Oil and Gas Division

Nathan D. Anderson - Director Mark F. Bohrer - Assistant Director
North Dakota Industrial Commission
Department of Mineral Resources
Nathan D. Anderson - Director
www.dmr.nd.gov/oilgas/

July 10, 2025

Olena Varych
CEO
ESG Solutions Group, Inc.
10815 Woodedge Drive
Houston, TX 77070

RE: BASIN ELECTRIC RESEARCH PROJECT #2 – CWC EM
GEOPHYSICAL EXPLORATION PERMIT #97-0345
MERCER COUNTY
NON-EXPLOSIVE METHODS

Dear Olena:

Be advised that your Geophysical Exploration permit is conditionally approved; effective for one year from July 10, 2025.

PERMIT STIPULATIONS:

- **ESG Solutions Group, Inc. must contact seismic inspector Tom Torstenson at (701) 290-1546 72 hours prior, to arrange a start-up meeting. Also, a copy of the entire permit is required for all contractors at the start up meeting.**
- **ESG Solutions Group, Inc. must contact Tom Torstenson at (701) 290-1546 24 hours prior to conducting any geophysical activities.**
- **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. 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.
2. 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 with all source and receiver points,

3. 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.
4. 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/
5. 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 our office.

Sincerely,

Todd L. Holweger
Seismic Program Manager

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
JUL 02 2025
N.D. INDUSTRIAL COMMISSION

1) a. Company **ESG Solutions Group, Inc.**	Address **10815 Woodedge Drive, Houston, Texas 77070**	
Contact **Misty Hill**	Telephone **(832) 585-6679**	Fax **(832) 218-1247**
Surety Company **Bonding Bank of ND**	Bond Amount **$25,000**	Bond Number **GEO 310**
2) a. Subcontractor(s)	Address	Telephone
b. Subcontractor(s)	Address	Telephone
3) Party Manager **Kenneth Elsbury**	Address (local) **same as above**	Telephone (local) **(361) 350-6007**

4) Project Name or Line Numbers
Basin Electric Research Project #2- CWC EM

5) Exploration Method (Shot Hole, Non-Explosive, 2D, 3D, Other)
CWC (charged well casin- CWC- Electromagnetic current sources)

6) Distance Restrictions (Must check all that apply)

- [x] 300 feet - NonExplosive - Distance setbacks apply to water wells, buildings, underground cisterns, pipelines, and flowing springs.
- [ ] 660 feet - Shot Hole - Distance setbacks apply to water wells, buildings, underground cisterns, pipelines, and flowing springs.

7) Size of Hole **3-D N/A**	Amt of Charge **n/a**	Depth **n/a**	**Source points ~~per sq. mi.~~** **2**	No. of sq. mi. 1	
Size of Hole **2-D**	Amt of Charge	Depth	**Source points per ln. mi.**	No. of ln. mi.	

8) Approximate Start Date July 2025	Approximate Completion Date July 2025

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

9) Location of Proposed Project - County
Mercer County

Section(s), Township(s) & Range(s)			
	Section 1,2, 11, 12	T. 145N	R. 88W
	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 **June 18, 2025**

Signature	Printed Name **Olena Varych**	Title **CEO**

Email Address(es)
olena.varych@esgsolutions.com

(This space for State office use)

Permit No. 97-0345	Approval Date 7/10/25
Approved by	
Title Mineral Resources Permit Manager	

Permit Conditions

* Permit in hand required at pre-program meeting with field inspector and be aware of all NDIC Rules and Regulations (i.e. distance restrictions).
* See attached letter.

*See Instructions On Reverse Side

Oil and Gas Division

Nathan D. Anderson - Director Mark F. Bohrer - Assistant Director

North Dakota Industrial Commission

Department of Mineral Resources

Nathan D. Anderson - Director

www.dmr.nd.gov/oilgas/

July 10, 2025

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

RE: Geophysical Exploration
Permit Number 97-0345

Dear Ms. Reed:

Pursuant to Section 38-08.1-04.2 of the North Dakota Century Code, please be advised that the ESG Solutions Group, Inc. was issued the above captioned permit on July 10, 2025, 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,

Todd L. Holweger
Seismic Program Manager

EERC – EM CCUS Monitoring
Coteau Mines
Beulah, North Dakota

Day 1: Setup Command and Control & Survey (Mark points for receivers & hydras)

