Blaise response to questions raised in:

TECHNICAL REVIEWERS' RATING SUMMARY

G-020-A
Flare Gas - Power Generation Viability Pilot
Submitted by Blaise Energy Inc.
Principal Investigator: Pascal Boudreau
Request for $425,000; Total Project Costs $7,475,000

Rating Category	Weighting Factor	Technical Reviewer 20A-01 Rating	20A-02 Rating	20A-03 Rating	Average Weighted Score
Objective	9	4	5	5	42.0
Availability	9	4	2	2	24.0
Methodology	7	3	2	2	16.3
Contribution	7	3	2	3	18.7
Awareness	5	4	3	3	16.7
Background	5	2	2	2	10.0
Project Management	2	3	2	2	4.7
Equipment Purchase	2	4	2	2	5.3
Facilities	2	3	2	3	5.3
Budget	2	3	3	3	6.0
Average Weighted Score		170	134	143	**149.0**
Maximum Weighted Score					**250**

OVERALL RECOMMENDATION

FUND	**X**		
FUNDING TO BE CONSIDERED		**X**	**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: 1 – very unclear; 2 – unclear; 3 – clear; 4 – very clear; or 5 – exceptionally clear.

Reviewer 20A-01 (Rating: 4)

The project will supply jobs and revenue for the state. It will also promote public awareness to other benefits the oil and gas industry can provide.

Reviewer 20A-02 (Rating: 5)

The project's stated objectives are very well aligned with those of the Oil & Gas Research Program. Especially those related to the efficient, environmentally sound development of ND's oil & gas resources.

Reviewer 20A-03 (Rating: 5)

The project objectives are very clearly stated and are aligned closely with the goals and objectives of the Oil & Gas Research Program. Note Goal and Purpose number 4 states "Encourage, and promote the use of new technologies and ideas that will have a positive economic and environmental impact on oil and gas exploration, development, and production in North Dakota."

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.

Reviewer 20A-01 (Rating: 4)

I believe the objectives are achievable in projected time frames even with the late start. Site selection was to take place on December 25, 2009, but we are still in the ball park. The budget seems manageable although there always seems to be unforeseen problems with new projects.

Reviewer 20A-02 (Rating:2)

The approach is not enumerated in any technical sense. In essence, the author's have left the reviewer with only enough information to assume that the technology is a "black box," focusing all of their allotted space on enumerating the benefits of a successful effort, while leaving the reader to assume that success is somehow inevitable.

It is important to remember that the objective of the Pilot is to prove financial viability of utilizing casing head gas to generate electricity for sale back into the electrical grid. If the approach is measured against time and budget available per above description of criteria 2, then is this the area to evaluate the technical enumeration? With respect to the project running concurrently and staggered over 18 months, the stated objective of proving a commercially viable alternative to flaring in North Dakota using all existing and proven technology should be achievable. With regard to approach availability measured against budget, figures presented are accurate and well researched.

We are not claiming new technology, but a new method of configuring existing technology in an innovative way to solve a unique problem. All components making up the mobile generation units are proven and commercially available. We have multiple equipment options available depending on gas quantity and makeup, consequently the page limit of grant request did not allow for equipment specifications of all options available. We will utilize standard shipping containers to contain "off the shelf" equipment already proven.

Because every potential site is different from a gas quantity and chemical makeup of the gas, we have to size the equipment (appropriate size of turbine) according to gas quantity, and associated gas conditioning equipment will be dependent on gas makeup.

Variables such as level of H2S, C02, etc may require different conditioning and filtration systems, which will be determined upon site selection. It is not that we are trying to be vague on these details, it is that because of the unique variables of every site, equipment will be (mostly size of turbine and gas conditioning equipment) determined after we know quantity and makeup of gas (as determined by gas analysis provided by oil operator).

We are currently in deep negotiations with multiple oil operators and have several potential site options under consideration. In multiple instances, Blaise cannot claim site is selected and have equipment specified until we also work through required contractual negotiations with operator, which is rapidly underway. Equipment options have been well researched and we have a thorough understanding of how to accommodate various gas makeup scenarios.

We also have developed the relationships and worked through the appropriate contractual requirements to interconnect with the Rural Electric Coops to be able to safely hand the electricity off to them and receive payment. Other variables include matching the size of generation with what can be handed off to the grid on the other side.

Reviewer 20A-03 (Rating: 2)

The methodology and techniques sections of the proposal provide no details about the processes or equipment to be used. It can't be assumed that the combination of components selected and configured will work as planned in the sour gas and highly variable ambient temperature conditions common in North Dakota.

