Emergency and Remedial Response Plan 40 CFR 146.94(a)

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SCS ENGINEERS

Capio Sherburne CCS Well No. 1 | January, 2023

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Facility Information

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Well Name: Capio Sherburne CCS Well No. 1

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Well location: Sherburne Wildlife Management Area (WMA)
Pointe Coupee Parish, Louisiana
30.521385, -91.718429

This Emergency and Remedial Response Plan (ERRP) outlines potential risks and events that could endanger human health, the environment, or the safe functioning of infrastructure at the site. This plan applies to the project's construction, operation, and post-injection phases. The following sections describe a list of potential technical project risks in accordance with the technical risk categories of the Screening-Level Risk Assessment (SLRA) and response to mitigate the risk.

Potential Risk Scenarios

The following events related to the injection well that constitute an emergency and trigger the use of the ERRP are listed below:

- Injection or monitoring (verification) well integrity failure;
- Vertical migration of CO_2 or formation fluid to a USDW causing changes to water quality;
- Lateral migration of CO_2 or formation fluid beyond the expected plume acreage
- CO_2 leakage to the land surface;
- Injection well-monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.);
- A natural disaster (e.g., earthquake, tornado, lightning strike);
- An induced seismic event.

Risk Determination

Based on a review of these potential risk scenarios, a list of risk detection and early indicators that could require an emergency response are in **Table 11-1** below.

Table 11-1. Potential Risk Scenarios and Their Detection

Potential Risk Scenarios	Early Indicators and Risk Detection
Injection or monitoring (verification) well integrity failure	Wellhead pressure exceeds the shutdown pressure specified in the permit. A review of annular pressure indicates a loss of well containment. Internal and external mechanical integrity tests results identify a loss of mechanical integrity.
Vertical or lateral migration of CO2 or formation fluid to a USDW causing changes to water quality or land surface	Monitoring of soil gas, groundwater, and surface water demonstrates elevated indicator parameter(s) concentrations). Seismic surveys identify unexpected CO2 migration.
Injection well-monitoring equipment failure (e.g., shut-off valve, pressure gauge, etc.)	Continuous monitoring reveals the failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure.
A natural disaster (e.g., earthquake, tornado, hurricane, lightning strike)	Well problems (integrity loss, leakage, or malfunction) are observed as a result of a natural disaster such as an earthquake, tornado, hurricane, or lightning strike.
Induced seismic event	Seismic monitoring demonstrates events exceeding predetermined parameters, the epicenter of the seismic event is within an established distance from the injection well, and depth to the epicenter is consistent with injection interval(s).

Emergency response to these events will depend on the severity of the event(s). These emergency events are categorized as shown in **Table 11-2**.

Table 11-2. Degrees of Risk for Emergency Events

Emergency Condition	Definition
Major emergency	The event poses a substantial immediate risk to human health, the environment, or infrastructure. Local authorities are engaged.
Serious emergency	The event poses a potentially severe (or significant) near-term risk to human health, the environment, or infrastructure if conditions worsen or no response actions are taken.
Minor emergency	The event poses no immediate risk to human health, the environment, or infrastructure.

Emergency Response Action Based on Risk Level

For all emergency scenarios, the following steps are implemented:

- Notify the regulatory UIC Program Director within 24 hours of the emergency event.
- Determine the event's severity, based on available information, within 24 hours of notification.

For a minor emergency:

- Conduct an assessment to determine whether mechanical integrity is lost.
- If mechanical integrity is lost, initiate a gradual shutdown plan.
- Confirm well integrity before restarting the injection.

For a major or serious emergency (i.e., release of CO_2 or formation fluid):

- Initiate immediate shutdown.
- Evaluate the cause of the emergency, characterize the release, and mitigate if necessary. This may include:
  - Venting CO_2 from surface facilities.
  - Limiting access to the wellhead.
- If warranted, initiate the evacuation of the facility and communicate with local emergency authorities to initiate evacuation plans of nearby residents.
- If contamination is detected, identify and implement appropriate remedial actions specified for each scenario discussed in **Table 11-3** below.

Where the phrase "initiate shutdown plan" is used, Capio Sherburne Sequestration, LLC (Capio) will immediately cease injection. However, in some circumstances, Capio will, in consultation with the UIC Program Director, determine whether gradual cessation of injection (using the parameters outlined in Attachment A of the Class VI permit) is appropriate.

Response Action for Emergency Scenarios

The emergency response for each scenario is in Table 11-3 below.

