



# Public Service Commission

## State of North Dakota

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March 29, 2011

Mr. Joshua S. Rockwell  
Office of Surface Mining  
South Interior Building — Room 222  
1951 Constitution Ave. NW  
Washington, DC 20240

RE: FY 2011 Underground Mine Map Initiative

Dear Mr. Rockwell:

Attached is North Dakota's proposal for an Underground Mine Map Cooperative Agreement for fiscal year 2011. This proposal requests funds (\$8,095) from OSM to continue development of North Dakota's Mine Map and Information System (MMIS). We fully support and endorse this project.

If you have any questions on the attached proposal, please contact Bruce Johnson at 701-328-4094.

Sincerely,

James R. Deutsch  
Director  
AML Division

m/AML/Grants/2011 Mine Map/grant\_cover\_ltr\_3-29-11

## OFFICE OF SURFACE MINING NATIONAL TECHNOLOGY TRANSFER TEAM FACE PAGE

PROJECT TITLE: Fiscal Year 2011 Underground Mine Map Cooperative AgreementPROJECT DURATION IN MONTHS: 2 MONTHSHAS THIS PROPOSAL BEEN SUBMITTED ELSEWHERE: NoPRINCIPAL INVESTIGATOR:NAME & TITLE: Bruce A. Johnson, P.E., GIS Specialist IIIORGANIZATION: ND Public Service Commission, Abandoned Mine Lands DivisionMAILING ADDRESS: 600 East Boulevard Avenue Dept. 408, Bismarck, ND 58505-0408TELEPHONE: 701-328-4094 FAX: 701-328-2133E-MAIL: bjohnson@nd.govFEDERAL TAX ID NUMBER: 45-0309764FUNDING:FUNDS REQUESTED FROM OSM \$8,095 NEW APPLICATION: YESFUNDS PROVIDED BY PROPOSER \*Refer to Item 3(g) CONTINUATION: YES

ADDITIONAL MATCHING FUNDS:

VALUE OF IN-KIND SERVICES \$12,000CASH CONTRIBUTION \$755TOTAL PROJECT COST \$20,850PROPOSERS ORGANIZATIONNAME: North Dakota Public Service Commission, Abandoned Mine Lands DivisionADDRESS: 600 East Boulevard Avenue Dept 408, Bismarck, ND 58505-0480CERTIFYING REPRESENTATIVES NAME & TITLE: James R. Deutsch, Director, AML/Reclamation Divisions March 29, 2011  
SIGNATURE OF PRINCIPAL INVESTIGATOR/DATE

PI Assurance: I agree to accept responsibility for the scientific conduct of the project, to provide the required reports, to acknowledge OSM in any presentations and publications wherein the results of this project are used, and to provide copies of presentation abstracts and publications to OSM. I also agree to allow this proposal to be reviewed by industry and/or academia and that proprietary information which has been properly identified will be used solely for proposal evaluation.

 March 29, 2011  
SIGNATURE OF ORGANIZATION'S CERTIFYING REPRESENTATIVE/DATE

Certification & Acceptance: I certify that to the best of my knowledge, the statements contained herein are complete and true and I accept the obligation to comply with OSM terms and conditions provided an award is made as a result of this submission.

## 1. Project Abstract

The North Dakota Public Service Commission (PSC) is requesting funds to continue development of a North Dakota Abandoned Mine Map and Information System (MMIS) database that is part of a Geographical Information System (GIS). The MMIS currently aids the PSC staff in identifying, prioritizing, and designing reclamation projects for abandoned coal mines that are a potential hazards to public safety. It provides desktop access for abandoned mine maps, mine inventory information, historic coal mine inspection data, cultural and other information. The GIS benefits property owners, wind energy developers, mining companies, realtors, public planners, researchers, and the general public to determine locations and data for abandoned coal mines in North Dakota.

