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

MARQUIS BIOCARBON PROJECT

Facility Information

Facility name:	MARQUIS BIOCARBON PROJECT
Facility contact:	ELIZABETH STEINHOUR DIRECTOR OF ENVIRONMENTAL AFFAIRS 10000 MARQUIS DRIVE, HENNEPIN, IL 61327 815.925.7300 / BETHSTEINHOUR@MARQUISENERGY.COM
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 will take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during the construction, operation, or post-injection site care periods.

If Marquis Carbon Injection, LLC obtains evidence that the injected carbon dioxide (CO_2) stream and/or associated pressure front may cause an endangerment to a USDW, Marquis Carbon Injection, LLC will perform the following actions:

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

Where the phrase "initiate shutdown plan" is used, the following protocol will be employed: Marquis Carbon Injection, LLC will immediately cease injection. However, in some circumstances, Marquis Carbon Injection, LLC will, in consultation with the UIC Program Director, determine if a gradual cessation of injection is appropriate. 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, override of certain relays may be required to properly and safely shutdown the system.

10.2 Local Resources and Infrastructure

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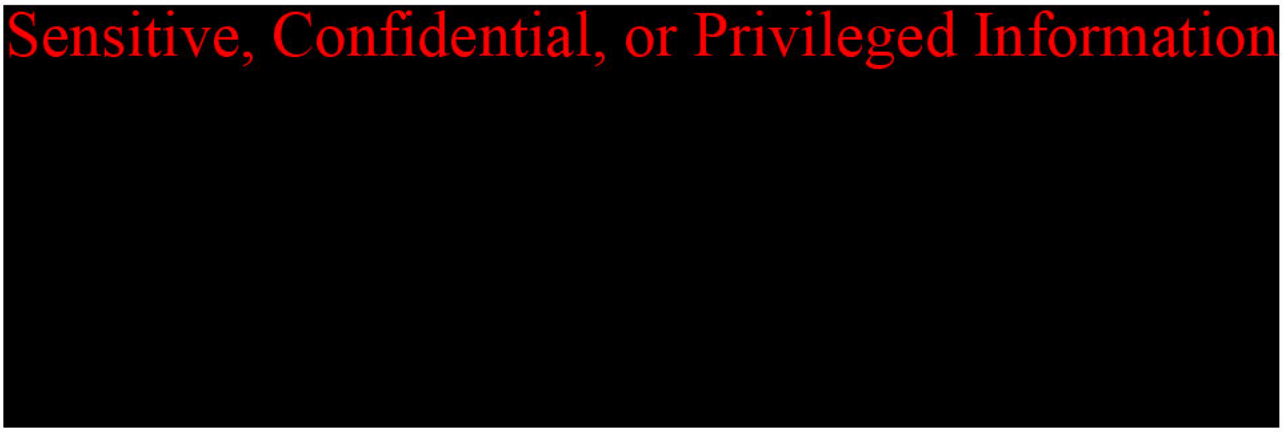

Nearby surface-water features include the Illinois River to the west and north and unnamed northern tributaries to Coffee Creek. Sensitive, Confidential, or Privileged Information

Sensitive, Confidential, or Privileged Information

The land in the vicinity of the MCI CCS 3 well consists primarily of cropland with sparse residential or agricultural buildings. There are no public buildings, such as schools or hospitals

Sensitive, Confidential, or Privileged Information

located 0.5 miles to the northwest of the injection site. These buildings and facilities are partially inside the AoR. Developed land is present 1.5 miles to the southwest in Hennepin, and other industrialized land uses in the area include an abandoned electrical coal plant to the north and an open pit quarry to the northeast.

Future infrastructure related to the Marquis BioCarbon Project site will consist of pipelines, the MCI CCS 3 well, the MCI MW 2, and above confining zone (MCI ACZ 1) wells, and the associated CO_2 compression facilities.

Resources and infrastructure addressed in this plan are shown in

Figure 10-1.

