Technical Reviewers' Rating Summary

Proposal Number G-034-05 Application Title Waterline Crossing Wrap Pilc Submitted By BOE Midstream, LLC Request For $36,242.00 Total Project Costs $72,484.00

Section A. Scoring

Statement	Weighting Factor	G-034-05B	G-034-05B	Average Weighted Score
1. Objectives	9	**3**	**4**	**27**
2. Achievability	7	**4**	**4**	**28**
3. Methodology	8	**3**	**4**	**24**
4. Contribution	8	**2**	**4**	**24**
5. Awareness / Background	5	**3**	**4**	**15**
6. Project Management	3	**4**	**4**	**12**
7. Equipment / Facilities	2	**4**	**3**	**6**
8. Value / Industry - Budget	4	**5**	**4**	**16**
9. Financial Match - Budget	4	**3**	**3**	**12**
Average Weighted Score		**162**	**194**	**178**
	Total: 50			**250 possible points**

OVERALL RECOMMENDATION

FUND		**X**
FUNDING TO BE CONSIDERED	**X**	
DO NOT FUND		

Section B. Ratings and Comments

1. The objectives or goals of the proposed project with respect to clarity and consistency with North Dakota Industrial Commission/Oil and Gas Research Council goals are:

   Project has goal of developing an alternative protective barrier for water pipelines that can be used where crude oil pipelines cross them. The goal is to produce another approved method that is more economical and less invasive to the water pipeline users while protecting them from potential hydrocarbon contamination at the targeted pipeline crossings.
   - Reviewer: G-034-05B
   - Rating: 3

   The project objective is to evaluate the effectiveness of protecting water supply lines (PVC pipe) from crude oil contamination. In areas where the water PVC could be exposed to crude oil, an outer wrap will be applied. Specifically in areas where oil

lines cross or overlap water supply lines. If PVC pipe is exposed to crude oil, failure to the pipe gaskets could occur within 9 weeks.
- Reviewer: G-034-05B
- Rating: 4

2. With the approach suggested and time and budget available, the objectives are:

   The proposed testing is relatively straightforward and facilities for the testing are largely in place at the EERC. Time frame is set by regulatory requirement for testing and approval.
   - Reviewer: G-034-05B
   - Rating: 4

   The project will be performed in a controlled environment. There are no foreseeable interruptions.
   - Reviewer: G-034-05B
   - Rating: 4

3. The quality of the methodology displayed in the proposal is:

   Testing procedure is a typical testing with control standard.
   - Reviewer: G-034-05B
   - Rating: 3

   The methodology includes a non-invasive application of an outer wrap for the PVC pipe as opposed to en-casing a section (approximately 40 ft.) of the PVC pipe or oil pipeline. Bench tests will be performed to determine the effectiveness of the wrap. If successful, the project will supply research results verifying the wrap.
   - Reviewer: G-034-05B
   - Rating: 4

4. The scientific and/or technical contribution of the proposed work to specifically address North Dakota Industrial Commission/Oil and Gas Research Council goals will likely be:

   While necessary to evaluate the wrapping material and process to insure it will work satisfactorily and safely, it is a small research target area that will benefit an equally small industry purpose.
   - Reviewer: G-034-05B
   - Rating: 2

   The project aligns with the OGRC goal and objective of environmental practices that will help reduce the footprint of oil and gas activities. This project has the potential to prevent supply water pipeline failures caused by exposure to hydrocarbons.
   - Reviewer: G-034-05B
   - Rating: 4

5. The background of the principal investigator and the 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:

   Limited documentation of research is provided, but the nature of this experiment is primarily a test of a new proposed application for an existing and proven product.

- Reviewer: G-034-05B
- Rating: 3

The project includes support form KLJ and the EERC, both are experienced and leaders in ND oil and gas operations. Technical support will also come from BOE Midstream and VISCOTAQ.
- Reviewer: G-034-05B
- Rating: 4

6. 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:

The management plan includes a detailed description of the personnel who will be directing the program, and a reporting schedule including the generation of a technical white paper at the end of the project.
- Reviewer: G-034-05B
- Rating: 4

A project manager has been identified and a timetable with milestones submitted.
- Reviewer: G-034-05B
- Rating: 4

7. The proposed purchase of equipment and the facilities available is:

Equipment purchased will be materials for creating the testing tank at the EERC. Monitoring and testing equipment is largely already available at the EERC laboratory.
- Reviewer: G-034-05B
- Rating: 4

Equipment purchases are minimal. Most cost is related to labor and research.
- Reviewer: G-034-05B
- Rating: 3

8. The proposed budget "value"1 relative to the outlined work and the commitment from other sources is of:

This program, as outlined, has potential for providing a significant benefit for the projected cost.
- Reviewer: G-034-05B
- Rating: 5

The commitment of $36,272 outweighs the potential outcome of the project; a non-invasive method to protect supply water lines from hydrocarbon exposure.
- Reviewer: G-034-05B
- Rating: 4

9. The "financial commitment"2 from other sources in terms of "match funding" have been identified:

Commitment from other sources is sufficient to satisfy requirement.
- Reviewer: G-034-05B
- Rating: 3

The project is funded 50% by cost shares and in-kind services.
- Reviewer: G-034-05B
- Rating: 3

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. A commitment of support from industry partners equates to a higher value.

2 “financial commitment” from other sources – A minimum of 50% of the total project must come from other sources to meet the program guidelines. Support less than 50% from Industrial Commission sources should be evaluated as favorable to the application; industry partnerships equates to increased favorability.

General Comments

This is a relatively inexpensive research project that has the potential to provide a significant benefit to oil pipeline companies facing the difficulties of crossing existing public water supply pipelines. I believe this should be approved.
- Reviewer: G-034-05B

Merits: The project has the potential to reduce supply water spills caused by exposure to hydrocarbons. This is a pro-active response to spills. If successful it could benefit the public water supply entities by minimizing disruptions in water supply (during installation and/or preventing failures). It would also present documentation in support of the project and provide industry with a feasible alternative for supply water PVC pipeline protection.
Questions & Concerns: The project will be performed in a controlled environment. The real application will be in field setting with more challenges. The project states the PVC Outer Wrap temperature applications are >+5° C/+41° F. A challenge for industry is to ensure environments align with the temperature applications. This project relates to water supply PVC pipe. Can it be applied to protect industry production saltwater fiberglass lines that cross or overlap crude oil/emulsion lines?
- Reviewer: G-034-05B