

October 31, 2019

North Dakota Industrial Commission
Oil and Gas Research Program
Attn: Brent Brannan, Director
State Capitol, 14th Floor
600 East Boulevard Avenue, Dept. 405
Bismarck, ND 58505-0840

Dear Mr. Brannan:

We, the undersigned intelligent Pipeline Integrity Program (iPIPE) Executive Committee members and the program's managing organization, the Energy & Environmental Research Center, wish submit to the North Dakota Oil and Gas Research Program (OGRP) this letter proposal requesting incremental state cost match funding to continue the state's investment in this growing and highly successful program.

We greatly appreciate the vision of OGRP in electing to recommend North Dakota Industrial Commission (NDIC) funding for iPIPE in May 2018. In its first 17 months of effort, iPIPE has gained national attention for its unique and highly successful approach to developing new technology that enhances safe pipeline operations. Our early success has been documented in reports submitted to NDIC and in presentations made by Governor Burgum and others on this program. We anticipate continued growth of the program, demonstrating North Dakota leadership in pipeline safety and development of new pipeline technologies. Simply put, this program would not be possible without NDIC's generous support.

At program inception, OGRP wisely advised us to return with requests for incremental funding as the consortium grew, thus ensuring the intention of OGRP to support industry oil research rather than lead it. We now feel that continued membership growth, growth in scope, notoriety earned for the state and its industry partners, and cash and in-kind cost share in excess of that promised by industry all combine to trigger our incremental funding request.

We ask that OGRP and NDIC consider awarding iPIPE incremental funding of \$1M. To date, the nine program members have committed to \$2.4M in cash cost share. These members have already posted \$358,634 in in-kind cost share. Additionally, technology providers have already posted \$1,076,663 in in-kind cost share, **resulting in a total cost share from industry of \$3.8M (including cash member dues)**, with much more anticipated as in-kind contributions continue to accrue and as we continue to welcome new member companies.

(continued on next page)

We greatly appreciate OGRP's continued support for this program, which is currently contracted through the end of 2021. If you have any questions, please feel free to contact our program manager, Jay Almlie, at the Energy & Environmental Research Center. Jay can be reached at (701) 777-5260 or at [jalmlie@undeerc.org](mailto:jalmie@undeerc.org).

Gratefully signed,

The iPIPE Executive Committee:



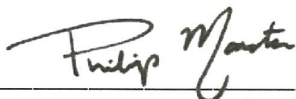
Brent Lohnes, ND General Manager
Hess Corporation




Linda Pitman, Williston Basin Regional Manager
Equinor



Kevin Cooper, Chief Information Officer
Goodnight Midstream

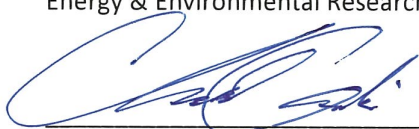


Phil Martin, Leak Detection Manager
Enbridge



Greg Tilley, Pipeline Corrosion Director
DCP Midstream

Energy & Environmental Research Center:



Charles Gorecki, CEO

Enclosures

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title: Expansion of the intelligent Pipeline Integrity Program (iPIPE)

Applicant: iPIPE Executive Committee

Principal Investigator: Jay Almlie, EERC

Date of Application: October 31, 2019

Amount of Request: \$1,000,000
*(in addition to the existing
\$1.6M OGRP investment)*

Total Amt. of Proposed Project: \$6,437,297

Duration of Project: 42 months

Point of Contact (POC): Jay Almlie

POC Telephone: (701) 777-5260

POC E-Mail Address: jalmlie@undeerc.org

POC Address:

15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

Compelling References Pointing to Program Growth and Progress

Original iPIPE Proposal Submitted to OGRP in May 2018	Exhibit A
Video Clip from Governor Burgum’s 2019 State of the State Address (electronic attachment).....	Exhibit B
Governor Burgum’s iPIPE Presentation at the Interstate Oil & Gas Compact Commission (IOGCC) Annual Meeting and IOGCC’s Chairman’s Stewardship Award	Exhibit C
American Petroleum Institute (Williston Chapter) Industry Innovation Award	Exhibit D
Current Membership Profile	Exhibit E
Program Financial Status.....	Exhibit F
Summary of Early Program Success in Commercializing New Technologies to Commercial-Ready Status	Exhibit G

Exhibit A
Original iPIPE Proposal Submitted to OGRP
in March 2018

(offered as reference material)

March 29, 2018

Ms. Karlene Fine
North Dakota Industrial Commission
ATTN: Oil and Gas Research Program
State Capitol – 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

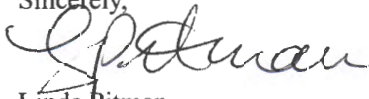
Subject: Proposal Entitled “intelligent Pipeline Integrity Program (iPIPE)”

Dear Ms. Fine:

On behalf of Statoil Pipelines LLC, Hess Corporation, and Oasis Midstream Partners, we are pleased to submit an original and one copy of the subject proposal. Also enclosed is the \$100 application fee.

This transmittal letter represents a binding commitment by the founding members of the iPIPE consortium – Statoil Pipelines LLC, Hess Corporation, Oasis Midstream Partners, Goodnight Midstream, and ONEOK -- to complete the project described in this proposal. If you have any questions, please contact Jay Almlie by telephone at (701) 777-5260, by fax at (701) 777-5181, or by e-mail at jalmlie@undeerc.org.

Sincerely,



Linda Pitman
Statoil Williston Basin Regional Manager

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title: intelligent Pipeline Integrity Program (iPIPE)

Applicants: Hess Corporation, Statoil ASA, and Oasis Midstream Partners

Principal Investigators:

Brent Lohnes, Linda Pitman, and Tone Macia

Date of Application: March 29, 2018

Amount of Request: \$1,600,000

Total Amount of Proposed Project: \$3,714,000

Duration of Project: 44 months

Point of Contact (POC): Jay C. Almlie, Energy & Environmental Research Center

POC Telephone: (701) 777-5260

POC E-Mail Address: jalmlie@undeerc.org

POC Address:

15 North 23rd Street, Stop 9018

Grand Forks, ND 58202-9018

TABLE OF CONTENTS

Abstract	4
Project Description	5
Standards of Success	11
Background/Qualifications	11
Management	12
Timetable	13
Budget	14
Confidential Information	15
Patents/Rights to Technical Data	16
Status of Ongoing Projects (if any)	16

ABSTRACT

Objective: A core group of pipeline operators proposes an R&D program focused on advancement of emerging technology to prevent and detect pipeline leaks. The proposed work will lead to development and application of new tools that will assist industry's ongoing efforts to continuously improve pipeline integrity, thus reducing leaks and spills. The proposed work responds directly to Governor Burgum's challenge to industry to apply cutting-edge technology to eliminate pipeline leaks.

