

TECHNICAL REVIEWERS' COMMENTS

LRC-LXX(70)-B: “Center for Air Toxic Metals® Affiliates Program – 3-Year Continuation of Membership”

Submitted by: Energy & Environmental Research Center.

Request for: \$45,000, 3-Year Term; Alternative \$18,000, 1-Year Term.

Project Manager: John H. Pavlish.

1. **OBJECTIVES**

The objectives or goals of the proposed project with respect to clarity and consistency with Industrial Commission/Lignite Research Council goals are: 1 - very unclear; 2 - unclear; 3 - clear; 4 - very clear; or 5 - exceptionally clear.

Reviewer 10-13 (Rating: 3)

The objectives of this proposed appear to be : 1) support the CATM affiliates program, 2) provide funding for small focused discrete research activities as a part of the CATM affiliates program, and) 3 better understand the science of trace metals and develop means to protect the environment and public health as a part of the overall CATM mission.

These objectives appear to be clear but are not very clearly stated or easily identified in the proposal. The objectives of CATM and the affiliates program are consistent with NDIC/LRC goals and priorities.

Reviewer 10-14 (Rating: 4)

The proposed work is consistent with the objective to “promote economic, efficient, and clean uses of lignite and products derived from lignite in order to maintain and enhance development of North Dakota lignite and its products”. The outputs of CATM are intended to provide the knowledge needed to reduce emissions of and environmental impact from toxic metals generated from the production of electricity and other industrial products using coal as a fuel. Since generation of electricity from North Dakota lignite is economically important to the State of North Dakota, the overall objective of CATM is in alignment with the Lignite Energy Council’s stated goal.

In addition, the proposal has greater than 50% cost share from industry, another stated objective.

Reviewer 10-15 (Rating: 4)

CATM’s general research objectives are well defined. No project-specific objectives are given since they are developed as individual projects are proposed. CATM’s research objectives are consistent with NDIC/ LRC goals.

2. **ACHIEVABILITY**

With the approach suggested and time and budget available, the objectives are: 1 - not achievable; 2 - possibly achievable; 3 - likely achievable; 4 - most likely achievable; or 5 - certainly achievable.

Reviewer 10-13 (Rating: 3)

The CATM Affiliates objectives and goals for the proposed work are likely achievable within the time and budget suggested. CATM has provided insight and access to information in the past and likely will continue to provide the same quality of data, information and access.

Reviewer 10-14 (Rating: 4)

The overall budget for CATM is not provided in the proposal. Nor are details given of how the contributions from the Lignite Energy Council will be used. Nevertheless, CATM has produced an impressive body of work over the years. Therefore, based on past accomplishments, it is reasonable to assume that the proposed work will be completed in the time and with the budget available.

Reviewer 10-15 (Rating: 3)

There are no specifics provided as these are developed on an on-going basis and are a function of CATM's budget. The objectives are likely to be met in a timely and cost-effective manner.

3. **METHODOLOGY**

The quality of the methodology displayed in the proposal is: 1 - well below average; 2 - below average; 3 - average; 4 - above average; or 5 - well above average.

Reviewer 10-13 (Rating: 4)

The quality of the methodology displayed in the proposal is above average. The request is \$15,000/yr for three years (\$45,000). The proposal requests membership in the CATM Affiliates program. The quality of the methodology displayed for this type and level of request is above average.

Reviewer 10-14 (Rating: 5)

Based on a review of recent CATM annual reports, the quality of the work is expected to be high.

Reviewer 10-15 (Rating: 3)

Similar comments as above. No details are provided as these are developed on an on-going basis as specific projects are developed and funded.

4. **CONTRIBUTION**

The scientific and/or technical contribution of the proposed work to specifically address Industrial Commission/LRC goals will likely be: 1 - extremely small; 2 - small; 3 - significant; 4 - very significant; or 5 - extremely significant.

Reviewer 10-13 (Rating: 4)

The scientific and technical contributions of past CATM activities have been very significant. It is expected that CATM will continue their level of technical contribution.

