



Energy & Environmental Research Center

15 North 23rd Street, Stop 9018 • Grand Forks, ND 58202-9018 • P. 701.777.5000 • F. 701.777.5181  
www.undeerc.org

October 30, 2020

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

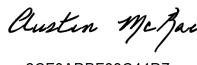
Dear Ms. Fine:

Subject: Quarterly Progress Report Entitled "iPIPE – intelligent Pipeline Integrity Program"  
Contract No. G-046-88; UND Project – Fund 43500-UND0022445  
EERC Funds 23121, 23211, and 24817

Attached is a quarterly progress report on the subject project for the period of  
July 1, 2020 – September 30, 2020.

If you have any questions, please contact me by phone at (701) 777-5402 or by e-mail at  
amcrae@undeerc.org.

Sincerely,

DocuSigned by:  
  
2CF0ADB88C44D7...  
T. Austin McRae  
Research Engineer  
Integrated Petroleum Systems

TAM/rlo

Attachment



---

# **iPIPE – iNTELLIGENT PIPELINE INTEGRITY PROGRAM**

## **Quarterly Progress Report**

*(for the period of July 1, 2020 – September 30, 2020)*

*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:*

T. Austin McRae

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

October 2020

## **EERC DISCLAIMER**

**LEGAL NOTICE** This research report was prepared by the Energy & Environmental Research Center (EERC), an agency of the University of North Dakota, as an account of work sponsored by North Dakota Industrial Commission. Because of the research nature of the work performed, neither the EERC nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement or recommendation by the EERC.

## **NDIC DISCLAIMER**

This report was prepared by the EERC pursuant to an agreement partially funded by the Industrial Commission of North Dakota, and neither the EERC nor any of its subcontractors nor the North Dakota Industrial Commission nor any person acting on behalf of either:

- Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately owned rights; or
- Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method, or process disclosed in this report.

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the North Dakota Industrial Commission. The views and opinions of authors expressed herein do not necessarily state or reflect those of the North Dakota Industrial Commission.

**TABLE OF CONTENTS**

LIST OF FIGURES ..... i

LIST OF TABLES ..... i

EXECUTIVE SUMMARY ..... ii

BACKGROUND ..... 1

ACCOMPLISHMENTS DURING REPORTING PERIOD ..... 2

MEMBERSHIP AND FINANCIAL INFORMATION ..... 3

FUTURE ACTIVITIES ..... 5

PARTIAL LISTING OF iPIPE MEDIA MENTIONS .....Appendix A

**LIST OF FIGURES**

1 Project progress ..... 5

**LIST OF TABLES**

1 iPIPE Original Budget..... 3

2 iPIPE Updated Budget ..... 4

3 iPIPE Expected Budget and Expenses to Date..... 4

**iPIPE – INTELLIGENT PIPELINE INTEGRITY PROGRAM**  
**Quarterly Progress Report**  
**July 1, 2020 – September 30, 2020**

## **EXECUTIVE SUMMARY**

This document is a quarterly report on the North Dakota Industrial Commission (NDIC)-funded intelligent Pipeline Integrity Program (iPIPE), managed by the Energy & Environmental Research Center (EERC). The goal of iPIPE is to develop and demonstrate cutting-edge technology that can prevent and/or detect gathering pipeline leaks. This goal is 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.

During this reporting period, the program achieved the following highlights:

- iPIPE received 25 proposals from 24 unique sources in response to the RFP (request for proposal) distributed to approximately 120 technology providers.
- Ten of the 25 proposals were selected and submitted to the Technology Selection Committee to review prior to the presentations in October.
- Satelytics completed the second portion of its scope of work, which included monitoring methane in a 100-km<sup>2</sup> area of western North Dakota.
- Direct-C completed all field activities and detected a simulated leak.

iPIPE experienced a change in project management at the EERC in mid-September. There have been no resulting delays in project execution nor are any anticipated. The direction and goals of the program remain the same. The EERC remains dedicated to managing iPIPE as it continues providing value to stakeholders.

The EERC holds an unwavering commitment to the health and well-being of its employees, partners and clients, and the global community. As such, precautionary measures have been implemented in response to COVID-19. Staff continue to carry out project-related activities remotely, and personnel supporting essential on-site laboratory and testing activities are proceeding under firm safety guidelines. Travel has been minimized, and protective measures are being undertaken for those who are required to travel. At this time, work conducted by EERC employees is anticipated to progress with minimal disruption. Challenges posed by economic variability will be met with open discussion between the EERC and project partners to identify solutions. The EERC is monitoring developments across the nation and abroad to minimize risks, achieve project goals, and ensure the success of our partners and clients. In the event that any potential impacts to reporting, scope of work, schedule or cost are identified, they will be discussed and addressed in cooperation with the project partners.

**iPIPE – INTELLIGENT PIPELINE INTEGRITY PROGRAM**  
**Quarterly Progress Report**  
**July 1, 2020 – September 30, 2020**

## **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 North Dakota Industrial Commission (NDIC)-funded intelligent Pipeline Integrity Program (iPIPE) 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 the technology's 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 is 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.

Members of the industry-led consortium include Dakota Access Pipeline, DCP Midstream, Enbridge, Equinor, Goodnight Midstream, Hess Corporation, Marathon Petroleum, Oasis Midstream Partners, ONEOK, Whiting, and TC Energy. The Energy & Environmental Research Center (EERC) has contracted with NDIC and the industrial partners to manage the program. As such, the EERC submits a quarterly report and an annual report to provide updates to NDIC on the progress of the iPIPE consortium.