Expected Results: Multiple field 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 effectively decrease the number and volume of spills experienced 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.

Duration: The duration of the proposed project is 44 months (May 2018 to December 2021). A long-term program is needed to ensure sufficient momentum required to mature multiple technologies.

Total Project Cost: The total cost of the proposed work is \$3,714,000. The amount requested from the NDIC Oil and Gas Research Program is \$1,600,000. At a minimum, cash cofunding in the amount of \$1,614,000 from pipeline operators will be provided. It is anticipated that additional consortium members will join the effort in 2019, thus increasing this amount. Therefore, the program requests contingent additional \$1,000,000 matching increments from NDIC in 2019 and 2020 as additional cash commitments are secured from additional industry program members. At no time will NDIC cost share exceed 50% of the program value. In-kind cost share from a combination of absorbed pipeline operator costs and technology provider costs will also be documented and is anticipated to exceed \$500,000.

Participants: Initially, program participants will include Hess Corporation, Statoil Pipelines LLC, Oasis Midstream Partners, ONEOK, Goodnight Midstream, NDIC, and possibly others. It is anticipated that

additional pipeline operators will join the program in 2018, 2019, 2020, and 2021. Technology vendors that commit in-kind resources will also be considered program participants.

PROJECT DESCRIPTION

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. A press release from the Governor's Office stated that he advised pipeline industry leaders that "we are entering an era of zero public tolerance for pipeline leaks." Indeed, this is a high bar for industry to achieve. In response to the Governor's challenge, industry has chosen a proactive path and is proposing a 3½-year program to advance development and application of emerging technologies that will prevent and detect pipeline leaks.

The consortium program will assist in the development of multiple emerging technologies to prevent and detect pipeline leaks by engaging with technology providers to tune designs specifically for buried gathering pipelines in North Dakota and then demonstrate technology application on working gathering pipelines.

Goals and Objectives:

The goal of this intelligent Pipeline Integrity Program (iPIPE) 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
- Demonstrate multiple technologies on working gathering pipelines
- Document results of technology demonstrations
- Facilitate adoption of technologies into North Dakota pipeline operations

Methodology:

Pipeline operators with operations in the state of North Dakota are coming together to fund, direct, develop, and demonstrate emerging technology that holds promise to either prevent or detect leaks from gathering pipelines. This consortium approach serves not only to convene the required funds to execute such development and demonstrations, but also to assure engagement among industry participants and adoption of worthy technologies. The consortium will select technologies for demonstration on an annual basis. This selection will be accomplished via a five-seat executive committee comprising members of the consortium and a nonvoting representative from the Energy & Environmental Research Center (EERC), who will serve to advise the committee and manage the voting process. Each fall, the EERC will research available emerging technologies to be included in the coming year's selection process, thus ensuring that technologies evaluated are always at the cutting edge of technology development.

Technology Selection

Throughout the program, the EERC will continually develop a revolving portfolio of new, not-yet-commercialized technology options for pipeline leak prevention and pipeline leak detection. Pipeline leak prevention options may include inline inspection technology, other pipeline health-monitoring sensors, novel self-healing technology for plastic pipelines, or other technologies. Pipeline leak detection technology may include options such as leak detection software/hardware, smart pigs, acoustic sensors, fiber optic distributed sensor arrays, or other technologies.

Each fall, the EERC will convene a five-seat executive committee comprised of consortium members (pipeline operators). The seats of this committee will rotate annually to facilitate input from all consortium members and to prevent any one member from dominating decision-making. The committee will entertain presentations from a variety of technology solution providers who will, in their own words, deliver information vital to the committee's decision process. After the series of technology provider presentations, the executive committee will vote immediately on demonstration projects to pursue during

the upcoming year. The consortium will then direct the EERC to begin contracting with the selected technology providers and assist in planning the demonstrations.

Specific demonstrations cannot be identified in this proposal because the decision on selection of specific technologies to demonstrate must be reserved for the executive committee. However, for the purposes of illustrating the types of technologies likely to be considered immediately upon program initiation, a sampling of technologies discussed within the stakeholder group of pipeline operators advising the current EERC Pipeline Study Phase III is presented:

1. *Produced Water Pipeline Leak Detection*: Use of artificial intelligence (machine learning algorithms) on data from multiple instruments aboard a drone aircraft, with emphasis on novel radiological sensors.
2. *Liquids Gathering Pipeline Leak Detection*: Use of drones to monitor large areas for pipeline leaks, with emphasis on beyond-visual-line-of-sight drone operations.
3. *Inline Inspection for Difficult-to-Pig Pipelines*: Miniaturized, neutrally buoyant sensor to locate pipelines and detect small leaks via acoustic measurements.
4. *Dedicated Leak Detection System for High-Consequence Areas (HCAs)*: Turnkey, nonintrusive suite of hardware and software to detect small leaks within pipelines in HCAs with limited power and communication infrastructure.
5. *Liquids Gathering Pipeline Leak Detection*: Opportunistic Artificial Intelligence (AI) processing of available data sets from satellites, commercial aircraft, drones, and fixed sensors.

Many other technologies are being investigated for possible inclusion in the initial round of selection for first-year demonstrations.

Technology Demonstration

Each year, the consortium will authorize one or more technology demonstrations as described above. The consortium will direct the EERC to work closely with selected technology provider(s) to plan and execute

the technology demonstrations on working gathering pipelines. The EERC will also work with individual consortium members to negotiate a specific volunteer pipeline system or segment to host the demonstration.