Day 2: Continue Survey & Begin Layout (Drive rods for hydras & points for receiver locations)

Day 3: Continue receiver rod installation & Install Wi-Fi communication towers

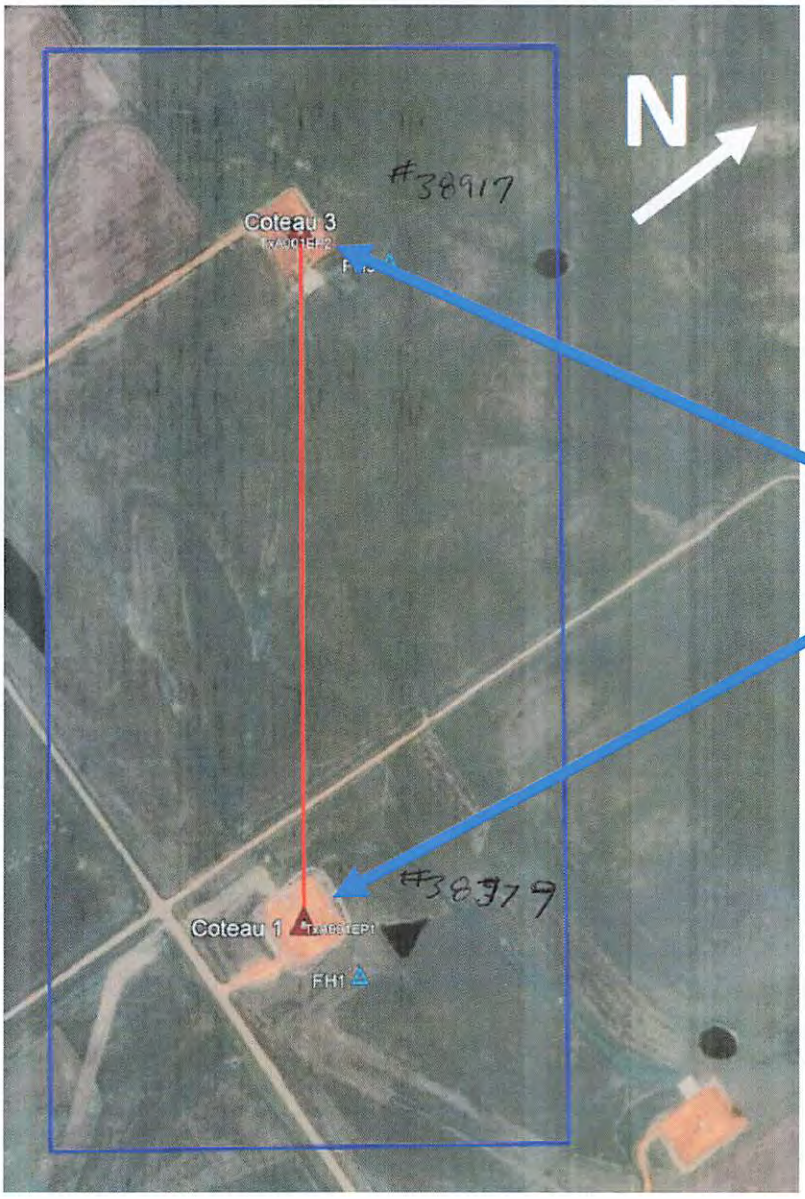
Day 4: Layout receivers, wire, & batteries