The following quarterly report summarizes program activities from July 1, 2020, through September 30, 2020.

## ACCOMPLISHMENTS DURING REPORTING PERIOD

With stabilized, yet low, oil prices and continued uncertainty regarding COVID-19 and market conditions, iPIPE has continued to follow the conscious and purposeful decision made by the Executive Committee earlier in the year to slow program promotion. Scheduled technology development activities were executed as scheduled, but aggressive outreach and new member recruitment efforts remained slowed.

- Program-level activities
  - Program briefings
    - ♦ During this reporting period, iPIPE's former project manager engaged in promising discussions with members from Phillips 66 as well as Cimarex Energy. The goal of the discussion was to explore possible membership in iPIPE.
  - Program meetings
    - ♦ On August 20, 2020, and September 14, 2020, iPIPE held monthly member meetings to update all members on program status. The goal of these meetings is to keep members apprised on a variety of program topics, including recruitment, finances, strategic direction, and technology development project status.
  - Member recruitment
    - ♦ The program continued discussion with a number of companies regarding membership in the consortium. Some of these companies have approached the program regarding membership requirements and benefits, while others have been approached by the program and/or existing consortium members.
  - Program media mentions
    - ♦ iPIPE has now been highlighted in more than 80 public multimedia and printed articles. A partial listing of known media mentions is provided in Appendix A.
- Technology selection
  - During this reporting period, the EERC was highly focused on bridging stakeholder needs with emerging technology offerings by helping engaged technology providers understand the technology needs of our members and prepare proposals to reflect this.
  - On September 4, 2020, proposals for projects in 2021 (Round 4) were due. iPIPE received 25 proposals from 24 unique sources in response to the RFP (request for proposal) distributed to approximately 120 technology providers.
  - On September 23, 2020, the EERC forwarded the ten selected proposals to the Technology Selection Committee for review and notified technology providers of selection status. The proposals were narrowed down from 25 to ten based on ranked aspects of quality, anticipated budget, and the number of available presentation slots at the Technology Selection Event.
  - The Technology Selection Committee will review the ten forwarded proposals prior to the Technology Selection Event where members will make the decisions on which projects to pursue in 2021.
  - Two unique requests arose during the reporting period requesting immediate member engagement for no-cash-ask project demonstrations. The Executive Committee decided not to engage in this manner and directed the technology providers to engage through the standard proposal process used to date.

- Throughout the proposal support and receipt process, the EERC continued its worldwide search for companies offering emerging (not yet commercial) technologies to improve gathering pipeline leak detection and gathering pipeline leak prevention. A wide range of technologies is continuously investigated, explored, and considered. These technologies include 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.
- Demonstration execution – Satelytics Phase III
  - Satelytics completed its planned methane monitoring campaign over North Dakota during this reporting period. Controlled methane releases were coordinated with satellite and aircraft flyover to test Satelytics’ ability to detect methane.
  - The project’s third portion, data fusion from multiple platforms and sensors, began and is near completion. Results are expected next quarter.
- Demonstration execution – Orbital Sidekick (OSK)
  - Throughout this reporting period, iPIPE continued to negotiate a contract with OSK. Progress toward an executed contract is nearing fruition and should be complete early in the following quarter.
- Demonstration execution – Direct-C
  - All required new hardware was installed, and communication issues with the devices were largely resolved. An unannounced simulated spill was performed on one of the sensors, and the alarm appeared on the client-side mobile application.
  - All fieldwork was completed. The final report is expected from Direct-C early in the next quarter.

## MEMBERSHIP AND FINANCIAL INFORMATION

The original budget proposed to the NDIC Oil and Gas Research Program (OGRP) totaled \$3,714,000, as shown in Table 1. To demonstrate additional resources provided by new members, additional financial commitment from NDIC, and significantly increased in-kind cost share provided by technology providers and program members, an updated budget is presented in Table 2. Table 2 demonstrates the rapid growth of this program. Table 3 presents greater detail on expected budget and actual expenses incurred by the program to date.

**Table 1. iPIPE Original Budget**

<b>Sponsors</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Total</b>
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
<b>Total</b>	<b>\$792,320</b>	<b>\$980,226</b>	<b>\$968,454</b>	<b>\$973,000</b>	<b>\$3,714,000</b>



**Table 2. iPIPE Updated Budget**

<b>Sponsors</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>Total</b>
NDIC – Cash	\$403,320	\$405,226	\$893,454	\$898,000	\$2,600,000
Industry – Cash	\$352,000*	\$700,000*	\$850,000	\$750,000	\$2,652,000
Industry and Technology Provider – In-Kind	\$525,878*	\$925,719*	\$1,500,000	\$500,000	\$3,451,597
<b>Total</b>	<b>\$1,281,198</b>	<b>\$2,030,945</b>	<b>\$3,243,454</b>	<b>\$2,148,000</b>	<b>\$8,703,597</b>

\* Reflects actuals for these years.

