Gas Pipeline Corridor Geologic Hazards and Resources: Delta Junction to Canadian Border

FY2007 Request: $350,000
Reference No: 41415

AP/AL: Appropriation
Project Type: Planning
Category: Development
Location: Statewide
Contact: Nico Bus
House District: Statewide (HD 1-40)
Contact Phone: (907)465-2406
Estimated Project Dates: 07/01/2006 - 06/30/2008

Brief Summary and Statement of Need:
This is the second phase 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 accordance with DGGS's statutory mission (AS 41.08.020). In the first phase, DGGS conducted airborne geophysical surveys of the corridor to identify major geologic features and structures, and to guide the geologic mapping and hazard assessment in this and subsequent phases. 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 that will occur in this corridor.

Funding:	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	Total
Gen Fund	$350,000	$600,000	$600,000	$600,000	$350,000	$200,000	$2,700,000
Total:	$350,000	$600,000	$600,000	$600,000	$350,000	$200,000	$2,700,000

☐ State Match Required ☐ One-Time Project ☐ Phased - new ☑ Phased - underway ☐ On-Going
0% = Minimum State Match % Required ☐ Amendment ☐ Mental Health Bill

Operating & Maintenance Costs:

	Amount	Staff
Project Development:	0	0
Ongoing Operating:	0	0
One-Time Startup:	0	
Totals:	0	0

Additional Information / Prior Funding History:
FSSLA2005,CH3 - $2,000,000
An airborne geophysical survey of the gas pipeline corridor from Delta Junction to the Canadian Border was conducted in Summer/Fall 2005. Data release is expected in Spring 2006.

Project Description/Justification:
One of Governor Murkowski's highest priorities for Alaska is the construction of a pipeline for delivery of North Slope natural gas to Alaska communities and the lower 48 states. The most likely route for the pipeline is along the existing Trans-Alaska Pipeline System (TAPS) from Prudhoe Bay to Delta Junction and then along the Alaska Highway into Canada, with probable spur lines to serve Alaska communities. From Fairbanks to the Canadian border, this route follows a strategic transportation corridor that originated to supply Alaska military bases during World War II and, since then, has only increased in importance as a vital link for commerce, tourism, and the military. Recently the state has also proposed extending the Alaska Railroad into Canada along this route. The importance of this corridor has been elevated in recent years by the installation of the U.S. military's antiballistic missile defense system at Ft. Greeley, which lies near the corridor route.

The proper design, operation, and maintenance of transportation systems depends on a thorough understanding of the composition, structure, and strength of the soils and rock on which they are built, as well as an understanding of nearby geologic processes that may affect future operation. Despite its importance, the portion of the 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 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 of only 2½ miles wide, did not have the benefit of detailed geophysical mapping techniques available today, are not publicly available, and are not in GIS format.

With FY2005 supplemental funding, the Division of Geological & Geophysical Surveys (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. Together with the proposed ground-based, 1:63,360-scale geologic mapping, this work will identify 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 along 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/DOG project manager (funded separately), one or two additional existing DGGS geologists, 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, published geologic reports, maps, and GIS data for a 10- to 12-mile wide corridor, depicting detailed bedrock and surficial geology, geologic hazards, and 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 our historic costs of field-geologic mapping projects. The area to be mapped is approximately 2,000 square miles, or the equivalent of about eight 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. Our proposed long-term budget is based on mapping the equivalent of one quadrangle (one-eighth of the corridor) in FY2007, two maps (one fourth of the corridor) in each of the following three fiscal years (2008-2010), one in FY2011, and final analysis and report writing in FY2012.

Why is this Project Needed Now:

With the State of Alaska currently negotiating construction of a natural gas pipeline, the timing was ideal to begin this hazards and resource analysis project in 2005 with FY2005 supplemental funds. This proposed project will allow the ground-based geologic mapping to immediately follow and utilize the acquisition of airborne geophysical data, scheduled for release in spring of 2006. The resulting detailed maps and reports of the engineering geology and hazards 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:

Personal Services	$80,000	Partial funding for existing geologists and a student intern
Travel	$10,000	Travel/per diem for field work, monitoring of geologic contracts
Services	$250,000	Contract geologists, laboratory analyses, helicopters
Commodities	$10,000	Computers, office supplies, field supplies
Capital Outlay	$0	None
Total	$350,000	

Project Support:
Pipeline companies, engineering community, geological consulting community, sand and gravel companies, Department of Transportation & Public Facilities, Alaska Railroad, University of Alaska, Alaska Miners Association, local communities, and Native corporations in the project area.

Project Opposition:
None identified