



November 24, 2023

Trevor Richards  
Assistant Director-Geophysics  
UND-Energy & Environmental Research Center  
15 N. 23<sup>rd</sup> Street, Stop 9018  
Grand Forks, ND 58202-9018

RE: BASIN ELECTRIC RESEARCH PROJECT-CWC EM  
GEOPHYSICAL EXPLORATION PERMIT #97-0322  
MERCER COUNTY  
NON-EXPLOSIVE METHODS

Dear Mr. Richards:

Be advised that your Geophysical Exploration permit is conditionally approved; effective for one year from November 24, 2023.

**PERMIT STIPULATIONS:**

- Pursuant to NDAC 43-02-12-05 (DISTANCE RESTRICTION) Non-explosive exploration methods may not be conducted less than 300 feet from water wells, buildings, underground cisterns, pipelines, and flowing springs.
- In addition, pursuant to NDAC 43-02-12-06 (NOTIFICATION OF WORK PERFORMED), “The director is authorized to suspend operations of the entire geophysical project, or any portion thereof, if further activity will cause excessive damage to the surface of the land”.

Review the following conditions for your permit:

1. A pre-program meeting with state seismic inspector Tom Torstenson is required. You must contact him at 701-290-1546 (cell) or 701-227-7436 at least 24 hours prior to any exploration operations. Also, a copy of the entire permit is required for all contractors at the pre-program meeting.
2. All variances for distance restrictions are to be furnished, and a pre-plot map displaying any source points that do not comply with the distance restriction rule must be supplied to the inspector.
3. The following information must be submitted within 30 days of the completion of the project by the Geophysical Company:
  - a. Completion Report,

- b. Completion Affidavit,
  - c. Post Plot Map. It must show all water wells, buildings, underground cisterns, pipelines, and flowing springs that fall within the program area and within one half mile of the perimeter of the program.
  - d. Must provide a GIS layer using NAD83 in an Esri shape file format and an Image file (.img) on a Flash Drive or email: [ttorstenson@nd.gov](mailto:ttorstenson@nd.gov) with all source and receiver points,
4. The permit agent shall notify the operator of the land at least seven days before commencement of any geophysical exploration activity, unless waived by mutual agreement of both parties. The notice must include the approximate time schedule and the location of the planned activity.
  5. Information regarding the location of water wells, springs, etc.; refer to the following ND State Water Commission Mapservice website, at: <http://mapservice.swc.state.nd.us/>
  6. The entire permit can be viewed, as well as the status of various seismic projects in the state, at: <https://www.dmr.nd.gov/oilgas/seismic/seismicstats.asp>

Should you have any questions regarding this matter, feel free to contact me at 701-328-8020, or Tom Torstenson at the number listed in paragraph 1.

Sincerely,



Todd L. Holweger  
Permit Manager/Geophysical Supervisor



# GEOPHYSICAL EXPLORATION PERMIT - FORM GE 1

INDUSTRIAL COMMISSION OF NORTH DAKOTA  
OIL AND GAS DIVISION  
600 EAST BOULEVARD DEPT 405  
BISMARCK, ND 58505-0840  
SFN 51459 (03-2011)

Received

001 23 2023

ND Oil & Gas  
Division

1) a. Company <b>University of North Dakota - EERC</b>		Address <b>15 N 23rd St, Stop 9018, Grand Forks, ND 58202-9018</b>		
Contact <b>Trevor Richards</b>		Telephone <b>(701) 777-5052</b>	Fax	
Surety Company <b>Bank of North Dakota</b>		Bond Amount <b>\$25,000</b>	Bond Number <b>GEO 308</b>	
2) a. Subcontractor(s)		Address		Telephone
b. Subcontractor(s)		Address		Telephone
3) Party Manager <b>Kris MacLennan</b>		Address (local) <b>Same as above</b>		Telephone (local) <b>(701) 777-5174</b>
4) Project Name or Line Numbers <b>Basin Electric Research Project - CWC EM (preliminary project)</b>				
5) Exploration Method (Shot Hole, Non-Explosive, 2D, 3D, Other) <b>CWC (Charged Well Casing (CWC) - Electromagnetic Current Source)</b>				
6) Distance Restrictions (Must check all that apply)				
<input checked="" type="checkbox"/> 300 feet - NonExplosive - Distance setbacks apply to water wells, buildings, underground cisterns, pipelines, and flowing springs.				
<input type="checkbox"/> 660 feet - Shot Hole - Distance setbacks apply to water wells, buildings, underground cisterns, pipelines, and flowing springs.				
7) Size of Hole <b>3-D n/a</b>	Amt of Charge <b>n/a</b>	Depth <b>n/a</b>	Source points per sq. mi. <b>1</b>	No. of sq. mi. <b>1</b>
Size of Hole <b>2-D</b>	Amt of Charge	Depth	Source points per ln. mi.	No. of ln. mi.
8) Approximate Start Date <b>November 27, 2023</b>			Approximate Completion Date <b>January 27, 2024</b>	