## 2. Project Description

- a. **Objective:** The objective of this project is to continue the development of the MMIS. It consists of a GIS that allows users access to historic mine locations, view historic mine maps and information regarding those mines.
- b. **Background:** In the past, North Dakota mine maps and information have been stored in various locations. Some have been lost and deteriorated with time. There is a need to preserve these maps and information and organize them into a user-friendly format. The data contains important information about hazardous and potentially hazardous abandoned mines. The GIS and maps are used in abandoned mine land reclamation and for public outreach.
- c. **Preliminary Efforts:** Work on the MMIS began in 2002. Approximately 420 mine maps from the ND State historical archives and 1,500 pages of text were scanned and converted to Adobe PDF Documents. Maps were linked to the textual information and arranged by bookmarks. This information, approximately 1 GB, is contained on the PSC network server and is used by AML staff. The approximate cost of the scanning and conversion was \$4,700, not including PSC staff time. In 2006, the PSC applied for OSM cooperative funding for additional work on its MMIS. This request was for \$82,000 and was proposed in three phases. The first phase was approved by OSM and \$6,000 was awarded. Positive steps toward development of the MMIS were made as a result of this project.

In July of 2008 North Dakota was awarded financial assistance through the Underground Mine Map Initiative (e-grant S08AP12777). The project began with the purchase of hardware that included two workstations and a large format monitor for viewing and georeferencing the maps. A temporary employee with GIS experience was hired through a local employment service company to carry out tasks as described in the cooperative agreement. Previously scanned and georeferenced

underground mine maps were added to our geodatabase. The raster mine maps have been vectorized and underground mine extents or footprints have been digitized for each of the scanned mine maps and organized by county. The underground mine extents (footprints) feature class was developed in accordance with the ASTM Standard D 7443-08 that had been created by the Coal Mining Spatial Data Standards ASTM Task Group. Point locations with corresponding attributes have also been developed for each mine. Historic mine documents were also scanned and OCR'd (optical character recognition) into searchable documents. Additional mine point data has been added from the USGS and NDGS (North Dakota Geological Survey) Biennial Reports from 1902 and 1912. The two NDGS reports were also OCR'd and the textual data was organized by mine and linked to the MMIS geodatabase. Since the close of the cooperative agreement for Underground Mine Map Grant (e-grant SO8AP 12777) on November 30, 2009, and the date of this application, the MMIS has 464 raster mine maps, 464 vectorized mine maps, 421 underground mine extents (footprints), and 1,921 mine points stored in the GIS with 863 documents linked to the mine point feature class.

- d. **Significance to OSM Underground Mine Map Initiative:** The MMIS is a significant contribution to OSM's Underground Mine Map Initiative. Prior to this project, the National Mine Map Reciprocity (NMMR) had only five North Dakota abandoned mine maps and documents on file. As a result of the cooperative effort on this project, the PSC has supplied the NMMR with nearly 500 more abandoned mine maps and 1,500 pages of mine information in digital format. When this project is completed, it will have added more mine-related information in a geographic database and allow users to access mine-related information while viewing mine maps in relation to their geographic location and setting. OSM will be provided the georeferenced maps, an electronic spreadsheet style catalog with the required document information.

For this project, we are proposing to georeference approximately 690 maps that were scanned, but not georeferenced as part of the 2008 Underground Mine Mapping grant. These maps were not georeferenced due to the grant funds running out. The maps are from previous AML projects that include underground mine maps, historical imagery, topography above abandoned underground mines, topography of abandoned surface mines, project site maps, and exploratory drilling used to find and delineate mine voids.

- e. **Description of Resources:** Scanning of maps necessary for the 2008 Underground Mine Mapping Initiative was performed in-house using the PSC's Graphtec CS600 large media scanner. The PSC has most of the necessary hardware and software required for scanning, georeferencing, mapping, and GIS-database creation. This application requests funds to hire a part-time temporary GIS technician to georeference and catalog scanned maps and to purchase one large format monitor (30") for the georeferencing.

