

EMERGENCY AND REMEDIAL RESPONSE PLAN

40 CFR 146.94(a)

SUTTER DECARBONIZATION PROJECT

1.0 Facility Information

Facility name: Sutter Energy Center
[REDACTED]

Facility contact: [REDACTED]

Well location: [REDACTED]

This plan is provided to meet the requirements of 40 CFR 146.94. The Emergency and Remedial Response Plan (ERRP) describes actions the owner/operator [REDACTED] will take in the unlikely event of an emergency within the project Area of Review (AoR) during construction, operation, or post-injection site care. Unexpected events may include unplanned CO₂ release or detection of unexpected CO₂ movement or associated fluids in or from the injection zone. This plan demonstrates how [REDACTED] will comply with 40 CFR 146.94. The AoR is shown in Figure 1. [REDACTED]

This Emergency and Remedial Response Plan (ERRP) describes actions that [REDACTED] shall 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 [REDACTED] obtains evidence that the injected CO₂ stream and/or associated pressure front may cause an endangerment to a USDW, [REDACTED] must perform the following actions:

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

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

[REDACTED] will immediately cease injection. However, in some circumstances, [REDACTED] will, in consultation with the UIC Program Director, determine whether gradual cessation of injection (using the parameters set forth in the Summary of Requirements of the Class VI permit) is appropriate.

2.0 Local Resources and Infrastructure

Resources in the vicinity of the [REDACTED]

Resources and infrastructure addressed in this plan are shown in Figure 1 and Figure 2.

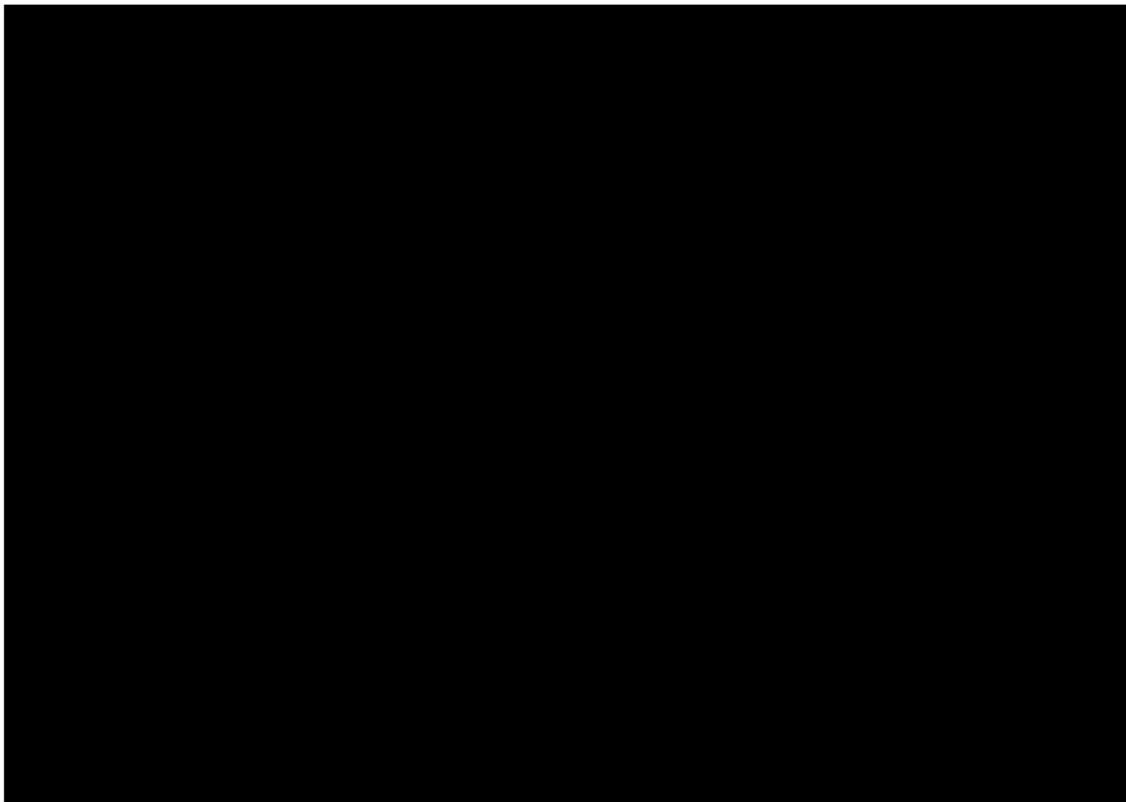


Figure 1. Map of the site resources and infrastructure.