Table 11-3. Emergency Response

Emergency Scenario	Risk Level	Emergency Response
Injection or monitoring (verification) well integrity failure	Minor	• Verify integrity by evaluating the well pressure, temperature, and annulus pressure. • Determine the cause and extent of failure. • Identify and implement appropriate remedial actions to repair damage to the well (in consultation with the UIC Program Director).
	Serious	• If subsurface impacts are detected, implement appropriate site investigation activities to determine the nature and extent of these impacts. • If warranted based on the site investigations, implement appropriate remedial actions (in consultation with the UIC Program Director).

Vertical or lateral migration of CO2 or formation fluid to a USDW causing changes to water quality or land surface	Serious	• Initiate shutdown plan
		• Conduct Hall Plot analysis.
		• Sample and test water quality in monitoring wells above confining zone.
		• Conduct pressure fall-off test.
		• Validate plume detection with sampling. All testing parameters and monitoring methodologies are included in the Testing and Monitoring Plan of this permit.
		• Consider obtaining thermal UAV imagery, as necessary.
		• Arrange for an alternate potable water supply if the event caused an exceedance of drinking water standards to any water supplies.
		• If water-quality changes or CO_2 migration due to:
		  ○ Well failure - attempt to identify the source location in the wellbore and remediate using appropriate methods
		  ○ Confining zone failure or flow along structural features - develop a plan to identify the extent of the problem and perform remedial measures.
		• If CO_2 is detected in a reservoir other than the injection zone, lower the injection rate in the injection zone and monitor for decreasing CO_2 in the "other" reservoir.
		• Perform an appropriate survey to identify the extent of plume migration.
		• If CO_2 leakage is identified through undocumented, abandoned or substandard wells in the surrounding area post injection
		  ○ Develop a well-specific plan to mitigate the leak at the well
		  ○ Consider alternate strategies, such as remediation.

Injection well monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.)	Minor	• If there is damage to the wellhead, repair the damage then conduct a survey to ensure wellhead leakage has ceased. • If a shut off is triggered by mechanical or electrical malfunctions, repair faulty components. • Monitor well pressure, temperature, and annulus pressure (manually if necessary) to determine the cause and extent of failure.
	Major	• In the event of an equipment failure, isolate the monitoring equipment from the tubing/annulus and repair the faulty components.

Emergency Scenario	Risk Level	Emergency Response
		• Isolate the nearby area, if needed; establish a safe distance and perimeter using a hand-held air-quality monitor.
A natural disaster (e.g., earthquake, tornado, hurricane, lightning strike)	Minor	• Conduct an assessment to determine whether there has been a loss of mechanical integrity. • Preemptively initiate shutdown plan in the event of an emergency.
	Serious/ Major	• Initiate Shutdown. • Vent CO_2 from surface facilities. • Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure. • Determine whether any leaks to USDW or surface water have occurred. • Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

Induced seismic event	Major/ Serious	• Review seismic and operational data - 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 Program Director).
		• Determine whether leaks to groundwater or surface water occurred. If a leak is detected:
		  ○ Identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
		  ○ Based on the project operating conditions, it is unlikely that injection operations could ever induce a seismic event outside a one-mile radius from the wellhead. Therefore, this portion of the response plan is developed for any seismic event with an epicenter within a one-mile radius of the injection well.
		  ○ Based on the systematic analysis of the monitoring data, observed level of seismic activity, and local reporting of felt events, the site will be assigned an operating state.
		  ○ The seismic monitoring system structure is presented in **Table 5-4**. The table corresponds to each level of operating state with the threshold conditions and operational response actions.

Table 11-4. Seismic monitoring system, for seismic events > M1.0 with an epicenter within a two-mile radius of the injection well.

Operating State	Threshold Condition[1,2]	Response Action[3]
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 and no felt report	1. Continue normal operation within permitted levels. 2. Within 24 hours of the incident, notify the UIC Program Director of the operating status of the well.
Orange	Seismic event greater than M1.5 and local observation or felt report	1. Continue normal operation within permitted levels. 2. Within 24 hours of the incident, notify the UIC Program Director, of the operating status of the well. 3. Review seismic and operational data. 4. Report findings to the UIC Program Director and issue corrective actions.
	Seismic event greater than M2.0 and no felt report	

[1] Specified magnitudes refer to magnitudes determined by local Louisiana Department of Natural Resources or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.

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

[3] Reporting findings to the UIC Program Director and issuing corrective action will occur within 25 business days (five weeks) of change in operating state.

[4] Onset of damage is defined as cosmetic damage to structures, such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets.