**Table 3. iPIPE Expected Budget and Expenses to Date**

<b>Sponsors</b>	<b>Expected Budget</b>	<b>Actual Expenses as of 6/30/20</b>	<b>Balance Remaining of Expected Budget</b>
NDIC Share – Cash	\$2,600,000	\$1,513,474	<b>\$1,086,526</b>
Industry Share – Cash	\$2,652,000	\$1,828,013	<b>\$832,987</b>
Industry – In-Kind	\$375,000	<i>Dakota Access</i> \$0 <i>DCP</i> \$46,800 <i>Enbridge</i> \$97,162 <i>Equinor</i> \$153,230 <i>Goodnight</i> \$18,720 <i>Hess</i> \$183,657 <i>MPLx</i> \$17,936 <i>Oasis</i> \$41,148 <i>ONEOK</i> \$5,000 <i>TransCanada</i> \$0 <u>Whiting</u> <u>\$9,042</u> <b>TOTAL</b> \$572,695	<b>\$0</b>
Technology Providers – In-Kind	\$3,076,597*	<i>Satellytics</i> \$1,519,450 <i>Direct-C</i> \$168,818 <u>Ingu</u> <u>\$88,266</u> <b>TOTAL</b> \$1,776,561	<b>\$1,300,063</b>
<b>Total</b>	<b>\$8,703,597*</b>	<b>\$5,690,716</b>	<b>\$3,210,576**</b>

\* Includes budget estimates from proposals for 2020 technology development projects and an estimate of anticipated 2021 in-kind from as-yet-unknown technology providers.

\*\* This amount does not include industry in-kind contributions provided in excess of the expected budget.

The program continues to solicit additional members to contribute to this program. As additional members join the program, Tables 2 and 3 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.

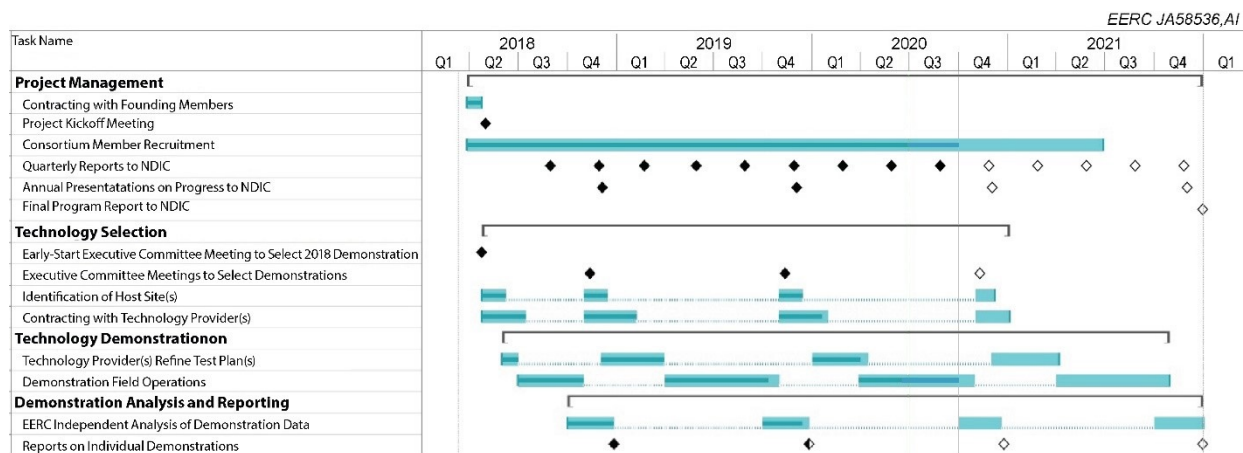


Figure 1. Project progress.

## FUTURE ACTIVITIES

The planned activities for the next quarter are detailed below:

- Program-level activities
  - iPIPE will continue ongoing and new discussions with potential new program members during the coming reporting period.
- Technology selection
  - The Technology Selection Event will be held virtually October 27–28, 2020.
  - The EERC will remain engaged with and on the lookout for providers of relevant, promising emerging technology with the anticipation of iPIPE continuing beyond its original 3½-year timeline.
- Demonstration execution – Satelitics, Phase III
  - Satelitics will finish processing data from monitoring methane in the area of interest and present findings and understandings to members at a virtual meeting.
- Demonstration execution – OSK
  - The EERC expects to complete contracting with OSK for 2020 work.
  - Upon completion of contracting, the program anticipates engagement on initial data exchange between OSK and iPIPE members to facilitate early tasks in the scope of work.
- Demonstration execution – Direct-C
  - Direct-C will provide a final report for the project.
  - The EERC will complete an evaluation report on the Direct-C project.



