



Energy & Environmental Research Center

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October 28, 2021

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 the quarterly progress on the subject project for the period of July 1 –  
September 30, 2021.

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:  
A handwritten signature in black ink that reads "Austin McRae".

2CF0ADB88C44D7...  
T. Austin McRae  
Research Engineer  
Integrated Petroleum Systems

TAM/kal

Attachment



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# **iPIPE – INTELLIGENT PIPELINE INTEGRITY PROGRAM**

## **Quarterly Progress Report**

*(for the period of July 1, 2021 – September 30, 2021)*

*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

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Grand Forks, ND 58202-9018

October 2021

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## **iPIPE – INTELLIGENT PIPELINE INTEGRITY PROGRAM**

### **Quarterly Progress Report July 1, 2021 – September 30, 2021**

#### **EXECUTIVE SUMMARY**

The Energy & Environmental Research Center (EERC) submits this quarterly report on the North Dakota Industrial Commission (NDIC)-funded intelligent Pipeline Integrity Program (iPIPE). 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, program highlights included the following:

- On July 14, August 9, and September 13, 2021, iPIPE held monthly member meetings to update all members on program status.
- On July 30, August 6, August 13, August 20, August 27, and September 17, Executive Committee Meetings were held to prepare for the next phase of funding proposal.
- On July 21, Orbital Sidekick gave an update to the members.
- Schedules with all current technology partners were successfully updated in contracts to address longer-than-anticipated timelines due to the variety of challenges experienced over the past year and a half. All scopes of work are currently under way.
- On June 30, 2021, Orbital Sidekick successfully launched its satellite into orbit. This milestone generated significant excitement and new and continued interest in the program.

## **iPIPE – INTELLIGENT PIPELINE INTEGRITY PROGRAM**

### **QUARTERLY PROGRESS REPORT**

**(July 1, 2021 – September 30, 2021)**

#### **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 to 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 technologies' application on working gathering pipelines.

The goal of this project is to develop and demonstrate cutting-edge technology to 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, ONEOK, 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 iPIPE's progress.

The following summarizes program activities from July 1 through September 30, 2021.

## ACCOMPLISHMENTS DURING REPORTING PERIOD

With iPIPE in its final year of the original contract with NDIC and the continued logistical constraints due to the global COVID-19 pandemic, iPIPE has continued to follow the conscious and purposeful decision made by the Executive Committee in 2020 to slow technology scouting. Scheduled technology development activities were executed as close to schedule as possible, but aggressive outreach efforts remained slowed for much of the quarter. Compared to previous quarters during the pandemic, member recruitment activities continued to pick up as iPIPE looks toward continuing to build upon program success beyond 2021.

- Program-level activities
  - Program management
    - ♦ The EERC worked closely with consortium members to define what was successful about the first phase of iPIPE and what could be done to achieve greater success in a potential continuation of the program. This information was used to begin crafting a proposal for iPIPE 2.0 to be submitted to NDIC's Oil and Gas Research Program (OGRP) by the November 1, 2021, deadline.
    - ♦ iPIPE extended the contracts with the four active technology partners to address a variety of delays, including travel restrictions, mechanical challenges in space, and supply chain issues. Satelitics is expected to conclude its scope by the end of November 2021. TOKU and Pipeline-Risk are expected to conclude their respective scopes by the end of December 2021. Orbital Sidekick's (OSK's) contract will continue into and conclude sometime in the first half of 2022.
  - Program meetings
    - ♦ On July 14, August 9, and September 13, 2021, iPIPE held monthly member meetings to update all members on program status. The goal of these meetings is to keep members apprised of a variety of program activities, including recruitment, finances, strategic direction, and technology development project status.
    - ♦ A project update meeting was held between OSK and members on July 21, 2021.
    - ♦ On July 30, August 6, August 13, August 20, August 27, and September 17, Executive Committee Meetings were held to prepare for the next phase of funding proposal.
  - Member recruitment
    - ♦ Discussions continued with a number of companies regarding membership in the program. Some of these companies have approached the program regarding membership requirements and benefits, while others have been previously approached by the program and/or existing members.
  - Program media mentions
    - ♦ Since its inception, iPIPE has been highlighted in more than 90 public multimedia and print articles. A partial listing of known media mentions is provided in Appendix A.
- Technology selection
  - The EERC continues to engage with companies from around the globe offering emerging (not-yet-commercial) technologies as they discover or are directed to iPIPE. With time and resources put toward recruitment and defining program direction beyond 2021 as well as having no technology selection event scheduled for 2021, technology providers are not currently being actively sought for 2022.

