EERC
Energy & Environmental Research Center
UNIVERSITY OF NORTH DAKOTA
15 North 23rd Street — Stop 9018 / Grand Forks, ND 58202-9018 / Phone: (701) 777-5000 Fax: 777-5181
Web Site: www.undeerc.org

May 2, 2012

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Ms. Fine:

Subject: EERC Proposal No. 2012-0192 Entitled "Add-On to Field Evaluation of Novel Approach for Obtaining Metal Emission Data"; NDIC Contract No. FY10-LXXI-176

As discussed with Michael Jones of the Lignite Energy Council, the Energy & Environmental Research Center (EERC) of the University of North Dakota is requesting add-on funding from the North Dakota Industrial Commission (NDIC) to support testing at a third site for the subject project. This funding will be used for continued evaluation of a proprietary measurement method for halogens and trace metals developed by the EERC called the multielement sorbent trap (ME-ST) method. This method will be evaluated with side-by-side results obtained by using U.S. Environmental Protection Agency (EPA) Methods 29 and 26A, which are approved methods for compliance with the Mercury and Air Toxic Standards (MATS). This will provide essential trace metal data for Fort Union lignite as well as additional data to determine the applicability of this measurement method for measuring halogens and/or trace metals at the low concentrations required by EPA's MATS. The scope of work to be done under this funding request for the third site will be the same as that for the first two sites, as described in the original proposal.

Background

In April 2011, the EERC embarked on the ME-ST project with support from NDIC, the U.S. Department of Energy (DOE), Electric Power Research Laboratory (EPRI), and a consortium of utility sponsors. The project goal was to obtain trace metal and halogen data for Fort Union coals. This is essential since EPA's 2009 Information Collection Request called for such sampling to be done at Texas lignite plants, but no North Dakota lignite plants were required to obtain such data.

The EERC, through the Center for Air Toxic Metals® (CATM®), developed the ME-ST sampling method for trace metals and/or halogen emissions; it is a much simpler sampling procedure that reduces personnel hours for sampling and eliminates the need for chemicals and solvents in the field, resulting in a method that is much easier and robust while also offering the potential for significant cost savings over the comparable EPA Methods 29 and 26A.

The recent proposed MATS will require that emissions be limited to emission concentrations that are very near practical detection limits—some would argue below achievable

measurement limits. MATS will also require much more frequent measurement of trace metals and HCl, which warrants the need for a simpler low-cost alternative sampling method such as ME-ST. To further validate the ME-ST method, additional full-scale comparative data are needed.

Schedule Impact for Current Project

As initially proposed, this project planned for field evaluations at two North Dakota sites, with approximately 1–2 months between the sites, with the possibility of an optional third site.

To begin testing, the EERC deployed a six-person test crew to Site 1, conducted safety training at the plant, sited the laboratory trailer, and set up the test equipment. However, while the crew was on-site and just prior to actually beginning the testing, the plant experienced an unplanned outage. As a result of the expected duration of the outage, the plant and EERC leadership jointly decided that the EERC test team should demobilize and return home.

After the problems at the plant were addressed, the same crew returned to Site 1 and successfully completed the 1-week test period.

For testing at Site 2, delays were encountered as a result of serious flooding in Bismarck and throughout the Missouri River Basin, causing key resources and attention to be diverted from this project to the more immediate crises. Consequently, planning for tests at Site 2 took longer than expected. Once the flooding was no longer an immediate concern, utility contacts and plant personnel were available to discuss specifics of the test and ensure that adequate plant resources were (would be) available to assist with on-site sampling and testing activities, with a test date set for March 8, 2012.

As March 8 approached, EERC personnel prepared trailers and test equipment to deploy to the second site. However, just prior to leaving for Site 2, the facility engineers advised that a major component at the plant had failed and could not be secured for many weeks. Once plant personnel were able to define a start-up schedule that would ensure a return to stable full- or near-full-capacity operation, EERC personnel were able to reschedule this testing for the week of June 3, 2012.

The original proposal addressed the potential of a third site at an undefined future date that would increase the overall project funding from industry, with commensurate additional funding from NDIC and DOE. At this time, the EERC has identified the Montana–Dakota Utilities (MDU) Lewis & Clark Station as Site 3 and has secured a commitment from the utility to provide resources necessary for this plant to serve as the host site (see attached letter).

The end date for this project, as originally proposed, is June 30, 2012. Because of the delays discussed above and with the addition of Site 3, the proposed add-on funding would extend the current project by 18 months to allow evaluation at one more Fort Union lignite facility (Site 3) as well as to present the findings from this project at an additional conference, tentatively scheduled for summer–fall 2013.