During demonstration activities, the host pipeline company (a consortium member) will provide the technology provider with access to the pipeline and will support the installation of the demonstration technology at the host site, including data acquisition integration, qualified pipeline specialist labor, and logistical support. The EERC will serve as independent observer, ensuring data integrity. It is also expected that technology providers will contribute substantially with some in-kind contributions to the demonstration to ensure that the demonstration is not seen merely as a one-time, invoiceable “sale.” The technology providers will understand that this is an opportunity for mutually supported technology development and refinement.

Demonstration Results Analysis and Reporting

Following each demonstration, the technology provider and the host pipeline operator will share data resulting from the demonstration with the EERC. These data will be independently analyzed and evaluated by the EERC to ensure objectivity. The EERC will create an evaluation report on each demonstration for consumption by consortium members. This report will include an assessment of performance, readiness for adoption by pipeline operators, and additional development needed before commercialization (if any). A summary of this information can also be provided to the North Dakota Industrial Commission (NDIC), if requested.

Consortium Management

The program will be managed on behalf of the consortium members by the EERC. The EERC will be responsible for coordinating communications among program members, program reporting to NDIC, scheduling of executive committee meetings, communications with technology providers, financial planning, and contracting for demonstrations.

Anticipated Results:

This program will result in development of new technology options to prevent and detect leaks. As more technologies are demonstrated, awareness of best practices among all pipeline operators will increase. Some technologies currently receiving a high level of optimistic attention may be demonstrated to be ineffective. Some technologies currently unknown will be demonstrated to be surprisingly effective. With increased adoption of effective new technologies and even the possible demonstration of the ineffectiveness of other technologies, public perception of pipeline safety and pipeline operators' diligence toward it will also improve. North Dakota, which is already leading the nation in diligent oversight of gathering pipelines, will further enhance its leadership position.

Facilities, Resources, and Techniques to Be Used:

Volunteer Demonstration Sites: Member companies will be encouraged to volunteer a variety of working pipeline segments upon which technology demonstrations can be applied. The program will seek a variety of pipeline configurations to demonstrate the full envelope of factors impacting technology performance. Volunteer companies will understand that when they volunteer, certain costs may also be incurred by the pipeline operator in support of the demonstrations.

Technology Provider Vested Participation: Although the consortium program will contract with technology providers to accomplish the demonstrations, it is anticipated, and will be encouraged, that technology providers will not recover all costs associated with the demonstration. The program is helping the technology providers mature their offerings for this specific market sector. Therefore, they will be expected to provide some level of in-kind cost share.

EERC Field Data Center: The EERC built a custom trailer with built-in support system during 2016 pipeline leak detection demonstration work for NDIC and will reuse this trailer in support of the independent observation of field demonstrations. The field data center houses data acquisition hardware

and software, fluid flow instrumentation, a portable electric generator, a fluid pump, and fluid containment equipment.

Environmental and Economic Impacts while Project Is under Way:

During demonstration of some technologies, penetration of operating pipelines may be required to incorporate components of the demonstration. There is a small risk of unintentional spills during these operations. In situations where this risk exists, extra precautions will be taken by the volunteering pipeline operator to limit any potential spills to negligible amounts, and protections for nearby soils will be employed.

Ultimate Technological and Economic Impacts:

Ultimately, it is envisioned that development of new tools specifically designed for small-diameter, highly segmented, networked gathering pipelines will result in improved pipeline integrity. With improved integrity, the incidence and total volume of liquids gathering pipeline leaks in North Dakota will be dramatically reduced, resulting in lower cleanup costs and pipeline inspection costs to industry, more efficient use of pipeline-monitoring staff, better relations with landowners, and easier permitting of new pipelines. Moreover, it is envisioned that these tools, developed in North Dakota, could become standard practice for gathering and transmission pipelines nationwide.

Why the Project Is Needed:

North Dakota has been highlighted via extensive media coverage in recent years regarding pipeline leaks. Increasing pressures from environmental groups after the Dakota Access Pipeline events of 2015–2016 have only exacerbated a negative public perception of pipelines. Governor Burgum has challenged industry to explore application of new technology and novel, out-of-the-box thinking to conquer the

problem of continuing pipeline leaks. Industry and the state share a vested interest in safe operations of pipelines. This program intends to contribute significantly to that goal.

STANDARDS OF SUCCESS

The proposed research and development (R&D) effort will be judged successful if the commercial readiness of multiple solutions is advanced, bringing commercial application closer to fruition. Success will be declared if the efficacy of multiple new technology options is proven and if new technologies are made available to the gathering pipeline market sector.

Holistically, the project will be successful if it inspires enthusiasm for new technology application to the challenge of early identification of pipeline issues before they become leaks and if it demonstrates North Dakota leadership in such endeavors. When the general public learns of North Dakota's involvement in advancing the cutting edge, its confidence in regulators and industry alike will be increased, facilitating a more productive relationship between the public, regulators, and industry. In the end, this will result in improved regulatory oversight and improved economics for industry and the state of North Dakota.

Ultimately, success of this program will be reflected in measurable improvements in pipeline integrity, especially noted in decreased spills statistics.

BACKGROUND/QUALIFICATIONS

Hess Corporation (Hess) has operated in North Dakota continuously since 1951 and is one of the state's largest oil and gas producers. Hess operates upstream and midstream facilities both north and south of Lake Sakakawea, which includes over 3000 miles of gathering pipelines for oil, gas, and produced water. The referenced gathering systems were installed over a wide range of years and are constructed of various materials from carbon steel, polypropylene, fiberglass, and FlexSteel. Hess is proactively researching alternative technologies that can be used to economically provide early leak detection and that will aid in determining the integrity of its in-service gathering systems.

Statoil Pipelines LLC(Statoil) is a Norwegian multinational oil and gas company that acquired Brigham Exploration Company’s Bakken assets in late 2011. Statoil splits upstream and midstream operations into two companies: Statoil Oil & Gas LP for the upstream and Statoil Pipelines LLC for the midstream. Statoil Pipelines LLC operates approximately 1000 miles of gathering pipeline network supporting crude, produced water, freshwater, and gas. Statoil Pipelines LLC has developed and implemented its own produced water leak detection technology in several HCAs and is looking to new technologies to improve monitoring of produced water and crude.