---

## **APPENDIX A**

### **PARTIAL LISTING OF iPIPE MEDIA MENTIONS**

# Partial List of Articles Highlighting iPIPE:

Updated June 30, 2020

Title	Date	URL
Industry Responds to Governor's Initiative to Improve Pipeline Technology; Program Funding Approved by North Dakota Industrial Commission		<a href="https://www.ndoil.org/industry-responds-to-governors-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/</a>
Satelytics Selected to Participate in the Intelligent Pipeline Integrity Program (iPIPE)	5/18/2018	<a href="https://mailchi.mp/satelytics/satelytics-chosen-to-participate-in-iPIPE-project?e=922473135e">https://mailchi.mp/satelytics/satelytics-chosen-to-participate-in-iPIPE-project?e=922473135e</a>
ND Implements Intelligent Pipeline Project	5/22/2018	<a href="http://northamericanshalemagazine.com/articles/2380/nd-implements-intelligent-pipeline-project">http://northamericanshalemagazine.com/articles/2380/nd-implements-intelligent-pipeline-project</a>
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.	5/23/2018	<a href="https://twitter.com/HessCorporation/statuses/999315208261853185">https://twitter.com/HessCorporation/statuses/999315208261853185</a>
North Dakota Pipeline Leak Detection Initiative Announced	5/25/2018	<a href="https://extension.psu.edu/north-dakota-pipeline-leak-detection-initiative-announced">https://extension.psu.edu/north-dakota-pipeline-leak-detection-initiative-announced</a>
New Consortium Sets Goal of Improving Pipelines	5/26/2018	<a href="https://www.mrt.com/business/oil/article/New-consortium-sets-goal-of-improving-pipelines-12941971.php">https://www.mrt.com/business/oil/article/New-consortium-sets-goal-of-improving-pipelines-12941971.php</a>
Industry Responds to Governor's Initiative to Improve Pipeline Technology; Program Funding Approved by North Dakota Industrial Commission	5/26/2018	<a href="https://www.oilandgasonline.com/doc/industry-governors-initiative-pipeline-program-north-dakota-industrial-commission-0001">https://www.oilandgasonline.com/doc/industry-governors-initiative-pipeline-program-north-dakota-industrial-commission-0001</a>
New Consortium Sets Goal of Improving Pipelines	5/27/2018	<a href="https://www.timesunion.com/business/oil/article/New-consortium-sets-goal-of-improving-pipelines-12941971.php">https://www.timesunion.com/business/oil/article/New-consortium-sets-goal-of-improving-pipelines-12941971.php</a>
Principal Engineer Jay Almlie Discusses the iPIPE Program on Energy Matters Radio	5/31/2018	<a href="https://www.youtube.com/watch?v=ZQuwsK0z2aM">https://www.youtube.com/watch?v=ZQuwsK0z2aM</a>
North Dakota Selects Ingu Solutions for Demonstration of Cutting-Edge Leak Detection and Prevention Technology for Oil and Gas Pipelines	5/31/2018	<a href="https://ingu.co/iPIPE/">https://ingu.co/iPIPE/</a>
Leak Detection Project Kicks Off This Summer	6/1/2018	<a href="https://myemail.constantcontact.com/Here-are-the-week-s-top-North-Dakota-energy-stories-.html?soid=1102657032033&amp;aid=NpwT2Ynl17c">https://myemail.constantcontact.com/Here-are-the-week-s-top-North-Dakota-energy-stories-.html?soid=1102657032033&amp;aid=NpwT2Ynl17c</a>
How a Canadian Solution to Detecting Pipeline Leaks Is Being Used in North Dakota	6/5/2018	<a href="https://www.bnnbloomberg.ca/video/how-a-canadian-solution-to-detecting-pipeline-leaks-is-being-used-in-north-dakota~1410402">https://www.bnnbloomberg.ca/video/how-a-canadian-solution-to-detecting-pipeline-leaks-is-being-used-in-north-dakota~1410402</a>
iPIPE Program Helps Solve Pipeline Leaks in ND	6/6/2018	<a href="http://www.kfyrvtv.com/content/news/iPIPE-Program-helps-solve-pipeline-leaks-in-ND--484747291.html">http://www.kfyrvtv.com/content/news/iPIPE-Program-helps-solve-pipeline-leaks-in-ND--484747291.html</a>
Startup Uses Small Sensors to Check North Dakota Oil Pipes	6/10/2018	<a href="https://www.alvareviewcourier.com/story/2018/06/10/interesting-items/startup-uses-small-sensors-to-check-north-dakota-oil-pipes/37406.html">https://www.alvareviewcourier.com/story/2018/06/10/interesting-items/startup-uses-small-sensors-to-check-north-dakota-oil-pipes/37406.html</a>
Sensors to Monitor Oil, Brine Gathering Lines Coming to ND	6/12/2018	<a href="https://www.westfargopioneer.com/news/science-and-nature/4459638-sensors-monitor-oil-brine-gathering-lines-coming-nd">https://www.westfargopioneer.com/news/science-and-nature/4459638-sensors-monitor-oil-brine-gathering-lines-coming-nd</a>
Pipe Sensors to Monitor Gathering Lines	6/12/2018	<a href="https://bismarcktribune.com/business/local/pipe-sensors-to-monitor-gathering-lines/article_cd64586c-1d52-52df-83e6-b661d3b95f0a.html">https://bismarcktribune.com/business/local/pipe-sensors-to-monitor-gathering-lines/article_cd64586c-1d52-52df-83e6-b661d3b95f0a.html</a>
Startup Uses Small Sensors to Check North Dakota Oil Pipes	6/21/2018	<a href="https://www.apnews.com/9d65538034a24711a4a84d4e2bb38efe">https://www.apnews.com/9d65538034a24711a4a84d4e2bb38efe</a>
Startup Uses Small Sensors to Check North Dakota Oil Pipes	6/21/2018	<a href="https://www.usnews.com/news/best-states/north-dakota/articles/2018-06-21/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</a>
Startup Uses Small Sensors to Check North Dakota Oil Pipes	6/21/2018	<a href="https://m.washingtontimes.com/news/2018/jun/21/startup-uses-small-sensors-to-check-north-dakota-o/">https://m.washingtontimes.com/news/2018/jun/21/startup-uses-small-sensors-to-check-north-dakota-o/</a>
iPIPE: Taking a Bite Out of Leaks	6/25/2018	<a href="http://blogs.und.edu/und-today/2018/06/taking-a-bite-out-of-leaks/">http://blogs.und.edu/und-today/2018/06/taking-a-bite-out-of-leaks/</a>
iPIPE: Taking a Bite Out of Leaks	6/29/2018	<a href="http://www.northdakotaagconnection.com/story-state.php?Id=688&amp;yr=2018">http://www.northdakotaagconnection.com/story-state.php?Id=688&amp;yr=2018</a>
Industry Demonstrates Commitment to Stopping Pipeline Leaks	7/17/2018	<a href="http://northamericanshalemagazine.com/articles/2444/industry-demonstrates-commitment-to-stopping-pipeline-leaks">http://northamericanshalemagazine.com/articles/2444/industry-demonstrates-commitment-to-stopping-pipeline-leaks</a>

