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October 29, 2018

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Ms. Fine:

Subject: Quarterly Project Status Report Entitled "iPIPE – Intelligent Pipeline Integrity Program" Contract No. G-046-88; UND Project – Fund 43500-UND0022445; EERC Funds 23121 and 23211

Attached is the subject project status report for the period of July 1, 2018 through September 30, 2018.

Thank you for funding this work. If you have any questions, please contact me by phone at (701) 777-5260 or by e-mail at jalmlie@undeerc.org.

Sincerely,

Jay C. Almlie
Principal Engineer
Mid/Downstream Oil & Gas Group Lead

JCA/kal

Attachment

iPIPE –INTELLIGENT PIPELINE INTEGRITY PROGRAM

Quarterly Project Status Report

(for the period of July 1, 2018, through September 30, 2018)

Prepared for:

Karlene Fine

North Dakota Industrial Commission
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Contract No. G-046-88

Prepared by:

Jay C. Almlie

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

October 2018

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Quarterly Progress Report
July 1, 2018 – September 30, 2018

BACKGROUND

During a May 2017 meeting with North Dakota pipeline operators, Governor Doug Burgum challenged industry to apply advanced technologies to eliminate pipeline leaks in North Dakota. In response to the Governor's challenge, industry chose a proactive path and engaged in a 3½-year program to advance development and application of emerging technologies that will prevent and detect pipeline leaks. The program intends to assist in the development of multiple emerging technologies to prevent and detect pipeline leaks by engaging with technology providers to refine not-yet-commercial products specifically for buried gathering pipelines in North Dakota and then demonstrate technology application on working gathering pipelines.

The goal of this project is to develop and demonstrate cutting-edge technology that can prevent and/or detect gathering pipeline leaks. This goal will be supported by accomplishment of the following objectives:

- Select the most promising emerging (near-commercial) technologies for demonstration.
- Assist technology providers in refinement of their products.
- Demonstrate multiple technologies on working gathering pipelines.
- Document results of technology demonstrations.
- Facilitate adoption of technologies into North Dakota pipeline operations.

Multiple demonstrations of emerging technologies on working pipelines will simultaneously assist technology providers in refining designs, pave a path toward full commercialization in the North Dakota market, prepare pipeline operators for adoption of the new tools, and improve the performance and economics of gathering pipeline operations in North Dakota. With demonstrated success, additional consortium members (pipeline operators) will join the effort, thus enabling field testing of more technologies and further proliferating new technology among all pipeline operators.

Founding members of the industry-led consortium include Hess Corporation, Equinor, Oasis Midstream Partners, Goodnight Midstream, ONEOK, and Andeavor. The consortium has asked the Energy & Environmental Research Center (EERC) to manage the program on its behalf. As such, the EERC submits this quarterly report on behalf of the members of the iPIPE consortium.

The following quarterly report summarizes the program activities from July 1, 2018, through September 30, 2018.

ACCOMPLISHMENTS DURING REPORTING PERIOD

- Program-level activities
  - Program briefings
    - EERC staff presented an introduction to iPIPE at the Bakken Conference & Expo in Watford City, North Dakota, on July 17, 2018.
    - EERC staff presented an update on iPIPE progress at the North Dakota Petroleum Council's Regulatory Committee meeting in Medora, North Dakota, on August 21, 2018.
    - EERC staff attended the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) Pipeline Safety R&D Forum, held in Baltimore, Maryland, September 11–12, 2018. iPIPE was invited to the forum to exchange information on common interests.
  - Member recruitment
    - The program is in discussion with a number of companies regarding new member participation. Some of these companies have approached the EERC regarding membership requirements and benefits, while others have been approached by the EERC and/or existing consortium members. At least two of these companies do not currently have operations in North Dakota. We believe this demonstrates the state of North Dakota's national leadership in creating a program such as iPIPE.
    - We have verbal commitment from one large North Dakota pipeline operator to join the consortium. This operator will be identified when contracting is completed.
  - Program media mentions
    - iPIPE has now been highlighted in nearly 20 public media or related articles. For a list of known media mentions, please refer to Appendix A.