Operating State	Threshold Condition[1,2]	Response Action[3]
Magenta	Seismic event greater than M2.0 and local observation or report	1. Initiate rate reduction plan. 2. Within 24 hours of the incident, notify the UIC Program 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 Program Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected: a. Notify the UIC Program Director within 24 hours of the determination. 7. Review seismic and operational data.
Red	Seismic event greater than M2.0, and local observation or report, and local report and confirmation of damage[4] Seismic event >M3.5	1. Initiate shutdown plan. 2. Within 24 hours of the incident, notify the UIC Program 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 Program Director). 5. Determine if leaks to ground water or surface water occurred. 6. If USDW contamination is detected: a. Notify the UIC Program Director within 24 hours of the determination. 7. Review seismic and operational data. 8. Report findings to the UIC Program Director and implement appropriate corrective actions.

[1] Specified magnitudes refer to magnitudes determined by local Louisiana Department of Natural Resources or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network.

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

[3] Reporting findings to the UIC Program Director and issuing corrective action will occur within 25 business days (five weeks) of change in operating state.

[4] Onset of damage is defined as cosmetic damage to structures, such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets.

Local Resources and Infrastructure

Resources in the vicinity of the injection well that may be affected as a result of an emergency event at the project site include the following public recreational surface waters:

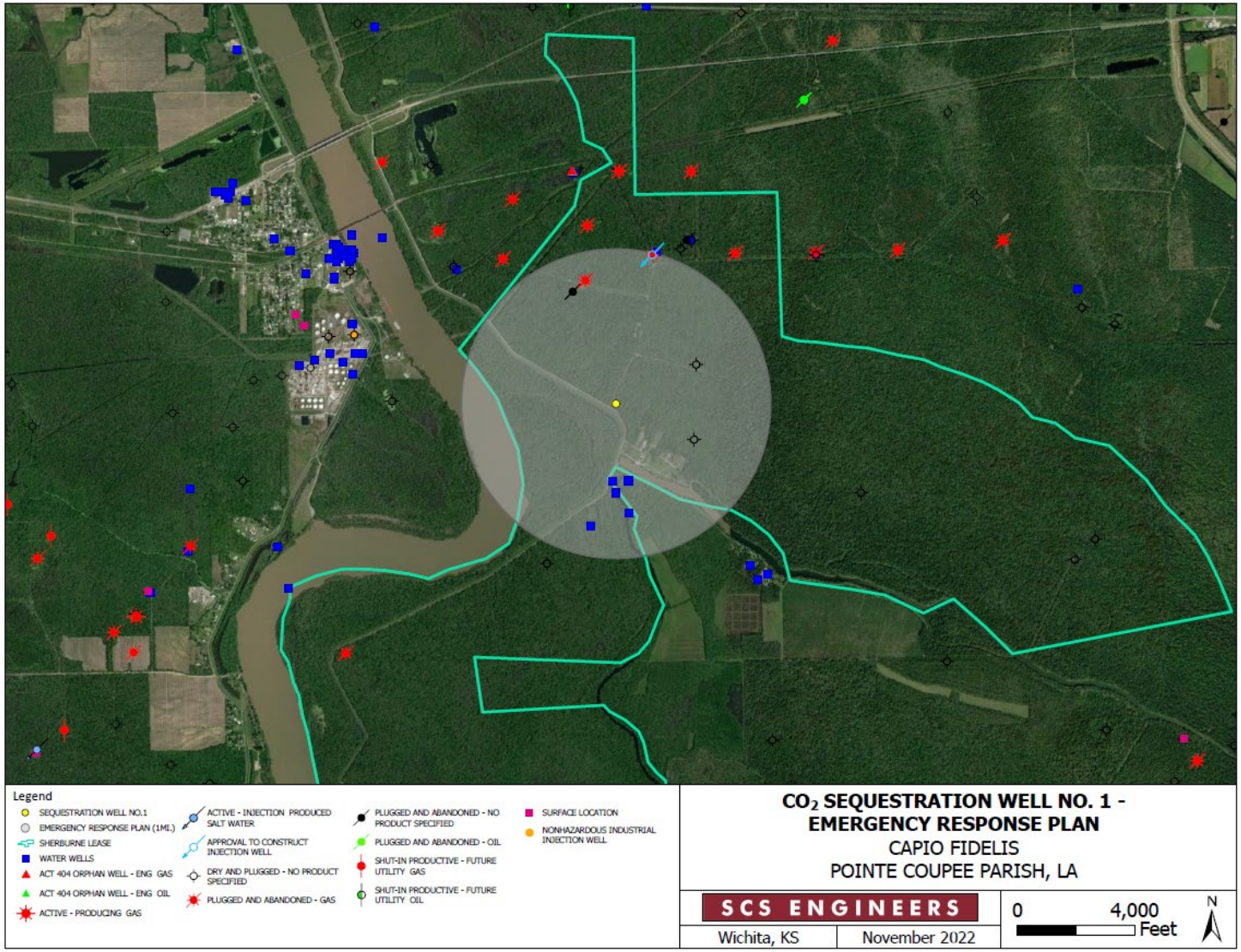
- Achafalaya River - 0.58 miles from the well
- Little Alabama Bayou Black Water Stream - 0.38 miles from the well
- Sherburne Wildlife Management Area - 0.81 miles from the well

