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Underground Injection Control
Carbon Sequestration
Class VI Permit Application

EMERGENCY AND REMEDIAL RESPONSE PLAN
40 CFR 146.94(a)
Section 11.0

NEXGEN CARBON OKLAHOMA, LLC

VANGUARD CCS HUB

JUNE 2025

11.0 EMERGENCY AND REMEDIAL RESPONSE PLAN

VANGUARD CCS HUB

Facility Information

Facility name: Vanguard CCS Hub
Vanguard I-1
Vanguard I-2
Vanguard I-3
Vanguard I-4
Vanguard I-5
Vanguard I-6
Vanguard I-8
Vanguard I-9
Vanguard I-10
Vanguard I-12

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Well locations: Osage County, Oklahoma

Vanguard I-1: Lat 36.633288°N, Long -96.571029°W NAD 83
Vanguard I-2: Lat 36.660083°N, Long -96.534652°W NAD 83
Vanguard I-3: Lat 36.664329°N, Long -96.586951°W NAD 83
Vanguard I-4: Lat 36.710244°N, Long -96.542370°W NAD 83
Vanguard I-5: Lat 36.744047°N, Long -96.533843°W NAD 83
Vanguard I-6: Lat 36.724157°N, Long -96.489526°W NAD 83
Vanguard I-8: Lat 36.823356°N, Long -96.620496°W NAD 83
Vanguard I-9: Lat 36.849167°N, Long -96.592912°W NAD 83
Vanguard I-10: Lat 36.893849°N, Long -96.578026°W NAD 83
Vanguard I-12: Lat 36.785641°N, Long -96.594085°W NAD 83

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ACRONYMS AND ABBREVIATIONS

A	
AoR	Area of Review
B	
BLM	Bureau of Land Management
C	
CFR	Code of Federal Regulations
CO_2	carbon dioxide
D	
DOD	Department of Defense
E	
G	
gpm	Gallons per minute
EHS	environmental health and safety
ERRP	emergency and remedial response plan
H	
I	
ICS	incident command system
L	
LOC	loss of containment
M	
MD	measured depth
mg/L	milligrams per liter
N	
NPS	National Park Service
P	
P&A	plugging and abandonment
PPM	parts per million
Project	Vanguard CCS Hub
S	
SCADA	supervisory control and data acquisition
T	
TDS	total dissolved solids
TVD	true vertical depth
TVDSS	true vertical depth subsea
U	
UIC	underground injection control
USDW	underground source of drinking water
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
V	
VA	Vamoosa-Ada Aquifer

11.0 EMERGENCY AND REMEDIAL RESPONSE PLAN [40 CFR 146.94(A)]

The proposed Class VI injection wells are in Osage County, Oklahoma. Locations of proposed individual wells are listed in **Table 11.1**.

Table 11.1—NexGen Injection Well locations.

Well Name	Use	Latitude*	Latitude*	PLSS
Vanguard I-1	CO_2 Injection	36.633288	-96.571029	20-T25N-R7E
Vanguard I-2	CO2 Injection	36.660083	-96.534652	10-T25N-R7E
Vanguard I-3	CO2 Injection	36.664329	-96.586951	7-T25N-R7E
Vanguard I-4	CO2 Injection	36.710244	-96.542370	22-T26N-R7E
Vanguard I-5	CO2 Injection	36.744047	-96.533843	10-T26N-R7E
Vanguard I-6	CO2 Injection	36.724157	-96.489526	19-T26N-R8E
Vanguard I-8	CO2 Injection	36.823356	-96.620496	14-T27N-R6E
Vanguard I-9	CO2 Injection	36.849167	-96.592912	6-T27N-R7E
Vanguard I-10	CO2 Injection	36.893849	-96.578026	20-T28N-R7E
Vanguard I-12	CO2 Injection	36.785641	-96.594085	30-T27N-R7E