- On July 5, 2021, iPIPE met with Pixxel to discuss its technology and fit as a potential technology partner.
- Demonstration execution – Satelystics Phase IV
  - Phase IV AOIs (areas of interest) and member assets were finalized, and Satelystics began to conduct the Phase IV work. Data capture has taken longer than anticipated because of wildfire smoke obscuring the satellites' views.
- Demonstration execution – OSK
  - OSK began satellite commissioning. Issues were encountered; the OSK team has been working through these issues and expects to have them resolved in the next quarter.
  - Additional manned overflights of the North Dakota AOI were conducted by OSK in an effort to begin supplying its software with project data and begin work on streamlining data analysis and delivery.
  - The EERC is continuing to communicate with OSK for updates on satellite commissioning status.
- Demonstration execution – Direct-C
  - The EERC's independent evaluation report was completed and distributed.
- Demonstration execution – Pipeline-Risk
  - Efforts to solicit member asset data to fuel this project continued.
- Demonstration execution – TOKU
  - TOKU equipment was installed on Goodnight and Hess facilities, and baseline data were collected for a minimum of 2 weeks.
  - A sequence of simulated leaks was performed at the Goodnight system on July 28 and 29, 2021, and performed on the Hess system on September 7 and 8, 2021.
  - On September 13, 2021, TOKU met with iPIPE members to report on its findings during the simulated leak tests.
  - TOKU begin analysis of leak simulation data, and initial results were presented to iPIPE membership.

## **MEMBERSHIP AND FINANCIAL INFORMATION**

The original budget proposed to NDIC's 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	\$565,909*	\$735,730*	\$438,772*	\$859,589	\$2,600,000
Industry – Cash	\$352,000*	\$700,000*	\$850,000*	\$675,000	\$2,577,000
Industry and Technology Provider – In-Kind	\$525,878*	\$1,074,077*	\$949,051	\$500,000	\$3,049,006
<b>Total</b>	<b>\$1,443,787</b>	<b>\$2,509,807</b>	<b>\$2,237,823</b>	<b>\$2,034,589</b>	<b>\$8,226,006</b>

\* Reflects actuals for these years.

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.

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

<b>Sponsors</b>	<b>Expected Budget</b>	<b>Actual Expenses as of 9/30/21</b>	<b>Balance Remaining of Expected Budget</b>
NDIC Share – Cash	\$2,600,000	\$2,092,322	<b>\$507,678</b>
Industry Share – Cash	\$2,577,000	\$2,212,474	<b>\$364,526</b>
Industry – In-Kind	\$375,000	<i>Dakota Access</i> \$0	
		<i>DCP</i> \$60,500	
		<i>Enbridge</i> \$110,947	
		<i>Equinor</i> \$153,230	
		<i>Goodnight</i> \$35,235	
		<i>Hess</i> \$207,097	
		<i>MPLx</i> \$17,936	
		<i>Oasis</i> \$40,069	
		<i>ONEOK</i> \$5,000	
		<i>TransCanada</i> \$0	
		<i>Whiting</i> \$9,042	
		<b>TOTAL</b> \$639,056	<b>\$0</b>
Technology Providers – In-Kind	\$3,076,597*	<i>Satellytics</i> \$1,713,450	
		<i>Direct-C</i> \$185,867	
		<i>Ingu</i> \$88,266	
		<i>OSK</i> \$1,321,061	
		<i>TOKU</i> \$156,764	
		<i>Pipeline-Risk</i> \$20,082	
		<b>TOTAL</b> \$3,485,490	<b>\$0</b>
<b>Total</b>	<b>\$8,628,597</b>	<b>\$8,429,342</b>	<b>\$872,204**</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.

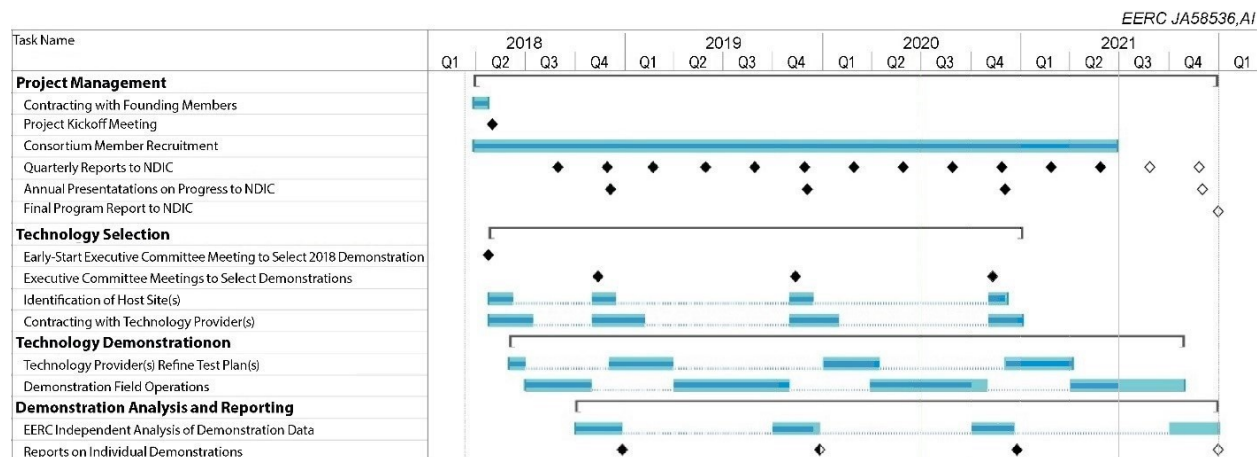


Figure 1. Project progress.