See above response.

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.

Reviewer 20A-01 (Rating: 3)

They were straight forward and seem to be on point. Instead of having one scenario, they outlined other options.

Reviewer 20A-02 (Rating: 2)

There is essentially no methodology enumerated in this proposal.

We have amended the grant request to better define the methodology not for testing new technology but using existing proven technology in a new configuration to prove the financial viability of new methods to provide alternatives to flaring. Blaise will utilize existing and proven "off the shelf" equipment, such as GE, Pratt & Whitney and Capstone turbines, and electrical equipment vendors already in use by Electrical Coops. We will condition the associated gas utilizing existing and proven methods such as Amine and membrane filters, and other accepted gas conditioning equipment. These methods will allow for a greater usable gas range and optimal combustion in a gas turbine generator, producing reliable and consistent electricity for sale and introduction into the local electrical grid.

The following information can be scaled according to the gas volume of the specific site selected:

- ***Generate 24,000 kWh per 325 MMBTU (or 325 MCF @ 1000 BTU) of associated gas. In terms of a daily rate, this volume (325 MCF) would be enough to run a 1 MW generator and supply about 1000 average US homes.***
- ***This scenario would prevent the wasting of almost 120,000 MCF of natural gas per year.***
- ***This scenario could help displace coal generation equivalent to 10 tons of coal per day or 3650 tons per year.***

The focus of the pilot will be on precisely monitoring all costs and revenue and ultimately comparing them with assumptions as well as stated targets. All project costs will be tracked closely and any expenditure will require approval in order to insure no costs are omitted. Revenue is single sources and should be much easier to track. All costs and revenue are going to be normalized to a cost per KWh produced with one-time costs spread over 3 years.

The grant application outlines a new creative solution and method of dealing with flaring. The focus of this pilot is to test the financial viability of this unique configuration on different gas condition scenarios. Fully understanding the operational costs and resilience of this equipment in the harsh oil field environment

will allow us to determine if target margins can be achieved and maintained, hence prove the commercial potential of this solution in North Dakota.

Reviewer 20A-03 (Rating: 2)

As noted above the methodology section provides quantitative benefits of the pilot tests, but little to no detail on the methods to be employed.
We have added additional detail in our amended grant proposal to further define the methodology of determining the financial viability of using casing head gas to generate electricity for sale into the electrical grid. We are not, nor is the grant request intended to define new technology, but rather use existing technology in a new configuration. The existing technologies we are using are standard gas conditioning systems, thoroughly established turbine manufacturers and standard utility-grade electrical equipment to do the electrical handoff.

4. The educational 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.

Reviewer 20A-01 (Rating: 3)

This is not new technology, but would be the first one in the state. It will also have a positive environmental impact. Proposal clearly defines the commitment to the EmPower ND policy and also supports the nations 25X25 initiative.

Reviewer 20A-02 (Rating: 2)

As would be suggested by the comments in the previous review categories, the authors have left the reviewer no means of evaluating any potential contributions scientifically or technically in this field. There is no enumeration as to how high the H2S content of the respective gas streams are. There is no enumeration as to how low the BTU content of the respective gas streams. There are further no explanations as to how these challenges will be overcome.
We have added additional detail in the amended grant application that highlights our leveraging of the expertise of respected firms in the field, and how we will make use of the existing gas analysis provided by the oil operator. We can accommodate gas from 200 to 2200 BTU and H2S content up to 12% by taking advantage of enhanced gas conditioning methods.
Remembering that the grant isn't enumerating on new inventions or technologies, but rather a new application of existing and proven technologies and system., The scientific and technical contribution is the commercial application of existing and separate technologies, and applying in an innovative way to a new and untested business model.

Reviewer 20A-03 (Rating: 3)

The proposal does not provide any information regarding potential scientific contribution. On the other hand the technical contribution could be very large and the proposal does include plans to hold workshops to share the technical knowledge gained with oil operators and the community.

5. The principal investigator's awareness of other current educational efforts being conducted by other persons or entities related to the proposal is: 1 – very limited; 2 – limited; 3 – adequate; 4 – better than average; or 5 – exceptional.

Reviewer 20A-01 (Rating: 4)

Investigator seemed to be very informed and appears to know what he is talking about. The proposal is complete and well put together.

Reviewer 20A-02 (Rating: 3)

No literature is referenced. However, the authors do certainly allude to statistical data from EIA and presumably the NDIC's Oil & Gas Division.