- Technology selection
  - During this reporting period, the EERC continued its worldwide search for companies offering emerging technologies (not yet commercial) to improve gathering pipeline leak detection and gathering pipeline leak prevention. A wide range of technologies was investigated, explored, and considered. These technologies included a vast spectrum of unique approaches such as direct measurement technologies, remote sensing technologies, nanotechnology sensors, self-healing technologies, multisensor fusion technologies, advanced cathodic protection technologies, and miniaturized inline inspection technologies.
  - On August 24, 2018, iPIPE sent requests for proposals (RFPs) to 20 technology providers that the EERC had researched and determined to have promising emerging technologies to improve state-of-the-art leak detection and leak prevention. The RFP can be found in Appendix B of this quarterly progress report.
  - During the month of August, the EERC arranged for a Williston, North Dakota, venue to host the October 2018 Shark Tank event, at which the iPIPE Executive Committee will hear 30-minute presentations from each of the ten technology providers that submitted a proposal and will select which of the technologies the program wishes to fund for codevelopment activities during 2019.
  - In August and September, the EERC assisted numerous technology providers in exploring which of their technologies were suited for codevelopment efforts within iPIPE.

Technology providers were informed of specific and broad needs of pipeline operators, and the EERC was educated on the state of development of several emerging technologies.

- By September 21, 2018, the EERC had received ten proposals from the 20 technology providers invited. The companies submitting proposals included the following:
  - Insitu, Inc.
  - Satelytics, Inc.
  - mIQroTech, LLC
  - Southwest Research Institute
  - eSmart Systems, Inc.
  - Omnisens
  - Trinity Bend Solutions, Inc.
  - Direct-C Monitoring Services, Inc.
  - Physical Sciences, Inc.
  - Expert Infrastructure Systems, Inc.

- Demonstration execution – Satelytics
  - A "deep dive" meeting was held on July 11 in Minot. This meeting facilitated a daylong, detailed review of all Satelytics results provided to date and allowed for a deeper interaction between Satelytics representatives and pipeline operators. The meeting resulted in greater engagement between iPIPE members, EERC staff, and Satelytics staff during weekly WebEx-based update meetings. It also resulted in many suggestions to help Satelytics improve its Web-based interface for more efficient use by pipeline operators.
  - Weekly update meetings were held among Satelytics staff and iPIPE members via a WebEx conferencing service hosted by the EERC.
  - EERC staff accompanied Satelytics staff in the field during the week of August 27, 2018. The EERC–Satelytics team worked with Hess and Oasis Midstream personnel to collect water and soil samples. These samples were then used in efforts to improve brine detection algorithms being refined by the Satelytics team. All samples collected were analyzed by labs contracted by Hess to provide calibration targets for the Satelytics algorithms.
  - During the week of September 17, 2018, EERC staff completed the balance of water and soil sample collections requested by Satelytics.
  - Using data from the completed soil and water sampling, Satelytics has begun refining their brine alert algorithms. Satelytics will report on progress made at the end of the project.
  - During this reporting period, Satelytics continued its satellite data collection program and subsequent processing with deep-learning algorithms. Satelytics is attempting to identify hydrocarbon leaks, equipment encroachment, land movement, vegetation changes, and water quality near gathering pipelines within a target area. Satellite images captured and hydrocarbon alerts were delivered to iPIPE members as shown in Table 1. As of the end of this reporting period, Satelytics had completed 93.75% of its planned image captures and subsequent hydrocarbon alert analyses. Given the exceptionally cloudy nature of much of September 2018 in the designated area of interest, the program extended the contract with Satelytics to the end of November 2018 to enable final satellite image capture and subsequent data delivery.

Table 1. Satellite Image Capture and Hydrocarbon Alert Dates

Image	Analysis	Image Capture	Data Delivered
Tasked Image 1	Analysis 1	6/7/2018	6/10/2018
Tasked Image 2	Analysis 2	6/14/2018	6/18/2018
Tasked Image 3	Analysis 3	6/25/2018; 6/30/2018	6/27/2018; 7/3/2018
Tasked Image 4	Analysis 4	7/4/2018	7/8/2018
Tasked Image 5	Analysis 5	7/7/2018	7/10/2018
Tasked Image 6	Analysis 6	7/12/2018	7/16/2018
Tasked Image 7	Analysis 7	7/17/2018	7/18/2018
Tasked Image 8	Analysis 8	7/23/2018	7/25/2018
Tasked Image 9	Analysis 9	7/30/2018; 8/2/2018	7/31/2018; 8/6/2018
Tasked Image 10	Analysis 10	8/6/2018; 8/7/2018	8/8/2018
Tasked Image 11	Analysis 11	8/12/2018	8/14/2018
Tasked Image 12	Analysis 12	8/21/2018	8/23/2018
Tasked Image 13	Analysis 13	8/30/2018	9/1/2018
Tasked Image 14	Analysis 14	9/5/2018	9/6/2018
Tasked Image 15	Analysis 15	9/18/2018; 9/28/2018	9/19/2018; 9/30/2018
Tasked Image 16	Analysis 16	(pending)	(pending)

