# Technical Reviewers' Rating Summary

Proposal Number G-37-01 Application Title Submitted By Hell Creek Environmental S Request For $137,321.00 Total Project Costs $274,642.00

## Section A. Scoring

| Statement | Weighting Factor | G-37-01B | G-37-01A | G-37-01C | Average Weighted Score |
|---|---|---|---|---|---|
| 1. Objectives | 9 | **4** | **4** | **4** | **36** |
| 2. Achievability | 7 | **4** | **4** | **4** | **28** |
| 3. Methodology | 8 | **3** | **3** | **4** | **24** |
| 4. Contribution | 8 | **4** | **3** | **4** | **24** |
| 5. Awareness / Background | 5 | **4** | **4** | **4** | **20** |
| 6. Project Management | 3 | **4** | **3** | **4** | **9** |
| 7. Equipment / Facilities | 2 | **3** | **3** | **4** | **6** |
| 8. Value / Industry - Budget | 4 | **4** | **3** | **4** | **12** |
| 9. Financial Match - Budget | 4 | **4** | **2** | **5** | **12** |
| **Average Weighted Score** | | **190** | **167** | **204** | **187** |
| | Total: 50 | | | | **250 possible points** |

## OVERALL RECOMMENDATION

| | | | |
|---|---|---|---|
| FUND | **X** | | **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:

   Very clear alignment with the following two goals: "Promote efficient, economic, and environmentally sound exploration, development and use of North Dakota's oil and gas resources." "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."
   - Reviewer: G-37-01B
   - Rating: 4

   Very clearly addresses NDIC goals of improving industry suitability by the development of new technology, maximizing value, and developing information that can lead to other

projects or processes. I thought this was very well spelled out. The goals of developing a viable technology to improve the time and money involved in land reclamation was well spelled out as well as the possibility this technology to can be used in other areas of the oil & gas industry as well as other industries in the State.
- Reviewer: G-37-01A
- Rating: 4

The objectives and goals are referred to in the cover letter and defined in the Abstract. The project objective "is to deliver imagery which verifies that the current state of the art in aerial remote sensing can effectively and efficiently assess the eligibility of well sites for their satisfaction with NDIC and other agency requirements for post-closure reclamation." This relates to the well site land reclamation process which is overseen by NDIC land reclamation specialist. The document states the relation to OGRC objectives and goals on pages 3 and 4. The objectives and goals are consistent with the NDIC/OGRC goals.
- Reviewer: G-37-01C
- Rating: 4

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

Both the budget and time line appear reasonable and appropriate for the scope.
- Reviewer: G-37-01B
- Rating: 4

Two 5-day flying events in the Spring and Fall can be accomplished. Dealing with the data obtained is where any uncertainty lies, but it is a reasonable timeline to complete the work.
- Reviewer: G-37-01A
- Rating: 4

Part of the objective "is to deliver imagery which verifies that current state of the art in aerial remote sensing." As stated "This proposal is for funding to conduct proof of concept research and development into the use of remote sensing technology, via manned aircraft, to assess and validate the quality of land reclamation at plugged or otherwise closed oil and gas well sites subject to NDIC well closure requirements. The project does not cover future manned or unmanned surveillance projects. With this in mind, the timetable and budget presented should be achievable, dependent on ND weather.
- Reviewer: G-37-01C
- Rating: 4

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

Methodology is clear and well presented. There will likely be a large amount of group verification if the project moves forward, but that appears to be anticipated by the applicant.
- Reviewer: G-37-01B
- Rating: 3

The approach seems well thought out. Fly existing good reclaimed sites, ones that are considered good, but not released, and troublesome sites with optical camera to get data and then field verify the data to see that proper identifications can be made. Display the data on imagery that can be obtained at the "desktop" would follow that.
- Reviewer: G-37-01A

- Rating: 3

The methodology will utilize "a high definition, electro- optical (HD EO) camera at various altitudes in conjunction with post flight analysis and processing, enabling NDIC and Hess personnel to determine reclamation status at their desktop." The data collected by the manned flights with remote sensing will be verified by ground analysis. Three key elements for NDIC reclamation approval are defined (p.4). Also, the proposed study site categories are described (p.5) along with Pre- and Post-flight data components (p.5). Both Pre- and Post-Flight data will include ground inspection data for comparison. Flight methodology is also included. The quality of the methodology is good and the proposed ground inspection validation process is important for verification.
- Reviewer: G-37-01C
- 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:

   As ND continues to mature, reclamation of oilfield development activities is only going to become more of an urgent issue with all interested parties. I feel this project could be very beneficial in many ways going forward and aligns well with the goal of environmentally sound and efficient development.
   - Reviewer: G-37-01B
   - Rating: 4

   If the technology of flying with a good enough imagery camera to identify good land reclamation can be achieved, this has many possibilities in being used in various industries that deal with land use. This could be a big win for the State if this can be achieved and if it can be done at a reasonable cost.
   - Reviewer: G-37-01A
   - Rating: 3

   This project aligns with the goals and mission statement of the OGRC. Specifically with improvement to the environment through enhanced land reclamation. Also, the remote sensing embraces new technologies and has the capability to reduce site visits by both industry and regulatory. If successful the technology could be used with but not limited to pipelines and right of ways.
   - Reviewer: G-37-01C
   - 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:

   PI appears well qualified to conduct and execute this research.
   - Reviewer: G-37-01B
   - Rating: 4