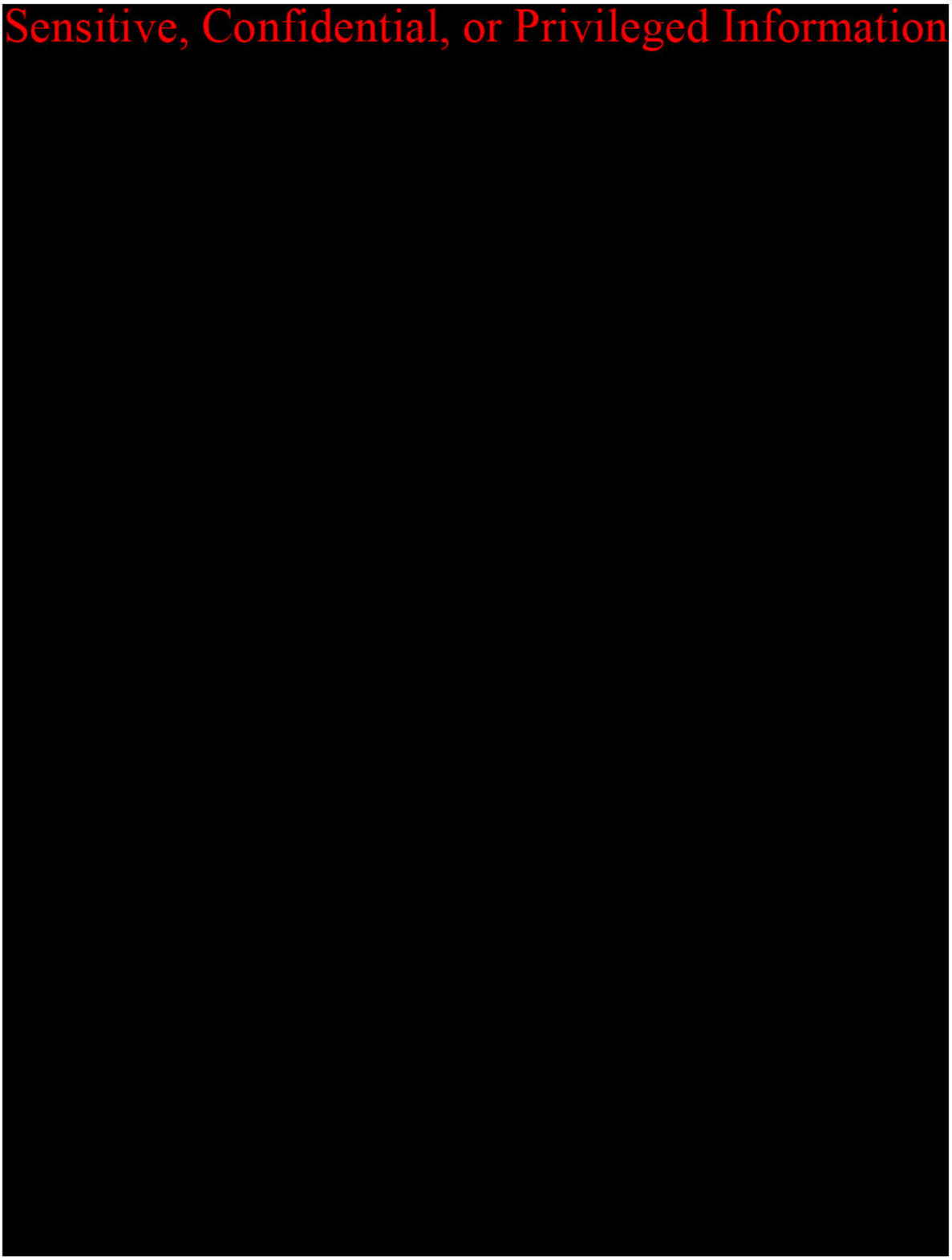

Figure 10-1: Map of the site resources and infrastructure.