Project Costs

The original budget for the 12-month project was $573,000. Of this amount, the EERC requested $235,120 from NDIC (41% of the project funding) and $220,205 from DOE (38.5% of the project funding). The remaining amount of $117,675 (20.5% of the funding) was provided by a consortium of industry partners that included Basin Electric Power Cooperative, Great River Energy, Minnesota Power, SaskPower, and EPRI. In addition, Ohio Lumex provided custom sorbent traps to the project.

At this time, the EERC requests additional funds from NDIC in the amount of $153,900 to support testing at Site 3 as well as cover costs related to project delays as discussed above. The EERC has or is securing funding from industry and DOE to maintain the same percent contribution of funding as originally proposed. As such, the EERC has already secured $20,000 from MDU, and $25,408 from the EERC's CATM Affiliate program (see enclosed letters of commitment). In addition, EPRI is already under contract with the EERC to provide $31,792. The remaining amount of $144,600 will be provided through the EERC–DOE Joint Venture program (see enclosed letter of commitment). The DOE Technical Monitor is aware of the pending request for additional funding and will expedite approval. As mentioned, funding under this request will maintain the same percentages for DOE, industry, and NDIC as was originally proposed. A detailed budget is provided showing the additional funds requested and percentages contributed by NDIC, industry, and DOE. Initiation of the proposed work is contingent upon the execution of a mutually negotiated agreement or modification to an existing agreement between our organizations.

We hope that you agree that testing at MDU Lewis & Clark is important and that you approve of this request. If you have any questions, please contact me by telephone at (701) 777-5268 or by e-mail at jpavlish@undeerc.org.

Sincerely,

John H. Pavlish
Senior Research Advisor

Approved by:

Dr. Gerald H. Groenewold, Director
Energy & Environmental Research Center

JHP/sah

Enclosures

MONTANA-DAKOTA
UTILITIES CO.
A Division of MDU Resources Group, Inc.

400 North Fourth Street
Bismarck, ND 58501
(701) 222-7900

March 30, 2012

Mr. John Pavlish
Senior Research Manager
Energy & Environmental Research Center
University of North Dakota
15 N. 23rd St, Mailstop 9018
Grand Forks, ND 58201-9018

Dear Mr. Pavlish:

Subject: Letter of Interest and Host Site Commitment for Project Entitled "Field Evaluation of Novel Approach for Obtaining Metal and Halogen Emission Data"

Montana-Dakota Utilities Co. (Montana-Dakota) is pleased to participate in the project entitled "Field Evaluation of Novel Approach for Obtaining Metal and Halogen Emission Data," which is currently under way at the Energy & Environmental Research Center (EERC) and jointly funded by a utility consortium, EPRI, the North Dakota Industrial Commission (NDIC), and the Department of Energy National Energy Technology Laboratory (NETL). Results from the first test site for the project are extremely interesting and support further testing and development of the EERC's multi-element sorbent trap (ME-ST) method as a viable measurement technology as an alternative to approved wet-chemistry test methods for trace metals and halogens.

Montana-Dakota believes this technology holds merit and has the potential to save sampling cost while providing useful data for determining compliance as set forth by the final Mercury and Air Toxics Standard (MATS).

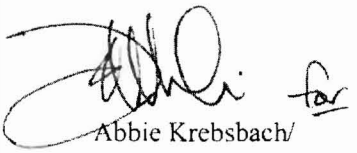
We are committed to provide financial support in the amount of $20,000 and serve as a host site for a full-scale field evaluation of this ME-ST method, which will be conducted side-by-side with U.S. Environmental Protection Agency methods 29 for trace metals and 26A for halogens. Montana-Dakota is committing to the financial support with the understanding that Lewis & Clark Station will be used as a host site and that the field evaluation is scheduled during the peak energy season, matching the EERC's field evaluation expectations. Typically, the peak energy season is from June to August, with higher demand observed during weekdays.

During the testing, Montana-Dakota will provide plant support as needed, and as approved by Montana-Dakota, to ensure successful testing at Lewis & Clark Station. This support is projected to include a plant liaison, ensuring the plant is prepared for the testing, staff available to perform coal-sampling activities, and potentially other related activities that will be agreed to jointly between the EERC and Montana-Dakota. As we understand, these details will be further

discussed between the EERC and Montana-Dakota, and delineated in a site-specific test plan and written agreement prior to testing.

We are excited about the opportunity to be involved in this project and look forward to working with the utility consortium, EPRI, NDIC, and NETL in further evaluating the ME-ST method.

