



October 27, 2014

Ms. Karlene Fine
Executive Director
North Dakota Industrial Commission
Attention: Oil and Gas Research Program
State Capitol – 14th Floor
600 East Boulevard Ave Dept 405
Bismarck, ND 58505-0840

Subject: 10-Code, LLC Rotorcraft Aerial Pipeline Inspection Proposal

Dear Ms. Fine:

Enclosed Please find an original and one copy of our joint proposal with Double M Helicopters entitled "Rotorcraft Aerial Pipeline Inspection". The overall goal of the proposed project is to improve the accuracy and efficiency of aerial pipeline inspection, as compared to current fixed wing visual inspections, by utilizing a helicopter equipped with advanced visual identification and monitoring equipment. We will demonstrate that early detection of fugitive hydrocarbon based emissions using this inspection technology can reduce economic and negative environmental impacts, sustain current transmission rates, and foster increased public confidence in the oil and gas transmission pipeline activities in North Dakota.

Enclosed also please find the required \$100.00 application fee. 10-Code, LLC and Double M Helicopters are committed to completing the project as described in this proposal if the Commission awards the requested grant funds. In addition to this grant funding application 10-Code, LLC is currently seeking to secure matching funding from industry partner sources to make implementation of this project possible.

If you have any questions regarding this proposal, please contact me by phone at (701) 425-2771, or by e-mail at skilde@10codellc.com.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink, appearing to read "S. Kilde", written over a horizontal line.

Steven V. Kilde
President
10-Code, LLC

Oil and Gas Research Program

North Dakota

Industrial Commission

Application

Project Title:

Rotorcraft Aerial Pipeline Inspection

Applicants:

Double M Helicopters, Inc.
10-Code, LLC

Principal Investigator:

Monte Myers
Steve Kilde

Date of Application:

October 30, 2014

Amount of Request:

\$575,000.00

Total Amount of Proposed Project:

\$2,350,000.00

Duration of Project: 18 Months

Point of Contact (POC):

Steve Kilde

POC Telephone:

701-425-2771

POC E-Mail Address:

skilde@10codellc.com

POC Address:

4231 Kodiak Place
Bismarck, ND 58503

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ABSTRACT

Double M Helicopters, Inc. and 10-Code, LLC are partnering to use a helicopter aerial platform and advanced visual identification and monitoring equipment to improve accuracy of aerial inspection and reconnaissance of hazardous liquid and natural gas transmission pipelines in North Dakota mandated by The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (49 CFR 192.613 and 49 CFR 195.442). This project correlates to the following Oil and Gas Research Council (OGRC) statutory goals and purposes:

1. Encourage and promote the use of new technologies and ideas that will have a positive economic and environmental impact on oil and gas exploration, development, and production in North Dakota.
 - a. Improve accuracy of monitoring and detection in comparison with current fixed wing aerial and ground based practices.
 - b. Early and more accurate detection of fugitive hydrocarbon based emissions will lead to reduced costs for remediation and environmental impact.
 - c. Identify visual, thermal, infrared and air density/chemistry anomalies above pipeline locations from the air. By producing more accurate data than current practices and validating the necessity for further ground based investigation, mitigation and remediation.
 - d. Pursuant to pipeline patrol and monitoring activities aerial detection of suspicious activity in remote areas to detect suspicious activity harmful to the environment. When detected aerial and enhanced video surveillance techniques can be deployed to identify perpetrators and provide actionable intelligence for regulatory or criminal enforcement by the State of North Dakota.
2. Preserve existing jobs and production levels.
 - a. Ensure current production levels and resource transmission rates through early detection of potential anomalies in transmission pipelines.
 - b. Reduce potential transmission pipeline down time through earlier detection resulting in more rapid anomaly investigation, mitigation and remediation.
3. Identify oil and gas exploration and production technologies presently not used in North Dakota.
 - a. Improve on accuracy of current fixed wing and ground based visual transmission pipeline inspection, and delivery of more accurate anomaly data to include GPS, visual, thermal, infrared and air density/chemistry information.

The proposed project achieve these goals by utilizing prescribed technology to increase the frequency of detection as compared to current fixed wing aerial and ground practices; producing baseline computer enhanced visual and thermal imaging data of transmission pipeline infrastructure and surrounding environments; reducing investigation, mitigation and remediation responses and costs based on more accurate initial fugitive emission detection and data; and, enabling more accurate enforcement of criminal and environmental regulations based on improved visual investigative techniques and intelligence data.

The project will take 12 to 18 months from award of contract, with total time dependent upon flyable weather days. The total project cost will be \$2.35 million.