Oasis Midstream Partners (Oasis) owns and operates approximately 450 miles of liquid gathering pipelines in North Dakota that gather produced water and crude oil. Oasis is focused on pipeline integrity management and pipeline leak detection capabilities. Oasis’s goals are aligned with the iPIPE goal to prevent or detect leaks in gathering pipeline systems. In addition to safe pipeline operation, quality pipeline construction methods, and third-party damage prevention, Oasis desires to explore emerging technologies that may improve the ability to detect or prevent leaks in gathering pipeline systems.

EERC EERC has been engaged in an ongoing study of liquids gathering pipelines since 2015. Phases I and II of this study were mandated by Section 8 of the North Dakota Legislature’s House Bill 1358 in 2015. The first two phases of the study served to inform the state on the status of the liquid gathering pipelines industry in North Dakota and to demonstrate different approaches to leak detection, respectively. Phase III of this study focuses on risk assessment and emerging technologies that can help North Dakota eliminate pipeline leaks.

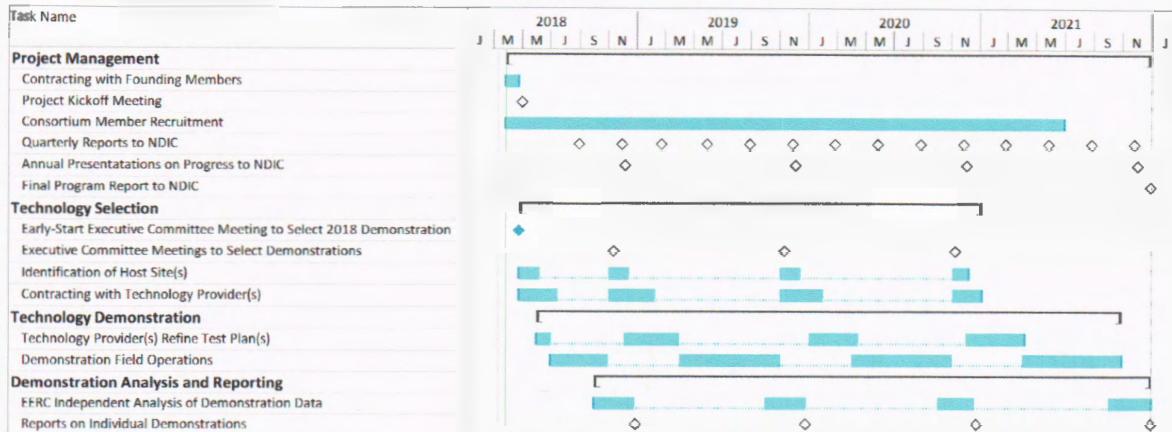
MANAGEMENT

Program decisions, especially those related to selection of specific technologies for investigation, will be made by a five-seat executive committee acting on behalf of the greater consortium membership. This five-seat executive

committee, comprised of pipeline operators, will meet each fall to select demonstration projects for the coming year. The seats of the executive committee will rotate yearly, giving all consortium members the opportunity to direct the program equally.

The executive committee will direct the EERC, which will act as operating manager of the program. The EERC will be responsible for coordinating communications among program members, program reporting to NDIC, scheduling of executive committee meetings, communications with technology providers, financial planning, and contracting for demonstrations.

TIMETABLE



Deliverables	Due Date
Quarterly Reports	Quarterly
Individual Demonstration Reports	12/31/19
	12/31/20
	12/31/21
	12/31/22
Final Report	12/31/22
Briefings to NDIC and North Dakota Legislation	On Demand

BUDGET

Project-Associated Expense	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
Project Management	\$446,000	\$93,000		
Contracts with Technology Providers for Demonstrations	\$900,000	\$1,250,000		
Other Costs of Demonstration Execution			\$300,000	\$200,000
Independent Observation of Demonstrations	\$90,000	\$107,000		
Analysis of Demonstration Performance Data	\$85,000	\$89,000		
Reporting	\$79,000	\$75,000		
TOTAL	\$1,600,000	\$1,614,000	\$300,000	\$200,000

Initially, the consortium will comprise at least six industry members, each committing \$269,000 in cash over the 44-month period of performance. At the time of submittal of this proposal, 3 unnamed companies have indicated probable commitment to the program starting in 2018, but have not yet provided letters of commitment. The program requests consideration of additional cost match from NDIC as additional pipeline operators (beyond the founding six members) commit additional cash cost share. This will be done on a sliding scale to balance the desire to encourage additional industry participation with the need to be fair to members who joined earlier in the program.

If at least four consortium members are added in 2019, the program requests that NDIC consider an additional \$1,000,000 cost match committed to the program to facilitate additional development and demonstration activities. The program requests an additional \$800,000 if at least four consortium members are added in 2020. The program requests an additional \$600,000 if at least four consortium members are added in 2021. At no time will NDIC cost share exceed 50% of the program value.

Additional consortium members will serve North Dakota's goals of uniformly advancing pipeline integrity across the industry. Additional consortium members will also ensure that gains made from this program will be quickly and equally shared among more of the pipeline operator sector. If less funding than that requested herein is available from NDIC, the program will proceed, but the scope of work may be adjusted to accomplish fewer emerging technology demonstrations than planned.

CONFIDENTIAL INFORMATION

It is anticipated that some specific aspects of individual demonstrations will necessarily require maintenance of confidentiality to preserve competitive advantage for the technology provider. To a minimum extent, this information will be held confidential by the EERC and by the hosting pipeline operator. To the extent possible, the program will be as transparent as possible in all demonstration reports.

PATENTS/RIGHTS TO TECHNICAL DATA

It is anticipated that any patents required will have been secured outside the confines of this program by technology providers. As such, no patent protections will be sought within this program.

STATUS OF ONGOING PROJECTS (IF ANY)

Hess: No active project with NDIC at time of submittal.

Statoil: No active project with NDIC at time of submittal.

Oasis: No active project with NDIC at time of submittal.

