10. EMERGENCY AND REMEDIAL RESPONSE PLAN
40 CFR 146.94(a)

MARQUIS BIOCARBON PROJECT

Facility Information

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Well name:	MCI CCS 3
Well location:	PUTNAM COUNTY, ILLINOIS S2 T32N R2W Latitude: 41.27026520 N, Longitude: 89.30939322 W

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10.0 Emergency and Remedial Response Plan

10.1 Introduction

This Emergency and Remedial Response Plan (ERRP) describes actions that Marquis Carbon Injection LLC (MCI or Marquis) shall take to address and remediate events that could allow for movement of the injected carbon dioxide (CO_2) stream (injection fluid), annulus fluid, brine, or formation fluid including but not limited to any movement of fluid into a Underground Source of Drinking Water (USDW) or any other unauthorized zones during the construction, operation, or post-injection site care (PISC) periods for the injection well.

The Marquis Biocarbon Project (Project) includes three wells that penetrate through the confining zone into the injection zone, as well as one above confining zone monitoring well and five shallow groundwater monitoring wells, as follows:

- MCI CCS 3 – CO_2 Injection Well.
- MCI MW 1 – Deep monitoring well located approximately 1.2 miles from MCI CCS3 and will be used for extended field monitoring under a backup contingency plan.
- MCI MW 2 – Deep monitoring well located adjacent to MCI CCS 3 that will be used to measure variations in the storage formation.
- MCI ACZ 1 – Above confining zone monitoring well to monitoring the Galesville Sandstone and the lowermost USDW, the Gunter Sandstone.
- MCI GW 1-5 – Shallow groundwater monitoring wells.

The comprehensive Sections of the UIC Application summarized below are considered in evaluating the potential risks associated with the Project. The risk-based management elements and response to emergency events are presented in this ERRP.

Section 1 of the UIC Application describes the geological setting for the Project site. The location is favorable to sequester CO_2 because of the existence of the Mt. Simon injection zone and the Eau Claire confining zone, as well as other site-specific factors as summarized below.

Section 2 details the modeling conducted to identify the CO_2 plume and pressure front within the injection zone, the Area of Review (AoR), steps for managing the pressure front, collecting baseline data pre-injection (e.g., aquifer samples from various geologic formations, shallow groundwater samples and seismic stations), and corrective action measures to protect USDWs within the AoR.

Section 4 details the construction design for the injection well and operational controls to maintain the mechanical integrity and pressure control within the well and prevent the movement of injection and formation fluids into the USDW or an unauthorized area. The construction plan includes:

- The well design;
- The drilling plan and contingencies, formations, casing depths and perforation strategy;
- State-of-the-art corrosion-resistant materials to be used;
- Pressure testing and logging to confirm proper installation prior to operation; and
- Well operational controls for continuous monitoring of the annular fluid, pressure and temperature.

Section 5 details the injection and monitoring wells' pre-operational test plan for the pre-operational formation testing that serves as baseline information for evaluation of any geochemical changes identified during operation and post-injection.

Section 6 details the injection and deep monitoring wells' operational design, preventive measures, and procedures, including monitoring systems, process and shutdown alarms, and process interlocks. The elements of the plan focus on safely maintaining: (1) the delivery and storage of CO_2 within the Mt. Simon; (2) the mechanical integrity of the wells; and (3) to prevent endangerment of the USDW or unauthorized zones.

Section 7 details the testing and monitoring plan for the injection well, above-confining zone monitoring well, two deep monitoring wells, and shallow monitoring wells. Section 7A includes the quality assurance components for the testing and monitoring plan implementation. As outlined in the Testing & Monitoring Plan, testing and monitoring data is evaluated utilizing EPA accepted statistical evaluation approaches, baseline and prior data monitoring or testing events, and predicted dynamic modeling results. An anomaly, outlier, or discrepancy (e.g., between electronic indicators and manual gauge monitoring) are further evaluated to determine if potential risks to endangerment of a USDW or an unauthorized zone are present.

Section 8 is the injection well plugging plan that details the methods and materials used to plug and abandon the injection well to prevent migration of injection or formation fluids above the confining zone.

Section 9 is the post-closure plan for the Project after the cessation of injections to monitor CO2 plume and pressure front stabilization and to demonstrate the Project poses no endangerment to USDWs.

While the below information does not negate or decrease the necessity of this ERRP or the utility of preparedness for emergency response, MCI includes this information to identify preventive measures it is taking to try to lessen the likelihood of some of the response scenarios occuring.

> MCI has taken steps regarding its site location, well drilling and construction materials, and preventive monitoring measures to lessen the likelihood of the occurrence of an emergency response. The potential for a CO_2 release from the injection or monitoring wells is diminished due to the corrosion-resistant well construction materials and well design. The injection well and two deep monitoring wells will be constructed with Super Chrome 25 casing and tubing material across the confining zone and within the Mt. Simon Sandstone. The Super Chrome material grade, which is a Super Duplex stainless steel has increased pitting and corrosion resistance. The injection well and nearby deep monitoring wells will be constructed with Chrome 13 long string casing material in the upper portion of the well (from the surface to the Eau Claire Shale caprock). The effectiveness of the mitigation strategy is monitored and reviewed through periodic corrosion coupon monitoring, as well as multi-finger caliper logging or an ultrasonic casing evaluation. Marquis' well design and monitoring approach substantially reduces the potential risk of an emergency event resulting from pitting and corrosion within the well. Marquis' monitoring wells do not utilize a nested-well design (e.g., installation of two or more well casings within the same borehole) further reducing the possibility of brine, annulus fluid, formation fluid, or CO_2 leakage or migration within the well bores.

In accordance with 40 C.F.R. § 146.94(b), if Marquis obtains evidence that the injected CO_2 stream and associated pressure front may cause an endangerment of a USDW. Marquis must perform the following actions:

1. Initiate shutdown plan for the MCI CCS 3 well, including immediately cease injection.
2. Take all steps reasonably necessary to identify and characterize any release.
3. Notify the permitting agency (EPA UIC Program Director, referred to as Director hereafter) of the emergency event within 24 hours.
4. Implement applicable portions of the approved ERRP.

Below in the ERRP, some of the scenarios where there may be evidence that the project may cause an endangerment of a USDW are identified along with the scope of response actions that will be taken as a result. The identified response actions must be implemented absent approval of an alternative by EPA in an emergency event.

Where the phrase "initiate shutdown plan" is used, the following protocol will be employed:

> MCI will immediately cease injection, unless MCI determines, in consultation with the Director, that gradual cessation of injection is necessary for safety. If a non-emergency shutdown of the CO_2 injection system is required, the operator will complete the shutdown in a stepwise approach to prevent over- pressure situations and/or damage to the equipment. Efforts will also be made to maintain the CO_2 in the injection stream in a supercritical phase to prevent special operations during the restart of the system. Also, the override of certain relays may be required to properly and safely shutdown the

system.

As used in this ERRP, the term "wells" unless otherwise specified, refers to the injection well and all monitoring/verification wells. As used in this ERRP, the term "Area of Review" or "AoR" unless otherwise specified, refers to the AoR as defined in the permit.

