Technical Reviewers' Rating Summary

Proposal Number	**G-033-04**
Application Title	**Integrated Waste Screening System Demonstration**
Submitted By	**Battelle Energy Alliance and C3 Corporation**
Request For	**$298,000.00**
Total Project Costs	**$600,000.00**

Section A. Scoring

Statement	**Weight**	**G-033-04A**	**G-033-04B**	**G-033-04C**	**Avg. Score**
1. Objectives	9	3	3	4	30
2. Achievability	7	3	3	3	21
3. Methodology	8	3	4	3	26
4. Contribution	8	3	4	3	26
5. Awareness / Background	5	4	4	4	20
6. Project Management	3	2	3	3	8
7. Equipment / Facilities	2	1	3	4	5
8. Value / Industry - Budget	4	3	3	4	13
9. Financial Match - Budget	4	3	3	4	13
Avg. Weighted Score		**148**	**171**	**174**	**164**
OVERALL					
FUND			**X**	**X**	
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:

“The stated primary objective is to demonstrate the first phase of the IWSS. However, the proposer also says several times that the proposer also wishes to demonstration the X-Rok ceramic cement product. After reading the proposal several times, the reviewer is left unsure about the relationship between these two objectives. One concern is that the proposer states in the "Timetable" section that all significant activities will be completed outside of North Dakota, thus putting the proposal at odds with OGRP's desire to have strong ties to North Dakota, and have activities leading to commercialization performed in North Dakota. The reviewer understands that this technology can be applied, if successfully demonstrated, to North Dakota operations, but the proposal seems to indicate that work WILL and WILL NOT be performed in North Dakota. (In the Facilities section, the proposer states that one or more demonstration sites in North Dakota will be sought).”

- Reviewer: G-033-04A

- Rating: 3 (Clear)

“In response to G-033-04A, there are two issues to be addressed. The first is the X-Rok demonstration. In this case, the proposal has been split into a Phase 1 (IWSS) and Phase 2 (X-Rok) Only Phase 1 is being considered as part of this proposal call Phase 2 will be submitted later. I revised proposal that addresses this separation has been submitted There is, a clear requirement for a field demonstration in North Dakota in Table 1 Item 1.5. There are also technical needs to perform a field demonstration. These include demonstration of IWSS functional capabilities in a field environment and it's ability to accurately characterize TENORM concentrations in a non equilibrium state (i.e., shortly after the waste is generated rather than the 21-30 days required by EPA or labs). ”

- Applicant

“”

- Reviewer: G-033-04B

- Rating: 3 (Clear)

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- Applicant

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- Reviewer: G-033-04C

- Rating: 4 (Very Clear)

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- Applicant

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

“Although the reviewer believes that the PPWS can be demonstrated within the 6 month project schedule (making some broad assumptions on what, specifically, will be demonstrated), the reviewer also wonders whether adequate time has been allowed to gather wastes to measure, and whether adequate time has been allowed to perform quality control checks of all measurements with known standards at TENORM-capable labs. Most TENORM labs require a month to complete quantitative measurement of TENORM isotopes because they rely on a 21-day ingrowth period to achieve secular equilibrium among all isotopes being meausured. ”

- Reviewer: G-033-04A

- Rating: 3 (Likely Achievable)

“The 6 month schedule is considered reasonable because the IWSS is based on well developed INL nuclear waste technology Development work is under way using internal INL funding. Also an initial specimen of cuttings waste has been tested and INL approval has been received to receive drums of filter socks. Discussions are underway with a N.D. TENORM disposal group to ship these drums relatively soon. Measurements will be performed on the individual filter socks and on the drums of waste. These drums will be at secular equilibrium and I believe sampling for TENORM has been done by the vendor. Non equilibrium waste will be measured during the field demonstration and samples sent for analysis. ”

- Applicant

“”

- Reviewer: G-033-04B

- Rating: 3 (Likely Achievable)

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- Reviewer: G-033-04C

- Rating: 3 (Likely Achievable)