Reviewer 10-14 (Rating: 3)

Not all of the activities proposed by CATM support the environmentally sound production of electricity from North Dakota lignite in that some of the work is aimed at control of trace metal emissions from other kinds of coals (e.g., high-sulfur bituminous coal) or pollution control configurations (e.g., selective catalytic reduction or SCR for NOx control) that are not used in North Dakota power plants. However, the funding request from CATM is small compared to the total budget, so this is perhaps not a big issue.

Reviewer 10-15 (Rating: 4)

The activities of CATM are very significant to the North Dakota lignite industry. Lignite is a major energy source and will be for many years. CATM's activities are important for the continued use of lignite.

5. **AWARENESS**

The principal investigator's awareness of current research activity and published literature as evidenced by literature referenced and its interpretation and by the reference to unpublished research related to the proposal is: 1 - very limited; 2 - limited; 3 - adequate; 4 - better than average; or 5 - exceptional.

Reviewer 10-13 (Rating: 4)

The PI's awareness of current research activity and literature is evident in the numerous publications by CATM. Appendix A is a reference to the CATM Final Technical Report 2003-2009, which more clearly addresses this area. This Final Report and the many quarterly and interim reports provided by CATM establish the PI's awareness of current activities.

Reviewer 10-14 (Rating: 5)

The proposal does not give many technical details. However, based on a review of recent CATM annual reports, the Principal Investigators in the five areas are aware of the important issues in their areas and have addressed significant technical questions in those areas.

Reviewer 10-15 (Rating: 5)

The PI is well qualified. He has been working in this field for many years, has a proven research record, and has gotten CATM well established.

6. **BACKGROUND**

The background of the investigator(s) as related to the proposed work is: 1 - very limited; 2 - limited; 3 - adequate; 4 - better than average; or 5 - exceptional.

Reviewer 10-13 (Rating: 5)

The background of the PIs in this area is exceptional. The CATM personnel are recognized as among the leading scientific authorities in trace metals.

Reviewer 10-14 (Rating: 5)

The Principal Investigators all have considerable experience related to the proposed work.

Reviewer 10-15 (Rating: 4)

The various Program Area Managers heading up the program areas of CATM are well qualified. Their expertise appears to match their respective areas.

7. **PROJECT MANAGEMENT**

The project management plan, including a well-defined milestone chart, schedule, financial plan, and plan for communications among the investigators and subcontractors, if any is: 1 - very inadequate; 2 - inadequate; 3 - adequate; 4 - very good; or 5 - exceptionally good.

Reviewer 10-13 (Rating: 4)

Given the level of the request and the scope of the project, the management plan is very good. Additional milestone charts and schedules could be provided as the project develops.

Reviewer 10-14 (Rating: 2)

The plan for communication is well thought out. The Advisory Committees are important in providing guidance to CATM, and these committees are discussed in the proposal. There is no milestone chart, schedule or financial plan included in the proposal. These aspects of the proposal cannot be evaluated.

Reviewer 10-15 (Rating: 3)

The organizational chart shows respective responsibilities and lines of communication. However, no details on schedule or milestones are provided.

8. **EQUIPMENT PURCHASE**

The proposed purchase of equipment is: 1 – extremely poorly justified; 2 – poorly justified; 3 – justified; 4 – well justified; or 5 – extremely well justified. (Circle 5 if no equipment is to be purchased.)

Reviewer 10-13 (Rating: 5)

No equipment purchase identified.

Reviewer 10-14 (Rating: 5)

No equipment purchase is mentioned in the proposal.

Reviewer 10-15 (Rating: 5)

The budget details are very general; however, it does not appear from the budget notes that equipment will be purchased with NDIC funds.

9. **FACILITIES**

The facilities and equipment available and to be purchased for the proposed research are: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – notably good; or 5 – exceptionally good.

Reviewer 10-13 (Rating: 5)

The facilities available to CATM are exceptionally good.

