TECHNICAL REVIEWER RATING SUMMARY

G-008-A

Polymer Gel Treatment – a Remediation for Produced Waters

Submitted by: Aeon Energy Corp.

Principal Investigator: Mr. Barry L. Snyder

Request for $100,815; Total Project Costs $201,630

Rating Category	Weighting Factor	Technical Reviewer 09-01 Rating	Technical Reviewer 09-02 Rating	Technical Reviewer 09-03 Rating	Average Weighted Score
Objective	9	3	5	4	36.00
Availability	9	5	3	4	36.00
Methodology	7	3	4	3	23.33
Contribution	7	2	4	3	21.00
Awareness	5	4	3	3	16.67
Background	5	3	5	4	20.00
Project Management	2	4	4	4	8.00
Equipment Purchase	2	5	5	5	10.00
Facilities	2	5	3	4	8.00
Budget	2	2	4	3	6.00
Average Weighted Score					**185**
Maximum Weighted Score					**250**

OVERALL RECOMMENDATION

	09-01	09-02	09-03
FUND		X	
FUNDING TO BE CONSIDERED	X		X
DO NOT FUND			

G-008-0A
"Polymer Gel Treatment: a Remediation for Produced Waters"

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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: 1 – very unclear; 2 – unclear; 3 – clear; 4 – very clear; or 5 – exceptionally clear. Please comment:*

Reviewer 09-01 (Rating: 3)
The objectives seem clear about what the operator wants do obtain.

Reviewer 09-02 (Rating: 5)
If successful the technical knowledge can be applied in other fields in ND with similar water problems to increase the ultimate recovery. This is a process successful in other basins but has not been tried to any extent in the Williston Basin.

Reviewer 09-03 (Rating: 4)
A thorough evaluation and demonstration of polymer gel treatment in North Dakota clearly would facilitate other producers' evaluation of its potential utilization in other fields. In turn, many of the OGRC goals would be positively affected.

2. *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. Please comment:*

Reviewer 09-01 (Rating: 5)
The time line is appropriate for the work required

Reviewer 09-02 (Rating: 3)
The risk is uncertain as there are no immediate examples for analogy in the Basin. There is success in the industry using this technology and therefore positive results are likely achievable.

Reviewer 09-03 (Rating: 4)
Time and budget are adequate.

3. *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. Please comment:*

Reviewer 09-01 (Rating: 3)
Although not "off the shelf" the technology is not extremely complex and the results should be recordable..

Reviewer 09-02 (Rating: 4)
Appears to be a well thought out plan utilizing Tiorco's experience for the design of the polymer treatment.

Reviewer 09-03 (Rating: 3)
Details regarding any proposed up-front laboratory work would have been helpful in reviewing this proposal. It seems that laboratory testing is an essential component in evaluating the compatibility of specific formation waters and attendant polymers. Any activities in this regard are only vaguely alluded to.

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: 1 – extremely small; 2 – small; 3 – significant; 4 – very significant; or 5 – extremely significant.*
   Please comment:

Reviewer 09-01 (Rating: 2)
Although the positive results may have a small increase in total production in ND the results would have a better economic impact on production operating expenses, resulting in more capital available for exploration and development.

Reviewer 09-02 (Rating: 4)
The proposed project meets the Statutory Goals & Purposes stated on the Mission Statement. With success the project will lead to other ideas and projects with similar requirements.

Reviewer 09-03 (Rating: 3)
The contribution could be much more significant if any accompanying laboratory efforts were expanded to accommodate additional formation waters, such that other potential applications or limitations of this specific treatment could be better evaluated. Further, the documentation of laboratory methodologies therein would also be useful to other producers in their evaluation of potential applications.

5. *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.*
   Please comment:

Reviewer 09-01 (Rating: 4)
I think the principal investigator has looked carefully at the project in general.

Reviewer 09-02 (Rating: 3)
The research provided is from a paper presented by Tiorco to SPE. It covers 200+ Polymer-Gel Water Shutoff Treatments. It is adequate to understand the risks and varying results of the polymer treatments.

Reviewer 09-03 (Rating: 3)

It is not apparent from the proposal as to whether or not similar treatments have ever been attempted in the Williston Basin.

6. *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.*
   Please comment:

Reviewer 09-01 (Rating: 3)
The investigator has been involved with the work in the past.

Reviewer 09-02 (Rating: 5)
Mr. Synder's technical expertise and 30+ years of Williston Basin experience qualifies him as having a broad understanding of the project to accomplish.

Reviewer 09-03 (Rating: 4)
The project team seems well qualified to conduct this effort.

7. *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.*
   Please comment:

Reviewer 09-01 (Rating: 4)
The scheduling and planning for the proposed project is obtainable considering the amount of steps in the proposal.

Reviewer 09-02 (Rating: 4)
The plan is a design that Tiorco has used with success on other polymer gel treatments. Modifications for each individual wellbore will be necessary.

Reviewer 09-03 (Rating: 4)
No comment.

8. *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.)*
   Please comment:

Reviewer 09-01 (Rating: 5)
The proposed equipment is minimal.

Reviewer 09-02 (Rating: 5)
No equipment is to be purchased.

Reviewer 09-03 (Rating: 5)
No comment.

9. *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.*
   Please comment:

Reviewer 09-01 (Rating: 5)
The facilities are more than acceptable for this proposal.

Reviewer 09-02 (Rating: 3)
The assumptions are that the wells are capable to produce fluids at present and that the facility equipment is adequate. The equipment used in the Polymer Gel Treatment is to be leased from well servicing companies and provided by Tiorco.

Reviewer 09-03 (Rating: 4)
No comment

10. *The proposed budget "value"[1] relative to the outlined work and the financial commitment from other sources is of: 1 – very low value; 2 – low value; 3 – average value; 4 – high value; or 5 – very high value. (See below)*
    Please comment:

Reviewer 09-01 (Rating: 2)
The overall value to the state may be low on the production side however it will have an effect on overall economics.

Reviewer 09-02 (Rating: 4)
No comments

Reviewer 09-03 (Rating: 3)
Reasonable (50%) cost share from the operator is noted.

Section C. Overall Comments and Recommendations:

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

Reviewer 09-01 (Funding may be considered)
The overall production increase from this project will be minimal. The most benefit for the state will be the lower baseline for economic limits of cutoffs for capital expenditure projects.

Reviewer 09-02 (Fund)
Assurances should be taken that the wells will have integrity for some future life so the projects can be continually monitored for some extended period of time such as 5 years. If successful the technical data obtained from the project can be used on many wells in North Dakota with water influx due to formation fractures. The benefits of this project will contribute to future projects of a similar nature and extend well life of existing wells. My recommendation is to fund the project.

Reviewer 09-03 (Funding may be Considered).
As mentioned previously, this project's potential to positively affect North Dakota production could be amplified significantly by incorporating additional formation waters into a parallel laboratory effort. In addition, the potential adoption of the technology would also be positively affected if the researchers committed to presenting these results in some way through the annual Williston Basin Petroleum Conference, and/or making the results widely available through informational products that could be distributed in some way to North Dakota's oil and gas industry.

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[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.*