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- Applicant

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

"The proposer states many times that the project will rely on proven BEA measurement systems, but no detailed radiological measurement methodology description is offered to educate the reviewer on methods that get around the otherwise-demanded 21-day ingrowth period required by many TENORM analytical laboratories to achieve secular equilibrium, and therefore accurate analytical results of isotopic activity concentrations. In fact, little description is offered to explain which radionuclides will be measured and how those measurements will be applied to determine whether the screened material will be classified as NORM or non-NORM. "

- Reviewer: G-033-04A

- Rating: 3 (Average)

"The methodology has not been described in detail because it is proprietary and the subject of a patent application that will be submitted in the next several weeks. Radionuclides to be measured are U-235, U-238, Th-232, Ra-226,Ra-228 and the radon daughters. A more detailed description of the methods can be discussed then. We currently do rapid characterization (30-90 seconds) of volumes (large trays and drums) of transuranic waste. Multiple methods are used to correct for density and other variations in the debris and radionuclides being measured that can reduce the accuracy and precision of the measurements. Also we have done testing of conveyor assay systems to do rapid characterization. Variations of this technology are used to address the non equilibrium conditions to allow measurements to be performed shortly after the waste is generated. "

- Applicant

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- Reviewer: G-033-04B

- Rating: 4 (Above Average)

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- Applicant

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- Reviewer: G-033-04C

- Rating: 3 (Average)

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- Applicant

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:

“One of the primary obstacles to formulation of a coherent TENORM disposal policy in North Dakota (or anywhere, for that matter) is lack of adequate characterization of the radionuclide concentration in oilfield wastes. This is, in part, due to the expense and time required to send samples to a TENORM analytical lab for radionuclide analysis. If BEA can develop a system to perform, in essence, assembly line assays quickly, this would be a major advancement. Debate over new TENORM regulations in North Dakota currently centers around what radionuclide measurements can be made in the field, and how those measurements contribute to or detract from compliance protocols.”

- Reviewer: G-033-04A

- Rating: 3 (Significant)

“As noted above we have already implemented systems that do rapid characterization of transuranic waste (which is more difficult to measure than NORM) as well as U-235 and U-238 at the INL. These systems have been used to process over 40,000 drums of waste and have been demonstrated to be accurate with 1000's of comparison measurements performed. Consequently we have addressed most of the issues of making this an assembly line operation that can be used by operators with a few hours training. ”

- Applicant

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- Reviewer: G-033-04B

- Rating: 4 (Very Significant)

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- Reviewer: G-033-04C

- Rating: 3 (Significant)

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- Applicant

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:

“The background of the P.I. seems to indicate a long experience with and significant expertise in radiological physics. With this background, the reviewer has no doubt that the proposer has excellent knowledge in this topic area and is aware of the aforementioned issues related to measurement of radioactive isotopes. The only potential weakness in the P.I.'s experience set may be in applying this knowledge to oilfield wastes with very low levels of radioactivity.”

- Reviewer: G-033-04A

- Rating: 4 (Better Than Average)

“In my opinion measuring TENORM is a bit easier that doing transuranic waste (plutonium isotopes and Am-241) with significant concentrations of U-235 and U-238 present from weapons waste. We deal with significant background and shielding issues as many of our measurements are performed at the dig site with open waste in trays and significant background. We have already done measurements on small volumes of low-activity ND cuttings waste and can do that relatively quickly (<1 minute) ”

- Applicant

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- Reviewer: G-033-04B

- Rating: 4 (Better Than Average)

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- Reviewer: G-033-04C

- Rating: 4 (Better Than Average)

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- Applicant

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:

"Very little description of how the proposer intends to manage the project, maintain schedule, and communicate progress was offered. Although milestones were delineated, no project schedule was offered to provide insight into how the proposer intends to conduct the project. The budget detail offered did not contribute greatly to the reviewer's understanding of how the budget may or may not be adequate to promote success within the project."

