

Gas Pipeline Corridor Geologic Hazards and Resources - Phase 2 **FY2009 Request: \$600,000**
Reference No: 41415

AP/AL: Appropriation **Project Type:** Planning
Category: Natural Resources
Location: Statewide **Contact:** Leta Simons
House District: Statewide (HD 1-40) **Contact Phone:** (907)465-2400
Estimated Project Dates: 07/01/2008 - 06/30/2010

Brief Summary and Statement of Need:

This is the continuation of a project to assess the geologic hazards and resource potential along the proposed natural gas pipeline corridor from Delta Junction to the Canadian border. In the first phase, DGGs conducted airborne geophysical surveys of the corridor to identify major geologic features and structures. The second phase, initiated in FY2007, is geologic mapping, hazard assessment and resource evaluation using the geophysics data as a guide. The resulting maps and reports will aid in design and construction of the pipeline and will be useful for future developments such as the proposed Alaska Railroad extension and other public and private development in this corridor.

Funding:	FY2009	FY2010	FY2011	FY2012	FY2013	FY2014	Total
AK Cap Inc	\$600,000						\$600,000
Gen Fund		\$600,000	\$350,000	\$250,000			\$1,200,000
Total:	\$600,000	\$600,000	\$350,000	\$250,000	\$0	\$0	\$1,800,000

<input type="checkbox"/> State Match Required	<input type="checkbox"/> One-Time Project	<input type="checkbox"/> Phased - new	<input checked="" 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
<u>One-Time Startup:</u>	<u>0</u>	<u>0</u>
Totals:	0	0

Additional Information / Prior Funding History:

SLA05/CH3	\$ 2,000,000	Completed
SLA06/CH82	\$ 350,000	Fieldwork completed, data analysis and publication in progress
SLA07/CH30	\$ 600,000	Preliminary work in progress, fieldwork will begin summer 2008

Project Description/Justification:

Because transportation corridors are the economic lifeline of the state, it is of primary importance that the Division of Geological and Geophysical Surveys (DGGs) provide fundamental data regarding aspects of geology that could impact existing and proposed infrastructure. Detailed geologic maps, including bedrock geology and surficial geologic deposits, lay the groundwork necessary for evaluating geohazards, such as potentially active faults, slope instability, and permafrost, and for targeting areas most suitable for new construction-materials sites. Prospective development along the Alaska Highway, with proposed construction of a natural gas pipeline and discussion of extending the Alaska Railroad into Canada, makes this corridor one with a compelling need for detailed geologic evaluation.

Despite its importance, the Alaska Highway corridor southeast of Delta Junction has little publicly available data on the potential geologic hazards that could adversely affect the safe construction and operation of a gas pipeline, railroad, and other critical developments. Such hazards include active faults, landslides, debris flows, earthquake-induced liquefaction, permafrost, erosion, and flooding, among others. The corridor north of Delta Junction has been much more extensively studied, primarily for construction of the Trans Alaska Pipeline System (TAPS), although most of these data are not

available digitally. Some detailed engineering studies were conducted by the private sector between Delta Junction and Canada during the late 1970s, but these studies were for a narrow corridor only 2½ miles wide, did not have the benefit of detailed geophysical mapping techniques or remote-sensing imagery available today, are not publicly available, and are not in GIS format.

With FY2005 supplemental funding, DGGs initiated geologic hazards and resources evaluations along this route by conducting airborne geophysical surveys of a 16-mile-wide corridor between Delta Junction and the Canadian border. This geophysical survey serves as a starting point for the proposed ground-based 1:63,360-scale geologic mapping. The mapping will provide the basis for evaluation of geologic hazard risks to construction and operation of the pipeline and railroad, materials sources that will aid in their construction, and potential mineral resources that may provide additional economic benefit through use of the corridor to gain access to markets. In addition to the Pogo deposit, other mineralized areas are known near or adjacent to the route, including the Goodpaster and Delta River districts.