   PI has a good background of education and experience. Has the added benefit of being from ND and desires the best for reclamation of ND lands.
   - Reviewer: G-37-01A
   - Rating: 4

The project consists of managerial, aerial and technology support. The principal investigator, Mark Jackson, is the VP of business development for Hell Creek Environmental. The aerial support is provided by Josh Brungardt, Executive VP with Paradigm. The technical support is provided by Todd Smith with Analytical Graphics, Inc. Their educations, job experience's and qualifications are extensive and are sufficient to support his project.
- Reviewer: G-37-01C
- 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:

   I appreciated the relatively tight schedule and budget. I think the sooner this information could become available, the better.
   - Reviewer: G-37-01B
   - Rating: 4

   Milestone chart/schedule look good. Financial breakdown of funds was specified but wasn't internally consistent in the document (within $2,713). Not a big discrepancy. Communications to be completed between Hess Corp. and HCE.
   - Reviewer: G-37-01A
   - Rating: 3

   The timetable along with key milestones is provided. It includes dates, status, actions, POC and notes. The timetable presented should be sufficient to tract and communicate the project progress.
   - Reviewer: G-37-01C
   - Rating: 4

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

   Equipment appeared justified and necessary for project completion.
   - Reviewer: G-37-01B
   - Rating: 3

   No comment
   - Reviewer: G-37-01A
   - Rating: 3

   All the proposed equipment that is presented in the budget is essential to the project.
   - Reviewer: G-37-01C
   - Rating: 4

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

   I feel there is a high level of value to stakeholders in both the private and public sectors. Hess appears to be a good partner due to their experience in ND and wide variety of development activities.
   - Reviewer: G-37-01B
   - Rating: 4

The title page indicates a total cost of $274,642 with requested amount of half of that or $137,321 whereas the Budget section later in the report adds up to a total of $280,068 with a requested amount of $140,034. A difference of $2,713. Not a great amount, but not sure where the difference comes from.
- Reviewer: G-37-01A
- Rating: 3

This project includes involvement from the service industry, producers (Hess Corporation) and regulatory (NDIC land reclamation specialists). It is unlikely to reproduce this project in a research setting. The field setting provides real time and the actual operating environment.
- Reviewer: G-37-01C
- Rating: 4

The inconsistency found between the total projected program cost is a mater of the initial estimate sited on the title page ($274,642) being drafted before a necessary addition to the budget was accounted for, specifically the ground truthing equipment line item found on page 14 ($4,932). That line item was also recorded inaccurately and is actually $5,426, a difference of $494. I apologize for the confusion. I would like to propose an even number of $280,000 as sited on page 2 and the adjustment in the total budget be made in the ground truth portion of the program.
- Applicant

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

Even with a 50/50 match, I still feel there is a high level of value to be gained from this research if selected to proceed.
- Reviewer: G-37-01B
- Rating: 4

Asking for the maximum allowed amount of 50%, but does have funds from Hess (Hell Creek and Paradigm). There is a plan noted in the timetable to find additional sponsors or reduce the scope of work if the 50% match is not achieved.
- Reviewer: G-37-01A
- Rating: 2

Hess Corporation has committed 50% or $140,000 towards the project. Also, Hess personnel and NDIC field specialists will be involved with validating field sites which will result in additional in-kind work hours.
- Reviewer: G-37-01C
- Rating: 5

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

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. I feel this project should be funded as it addresses an issue that will be critical to many stakeholders in ND for decades. The project clearly aligns with OGRP goals as noted above. There is significant upside potential for private and public employers that are tight on both time and money. For the state's investment, there is the potential of cost savings at several state agencies including the Dept. of Mineral Resources, Dept. of Health, and Dept. of Agriculture. Along with the potential budget upside, the goal of better and more timely reclamation activity could go a long way in bettering relationships between industry and impacted landowners.
- Reviewer: G-37-01B

I like this project. It has a big upside potential for the oil & gas industry and well as other industries if the concept can be proved out and deemed successful. The more efficient use of time and money could be a big win as well as the potential for more widespread use. I was a little disappointed with the financial numbers in the proposal. The total project cost was listed in three different places within the report with three different totals ($274,642, $280,000, & $280,068); same for the 50% requested amount. Not a big difference, but it would have been better to have them all consistent. I would have liked to have seen some scoping economics on the what the anticipated time & cost savings would be for the industry and NDIC inspectors if this approach is successful; to get an idea of what the savings could be. I realize this can be done with more accuracy once the study is complete. Technology like this isn't necessary inexpensive, but it seems like there is a lot of room for success here.
- Reviewer: G-37-01A

A strength of this project is the partnership with producers, the service industry and regulatory. Well site closures can take multiple trips by both producers and regulatory personal before they come to an acceptable closure. This project brings a high tech procedure of remote surveillance (high resolution imagery) to assist with well site land reclamation. This project should develop a level of confidence between operator and regulatory to support site closures and eliminate multiple trips to the location by both operator and regulatory personnel. If successful, this project should have have a positive impact on the landowner or share owners resulting in increased efficiencies and improved land reclamations. It has the potential to impact additional field activities such as pipelines, right of aways, and spill clean-ups. It also has the potential to introduce unmanned aerial surveillance. Some of the challenges as the project states is differentiating between certain grasses, scrubs and unacceptable weeds and invasive species. Also, determining site elevations. These are identified in the proposal and will have an impact to determining the level of confidence and satisfaction with site closures.
- Reviewer: G-37-01C