* NAD83

11.1 Introduction

As part of their proposed Vanguard CCS Hub (Vanguard CCS Hub, the "Project"), NexGen Carbon Oklahoma, LLC (NexGen) proposes drilling and completing ten (10) carbon sequestration injection wells (Vanguard I-1, Vanguard I-2, Vanguard I-3, Vanguard I-4, Vanguard I-5, Vanguard I-6, Vanguard I-8, Vanguard I-9, Vanguard I-10, Vanguard I-12) and ten (10) above-zone monitoring wells (Vanguard AZM-1, Vanguard AZM-2, Vanguard AZM-3, Vanguard AZM-4, Vanguard AZM-5, Vanguard AZM-6, Vanguard AZM-8, Vanguard AZM-9, Vanguard AZM-10, Vanguard AZM-12) and seven (7) in-zone monitoring wells (Vanguard IZM-1 through Vanguard IZM-7) for the safe sequestration of carbon dioxide at the Vanguard CCS Hub (Vanguard CCS Hub) in Osage County, OK.

This Emergency and Remedial Response Plan (ERRP) meets the requirements of 40 CFR §146.94(A). It describes actions that NexGen will take to address the 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/monitoring periods.

Additionally, a list of potential emergency events has been generated and provided in **Table 11.2**. The procedures in this plan outline the responses to coordinate among the emergency teams, local resources, surface owners, mineral claimants, mineral owners, lessees, owners of record with subsurface interests, and governmental authorities. The ERRP's objectives are to minimize impacts and the potential for loss of life and maximize the protection of the USDWs, the environment, the surrounding community, and company property.

NexGen is developing a site-specific ERRP to detail the Vanguard CCS Hub procedures that will be followed in an emergency.

This plan incorporates the Testing and Monitoring Plan (*Section 8*) to verify that the geologic sequestration project is operating as permitted and not endangering USDW(s).

11.2 Identification of Potential Emergency Events

An emergency event would be considered to have occurred when an event endangers a USDW or threatens human health, safety, or the environment during the construction, operation, closure, and post-closure periods due to the movement of the injectate, formation, or other fluids. Other events include the risk of accidental release of CO_2 into the atmosphere. Potential emergency events and the methods that will be used to identify such an event are included in **Table 11.2**.

Table 11.2—Potential Project emergency events and their detection.

Potential Emergency Events	Detection of Emergency Event
Well control event while drilling or completing the well with the loss of containments	• Sudden increase in drilling rate. • Increase in flow rate at the surface. • Changes in pump pressure. • Reduction in drill pipe weight. • Increase in gas, oil, or water-cut mud.
Movement of brine between formations during drilling	• Indication of lost circulation.
Presence of hydrogen sulfide (H_2S) while drilling or completing the well	• H_2S monitors located on the well site during operations.
Loss of mechanical integrity (flowlines, injection, monitoring wells, disposal well)	• Deviation of expected surface and downhole pressure/temperature gauges detects leaks in CO_2 flowline, injection well, and monitoring wells. Wellhead pressure monitoring measurement exceeds maximum injection wellhead pressure. • Annular pressure monitoring exceeds expected pressure.
Loss of containment (LOC): vertical migration of CO_2/brines via injection wells, monitor wells, plugging and abandonment (P&A) wells, and undocumented wells	• Sampling and analysis indicate deviations of baseline values of groundwater wells, monitoring wells.
LOC: lateral migration of CO_2 outside of defined AoR	• Sampling and analysis indicate deviations of baseline values of groundwater wells, monitoring wells. • Indications of lateral migration on time-lapse 2D seismic survey.
LOC: vertical migration due to failure in the confining zones, faults, and fractures	• Changes in downhole pressure and temperature, CO_2 measurements, and water chemistry analysis.
External impact on flowlines, wells, and infrastructure	• Indication of CO_2 leak from detection systems in place. • Deviation of expected line and injection pressures.
Monitoring equipment failure or malfunction	• Monitoring systems will alert site personnel if one or more portions of the system fail. Site personnel will regularly review for anomalous data.
Induced seismicity	• Seismic monitoring station.
Seismic event	• Seismic monitoring station.
Other natural disasters	• Tornados and severe storms, including lightning strikes, are additional risks that create the potential for the release of CO_2 due to possible injection well and facility damage and may disrupt surface and subsurface operations. • Monitoring systems will alert personnel to changes in operating parameters that may indicate the impact of such an event.