EERC:

1. (G-040-080) Bakken Production Optimization Program 2.0. Project status: currently in progress. Contract ends on 11/1/2019.
2. (G-000-004) NDIC Emerging Issues. Project status: currently in progress. Contract ends on 11/1/2019.
3. (G-Sandia 01) NDIC Resource Characterization. Project status: currently in progress. Contract ends on 8/31/2018.
4. (G-043-084) Pipeline Study Phase III (HB1347). Project status: currently in progress. Contract ends on 6/30/2019.
5. (G-015-030) Plains CO₂ Reduction Partnership – Phase III. Project status: currently in progress. Contract ends on 12/31/2018.

APPENDIX A

LETTERS OF COMMITMENT



Hess Corporation
1501 McKinney Street
Houston, TX 77010

April 5, 2018

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept.405
Bismarck, ND 58505-0840

Subject: Program Entitled "iPIPE – Intelligent Pipeline Integrity Program"

Dear Mr. Brannan:

This letter is provided to convey Hess Corporation's intent to fund and actively participate in the industry-led, consortium based proposed program named in the subject line above. The program will explore, develop, and evaluate emerging technology that can be applied to gathering pipelines to reduce leaks and spills. This mission is important to our industry, to landowners, and to the state overall.

Hess Corp., in collaboration with other founding members of the iPIPE consortium, wishes to pursue R&D funding for this project through the North Dakota Industrial Commission (NDIC) Oil & Gas Research Council. The consortium wishes to request cash support of \$1,600,000 from NDIC, and intends to commit \$1,614,000 in cash cost share. Additionally, it is anticipated that consortium members and selected demonstration technology providers will contribute approximately \$500,000 in-kind toward execution of the program demonstrations. Hess' commitment is contingent on the award of adequate matching funds from NDIC's Oil & Gas Research Program and other pipeline operators participating in the program.

We are eager to participate in this program. Any questions regarding Hess' involvement in the project may be directed to me by phone at (713) 496-5443 or by e-mail at blohnes@hess.com.

Sincerely,

A handwritten signature in black ink that reads "Brent Lohnes". The signature is written in a cursive, flowing style.

Brent Lohnes
General Manager – North Dakota
Hess Corporation

March 28, 2018

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept. 405
Bismarck, ND 58505-0840

Subject: Program Entitled "iPIPE – intelligent Pipeline Integrity Program"

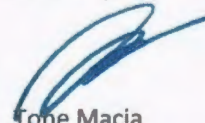
Dear Mr. Brannan:

This letter is provided to convey Oasis Midstream's intent to fund and actively participate in the proposed program named in the subject line above. We believe this industry-led, consortium-based program will result in improved pipeline performance in North Dakota and beyond. The program will explore, develop, and evaluate emerging technology that can be applied to gathering pipelines to reduce leaks and spills. This mission is important to our industry, to landowners, and to the state on the whole.

Oasis Midstream, in collaboration with other founding members of the iPIPE consortium, wishes to pursue R&D funding for this project through the North Dakota Industrial Commission (NDIC) Oil & Gas Research Council. The consortium wishes to request cash support of \$1,600,000 from NDIC, and intends to commit \$1,614,000 in cash cost share. Additionally, it is anticipated that consortium members and selected demonstration technology providers will contribute approximately \$500,000 in-kind toward execution of the program demonstrations. Oasis' commitment is contingent on the award of adequate matching funds from NDIC's Oil & Gas Research Program and other pipeline operators participating in the program.

We are eager to participate in this program. Any questions regarding Oasis Midstream's involvement with this project may be directed to me by phone at (281) 404-9657 or by e-mail at tmacia@oasispetroleum.com.

Sincerely,



Tone Macia
Manager, Engineering & Construction
Oasis Midstream Services



April 5, 2018

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept. 405
Bismarck, ND 58505-0840

Subject: Program Entitled "iPIPE – intelligent Pipeline Integrity Program"

Dear Mr. Brannan:

This letter is provided to convey Statoil Pipelines LLC 's intent to fund and actively participate in the proposed program named in the subject line above. We believe this industry-led, consortium-based program will result in dramatic improvements to the performance and integrity of gathering pipelines in North Dakota and beyond. The program will explore, develop, and evaluate emerging technology that can be applied to gathering pipelines to greatly reduce leaks and spills. This mission is important to our industry, to landowners, and to the state on the whole.

Statoil, in collaboration with other founding members of the iPIPE consortium, wishes to pursue R&D funding for this project through the North Dakota Industrial Commission (NDIC) Oil & Gas Research Council. The consortium wishes to request cash support of \$1,600,000 from NDIC, and intends to commit \$1,614,000 in cash cost share. Additionally, it is anticipated that consortium members and selected demonstration technology providers will contribute approximately \$500,000 in-kind toward execution of the program demonstrations. Statoil's commitment is contingent on the award of adequate matching funds from NDIC s Oil & Gas Research Program and other pipeline operators participating in the program.

We are eager to participate in this program. Any questions regarding Statoil's involvement in the project may be directed to Linda Pitman by phone at (701) 875-3510 or by e-mail at lpitm@statoil.com.

Sincerely,

A blue ink signature of Todd Walls, consisting of a stylized, flowing script.

Todd Walls
Finance Manager

A blue ink signature of Linda Pitman, featuring a more complex and cursive script.

Linda Pitman
Leader, Operation & Maintenance
(Williston Basin Regional Manager)

Company

Statoil Pipelines LLC

Office address

120 Long Ridge Road, Suite 3E01
Stamford, CT 06902
USA

Telephone

+1 203 978 6900



March, 29 2018

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 E Boulevard Ave.
Dept. 405
Bismarck, ND 58505 0840

Subject: iPIPE – Intelligent Pipeline Integrity Program

Dear Mr. Brannan:

This letter is provided to convey Goodnight Midstream's support of the proposed iPIPE – Intelligent Pipeline Integrity Program. The iPIPE program is being established to explore, develop, and evaluate emerging technology that may be applied to gathering pipelines to greatly reduce the likelihood of leaks and spills. As a founding member of the iPIPE consortium, this mission is important to Goodnight Midstream, and we believe this mission is equally important for our industry, to North Dakota landowners, and to the State as a whole.