- Demonstration execution – Ingu Solutions
  - During this reporting period, six of the planned 15 tests of the Pipers technology were completed on various operating pipelines volunteered by Hess, Equinor, Goodnight Midstream, and Oasis Midstream Partners. Tests were conducted on the following types of pipeline:
    - 6" DIA composite carrying crude oil (Hess)
    - 8" DIA steel carrying crude oil (Equinor)
    - 6" DIA composite carrying produced water (Goodnight Midstream)
    - 4" DIA steel carrying high pressure gas (Hess)
    - 8" DIA polyethylene carrying produced water (Equinor)
    - 6" DIA steel carrying crude oil (Hess)
  - A number of tests planned for completion during this reporting period were delayed until October after encountering challenges in gathering pipeline design information for Ingu Solutions to use in determining appropriate Pipers hardware configurations.
  - Three pipeline segments specified as 2" segments that were initially volunteered by one of the iPIPE members were withdrawn from demonstration plans because none of the iPIPE members had 2" DIA pipelines available to volunteer for these tests.
  - Two pipeline segments (one 3" nonmetallic produced water pipeline and one 4" nonmetallic produced water pipeline) that were initially volunteered by one of the iPIPE members were withdrawn after the pipeline operator sold those assets. As of the time of this report, the program is still seeking replacement for these pipelines to demonstrate Pipers.

MEMBERSHIP AND FINANCIAL INFORMATION

The original budget proposed to North Dakota Industrial Commission Oil and Gas Research Program (NDIC OGRP) is $3,714,000, as shown in Table 2. Table 3 presents an expected budget and actual expenses incurred by the program to date.

Table 2. iPIPE Original Budget, $

Sponsors	2018	2019	2020	2021	Total
NDIC – Cash	403,320	405,226	393,454	398,000	**1,600,000**
Industry – Cash	264,000	450,000	450,000	450,000	**1,614,000**
Industry and Technology Provider – In-Kind	125,000	125,000	125,000	125,000	**500,000**
Total	**792,320**	**980,226**	**968,454**	**973,000**	**3,714,000**

Table 3. iPIPE Expected Budget and Expenses to Date, $

Sponsors	Expected Budget	Actual Expenses as of 9/30/18		Balance
NDIC Share – Cash	1,600,000		402,784	**1,197,216**
Industry Share – Cash	1,614,000		201,666	**1,412,334**
Industry – In-Kind	250,000	*Hess*	*96,879*	**173,186**
		Andeavor	*12,600*	
		Oasis	*19,620*	
		Goodnight	*6,800*	
		Equinor	*49,950*	
		Total	185,849	
Technology Providers – In-Kind	250,000	*Satelytics*	*107,323*	
		Ingu	*33,642*	
		Total	140,965	
Total	**3,714,000**		**931,264**	**2,782,736**

To date, CY2018 program membership dues have been collected from Hess Corporation, Oasis Midstream Partners, Goodnight Midstream, Andeavor, and ONEOK. Invoices for CY2019 membership dues will be sent in December 2018.

The program continues to solicit additional members to contribute to this program. As additional members join the program, Table 2 will be updated to show the additional financial resources brought to the program.

Project progress, as represented by the project schedule presented in the original NDIC OGRP proposal, is shown in Figure 1.

