



WESTERN DAKOTA ENERGY ASSOCIATION

March 26, 2024

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Karen Tyler
ND Industrial Commission
State Capitol 14th Floor
600 E Boulevard Avenue, Dept 405
Bismarck ND 58505-0840

Dear Ms. Tyler:

We are pleased to report that the Western Dakota Energy Association, in partnership with the ND Agricultural Weather Network, has successfully completed the Wise Roads weather station project. Wise Roads (Weather Information System to Effectively Reduce Oilfield Delays and Disruption) involved the deployment of 50 research-grade weather stations throughout the oil-producing counties of western North Dakota, focusing on areas that experienced moderate to heavy oil industry truck traffic. The goal of Wise Roads is to provide real-time weather information, especially precipitation data, to allow county/township road managers to more precisely identify those roads that require temporary weight restrictions, and more importantly, exclude those that do not.

Weather station installation was completed in phases. The first phase involved the installation of the initial 10 Wise Roads full-service stations in June 2019. Each station was equipped with a high-resolution camera and sensors to measure temperature, precipitation, wind speed and direction, and soil temperature and moisture to a depth of 72 inches. Phase II was completed in Fall of 2019 and Spring of 2020, resulting in the installation of 15 additional stations. Phase III installed 15 more stations throughout the summer and fall of 2021 and into the spring of 2022. Based on advice from NDAWN, the project was revised for most Phase IV stations. Because the first 40 stations virtually saturated the key oil-producing counties, NDAWN advised that there was no need for additional equipment to measure temperature and wind speed, which do not vary greatly over short distances. Instead of full-service stations, most Phase IV sites were equipped with just a camera and rain gauge, which obviously reduced the cost of the installation. And because they do not measure temperature, the Phase IV stations could be sited near buildings. This allowed for connection to AC power, so the stations could be equipped with rain gauges that melt and measure the moisture content of snow.

Fifty new stations have been installed, 39 of which are located in the four major oil-producing counties. Prior to the start of the project, Dunn and McKenzie Counties had just one station each, Mountrail County had three and Williams County had four. The 50th station is the only one not in an oil-producing county. With an eye toward the emerging CO2 capture industry, the last station was installed about six miles south of Center in Oliver County, nearly due west of Milton R. Young Station. One more station has yet to be installed at a site to be determined near Mandaree.

Western Dakota Energy Association
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WDEA's partner NDAWN provides for management and distribution of the weather station data, and ongoing operation and maintenance of the weather stations. Current and historic data are available on NDAWN's website (ndawn.ndsu.nodak.edu/), as well as the project website (wiseroadsnd.com). The latter site also includes a page devoted to photos from the stations' high-resolution cameras. The images are updated continuously throughout the daylight hours. To promote the availability of the images and data from the stations, WDEA includes a "Shots of the Week" article in its weekly newsletter. NDAWN has also trained county road managers in the use of the equipment and data. They have been provided remote access to the cameras, which can be rotated left to right and up and down.

The weather station project got a boost In October 2020 when the U.S. Army Corps of Engineers awarded NDAWN a \$6.4 million, five-year contract to retrofit existing weather stations and build new stations across North Dakota. The contract is part of a larger, five-state project focused on weather monitoring in the Upper Missouri River Basin that will improve the data available for water management by the Corps of Engineers. One of the many variables the project will record will be the moisture content in every snow storm in areas where the data is currently unavailable. NDAWN's plans include upgrades to some of the stations installed through the Wise Roads project.

Many of the stations are equipped with soil moisture and temperature probes, information which is particularly valuable to the ag sector. WDEA partnered with the Upper Great Plains Transportation Institute (UGPTI) to conduct research into the appropriate timing of spring weight restrictions as the ground thaws, a practice commonly known as "frost laws." The data allowed UGPTI to evaluate soil moisture and temperature to improve road construction and maintenance techniques. UGPTI took the research one step further, partnering with each of the Big Four oil-producing counties to embed probes in gravel roads. UGPTI and NDAWN were able to compare the moisture and temperature profile of the road sensors with the other sensor on the adjacent weather station sites.

WDEA received considerable assistance from the oil and gas industry in identifying sites for stations. Many of the stations were located in grassy areas adjacent to well pads, and as previously noted, there are eight Phase IV stations located directly on well pads with a connection to AC power.

As anticipated, counties took advantage of the weather station data to refine their use of weight restrictions following weather events. Dunn, McKenzie and Mountrail Counties have broken their county into zones to narrow the scope of road restrictions. Dunn and Mountrail created four quadrants, and McKenzie is broken down into five separate zones. Williams County chose to narrow its road restrictions by identifying the restricted area using the names and numbers of county and township roads. Williams County is also evaluating the use of road quality tiers. For example, if an area received an inch of rain, weight restrictions may be placed on poor quality township roads, but better built county roads may remain open. WDEA's software developer, DAWA Solutions Group, has also developed tools for county road departments, including a program that transmits an automated text message or email to county road officials if a weather station receives rainfall over a designated threshold.