THE COMMISSION MUST BE NOTIFIED AT LEAST 24 HOURS IN ADVANCE OF COMMENCEMENT OF GEOPHYSICAL OPERATIONS

9) Location of Proposed Project - County <b>Mercer County</b>				
preliminary project area:  Section(s), Township(s) & Range(s)	Section	<b>I, 2</b>	T. <b>145N</b>	R. <b>88W</b>
	Section		T.	R.
	Section		T.	R.
	Section		T.	R.
	Section		T.	R.
	Section		T.	R.

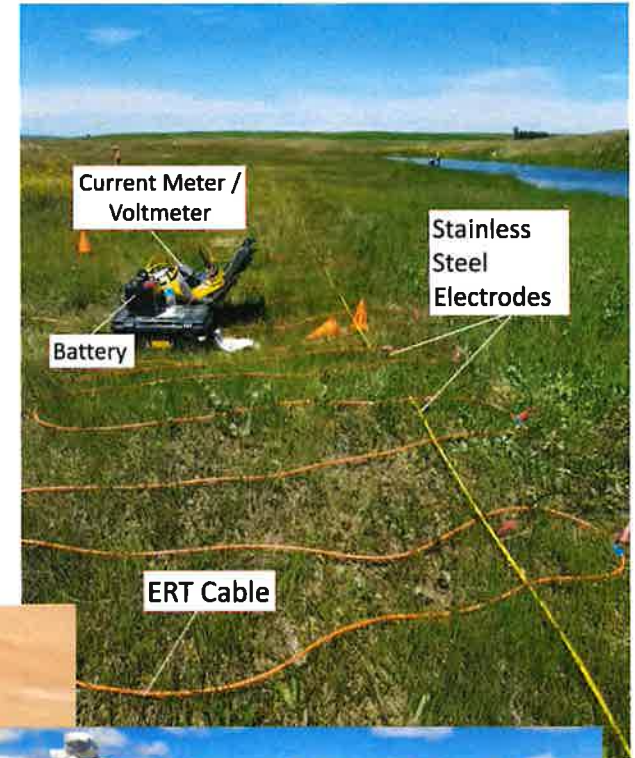
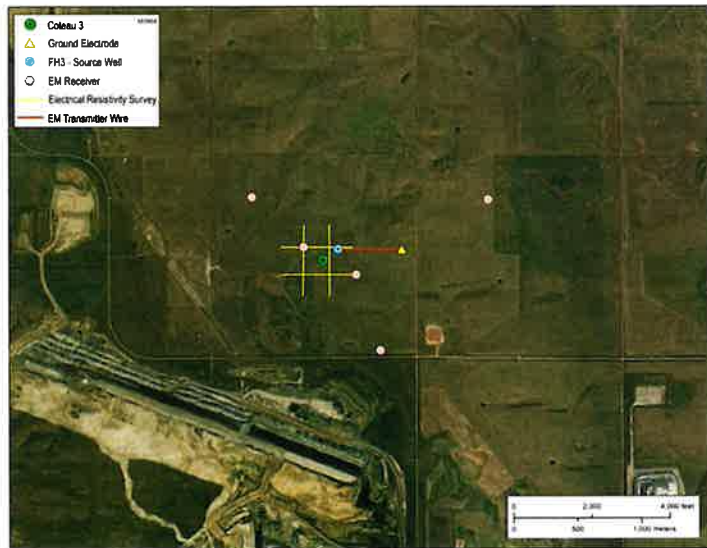
I hereby swear or affirm that the information provided is true, complete and correct as determined from all available records.			Date <b>10/23/2023</b>
Signature 	Printed Name <b>Trevor Richards</b>	Title <b>Assistant Director - Geophysics</b>	
Email Address(es) <b>trichards@undeerc.org</b>			