As used in this ERRP, the term "unauthorized zone", unless otherwise specified, refers to any geologic unit other than the injection zone formation as defined in the Permit.

10.2 Local Resources and Infrastructure

10.2.1 Local Resources

Local resources in the vicinity of the Marquis BioCarbon Project that may be impacted due to an emergency event at the Project include:

- Underground Sources of Drinking Water (USDWs);
- Four existing groundwater wells within ¼ mile of the CO_2 plume;
- The Illinois River and tributaries to the River;
- Donnelley State Fish and Wildlife Area;
- Hennepin Lake and Hopper Lake; and
- Dixon Waterfowl Refuge (The Wetlands Initiative).

The base of the lowermost USDW in the AoR is the Gunter Sandstone (2,118-2,131 ft MD). The AoR and Corrective Action Plan provides further details about the USDWs in the project area.

See **Figure 10-1** (Aerial of Local Resources and Wells); and **Figure 10-2** (Aerial Depicting the CO_2 Plume and AoR).

Two major aquifer systems serve as the primary public water supply in Putnam County and vicinity: the Quaternary and Pennsylvania aquifers. The village of Hennepin obtains its groundwater supply at depths up to 135 feet [ft]. The Quaternary aquifer system consists of shallow, glacial deposits overlying the bedrock. The Pennsylvanian aquifer system, up to 250 ft deep in the project area, contains variable water quality that is generally utilized when the Quaternary aquifer supplies are insufficient.

Within the vicinity, there is the Hennepin community water supply well. However, the Hennepin community well is not at a depth that penetrates through the confining zone (Eau Claire). The confining zone provides a barrier to prevent the migration of CO_2 from the injection zone (Mt. Simon) into a USDW.

There is also a plugged and abandoned deep injection well (J & L Well) located approximately 1.5 miles southwest of the MCI CCS 3 well. The J&L well was abandoned and closed, and final approval was received from the Illinois EPA in 2013. The well was closed in accordance with the standards of 35 Illinois Administrative Code (IAC) 730.171. See **Appendix W**.

(ArcelorMittal Permit No. UIC-004-W1-JL confirming proper plugging and abandonment of the J&L Well, Condition D.4). Based on the distance and certified closure of the J&L Well, this well is not expected to be impacted by an emergency at the MCI CCS 3 well.

Within the AoR that extends in a 14.5 mile radius, there are 2,537 community and non-community water wells. Of the community wells, none are within the CO2 plume or extend through the confining zone. The two closest to the CO_2 plume are shallow wells (less than 150 feet) owned by Village Hennepin. The non-community wells are less than 600 feet in depth. See **Figure 10 - 3** Community and Non-Community Wells Nearby MCI CCS 3. For a Complete List of all Wells within the AoR see **Appendix V7**. The community and non-community water wells are not expected to be impacted by an emergency at the MCI CCS 3 well because the confining zone is a barrier to prevent migration of CO_2 from the injection zone into those wells.

Nearby surface-water features in the vicinity include the Illinois River to the west and north and unnamed northern tributaries to Coffee Creek, and Hennepin Lake and Hopper Lake southwest of the Marquis Biocarbon Project. Groundwater supply wells within the vicinity of the project are scattered across the area, with depths typically shallower than 300 ft. More details are provided in Permit **Section 2.5** of the Area of Review (AoR) and Corrective Action Plan.

The land in the vicinity of the project consists primarily of cropland with a parcel to the northwest that is the site of an ethanol production facility.

10.2.2 Infrastructure

Infrastructure in the vicinity of Marquis BioCarbon Project that may be impacted due to an emergency at the project site includes:

- MCI CCS 3 wellhead;
- CO_2 compression facility that will house the CCS 3 compressors, steam generating units, and dehydration units; and
- Industrial buildings associated with the ethanol production facility location 0.5 miles to the north.

There are no public buildings, such as schools or hospitals in the vicinity of the MCI CCS 3 well.

The AoR encompasses portions of the counties of Putnam, Bureau, LaSalle, and Marshall. Hennepin, the town closest to the MCI CCS 3 site, is located approximately 1.5 miles southwest of the MCI CCS 3 well. Hennepin has residential areas, commercial properties, and recreational facilities. There is also a closed electrical coal-fired facility to the north, an open pit quarry to the northeast, and an abrasive grains and industrial fused mineral manufacturer north of the project site. However, these developed areas are not expected to be impacted due to an emergency at the MCI CCS 3 well.

At the end of this plan, figures are included identifying the following:

- **Figure 10 - 1**: Aerial of the site resources and infrastructure in the Vicinity of MCI CCS 3.
- **Figure 10-2**: Aerial Identifying Counties Within the AoR (i.e., 14.5- mile radius / 29-mile diameter)
- **Figure 10 - 2**: MCI CCS 3 CO2 Plume and AoR
- **Figure 10 - 3** Community and Non-Community Wells Nearby MCI CCS 3. For a Complete List of all Wells within the AoR see **Appendix V7.**
- **Figure 10 - 4**: Present Locations of Microseismic Stations Around Injection Site

10.3 Potential Risk Scenarios

The following events related to the Marquis BioCarbon Project that could potentially result in an emergency response are included in **Table 10-1**. This table lists the types of potential adverse incidents that will trigger response actions to protect USDWs and prevent injection fluid, brines, annulus fluid, or formation fluid migration into any unauthorized zones if the incidents occur during the construction, injection, or post-injection site care periods. Marquis will undertake emergency or remedial actions in response to these incidents.

This is a non-exhaustive list of potential risk scenario events:

Construction/Pre-Injection Period
• Well construction event during drilling or completion with loss of containment. • Evidence suggesting leakage to a USDW or other Unauthorized Zone (including the surface). For example, evidence suggesting a leakage may include: ◦ Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence suggesting potential fluid leakage into a USDW or other Unauthorized Zone (including the surface), including elevated concentrations of indicator parameter(s) in groundwater sample(s) from the MCI ACZ 1 well or increased pressures in the MCI ACZ 1 well. ◦ Evidence of migration of brines, annulus fluid, or formation fluid related to unanticipated emergency corrective action(s) needed on a well(s) within the AoR. ◦ Evidence of migration of brines, annulus fluid, or formation fluid between formations through injection, monitoring/verification, or water withdrawal well bores. ◦ Evidence of migration of brines, annulus fluid, or formation fluid from the Injection Zone through plugged and abandoned (P&Aed) wells or undocumented wells in the AoR. ◦ Evidence of migration of brines, annulus fluid, or formation fluid from the Injection Zone through failure of the confining zone, faults, and fractures (loss of containment). ◦ Evidence of migration of brines, annulus fluid, or formation fluid outside the AoR. • Severe weather disaster (e.g., tornado, hurricane, lightning strike). • Seismic event (e.g., natural or induced).