Day 5: Test & QC

Day 6: Acquisition

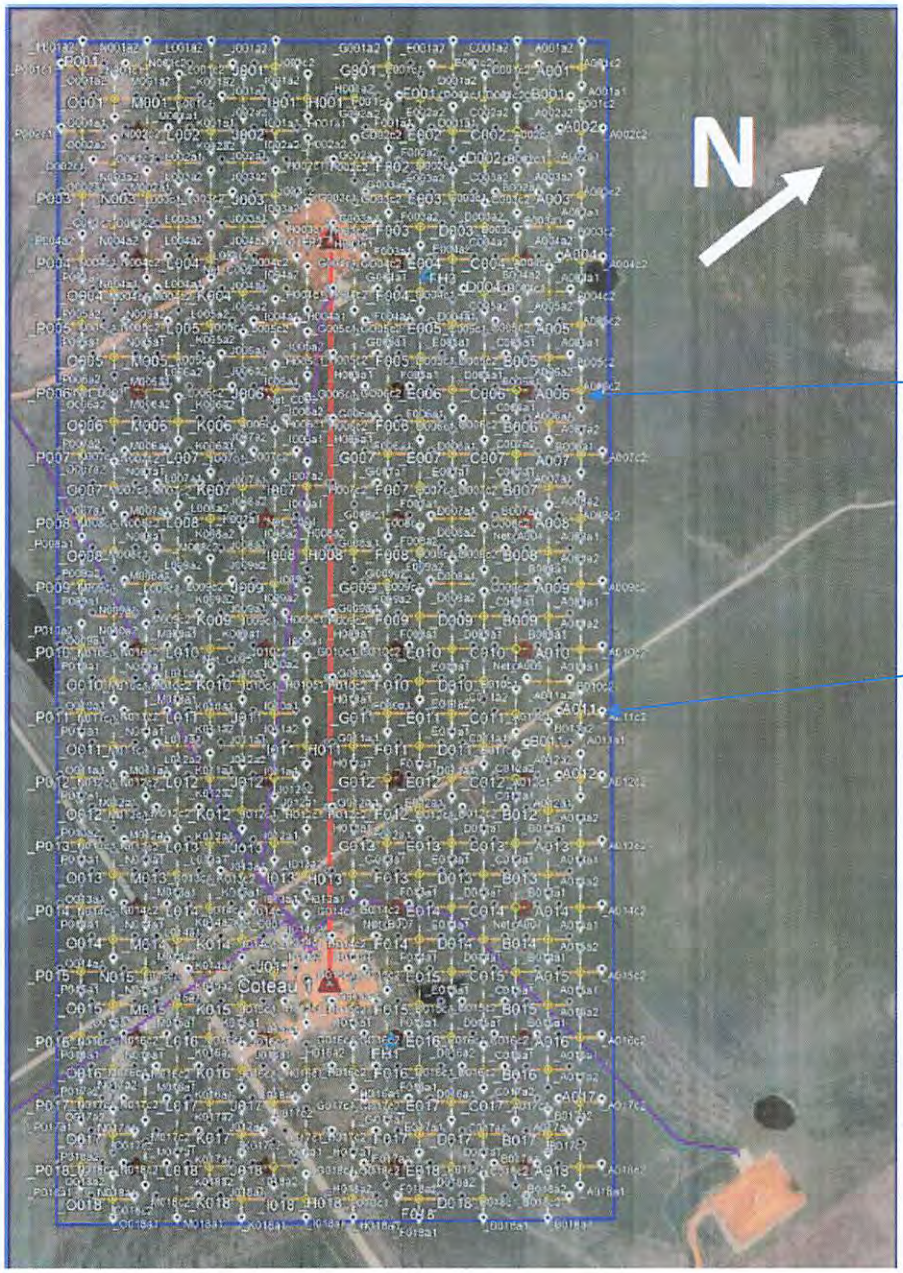
Day 7: Acquisition

Days 8-10: Equipment retrieval



HYDRA Locations


N
Coteau 3
FH3
Highest general area
Coteau 1
FH1
Wi-Fi Towers – 36 – small red stars
Command & Control



Receiver Locations - ~250

Yellow points

Rods - ~500

White points

BASIN ELECTRIC POWER COOPERATIVE
A Touchstone Energy® Cooperative

RECEIVED
JUL - 3 2025
MINERAL RESOURCES

July 1, 2025

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 Permits

Dear Mr. Holweger:

All landowners within one-half mile of the proposed 2025 Basin Electric Research Project area have been notified of the schedule and location of the Electromagnetic Charged-Well-Casing Surveys (EM CWC) and 2D Active Seismic activities estimated to take place in July and August and have been 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) as required by NDCC Section 38-08.1-04.1. There was a total of four private landowners, three industry landowners, and Mercer County that were provided with the required notification. The EM CWC will be submitted by ESG Solutions Group, Inc. The 2D Seismic will be submitted by Explor Geoscience USA Inc.

We look forward to collaborating with you further in 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.

Sincerely,

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

IN WITNESS WHEREOF, the Parties have set his/her/their hand this 1st day of July 2025.