Title	Date	URL
Testing of New Pipeline Inspection Device Begins in Bakken	7/18/2018	<a href="https://www.spe.org/en/ogf/ogf-article-detail/?art=4404">https://www.spe.org/en/ogf/ogf-article-detail/?art=4404</a>
Testing of New Pipeline Inspection Device Begins in Bakken (Link Not Active)	7/18/2018	<a href="https://www.spe.org/en/print-article/?art=4404">https://www.spe.org/en/print-article/?art=4404</a>
6 Companies Collaborating on Pipeline Leak Detection	8/15/2018	<a href="https://www.willistonherald.com/news/companies-collaborating-on-pipeline-leak-detection/article_bbce3194-a098-11e8-8bac-1b765123019e.html">https://www.willistonherald.com/news/companies-collaborating-on-pipeline-leak-detection/article_bbce3194-a098-11e8-8bac-1b765123019e.html</a>
More Skin in the Game: New Technology to Find, Fix Leaks	8/20/2018	<a href="https://pgjonline.com/magazine/2018/august-2018-vol-245-no-8/features/more-skin-in-the-game-new-technology-to-find-fix-leaks">https://pgjonline.com/magazine/2018/august-2018-vol-245-no-8/features/more-skin-in-the-game-new-technology-to-find-fix-leaks</a>
Burgum Highlights Oil Industry's Progress, Challenges at ND Petroleum Council's Annual Meeting in Fargo	9/25/2018	<a href="https://www.governor.nd.gov/news/burgum-highlights-oil-industry%E2%80%99s-progress-challenges-nd-petroleum-council%E2%80%99s-annual-meeting">https://www.governor.nd.gov/news/burgum-highlights-oil-industry%E2%80%99s-progress-challenges-nd-petroleum-council%E2%80%99s-annual-meeting</a>
Burgum Highlights Oil Industry's Progress, Challenges at ND Petroleum Council's Annual Meeting in Fargo	9/25/2018	<a href="https://votesmart.org/public-statement/1287849/burgum-highlights-oil-industrys-progress-challenges-at-nd-petroleum-councils-annual-meeting-in-fargo#.XDz9tVxKjME">https://votesmart.org/public-statement/1287849/burgum-highlights-oil-industrys-progress-challenges-at-nd-petroleum-councils-annual-meeting-in-fargo#.XDz9tVxKjME</a>
The Digital Oilfield: How Digital Technologies Are Changing the Oil Industry in ND and Nationwide	9/30/2018	<a href="http://www.prairiebusinessmagazine.com/business/energy-and-mining/4506605-digital-oilfield-how-digital-technologies-are-changing-oil">http://www.prairiebusinessmagazine.com/business/energy-and-mining/4506605-digital-oilfield-how-digital-technologies-are-changing-oil</a>
Progress for Partners Key to Energy & Environmental Research Center		<a href="https://www.ndliving.com/content/progress-partners-key-energy-environmental-research-center">https://www.ndliving.com/content/progress-partners-key-energy-environmental-research-center</a>
API Banquet Salutes Stars of Bakken Oil and Gas	11/19/2018	<a href="https://www.willistonherald.com/news/api-banquet-salutes-stars-of-bakken-oil-and-gas/article_a006f78e-eb98-11e8-a353-abe9fc1170fc.html">https://www.willistonherald.com/news/api-banquet-salutes-stars-of-bakken-oil-and-gas/article_a006f78e-eb98-11e8-a353-abe9fc1170fc.html</a>
Energy Matters: iPIPE Receives Industry Innovation Award	12/3/2018	<a href="https://www.youtube.com/watch?v=L2lEr2Xu4aw">https://www.youtube.com/watch?v=L2lEr2Xu4aw</a>
Energy Matters with iPIPE	12/12/2018	<a href="https://www.satelytics.com/blog/oil-gas-solutions/2018-energy-matters-with-iPIPE/">https://www.satelytics.com/blog/oil-gas-solutions/2018-energy-matters-with-iPIPE/</a>
Developing Technology to Prevent Pipeline Leaks	1/3/2019	<a href="https://mydigitalpublication.com/publication/?i=547462&amp;p=&amp;pn=#{%22issue_id%22:547462,%22page%22:34}">https://mydigitalpublication.com/publication/?i=547462&amp;p=&amp;pn=#{%22issue_id%22:547462,%22page%22:34}</a>
Innovative Pipeline Consortium Marks New Highlights	1/8/2019	<a href="http://undeerc.blogspot.com/2018/12/innovative-pipeline-consortium-marks.html">http://undeerc.blogspot.com/2018/12/innovative-pipeline-consortium-marks.html</a>
2018 State of the State Address	1/23/2019	<a href="https://www.governor.nd.gov/events/2018-state-state-address">https://www.governor.nd.gov/events/2018-state-state-address</a>
North Dakota Eyes Expanded Use of Drones for Oil and Natural Gas Operations	2/8/2019	<a href="https://www.naturalgasintel.com/articles/117347-north-dakota-eyes-expanded-use-of-drones-for-oil-and-natural-gas-operations">https://www.naturalgasintel.com/articles/117347-north-dakota-eyes-expanded-use-of-drones-for-oil-and-natural-gas-operations</a>
The Crude Life Interview: Joe Dancy, Energy Expert & Educator	5/18/2019	<a href="http://www.thecrudelife.com/podcast/the-crude-life-interview-joe-dancy-energy-expert-educator/">http://www.thecrudelife.com/podcast/the-crude-life-interview-joe-dancy-energy-expert-educator/</a>
The Big Data Revolution: Detecting Pipeline Leaks, Encroachments and More Using Satellites	6/15/2019	<a href="https://www.pipeline-journal.net/journal/pipeline-technology-journal-32019">https://www.pipeline-journal.net/journal/pipeline-technology-journal-32019</a>
Energy Matters Radio: iPIPE	9/6/19	<a href="https://youtu.be/4tTA_WEsMI8">https://youtu.be/4tTA_WEsMI8</a>
iPIPE Program Assisting in Detection of Pipeline Leaks in the Pipeline & Gas Journal September Edition (Page 50-52)	9/10/2019	<a href="https://www.nxtbook.com/nxtbooks/gulfpub/pgj_201909/">https://www.nxtbook.com/nxtbooks/gulfpub/pgj_201909/</a>
iPIPE Receives IOGCC Chairman's Stewardship Award for Environmental Partnership	9/10/2019	<a href="https://www.am1100theflag.com/news/10755-iPIPE-receives-iogcc-chairman%E2%80%99s-stewardship-award-environmental-partnership">https://www.am1100theflag.com/news/10755-iPIPE-receives-iogcc-chairman%E2%80%99s-stewardship-award-environmental-partnership</a>
iPIPE Receives Chairman's Stewardship Award	9/10/2019	<a href="http://undeerc.blogspot.com/2019/09/iPIPE-receives-chairmans-stewardship.html">http://undeerc.blogspot.com/2019/09/iPIPE-receives-chairmans-stewardship.html</a>
iPIPE Receives Chairman's Stewardship Award	9/13/2019	<a href="https://www.willistonherald.com/news/business/iPIPE-receives-stewardship-award/article_e7c45bf0-d636-11e9-b069-739139b5d75b.html">https://www.willistonherald.com/news/business/iPIPE-receives-stewardship-award/article_e7c45bf0-d636-11e9-b069-739139b5d75b.html</a>
API Award Winner Shares What Recognition Has Meant	10/14/2019	<a href="https://www.willistonherald.com/news/oil_and_energy/api-award-winner-shares-what-recognition-has-meant/article_ec10b56a-eecc-11e9-a94a-0f17a0778d95.html">https://www.willistonherald.com/news/oil_and_energy/api-award-winner-shares-what-recognition-has-meant/article_ec10b56a-eecc-11e9-a94a-0f17a0778d95.html</a>
AI Raising Drone Game in Oil, Gas but FAA Challenges Remain	10/15/19	<a href="https://www.naturalgasintel.com/articles/119892-ai-raising-drone-game-in-oil-gas-but-faa-challenges-remain">https://www.naturalgasintel.com/articles/119892-ai-raising-drone-game-in-oil-gas-but-faa-challenges-remain</a>
Almlie and Helms: Where Innovation Leads, Regulation Follows	10/18/19	<a href="https://trib.com/opinion/columns/almlie-and-helms-where-innovation-leads-regulation-follows/article_ee198ef8-05aa-599f-9df9-67bfd8492bc0.html">https://trib.com/opinion/columns/almlie-and-helms-where-innovation-leads-regulation-follows/article_ee198ef8-05aa-599f-9df9-67bfd8492bc0.html</a>
Shared on Drilling Info's Social Media Site: Almlie, Helms: Innovation Leads, Regs Follow	10/20/19	<a href="https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow">https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow</a>
Almlie, Helms: Innovation Leads, Regs Follow	10/20/19	<a href="https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow">https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow</a>