PROJECT DESCRIPTION

Introduction

Pipelines are the key to solving many of the challenges currently associated with oil and gas activity in North Dakota, including traffic and impact to roads, dust, and flaring. Pipelines, however, have their own challenges as frequent reports of spills and concerns about emissions have risen to the forefront. Faster and more efficient detection of these spills and emissions is needed, and Double M Helicopters, Inc. and 10-Code, LLC have partnered to address this critical issue.

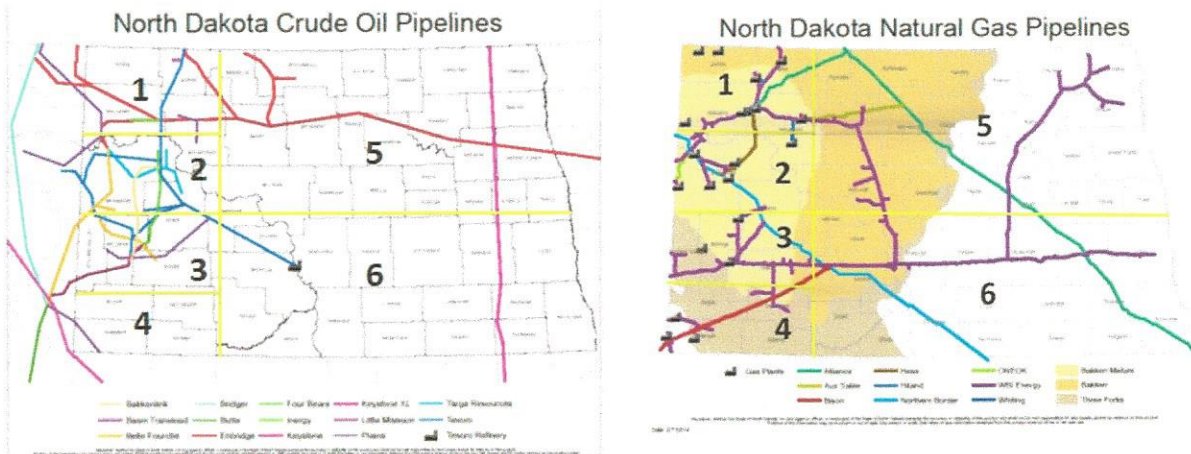
The primary goals of this project will be to demonstrate technologies and methodologies that will help in the early and more accurate detection of hydrocarbon-based spills and emissions, which will lead to reduced costs for remediation and environmental impact. The technologies used in this project will help improve upon current fixed wing aerial and ground surveillance practices that identify on average only seven percent of all liquid leak sites, with accuracy of identification of fugitive emission vapor sites less than that. Our advanced detection and monitoring equipment aboard a helicopter will significantly improve the frequency of detection and decrease the time required to detect suspect sites. The use of this technology may be an extremely attractive option for pipeline inspection by both transmission companies and regulators because the early and more accurate detection of fugitive hydrocarbon based emissions will lead to reduced costs for remediation and environmental impact and because it will reduce pipeline transmission productivity loss due to repair and/or remediation.

Objective

The overall goal of this proposed project is to use a helicopter aerial platform and advanced visual identification and monitoring equipment to improve accuracy of aerial inspection and reconnaissance of hazardous liquid and natural gas transmission pipelines in North Dakota as mandated by The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (49 CFR 192.613 and 49 CFR 195.442).

The state of North Dakota will be divided into six sectors (Figure 1), with inspections in each sector to be completed within three months each prior to proceeding to the next grid sector. The timetable for when

Figure 1



each sector will be inspected will be dependent upon the number of flyable days each month as affected by weather and equipment maintenance requirements.

Methodology

For each inspection, advanced visual identification and monitoring equipment, including FLIR Systems and Boreal Laser GasFinder, will be mounted on the exterior of the Bell 206 L IV aerial platform (Appendix A). The helicopter is flown over the prescribed pipeline route at approximately 100 feet Above Ground Level (AGL) and at approximately 60 knots or less. The FLIR Systems video camera has a filter that records a select spectrum of infrared wavelengths. Within these wavelengths, certain hydrocarbons absorb infrared radiation, and these hydrocarbons are seen as “smoke” in the video imagery.

Higher winds disperse gas quickly, which makes it harder to see with a passive system. In order to improve accuracy in these conditions, the system will be enhanced with the addition of the Boreal GasFinderAB Laser Detection System. The laser is tuned to the absorption wavelength of hydrocarbons, and a portion of the laser energy is absorbed by the chemical hydrocarbons. The laser return signal is then measured to determine existence of the chemical and quantify the amount in the atmosphere.