Reviewer 20A-03 (Rating: 3)

No literature is referenced, but the proposal states that input was sought from oil operators, electric utilities, equipment manufacturers, the state health department, and state commerce department.

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.

Reviewer 20A-01 (Rating: 2)

Did not have enough information to make an informed answer.

We have added additional detail on the background of the PI in the amended grant proposal. The principal investigator (Pascal Boudreau) is an electrical engineer with a specialty in control systems. Pascal is in charge of Operations and engineering and has held the following positions prior to his involvement with Blaise Energy: Manager of Sales Engineering for JDSU, Director of Implementation for Terabeam, Director of Network Development for NBTel (now Alliant), System Control Engineer at NBPower. Pascal has over 15 years of experience managing complex projects and fostering relationships at all corporate levels.

Reviewer 20A-02 (Rating: 2)

No information regarding the investigator's qualifications is provided.

Reviewer 20A-03 (Rating: 2)

No information regarding the PI's qualifications is provided.

7. The project management plan, including a well-defined milestone chart, schedule, financial plan, and plan for communications among the parties involved in the project . is: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – very good; or 5 – exceptionally good.

Reviewer 20A-01 (Rating: 3)

The plan seems well put together utilizing other project participants and contractors who have expertise in this area. The milestone chart takes you from start to finish and is well defined.

Reviewer 20A-02 (Rating: 2)

Again, the authors have provided minimal information for the reviewer to evaluate their project management plan. No Gantt chart is provided to allow for visualization of the milestones and attendant schedule – but the authors suggest that they will provide a confidential Gantt chart once final site selection has occurred. Subcontractors and suppliers are not enumerated. Schedules for fabrication, etc. are not provided.
Additional information has been added to the grant proposal including the coordination between the oil operator, the rural electrical coop, the turbine dealer and Blaise Energy. It is somewhat difficult to provide additional detailed information until final site selection, which is currently being resolved and finalized. Upon which time more detailed project management plans will be provided with exact dates for delivery of equipment, test and turn-up and grid connection. We will also leverage as much as possible the use of existing contractors for the oil operators such as using their gas analysis and existing vendor/subcontractors for piping and connecting to flare stack, etc. We also have coordinated with the electrical coop to also use their existing vendors for electrical connections to the grid and any additional power line infrastructure improvements, transformer installation, etc.
Reviewer 20A-03 (Rating: 2)

The PI has provided project milestones, but no schedule or timetable for achieving them. A confidential Gantt chart is promised, but not until "some initial milestones further define the project start time."

Blaise will host weekly conference calls (at a minimum) to communicate project milestones and next steps. A web portal will be established to share the project plan, activity calendar and other documents among stakeholders.

8. The proposed materials and media to be developed or used are: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – very good; or 5 – exceptionally good.

Reviewer 20A-01 (Rating: 4)

It does not appear they want to buy any equipment that is not needed for the facility. The use of mobile generation units is a good idea; they may be utilized in other places in the future.

Reviewer 20A-02 (Rating: 2)

No justification for equipment purchase is provided, nor any equipment specifications. It is virtually certain that equipment is needed for the project to proceed as described, but again, the reviewer cannot evaluate this with the information provided. The authors suggest in one area that the equipment will be financed by a 3rd party (Budget section of proposal), while it is less clear in Appendix B. The Budget section, when viewed in conjunction with the data in Appendix B suggest that equipment O&M costs will also be at least partially financed by a 3rd party. Surely the financing entity would require some specification?
Equipment will be necessary, and therefore must be purchased. Equipment will be sized per the flare quantities, which will be finalized upon site selection. Equipment financing will be provided by equipment vendor.

Reviewer 20A-03 (Rating: 2)

No details are provided about what equipment is being purchased, specifications, cost, or financing. It isn't possible to evaluate this based on the information provided.
Equipment specifications, cost and financing amount will be provided upon final site selection.

9. The materials and media available and to be purchased for the proposed educational effort are: 1 – very inadequate; 2 – inadequate; 3 – adequate; 4 – notably good; or 5 – exceptionally good.

Reviewer 20A-01 (Rating: 3)

No Comment

Reviewer 20A-02 (Rating: 2)

There is no means of adequately evaluating the suitability of the facilities and equipment with the information that is provided.