Existing geologic map coverage along this corridor is discontinuous, at different scales, and inconsistent in terminology, approach, and content. This project will make use of existing data in planning and analysis, but will combine all viable existing data with new data in a single, seamless GIS database using state-of-the-art methodology and standardized terminology. Planners and designers will be able to layer the resulting GIS maps of geology, geophysics, hazards, and resources with proposed alignments of the gas pipeline, railroad extension, and other infrastructure to facilitate efficient engineering, construction, and risk management.

At DGGs's recommendation in 2000, in anticipation of the proposed natural gas pipeline and railroad extension, NASA flew airborne Synthetic Aperture Radar imaging surveys along the entire corridor between Fairbanks and the Canadian border. These surveys produced digital elevation data for the corridor at 5-meter resolution. These data, together with airborne geophysics and new high-resolution orthorectified satellite panchromatic and thematic imagery, provide new tools for detailed geologic mapping and terrain analysis that will be used to the greatest extent possible in conducting this project and generating products. These tools were not available to the engineers and scientists who surveyed this route in the 1970s and 1980s.

Staffing of this project will include a DGGs project manager (funded separately), two or more additional existing DGGs geologists (part time), and a student intern. The project will make extensive use of contract geologists from the private sector, University of Alaska faculty from the Department of Geology and Geophysics, and Department of Mining and Geological Engineering.

Products of this project will be peer-reviewed, with published geologic reports, maps, and GIS data depicting detailed bedrock and surficial geology, potential geologic hazards, and areas suitable for construction materials resources. All map data will be made available in digital GIS formats in conformance with national standards.

The proposed cost and duration of this project are based on historic costs of field-geologic mapping projects. The area to be mapped is approximately 2,400 square miles, or the equivalent of about ten standard 1:63,360-scale quadrangles. Our average cost of generating a single comprehensive (bedrock and surficial) geologic quadrangle map in a year is about \$350,000. The cost of producing the equivalent of two adjacent maps in one year is approximately \$600,000. In FY2007, we were able to map the equivalent of about 3 quadrangles between Delta Junction and Dot Lake, taking advantage of existing detailed geologic maps and FY2005 funds that were remaining. Current FY2008 funding will map the equivalent of about two quadrangles eastward from Dot Lake toward Tetlin Junction. The proposed FY2009 funding allows mapping of the equivalent of another two quadrangles eastward. We project the mapping effort to continue through FY2010 and FY2011, with final analyses and publication of comprehensive maps and reports to be completed in FY2012.

Why is this Project Needed Now?:

With the State of Alaska actively advocating construction of a natural gas pipeline, the timing was ideal to begin this hazards and resource assessment project in 2005 with FY2005 supplemental funds. The corridor hazards and resources project will allow ground-based geologic mapping to utilize the published airborne geophysical data. The resulting detailed maps and reports of potential geohazards and resources along the corridor between Delta Junction and Canada will aid pipeline designers, contractors, and regulators who can use the data to guide pipeline design and on-site modification planning, locate prospective sources for construction materials, and guide site-specific hazards and engineering studies. Consequently, potential risks can be identified prior to construction, problems can be avoided, delays will be reduced, and future operation will be safer. The same kind of geologic analysis and resultant engineering that prevented catastrophic failure of the TAPS during the 2002 Denali fault earthquake will help prevent future interruption of service of the natural gas pipeline.

Specific Spending Detail:

<u>LINE ITEM</u>	<u>DOLLAR AMOUNT</u>	<u>DESCRIPTION (text)</u>
Personal Services	\$ 160,000	Partial funding for existing geologists and a student intern
Travel	\$ 50,000	Travel/per diem for field work, monitoring of geologic contracts
Services	\$380,000	Contract geologists, laboratory analyses, helicopters, computers
Commodities	\$ 10,000	Office supplies, field supplies

Project Support:

Pipeline companies, oil and gas industry, engineering community, geological consulting community, sand and gravel companies, Department of Transportation and Public Facilities, State Pipeline Coordinator's Office, Alaska Railroad, University of Alaska, Alaska Miners Association, local communities, and Native corporations in the project area.