needed Now:

The North Slope's onshore oil province is progressing toward maturity at the same time that industry is showing renewed interest in leasing and licensing in other areas of the state. It is critical to rapidly advance our understanding of Alaska's other oil and gas basins, and use this knowledge to compete for the investment capital of an increasingly global energy industry considering its investment opportunities around the world. Given the prevailing forecasts for sustained high consumer demand, many companies are now very eager to reinvest the profits generated by recent high prices. The modern petroleum systems studies funded through this CIP request will provide much-needed data and interpretations to companies looking for the best opportunities.

Specific Spending Detail:

Line Item Expenditures:

Personal Services	----	n/a
Travel	\$15,000	Contractor travel for technical collaboration, software training
Services	\$205,000	Sample preparation, laboratory analyses, professional interpretation services
Capital Outlay	\$80,000	Software licensing and maintenance, equipment

Project Support:

Broad support can be expected from 1) energy industry companies and independent investors that will benefit from these studies, 2) Native regional and village corporations with stakeholder interests, 3) natural resource management agencies in the State and Federal government, including DGGS, USGS, MMS, BLM, and 4) research institutions, including UAF.

Project Opposition:

No opposition is anticipated.