10.3 Potential Risk Scenarios

The following events related to the Marquis BioCarbon Project could potentially result in an emergency response:

- MCI CCS 3 well or MCI MW 2 well integrity failure.
- MCI CCS 3 well monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.).
- A natural disaster (e.g., earthquake, tornado, lightning strike).
- Fluid (e.g., brine) leakage to a USDW.
- CO_2 leakage to USDW or land surface
- Induced seismic event.

Response actions will depend on the severity of the event(s) triggering an emergency response and are categorized below in Table 10-1.

In addition to the potential risk scenarios listed above a Feature, Event, and Process (FEP) risk assessment has been undertaken. A summary of this exercise is shown in Appendix A which describes the main FEPs identified for this project .

Emergency Condition	Definition
Major emergency	Event poses immediate substantial risk to human health, USDW's, other resources, or infrastructure. Emergency actions involving local authorities (evacuation or isolation of areas) should be initiated.
Serious emergency	Event poses potential serious (or significant) near-term risk to human health, resources, or infrastructure if conditions worsen, or no response actions taken.
Minor emergency	Event poses no immediate risk to human health, resources, or infrastructure.

Table 10-1: Degrees of risk for emergency events.

10.4 Emergency Identification and Response Actions

Steps to identify and characterize an emergency event will be dependent on the specific issue identified and the severity of the event. Each of the potential risk scenarios identified in the previous section are detailed below.

10.4.1 Well Integrity Failure

Integrity loss of the MCI CCS 3 well and/or MCI MW 2 well may endanger USDWs. Integrity loss may have resulted, and automatic shutdown devices will be activated if the following events occur:

- Wellhead (injection) pressure exceeds the shutdown pressure specified in the permit.
- Annulus pressure indicates a loss of external or internal well containment.
- Mechanical integrity test results identify a loss of mechanical integrity.

Response actions for the situations listed above are detailed below in Table 10-2.

Emergency Condition	Response Action and Notification Procedures
All	1. Notify the Marquis Carbon Injection, LLC Environmental Manager and CCS Operations Manager immediately. 2. Notify the UIC Director within 24 hours of the emergency event, per 40 CFR 146.91(c). 3. After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel. 4. Determine the severity of the event, based on the information available, within 24 hours of notification.
Major or Serious	5. Initiate shutdown plan a. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. b. Check wind direction c. Mark an exclusion zone around the affected area/well to limit access to authorized personnel only. d. Notify plant safety personnel that well has been shut down. e. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. f. Notify local authorities and plant personnel, as necessary. g. If evacuation plan must be implemented, notify all surrounding businesses and offices, and local authorities. h. Monitor the well conditions (i.e., pressures, temperatures, and annulus pressure) to determine potential causes and the extent of any failure, as well as any additional steps in the emergency procedure. 6. Evaluate whether any leaks to groundwater or surface water occurred. 7. If contamination of groundwater or surface water is detected, identify, and implement appropriate remedial actions (in consultation with the UIC Program Director).
Minor	1. Conduct assessment to determine whether there has been a loss of mechanical integrity. 2. If there has been a loss of mechanical integrity, initiate shutdown plan. 3. For shutdown plan, implement the following: a. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. b. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. c. Mark an exclusion zone around the affected well to limit access to well to authorized personnel only. d. Notify plant safety personnel that well has been shut down. e. Monitor the well conditions (i.e., pressures, temperatures, and annulus pressure) to determine potential causes and the extent of any failure. f. Identify and, if necessary, implement appropriate remedial actions in consultation with the UIC Program Director.

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

10.4.2 Injection Well Monitoring Equipment Failure

The failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure may indicate a problem with the MCI CCS 3 well that could endanger USDWs. Most equipment failures can be rapidly addressed by replacing the failed pieces of equipment and are likely minor emergencies. However, if the situation cannot be quickly addressed, system shutdown may be required.

The response actions to an emergency associated with well equipment failure is detailed below in Table 10-3.