Mike Murray, SR/WA, R/W-NAC
Director of Property and Right of Way

Mike Murray

ACKNOWLEDGEMENT

STATE OF North Dakota)
) ss.
COUNTY OF Burleigh)

The foregoing instrument was acknowledged before me this 1st day of July 2025, by Mike Murray.

SHAUNA L SCOTT
Notary Public
State of North Dakota
My Commission Expires Mar 13, 2028

Shauna L Scott
Notary Public, State of _____
My commission expires: _____

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

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JUL 02 2025
N.D. INDUSTRIAL COMMISSION

FORM GE 1

FILING AUTHORIZATION

COMPANY NAME: ESG Solutions Group, Inc.

ADDRESS: 10815 Woodedge Drive

CITY: Houston STATE: TX ZIP: 77070

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

Authorized Individuals	Phone Number	E-Mail Address
Misty Hill	832-585-6679	Misty.hill@esgsolutions.com
Amy Pilling	469-371-4994	amy.pilling@esgsolutions.com

Company Authorized Signature: _____ Date: 06/18/2025

Printed Name: Olena Varych Title: CEO

Phone: 281-290-0492 Email Address: olena.varych@esgsolutions.com

****

Witness Signature: Misty Hill Date: 06/18/2025

Witness Printed Name: Misty Hill

Electromagnetic Imaging – Surface Deployment

Equipment and Operational Considerations

RESTRICTED & CONFIDENTIAL DOCUMENT

SEEING DATA AT A WHOLE NEW LEVEL

EMAIL
info@esgsolutions.com

OFFICE
+1.613.548.8287

WEB
esgsolutions.com

Contents

ELECTROMAGNETIC ARRAY DESIGN

Array Design

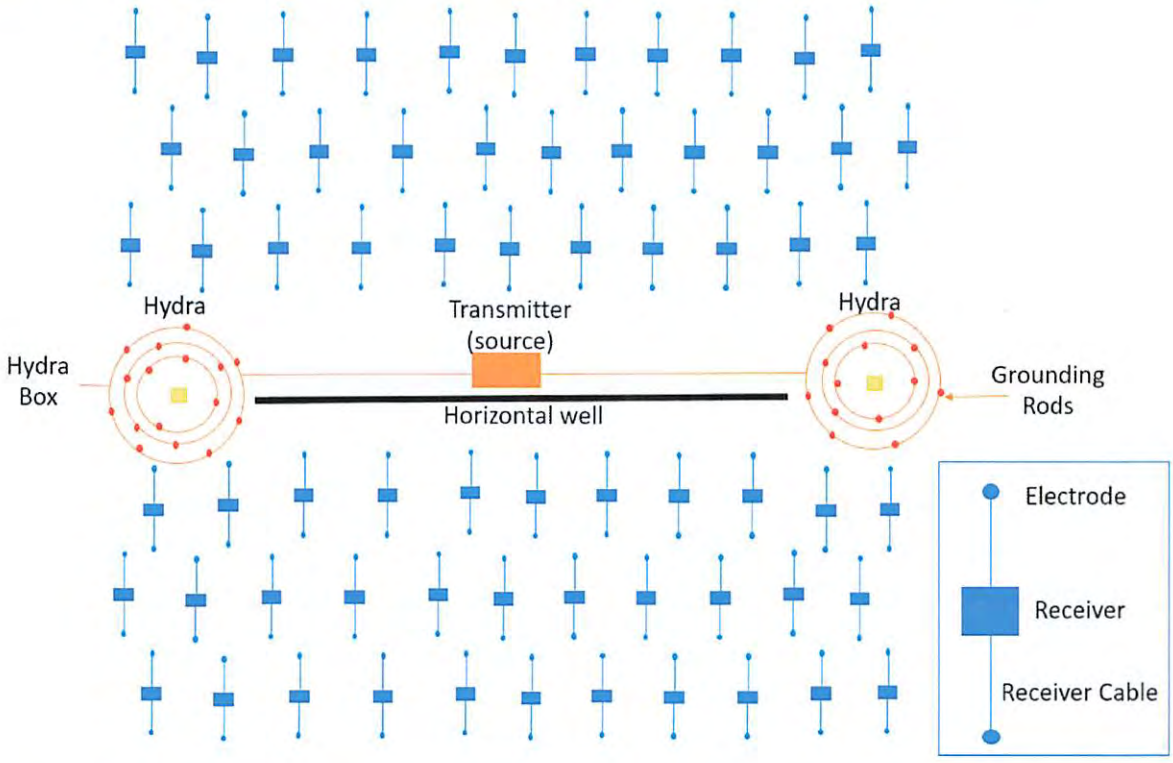
Electromagnetic (EM) arrays are designed to cover ground directly above where the fluid is potentially moving subsurface. Therefore, the array will ideally be deployed slightly further than the expected distance of water movement. When needed, the arrays are deployed over the initial monitoring area, then leap-frogged to cover the subsequent project area.