Injection Period

- Mechanical integrity failure, for example:
  - Loss of internal mechanical integrity due to tubing, packer, or casing leak in injection or monitoring/verification wells.
  - Loss of external mechanical well integrity due to fluid movement through vertical channels adjacent to well bores.
  - Loss of external mechanical well integrity from metal leaching or corrosion due to prolonged wetted CO_2 exposure.
- Evidence suggesting leakage to a USDW or other unauthorized zone (including the surface), for example, evidence suggesting a leakage may include:
  - Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence suggesting potential fluid leakage into a USDW or other Unauthorized Zone (including the surface), including elevated concentrations of indicator parameter(s) in groundwater sample(s) from the MCI ACZ 1 well or increased pressures in the MCI ACZ 1 well.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Project related to unanticipated emergency corrective action(s) needed on a well(s) within the AoR.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid between formations through injection, monitoring/verification, or water withdrawal well bores.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Injection Zone through plugged and abandoned (P&Aed) wells or undocumented wells in the AoR.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Injection Zone through failure of the confining zone, faults, and fractures (loss of containment).
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the injection zone, including due to metal leaching or corrosion due to prolonged wetted CO_2 exposure.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid outside the AoR.
- Well monitoring equipment failure or malfunction (e.g., all valves and gauges, pressure and temperature sensors downhole and at the wellheads, etc).
- Severe weather disaster (e.g., tornado, hurricane, lightning strike).
- Seismic event (e.g., natural or induced).

Post-Injection Site Care Period

- Mechanical integrity failure, for e.g.:
  - Loss of internal mechanical integrity due to tubing, packer, or casing leak in monitoring/verification wells.
  - Loss of external mechanical well integrity due to fluid movement through vertical channels adjacent to the well bores.
- Evidence suggesting leakage to a USDW or other unauthorized zone (including the surface), for example, evidence suggesting a leakage may include:
  - Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence suggesting potential fluid leakage into a USDW or other Unauthorized Zone (including the surface), including elevated concentrations of indicator parameter(s) in groundwater sample(s) from the MCI ACZ 1 well or increased pressures in the MCI ACZ 1 well.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Project related to an unanticipated emergency corrective action(s) needed on a well(s) within the AoR.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid between formations through injection, monitoring/verification, or water withdrawal well bores.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Injection Zone through P&Aed wells or undocumented wells in the AoR.
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Injection Zone through failure of the confining zone, faults, and fractures (loss of containment).
  - Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the injection zone, including due to metal leaching or corrosion due to prolonged wetted CO_2 exposure.

- Migration of injection fluid, brines, annulus fluid, or formation fluid outside of the AoR.
- Well monitoring equipment failure or malfunction (e.g., all valves and gauges, pressure and temperature sensors downhole and at the wellheads, etc.).
- Severe weather disaster (e.g., tornado, hurricane, lightning strike).
- Seismic event. (e.g., natural or induced).

Table 10-1: Potential Emergency Events.

In addition to the potential risk scenarios listed above a Feature, Event, and Process (FEP) risk assessment has been undertaken. Through the FEP risk assessment process, the response actions were developed.

10.4 Emergency Identification and Response Actions

Marquis must report to the Director within 24 hours if any evidence is obtained that the injected CO_2 stream or associated pressure front may cause an endangerment to a USDW (40 C.F.R. § 146.91(c)(1)); any noncompliance with a Permit Condition, or malfunction of the injection system, which may cause fluid migration into or between USDWs (40 C.F.R. § 146.91(c)(2)); any triggering of a shut-off system (i.e. down-hole or at the surface (40 C.F.R. § 146.91(c)(3)); and any failure to maintain mechanical integrity (40 C.F.R. § 146.91(c)(4)). If required by the Director, any release of CO_2 to the atmosphere or biosphere must also be reported within 24 hours (40 C.F.R. § 146.91(c)(5)).

The purpose of the ERRP is to ensure that appropriate actions are taken in an emergency or USDW endangerment situation. Steps to identify and characterize an emergency event will be dependent on the specific issue identified and the severity of the event. The avoidance, detection, and response actions for the potential risk scenarios are detailed below.[1] Detection methods include a process where evidence that may indicate a release is evaluated and confirmed, as detailed in the Testing and Monitoring Plan of the Permit. The confirmation procedures include, but are not limited to, statistical analysis, additional sampling, monitoring, or testing. Regardless what detection methods (including those that may not be listed) are utilized, listed response actions must be implemented as identified in each emergency event scenario that calls for their employment.

10.4.1 Well Construction Event

Loss of containment could occur during drilling and completion operations if the hydrostatic column controlling the well decreases below the formation pressure, allowing fluids to enter the well.

Timing of event: Construction/Pre-Injection

Avoidance measures: Include but are not limited to well control training, blowout prevention (BOP) equipment, kill fluid, BOP testing protocol, kick drill, lubricators for wireline operations.

Detection methods: Include but are not limited to flow sensor, pressure sensor, tank level indicator,

[1] Avoidance and detection measures identified throughout this ERRP do not replace or supersede any terms or conditions of the permit.

tripping displacement practices, mud weight control.

Response actions include but are not limited to:

- Notify the Director about the emergency event within 24 hours.
- Stop operation.
- Close Blow Out Prevention.
- Clear floor and secure area.
- Execute well control procedure.
- Evaluate drilling parameters and identify root cause.

10.4.2 Mechanical Integrity Failure

Loss of integrity in MCI CCS 3, monitoring/verification wells or water withdrawal well(s) may endanger USDWs, including endangerment due to the movement of injection fluid, brines, annulus fluid, or formation fluid into an unauthorized zone. Integrity loss may have occurred if the following events occur (note, this is not an exhaustive list):

- Automatic shutdown devices will be activated:
    - Wellhead pressure exceeds the maximum injection pressure (the shutdown point) specified in the permit.
    - Annulus pressure indicates a loss of external or internal well containment.
- Mechanical integrity test results identify a potential loss of mechanical integrity.
    - Loss of mechanical integrity due to a tubing or packer leak in all project site wells
    - Loss of mechanical integrity due to a casing leak in MCI CCS 3, monitoring/verification wells, or water withdrawal well(s).

Timing of event: Injection or Post-Injection

Avoidance measures:

- Use of corrosion resistant cement and corrosion resistant materials in the long string casing and tubing.
- Routine inspection of the well casing to determine corrosion rate using corrosion coupons.
- Corrosion evaluation using multi-finger caliper logging or ultrasonic casing evaluation.
- Continuous pressure monitoring and CO_2 stream injection monitoring.
- If high level pressure alarm triggers indicating maximum injection pressure (90% of fracture pressure), injection ceases.

Detection methods: Include but are not limited to:

- Well integrity issue is identified during internal mechanical integrity testing;
- Deficiency identified during pressure fall off testing,
- Exceedance of the maximum well injection pressure as specified in the permit;

- Inconsistencies confirmed of fluid flow behind casing resulting from annual evaluation of continuous temperature measurements using the Distributed Temperature Sensing (DTS) fiber optic sensor collection system.
- Exceedance of the annular pressure based on the variability from baseline conditions when correlating injection stream temperature and annular pressure.
- Change in annular fluid volume tank level indicator greater than 20% from baseline conditions.
- CO_2 plume and pressure tracking from above the confining zone shows a pressure change greater than 10% above baseline.
- Fluid samples from above the confining zone and USDW indicate a statistically significant change in conditions.
- Corrosion coupon evaluation indicates corrosion rate above acceptable industry standards and multi-finger caliper logging confirms well structural integrity issue.

