Renewable Energy Council

March 30, 2022
Agenda

• 9:00 AM   Call to Order
  Welcome & Opening Comments
  Consideration of September 22, 2021 Meeting Minutes
  Financial Report
• 9:10 AM   Consideration of Grant Round 49 Requests
• 10:10 AM  Discussion/Completion of Ballot/Administration Business
• 10:30 AM  Adjourn
Round 49

• 9 applications received
  • 3 sent to Technical Reviewers for peer review
• Total amount being considered for Round 49
  • $566,500
R-049-A – MSC High Protein Project

- Submitted by: Theraldson Ethanol LLC
- PI: Ryan Carter, General Manager
- Project Duration: 21 Months
- Requesting: $500,000
- Total Project Costs:
  - $80,322,468
• Project Objectives

• The purpose of this proposal is to request funds from the North Dakota Industrial Commission (NDIC) Renewable Energy Program to assist GP Turnkey Tharaldson, LLC, a new joint venture with Green Plains, Inc. and Tharaldson Ethanol Plant I, LLC, with the integration of the MSCTM High Protein Project. The MSCTM high protein project is designed to implement equipment to generate a high-grade protein product from whole stillage that will trade at a value substantially higher than DDGS. The MSCTM High Protein will be made using Maximized Stillage Co-Products (MSC) Technology, which was developed and patented by Fluid Quip Technologies (FQT). The protein has shown great success in the pet food, aqua, dairy, poultry, and swine markets. The coproducts that will be produced will be sold to North Dakota companies, nationally, and internationally. The goal for GP Turnkey Tharaldson, LLC is to accelerate the reinvention of the biofuels industry. New jobs will be created with this project to support the operations of the facility along with local services that will be used to assist GP Turnkey Tharaldson, LLC.
R-049-A – MSC High Protein Project

- Reviewers Ratings
  - FUND – 228/250
  - FUND – 209/250

- Average Weighted Score: 218.5 / 250
All reviewer's felt project was achievable

One reviewer felt that the schedule was fairly aggressive due to the state of readiness of the technology and the expected immediate success of the resulting products.

One reviewer felt the schedule was well defined
All reviewers felt the methodology was above average.

One reviewer felt this first-time installation in North Dakota has been implemented elsewhere and there are plans to review these prior to commissioning.

One reviewer commented that the business, facility, process, resources, and expected results are relatively well-described. Detailed technical descriptions of MSC technology is not provided, but not critical information.
All reviewers felt the scientific/technical contribution could be significant.

This first-time installation in North Dakota has been implemented elsewhere and there are plans to review these prior to commissioning.

The business, facility, process, resources, and expected results are relatively well-described. Detailed technical descriptions of MSC technology is not provided.
All reviewers were comfortable with the project management plan.

One reviewer stated the proposal outlines current individual responsibilities with the installation along with ensuing operational responsibilities. Though there are some completion date errors in the submitted timeline chart, the schedule appears to be achievable. The breakdown of the financial plan is provided.

Another reviewer states the project management plan is generally extremely well-defined, the exception being the lack of a detailed communications plan with subcontractors, which is not necessary.
### Table 4: MSC™ High Protein Project Budget

<table>
<thead>
<tr>
<th>Project Associated Expense</th>
<th>NDIC’s Share</th>
<th>Applicant’s Share (Cash)</th>
<th>Applicant’s Share (In-Kind)</th>
<th>Other Project Sponsor’s Share</th>
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</thead>
<tbody>
<tr>
<td>Consulting/Engineering/Salaries</td>
<td>$500,000</td>
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<td>Marketing &amp; Advertising</td>
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<td>Buildings &amp; Materials</td>
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<td>Equipment</td>
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<td>Equipment Installation</td>
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<tr>
<td>Dryer Siding Equipment &amp; Installation</td>
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<td>Truck Loadout Equipment</td>
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<td>Truck Loadout Installation</td>
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<td>Rail Loadout Equipment</td>
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<td>Rail Loadout Installation</td>
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<td><strong>Subtotals</strong></td>
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<td><strong>Total Projected Budget</strong></td>
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</table>

Applicant’s Share of Cash is provided from the joint venture of 50% contributed capital by Green Plains, Inc. and 50% contributed capital by Tharaldson Ethanol Plant I, LLC.
Reviewer's comments

Innovation in the ethanol industry has been rather slow over the years. This MSCTM High Protein Project provides many benefits to the State of North Dakota. According to the proposal, this project will provide a short term positive economic impact to the site region along with long term employment stability with 15 additional jobs to the site (approximately $840k/yr in wages). The project will also supply a better animal feed product to the region and utilize additional renewable resources (corn). There is no additional environmental impact. After reviewing this proposal along comparing it to the North Dakota Industrial Commission Renewable Energy Council’s mission statement, goals & purposes and grant priorities, the two align with almost every bullet point. This project appears to be very positive for the State of North Dakota.

The proposed project will provide additional income to a critical biorefinery, high-quality feed for the state’s livestock industry, additional feedstock for the biomass-based diesel, and even more secure market for North Dakota corn. Given the technology and track record of the associated businesses and management, project success is a near certainty.
This project supports all 6 goals & purposes set forth by the North Dakota Industrial Commission Renewable Energy Council. The project also meets the additional goals and objectives cited with investment, job creation, preservation of production, new technology, maximization, no additional environmental impact and taking the lead that may be followed by other ethanol plants.