Title	Date	URL
Where Innovation Leads, Regulation Follows	10/21/19	<a href="https://bismarcktribune.com/opinion/letters/where-innovation-leads-regulation-follows/article_6018311c-49fd-5744-b815-2a485b881e59.html">https://bismarcktribune.com/opinion/letters/where-innovation-leads-regulation-follows/article_6018311c-49fd-5744-b815-2a485b881e59.html</a>
Bakken Backers E-Mail: Almlie, Helms: Innovation Leads, Regs Follow	10/25/19	<a href="https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow">https://www.grandforksherald.com/opinion/columns/4728897-Almlie-Helms-Innovation-leads-regs-follow</a>
Cleanup Continues after Keystone Pipeline Oil Spill near Edinburg, ND	11/4/19	<a href="https://www.grandforksherald.com/news/accidents/4754456-Nearly-half-of-the-oil-has-been-recovered-in-Keystone-Pipeline-incident-says-TC-Energy">https://www.grandforksherald.com/news/accidents/4754456-Nearly-half-of-the-oil-has-been-recovered-in-Keystone-Pipeline-incident-says-TC-Energy</a>
ND Keystone Spill about Half Recovered, Official Says	11/4/19	<a href="https://www.bemidjipioneer.com/business/energy-and-mining/4755069-ND-Keystone-spill-about-half-recovered-official-says">https://www.bemidjipioneer.com/business/energy-and-mining/4755069-ND-Keystone-spill-about-half-recovered-official-says</a>
DAPL 2.0 Pipeline – Doug Burgum, North Dakota Governor (governor mentioning iPIPE on “what’s on your mind”)	11/7/2019	<a href="https://www.am1100theflag.com/news/12229-11719-dapl-20-pipeline-doug-burgum-north-dakota-governor">https://www.am1100theflag.com/news/12229-11719-dapl-20-pipeline-doug-burgum-north-dakota-governor</a>
Previewing the PSC’s DAPL 2.0 Expansion Hearing	11/11/2019	<a href="https://www.am1100theflag.com/news/12320-previewing-psc%E2%80%99s-dapl-20-expansion-hearing">https://www.am1100theflag.com/news/12320-previewing-psc%E2%80%99s-dapl-20-expansion-hearing</a>
Oasis Petroleum’s Jared Iverson Talks about the Next 20 years in the Bakken	12/4/2019	<a href="https://www.willistonherald.com/news/oil_and_energy/oasis-petroleum-s-jared-iverson-talks-about-the-next-years/article_2368a346-16f1-11ea-81ad-d3443353be3e.html">https://www.willistonherald.com/news/oil_and_energy/oasis-petroleum-s-jared-iverson-talks-about-the-next-years/article_2368a346-16f1-11ea-81ad-d3443353be3e.html</a>
DCP Midstream LinkedIn Mention	~Sept 2019	<a href="https://www.linkedin.com/posts/dcp-midstream_dcp-wearcdcp-transformation-activity-6577940399116038144-orkP/">https://www.linkedin.com/posts/dcp-midstream_dcp-wearcdcp-transformation-activity-6577940399116038144-orkP/</a>
iPIPE Looks to Enhance Pipeline Safety	12/17/2019	<a href="https://www.kfyrtv.com/content/news/iPipe-looks-to-enhance-pipeline-safety-566298741.html">https://www.kfyrtv.com/content/news/iPipe-looks-to-enhance-pipeline-safety-566298741.html</a>
Burgum, Sanford Reflect on Significant Progress Made During Administration’s Third Year	12/19/2019	<a href="https://www.thedickinsonpress.com/incoming/4830773-Burgum-Sanford-reflect-on-significant-progress-made-during-administration%E2%80%99s-third-year-Site-and-date-announced-for-2020-State-of-the-State-address">https://www.thedickinsonpress.com/incoming/4830773-Burgum-Sanford-reflect-on-significant-progress-made-during-administration%E2%80%99s-third-year-Site-and-date-announced-for-2020-State-of-the-State-address</a>
Burgum, Sanford Reflect on Significant Progress Made During Administration’s Third Year	12/19/2019	<a href="https://www.nd.gov/news/burgum-sanford-reflect-significant-progress-made-during-administrations-third-year">https://www.nd.gov/news/burgum-sanford-reflect-significant-progress-made-during-administrations-third-year</a>
Companies Aim to Prevent, Detect Pipeline Leaks with New Technologies	1/5/2020	<a href="https://bismarcktribune.com/bakken/companies-aim-to-prevent-detect-pipeline-leaks-with-new-technologies/article_0cac7e82-c49a-5c86-9267-ad8beb5b9799.html">https://bismarcktribune.com/bakken/companies-aim-to-prevent-detect-pipeline-leaks-with-new-technologies/article_0cac7e82-c49a-5c86-9267-ad8beb5b9799.html</a>
