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January 28, 2026

Mr. Jordan Kannianen
Deputy Executive Director
North Dakota Industrial Commission
State Capitol – 14th Floor
600 East Boulevard Avenue, Department 405
Bismarck, ND 58505-0840

Dear Mr. Kannianen:

Subject: Quarterly Progress Report Entitled "iPIPE 3.0: intelligent Pipeline Integrity Program"
Contract No. G-059-116; UND Project – Fund 41000-UND0029076
EERC Fund 29076

Attached is the quarterly progress report for the subject project for the period October 1 – December 31, 2025.

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

Sincerely,

DocuSigned by:
Austin McRae
2CF0ADBF88C44D7...

T. Austin McRae
Oilfield Operations Specialist

TAM/rlo

Attachment

c/att: Brent Brannan, North Dakota Industrial Commission

iPIPE 3.0: INTELLIGENT PIPELINE INTEGRITY PROGRAM

Quarterly Progress Report

(for the period October 1 – December 31, 2025)

Prepared for:

Jordan Kannianen

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

Contract No. G-059-116

Prepared by:

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January 2026

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EXECUTIVE SUMMARY

This report documents activity conducted by the intelligent Pipeline Integrity Program (iPIPE) 3.0 for the North Dakota Industrial Commission (NDIC) Oil and Gas Research Program for October 1 – December 31, 2025. The goal of iPIPE is to advance technologies that reduce the frequency and duration of pipeline releases. iPIPE 3.0 operates with seven industry members, led by the Energy & Environmental Research Center (EERC). We are pleased to provide a model program for how to collaborate between government and industry and put innovation ahead of regulation. iPIPE is finding what could not be seen with previous technology and preventing larger impacts. iPIPE has achieved these with satellite technology, advanced inspection tools, and smart sensors. We have also expanded technology typically reserved for oil and gas systems to produced water systems. Today, at least three major produced water systems in North Dakota operate with artificial intelligence (AI) leak detection technology sprung from iPIPE. iPIPE 3.0 is advancing preventive technology for in-line inspection, methane detection, and sensors with AI and working to make detection affordable. This report provides an update on these exciting efforts.

Highlights of the first year of iPIPE 3.0 included the vetting of more than 45 technology providers and the final selection of seven for technology demonstration projects. Efforts in the second half of 2024 focused on negotiating and executing subcontracts with each of the technology providers as well as kicking off project tasks. Each project has continued to progress throughout the year regarding both scope and in-kind support.

- Vanguard completed its scope of work for iPIPE 3.0. This included final flight testing over member assets, analysis of methane detections from previous flights at the Methane Emissions Technology Evaluation Center, and delivery of its final report.

- KMAX completed primary software development and commissioning of its 4-inch circumferential magnetic flux leakage tool, readying it for a field trial.

- Direct-C deployed its remaining sensors and communication devices at a pipeline facility in Wyoming and worked with the EERC for a smaller deployment in Grand Forks, North Dakota.

- An iPIPE 3.0 contract extension between the NDIC and EERC was signed through 2026. Subcontract modifications and extensions were subsequently executed to allow technology subcontractors to adapt to dynamic business and operational challenges while still providing maximum value to iPIPE stakeholders.

- Out of seven subcontracts, one is complete, three are anticipated to be completed in Q1 of 2026, two completed by mid-2026, and one at the end of 2026. The iPIPE 3.0 program has significantly advanced methane detection technology, in-line-inspection technologies, and smart sensor-based technologies.

iPIPE 3.0: INTELLIGENT PIPELINE INTEGRITY PROGRAM
Quarterly Progress Report
October 1 – December 31, 2025

BACKGROUND

The intelligent Pipeline Integrity Program (iPIPE) includes industry organizations that account for a majority of the oil and gas in North Dakota gathered and transported to commodity markets. iPIPE is the industry's response to former Governor Doug Burgum's challenge to eliminate pipeline leaks through innovation.[1] The program is a pinnacle in demonstrating the option for innovation over regulation. Since 2018, iPIPE has vetted more than 145 technologies and conducted 12 technology projects that have ranged from technology in and on the pipe to technology orbiting the earth. Members of iPIPE collaborate monthly to discuss advancements in leak detection and conduct technology projects that explore applications within their assets. The Energy & Environmental Research Center (EERC) manages the activity of iPIPE, which includes technology scouting, technical evaluation, contract management, field activity, project performance, reporting, and coordination of member meetings.

iPIPE 3.0 is active with seven members: Enbridge, Energy Transfer Partners, Chevron Corporation, Marathon Petroleum Logistics, ONEOK, South Bow, and TC Energy.

The goal of the program is to advance technologies that reduce the frequency and duration of pipeline releases.

The objectives to achieve this goal are as follows:

- Select multiple projects for demonstration from the technology-scouting efforts.
- Grow industry membership.
- Foster industry collaboration through monthly member meetings and an annual member forum.
- Advance technology to commercial application and demonstrate commercial deployment.

The following summarizes program activities from October 1, 2025, through December 31, 2025.