- Reviewer: G-033-04A

- Rating: 2 (Inadequate)

"I did not put a lot of detail in the proposal on the project management side as we (INL) has detailed project and budget management requirements that I have to meet to implement the project. As far as communication goes we do mandatory monthly reports as well as budget status. As I indicated earlier, this project is in an advanced state of development with few technical hurdles. This maximizes the potential for completing the project within budget and schedule. Our primary hurdle is access to facilities in N.D. for the field demonstration and it appears that most of that will be finalized soon. "

- Applicant

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- Reviewer: G-033-04B

- Rating: 3 (Adequate)

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- Reviewer: G-033-04C

- Rating: 3 (Adequate)

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- Applicant

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

“No detail was offered within the allowed portion of the proposal to justify what equipment must be purchased, or how that equipment contributes directly to the success of the project. Whether OGRP wishes to consider the detail provided in the appendices outside the defined page limit is a decision left to OGRP leadership. As a reviewer, I am obligated to read the proposal as defined by rules of submittal defined by OGRP.”

- Reviewer: G-033-04A

- Rating: 1 (Extremely Poorly Justified)

“As indicated in the proposal, most of the equipment and facilities needed for this project are already available at INL, including detectors analyzers, shielding and test laboratories where the initial development can be performed. The primary items to be purchased for this are primarily ancillary equipment that can be used to hold the detector, stands, and a drum positioner and rotator needed for testing. ”

- Applicant

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- Reviewer: G-033-04B

- Rating: 3 (Justified)

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- Applicant

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- Reviewer: G-033-04C

- Rating: 4 (Well Justified)

“As indicated in the proposal, most of the equipment and facilities needed for this project are already available at INL, including detectors analyzers, shielding and test laboratories where the initial development can be performed. The primary items to be purchased for this are primarily ancillary equipment that can be used to hold the detector, stands, and a drum positioner and rotator needed for testing. ”

- Applicant

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

“The overall budget request seems reasonable for the results anticipated from the project, and comparable to other somewhat-similar research efforts to which the reviewer has been privvy. Better definition of methodology and anticipated detailed results would have contributed to a higher score on this criterion. As it stands, the reviewer had to make some educated assumptions as to what results can be expected from this project.”

- Reviewer: G-033-04A
- Rating: 3 (Average Value)
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- Applicant
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- Reviewer: G-033-04B
- Rating: 3 (Average Value)
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- Applicant
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- Reviewer: G-033-04C
- Rating: 4 (High Value)
“”
- Applicant

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

“The proposer is requesting slightly less than 50% of the total project value to be funded by OGRP. This is adequate to meet the requirements of OGRP policy. Higher value scores are generally obtained by 1) requesting a smaller percentage, 2) including other North Dakota partners as cost-share partners, or 3) demonstrating significant near-term economic impacts to North Dakota.”

- Reviewer: G-033-04A
- Rating: 3 (Average Value)
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- Applicant
“”
- Reviewer: G-033-04B
- Rating: 3 (Average Value)
“”
- Applicant
“”
- Reviewer: G-033-04C
- Rating: 4 (High Value)
“”
- Applicant

General Comments

“Successful completion of this project has the potential to resolve some of the issues anticipated with new ND Dept. of Health regulations on TENORM disposal.

The reviewer is left with questions about how BEA intends to obtain verifiable measurements of activity concentration of specific isotopes without incurring the limitations of the 21-day ingrowth period typically required by TENORM-capable analytical labs. The reviewer is also left with some lack of clarity about how the objectives related to demonstration of X-Rok ceramic material fits into the overall goals of this research & demonstration project. The inclusion of X-Rok objectives seemed a bit of an afterthought.

The fact that the proposer referred to "Bakkan" several times (note misspelling), likely indicates a general unfamiliarity with the region and the oil play. It also indicates that little homework was put into the partnership with Bakken Western Services, LLC. It is hoped that the proposer would become more familiar with the play, its specific characteristics, and proposed partners before engaging in the project, if awarded.”

- Reviewer: G-033-04A

“The problems associated with NORM are well documented and are a known quantity. This project will assist industry in having a method to target and eliminate the RA wastes from the wellsite location, and allow for safe disposal.”

- Reviewer: G-033-04B

“Overall there is a need to provide a method to accurately and quickly determine the radioactive characteristic of oilfield waste. If the project and provide a method of accurately determining waste characteristics in a short time frame and have the technology portable the outcome of the project may find use in the field.”

- Reviewer: G-033-04C

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.