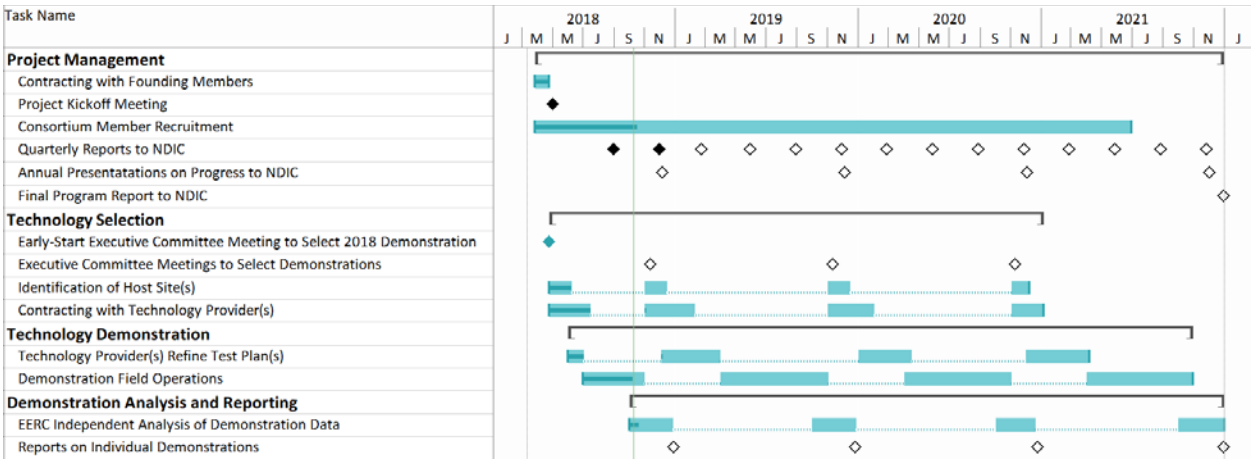

Figure 1. Project progress.

FUTURE ACTIVITIES

The planned activities for the next quarter are detailed below:

- Program-level activities
  - On October 25, 2018, EERC staff will present a high-level summary of iPIPE activities to the Rocky Mountain Environment Health & Safety Peer Group, at the request of RMEHSPG member, Anadarko, in Denver, Colorado.
  - iPIPE representatives will be available to present to NDIC's Oil & Gas Research Council (OGRC) at its choosing, per the declared deliverables included in the contract with the NDIC.
  - iPIPE will continue to solicit additional consortium members, following up on several open discussions.

- Technology selection
  - iPIPE will host its second iPIPE Shark Tank event in Williston on October 30 and 31. At this event, the Executive Committee anticipates engaging with ten different technology providers, then determining which technologies to award codevelopment funding for activities in 2019. Upon selection of technologies for investment, the Executive Committee will ask the EERC to work with each company to refine a detailed scope of work for 2019 codevelopment activities and then contract with the selected companies to complete that scope of work.
  - The EERC will continue to research and evaluate potential new and emerging technologies for consideration by iPIPE. The EERC will contact several potential candidates for the next "Shark Tank" event and will solicit proposals from select technology providers. This is a continuous task that will continue until the 2020 iPIPE Shark Tank event.

- Demonstration execution – Satelytics
  - Weekly satellite data capture and subsequent analysis will continue until the final satellite image is captured and processed. The program strongly prefers that this occur in October, but the image capture is at the mercy of cloud cover in the area of interest.
  - Satelytics will use data obtained from water and soil samples collected in August and September to calibrate and refine its brine detection algorithms.
  - Satelytics will provide iPIPE members with a report detailing Satelytics' perspective on overall performance of its technology throughout the summer/fall 2018 demonstration period.
  - The EERC will begin writing a final report for NDIC on the overall progress of the program, a summary of Satelytics performance, and a summary of Ingu Solutions performance. This report is due by the end of January 2019.
  - The EERC will also begin writing a separate detailed report on the EERC's independent assessment of Satelytics' performance during 2018 demonstration activities. This report will include an assessment of performance, estimation of challenges remaining before commercialization (if any), and an EERC forecast of commercial deployability.