Depending on the project objectives and granularity of detail required, a spare (less detail) or dense (more detail) array can be used. Creating a sparse vs. dense array is done by shortening (dense array) or lengthening (sparse array) the cable lengths on either side of the receivers.

Project feasibility and array design will be assessed by the ESG EM Subject Matter Experts (SME).

EQUIPMENT

The monitoring equipment is grouped into two main components: the source and the receivers.



The source is called the Transmitter (powered by a generator), which introduces current into the transmitter line and Hydra's. Each Hydra consists of concentric circles of cable, that all plug into the central hydra box. The current is transmitted along the cables and enters the ground through grounding rods. These 8 feet grounding rods are hammered into the ground approximately 6 feet or until moist ground. The quantity of grounding rods is dependent on the geology and designed to get enough current into the ground.

Two hydras are generally used on either side of the transmitter line. The transmitter line(s) are generally deployed above a horizontal well or wells.

The data is collected by laying out a series of receivers. Each station consists of:

1. 1 x receiver
2. 1 x antenna with GPS and communication
3. 1 x battery to power the receiver
4. 2 x 100 feet or 200 feet cable deployed on either side of the receiver
5. Electrodes placed at either end of the cable
    a. Survey stakes placed at each electrode to safely identify each station.
    b. The receivers placed above the area water flow is expected, perpendicular to the transmitter line.
    c. Generally, a few hundred receiver stations will be deployed, however this is highly dependent on the monitoring objectives.
    d. Furthermore, if needed, we can order custom cable lengths.

Preprocessing is performed at each receiver. The preprocessed data are transmitted via wi-fi to the on-site office. During operation, the batteries from each receiver station will require manual swapping. The current batteries last 72 hours but cold weather will affect the duration of the battery charge.

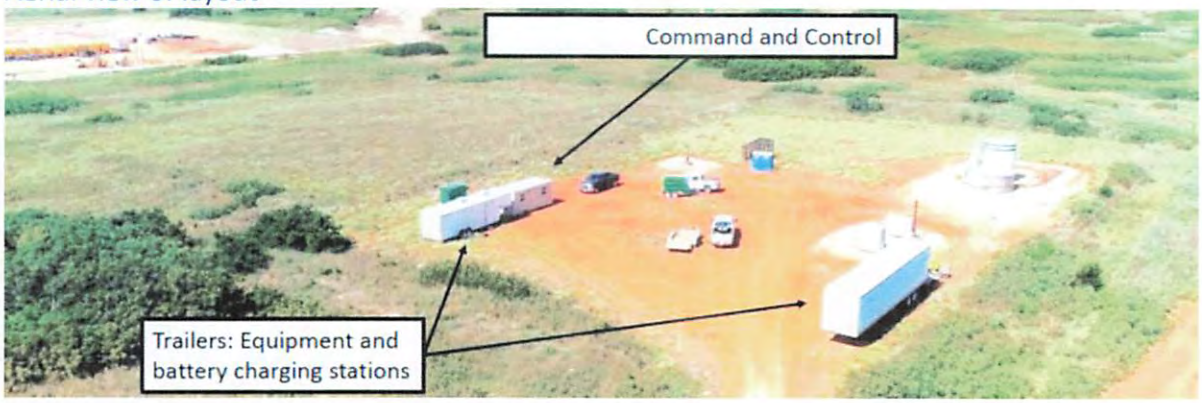
The array is considered walk safe to humans and livestock in the field.