[1] www.ndoil.org/industry-responds-to-governors-initiative-to-improve-pipeline-technology-program-funding-approved-by-north-dakota-industrial-commission (accessed October 2024).

ACCOMPLISHMENTS DURING REPORTING PERIOD

- Program-level activities
  - Program management
    - The EERC continued working with the iPIPE industry member-selected technology providers to execute contracts for iPIPE 3.0.
  - Program meetings
    - On October 16, November 20, and December 18, 2025, iPIPE held monthly member meetings to update all members on program status. The meeting agendas include safety, determination of quorum, approval of minutes, project updates, and business of the membership.
  - Member recruitment
    - iPIPE continues to seek new members and develop strategic relationships.

- Technology demonstration project updates
  - Bridger Photonics (Bridger) – This project will work to overcome the limitations of using lidar over snow cover, ideally resulting in a technology capable of detecting methane year-round in North Dakota.
    - Having completed its second of three flight campaigns over North Dakota in the previous quarter, Bridger monitored the area of interest for appropriate snow cover. Sufficient snow cover did not accumulate during the past quarter but looks promising for the first quarter of 2026.
    - A subcontract extension was signed to allow Bridger to wait for complete snow cover.
  - Direct-C – This project aims to demonstrate mass leak detection monitoring of critical assets at a significant cost reduction when compared to present technology.
    - Direct-C deployed its third and final major set of sensors at a pipeline facility in Wyoming and began monitoring.
    - Direct-C worked with the EERC to deploy a smaller set of sensors around the EERC's Grand Forks campus.
    - Direct-C continued monitoring its first and second set of sensors and communication devices at Enbridge's Edmonton Terminal in Alberta and facility in Cushing, Oklahoma.
    - A subcontract extension was signed to allow Direct-C additional time to collect data from the Wyoming and EERC deployments.
  - Flowstate and TOKU – This project will integrate TOKU's cutting-edge pressure sensor data with Flowstate's computational pipeline monitoring system to significantly enhance the accuracy and reliability of leak detection and localization within complex pipeline networks, all in compliance with industry cybersecurity standards.
    - A subcontract modification including an extension was signed to allow Flowstate and TOKU to move the remaining scope of the project to a Bridger Pipeline asset from the previous Hess Corporation (Hess) asset due to the Chevron acquisition of Hess. Fluid withdrawal tests will continue with the new system, which is already equipped with TOKU sensors.
    - The dynamic (live) data connection on the (now Chevron) pipeline asset remains active and provides useful data.
  - Flyscan – This project is designed to add methane detection capability to Flyscan's automated aerial right-of-way technology for pipeline inspection.

    - ♦ Flyscan continued the design of the alpha airborne unit.
    - ♦ A subcontract extension was signed with an end date of December 31, 2026.
  - KMAX – This project will improve offerings of smaller diameter in-line inspection tools by developing a circumferential magnetic flux leakage (CMFL) tool capable of inspecting 4-inch-diameter pipelines.
    - ♦ KMAX completed tool commissioning and software development.
    - ♦ A subcontract extension was signed to allow flexibility with scheduling the field trial.
  - Novitech – This project will develop a prototype inspection system with a new multifield CMFL magnetizer module to enable detection and identification of axially oriented stress corrosion cracking.
    - ♦ Novitech continued work on its full-scale pull testing of the prototype unit.
    - ♦ A subcontract extension was signed to allow flexibility with scheduling the field trial.
  - Vanguard – This project adds improved functionality to Vanguard's tunable diode laser absorption spectroscopy methane sensor to enhance automation and leak quantification.
    - ♦ Vanguard completed final flight testing over Energy Transfer's assets and the Methane Emissions Technology Evaluation Center at Colorado State University.
    - ♦ Vanguard concluded its scope of work for this project with delivery of its final reports.

- Technology selection
  - iPIPE continues to engage with companies from around the globe that offer emerging technologies.

MEMBERSHIP AND FINANCIAL INFORMATION

The budget proposed to the NDIC Oil and Gas Research Program was $6,000,000, as shown in Table 1. Table 2 presents greater detail on the current budget and actual expenses incurred by the program.

Project progress is shown in Figure 1.

Table 1. iPIPE 3.0 Original Budget

Sponsors	Contribution
NDIC – Cash	$3,000,000
Industry – Cash	$900,000
Technology Providers – In-Kind	$2,100,000
Total	**$6,000,000**

Table 2. iPIPE 3.0 Expected Budget and Expenses to Date

Sponsors	Expected Budget	Actual Expenses as of 12/31/2025		Balance Remaining of Expected Cash Budget
NDIC Share – Cash	$3,000,000		$2,210,494	**$789,506**
Industry Share – Cash	$975,000		$610,340	**$364,660**
Technology Providers – In-Kind	$2,100,000	*Bridger*	*$375,000*	
		Direct-C	*$266,239*	
		Flowstate + TOKU	*$226,482*	
		Flyscan	*$962,189*	
		KMAX	*$275,886*	
		Novitech	*$207,835*	
		Vanguard	*$69,313*	
		TOTAL	**$2,382,944**	
Total	**$6,075,000**		**$5,203,778**	**$1,154,166**