- Demonstration execution – Ingu Solutions
  - Ingu Solutions will work with program members and the EERC to accomplish the remaining field tests on operating pipelines. Tests are currently scheduled for two weeks in October on Oasis Midstream Partners pipelines, Hess Corporation pipelines, and Equinor pipelines.
  - An Ingu Solutions team will travel to various pipeline sites volunteered by iPIPE members during scheduled weeklong windows in July, August, and September. During these weeklong demonstrations, Ingu Solutions will work with iPIPE companies to inject the Pipers sensors into operating pipelines and retrieve the sensors for subsequent and immediate data analysis. An EERC representative will be present during these operations to facilitate independent evaluation of the performance of the technology.
  - The EERC will begin writing a final report for NDIC on the overall progress of the program, a summary of Satelytics performance, and a summary of Ingu Solutions performance. This report is due by the end of January 2019.
  - The EERC will also begin writing a separate detailed report on the EERC's independent assessment of Ingu Solutions' performance during 2018 demonstration activities. This report will include an assessment of performance, estimation of challenges remaining before commercialization (if any), and an EERC forecast of commercial deployability.

APPENDIX A

LIST OF MEDIA MENTIONS

	Publication/ Organization	Date	Title	Link
1	KFRY-TV	June 6, 2018	iPIPE Program helps solve pipeline leaks in ND	https://www.kfyrtv.com/content/news/iPIPE-Program-helps-solve-pipeline-leaks-in-ND--484747291.html
2	Energy Matters (WZFG 1100 AM, Fargo)	May 31, 2018	Jay Almlie discusses the iPIPE program on Energy Matters Radio	https://www.youtube.com/watch?v=ZQuwsK0z2aM
3	Midland Reporter-Telegram	May 26, 2018	New consortium sets goal of improving pipelines	https://www.mrt.com/business/oil/article/New-consortium-sets-goal-of-improving-pipelines-12941971.php
4	North American Shale Magazine	May 22, 2018	ND implements intelligent pipeline project	http://northamericanshalemagazine.com/articles/2380/nd-implements-intelligent-pipeline-project
5	BNN Bloomberg	June 5, 2018	How a Canadian solution to detecting pipeline leaks is being used in North Dakota	https://www.bnnbloomberg.ca/video/how-a-canadian-solution-to-detecting-pipeline-leaks-is-being-used-in-north-dakota~1410402
6	Society of Petroleum Engineers Oil & Gas Facilities Magazine	July 18, 2018	Testing of new pipeline inspection device begins in Bakken	https://www.spe.org/en/ogf/ogf-article-detail/?art=4404
7	North Dakota Petroleum Council press release	Exact date of release unknown	Industry responds to governor's initiative to improve pipeline technology; program funding approved by North Dakota Industrial Commission	https://www.ndoil.org/industry-responds-to-governors-initiative-to-improve-pipeline-technology-program-funding-approved-by-north-dakota-industrial-commission/
8	UND Today	June 25, 2018	iPIPE: Taking a bite out of leaks	http://blogs.und.edu/und-today/2018/06/taking-a-bite-out-of-leaks/
9	Associated Press	June 21, 2018	Startup uses small sensors to check North Dakota oil pipes	https://www.apnews.com/9d65538034a24711a4a84d4e2bb38efe
10	Bismarck Tribune	June 12, 2018	Pipe sensors to monitor gathering lines	https://bismarcktribune.com/business/local/pipe-sensors-to-monitor-gathering-lines/article_cd64586c-1d52-52df-83e6-b661d3b95f0a.html
11	North Dakota Ag Connection	June 29, 2018	iPIPE: Taking a bite out of leaks	http://www.northdakotaagconnection.com/story-state.php?Id=688
12	Oil and Gas Online	May 26, 2018	Industry responds to governor's initiative to improve pipeline technology; program funding approved by North Dakota Industrial Commission	https://www.oilandgasonline.com/doc/industry-governors-initiative-pipeline-program-north-dakota-industrial-commission-0001

	Publication/ Organization	Date	Title	Link
13	U.S. News and World Report	June 21, 2018	Startup uses small sensors to check North Dakota oil pipes	https://www.usnews.com/news/best-states/north-dakota/articles/2018-06-21/startup-uses-small-sensors-to-check-north-dakota-oil-pipes
14	PennState Extension press release	May 25, 2018	North Dakota pipeline leak detection initiative announced	https://extension.psu.edu/north-dakota-pipeline-leak-detection-initiative-announced
15	Hess Corp. Twitter announcement	May 23, 2018	North Dakota Governor Doug Burgum provides remarks this morning at the Williston Basin Petroleum Conference in Bismarck, thanks Hess and the industry for innovation through iPIPE Program	https://twitter.com/HessCorporation/statuses/999315208261853185
16	Williston Herald	August 15, 2018	6 companies collaborating on pipeline leak detection	https://www.willistonherald.com/news/companies-collaborating-on-pipeline-leak-detection/article_bbce3194-a098-11e8-8bac-1b765123019e.html
17	Prairie Business Magazine	September 30, 2018	The digital oilfield: How digital technologies are changing the oil industry in ND and nationwide	http://www.prairiebusinessmagazine.com/business/energy-and-mining/4506605-digital-oilfield-how-digital-technologies-are-changing-oil