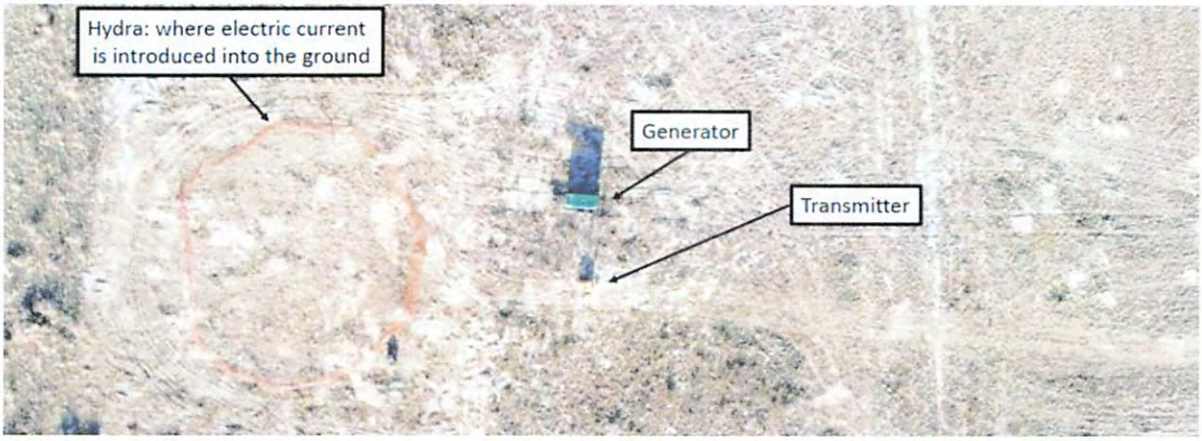
Components	Description
Receivers Box (Rx Box) 	The receivers collect the data and facilitate pre-processing. Each receiver has an external USB with up to around 1 week of compressed data storage. A janitor tent is placed on top of each receiver as some protection from the elements and ease of visualization Power: Each receiver is powered with 1 battery that lasts approximately 72 hrs. (condition dependent) Communication: The pre-processed data from each receiver is transmitted via Wi-Fi to the on-site trailer
Receiver Antennas 	Each Receiver has an 8 feet PVC pole that houses 2 wi-fi antennas and GPS antenna.
Sensor Cable 	Lengths of cable are placed on either side of the receiver, typically perpendicular to the transmitter line. Lengths available: 100 feet or 200 feet Custom lengths require manufacturing. All receiver cable is coated in 'Tiger Urine' or bittering agent to detract wildlife from chewing the cable.
Electrode 	The electrode is a 4 feet copper coated steel rod that is placed at the end of each sensor cable. The receiver cable is connected to each electrode, two per received location. Each electrode is hammered into the ground to approximately 3.5 foot depth with an electrical hammer (hydraulic hammer for some locations). Each rod has a plastic safety cap.
Wi-Fi 	Ad Hoc Wi-fi network consists of a base station at command control unit mounted on a 40 feet mast, and multiple repeaters on 30feet masts that include a wi-fi aggregator and a light beam direction antenna. Each aggregator/light beam is powered with battery pack +power over ethernet (POE). Battery changed every 12 hours, 24-hr power 12-volt battery.

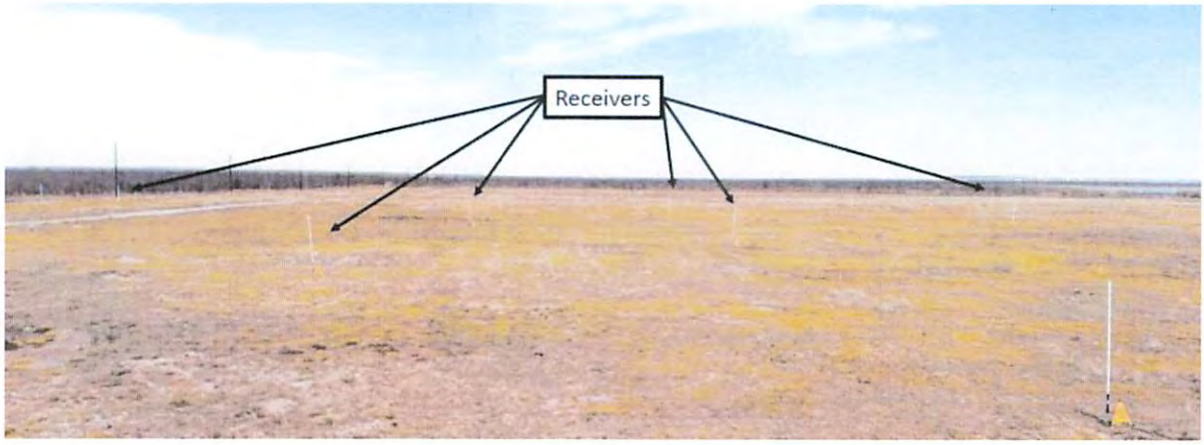
Transmitter 	The Transmitter introduces an alternating electric current into the Hydra's and transmitter line, which introduces it into the ground via grounding rods. Transmitter is up to 160KW, generally do around 100KW. Power: Generator- 56kW
Transmitter Wire 	The current from the Transmitter travels through the transmitter line to the Hydras.
Hydra 	Each Hydra consists of concentric circles of cable, all connected to a central hydra box. Grounding rods, approximately 100 per Hydra, are placed at ~3- foot radius distance from the hydra box to ground the current into the subsurface. They are pounded into the ground ~ 6 feet or to moist ground.