The iPIPE consortium wishes to pursue R&D funding for this project through the North Dakota Industrial Commission (NDIC) Oil & Gas Research Program (OGRP). Specifically, the consortium is respectfully requesting cash support of up to \$1,600,000 from the NDIC, and intends to directly commit up to \$1,614,000 for its cash cost share. Additionally, the founding members of the consortium expect that they and selected demonstration technology providers will also make up to approximately \$500,000 through in-kind contributions toward execution of the program demonstrations. The founding members of iPIPE have pledged their initial commitments contingent on the award of adequate matching funds from the NDIC's Oil & Gas Research Program and other pipeline operators participating in the program.

Should you have any questions regarding Goodnight Midstream's involvement in the iPIPE program, please contact me by phone at (701) 690-4311 or by email at mtaylor@goodnightmidstream.com. Additionally, Mr. Fred Kershisnik, advisor to the Board of Directors of Goodnight Midstream, is available to answer questions regarding the mission of the iPIPE consortium and Goodnight Midstream's role therein at fkershisnik@goodnightmidstream.com.

Sincerely,

Goodnight Midstream

Mark Taylor
Director of North Dakota Regional Operations

At the time of submittal of this proposal, the program has obtained verbal commitment from ONEOK, but a signed letter of commitment was not available at submittal time. Verification of this can be obtained by contacting Christopher Fonck, Director of Field Operations for ONEOK. Mr. Fonck can be reached by telephone at 406-433-8708 or by email at cfonck@oneok.com. Additional letters of commitment will be provided during the proposal review process, if requested.



March 29, 2018

Mr. Brent Brannan
Director
Oil & Gas Research Program
State Capitol, 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Mr. Brannan,

Subject: Program entitled "iPIPE – intelligent Pipeline Integrity Program"

The Energy & Environmental Research Center (EERC) is proud to be named in the proposal referenced in the above subject line. The founding members of the iPIPE consortium have communicated to the EERC that they wish to contract with the EERC to manage the proposed program on their behalf. We look forward to the opportunity to lead this program to success.

The EERC hereby commits to serving the role outlined in this proposal. Although an exact budget for our role cannot be determined until specific technology field demonstrations have been selected, the budget table in the proposal provides notional figures that are in line with the role we anticipate.

We are eager to participate in this program. Any questions regarding the EERC's involvement with this project may be directed to me by phone at (701) 777-5153 or by e-mail at terickson@undeeerc.org.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Erickson", is written over a light blue rectangular background.

Thomas A. Erickson
CEO

TAE/mro

c: Jay Almlie, EERC

March 29, 2018

Ms. Karlene Fine
North Dakota Industrial Commission
ATTN: Oil and Gas Research Program
State Capitol – 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

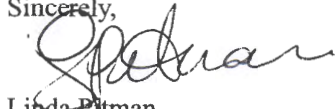
Subject: Proposal Entitled “intelligent Pipeline Integrity Program (iPIPE)”

Dear Ms. Fine:

On behalf of Statoil Pipelines LLC, Hess Corporation, and Oasis Midstream Partners, we are pleased to submit an original and one copy of the subject proposal. Also enclosed is the \$100 application fee.

This transmittal letter represents a binding commitment by the founding members of the iPIPE consortium – Statoil Pipelines LLC, Hess Corporation, Oasis Midstream Partners, Goodnight Midstream, and ONEOK -- to complete the project described in this proposal. If you have any questions, please contact Jay Almlie by telephone at (701) 777-5260, by fax at (701) 777-5181, or by e-mail at jalmlie@undeerc.org.

Sincerely,



Linda Pitman
Statoil Williston Basin Regional Manager

Exhibit B

Video Clip from Governor Burgum's 2019 State of the State Address

(see attached digital video file)

Exhibit C

**Governor Burgum's iPIPE Presentation at the IOGCC
Annual Meeting
and
IOGCC's Chairman's Stewardship Award**



IOGCC Annual Meeting

Gov. Doug Burgum
Medora, ND
Aug. 26, 2019



INTERSTATE
Oil & Gas
COMPACT COMMISSION



NORTH
Dakota
Be Legendary.™

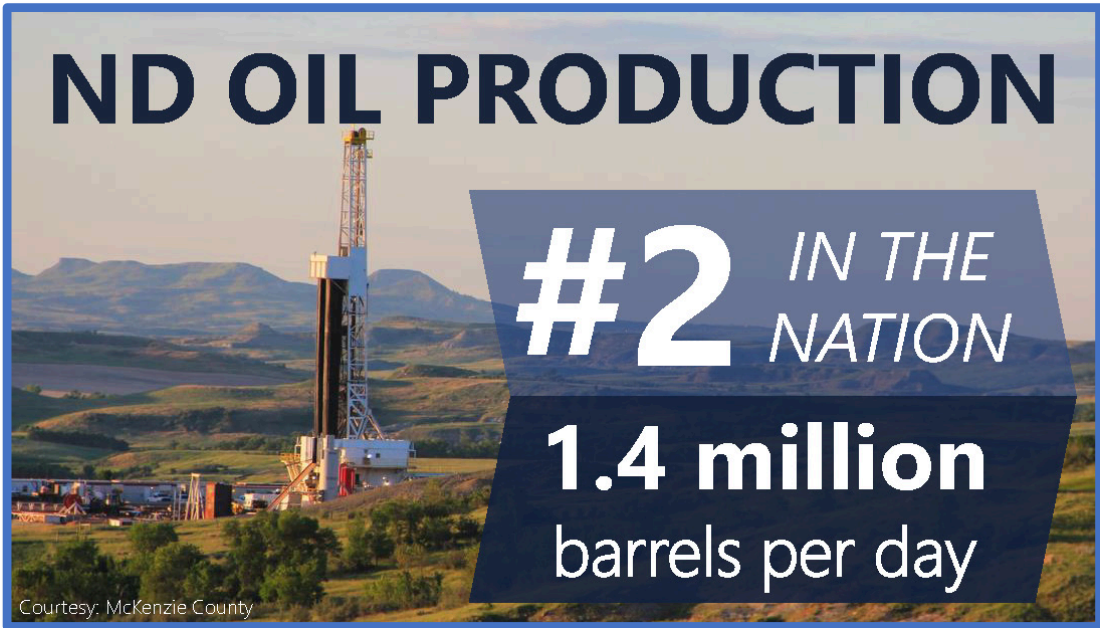


MISSION

To promote the conservation and efficient recovery of domestic oil and natural gas resources while protecting health, safety and the environment.