The sensor operator monitors real time sensor data to identify potential fugitive emissions. When a fugitive emission, liquid spill, or suspicious activity is detected, a day and night image will be recorded with a GPS location and date and time stamp. In the event of a fugitive emission, the Laser GasFinder will also identify chemical composition of fugitive emissions, and quantify parts per million (ppm) present at that location.

Suspect fugitive emission site and accompanying data will be reported immediately to OGRC for further ground based evaluation and analysis to validate aerial findings and determine proper remediation course of action. Detailed written synopsis of aerial survey and data collected from suspect fugitive emission sites will be analyzed and a written report will also be submitted to the OGRC on a monthly basis. Because the technology also has the ability to identify occurrences of illegal dumping, any suspicious activity will be reported immediately for regulatory or criminal enforcement by the State of North Dakota. In addition to these short-term objectives, all data collected by the project will be compared to prior years’ spill and/or emission reports to help demonstrate how monitoring or early detection may help prevent or mitigate spills or emissions during the project timeframe.

Pipeline transmission companies operating within North Dakota will also have access to the data collected and improved accuracy of aerial inspections, ultimately resulting in consistency of transmission quantities, improving risk management and increased revenue. The increased accuracy and speed of detection with this inspection method, as opposed to traditional methods currently in use, will demonstrate to transmission pipeline operators the overall benefits to productivity and risk reduction and ensure future use of this technology.

Why the Project is Needed and Anticipated Results

Inspection and reconnaissance of hazardous liquid and natural gas transmission pipelines in North Dakota is mandated by The United States Department of Transportation Pipeline and Hazardous Materials Safety Administration (49 CFR 192.613 and 49 CFR 195.442), but current fixed wing aerial and ground surveillance practices are inaccurate, unnecessarily time consuming, lack collection of scientific data, and fail to produce reliable results. In fact, fixed wing and ground based visual inspection techniques identify on average only seven percent of all liquid leak sites, with accuracy of identification of fugitive emission vapor sites less than that.

Our advanced detection and monitoring equipment aboard a helicopter will significantly improve the frequency of detection and decrease the time required to detect suspect sites. This, in turn, will reduce remediation costs and negative environmental impact as a result of early detection and will reduce pipeline transmission productivity loss due to repair and/or remediation. In addition, while this is not a primary goal of this specific project, the technology may be used to identify suspicious activity harmful to the environment, such as illegal dumping, and this information may be provided to regulators for criminal enforcement by the State of North Dakota.

Facilities, Resources, and Capabilities:

Double M Helicopters will provide experienced helicopter pilots and maintenance personnel to safely accomplish the surveys. Double M Helicopters operates superbly maintained helicopters that provide an excellent reliability rate to allow the project to be completed on time and on budget. Both Helicopters will be equipped with advanced navigation equipment to track pipeline routes in North Dakota. Monte Myers, Chief Pilot and owner of Double M Helicopters has over 30 years of experience operating in the weather patterns of North Dakota. A comprehensive understanding of the limitations imposed by those weather patterns, and how they affect flight operations in North Dakota and experience with mitigating risks associated with extreme low level flying. Most importantly, Monte has an excellent safety record and is FAA Certified to conduct PART 135 operations and a true safety first approach to all aviation operations

10-Code LLC will provide experienced law enforcement trained FLIR system operators that understand how weather, speed and visible moisture affect the results of these advanced surveys. Along with the expertise of monitoring the FLIR equipment 10-Code LLC will also provide experience in the investigation of results obtained by the monitoring equipment. In addition, they will bring over 50 years of investigative, law enforcement experience to help identify and investigate any criminal activity taking place while conducting the aerial surveillance operations utilizing the following equipment:

- FLIR Systems, Ultra 8000E: Airborne Environmental Imaging and Fugitive Emission Detection System and Stabilized Thermal Imaging Camera.
- Boreal Laser, GasFinderAB: Laser Gas Emissions Airborne Monitoring System.
- Helicopter: Bell 206 L IV
- Computers
- Cell Phones
- Still photography camera

Environmental and Economic Impacts while Project is Underway:

No negative impacts anticipated in this project.

Ultimate Technological and Economic Impacts:

Early detection of spills or emissions will lead to minimizing the size and severity of incidents, thereby reducing negative environmental impacts.

STANDARDS OF SUCCESS

The success of this project will be measured through the successful field demonstration of aerial surveying and data collection of fugitive emission sites. Analysis will include more than 300 flight hours over an 18 month period, which may be compared to previous years' spill data to gauge the technologies' effectiveness in early detection. Early detection will have tremendous benefits for the state of North Dakota through lower remediation costs, reduced negative environmental impacts, increases in pipeline transmission productivities, and an improved public confidence in the oil and gas industry.