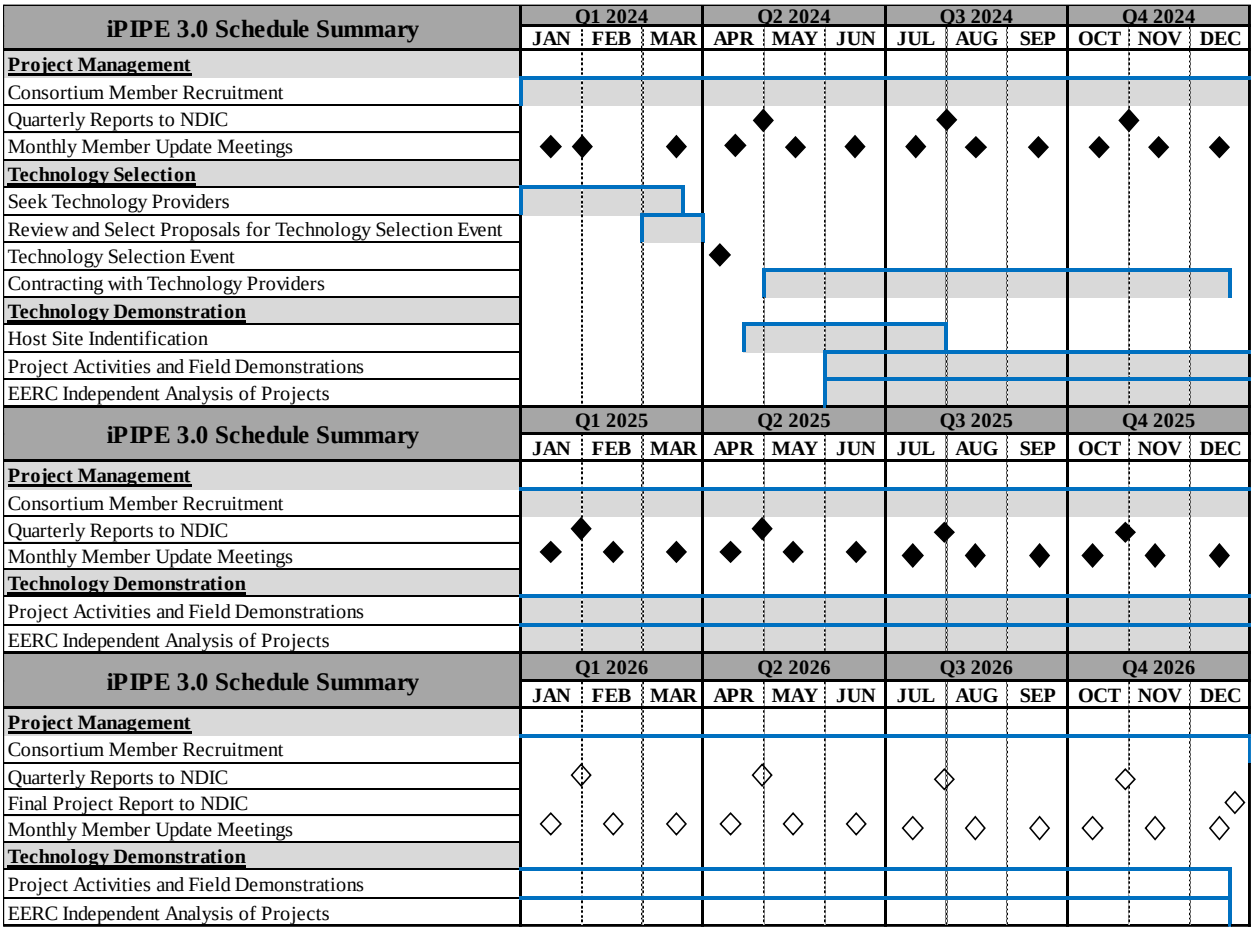

Figure 1. Project progress.

FUTURE ACTIVITIES

The planned activities for the next quarter are detailed below.

- Program-level activities
  - iPIPE is anticipating an OGRP review of the iPIPE 4.0 proposal.
  - iPIPE will continue discussions with potential program members.
  - iPIPE will hold its annual member forum on February 19, 2026.

- Technology demonstrations
  - Bridger will complete the third and final flight campaign, which will be over snow cover. Results and final reporting may occur in the coming quarter or next as data capture is dependent on weather.
  - Direct-C will continue to collect data from all deployments and work with the EERC to conduct testing with plans to complete the scope by the end of the quarter.
  - Flowstate and TOKU will continue data collection and technology development and enhancements.
  - Flyscan will continue development of its technology albeit at a reduced pace while it also focuses on other high-demand leak detection technology.
  - KMAX is scheduled to run the prototype tool with ONEOK in February.
  - Novitech will complete full-scale pull-through testing and continue arranging the field trial.
  - Vanguard’s scope of work is complete. The EERC will work to close out the subcontract in early 2026.

- Technology selection
  - The EERC will continue to seek exciting emerging technologies and engage with companies from around the globe.