Emergency Condition	Response Action and Notification Procedures
All	1. Notify the Marquis Carbon Injection, LLC Environmental Manager and CCS Operations Manager immediately. 2. Notify the UIC Director within 24 hours of the emergency event, per 40 CFR 146.91(c). 3. After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel. 4. Determine the severity of the event, based on the information available, within 24 hours of notification.
Major or Serious	5. Initiate shutdown plan a. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. b. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. c. Mark an exclusion zone around the affected well to limit access to well. d. Notify local authorities and plant personnel, as necessary. e. Monitor the well conditions (i.e., pressures, temperatures, and annulus pressure) to determine additional steps in the emergency procedure. 6. Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).
Minor	1. Conduct assessment to determine whether there has been a loss of mechanical integrity. 2. If there has been a loss of mechanical integrity, initiate shutdown plan. 3. For shutdown plan, implement the following: a. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. b. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. c. Reset or repair automatic shutdown devices, if necessary. d. Monitor the well conditions (i.e., pressures, temperatures, and annulus pressure) to determine potential causes and the extent of any failure. 4. Repair or replace monitoring equipment that failed. 5. Identify and, if necessary, implement appropriate remedial actions in consultation with the UIC Program Director.

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

10.4.3 Potential Brine or CO_2 Leakage to USDW

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 may indicate fluid (brine) or CO_2 leakage into a USDW.

The response actions to an emergency associated with potential Brine or CO_2 leakage to a USDW is detailed below in Table 10-4.

Emergency Condition	Response Action and Notification Procedures
All	1. Notify the Marquis Carbon Injection, LLC Environmental Manager and CCS Operations Manager immediately. 2. After an initial assessment, the Environmental Manager and/or the CCS Operations Manager will notify other Project Management and Operational Personnel. 3. Notify the UIC Director within 24 hours of the emergency event, per 40 CFR 146.91(c). 4. Determine the severity of the event, based on the information available, within 24 hours of notification. 5. For all cases of confirmed migration of non-native fluid or CO_2 above the confining zone: a. Initiate shutdown plan i. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. ii. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. iii. Mark an exclusion zone around the affected well to limit access to affected area. iv. Notify local authorities and plant personnel, as necessary. v. Monitor the well conditions (i.e., pressures, temperatures, geochemical parameter, temperature data, etc.) to determine additional steps in the emergency procedure. b. Collect confirmation sample(s) of groundwater and analyze for indicator parameters. See Table 7-6 of the Testing and Monitoring Plan. 6. If the leakage of non-native fluid or CO_2 is confirmed, develop (in consultation with the UIC Program Director) a case-specific plan with various methods to address any unacceptable impacts to the affected USDW while achieving certain goals. The goals and proposed methods are as follows: a. Install additional groundwater monitoring points near the affected groundwater well(s) to delineate the extent of impact. b. Remediate the affected USDW to mitigate any unsafe conditions through the installation of: i. A system to intercept and extract non-native fluid or CO_2; or ii. A pump-and-treat type system to aerate the water contaminated with CO_2 to purge the CO_2 from the water. c. Arrange for an alternate potable water supply if the USDW was being utilized as a drinking water source and has exceeded drinking water standards by CO_2 or brine infiltration. d. Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by Marquis Carbon Injection, LLC and the UIC Director) until unacceptable adverse USDW impact has been addressed.

Table 10-4: Response actions to an emergency associated with potential Brine or CO_2 leakage to a USDW.

10.4.4 Natural 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. An earthquake may disturb surface and/or subsurface facilities; and 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.

The response actions to an emergency associated with a natural disaster are detailed below in Table 10-5.