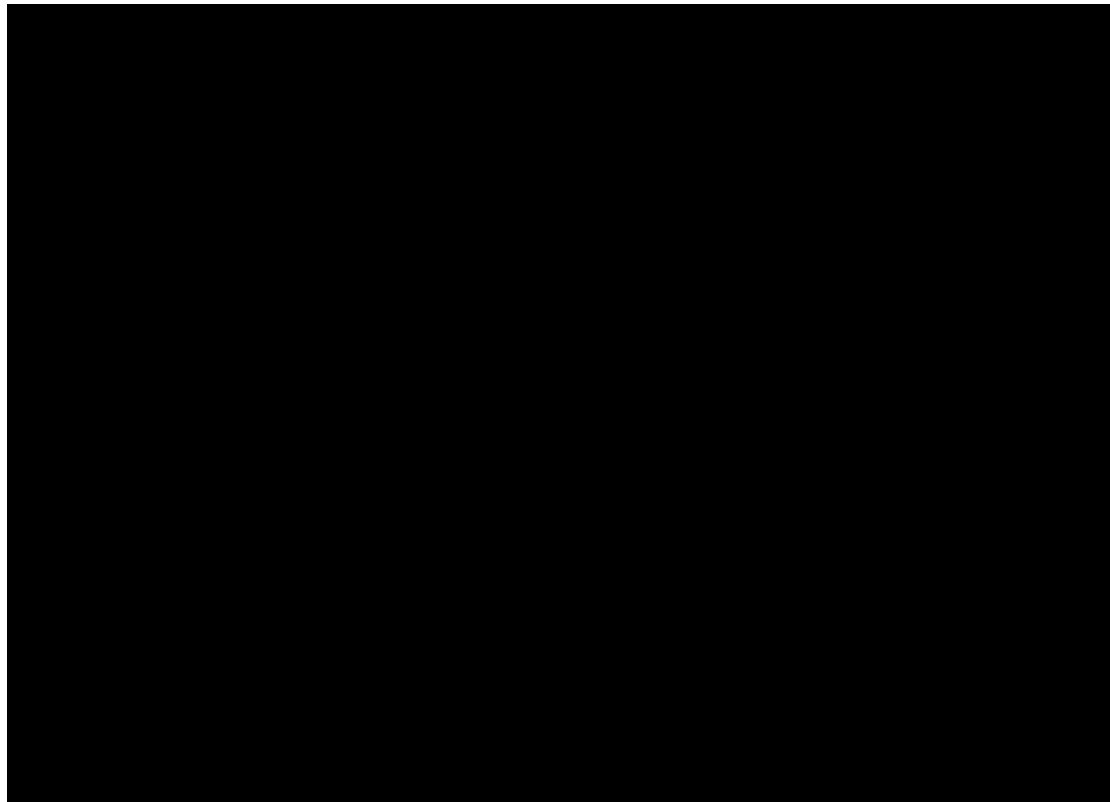


Figure 2. Wildlife areas near AOI

3.0 Potential Risk Scenarios

The following events related to the Sutter Energy Center that could potentially result in an emergency response:

- Injection or monitoring (verification) well integrity failure;
- Injection well monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.);
- Fluid (e.g. brine) or CO₂ leakage to a USDW or land surface;
- A natural disaster (e.g., earthquake, tornado, lightning strike); or wildfire
- Induced or natural seismic event.

Response actions will depend on the severity of the event(s) triggering an emergency response. “Emergency events” are categorized as shown in Table 1.

Table 1. Degrees of risk for emergency events.

4.0 Emergency Identification and Response Actions

Steps to identify and characterize the event will be dependent on the specific issue identified, and the severity of the event. The potential risk scenarios identified in Part 2 are detailed below. The order of notification for an event is shown in Table 2.

Table 2 Emergency contacts

4.1 Well integrity failure

Integrity loss of the injection well and/or verification well may endanger USDWs. Note that a pressure or temperature anomaly that may occur does not indicate, in every instance, a loss of well integrity. A potential integrity loss or permit non-compliance may have occurred if the following events occur:

- Automatic shutdown devices are activated:
 - Wellhead 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.