Reviewer 10-14 (Rating: 5)

No purchase of facilities is mentioned in the proposal. Based on a review of recent CATM annual reports, the facilities available to CATM are exceptionally good.

Reviewer 10-15 (Rating: 3)

There are no specifics regarding projects/facilities in this proposal since it is a membership proposal.

10. **BUDGET**

The proposed budget "value"¹ relative to the outlined work and the financial commitment from other sources² is of: 1 - very low value; 2 - low value; 3 - average value; 4 - high value; or 5 very high value.

¹ "Value" – The value of the projected work and technical outcome for the budgeted amount of the project, based on your estimate of what the work might cost in research settings with which you are familiar.

² Financial commitment from other sources – A minimum of 50% of the total project must come from other than Industrial Commission sources to meet the program guidelines. Support greater than 50% from Industrial Commission sources should be evaluated as favorable to the application.

Reviewer 10-13 (Rating: 4)

The project budget is of high value because of the leverage obtained from multiple funding sources.

Reviewer 10-14 (Rating: 5)

The overall budget for CATM is not provided in the proposal. Nor are details given of how the contributions from the Lignite Energy Council will be used. Nevertheless, the amount of \$15,000 per year, requested for three years, appears to be a relatively small fraction of the total CATM budget. Two North Dakota utilities are members of the Advisory Committee, as is the NDIC. This allows user of lignite to have input into the research direction of CATM, which increases the value of the investment.

Reviewer 10-15 (Rating: 5)

The amount requested, \$15,000 per year for three years, for membership to CATM is a very good value relative to CATM's overall budget of \$1-2 million per year.

OVERALL COMMENTS AND RECOMMENDATION:

Please comment in a general way about the merits and flaws of the proposed project and make a recommendation whether or not to fund.

Reviewer 10-13 (Rating: FUND)

The strengths of this proposal include the expertise and accomplishments of CATM. This group has increased the knowledge and understanding of trace metals during combustion and post-combustion in the environment. In addition, CATM has been involved in the development of novel concepts for control and capture of trace metals during processing and combustion. CATM is a unique organization and continued participation is advantageous for NDIC and the lignite industry.

A weakness of the CATM program is related to its multi-participant nature. Because of the multi-participant nature of the program, the best interests of NDIC and the lignite industry may not always prevail. The loss of EPA participation has weakened this program. However, it is unclear an advantage exists in current contact with EPA as it is doubtful any technical contact or scientific reason is effective.

It is reasonable to support the request for \$15,000 for three-years for a total of \$45,000.

Reviewer 10-14 (Rating: FUND)

CATM has produced important scientific research in the past. The investment requested from the Lignite Energy Council is modest: \$45,000 over three years (or \$15,000 per year). It is very likely that CATM will continue to produce high quality technical investigations and reports during this period. Therefore, funding is recommended.

The objectives of CATM are generally in alignment with the Lignite Energy Council's objective to promote clean and efficient use of North Dakota lignite. The main beneficiaries of the proposed work in North Dakota are utilities that burn North Dakota lignite to generate electricity. There is lack of specificity in the proposal as to how CATM's work product will reduce emissions of trace metals and/or the cost of complying with emissions regulations for trace metals with respect to utilities in North Dakota. It seems to this reviewer that CATM should provide clearer evidence for the impact of previous work on trace metal emissions and compliance costs from North Dakota utilities, as well as more a concrete explanation of the ways that the proposed work will reduce emissions and/or compliance costs in the future.

Reviewer 10-15 (Rating: FUND)

My recommendation is to fund the three-year membership to CATM. Although there are essentially no details on how the funds will be used because projects are developed on an on-going basis, CATM and the activities it funds are very important to the North Dakota lignite/energy industry. One should be able to get a sense of the types of projects that will be conducted from CATM final technical report for the period 2003-2209, which was referred to in Appendix A but not included. I suspect that NDIC has seen this report since NDIC has been part of CATM. I do not know what was reported and did not request the report, per the note in the appendix, so as not to reveal my identity as a reviewer.