Emergency Condition	Response Action and Notification Procedures
All	1. Notify the Marquis Carbon Injection, LLC Environmental Manager and CCS Operations Manager immediately. 2. The Environmental Manager and/or the CCS Operations Manager or their designee will notify other Project Management and Operational Personnel. 3. Notify the UIC Director within 24 hours of the emergency event, per 40 CFR 146.91(c). 4. Determine the severity of the event, based on the information available, within 24 hours of notification.
Major or Serious	5. Initiate shutdown plan a. Confirm no leakage from the CO_2 injection system. b. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. c. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. d. Mark an exclusion zone around the affected well to limit access. e. Notify local authorities and plant personnel, as necessary. f. Determine if any leaks to groundwater or surface water occurred. g. Monitor the well conditions (i.e., pressures, temperatures, etc.) to determine additional steps in the emergency procedure. 5. If contamination or endangerment is detected, identify, and implement appropriate remedial actions (in consultation with the UIC Program Director).
Minor	4. Conduct assessment to determine whether there has been a loss of mechanical integrity. 5. If there has been a loss of mechanical integrity, initiate shutdown plan. For shutdown plan, implement the following: i. Shut in well (close flow valve). Prior to closing the flow valve, notify plant personnel to direct CO_2 from the Scrubbers to the atmosphere. ii. Vent excess CO_2 from surface lines and well, as necessary to reduce pressures and clear lines. iii. Monitor the well conditions (i.e., pressures, temperatures, and annulus pressure) to determine potential causes and the extent of any failure. 6. Identify and, if necessary, implement appropriate remedial actions in consultation with the UIC Program Director.

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

10.4.5 Induced Seismic Event

The Marquis BioCarbon Project is in a seismically stable region. To monitor the AoR for any potential seismic activity, a network of surface seismological stations will be deployed to continuously record background seismic activity. The number of required stations will be determined based on a site-specific modeling exercise incorporating the AoR and the seismic event magnitudes to be monitored. Baseline microseismic data will be acquired for six months prior to the start of injection operations. Triggered seismic event data will be processed to provide seismic moment magnitude and precise location and depth information on a real-time basis and reported daily should any occur.

Based on the periodic analysis of the monitoring data, observed level of seismic activity, and local reporting of felt events, the site will be assigned an operating state based on the protocol described in Table 10-6. 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.

Operating State	Threshold Condition	Response Action
Green	Seismic events less than or equal to M1.5	1. Continue normal operation within permitted levels.
Yellow	Five (5) or more seismic events within a 30-day period having a magnitude greater than M1.5 but less than or equal to M2.0	1. Continue normal operation within permitted levels. 2. Within 24 hours of the fifth event, notify the UIC Director of the operating status of the well.
Orange	Seismic event greater than M1.5 and local observation or felt report Seismic event greater than M2.0 and no felt report	4. Continue normal operation within permitted levels. 5. Within 24 hours of the incident, notify the UIC Director, of the operating status of the well. 6. Review seismic and operational data. 7. Report findings to the UIC Director and issue corrective actions.
Magenta	Seismic event greater than M2.0 and local observation or report	1. Initiate rate reduction plan (section 1 above). 2. Within 24 hours of the incident, notify the UIC Director, of the operating status of the well. 3. Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary. 4. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected: a. Notify the UIC Director within 24 hours of the determination. 7. Review seismic and operational data. 8. Report findings to the UIC Director and issue corrective actions.
Red	Seismic event greater than M2.0, and local observation or report, and local report and confirmation of damage Seismic event >M3.5	1. Initiate shutdown plan. 2. Within 24 hours of the incident, notify the UIC Director of the operating status of the well. 3. Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary. 4. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected, notify the UIC Director within 24 hours of the determination. 7. Review seismic and operational data. 8. Report findings to the UIC Director and issue corrective actions.

Table 10-6: Induced seismicity protocol for seismic events located with an epicenter within the AoR.

10.5 Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP.

A site-specific emergency contact list is provided in Table 10-7 and will be maintained during the life of the project. Marquis Carbon Injection, LLC will provide the current site-specific emergency contact list to the UIC Program Director.