Response actions include but are not limited to those detailed below in **Table 10 - 2**: Response actions to an emergency associated with mechanical integrity failure.

Wells	Response Action and Notification Procedures – Mechanical Integrity Failure
All	If a loss of mechanical integrity has occurred, then: • Notify the Marquis Carbon Injection LLC Environmental Manager and CCS Operations Manager immediately. • Notify the Director within 24 hours of the emergency event, per 40 C.F.R. § 146.91(c) and 40 C.F.R. § 146.94(b)(3). • After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel.
MCI CCS 3 and deep monitoring/ verification wells (MCI MW-1 and MCI MW-2)	• Initiate shutdown plan: o Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the compressors to the atmosphere. o Check wind direction. o Mark an exclusion zone around the affected area/well to limit access to authorized personnel only. o Notify plant safety personnel that well has been shut down. o Vent excess CO_2 from surface lines and well, as necessary, to reduce pressures and clear lines. o Notify local authorities and plant personnel, as necessary. o Limit access to wellhead and surface facilities to authorized personnel only. o If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities. o Reset or repair automatic shutdown devices, if necessary. o Monitor the well conditions, including pressures, temperatures, and annulus pressure, and perform diagnostics to verify integrity loss and determine the nature or cause and extent of any failure, as well as any additional steps in the emergency procedure. • Provide Director with a report within 5 days from date MCI became aware of mechanical integrity failure that contains a description of the circumstance, and if situation has been corrected, and if situation has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the circumstance. • Identify and implement appropriate remedial actions to restore well integrity (in consultation with the Director). • If the loss of mechanical integrity has resulted in a failure or malfunction of monitoring equipment, implement Response Actions from Section 10.4.3. • Collect fluid samples from ACZ-1 and conduct a statistical evaluation of results with baseline and previous monitoring data. If there is evidence suggesting fluid leakage into a USDW or other Unauthorized Zone, implement Response Actions from Section 10.4.4. • Upon completing of steps to restore well integrity, perform mechanical integrity test prior to bringing the well back online and resumption of injection, and within 30 days of receipt of test results, provide a report of mechanical integrity test findings to the Director for review and approval.

Wells	Response Action and Notification Procedures – **Mechanical Integrity Failure**
All other monitoring/ verification well (MCI-ACZ- 1)	• Identify and implement appropriate remedial actions to repair the well (in consultation with the Director). Within 30 days of the event, inform Director of the plan and schedule for repairs. • Identify and implement appropriate remedial actions (in consultation with the Director). • Within 30 days after well repair completion, provide a report to the Director detailing the repairs that were made.

Table 10 - 2: Response actions to an emergency associated with mechanical integrity failure.

10.4.3 Well Monitoring Equipment Failure or Malfunction

The failure or malfunction of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure, including a malfunctioning monitoring/verification well, may indicate a problem that could pose a risk of endangerment to USDWs.

This subsection covers the remedial response and procedures to be followed should confirmation that the failure of one (or more) of the monitoring sensors/equipment for wellhead pressure, temperature, and/or annulus pressure fail. Note in the event of failure or malfunction of monitoring equipment, manual gauges are used to monitor well operations. The failure or malfunction of electronic equipment, when using manual gauges, along with an evaluation of other available information that demonstrates well integrity has not been impacted, is not considered an emergency event.

Timing of event: Injection or Post-Injection

Avoidance measures:

- Inspection and maintenance of monitoring equipment to prevent, detect, and correct potential equipment malfunctions or failures that could result in integrity issues.
- Routine inspection and calibration of monitoring equipment based on manufacturer's recommendations.
- Fluid sampling in ACZ-1 to identify a release above the confining zone.
- Surface pressure and temperature monitoring in ACZ-1 to identify pressure changes.
- Continuous and redundant pressure and temperature measurements at the surface and in the injection zone to ensure compliance with operational parameters in the permit.
- Continuous temperature measurements in injection well and deep monitoring wells using the DTS fiber optic sensor collection system

Detection methods:

- Failure or malfunction of monitoring equipment confirmed through use of redundant manual gauges. Once equipment is repaired, calibrated equipment evaluated for consistency with manual gauge information and other available monitoring data reviewed to confirm well integrity has not been impacted.
- Pressure and rate monitoring anomalies, pressure falloff tests, CO_2 plume and pressure tracking.
- Fluid and confirmation sampling in ACZ-1 to identify a statistically significant change in conditions that potentially indicates a release above the confining zone.

The response actions to an emergency associated with well monitoring equipment failures or malfunctions for all wells, except shallow groundwater wells, include but are not limited to the actions detailed below in **Table 10 - 3**: Response actions to an emergency associated with well monitoring equipment failure or malfunction.

Wells	Response Action and Notification Procedures – Monitoring Equipment

All, except Shallow Groundwater Monitoring Wells	If evidence indicates a failure or malfunction of monitoring equipment poses a risk to a USDW, then MCI will: • Notify the MCI Environmental Manager and CCS Operations Manager immediately. • Notify the Director within 24 hours of the emergency event, per 40 C.F.R. § 146.91(c) and 40 C.F.R. § 146.94(b)(3). • After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel. • Determine the impact of the event, based on the information available, within 24 hours of the event occurring. At this time, assess the impact of the loss of monitoring equipment and determine and implement a viable alternative monitoring method. Report this information to the Director. Note: A viable alternative monitoring method is not a substitution for any permit condition, including compliance with the Testing and Monitoring Plan. • If there has been a loss mechanical integrity, implement Response Actions from Section 10.4.2. • Identify and implement appropriate remedial actions to repair the well (in consultation with the Director). • Assess whether there is evidence suggesting potential fluid leakage into a USDW or Unauthorized Zone, and if there is such evidence, implement Response Actions from Section 10.4.4. • Assess the cause of the equipment failure and report the details to the Director within 30 days. • Repair or replace monitoring equipment that failed and utilize and record data from manual gauges in the interim. Repair or replacement of equipment (if needed) should be done as soon as is feasible based on operational conditions and suitability of the alternative method of monitoring. • Assess (in consultation with the Director) whether monitoring capabilities at the project are sufficient to ensure non-endangerment to USDWs. If monitoring capabilities are not sufficient, identify and implement (in consultation with the Director) alternative or redundant monitoring capabilities. If alternative or redundant monitoring capabilities are not sufficient, treat the event as an immediate risk and see Response Actions immediately below. • If the event poses an immediate or near-term risk to human health, USDWs, or infrastructure, implement the following Response Actions: o Initiate shutdown plan ▪ Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the compressors to the atmosphere. ▪ Check wind direction. ▪ Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. ▪ Mark an exclusion zone around the affected area/well to limit access to authorized personnel only. ▪ Notify plant safety personnel that well has been shut down. ▪ Notify local authorities and plant personnel, as necessary. ▪ Limit access to wellhead and surface facilities to authorized personnel only. ▪ If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities. ▪ Reset or repair automatic shutdown devices, if necessary. ▪ Monitor the well conditions, including pressures, temperatures, and annulus pressure, to determine nature or cause and extent of failure or malfunction, as well as any additional steps in the emergency procedure. • Identify and, if necessary, implement appropriate remedial actions (in consultation with

	the UIC Program Director).
Shallow Groundwater monitoring wells	If evidence indicates a failure or malfunction of monitoring equipment poses a risk to a USDW, then MCI will: • Notify the Director about the event within one week; • Identify an alternative monitoring method as appropriate (in consultation with the Director)

Table 10 - 3: Response actions to an emergency associated with well monitoring equipment failure or malfunction.