Pursuant to 40 CFR 146.91(c)(3), [REDACTED] must notify the UIC Program Director within 24 hours of any triggering of a shut-off system (i.e., down-hole or at the service).

Potential response actions:

- Immediately notify [REDACTED] plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the severity of the event, based on the information available, within 24 hours of notification.
- For a Major or Serious emergency:
 - Initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities located at the [REDACTED] site.
 - Limit access to wellhead to authorized personnel only.
 - Communicate with [REDACTED] personnel and local authorities to initiate evacuation plans, as necessary.
 - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and perform diagnostics to 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).
- If contamination is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
- For a Minor emergency:
 - Conduct assessment to determine whether there has been a loss of mechanical integrity.
 - If there has been a loss of mechanical integrity, initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities.
 - Reset automatic shutdown devices.
 - Monitor well pressure, temperature, and annulus pressure and perform diagnostics to verify integrity loss and determine the cause and extent of failure; identify and, if necessary, implement remedial actions to restore well integrity (in consultation with the UIC Program Director).
 - If there has been NO loss of integrity or permit non-compliance
 - Continue injection operations.
 - Determine cause of anomalous instrument reading.

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 injection well that could endanger USDWs.

Potential Response actions:

- Immediately notify the [REDACTED] plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the severity of the event, based on the information available, within 24 hours of notification.
- Project management will make the initial assessment of the event and determine other personnel to notify.
- For a Major or Serious emergency:
 - Initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities located at the [REDACTED] site.
 - Limit access to wellhead to authorized personnel only.
 - Communicate with [REDACTED] personnel and local authorities to initiate evacuation plans, as necessary.
 - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and perform diagnostics to 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).
 - Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

- For a Minor emergency:
 - Conduct assessment to determine whether there has been a loss of mechanical integrity.
 - If there has been a loss of mechanical integrity, initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities located at The [REDACTED] site.
 - Limit access to wellhead to authorized personnel only.
 - Communicate with [REDACTED] personnel and local authorities to initiate evacuation plans, as necessary.
 - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and perform diagnostics to 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).
 - Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

4.3 Potential brine or CO₂ leakage to USDW

Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence of fluid (brine) or CO₂ leakage into a USDW.

Potential Response actions:

- Immediately notify the [REDACTED] plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the severity of the event, based on the information available, within 24 hours of notification.
- Project management will make the initial assessment of the event and determine other personnel to notify.
- For all emergencies (Major, Serious, or Minor):
 - Initiate shutdown plan.
 - Shut in well (close flow valve)
 - Vent CO₂ from surface facilities, if applicable.
 - Collect a confirmation sample(s) of groundwater and analyze for indicator parameters.
 - If the presence of indicator parameters are confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:
 - Install additional groundwater monitoring points near the affected groundwater well(s) to delineate the extent of impact; and
 - Remediate unacceptable impacts to the affected USDW.
 - Arrange for an alternate potable water supply, if the USDW was being utilized and has been caused to exceed drinking water standards.

- Proceed with efforts to remediate USDW to mitigate any unsafe conditions (e.g., install system to intercept/extract brine or CO₂ or “pump and treat” to aerate CO₂-laden water).
- Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by [REDACTED] and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.

4.4 Natural disaster

Well problems (integrity loss, leakage, or malfunction) may arise as a result of a natural disaster affecting the normal operation of the injection well. An earthquake may disturb surface and/or subsurface facilities; and weather-related disasters (e.g., tornado or lightning strike) may affect surface facilities.

If a natural disaster occurs that affects normal operation of the injection well, perform the following:

- Immediately notify the [REDACTED] plant superintendent or designee.
- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- The plant superintendent or designee will make an initial assessment of the situation and determine which other personnel to notify.
- Project contacts will determine the severity of the event, based on the information available, within 24 hours of notification.
- For a Major or Serious emergency:
 - Initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities located at The [REDACTED] site.
 - Limit access to wellhead to authorized personnel only.
 - Communicate with [REDACTED] personnel and local authorities to initiate evacuation plans, as necessary.
 - Monitor well pressure, temperature, and annulus pressure to verify integrity loss and perform diagnostics to determine the cause and extent of failure; identify and implement appropriate remedial actions to repair damage to the well.
 - Determine if any leaks to ground water or surface water occurred.
 - If contamination or endangerment is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
- For a Minor emergency:
 - Conduct assessment to determine whether there has been a loss of mechanical integrity.
 - If there has been a loss of mechanical integrity, initiate shutdown plan.
 - Shut in well (close flow valve).
 - Vent CO₂ from surface facilities located at The [REDACTED] site.
 - Limit access to wellhead to authorized personnel only.
 - Communicate with [REDACTED] personnel and local authorities to initiate evacuation plans, as necessary.