Position	Name	Phone Number
Project Officer	Jason Marquis	Sensitive, Confidential, or Privileged Information
Project Manager	Lester Smith	
CCS Operations Manager	Jared Walker	
Plant Safety Manager	Jeff Sonnenberg	
Safety Coordinator	Tyler Smith	
Safety Coordinator	Bob Boehm	
Environmental Director	Beth Steinhour	
Environmental Manager	Bridget Conlon	
Plant Technology Director	Trevor Davis	
Marquis Energy Control Room		
Marquis Marine Terminal		

Table 10-7: Site-specific emergency contact list.

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
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

Marquis Carbon Injection, LLC will communicate to the public about any event that requires an emergency response to ensure that the public understands what happened and whether there are any environmental or safety implications, in consultation with the UIC Program Director. The amount of information, timing, and communications method(s) will be appropriate to the event, its severity, whether any impacts to drinking water or other environmental resources occurred, any impacts to the surrounding community, and their awareness of the event.

Marquis Carbon Injection, LLC will describe what happened, any impacts to the environment or other local resources, how the event was investigated, what responses were taken, and the status of the response. For responses that occur over the long-term (e.g., ongoing cleanups), Marquis Carbon Injection, LLC will provide periodic updates on the progress of the response action(s).

Marquis Carbon Injection, LLC will also communicate with entities who may need to be informed about or act in response to the event, including local water systems, CO_2 source(s) and pipeline operators, landowners, and Regional Response Teams (as part of the National Response Team).

Emergency situations related to the injection project and described in this EERP will be managed by Marquis Carbon Injection's communication team. All media communications with the public through either interviews, press releases, website postings, or other.

The individual to be designated by Marquis Carbon Injection will be the first contact during an emergency event.

This individual will contact the crisis communication team as appropriate. Emergency responses to the media from Marquis Carbon Injection will be dealt with by personnel designated by Marquis Carbon Injection.

Individuals assigned the emergency response communications duties should have availability 24-hours a day in the event of an emergency.

10.7 Plan Review

This ERRP shall be reviewed:

- At least once every five-years following its approval by the permitting agency.
- Within one-year of an AoR re-evaluation.
- Within six-months following any significant changes to the injection process or the injection facility, or an emergency event; or
- As required by the permitting agency.

If the review indicates that no amendments to the ERRP are necessary, Marquis Carbon Injection, LLC will provide the permitting agency with the documentation supporting the "no amendment necessary" determination.

If the review indicates that amendments to the ERRP are necessary, amendments shall be made and submitted to the permitting agency within six-months following an event that initiates the ERRP review procedure.

10.8 Staff Training and Exercise Procedures

Marquis Carbon Injection, LLC 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, safety and environmental personnel, plant technology manager 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.

Appendix 10.A – FEP Risk Assessment

Feature, Event, or Process	Avg Severity	Avg Likelihood	Multiplier (sev*like)	Scenarios	RRA	Resulting Severity	Resulting Likelihood	Multiplier
Schedule and Planning (Financial)	-2.5	3.6	9.1	Increasing oilfield activity; long lead times for materials or services	Plan ahead as much as possible; drilling or well ops in off-peak times (spring, fall)	-1.5	3.2	4.8
Procurement Delays – Well ubulars Well Hardware	-2.9	3 0	8.6	Delays in obtaining specialized equipment/materials	Plan ahead as much as possible; reduce equipment exposure to injectate; develop relationships with vendors now	-2	2	4
Accidents and Unplanned Events Project	-4	2	8.0	Large presure swings from errant compressor sensors				0
Hydrogeology	-4	2	8.0	CO2 leaking into groundwater				0
CO2 njectate Water Vapor	-4	2	8.0	Scrubber upset causes water to carry over				0
nterruptions o CO2 Source Plant	-4	2	8.0	Ethanol plant production slows				0
Legal/Regulatory Permits Construction Discharge and Other Operations	-3.5	3.0	10.5	Permit timelines change				0
Legal/Regulatory Permits Drilling njection/Storage	-3.5	2.5	8.8	Not many sites permitted in IL before				0