10.4.4 Evidence Suggesting Potential Fluid Leakage to a USDW or Other Unauthorized Zone (including the Surface)

Potential injection fluid, brines, annulus fluid, or formation fluid leakage to the USDW or other unauthorized zone may endanger USDWs. This scenario includes but is not limited to:

- Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence suggesting fluid leakage into a USDW or other Unauthorized Zone (including the surface), including elevated concentrations of indicator parameter(s) in groundwater sample(s) from the MCI AZI well based on the Testing and Monitoring Plan (Attachment C) and Quality Assurance & Surveillance Plan (Attachment K) or increased pressures in the MCI ACZ1 well above 10%.
- A sudden, significant decrease in injection pressure (assuming constant injection rate) that might indicate a breach of confinement.
- Monitoring/Verification Well down hole pressure measurement deviating from expected within any overlying layers.
- Monitoring/Verification Well down hole temperature measurement deviating from expected within any overlying layers.
- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Project related to an unanticipated emergency corrective action(s) needed on a well(s) within the AoR.
- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid between formations through the injection, monitoring/verification, or water withdrawal well bores.
- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the Injection Zone through plugged and abandoned wells or undocumented wells in the AoR.
- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the injection zone through failure of the confining zone, faults, and fractures (loss of containment).

- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid from the injection zone, including metal leaching or corrosion due to prolonged wetted CO2 exposure.

- Evidence of migration of injection fluid, brines, annulus fluid, or formation fluid outside of the AoR.

Timing of event: Construction/Pre-Injection, Injection or Post-Injection

Avoidance measures:

- The use of corrosion-resistant well materials.
- Compliance with Testing and Monitoring Plan of the UIC Permit. For example,
  - Continuous monitoring of CO_2 injection flow.
  - Continuous pressure and temperature measurements at the surface and in the injection zone.
  - Monitoring of annulus pressures in injection and monitoring wells (except shallow groundwater wells), and annulus volume in injection well.
  - Fluid sampling in ACZ-1 to assess potential movement of injection zone fluids above the confining zone.
  - Pressure and temperature monitoring in ACZ-1 to confirm no pressure and temperature changes which indicate fluid leakage above the confining zone.
  - Continuous temperature measurements in injection well and deep monitoring wells using the DTS fiber optic sensor collection system to monitor temperature changes along the entire length of the fiber optic cable to confirm no leaks are detected.

Detection methods:

- Corrosion monitoring.
- Redundant monitoring of pressures, temperatures, and injectate flow.
- Redundant monitoring of annulus system (monitoring and annular fluid volumes) and annulus surface monitoring,
- Fluid sampling of water chemistry and statistical evaluation of data.
- Mechanical integrity testing.
- Pressure falloff testing.
- Oxygen activation logs over DTS zones to confirm anomalies.

Response actions to evidence suggesting fluid leakage to a USDW or other unauthorized zone include but are not limited to the actions detailed below in **Table 10-4**. If there is evidence of potential injection fluid, brines, annulus fluid, or formation fluid leakage to a USDW or other unauthorized zone, MCI must perform the following actions in **Table 10-4.**

Response Action and Notification Procedures – Fluid Leakage to USDW or Unauthorized Zone

If MCI obtains evidence of potential injection fluid, brines, annulus fluid, or formation fluid leakage to a USDW or other unauthorized zone, MCI must perform the following actions:

- Notify the MCI Environmental Manager and CCS Operations Manager immediately.
- After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel.
- Notify the Director within 24 hours of the emergency event, per 40 C.F.R § 146.91(c) and 40 C.F.R. § 146.94(b)(3).
- Initiate shutdown plan
  - Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the compressors to the atmosphere.
  - Check wind direction.
  - Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines.
  - Mark an exclusion zone around the affected area/well to limit access to affected area to authorized personnel only.
  - Notify plan safety personnel that well has been shut down.
  - Notify local authorities and plant personnel, as necessary.
  - Limit access to wellhead and surface facilities to authorized personnel only.
  - If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities.
  - Reset or repair automatic shutdown devices, if necessary.
  - Monitor the well conditions, including pressures, temperatures, and geochemical parameters to determine the nature or cause and extent of any failure or fluid migration, as well as additional steps in the emergency procedure.
- Take all steps reasonably necessary to identify and characterize any release within 24 hours (40 C.F.R. § 146.94(b)(2)), including
  - Collection of confirmation sample(s) of USDWs, groundwater, or any other potentially relevant formation(s) (in consultation with the Director) and performance of constituent analysis for abnormal indicator parameters. See Table 7-6 of the Testing and Monitoring Plan.
- If presence of leaked fluid or other contamination is confirmed in a USDW or other unauthorized zone, MCI will perform the following response actions:
  - Identify and implement (in consultation with the Director) a case-specific remediation plan as soon as possible and no later than 30 days of the emergency event. The plan will include, but not be limited to:
    - Installing additional groundwater monitoring points to delineate the extent of impact; and
    - Remediating the affected USDW or unauthorized zone to mitigate potential endangerment of or adverse impacts to USDWs. Examples of methods that may be applicable include:
      - A system to intercept and extract non-native fluid or CO_2; or
      - A pump-and-treat type system to aerate the water contaminated with CO_2 to purge the CO_2 from the water.
  - Arrange for an alternate potable water supply if the USDW was being utilized as a drinking water source and the contamination has caused an exceedance of drinking water standards.
  - Continue remediation and monitoring on a frequent basis (in consultation with the Director) until potential endangerment of or adverse impacts to USDWs have been fully addressed.

Table 10 - 4: Response actions to evidence suggesting potential fluid leakage to a USDW or other unauthorized zone

10.4.5 Severe Weather Disaster

Well problems (integrity loss, leakage, or malfunction) may arise because of a natural disaster affecting the normal operation of the MCI CCS 3 well. Weather-related disasters (e.g., tornado or lightning strike) may affect surface facilities. The Marquis Carbon Injection facility lies outside the Federal Emergency Management Agency Adverse Effects (FEMA AE) Zone for floodplains.

Timing of event: Construction/Pre-Injection, Injection, and Post-injection

Response actions to an emergency associated with a natural disaster include but are not limited to the actions detailed below in
Table 10-5.