The proposal’s objectives clearly align with REP goals of 1) promotion of development, 2) job creation, 3) economic stability and growth, 4) and use new technology.
Suggested Contingencies if Funded

• Recommend to fund project

• Contingencies
  
  • Consider careful review of the project schedule as it seems fairly optimistic and aggressive
R-049-A – MSC High Protein Project -
Presenter

• Ryan Thorpe – COO, Project Management, Data Analysis
R-049-D – Front End Engineering and Design (FEED) Study for Creosote Treated Railroad Tie Fuel Conversion at Spiritwood Station

•Submitted by: Great River Energy – Spiritwood Station
•PI: Glenn Hauck, Manager – Spiritwood Station
•Project Duration: 5 Months
•Requesting: $66,500
•Total Project Costs:
  • $133,000
Project Objectives

Great River Energy is evaluating an alternative low carbon intensity fuel source at its Spiritwood Station located at Spiritwood, North Dakota. The 99MW gross capacity combined heat and power plant produces steam and electricity. Currently, Spiritwood Station’s primary fuel source is beneficiated lignite sourced from Great River Energy’s Coal Creek Station and co-fired with natural gas fuel. Steam from Spiritwood Station powers an adjacent agriculture processing plant – the Dakota Spirit ethanol biorefinery. The plant also has the capacity to generate up to 99 megawatts of electricity for homes, farms and businesses in the regional energy market. Spiritwood Station is currently working with a new soybean crushing facility about the opportunity to serve the facility steam. Spiritwood Station has a significant impact on the local economy through 34 operating jobs plus many indirect jobs. Spiritwood Station has a positive impact on the agricultural industry by providing steam to operate the Dakota Spirit ethanol biorefinery, which uses corn from and markets distillers’ grains to area farmers. Dakota Spirit also provides stable, good-paying jobs and a steady market for locally grown corn.

Due to the upcoming sale of Coal Creek Station, Great River Energy desires to evaluate alternative fuel availability, fuel costs, and the capital costs of converting the boiler, fuel handling system, and ash handling system to replace coal with biomass, specifically creosote treated railroad crossties (CTRT’s).
R-049-D – Front End Engineering and Design (FEED) Study for Creosote Treated Railroad Tie Fuel Conversion at Spiritwood Station – Reviewers Ratings

- Reviewers Ratings
  - FUND* – 171/250
  - FUND – 161/250
  - FUND – 197/250

- Average Weighted Score: 176.3 / 250

* Fund if contingencies/questions answered
All reviewer's felt project was achievable

One reviewer felt that the schedule was achievable since this was a high-level engineering evaluation.

One reviewer felt expressed some concern about potential pandemic delays. Some of the turnaround times for reviews and comments may be a little optimistic.

Reviewer is concerned that the amount of time allocated to review and comment periods is too aggressive.
R-049-D – Front End Engineering and Design (FEED) Study for Creosote Treated Railroad Tie Fuel Conversion at Spiritwood Station – Methodology

• All reviewers felt the methodology was above at or above average

• One reviewer noted the expertise in the engineering firm as contributing to the solid methodology.

• Another reviewer believes that the methodology is adequate, but not outstanding.

• A reviewer states that the logical breakdown in tasks by the consultant contributes positively to the methodology.
All reviewers agreed that the contribution and knowledge of the principal participants was better than average.

One reviewer noted that the engineering firm has significant experience.

A reviewer notes that Mr. Hauck’s specific experience with refuse-based fuel boilers offers unique experience to the project.

A reviewer noted that Great River Energy’s extensive boiler operation experience paired with the design engineers should provide a “better than average” solution to this engineering project.
All reviewers felt the management plan would be adequate or very good.

One reviewer felt the engineering firm was capable of managing the project.

A reviewer felt that there should be provisions for interim reports.

A reviewer felt that the work was well defined, but noted that there should be feedback to the REC after each phase of the study was completed.
Reviewers were mixed

All reviewers noted that the project had no equipment that was being purchased.
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<th>Other Project Sponsor’s Share</th>
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<tbody>
<tr>
<td>FEED Study</td>
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<tr>
<td>Total</td>
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</table>
• One reviewer had concern that proper measures would need to be taken to assure that the toxicity of burning ties could be effectively managed with pollution control equipment in place at the plant.

• A reviewer recommended that this project be funded at the level proposed. The project prepares usable deliverables that have a defined fixed scope to judge further investment in the Spiritwood Station.

• A reviewer suggested that while the project as proposed has limited application, it has the potential to provide a pathway for future low to modest cost energy to support two agricultural processing plants that provide benefit to the state of North Dakota.

• A reviewer had concern of the supply chain and availability of ties to the project for fuel.

• Design concerns were listed as:
  • How does this supplemental biomass fuel affect the MCR? Is there an optimal balance
  • Will this fuel blend negatively affect flyash makeup? What will the disposition of the ash be?
  • Will this design negatively affect the metallurgy of the furnace?
R-049-D – Front End Engineering and Design (FEED) Study for Creosote Treated Railroad Tie Fuel Conversion at Spiritwood Station - Presenters

- Glen Hauck – Spiritwood Station
- Eathan Gumke – Spiritwood Station
- William Gallagher – Great River Energy
• Recommend to fund project with the following contingencies

• Design, schedule and logistic concerns were listed below. It is recommended that due diligence be performed and answers to the following questions be submitted to the appropriate responses.
  
  • Will this fuel blend negatively affect flyash makeup? What will the disposition of the ash be?
  • Will this design negatively affect the metallurgy of the furnace?
  • Schedule seems optimistic, care should be taken in making sure schedule is achievable and that there is adequate time for review
  • One reviewer had concerns that this project may see fuel supply issues. It is recommended that the investigators perform proper due diligence on the fuel supply topic and verify a consistent supply of ties for fuel.
  • A reviewer states their concern that the toxicity of the burning of railroad ties coated in creosote. It is recommended that the investigators perform appropriate due diligence to assure that proper environmental controls are in place to minimize any toxicity that may be released in the burning of the ties.