Sincerely,



Abbie Krebsbach/
Environmental Manager

cc: Bruce Beiswanger, Lewis & Clark Station Manager
Alan Welte, Generation Manager
Jon Madison, Environmental Scientist

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May 2, 2012

Ms. Karlene Fine
Executive Director
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600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Ms. Fine:

Subject: Cost Share for EERC Proposal No 2012-0192 Entitled "Add-On to Field Evaluation of Novel Approach for Obtaining Metal Emission Data"

The Energy & Environmental Research Center (EERC) is conducting complementary research and development efforts under a multimillion-dollar 5-year Cooperative Agreement with the U.S. Department of Energy (DOE) entitled "Joint Program on Research and Development for Fossil Energy-Related Resources." Through this joint program, nonfederal entities can team with the EERC and DOE in projects that address the goals and objectives of DOE's Office of Fossil Energy.

The proposed project to the North Dakota Industrial Commission (NDIC) Lignite Research Council entitled "Add-On to Field Evaluation of Novel Approach for Obtaining Metal and Halogen Emission Data" is a viable candidate for funding under this program. Therefore, the EERC intends to secure $144,600 of cash cost share for the proposed project through its Cooperative Agreement with DOE providing NDIC commits $153,900 cash cost share. The EERC has already secured an additional $77,200 from other industry partners, for a project total of $375,700.

Once the EERC has a commitment from NDIC, the EERC will submit a proposal to DOE for its concurrence. Initiation of the proposed work is contingent upon the execution of a mutually negotiated agreement or modification to an existing agreement between the EERC and each of the project sponsors.

If you have any questions, please contact me by phone at (701) 777-5157 or by e-mail at jharju@undeerc.org.

Sincerely,

Mike Holmes FOR JAH

John A. Harju
Associate Director for Research

JAH/sah

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Energy & Environmental Research Center

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May 2, 2012

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Ms. Fine:

Subject: CATM® Affiliates Funding Commitment for EERC Proposal No 2012-0192 Entitled "Add-On to Field Evaluation of Novel Approach for Obtaining Metal Emission Data"

As Director of the Center for Air Toxic Metals® (CATM®) Program, I am pleased to commit $25,408 of funding from the CATM Affiliates Program to the subject project, provided that the North Dakota Industrial Commission and the U.S. Department of Energy pledge funding for this project.

The CATM Affiliates Program, comprising of industrial partners, has a history of funding research projects that involve air toxins, in particular trace metals. The project that is being funded has the potential to provide utilities and other stakeholders with a measurement technique that is easier, faster, less costly, and more flexible and that does not involve the use of caustic acids and base liquids in the field. Based on the intense interest in the development of this project, it is clearly in line with the most current needs of industry. We will be very interested to participate in the validation of this method.

I am hopeful that the other potential sponsors view this proposal favorably and look forward to supporting and participating in this project. If you have any questions, please feel free to contact me by phone at (701) 777-5268, by fax at (701) 777-5181, or by e-mail at jpavlish@undeerc.org.

Sincerely,

John H. Pavlish
Senior Research Advisor

JHP/kmd

ADD-ON TO FIELD EVALUATION OF A NOVEL APPROACH FOR OBTAINING METAL EMISSIONS DATA
NDIC
PROPOSED PROJECT START DATE: 6/1/12
EERC PROPOSAL #2012-0192

BUDGET

CATEGORY	NDIC SHARE	INDUSTRY SHARE	FEDERAL SHARE	SITE 3 TOTAL
LABOR	$ 75,162	$ 65,358	$ 85,530	$ 226,050
TRAVEL	$ 17,184	$ -	$ 3,597	$ 20,781
SUPPLIES	$ 1,629	$ 11,600	$ 5,496	$ 18,725
COMMUNICATIONS	$ 32	$ 50	$ 147	$ 229
PRINTING & DUPLICATING	$ 30	$ 32	$ 390	$ 452
FOOD	$ -	$ 160	$ -	$ 160
OPERATING FEES & SVCS				
Fuels & Materials Research Lab.	$ 2,547	$ -	$ -	$ 2,547
Analytical Research Lab.	$ -	$ -	$ 47,781	$ 47,781
Particulate Analysis	$ 53,555	$ -	$ -	$ 53,555
Process Chem. & Dev. Lab.	$ -	$ -	$ 1,011	$ 1,011
Graphics Support	$ -	$ -	$ 648	$ 648
Shop & Operations Support	$ 3,192	$ -	$ -	$ 3,192
Remote Sampling Trailer	$ 569	$ -	$ -	$ 569
TOTAL COST - US DOLLARS	$ 153,900	$ 77,200	$ 144,600	$ 375,700

LABOR CATEGORIES	LABOR HOURS			
	NDIC	INDUSTRY	FEDERAL	TOTAL
Research Scientists/Engineers	329	520	451	1,300
Research Technicians	-	-	135	135
Mechanics/Operators	400	-	-	400
Senior Management	10	-	84	94
Technical Support Services	30	-	113	143
TOTAL PROJECT COST SHARE	**41.0%**	**20.5%**	**38.5%**	**100.0%**