(This space for State office use)		<p align="center"><b>Permit Conditions</b></p> <p>* Permit in hand required at pre-program meeting with field inspector and be aware of all NDIC Rules and Regulations (i.e. distance restrictions).</p> <p>* See attached letter.</p>
Permit No. <b>97-0322</b>	Approval Date <b>11/24/23</b>	
Approved by 	Title <b>Mineral Resources Permit Manager</b>	

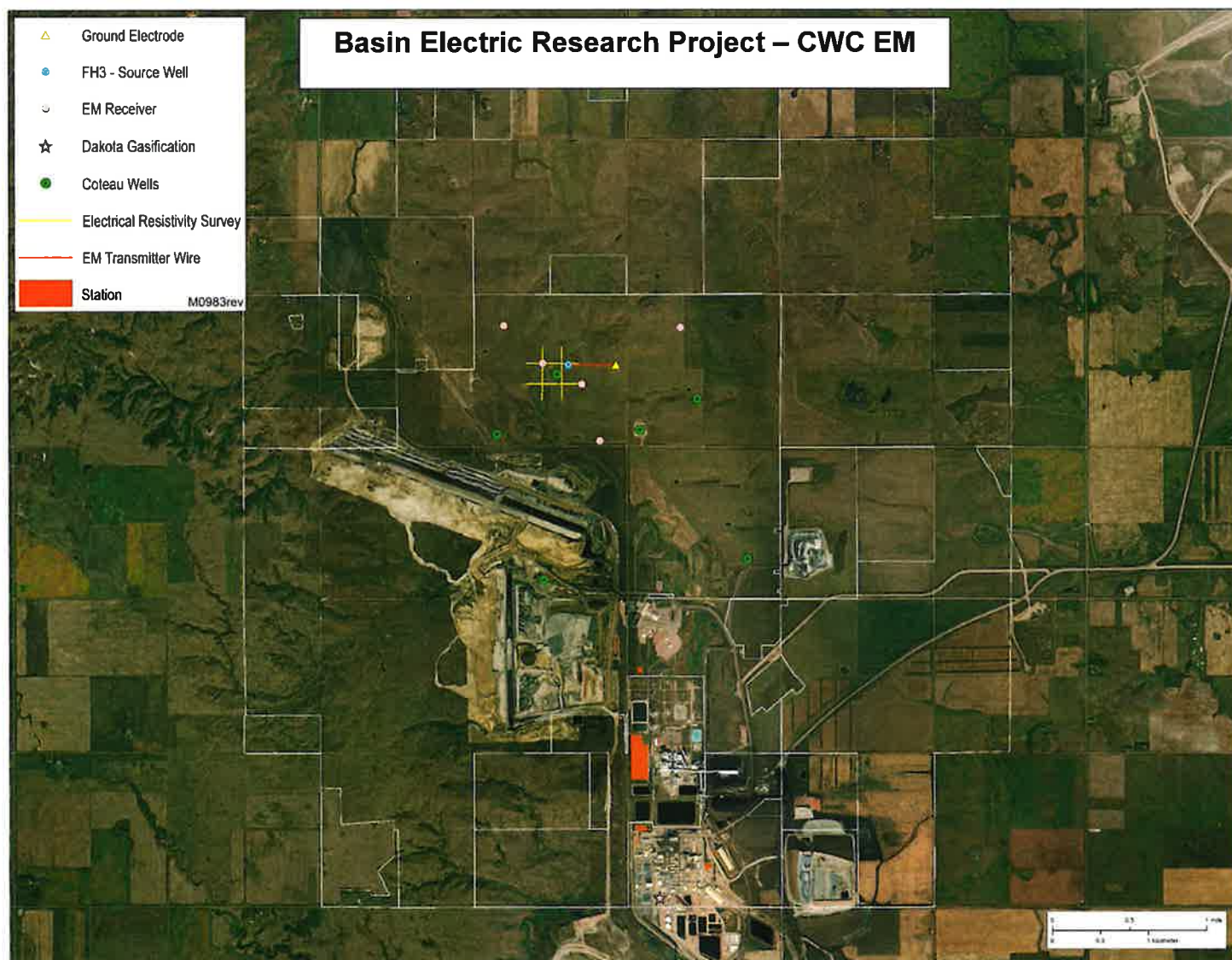
Explanation of work

# EM Baseline Activity – November 2023

- Initial baseline activity shown here is planned to align with mid November Active Seismic crew
- EERC Field Crew of 3-4