This Emergency and Remedial Response Plan (ERRP) describes actions that NexGen will take to address the 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 NexGen detects evidence that the injected CO_2 stream or associated pressure front may currently or imminently threaten contamination of a USDW, the following actions will be taken:

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: NexGen will immediately cease injection. However, in some circumstances, NexGen 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.

11.3 Local Resources and Infrastructure

This section includes descriptions of resources and infrastructure in the vicinity of the NexGen Vanguard CCS Hub that may be affected by an emergency event.

11.3.1 Resources

11.3.1.1 *Underground Sources of Drinking Water*

The primary and likely lowermost Underground Source of Drinking Water (USDW) at the location of the Vanguard CCS Hub, as indicated in **Figure 11.1**, is the Vamoosa-Ada Aquifer (VA). The VA Aquifer serves as the primary groundwater resource in the region and transitions from freshwater to brine-filled conditions moving westward across the project area. The base of the VA Aquifer is estimated to lie between 400 and 700 feet below ground surface (bgs) at the Vanguard CCS Hub location, providing significant vertical separation from the Arbuckle Group injection zone, which is located at depths exceeding 2,500 ft bgs.

Maps provided in *Section 1.3* of the permit application illustrate the spatial distribution of water and mineral resources near the facility, highlighting areas that could potentially be affected by emergency events associated with the facility's operations. There are no identified drinking water treatment plants or related water infrastructure within the vicinity of the facility. However, there are five (5) domestic water wells documented within the Area of Review (AoR), and another **Zone (1)** domestic well located within a one-mile radius of the AoR boundary. The five wells (**Figure 11.1**) within the AoR yield an average of 8 gallons per minute (gpm) and range in depth from 100 to 254 feet bgs.

The region surrounding the Vanguard CCS Hub is characterized by a low population density, with groundwater primarily utilized for domestic purposes. Surface water distributed through rural water districts meets the majority of water demand in Osage County. Consequently, local groundwater withdrawal rates remain low, and the Vamoosa-Ada Aquifer is not under significant pressure from municipal or industrial use. This minimizes the risk of adverse impacts on regional water resources from the facility's operations.

Figure 11.1—Map showing the water source wells, proposed injection and monitoring wells within the AoR.

Figure 11.2—Map of major alluvial and bedrock aquifers in Oklahoma (Wortmann, 2021).

11.3.1.2 *Surface Water Bodies*

The surface water resources within the AoR are ephemeral streams (**Figure 11.3**) that flow intermittently after significant rainfall. These streams contribute to localized drainage patterns but do not represent sustained surface water bodies. The AoR is situated within the Arkansas River Basin, with regional drainage influenced by the Caney and Verdigris Rivers, which flow eastward to join the Arkansas River.

Figure 11.3—Location of the Vanguard CCS Hub-related land position (shown in yellow) in relationship to regional surface drainage located on the drainage divide between the Bird Creek and Salt Creek watersheds.

According to the ESRI USA Parks[1] and ESRI Federal Lands[2] layers, which include national, state, county, regional, and local parks, as well as lands managed by federal agencies (BLM, DOD, NPS, USFWS, and USFS), there are no recreation areas, parks, forests, or grasslands within the AoR, as shown in **Figure 11.4**.

11.3.1.3 *National Historic Sites*

According to the National Park Service (NPS) National Historic Landmarks Program,[3] there are no National Historic Landmarks within the AoR, as shown in **5.**

[1] https://www.arcgis.com/home/item.html?id=f092c20803a047cba81fbf1e30eff0b5 – Accessed 08/06/2024
[2] https://www.arcgis.com/home/item.html?id=5e92f2e0930848faa40480bcb4fdc44e – Accessed 08/06/2024
[3] https://mapservices.nps.gov/arcgis/rest/services/ - Accessed 08/06/2024

Figure 11.4—Recreational areas and registered historical places in the vicinity of the AoR.