In addition, the project will provide overall evaluation of existing transmission pipeline infrastructure and an aerial assessment of its integrity. This will have a positive impact on the oil and gas industry as a whole because it will help encourage and promote the use of new technologies in producing and transporting oil and gas while positively impacting the environment. This technology will also help ensure current production levels and resource transmission rates through early detection of potential anomalies in transmission pipelines, and it will reduce potential transmission pipeline down time through earlier detection resulting in more rapid anomaly investigation, mitigation and remediation.

BACKGROUND/QUALIFICATIONS

The partners working on this project have well over three decades of combined experience in law enforcement, health and safety operations, hazardous materials response, and flight experience. Monte Myers, president and chief pilot of Double M Helicopters has more than 30 years of military flight experience and 9,500 hours of flight time. He is qualified in both helicopters and Fixed Wing Multi Engine Aircraft and is currently operating a King Air 200 and Bell 206BIII. He is also a certified safety officer and is currently a Chief Warrant Officer 5 with North Dakota Army National Guard (NDARNG) as the State Stan Instructor Pilot.

Steven Kilde, CEO for 10-Code, LLC, has 26 years of law enforcement experience, as well as 22 years of military experience that included two deployments. He retired as a lieutenant with the traffic section and specialized in criminal investigations and was a team leader for SWAT team. Kilde is a certified hazmat technician and site safety officer and is also specialized to operate MEP helicopter package sensor equipment.

Kilde's partner Steve Lundin has 13 years of law enforcement experience and retired as a Sergeant supervising an Investigations Section. Like Kilde, he is also a SWAT team leader. Lundin is an FBI Certified

Bomb Technician and served as a Bomb Squad Commander. He is certified as a hazmat technician and a site safety officer and is also specialized to operate MEP helicopter package sensor equipment.

MANAGEMENT

Steven Kilde, CEO for 10-Code, LLC, will serve as the project manager of the proposed project and will have overall responsibility for the contract and will collaborate regularly with other partners. He will also be responsible for regular reporting to the OGRC management.

The project will be managed in accordance with all applicable Federal Aviation Administration (FAA) rules and regulations with respect to helicopter operations, minimum flight requirements, maintenance and specialized equipment limitations. All partners will work to complete data analysis following each flight and provide immediate notification of potential hazards, monthly written reports and data submissions to OGRC, and weekly analysis of expenses compared to projected budget expenditures with necessary adjustments.

TIMETABLE

The project will begin 90-120 days after notification of project approval and will run for a period of 12 to 18 months, depending on the number of flyable days each month as affected by weather and equipment maintenance requirements.

BUDGET

The total estimated cost for this project is \$1.235 million. The table below shows a summary of the funding for the proposed project.

Project Associated Expense	NDIC's Share	Applicant's Share (Cash)	Applicant's Share (In-Kind)	Other Project Sponsor's Share
Bell 206 L IV			\$1.2M	None
Flight hours	\$225,000.00			\$225,000.00
FLIR 8000E	\$187,500.00			\$187,500.00
Operator/Pilot/Data Analysis Salaries	\$100,000.00			\$100,000.00
Boreal GasFinder AB	\$50,000.00			\$50,000.00
OEM Training	\$12,500.00			\$12,500.00
Total	\$575,000.00		\$1.2M	\$575,000.00

Please note that the budget as listed above demonstrates the lowest costs to perform project in its entirety. Reduction in grant award would result in reduced flight hours and data collection, as well as limited area of pipeline surveyed. Equipment acquisition costs will remain the same.

CONFIDENTIAL INFORMATION

There is no confidential information related to this proposal.

PATENTS/RIGHTS TO TECHNICAL DATA

It is anticipated that no patents will be generated by the proposed activities.

APPENDIX

A. Equipment Descriptions:



Bell 206 L IV Helicopter

(\$1,500.00 per hour with a minimum of 300 hours on project).



FLIR Systems, Ultra 8000E

Airborne Environmental Imaging and Fugitive Emission Detection System and Stabilized Thermal Imaging Camera. (\$375,000.00).



Boreal Laser, GasFinderAB

Laser Gas Emissions Airborne Monitoring System. (\$100,000.00).



AFFIDAVIT OF TAX LIABILITY

I, Steven Joel Lundin, certify that 10-Code, LLC does not have any outstanding tax liability owed to the State of North Dakota or any of its political subdivisions.



Steven Joel Lundin
Chief Financial Officer, 10-Code, LLC



Date