Wells	Response Action and Notification Procedures – Severe Weather Disaster
All	• Notify the MCI Environmental Manager and CCS Operations Manager immediately. • The Environmental Manager and/or the CCS Operations Manager or their designee will notify other Project Management and Operational Personnel. • Trigger alarm by the monitoring system or monitoring personnel. • If appropriate, contact the field supervisor to activate emergency evacuation and secure the location. • Notify the Director within 24 hours of the emergency event, per 40 C.F.R. § 146.94(b)(3), and 40 C.F.R. § 146.91(c) and (e). • If there has been a loss of mechanical integrity, implement Response Actions from Section 10.4.2. • Determine if all monitoring equipment remains functional. If there has been a failure or malfunctioning of monitoring equipment, implement Response Actions from Section 10.4.3. • Conduct assessment to determine if there is evidence suggesting potential fluid leakage into a USDW or Unauthorized Zone. If there is such evidence, implement Response Actions from Section 10.4.4. • Assess potential impact to the project and the Local Resources and Infrastructure. • Identify and implement appropriate remedial actions (in consultation with the Director).

Table 10 - 5: Response actions to an emergency associated with a severe weather disaster.

10.4.6 Seismic Events

A major natural seismic event may disturb the surface or subsurface facilities. There is also a possibility that injection operations may cause induced seismicity. This portion of the response plan is developed for any seismic event with an epicenter within a 100-kilometer (62.14-mile) radius of the MCI CCS 3 well.[2] Refer to **Table 10-6** below for response actions based on Moment magnitude (Mw) thresholds and potential damage.

The Marquis BioCarbon Project is in a seismically stable region. To monitor the AoR for any potential seismic activity, MCI will maintain a network of surface seismological stations continuously record background seismic activity. MCI has installed microseismic surface monitors to collect background data prior to injection. The location of individual stations within

[2] The midpoint between the surface-hole and bottom-hole locations shall be used as the center of the circle.

this network are shown on **Figure 10 - 4**: Present Locations of Microseismic Stations Around Injection Site, and those stations can be adjusted as required in response to monitoring results or future AoR re-evaluations. Baseline microseismic data is being acquired prior to the start of injection operations. As of August 2024, no seismic activity has been identified within the modeled MCI CCS 3 CO_2 plume extent. However, should seismic activity occur, triggered MCI will process the seismic event data to provide seismic moment magnitude and precise location and depth information on a real-time basis and reported daily.

Upon issuance of a final permit, Marquis must subscribe to the U.S. Geological Survey (USGS) Earthquake Notification Service to receive notification of seismic events (both natural and induced) within 100 kilometers from the well. Based on the periodic analysis of the monitoring data, observed level of seismic activity, the USGS notification system, and local reporting of felt events, the site is assigned an operating state based on the protocol described in **Table 10 - 6**: Seismicity Monitoring System and Protocol for seismic events for Seismic Events >Moment Magnitude (Mw) 1.0 with an Epicenter Within a 100-Kilometer Radius of MCI CCS 3. The operating state is determined using threshold criteria which correspond to the site's potential risk and level of seismic activity. The operating state provides operating personnel information about the potential risk of further seismic activity and guides them through a series of response actions.

Timing of event: Construction/pre-injection, injection and post-injection

Operating State	Threshold Condition, Movement Magnitude (Mw)[3][4]	Response Actions include but are not limited to:
Green	Seismic events within a 14.5-mile radius less than or equal to Mw 1.5	• Continue normal operation within permitted levels.
Yellow	Five (5) or more seismic events within a 14.5-mile radius within a 30- day period having a magnitude greater than Mw 1.5 but less than or equal to Mw 2.0	• Continue normal operation within permitted levels. • Within 24 hours of the fifth event, notify the Director of the operating status of the well. • Review seismic and operational data to determine the cause
Orange	Seismic event within a 14.5-mile radius greater than Mw 1.5 and local observation or felt report Seismic event within a 14.5-mile radius greater than Mw 2.0 and no felt report	• Continue normal operation within permitted levels. • Within 24 hours of the incident, notify the Director of the operating status of the well. • Review seismic and operational data to determine the cause. • Report findings to the Director and identify and implement appropriate remedial actions (in consultation with the Director).
Magenta	Seismic event within a 14.5-mile radius greater than Mw 2.0 and local observation or report	• Initiate rate reduction plan (in consultation with the Director) • Within 24 hours of the incident, notify the Director of the operating status of the well. • Limit access to wellhead to authorized personnel only. • Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary. • Review seismic and operational data to determine the cause of the event. • Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure. • Report findings to the Director and identify and implement appropriate remedial actions (in consultation with the Director). • If there has been a loss mechanical integrity at any of the wells, implement Response Actions from Section 10.4.2. • Determine if all monitoring equipment remains functional. If there has been a failure or malfunctioning of monitoring equipment, implement Response Actions from Section 10.4.3. • Conduct assessment to determine if there is evidence suggesting potential fluid leakage into a USDW or Unauthorized Zone. If there is such evidence, implement Response Actions from Section 10.4.4.
	Seismic event within a 14.5-mile radius greater than Mw 2.0, and local observation or report, and local report and confirmation of damage at the project site	• Monitor well pressure, temperature, and annulus pressure to assess if well operation is within permitted operational parameters. • Review seismic data from seismic stations around the project site.

[3] Specified magnitudes refer to magnitudes determined by USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.

[4] "Felt report" and "local observation or report" refer to events confirmed by local reports of felt ground motion or reported on the USGS "Did You Feel It?" reporting system.

Red	Seismic event greater than Mw 3.5 within a 14.5-mile radius	• If seismic stations indicate, based on USGS *Modified Mercalli Intensity Scale* (Fig. 10-5), an instrumental intensity in the project area of VII or above, Initiate shutdown plan (40 C.F.R. § 146.94(b)(1)).
		  ○ Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the compressors to the atmosphere.
		  ○ Check wind direction.
		  ○ Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines.
		  ○ Mark an exclusion zone around the affected area/well to limit access to affected area to authorized personnel only.
		  ○ Notify plan safety personnel that well has been shut down.
		  ○ Notify local authorities and plant personnel, as necessary.
		  ○ Limit access to wellhead and surface facilities to authorized personnel only.
		  ○ If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities.
		  ○ Reset or repair automatic shutdown devices, if necessary.
		• Within 24 hours of the incident, notify the Director of the operating status of the well and about the emergency (40 C.F.R. § 146.94(b)(3)), including information on the status of the injection site.
		• Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary.
		• Review seismic and operational data to determine the cause of the event.
		• Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure.
		• Report findings to the Director and identify and implement appropriate remedial actions (in consultation with the Director).
		• Within 48 hours of the incident, evaluate the mechanical integrity of the well in accordance with Section 10.4.2 of the ERRP. If there has been a loss of mechanical integrity, implement Response Actions from Section 10.4.2. If there is a loss of mechanical integrity or other problems with the system that might impact a USDW, consult the Director prior to recommencing injection.
		• Determine if all monitoring equipment remains functional. If there has been a failure or malfunctioning of monitoring equipment, implement Response Actions from Section 10.4.3.
		• Conduct assessment to determine if there is evidence suggesting potential fluid leakage into a USDW or Unauthorized Zone. If there is such evidence, implement Response Actions from Section 10.4.4.

Red	Seismic event greater than Mw 3.5 outside of 14.5-mile radius but within 100-kilometer radius	• Within 24 hours of the incident, notify the Director of the operating status of the well and about the emergency (40 C.F.R. § 146.94(b)(3)), including information on the status of the injection site. • Within 30 days of the incident, evaluate the mechanical integrity of the well. If there has been a loss in mechanical integrity, implement Response Actions from Section 10.4.2. If there is a loss of mechanical integrity or evidence of other problems with the system that may endanger a USDW, consult the Director prior to recommencing injection.