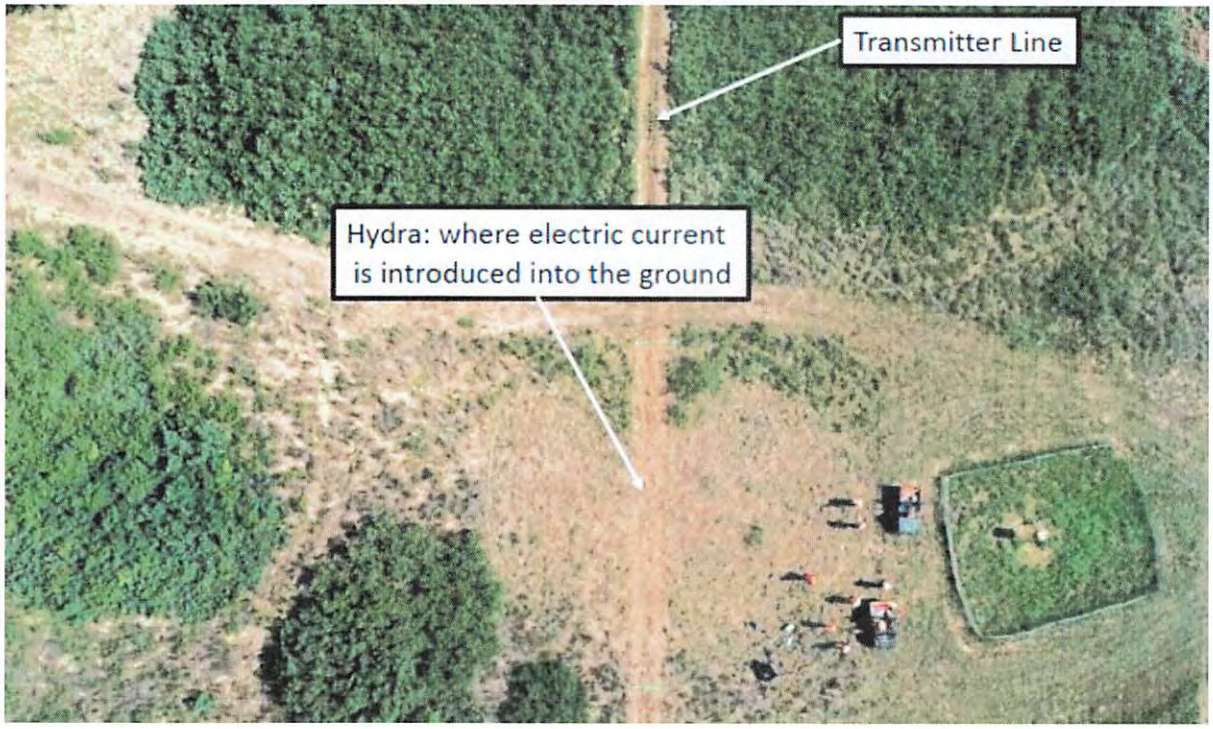
Pictures

Aerial view of layout

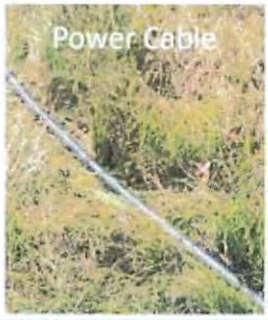








Transmitter



OPERATIONAL CONSIDERATIONS

Optimal Project Deployment Planning	
Water Rating	Equipment is water resistant. It is not designed for submersion. If submersion is expected, the receivers can be raised off the ground.
Terrain	Cliffs, bodies of water, streams will prevent sensor deployments at those locations. However successful surveys have been acquired while avoiding these areas.
Ground Condition	General: Grounding rods from hydras need to touch moisture. Approximately 100 per Hydra location. They are 8 feet in length and need about 1-2 feet above ground. Therefore, moist ground needs to be reached at 6 feet. Additionally, these rods are manually installed with a hydraulic hammer. Brush: Cable needs to lie close to the ground, therefore density of brush needs to be assessed and potentially cut. Dry Ground: Okay, as long as rods can get into competent ground within 6 feet that has moisture. Swampy/ muddy: This could pose an issue operationally to deploy the stations, and to continually harvest the batteries. Swampy areas should be avoided when possible. Freezing and thawing: Near-surface thawing and re-freezing could cause field wide response that is difficult to remove.
Infrastructures	Buildings, roads, homes, and current infrastructure should be evaluated. Roads: transmitter cable can run across some roads, which will be suitably protected.
Noise	Significant electrical noise sources should be avoided.
Interfering Sources	Radios, walkie talkies: These can cause some interference, avoid when possible Electric Fences: Any electrical fence within the array boundary should be turned off during all operations Oil Pipelines with cathodic protection: should be avoided, but request can be made to turn off during acquisition
Animals	Receiver cables are injected with a bittering agent 'Tiger Urine'. This deters rodents from chewing the cables. Hydra cables and transmitter line are not injected, however due to the current traveling through them, less of a concern. Big hooved animals (Moose, Deer, Elk) could rip out the cabling.
Weather	Rain: Manageable, assuming doesn't flood area and submerge equipment. Snow: Manageable Hail: This could damage equipment. Lightning: This could cause interference. Temperature: Extreme cold temperatures need to be evaluated. System equilibration could take longer during the cold

PROJECT STEPS

1. Scouting (often completed prior award, location dependent)