Preliminary EM project  
Pre-plot map



# GGT-10 Geophysical Transmitter

*Versatile, Medium Power*



## FEATURES

- Constant current supply
- Used for time/frequency domain IP, Resistivity, CR, TEM, CSAMT
- Broad-band: DC to 8 kHz (standard)
- Output up to 1000 V, 20 A (Optional 30A)
- Fast turn-off time: 125  $\mu$ sec (300 x 300 m loop)
- Drives a loop or grounded dipole
- Efficient, modular design
- Rugged design reliable in all climates
- Optional internal time base

# SPECIFICATIONS FOR THE GGT-10 TRANSMITTER

## General

Description: Broadband, constant-current, time and frequency domain, medium-power geophysical transmitter

Enclosure: Welded, hardened aluminum frame inserted in a high impact fiberglass case

Size: 53 x 51 x 37 cm (21 x 20 x 14.5 in)

Weight: 51 kg (113 lb)

Operating temperature: -40° to +55°C (-40° to +130°F)

Operating humidity: 0 to 90%, non-condensing

## Electrical Characteristics

Drives a loop or grounded dipole

Turnoff time: Under 10  $\mu$ sec for a resistive load; 125  $\mu$ sec for a 300 x 300 m loop (16 ohms resistance, full current)

Maximum input: 10KVA @ 30°C

Output voltage range: 50 to 1000V

Output current range: 0.2 to 20A (Optional 30A)

Current stability:  $\pm$ 0.2%

Frequency range: DC to 8 kHz

## Switching Control

Switching controlled by external device

Recommended transmitter controller: Zonge XMT-32

Waveform type: Capable of virtually any type of pulse waveform, limited by external controller device

## Controls

Power ON / OFF

Transmit / Reset switch

Current adjust pot, continuously adjustable, locking

Voltage range switch (50-250V, 200-500V, 450-750V, 700-1000V)

Loop / Dipole select switch

**Displays** Analog input voltage meter, 0-150 V

Analog output voltage meter, 0-1000 V

Power On / Off lamp, transmit lamp, output lamp

## LCD:

Output current ( $\pm$ 0.01A)

Input power (0-30 KW)

Transformer temperature

Loop turnoff time (microseconds)

Indicator lamps: control power on, transmit on, transmit polarity

Fault indicator lamps: output and input overcurrent, output and input overvoltage, end of regulation, alternator overvoltage, open circuit

## Output Jacks

Current calibrate terminals (50 mV/A)

Output current terminals

Grounding jack

## Power

Three-phase, 120 VAC, 400 Hz

Recommended motor generator set: Zonge ZMG-7.5

Power connector: four-pin military screw-type with locking ring

## Options

Spare parts kit (standard and extended kits available)

LCD heater for temperatures below -15°C (+5°F)

Current monitor isoamp module

Resistor load bank

Switch box for rapid switching of dipole pairs

Internal timing board for specified IP-range frequencies

30 amp output

*Specifications subject to change without notice  
© Copyright 1998, Zonge International, Inc.*

## Zonge Offices:

Arizona, Alaska, Nevada, Colorado and Oregon

### Headquarters:

3322 E. Ft. Lowell Road, Tucson, AZ 85716, USA (800) 523-9913

Tel: (520) 327-5501 Email: [zonge@zonge.com](mailto:zonge@zonge.com)

Fax: (520) 325-1588 Web: <http://www.zonge.com>

20130110



October 31, 2023

Mr. Todd Holweger  
Permit Manager/Geophysical Supervisor  
ND Industrial Commission Oil & Gas Division  
600 East Boulevard Ave, Dept 405  
Bismarck ND 58505

Subject: Geophysical Exploration Permit & Affidavit

Dear Mr. Holweger:

Please accept this letter as an affidavit of compliance for University of North Dakota EERC's proposed geophysical activities.

We look forward to working with you further with regard to this proposed geophysical project. Please contact me with any questions by phone at 701.557.5454 or by email at [mmurray@bepc.com](mailto:mmurray@bepc.com).

Sincerely,

A handwritten signature in blue ink, appearing to read "Mike Murray".

Mike Murray, SR/WA, R/W-NAC  
Directory of Property & Right of Way

Enclosure



**AFFIDAVIT OF MIKE MURRAY**

STATE OF NORTH DAKOTA )  
 ) ss  
COUNTY OF BURLEIGH )

Mike Murray, being first duly sworn, deposes and states as follows:

1.

