EMERGENCY AND REMEDIAL RESPONSE PLAN
40 CFR 146.94(a)

PROJECT MINERVA

1.0 Facility Information

Facility name: Project Minerva
Wells 1-4

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[The information is Confidential Business Information per 5 U.S.C. § 552 (b)(4) and (b)(9).]

2.0 Introduction

This Emergency and Remedial Response Plan ("ERRP") describes actions that Gulf Coast Sequestration ("GCS") shall take to address movement of the injection fluid/gas or formation fluid in a manner that may endanger the underground source of drinking water ("USDW") during the construction, operation, or post-injection site care periods.

If GCS obtains evidence that the injected CO_2 stream and/or associated pressure front may cause an endangerment to a USDW, GCS must perform the following actions:

1. Initiate shutdown plan for the injection well
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 ERRP

Where the phrase "initiate shutdown plan" is used, the following protocol will be employed: GCS will immediately cease injection. However, in some circumstances, GCS will, in consultation with the UIC Program Director, determine whether gradual cessation of injection is appropriate (using the parameters set forth in APPDX A).

3.0 Local Resources and Infrastructure

Resources in the vicinity of Project Minerva that may be affected as a result of an emergency event at the project site include:

- Local USDW

Infrastructure in the vicinity of Project Minerva that may be affected as a result of an emergency at the project site includes:

- Pipelines

Resources and infrastructure addressed in this plan are shown in Figure 3.0-1.

[The information is Confidential Business Information per 5 U.S.C. § 552 (b)(9).]

4.0 Potential Risk Scenarios

The following events related to Project Minerva that could potentially result in an emergency response:

- Injection or monitoring well integrity failure
- Injection well monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.)
- Fluid (e.g., brine) leakage to a USDW
- CO_2 leakage to USDW or land surface
- A natural disaster (e.g., earthquake, tornado, hurricane, lightning strike)
- Significant induced seismic event, of level Orange or Magenta in Table 4.0-1

Response actions will depend on the severity of the event(s) triggering an emergency response. "Emergency events" are categorized as shown in Table 4.0-2.

4.1 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 Section 4.0 are detailed below.

4.1.1 Injection or Monitoring Well Integrity Failure

Integrity loss of an injection or monitoring well may endanger USDWs. Integrity loss may have occurred if the following events occur:

- Automatic shutdown devices are activated:
    - Wellhead pressure exceeds the specified shutdown pressure specified in the permit

  - Annulus pressure indicates a loss of external or internal well containment
  - Pursuant to 40 CFR 146.91(c)(3), GCS must notify the UIC Program Director within 24 hours of any triggering of a shut-off system (i.e., down-hole or at the surface)
- Mechanical integrity test results identify a loss of mechanical integrity

Severity: To be determined at upon occurrence

Timing of event: Pre-injection (after well has been drilled and suspended), or during injection

Avoidance measures: To be determined. Updates will be provided once development finalized

Detection methods: Please see "Testing and Monitoring Plan 40 CFR 146.90" document for full details on detection methods

Potential response actions:

- 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 response plan
  - 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 response plan

Response personnel: Operator staff and any necessary contractor staff. Exact personnel to be determined. Updates will be provided once development finalized

Equipment: To be determined. Updates will be provided once development finalized

4.1.2 Injection Well Monitoring Equipment Failure

The failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure may indicate an inability to monitor the well which could lead to a loss of mechanical integrity being detected.

Severity: To be determined at upon occurrence

Timing of event: Pre-injection (after well has been drilled and suspended), or during injection

Avoidance measures: To be determined. Updates will be provided once development finalized

Detection methods: Please see "Testing and Monitoring Plan 40 CFR 146.90" document for full details on detection methods

Response actions:

- Restore monitoring capability
- Conduct assessment to determine whether there has been a loss of mechanical integrity
- If there has been a loss of mechanical integrity, initiate response plan

Response personnel: Operator staff and any necessary contractor staff. Exact personnel to be determined. Updates will be provided once development finalized

Equipment: To be determined. Updates will be provided once development finalized

4.1.3 Brine or CO_2 Leakage to USDW or the Surface

Groundwater sample(s) or other evidence of fluid (brine) or CO_2 leakage into a USDW.

Severity: To be determined at upon occurrence

Timing of event: Pre-injection (after well has been drilled and suspended), or during injection

Avoidance measures: To be determined. Updates will be provided once development finalized

Detection methods: Please see "Testing and Monitoring Plan 40 CFR 146.90" document for full details on detection methods

Response actions:

- 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 all emergencies:
    - Initiate response plan
    - If the presence of indicator parameters is confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan
    - If any water well being utilized as potable water supply and has been caused to exceed drinking water standards, arrange for an alternate potable water supply
    - Proceed with efforts to remediate USDW to mitigate any unsafe conditions
    - Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by GCS and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed

Response personnel: Operator staff and any necessary contractor staff. Exact personnel to be determined. Updates will be provided once development finalized

Equipment: To be determined. Updates will be provided once development finalized

4.1.4 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. Weather-related disasters (e.g., tornado, hurricane or lightning strike) may affect surface facilities.

Severity: To be determined at upon occurrence

Timing of event: All phases of development

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

Response actions:

- 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 emergency:
    - Initiate shutdown plan
    - If contamination or endangerment is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director)
- For a major or 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 response plan

Response personnel: Operator staff and any necessary contractor staff. Exact personnel to be determined. Updates will be provided once development finalized

Equipment: To be determined. Updates will be provided once development finalized

4.1.5 Induced or Natural Seismic Event

Based on the project operating conditions, it is highly unlikely that injection operations would ever induce a seismic event outside the Area of Review ("AoR"). Therefore, this portion of the response plan is developed for any seismic event within the AoR (see Figure 3.0-1).

To monitor the area for seismicity, Distributed Acoustic Sensing ("DAS") will be installed in the monitoring wells. DAS is a technology that enables continuous, real-time measurements along the entire length of a fiber optic cable. Unlike traditional sensors that rely on discrete sensors measuring at pre-determined points, distributed sensing utilizes the optical fiber. The optical fiber is the sensing element. These systems allow acoustic signals to be detected over large distances and in harsh environments.

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.

Severity: To be determined at upon occurrence

Timing of event: Pre-injection (after well has been drilled and suspended), or during injection

Detection methods: DAS installed in monitoring wells

The seismic monitoring system structure is presented in Table 4.0-1. The table corresponds each level of operating state with the threshold conditions and operational response actions.

Response personnel: Operator staff and any necessary contractor staff. Exact personnel to be determined. Updates will be provided once development finalized

Equipment: To be determined. Updates will be provided once development finalized

5.0 Response Personnel and Equipment

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

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

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

A site-specific emergency contact list will be developed and maintained during the life of the project (Table 5.0-1). Project Minerva will provide the current site-specific emergency contact list to the UIC Program Director.

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, GCS shall be responsible for its procurement.

6.0 Emergency Communications Plan

Project Minerva 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. 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.

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

GCS 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).

7.0 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 reevaluation
- Immediately after any significant changes to the injection process or the injection facility, or an emergency event
- As required by the permitting agency

If the review indicates that no amendments to the ERRP are necessary, GCS 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, following an event that initiates the ERRP review procedure.

8.0 Staff Training and Exercise Procedures

Training and exercise procedures (with appropriate manuals) will be compiled once a clear understanding of the facilities and personnel are finalized.