**EMPOWER PEOPLE
IMPROVE LIVES
INSPIRE SUCCESS**










iPIPE


Intelligent Pipeline
Integrity Program

THE iPIPE MISSION

Foster development of emerging technologies to prevent pipeline releases.


 **Fund development work**

- ND Industrial Commission
- Pipeline & tech companies
- \$5M investment over 3 yrs

 **Feedback**



- Provide user feedback to hone products



↙ ↘







Provide test sites


- Live, operating pipelines upon which technology is developed





COMPETITIVE SELECTION PROCESS FOR PROVIDERS

Modeled after ABC's *Shark Tank*

- Annual events for technology providers to pitch solutions to expert selection committee.



TECH



COST



SCHEDULE



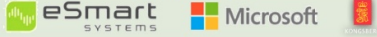






OUTCOME

iPIPE

FIRST SELECTION ROUND

MAY 2018

	DETECTION: Opportunistic data collection + AI
	DETECTION: UAV + advanced analytics + BVLOS
	DETECTION: UAV + AI + novel sensor suite
	DETECTION/PREVENTION: Golf ball-sized free-floating sensor
	DETECTION: AI + multiple sensors
	DETECTION/PREVENTION: Fiber optic leak and land movement detection
	DETECTION: Noncontact, Internet of Things monitoring of pipelines

iPIPE

SECOND SELECTION ROUND

OCT. 2018

Technology Provider	Function	Technology Summary
Asel-Tech	DETECTION	Non-intrusive negative pressure wave leak detection
Direct-C	DETECTION	Nanotechnology "paint" for leak detection
eSmart Systems	DETECTION	Sensor fusion with novel sensor suite + AI + drone
Expert Infrastructure Solutions	PREVENTION	AI-based risk assessment
High Impact Technologies	PREVENTION	Self-healing coating, pinpoint leak location
Insitu	DETECTION	BVLOS-focused drone-based leak detection
mIQrotech	BOTH	Mesh network sensor package + AI
NAR Technologies	DETECTION	Drones + machine learning
Ominsens	BOTH	Fiberoptics leak detection and land movement
One-Bridge	BOTH	Machine learning/cathodic protection
PSI	DETECTION	Laser-based hydrocarbon leak "sniffer"
PureHM	BOTH	Miniaturized inspection tool
Rheidiant	DETECTION	IoT leak detection
Satelytics	DETECTION	Phase II of current work
Seal-Tite International	PREVENTION	"Platelet clotting" leak repair
SwRI	DETECTION	Machine learning-based hydrocarbon identification
Trinity Bend Solutions Inc.	DETECTION	Determining optimal resolution for leak detection

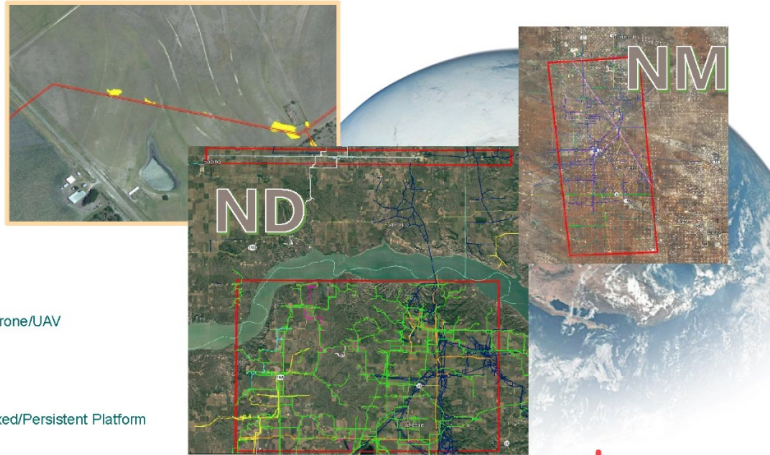
- 20 technologies invited
- 9 technologies presented
- 4 selected for development



SATELYTICS – OPPORTUNISTIC DATA

Leveraging Big Data:

- Data Acquisition
- Spectra
- Bands
- Algorithms
- Analytics
- Alerts and Dashboards



Leveraging Technology

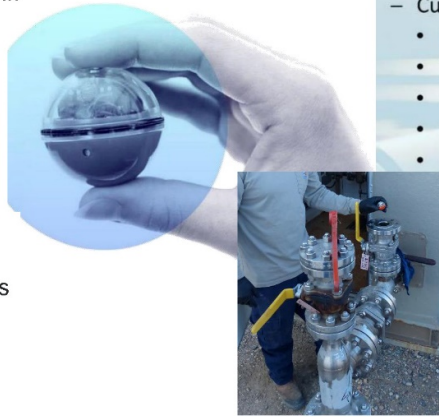
- Satellites
- Drone/UAV
- Nano-satellites
- Aircraft
- Fixed/Persistent Platform



"GOLF BALL" PIPELINE SENSOR

Pipers™: Control in the palm of your hand

- Deploy when needed in all pipelines
- No downtime



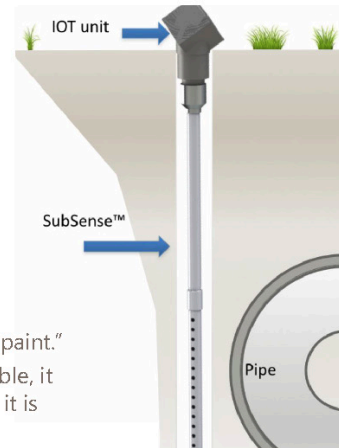
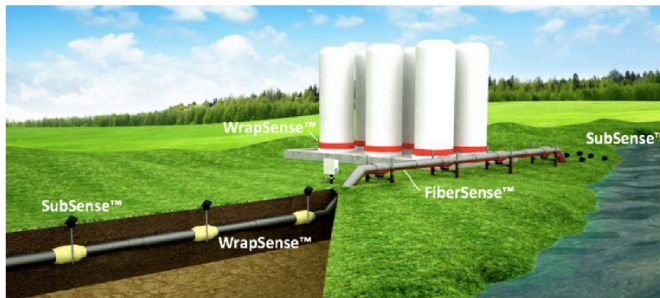
- Golf ball-sized (1.5 inch)
- Free-flowing; adjustable weight
- Current sensors
 - Pressure
 - Temperature
 - Position (acceleration/rotation)
 - Magnetic fields
 - Acoustics

- Detect leaks
- Locate deposits
- Identify pipe wall flaws
- Locate pipeline centerlines



DIRECT-C

iPIPE



- Uses polymers mixed with nanoparticles to create an "intelligent paint."
- When applied to a PCB board, flexible substrate, or fiber optic cable, it creates a sensor to indicate presence of different fluids for which it is tuned (hydrocarbons or brine).