11.3.2 Infrastructure

The Vanguard CCS Hub area and well locations were selected to minimize the potential impact on the surrounding oil, gas, and water wells (**Figure 11.5**), landowners and nearby communities. The infrastructure in the vicinity of the AoR that may be impacted due to an emergency at the Vanguard CCS Hub includes wellheads and flowlines of oil and gas wells. To reduce environmental or safety impacts, assistance from local resources will be activated based on the type and severity of the event.

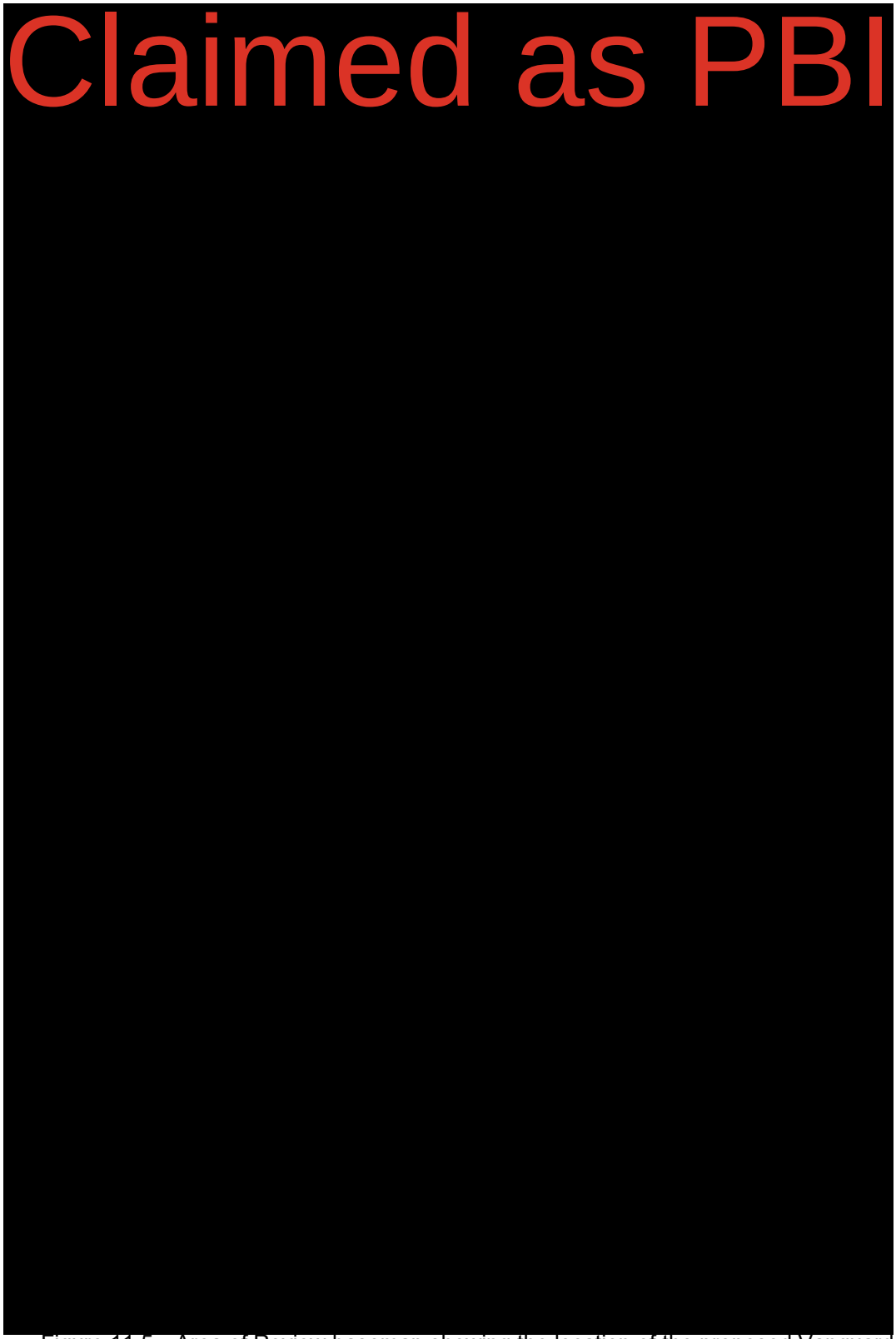

Figure 11.5—Area of Review basemap showing the location of the proposed Vanguard CCS Hub wells.