APPENDIX B

REQUEST FOR PROPOSALS

Request for Proposals

A consortium of gathering pipeline operators in North Dakota is exploring applications of new and emerging technologies that hold promise to improve leak detection and leak prevention in gathering pipelines. With cofunding from the state of North Dakota, the program anticipates investing several million dollars in demonstrations of promising technologies in 2018–2021.

The program is requesting proposals from interested technology providers to perform demonstrations during 2019. These demonstrations will be executed on operating liquids gathering pipelines volunteered by program members in North Dakota. The goal of these demonstrations is to evaluate the feasibility and cost-effectiveness of specific, new, emerging technologies to decrease the incidence of pipeline leaks. It is not the intent of the program to demonstrate technologies that are commonly employed on liquids gathering pipelines or that are already commercially proven and viable.

The program is managed on behalf of the consortium by the Energy & Environmental Research Center (EERC). The EERC will coordinate all activities leading to selection of specific technologies for demonstration and will then serve as an independent evaluator of demonstration results. As such, proposers are encouraged to discuss the program, intended outcomes, and specifics of this opportunity with the EERC. Contact information can be found within this document.

Fundamentals of North Dakota's Liquids Gathering Pipelines

In an effort to help proposers assess whether their technologies are a fit for cold climate gathering pipeline operations in varied, sometimes rugged terrain, we present the following summary of typical pipeline operations in North Dakota:

- Liquids gathering pipelines carry produced water and crude oil from the wellsite to a point of sale (in the case of oil) or disposal (in the case of produced water).
- Produced water from the Bakken Formation can contain up to 30% dissolved salts, making it one of the most saline produced waters from shale formations in the nation.
- Gathering pipelines are typically buried between 4 and 20 feet below the surface to mitigate the effects of North Dakota's severe winters and frost depth.
- The nominal diameters of gathering pipelines typically range from 2 to 20 inches, with the majority of pipeline diameters falling into the 2- to 8-inch range.
- Some liquids gathering pipelines operate at significant pressure, while others operate at low pressure or atmospheric pressure.
- Gathering pipelines are constructed of a variety of materials, including steel, polyethylene, fiberglass, or other composite materials.
- For further information on the nature of liquids gathering pipelines in North Dakota, please refer to an EERC study found at www.undeerc.org/Bakken/Pipeline-Study.aspx.

Eligible Participants

The program is inviting specific technology providers to submit proposals during the second round of funding intended to facilitate development and demonstration activities in 2019. Subsequent funding rounds may be opened to include additional participants.

The participants selected for this round will be evaluated by the EERC. The EERC will evaluate each potential technology entry based upon extensive discussions with the technology providers and content of the discussed scope of work. The EERC will select up to 13 technology providers to submit full proposals to the program to be considered during the selection process. Those selected for full proposal will be deemed to possess technology solutions at the appropriate technology readiness level: not yet commercialized but very close to being able to offer a commercially ready product. Because of significant interest in iPIPE from a wide variety of technology providers, it is anticipated that the EERC will select up to 13 technology providers from among many qualified and high-quality proposal ideas.

It is anticipated that this program will likely assist the technology providers in bridging what is frequently referred to as the "valley of death" on the road to commercialization. This is in recognition of the fact that the last steps before commercial offering often require engagement with industry to refine the product for specific commercial application in specific circumstances, environments, or markets. As such, this program should be viewed as assistive in the development process.