Infrastructure in the vicinity of the injection well that that may be affected as a result of an emergency at the project site include:

- Krotz Springs a town on the Atchafalaya River - 2.68 miles from the well
- Krotz Springs Refinery - 1.96 miles from the well
- Sherburne Shooting Range - 0.40 miles from the well
- Sherburne Life Campground - 1.38 miles from the well
- Colonial Pipeline Co - 1.76 miles from the well
- Water Works District - 2.14 miles from the well
- Lantoya Electrical Substation - 3 miles from the well
- US Highway 190 - 2.65 miles from the well
- US Highway 975 - 0.06 miles from the well

Resources and infrastructure addressed in this plan are shown in **Figure 11-1**.

Figure 11-1. Map of the site resources and infrastructure.



Response Personnel and Equipment

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

Site personnel to be notified (not listed in order of notification):

1. Project Engineer(s): TBD
2. Plant Safety Manager(s): TBD
3. Environmental Manager(s): TBD
4. Plant Manager: TBD
5. Plant Superintendent: TBD

A site-specific emergency contact list will be developed and maintained during the life of the project. Capio will provide the current site-specific emergency contact list to the UIC Program Director.

Table 11-5. Contact information for key local, state, and other authorities.

Agency	Phone Number
Local police (Krotz Springs)	911
State police	(877) 925-6595
Pointe Coupee emergency preparedness (OHSEP)	(225) 638-9556
State emergency management agency	(225) 925-7500
UIC Injection Well Incident Reporting (24 hours)	(225) 342-5515
Pipeline Incidents (24 hours)	(225) 342-5505
EPA National Response Center (24 hours)	(800) 424-8802
Louisiana Geological Survey	(225) 578-3662

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. Capio will procure specialized equipment (such as a drilling rig or logging equipment) as required for emergency operations.

In the event of an immediate emergency situation, the following entities will be contacted.

St. Landry Fire Protection District/Fire Station	(337) 566-3900
Point Coupee Fire District 4 Station 47	(225) 637-3832
Lottie Fire Department	(225) 637-3789
Med Express Ambulance Service	(337) 623-5734
Acadian Ambulance Service	(337) 291-3333

Med Express Ambulance	(337) 585-5710
EMS-Emergency Medical Services	(225) 389-5155
Disaster Resource Group	(225) 478-3831
Clean Harbors Environmental	(225) 778-3616

Contractors to Notify for Services

Justiss Oil Company (well services) (318) 229-9017 or (318) 992-4111
Jena, Louisiana

Acadiana Shelle & Limestone, Inc. (site work) (337) 566-2101
Krotz Springs, Louisiana

Emergency Communications Plan

Capio will communicate to the public about events that require an emergency response to ensure that the public understands what happened and whether or not there are any environmental or safety implications. The amount of information, timing, and communication method(s) will be appropriate to the event, its severity, whether any impacts to drinking water or other environmental resources occurred, any effects on the surrounding community, and their awareness of the event.

Capio 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), Capio will provide periodic updates on the progress of the response action(s).

Capio will also communicate with entities who may need to be informed about or take action in response to the event, including local water systems, CO_2 source(s) and pipeline operators, land owners, and Regional Response Teams (as part of the National Response Team).

Plan Review

This ERRP shall be reviewed:

- At least once every five (5) years following its approval by the UIC Program Director;
- Within one (1) year of an area of review (AOR) reevaluation;
- Within 60 days following any significant changes to the injection process or the injection facility, or an emergency event; or
- As required by the UIC Program Director.

If the review indicates that no amendments to the ERRP are necessary, Capio will provide the UIC Program Director 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 UIC Program Director within 60 days following an event that initiates the ERRP review procedure.