- Monitor well pressure, temperature, and annulus pressure to verify integrity loss and perform diagnostics to 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).
- If there has been NO loss of mechanical integrity, reset the automatic shutdown devices.

4.5 Induced or natural seismic event

Induced seismicity refers to a minor seismic event caused by human activity which alters the stresses and fluid pressures in the subsurface. Induced seismicity can happen from injection of fluids into subsurface formations that lubricate or change the stress state of existing faults which causes them to move along the fault planes and release energy. Most induced seismic events are small (microseismic) but there have been some big enough to be felt by humans.

Regional seismicity is discussed in the Seismic History [40 CFR 146.82(a)(3)(v)] portion of the permit. Seismicity increases in density and frequency towards the basin margins in the Sacramento Valley. None of the magnitude 4.0 or greater earthquakes have occurred within the Sacramento Basin meaning injection will occur in the relatively seismically stable area.

Based on the project operating conditions, it is highly unlikely that injection operations would ever experience a seismic event outside an [REDACTED] mile radius from the wellhead. Therefore this portion of the response plan is developed for any seismic event with an epicenter within an [REDACTED] mile radius of the injection well.

To monitor the area for seismicity, [REDACTED] will rely on the established USGS seismic monitoring network. The USGS has real time monitoring stations of seismic activity across the US. [REDACTED]

[REDACTED] In addition to the

USGS monitoring, passive monitoring in the form of a local seismic array will be put in place by the operator. The seismic monitoring array will be used to map the lateral and vertical extent of the plume front and its evolution in time.

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. 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.



Figure 3. USGS seismic monitoring stations

Potential Response actions:

The seismic monitoring system structure is presented in Table 2. The table provides guidance on each level of operating state with the threshold conditions and operational response actions.

Table 3. Seismic monitoring system, for seismic events > M1.0 with an epicenter within an 10 mile radius of the injection well.

¹ 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.

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.

4.6 Response personnel and equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP. The injection wells are located in [REDACTED] outside of any city limits. County emergency responders as well as state agencies will be notified in the event of an emergency.

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

1. Project Engineer(s)
2. Plant Safety Manager(s)
3. Environmental Manager(s)
4. Plant Manager
5. Project Operations Manager
6. Carbon Capture Plant Manager
7. Carbon Capture Plant Operations Supervisor

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

Table 4. Contact information for key local, state, and other authorities.

Authority	Contact Information
Site Personnel	[REDACTED]
Project Personnel	[REDACTED]
Local Authorities	[REDACTED]
County Emergency Responders	[REDACTED]
State Agencies	[REDACTED]
UIC Program Director	[REDACTED]

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, an appropriate 3rd party project contractor shall be responsible for its procurement.

4.7 Emergency communications plan

██████████ will communicate to the public about any event that requires 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 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.

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

██████████ will also communicate with entities who may need to be informed about or take action in response to the event, including local water systems, CO₂ source(s) and pipeline operators, land owners, and Regional Response Teams (as part of the National Response Team).

4.8 Plan review

This ERRP shall be reviewed:

- Not to Exceed five (5) years following its approval by the permitting agency;
- Not to exceed one (1) year of an area of review (AOR) reevaluation;
- Not to exceed six (6) 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, ██████████ 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 not to exceed six (6) months following an event that initiates the ERRP review procedure.

4.9 Staff training and exercise procedures

██████████ will integrate the ERRP into the plant standard operating procedures. Periodic training will be provided not to exceed 15 months and include well operators, plant safety and environmental personnel, the plant manager, plant superintendent, and corporate communications. The training plan will document personnel that have been trained and possess the required skills to perform their relevant emergency response activities described in the ERRP.