Successful Proposals

It is the intention of this program to explore and assess as wide a range of technologies as possible that fit the program's purpose. While these are not requirements for consideration, industry members and the EERC seek the following qualities in the technology and eventual proposal:

- Integrated solutions that provide customers with concise, actionable information – not simply large volumes of data
- Technologies that work in a majority of the scenarios outlined in the earlier "Fundamentals of North Dakota's Liquids Gathering Pipelines" section
- Demonstration of "skin in the game" – in-kind contributions showing mutual investment toward solutions (waived fees, pro bono tests, materials contributed, etc.)
- Clear differentiation and benefit versus similar technologies and solutions
- Defined demonstration costs and commercial offering ranges

Written Proposal

To facilitate objective comparisons of available technology demonstration options, a written proposal is requested by Friday, September 21, 2018. Written proposals should be submitted via e-mail to Jay Almlie at the EERC (jalmlie@undeerc.org). Alternately, proposers may submit hard copies to:

Jay Almlie
UND EERC
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

If submitting hard copies, please ensure the hard copies are received by September 21, 2018.

Written Proposal Format

Proposers must adhere to the following proposal format:

- Proposal must be no longer than 16 pages, inclusive of the cover letter. Appendices may be added as deemed necessary and will not count toward the page limit. The proposer is cautioned to include as much important material in the main body of the proposal as possible. Appendices may not be reviewed with the same scrutiny as the main body of the proposal.
- Proposal must be double-spaced and must utilize 1-inch margins.
- Proposal must utilize 11-point Times New Roman, 11-point Calibri, or 11-point Arial font.
- Proposal must contain the following sections:

Cover Letter

Abstract

A one-page abstract of the demonstration plan, stating its objective, expected results, duration, total project cost, and participants.

I. Mission Statement

Overarching summary statement to describe the intended function and mission of the technology as it relates to pipeline leak detection and/or pipeline leak prevention.

- How will your technology lead to decreased pipeline leaks/spills and associated volumes?
- Indicate which types of pipeline your technology is applicable to (e.g., crude oil, produced water, diameters above a certain size, metallic lines only, etc.)

II. Specific Demonstration Goal(s) and Objectives

Define the goal(s) of the demonstration, and outline objectives that will support the goal(s).

III. Demonstration Scope of Work

Define the proposed scope of work in as much detail as possible. Include enough detail to allow the consortium's executive committee to assess whether the scope of work will advance the technology toward commercial application.

IV. Proposed Demonstration Budget

- Cost-to-execute

Define the estimated cost to execute the proposed demonstration. Include enough detail to facilitate an assessment of whether the budget is sufficient to achieve the stated scope of work.

- Proposed cost share

The technologies selected for demonstration are intended to be technologies close to commercial readiness but not yet available as common, off-the-shelf solutions for liquids gathering pipeline operations specific to North Dakota conditions. The program will help to develop and/or refine application of the demonstration technology. In return, the program expects that each proposer will demonstrate some level of in-kind investment in the demonstration activities. In-kind cost sharing will be considered as a factor in the selection process.

V. Cooperation Required from Pipeline Operator Demonstration Site

Define specifically what assistance will be required from the pipeline operator at the demonstration site. This may include tasks such as hot taps into the pipeline, excavation requirements to install the demonstration technology, integration with the operator's SCADA (supervisory control and data acquisition) system, power requirements, communication requirements, valve/pump operation to facilitate the demonstration, or any other task that a pipeline operator will either need or prefer to complete.

VI. Proposed Data Ownership Policy

Describe the proposer's preferences for data ownership:

- Will data be shared openly with the demonstration host (the pipeline operator)?
- Will data only be shared with the EERC to facilitate independent analysis and performance reporting?
- What intellectual property concerns must be addressed in sharing demonstration data?
- In the event that data sharing will compromise eventual commercialization of the technology, what steps will the provider take to allow objective analysis of performance?

VII. Proposed Data Collection Plan

Define how demonstration test data will be collected. Clearly identify requirements of demonstration host site in facilitating data collection.

VIII. Proposed Data Transmission Plan

Briefly define how data will be transmitted to the EERC for independent analysis of technology performance. Include any requirements to protect proprietary aspects of the demonstration data.

IX. Specific Requests for Protection of Intellectual Property Protection (including nondisclosure agreement requests)

Outline specific concerns regarding protection of intellectual property.

X. Demonstration Schedule

Define the proposed schedule of demonstration activities in a Gantt chart format.