2. Acquisition (Layout, background recording, acquisition recording, removal)
3. Post- Acquisition Reporting

Project Scoping

The first step is assessing the feasibility of the project. This is accomplished by gathering the appropriate data. The assessment can be classified into two parts: surface and subsurface assessment.

The surface assessment looks at operational considerations, such as pipelines, vegetation, roads, streams, tomography, noise sources and weather, to determine array design and project viability. This is done by evaluating regional information provided by operator and loading the well trajectories in Google Earth/Spotfire.

The subsurface assessment includes reviewing the resistivity log for geology assessment and reviewing the injection fluids/mixtures (frac-proppant) in comparison to injection formation fluids.

Where the feasibility results show geology is less than optimal, streaming potential application can be applied by connecting low amperes current to the well casing. This approach allows the signal processing to better account for geological variability and yield higher fidelity data results. A survey of all instruments connected to the casing within several hundred feet of our connection to the casing is recommend. Electrical isolation between the casing in ground and the piping on surface is key. Flexible tubing can be used.

Scouting

Scouting is required to determine the feasibility of a project. This step is sometimes conducted in the quoting stage to determine if the project is feasible. When done before project award, we ask the client to sponsor the scouting price. If the scouting determines the project could be successful, then we credit the scouting if the project is awarded.

Scouting requires 2 people for a few days in the field. During the scouting trip, the following are assessed; ground condition, terrain, vegetation, and infrastructure to determine if project can be deployed efficiently and effectively.

Permitting

Permitting is conducted by the client, leaning on landowner relationships.

Acquisition

- Notice: We request 4 weeks' minimum notice prior to acquisition start to properly prepare for a new acquisition. If on the shorter term, design may be limited due to permitting or equipment availability.
- Layout: Average 3-10 days
- Recording
    - Battery harvesting
    - As stations are no longer required due to the fracturing operations progression, the field crew conducts retrieval of equipment, or repositions equipment for Flowback monitoring.
- Removal: Average 2-3 days