Not sure if 9 pertains to equipment used on site for the gas to electricity conversion, or equipment used for educational effort? If it is materials and media for proposed education, then we have that readily available but were unaware that needed to be presented in the grant proposal. We will conduct multiple seminars for the oil industry sharing our findings, alternatives to flaring and the economics around proposed flaring alternatives. We will leverage existing oil industry functions (such as presenting at Williston Basin Petroleum Conference, OGRC etc.), as much as possible to facilitate participation. The equipment will be computers, projectors and powerpoint presentations which we currently have. The funds requested will be used for reservation of facilities (meeting rooms), catering, and preparation of collateral.

Reviewer 20A-03 (Rating: 3)

The PI doesn't provide enough information to determine the adequacy of the facilities and equipment. ***See above***

10. The proposed budget value 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)

Reviewer 20A-01 (Rating: 3)

No Comment

Reviewer 20A-02 (Rating: 3)

Should the objectives enumerated in this proposal be attained, there could be a very high value. The degree of financial commitment from other sources is completely unclear. Other than waived salaries on the part of Blaise Energy, the only other cost-share is in the form of equipment. Perhaps fair rental value over the course of the project would be more appropriate to recognize as cost share.

Equipment value is contained in the budget section, and our contribution is a combination of self funding and equipment financing, which Blaise will be financially responsible for.

Reviewer 20A-03 (Rating: 3)

If the objectives in this proposal are attained, the value would be very high. The breakdown of the financial commitment from other sources is provided. Cost share is a combination of Blaise Energy waived salaries and equipment, but it isn't possible to evaluate the equipment value with the information provided.

[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.

<u>Financial commitment from other sources</u> – 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.

Proposed support from the NDIC is currently projected at less than 6% of total project cost per submitted budget.

Section C. Overall Comments and Recommendations:

Reviewer 20A-01

The project will create jobs, generate revenue and have a positive environmental impact. I feel the project should be funded.

Reviewer 20A-02

As stated previously, the project's stated objectives are very well aligned with those of the Oil & Gas Research Program. Especially those related to the efficient, environmentally sound development of ND's oil & gas resources. However, the authors have done an extremely poor job of enumerating how those objectives will be attained.

This reviewer suggests that the Council only consider funding after the following are provided:

- *An adequate description of the gas quality and attendant quantities for each application.* ***Will be provided upon final site selection.***
- *An adequate description as to how the attendant quality constraints of these gas streams will be addressed.* ***Is dependent on final site selection, and will be provided when final site is selected.***

- *An adequate description of the equipment that will be utilized, along with attendant size/cost considerations.* ***Turbine, gas conditioning equipment and associated electrical equipment is dependent on many variables such as gas quantity and analysis, what the grid is able to handle, so will be provided upon final site selection.***
- *Details regarding what, if any, type of performance monitoring will be conducted over the course of the effort and how those data will be evaluated.* ***The focus of the pilot is on precisely monitoring all costs and revenue and ultimately comparing them with assumptions as well as stated targets. All project costs will be tracked closely and any expenditure will require approval in order to insure no costs are omitted. Revenue is single sources and should be much***

easier to track. All costs and revenue are going to be normalized to a cost per KWh produced with one-time costs spread over 3 years.

- *The qualifications of Blaise Energy and its principals should be enumerated.* ***Provided above.***
- *A Project Management plan with realistic procurement and fabrication timelines should be provided. A Gantt chart should be prepared that illustrates critical pathways for successful project execution. Letters/quotes from suppliers/fabricators with attendant timelines should be provided.* ***Will be provided upon final site selection.***
- *Details regarding the specific nature of the cost share to be provided. Do the host producers have any skin in this effort?* ***Blaise will have 94% of costs covered by self funding and debt.*** *Is the alluded to financing readily forthcoming – can a letter of credit be provided?*

These data should then be provided to a reviewer with appropriate background knowledge to better evaluate the project's merits.

Again, the proposed effort would be worthy of consideration, should these points be adequately addressed. However, the virtual absence of any technical detail in this proposal limits the ability of this reviewer to recommend funding.

Reviewer 20A-03

The project's stated objectives align very well with the goals and objectives of the Oil & Gas Research Program. The PI has not done a good job of explaining how the objectives will be attained.

It is recommended that the Council consider funding only if the PI can provide the following information:

A description of what equipment is being purchased, cost, and financing.

A timetable for achieving the project milestones.

The qualifications of the PI and other technical resources.

Blaise Energy and its principals should be enumerated.

A breakdown of the financed equipment cost share. Is funding state, private or federal? Is private funding from venture capital, financed by manufacturers, bank financed, or from the oil and gas operator who will benefit?