Red	Seismic event equal to or greater than Mw 5.0 within a 100-kilometer radius, and local observation or report, and local report and confirmation of damage to the project site	• Monitor well pressure, temperature, and annulus pressure to assess if well operation is within permitted operational parameters.
		• Review seismic data from seismic stations around the project site.
		• If seismic stations indicate, based on USGS *Modified Mercalli Intensity Scale* (Fig. 10-5), an instrumental intensity in the project area of VII or above, Initiate shutdown plan (40 C.F.R. § 146.94(b)(1)).
		  ○ Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the compressors to the atmosphere.
		  ○ Check wind direction.
		  ○ Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines.
		  ○ Mark an exclusion zone around the affected area/well to limit access to affected area to authorized personnel only.
		  ○ Notify plan safety personnel that well has been shut down.
		  ○ Notify local authorities and plant personnel, as necessary.
		  ○ Limit access to wellhead and surface facilities to authorized personnel only.
		  ○ If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities.
		  ○ Reset or repair automatic shutdown devices, if necessary.
		• Within 24 hours of the incident, notify the Director of the event, operating status of the well and about the emergency (40 C.F.R. § 146.94(b)(3)), including information on the status of the injection well system.
		• Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary.
		• Review seismic and operational data to determine the cause of the event.
		• Within 48 hours of the incident, evaluate the internal and external mechanical integrity of the injection well in accordance with Section L(2) of the Permit. If there is a loss of mechanical integrity or other problems with the system that might impact a USDW, the injection well must remain shut-in and MCI must submit a report in electronic format as soon as possible but no later than 30 days from the time MCI becomes aware of the circumstances
		  ○ The report shall contain a description of failure and if the failure has not been corrected, the anticipated time it is expected to continue and any steps taken or planned to reduce, eliminate, and prevent recurrence of the failure.
		  ○ Upon completion of the steps to ensure mechanical integrity and the subsequent mechanical integrity demonstration, MCI shall submit the results and any other required documentation to the Director.
		• Determine if all monitoring equipment remains functional. If there has been a failure or malfunctioning of monitoring equipment, implement Response Actions from Section 10.4.3.
		• Conduct assessment to determine if there is evidence suggesting potential fluid leakage into a USDW or Unauthorized Zone. If there is such evidence, implement Response Actions from Section 10.4.4.
		• If the well has been shut-in, consult the Director prior to recommencing injection.

Table 10 - 6: Seismicity monitoring system and protocol for seismic events > Mw1.0 with an epicenter within a 100-kilometer radius of MCI CCS3.

10.5 Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP. The injection well is located in Putnam outside of any city limits. Therefore, County emergency responders (as well as State agencies) will need to be notified in the event of an emergency.

A site-specific emergency contact list will be developed and maintained during the life of the project. The contact list will identify the site personnel, and their phone numbers, to be notified, in addition to the Director. This site-specific emergency contact list will be maintained during the life of the Project. MCI will provide the current site-specific emergency contact list to the Director.

Name	Title	Telephone Number
Jason Marquis	Chief Operating Officer	Office: (815) 925-7300 – Ext. 1128
Alex Tarmann	Emergency Preparedness & Response Advisor	Office: (815) 925-7300 – Ext. 2213
Dustin Marquis	Senior Vice-President – Government Relations & Corporate Communications	Office: (815) 925-7300 – Ext. 1121

Table 10-7: Contact Information of MCI Emergency Authorities

Key local, state, and other authority's emergency contact list is provided in **Table 10-8** and will also be maintained during the life of the project.

Agency	Phone Number
Local police (Hennepin Police)	815-925-7084
Illinois State police (LaSalle office, IL)	815-224-1171
Putnam County Sheriff	815-925-7015
Hennepin Fire Department	815-925-7225 or 911

Illinois Emergency Management Agency	800-782-7860
Environmental Services Contractor	Clean Harbors 1-800-645-8265
EPA National Response Center (24-Hours)	(800) 424-8802
UIC Director US EPA Region V	312-353-7648

Table 10 - 8: Key local, state, and other authority's emergency contact list.

Equipment needed in the event of an emergency and remedial response will vary, depending on the triggering emergency event. Response actions (cessation of injection, well shut-in, and evacuation) will generally not require specialized equipment to implement. Where specialized equipment (such as a drilling rig or logging equipment) is required, Marquis Carbon Injection LLC shall be responsible for its procurement.

10.6 Emergency Communications Plan

MCI will communicate to the public and relevant authorities about any event that requires an emergency response to ensure that the public understands what happened and whether there are any environmental health or safety concerns in consultation with the Director. Based on the emergency event, MCI will determine the amount of information, timing, and communications method(s) will be appropriate to the event. This information may include potential severity, impacts to drinking water, any impacts to the surrounding community, actions taken or planned to address the emergency event, and other information to protect the public during the event.

For responses that occur over the long-term (e.g., ongoing cleanups), MCI will provide periodic updates on the progress of the response action(s).

If required, MCI will also communicate with other entities who may need to be informed about or act in response to the event, including local water utilities, CO_2 source(s) and pipeline operators, landowners, Regional Response Teams (as part of the National Response Team), and other departments or authorities as guided by the UIC Program Director.

A designated MCI representative will be the first contact during an emergency event, and that representative will communicate with the relevant public authorities. The MCI representative and any designees will contact the agencies/departments on the emergency contact list (Table 10-7).

The MCI representative assigned the emergency response communications duties will be available 24-hours a day in the event of an emergency.

10.7 Plan Review

In accordance with 40 C.F.R. § 146.94(d), MCI shall periodically review the ERRP. Based on this review, MCI shall submit an amended ERRP or a demonstration to the Director that no amendment is needed. Any amendments to the ERRP must be approved by the Director to be effective, and if approved, will be incorporated into the Permit. Amended plans or demonstrations shall be submitted to the Director as follows:

- At least once every five (5) years following its approval by the permitting agency;
- Within one (1) year of an area of review re-evaluation;
- Following any significant changes to the facility, such as an addition of injection or monitoring/verification wells, on a schedule determined by the Director;
- Within six (6) months following the occurrence of an emergency event under this ERRP; or
- When required by the Director.

10.8 Staff Training and Exercise Procedures

MCI will integrate this ERRP into the project-specific standard operating procedures and training program. Periodic training will be provided, not less than annually, to well operators, CO_2 scrubber operators, project safety and environmental personnel, plant technology manager, project manager, Carbon Capture Plant operations supervisor, and corporate communications. The training plan will document that the above listed personnel have been trained and possess the required skills to perform their relevant emergency response activities described in the ERRP.

Figure 10 - 1: Aerial of the site resources and infrastructure in the vicinity of MCI CCS 3.