### **3. Statement of Work**

- a. **Issue Identification:** This project is addressing the need to continue the assembly of North Dakota mine maps and complimentary information into the MMIS.
- b. **Work Tasks:** Personnel work tasks and timeframes for this project include but are not limited to:
  - Manipulating mine maps and data using Adobe, ESRI, and other software applications to facilitate the incorporation into the MMIS. The timeframe allotted to georeferencing and cataloging the historic mine information is two months, based on the GIS assistant working 176 hours per month.
  - Provide assistance in serving portions of the MMIS to the public via the World Wide Web. A Beta version is up and running within the PSC. This work will be done primarily by the GIS Specialist and data processing staff in consultation with the North Dakota Information Technology Division (ITD) and the North Dakota GIS Hub. This will allow future access to the maps and related data by anyone with access to the internet. Please note that each of these steps is dynamic and will continue as long as necessary to achieve project goals.
- c. **Time Allocation:** Refer to Item b)
- d. **Resource Allocation:** Refer to Item b)
- e. **Quality Assurance/Quality Control:** Quality is of the utmost importance in this project. The PSC has an experienced GIS Specialist and Programmer to support the project. Proofreading, map and data review, technical and overall project supervision will be the responsibility of the GIS Specialist. Budgets, financial management, and recordkeeping and reporting will be conducted by the PSC accounting division's administrative staff officer. PSC data processing personnel will be consulted when needed, as will the North Dakota Information Technology Division, the North Dakota GIS Hub, and the North Dakota Historical Society.
- f. **Determination of Goals:** An assessment of the effectiveness of meeting the overall project goal and that of each work task will be made each quarter and will be a part of the quarterly report. These assessments will be based initially on the completeness and technical accuracy; and eventually on the usefulness and user-friendliness of the MMIS.

- g. **Cost Sharing/Funds and Resources Contributed by Applicant:** The PSC is dedicated to the completion of this project. It has provided considerable time, money, and effort toward it and will continue to do so. The PSC has actively pursued input on this project from other state agencies, mining companies and other non-federal sources. This request for funding is for costs related to hiring a part-time temporary GIS assistant to georeference and catalog mine maps and related information for the PSC's MMIS. As previously noted, the PSC is providing the GIS Specialist and a Programmer to support the project as well as most of the required computer hardware. The value of the in-kind services over the two month period is estimated to be at least \$12,000. The PSC is also willing to pay 10% of the cost of hiring the part-time temporary GIS assistant. If awarded, the funds requested in this project would complete the incorporation of all the current scanned data into the MMIS.

**OFFICE OF SURFACE MINING NATIONAL TECHNOLOGY TRANSFER TEAM  
BUDGET PAGE**

**PROJECT TITLE:** Fiscal Year 2011 Underground Mine Map Cooperative Agreement

**PRINCIPAL INVESTIGATOR:** Bruce A. Johnson, P.E., GIS Specialist III

**ORGANIZATION:** North Dakota Public Service Commission, Abandoned Mine Lands Division

**REQUESTED DURATION IN MONTHS:** Two

ITEM	HOURS	RATE/HOUR	TOTAL	OSM TOTAL	APPLICANT	OTHER
<b>SALARIES</b> (LIST EACH PERSON OR POSITION SEPERATELY)	352	\$16.50	\$5,808	\$5,227	\$581	
<b>BENEFITS</b> (LIST EACH BENEFITS RATE PER PERSON/ POSITION)	Fringe @ 30%		\$1,742	\$1,568	\$174	
<b>TUITION</b>	-					
<b>SUPPLIES</b>	-					
<b>EQUIPMENT</b>			\$1,300	\$1,300		
<b>SUBCONTRACTS</b>	-					
<b>TRAVEL</b>	-					
<b>OTHER DIRECT COST</b>	-		\$12,000		\$12,000	
<b>TOTAL DIRECT COST</b>						
<b>INDIRECT COST</b> (LIST APPLICANT ORGANIZATION'S RATE AND WHICH LINE ITEMS TO WHICH IT APPLIES)	-					
<b>TOTAL</b>			\$20,850	\$8,095	\$12,755	
<b>COST SHARE PERCENTAGE (100%)</b>	See Section 3(g)					