## FUTURE ACTIVITIES

The planned activities for the next quarter are detailed below:

- Program-level activities
  - The EERC will work with members and stakeholders to continue iPIPE on its successful path beyond the original 2018–2021 timeline. This includes producing a new proposal to submit to NDIC in November 2021.
  - iPIPE will continue ongoing and start new discussions with potential program members during the upcoming reporting period.
- Technology selection
  - 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 – Satelytics Phase IV
  - The Phase IV work will be completed, results will be presented to members by Satelytics, and a final report from Satelytics will be delivered to iPIPE.
  - The EERC will begin work on its independent assessment report of the Satelytics Phase IV work.
- Demonstration execution – OSK
  - OSK will conclude satellite commissioning activities.
  - Satellite captures of the North Dakota and New Mexico/Texas AOIs will begin along with coordinated, limited manned overflights.
  - The EERC will continue to assist OSK in coordinating satellite data captures and presenting the results of each capture to iPIPE members.
  - The EERC will work with iPIPE members to conduct coordinated controlled releases, sample collections per the request of OSK, field verifications of alerts, and communicate member questions and input to OSK.
- Demonstration execution – Pipeline-Risk
  - Iteration on the risk learning system (RLS) will begin.
  - Pipeline-Risk will present initial results to iPIPE members and a go/no-go decision will be made.
  - The scope will be complete by the end of December 2021.
- Demonstration execution – TOKU
  - TOKU will perform analysis of leak simulation data and continue development/refinement of algorithms and machine learning.



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## **APPENDIX A**

# **PARTIAL LISTING OF iPIPE MEDIA MENTIONS**

Partial List of Articles Highlighting iPIPE:  
Updated July 28, 2021

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.kfyrtv.com/content/news/iPIPE-Program-helps-solve-pipeline-leaks-in-ND--484747291.html">http://www.kfyrtv.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_ed64586c-1d52-52df-83e6-b661d3b95f0a.html">https://bismarcktribune.com/business/local/pipe-sensors-to-monitor-gathering-lines/article_ed64586c-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>
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>

Title	Date	URL
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>
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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>
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Innovative Pipeline Consortium Marks New Highlights	1/8/2019	<a href="http://undeere.blogspot.com/2018/12/innovative-pipeline-consortium-marks.html">http://undeere.blogspot.com/2018/12/innovative-pipeline-consortium-marks.html</a>
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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>
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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>
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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>
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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>
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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>
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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>
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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>
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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>
iPIPE Selects Orbital Sidekick as Partner for Pipeline Monitoring Project	11/19/2020	<a href="https://www.prnewswire.com/news-releases/ipipe-selects-orbital-sidekick-as-partner-for-pipeline-monitoring-project-301177019.html">https://www.prnewswire.com/news-releases/ipipe-selects-orbital-sidekick-as-partner-for-pipeline-monitoring-project-301177019.html</a>
Orbital Sidekick Secures \$16 Million Series A to Commercialize Hyperspectral Satellite Monitoring Solutions for Energy and Defense Sectors	4/13/2021	<a href="https://www.prnewswire.com/news-releases/orbital-sidekick-secures-16-million-series-a-to-commercialize-hyperspectral-satellite-monitoring-solutions-for-energy-and-defense-sectors-301267276.html">https://www.prnewswire.com/news-releases/orbital-sidekick-secures-16-million-series-a-to-commercialize-hyperspectral-satellite-monitoring-solutions-for-energy-and-defense-sectors-301267276.html</a>
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Orbital Sidekick to Launch Hyperspectral Satellite for Oil, Gas, Mine Monitoring	6/15/2021	<a href="https://investableuniverse.com/2021/06/15/orbital-sidekick-hyperspectral-imaging-oil-gas-mining-defense/">https://investableuniverse.com/2021/06/15/orbital-sidekick-hyperspectral-imaging-oil-gas-mining-defense/</a>
Hyperspectral Imaging Satellite, Currently Being Evaluated by iPIPE Consortium, Will Be Aboard SpaceX Flight	6/30/2021	<a href="https://www.enbridge.com/stories/2021/june/hyperspectral-imaging-satellite-latest-pipeline-monitoring-technology-officially-out-of-this-world">https://www.enbridge.com/stories/2021/june/hyperspectral-imaging-satellite-latest-pipeline-monitoring-technology-officially-out-of-this-world</a>
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