CHAIRMAN'S
STEWARDSHIP
A W A R D

ENVIRONMENTAL PARTNERSHIP COMPANY WINNERS – IPIPE AND NDIC



Page 96

ENVIRONMENTAL PARTNERSHIP: ENERGY & ENVIRONMENTAL RESEARCH

The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota

*"We're moving toward an
era of zero tolerance
[for pipeline leaks]."*

- The Honorable Doug Burgum,
North Dakota Governor

Page 97

ENVIRONMENTAL PARTNERSHIP: ENERGY & ENVIRONMENTAL RESEARCH CENTER

The Intelligent Pipeline Integrity Program (iPIPE) | North Dakota



Page 98



Exhibit D
American Petroleum Institute (Williston Chapter)
Industry Innovation Award

Excerpt from API press release:

Williston API Recognizes Achievement Award Winners - iPIPE, Oasis Petroleum, Tractor & Equipment, Bob Reynolds, Bill Dutton, JoAnn Callahan, and Jerry Illerbrun

November 17, 2018, Williston, ND – The Williston Basin Chapter of the American Petroleum Institute (Williston API) announces the winners of the seventh annual Achievement Awards. The Williston API Achievement Awards celebrate the many positive contributions and accomplishments of the oil and gas industry throughout the Williston Basin.

Industry Innovation Award – iPIPE

The Industry Innovation Award recognizes significant achievement for advancements in technology, systems, processes and the application thereof in the oil and gas industry in the Williston Basin.

This year’s award was presented to intelligent Pipeline Integrity Program (iPIPE), a consortium of pipeline operators in North Dakota aimed at improving leak detection and prevention in gathering pipelines in America’s oil fields. Managed by the EERC and led by founders Hess Corporation, Equinor (formerly Statoil), Oasis Midstream Partners, Goodnight Midstream, ONEOK, DCP Midstream, and Andeavor, the program solicits proposals from technology providers to co-develop and demonstrate their promising technologies collaboratively with these pipeline operators.



Exhibit E
Current Membership Profile

iPIPE Membership as of 10/30/19



Exhibit F
Program Financial Status

The original budget from the March 2018 proposal initiating iPIPE is presented in Table 1 for reference.

Table 1. iPIPE Original May 2018 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

To illustrate the dramatic excess of cost share provided by program members and by technology providers selected by the program for development activities, Table 2 is offered. It should be noted that three additional members have joined the consortium since it was founded, bringing an additional \$788,000 in cash resources (program dues) to the program.

Table 2. Proposed Funding Profile

Funding Source	Original Funding Profile	Additional Expected Cost Share	Requested Incremental Funds - Nov. 2019	Revised Funding Profile	Cost Share %
NDIC – Cash	\$1,600,000	\$0	\$1,000,000	\$2,600,000	40%
Partner Cost Share – Cash	\$1,614,000	\$788,000	\$0	\$2,402,000	
Cost Share – In Kind*	\$500,000	\$935,297	\$0	\$1,435,297	
Cost Share Subtotal	\$2,114,000	\$1,723,297	\$0	\$3,837,297	60%
Total	\$3,714,000	\$1,723,297	\$1,000,000	\$6,437,297	100%

*See Table 3 for in-kind contribution breakdown

Table 3 illustrates the current in-kind contributions of program partners and technology providers.

Table 3. In-Kind Breakdown

Partner/Technology Provider	In-Kind Contribution
Andeavor	\$17,936
DCP Midstream	\$13,580
Enbridge	\$33,722
Equinor	\$126,530
Goodnight Midstream	\$6,800
Hess Corp.	\$126,404
Oasis Midstream	\$19,620
ONEOK	\$5,000
Whiting Petroleum	\$9,042
Partner Subtotal	\$358,634
Satelytics	\$971,550
Ingu Solutions	\$88,266
Direct-C	\$16,847
Technology Provider Subtotal	\$1,076,663
Total	\$1,435,297

Table 4 presents the expected budget associated with the request for incremental funding.

Table 4. Budget Requested for Additional NDIC Funding

Project-Associated Expense	NDIC's Share
Project Management	\$278,750
Contracts with Technology Providers for Demonstrations	\$562,500
Other Costs of Demonstration Execution	
Independent Observation of Demonstrations	\$56,250
Analysis of Demonstration Performance Data	\$53,125
Reporting	\$49,375
Total	\$1,000,000

Exhibit G

**Summary of Early Program Success in
Commercializing New Technologies to Commercial-
Ready Status**

Summary of Early Program Success in Advancing New Technologies to Commercial-Ready Status

In May 2018, the first two technologies were selected for development – Satelytics' *Constant Vigilance*[™] and Ingu Solutions' *Pipers*[™]. Following development activities that refined these two products, multiple members of iPIPE began commercially contracting with these two technology providers. Additionally, word of the iPIPE successes spread, which assisted both companies in expanding their commercial reach beyond iPIPE members. The commercial success of these products has been attributed, in part, by the technology providers to the work done within the iPIPE Program. These technology providers have publicly touted their work with iPIPE, and the iPIPE Program itself, in numerous press releases and interviews.

The program is now approaching its third technology selection round. Each year, the number of interested participants has expanded, providing evidence that iPIPE's efforts are highlighting the market opportunity to companies with novel solutions.