For the Industrial Commission's information, Jonathan Rosencrans, the meteorologist hired to manage the Wise Roads project, has assembled a Powerpoint of the project. The slides include a photo of the station, the date of installation, geographic coordinates of its location, and the county in which the station is located. The presentation can be accessed online at tinyurl.com/WiseRoads.

Karen Tyler
ND Industrial Commission
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Attached to this letter are additional letters from some of the oil-producing counties describing how they used the Wise Roads project. WDEA's final invoice for the remaining portion of the Oil and Gas Research Council grant funding will be transmitted via email to OGRC grant administrator Erin Stieg.

If the NDIC is interested, we would welcome an opportunity to provide a summary presentation of the project at a future Commission meeting. We wish to thank NDIC and the Oil and Gas Research Council for their support of the Wise Roads project.

Sincerely,

A handwritten signature in black ink, appearing to read "Geoff Simon". The signature is written in a cursive, flowing style.

Geoff Simon
Executive Director

attach



Oil & Gas Research Council
North Dakota Industrial Commission
600 East Boulevard Ave., Dept. 405
Bismarck, ND 58505-0840

Dunn County utilizes the Weather Information System to Effectively Reduce Oilfield Delays and Disruption.

Over the last four years, Dunn County has come to rely on the weather stations throughout our county to make decisions regarding weather related road closures. Our county is split into four zones. The weather in each zone can be different at any given time. We have restricted our county gravel roads 16 times since 2020. Out of those 16 restrictions, we restricted certain zones 4 times.

- On May 11, 2022 we restricted zone 1. With the additional rain that fell we added zones 2-4 on May 12, 2022.
- July 5, 2022 zone 4 was restricted.
- August 4, 2023 zones 3 and 4 were restricted. Later that day we added zones 1 and 2.

These do not include the hours spent monitoring what is going on throughout the county by checking the stations. Without the weather stations we would not have been able to easily make those decisions without having to travel all over the county to see the zones in person. It is truly a great resource to have and to use.

A handwritten signature in blue ink that reads "David Lym".

David Lym
Dunn County Highway Superintendent.



McKenzie County
1300 12th Street SE, Suite 240
Watford City, ND 58854
Ph. 701-444-2600
county.mckenziecounty.net

February 7th, 2024

Oil and Gas Research Council
North Dakota Industrial Commission
600 East Boulevard Ave, Dept 405
Bismarck, North Dakota 58505-0840

RE: Wise Roads Project

Dear Oil and Gas Research Council Members,

The McKenzie County Road and Bridge Department regularly utilizes the information provided via the Wise Roads weather stations and soil probes to help make informed decisions regarding inclement weather road closures, spring load restrictions, and Road and Bridge daily operations.

Due to the significant impact that weather road closures and spring load restrictions may have on industry and County operations, County Staff appreciates having the Wise Roads weather stations and soil probes as a resource to help determine where restrictions are needed and where they may not be needed. Weather patterns can vary throughout the County and the precipitation information provided by the Wise Roads weather stations helps the Road and Bridge Department determine if all of the County needs to be restricted or just a zone or two.

Thank you for investing in the Wise Roads project and for allowing the investment to be made to help the County make informed decisions.

Sincerely,

A blue ink signature of Layton Northrop, written in a cursive style.

Layton Northrop

McKenzie County

Road and Bridge Superintendent

A blue ink signature of Grace Demars, written in a cursive style.

Grace Demars

McKenzie County

Engineering Director

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Mountrail County Commissioners

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February 6, 2024

Oil & Gas Research Council
North Dakota Industrial Commission
600 East Boulevard Avenue, Dept. 405
Bismarck, ND 58505-0840

To Whom it May Concern:

Mountrail County appreciates the investment by the Oil & Gas Research Council into the WISE Roads weather station program. Mountrail County benefited with the addition of multiple new weather stations added to our county.

These weather stations have been utilized by the Road and Bridge department in assisting with managing our roadway network to protect the infrastructure while allowing commercial goods and services to utilize these roads when possible during weather related events. Since the installation of the WISE Roads weather stations, Mountrail County has implemented a 4 quadrant map, splitting the county into 4 sections. Each section has one or more weather station within its boundaries', allowing the Road department to have quadrant specific weather information and make applicable roadway travel decisions, minimizing countywide shut downs.

The WISE Roads program, and the publicity of the program from and through WDEA / Load Pass Permit System, has brought the weather stations and that knowledge to oil and gas operators, dispatchers, and more trucking industry personnel in our county. The Road department often fields inquiry's regarding roadway status from these personnel. Having the accurate, real time data from the additional weather stations assists both for roadway weather restrictions, closures, and returning to normal business operations. Additionally, Mountrail County was able to add the weather stations links within our Road department page on our website. This has created additional public access to the weather information, along with convenience of use to the County personnel.

Mountrail County wanted to take this opportunity to say Thank You to both the Oil & Gas Research Council and the WDEA Association for continued support of services into our County.

Sincerely,



Trudy Ruland, Chairman

Mountrail County Weather Zones