Podcast: iPIPE with Jay Almlie — Real Technology, Real Pipelines, Real Progress	1/7/2020	<a href="https://pipelinerspodcast.com/episode-109-iPIPE-jay-almalie/">https://pipelinerspodcast.com/episode-109-iPIPE-jay-almalie/</a>
iPIPE Welcomes New Consortium Member	1/10/2020	<a href="https://mailchi.mp/undeerc/news-release-iPIPE-receives-chairmans-stewardship-award-585605">https://mailchi.mp/undeerc/news-release-iPIPE-receives-chairmans-stewardship-award-585605</a>
DAPL Owner Joining North Dakota’s iPIPE Consortium to Help Advance Leak Detection Technology	1/13/2020	<a href="https://www.willistonherald.com/news/regional/dapl-owner-joining-north-dakota-s-iPIPE-consortium-to-help/article_ab8d13a8-3652-11ea-9117-ef358444f87f.html">https://www.willistonherald.com/news/regional/dapl-owner-joining-north-dakota-s-iPIPE-consortium-to-help/article_ab8d13a8-3652-11ea-9117-ef358444f87f.html</a>
Energy Transfer Joins Pipeline Spill Consortium	1/14/2020	<a href="https://bismarcktribune.com/bakken/energy-transfer-joins-pipeline-spill-consortium/article_5f983ae5-109c-596e-a254-f09974b1f8c1.html">https://bismarcktribune.com/bakken/energy-transfer-joins-pipeline-spill-consortium/article_5f983ae5-109c-596e-a254-f09974b1f8c1.html</a>
iPIPE Welcomes New Consortium Member: Dakota Access Pipeline	1/16/2020	<a href="http://undeerc.blogspot.com/2020/01/iPIPE-partnership-welcomes-new-member.html">http://undeerc.blogspot.com/2020/01/iPIPE-partnership-welcomes-new-member.html</a>
TC Energy Will Join North Dakota’s iPIPE Consortium to Help Advance Leak Detection	1/16/2020	<a href="https://www.willistonherald.com/news/oil_and_energy/tc-energy-will-join-north-dakota-s-iPIPE-consortium-to/article_2a52fa3e-38b7-11ea-aca2-23bfb860113c.html">https://www.willistonherald.com/news/oil_and_energy/tc-energy-will-join-north-dakota-s-iPIPE-consortium-to/article_2a52fa3e-38b7-11ea-aca2-23bfb860113c.html</a>
iPIPE Partnership Welcomes New Member: TC Energy	1/16/2020	<a href="http://undeerc.blogspot.com/2020/01/iPIPE-partnership-welcomes-new-member.html">http://undeerc.blogspot.com/2020/01/iPIPE-partnership-welcomes-new-member.html</a>
Podcast: iPIPE — Inside the Tech Pitch with Jay Almlie	1/21/2020	<a href="https://pipelinerspodcast.com/episode-111-iPIPE-tech-pitch-jay-almalie/">https://pipelinerspodcast.com/episode-111-iPIPE-tech-pitch-jay-almalie/</a>
Enbridge Joins Consortium Evaluating Next-Generation Technology in the Pipeline Industry	1/27/2020	<a href="https://www.enbridge.com/stories/2020/january/iPIPE-consortium-evaluating-next-generation-pipeline-technology">https://www.enbridge.com/stories/2020/january/iPIPE-consortium-evaluating-next-generation-pipeline-technology</a>
Monique Roberts LinkedIn Post	1/29/2020	<a href="https://www.linkedin.com/posts/monique-roberts-81a84527_pipelinesafety-iPIPE-pipelineintegrity-activity-6628411257315741697-cUBx/">https://www.linkedin.com/posts/monique-roberts-81a84527_pipelinesafety-iPIPE-pipelineintegrity-activity-6628411257315741697-cUBx/</a>
iPIPE Mentioned in 2019 State of the State Address	1/29/2020	<a href="https://www.youtube.com/watch?v=5vkkqT6DaE">https://www.youtube.com/watch?v=5vkkqT6DaE</a> Link to 1:02 time: <a href="https://youtu.be/5vkkqT6DaE?t=3731">https://youtu.be/5vkkqT6DaE?t=3731</a>
Bakken Oil, Gas to Energize North Dakota’s Global Impact, Governor Says	2/3/2020	<a href="https://www.naturalgasintel.com/articles/120930-bakken-oil-gas-to-energize-north-dakotas-global-impact-governor-says">https://www.naturalgasintel.com/articles/120930-bakken-oil-gas-to-energize-north-dakotas-global-impact-governor-says</a>
iPIPE with Jay Almlie on the Pipeliners Podcast: Episode 111	2/4/2020	<a href="https://pipelinerspodcast.com/episode-113-iPIPE-operators-perspective-brian-epperson-greg-tilley/">https://pipelinerspodcast.com/episode-113-iPIPE-operators-perspective-brian-epperson-greg-tilley/</a>
iPIPE on Energy Matters Radio (beginning at 9:15)	2/15/2020	<a href="https://www.am1100theflag.com/news/14840-2-15-20-energy-matters-hour-1#volume">https://www.am1100theflag.com/news/14840-2-15-20-energy-matters-hour-1#volume</a>