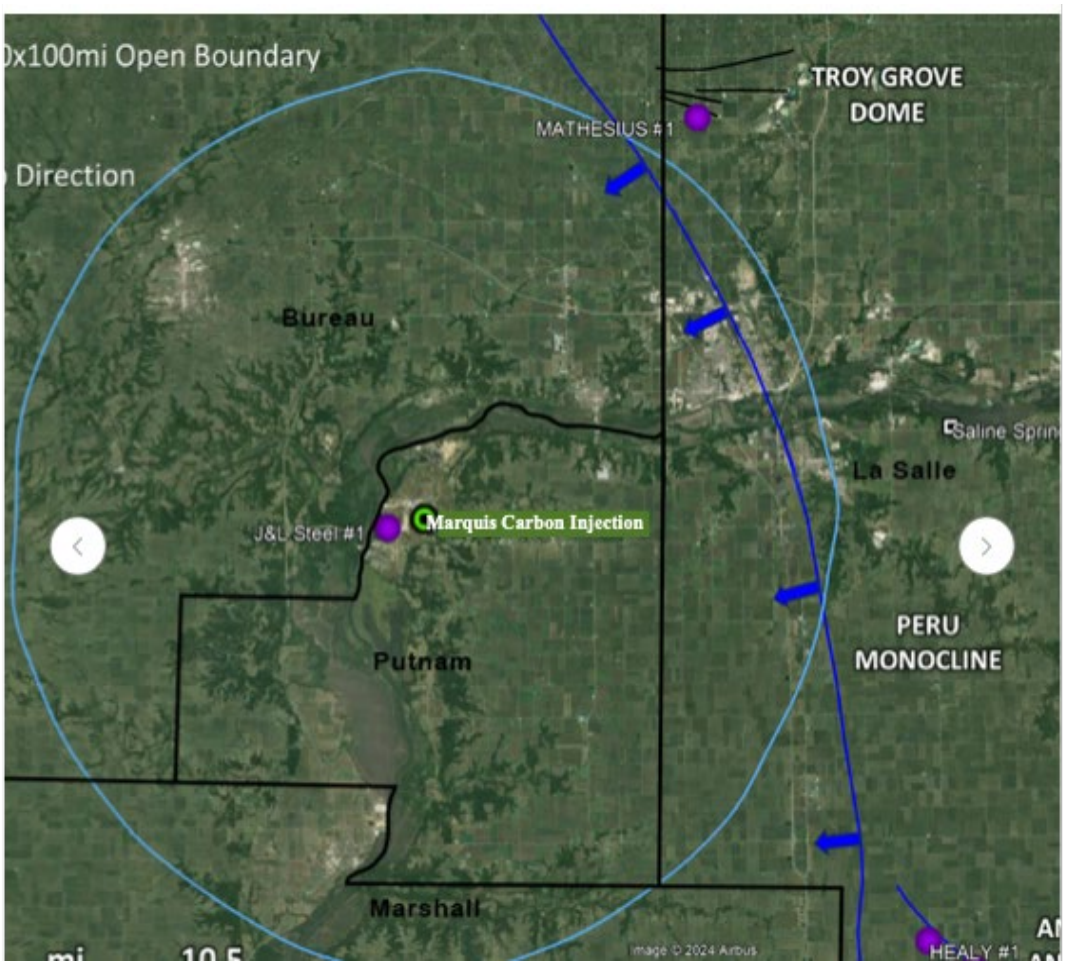

Figure 10 - 2: MCI CCS 3 CO_2 Plume and AoR

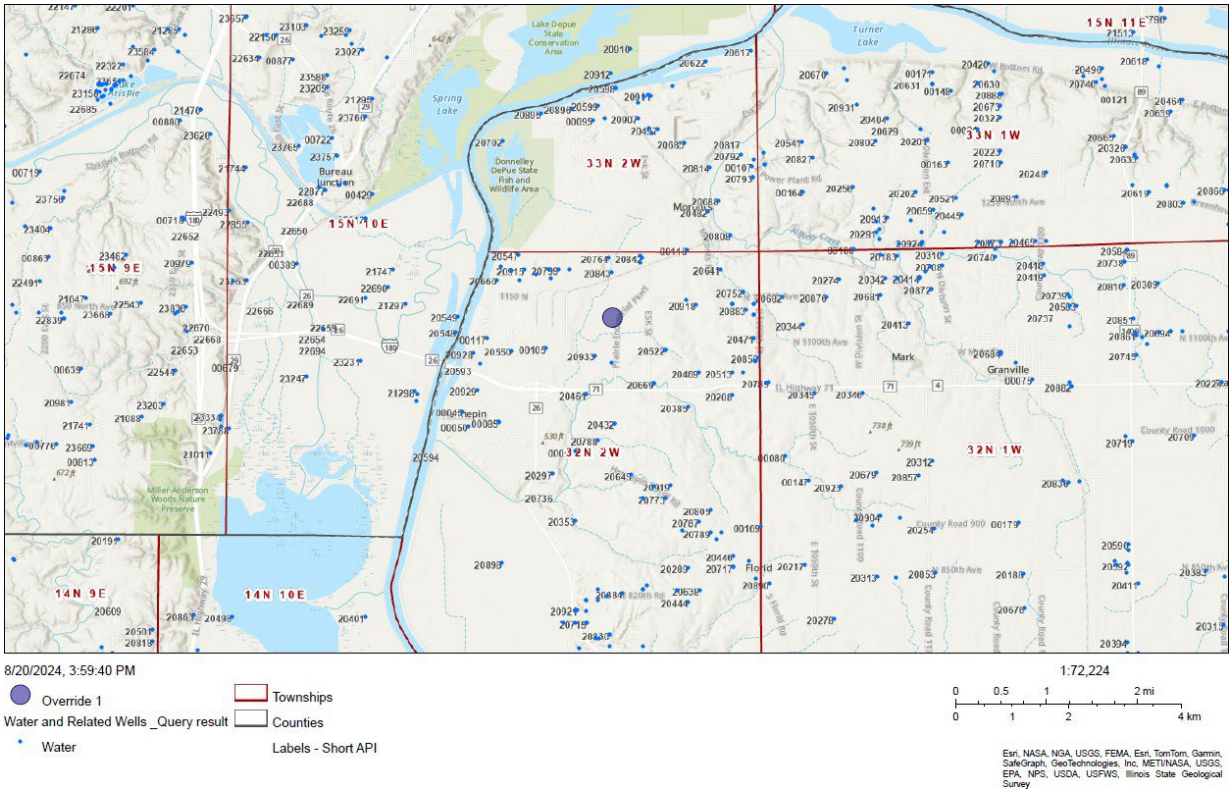

Figure 10 - 3 Community and Non-Community Wells Nearby MCI CCS 3. For a Complete List of all Wells within the AoR see **Appendix V7.**

Figure 10 - 4: Present Locations of Microseismic Stations Around Injection Site

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Moderate/Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	*<.17*	*.17-1.4*	*1.4-3.9*	*3.9-9.2*	*9.2-18*	18-34	34-65	65-124	>124
PEAK VEL. (cm/s)	<0.1	0.1-1.1	1.1-3.4	3.4-8.1	8.1-16	*16-31*	*31-60*	*60-116*	*>116*
INSTRUMENTAL INTENSITY	I	II-III	IV	V	VI	VII	VIII	IX	X+

Figure 10 - 5: USGS Modified Mercalli Intensity Scale