I am the Director of Property & Right of Way at Basin Electric Power Cooperative. I also work on matters for Basin Electric Power Cooperative's subsidiary Dakota Gasification Company ("DGC"), located at 1717 East Interstate Avenue, Bismarck, North Dakota 58503.

2.

All landowners within the proposed EERC research on DGC's 45Q Project area have been notified of the approximate schedule and location of the project and provided a written copy of the North Dakota Century Code (NDCC) Section 38-08.1-04.1 (Exploration Permit) and NDCC Chapter 38-11.1 (Oil & Gas Production Damage Compensation). Further, as required by NDCC Section 38-08.1-04.1 (4), landowners within 1/2 mile of the project area were provided written copies of the required NDCC sections 38-08.1-04.1 and chapter 38-11.1.

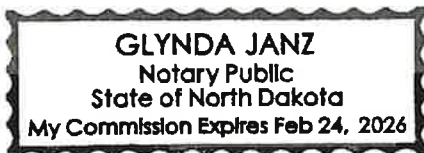
DATED this 31<sup>st</sup> day of October, 2023.

  
\_\_\_\_\_  
Mike Murray  
Director of Property & Right of Way  
Basin Electric Power Cooperative

STATE OF NORTH DAKOTA )  
 ) ss  
COUNTY OF BURLEIGH )

The foregoing instrument was acknowledged before me this 31<sup>st</sup> day of October 2023, by Mike Murray of Basin Electric Power Cooperative.

  
\_\_\_\_\_  
Notary Public  
My Commission Expires:





# North Dakota Industrial Commission Department of Mineral Resources Oil & Gas Division

## FORM GE 1 FILING AUTHORIZATION

COMPANY NAME: University of North Dakota - EERC

ADDRESS: 15 North 23rd Street, Stop 9018

CITY: Grand Forks STATE: ND ZIP: 58202-9018

This form authorizes the person(s) listed below to submit a NDIC Geophysical Exploration Permit – Form GE 1 for approval on behalf of the designated company as listed above.

A new authorization will be required if any changes are to be made to the authorized individuals on the form.

The data submitted from the authorized individuals listed below have been checked and conform to the standards and procedures set forth by the NDIC Department of Mineral Resources.

The authorized individual(s) will ensure that the company, as listed above, and party manager receive a copy of the approved Form GE 1

<u>Authorized Individuals</u>	<u>Phone Number</u>	<u>E-Mail Address</u>
Mike Murray	701-557-5454	mmurray@bepc.com

Company Authorized Signature: *Tobe Larson* Date: 10/12/2023

Printed Name: Tobe Larson Title: Assistant Dir. of Contracts & IP

Phone: 701-777-5271 Email Address: tlarson@undeerc.org

\*\*\*\*\*

Witness Signature: *Kellie Ebertowski* Date: 10/12/2023

Witness Printed Name: Kellie Ebertowski



**Energy & Environmental  
Research Center**

University of North Dakota  
15 North 23rd Street, Stop 9018  
Grand Forks, ND 58202-9018

[www.undeerc.org](http://www.undeerc.org)  
701.777.5000 (phone)  
701.777.5181 (fax)

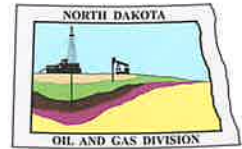
**Trevor Richards**  
**Assistant Director for Geophysics**  
trichards@undeerc.org  
701-777-5052 (office)  
214-557-6282 (mobile)



**THANK YOU**

A wide-angle photograph of a university campus during autumn. The scene shows several large, multi-story brick buildings with windows, interspersed with trees that have yellow and orange leaves. The sun is low in the sky on the left, creating a bright glow and long shadows. The foreground is a green lawn.

Critical Challenges. Practical Solutions.



November 24, 2023

The Honorable Carmen Reed  
Mercer County Auditor  
P.O. Box 39  
Stanton, ND 58571-0039

RE: Geophysical Exploration  
Permit #97-0322

Dear Ms. Reed:

Pursuant to Section 38-08.1-04.2 of the North Dakota Century Code, please be advised that the University of North Dakota Energy & Environmental Research Center was issued the above captioned permit on November 24, 2023, and will remain in effect for a period of one year. The entire permit can be viewed on our website at: <https://www.dmr.nd.gov/oilgas/seismic/seismicstats.asp>

Should you have any questions, please contact our office.

Sincerely,

A handwritten signature in blue ink, appearing to read "Todd L. Holweger".

Todd L. Holweger  
Permit Manager/Geophysical Supervisor