Title	Date	URL
iPIPE on the Pipeliners Podcast: Episode 115	2/18/2020	<a href="https://pipelinerspodcast.com/episode-115-iPIPE-vendor-perspective-john-van-pol-sean-donegan/">https://pipelinerspodcast.com/episode-115-iPIPE-vendor-perspective-john-van-pol-sean-donegan/</a>
On the Path to Zero Pipeline Spills	2/27/2020	<a href="http://blogs.und.edu/und-today/2020/02/on-the-path-to-zero-pipeline-spills/">http://blogs.und.edu/und-today/2020/02/on-the-path-to-zero-pipeline-spills/</a>
iPIPE with Jay Almlie on the Pipeliners Podcast: Episode 117	3/2/2020	<a href="https://pipelinerspodcast.com/episode-117-iPIPE-high-tide-floats-all-boats-jay-almalie/">https://pipelinerspodcast.com/episode-117-iPIPE-high-tide-floats-all-boats-jay-almalie/</a>
iPIPE with Jay Almlie on the Pipeliners Podcast: Episode 119	3/17/2020	<a href="https://pipelinerspodcast.com/episode-119-future-technology-today-jay-almalie/">https://pipelinerspodcast.com/episode-119-future-technology-today-jay-almalie/</a>
Pipelines Take on Their Biggest Enemy	3/30/2020	<a href="https://www.hartenergy.com/exclusives/pipelines-take-their-biggest-enemy-186778?mkt_tok=eyJpIjoiTjJFek5UUmI0ekEzTW1WbSIsInQiOiJUNlNxSmdiOHAwN081ZFdrTjRZRG0yK2FvdEIIUXM3TnFpSndSbnE5NUhjZ0NlakxVNFdwM0NUVFwvcnM5UW9hd0g0Rfc5T3ROc3ljR0xWXC9uckFnQ3RFRUpNTW1oQlcreFBPQnRDb1BBZFhLU0F5bVE4Nk92WHhock1wS1lrRUt5In0%3D">https://www.hartenergy.com/exclusives/pipelines-take-their-biggest-enemy-186778?mkt_tok=eyJpIjoiTjJFek5UUmI0ekEzTW1WbSIsInQiOiJUNlNxSmdiOHAwN081ZFdrTjRZRG0yK2FvdEIIUXM3TnFpSndSbnE5NUhjZ0NlakxVNFdwM0NUVFwvcnM5UW9hd0g0Rfc5T3ROc3ljR0xWXC9uckFnQ3RFRUpNTW1oQlcreFBPQnRDb1BBZFhLU0F5bVE4Nk92WHhock1wS1lrRUt5In0%3D</a>
UND Today: Engineering Students Team Up with Industry	4/2/2020	<a href="http://blogs.und.edu/und-today/2020/04/engineering-students-team-up-with-industry/">http://blogs.und.edu/und-today/2020/04/engineering-students-team-up-with-industry/</a>