XI. Forecast of Commercial Operations

Briefly describe, at a high level, the anticipated commercial operations plan. Include a description of the business model (how the service will be costed, who performs the service, etc.). To the extent possible, indicate general notions of approximate cost, assessment of disruption to normal operations, anticipated frequency of service, and options for multiparty purchase of service to facilitate economical application of technology:

- Proposed plan for technology utilization in everyday operations
- Estimated cost of utilization in everyday operations or plan to develop this estimate
- Estimated schedule for commercial maturity
- Proposed schedule of demonstration activities in a Gantt chart format with clearly designated go/no-go decision points

Proposal Presentations and Selection of Demonstrations

Thirteen proposers selected by the EERC will be invited to Williston, North Dakota, on October 30–31, 2018, to present their proposals to the program's executive committee. The executive committee will comprise six representatives of the pipeline operator members of the consortium-based program. Presentations will be strictly limited to 30 minutes each and should briefly address each of the topics outlined above. The 30-minute period will include approximately 20 minutes of presentation and 10 minutes of Q&A. This is an opportunity for the technology providers to convey directly to their future customers the appeal of the technology solution and to explain both the demonstration plan and the plan for eventual commercial application.

Following the technology provider presentations, the executive committee will select one or more demonstrations for funding and codevelopment during 2019. Upon selection, the executive committee will direct the EERC to contract with each selected technology provider for demonstration activities. The EERC will immediately engage with each selected technology provider to begin definition of specific demonstration plans customized for specific demonstration host sites.

Technologies not selected for demonstration activities during 2019 may be reconsidered for demonstration during the following year. It is the intent of the program to facilitate demonstration of ready technologies during spring/summer 2019, but those demonstrations may also include fall/winter demonstration activities. Providers with technology selected for demonstration may specify preference for either winter or summer demonstration periods. Ultimately, any technology demonstrated should be able to operate year-round in North Dakota climatic conditions.

Anticipated Award Sizes

It is anticipated that the executive committee will entertain demonstration projects requesting $50,000 to $1.0 M cash resources. This wide range is necessary to accommodate the wide range of technology demonstration offerings anticipated. Proposers are encouraged to consider the value proposition offered when proposing a demonstration. A subjective cost–benefit ratio will be considered by the executive committee when making demonstration selections.

Anticipated Periods of Performance

Similarly, a wide range of periods of performance is anticipated. Please specify the requested period of performance in the proposal. Some technologies may easily be demonstrated within a single month during 2019. Others may require 8–12 months to accomplish the scope of work specified. Periods of performance longer than 12 months are discouraged.

Selection and Contracting Time Line

Date	Milestone
August 24, 2018	Request for Proposals for 2019 released
September 21, 2018	Proposals due to EERC for evaluation. Participants are strongly encouraged to communicate and work with the EERC prior to submittal of a formal proposal.
September 28, 2018	EERC announces 13 finalists for invitation to the 2018 Shark Tank event in Williston, North Dakota
October 5, 2018	Final proposals due from invited participants
October 30–31, 2018	Shark Tank event in Williston, North Dakota
November 23, 2018	Target date to announce funded technologies
February 1, 2019	Demonstration plan for contracting purposes due
March 15, 2019	Complete detailed demonstration plan due
April 1, 2019	Target date to hold project kickoff meeting. Technology demonstrators present finalized plans and discuss with partnered members
April 22, 2019	Target date to begin demonstration operations

EERC Role as Independent Evaluator

The program relies upon the EERC to serve as an objective, independent evaluator of demonstrated technologies. As such, each proposer should be prepared to engage the EERC as an objective third party. The EERC will provide an objective evaluation of each demonstration's results and performance to the pipeline operator members of the program and to the state of North Dakota, via the North Dakota Industrial Commission, which is cosponsoring this activity.

Proposers are encouraged to contemplate how to work closely with the EERC to convey accurate evaluation of demonstration results and performance, while avoiding any perception of undue influence over said evaluation. The EERC should be viewed as a provider of valuable feedback on technology readiness and as a useful intermediary to convey accurate details of market and specific pipeline operator needs.

Questions on Proposal Process

All inquiries should be directed to Jay Almlie at the EERC (phone: 701-777-5260; e-mail: jalmlie@undeerc.org). The EERC will manage this program on behalf of the consortium's industrial partners and the state of North Dakota.