Potential Risk Scenarios

The following events related to the operation of the Vanguard CCS Hub 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 CO_2 leakage to a USDW or the surface.
- A natural disaster (e.g., earthquake, tornado, lightning strike).
- 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 11.3**.

Table 11.3—Degrees of risk for Emergency Events.

Emergency Condition	Definition
Major Emergency	Event poses an immediate substantial risk to human health, 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 are taken.
Minor Emergency	Event poses no immediate risk to human health, resources, or infrastructure.

11.4 Emergency Identification and Response Actions

Steps to identify and characterize the event will depend on the specific issue identified and the severity of the event. This section identifies those issues and the response plans for each.

11.4.1 Injection and/or Monitoring Well Integrity Failure

Integrity loss of the injection and/or the in-zone and above-zone monitoring wells and/or verification well may endanger USDWs. Integrity loss may have occurred if the following events occur:

- Automatic shutdown devices are activated:
  - Wellhead pressures exceed the specified 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.

According to 40 CFR §146.91(c)(3), NexGen must notify the UIC Program Director within 24 hours of any triggering of a shut-off system (i.e., downhole or at the surface).

Severity:

Continuous monitoring of the annuli and injection stream will rapidly identify a well integrity failure. This near-immediate identification of integrity failure will trigger the injection stream to stop.

The proposed well designs have multiple layers of protection between the injection stream and any USDW, requiring multiple integrity failures to pose a contamination risk. This layered protection provides additional time for proper remediation and further reduces the potential severity of any failure.

The residual risk exposure is concluded to be relatively low.

Timing of Event:

The highest stresses on the tubing will be during injection; therefore, this is the most likely time when an integrity failure may occur.

Avoidance Measures:

Continuous monitoring of the annuli, injection stream, and proposed mechanical integrity testing will also serve as avoidance measures.

Detection Methods:

Continuous monitoring of the annuli, injection stream, and proposed mechanical integrity testing will serve as detection measures.

Potential Response Actions:

- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR §146.91(c).
- Determine the event's severity, based on available information, within 24 hours of notification.

Major or Serious Emergency

1. Initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
    c. Limit access to wellhead to authorized personnel only.
2. Communicate with NexGen personnel and local authorities to initiate evacuation plans, as necessary.
3. Monitor well pressure, temperature, and annulus pressure to verify integrity loss and 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).
4. If contamination is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).

Minor Emergency

1. Conduct an 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.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
3. Reset automatic shutdown devices.
4. Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of failure; identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

11.4.2 Injection Well Monitoring Equipment Failure

During the pre-injection and injection phases, the failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure may indicate a problem with the injection wells that could endanger USDWs. Pressure and temperature gauges will be continuously monitored, and the Supervisory Control and Data Acquisition (SCADA) system for the well will alert personnel of any monitoring equipment failure.

Severity:

The severity of a monitoring equipment failure event would be low. The planned response actions would reduce the impact of any fluid movement to a USDW or out of the confining zones.

Timing of Event:

Monitoring equipment failure could occur during the pre-injection, injection, and/or post-injection phases.

Avoidance Measures:

According to the Testing and Monitoring Plan (*Section 8*), all monitoring equipment will be calibrated as required or, at a minimum, at the frequency recommended by the manufacturer. This calibration ensures that all shut-off devices, automatic alarms, and surface shut-off systems function within planned operational limits and will shut-in when injection or annulus pressures exceed limits, preventing fracturing of the confining zone or damage to the well.

Detection Methods:

According to the Testing and Monitoring Plan, well pressure, temperature, and annulus pressure will be monitored continuously.

Potential Response Actions:

- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the event's severity, based on available information, within 24 hours of notification.

Major or Serious Emergency

5. Initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
    c. Limit access to wellhead to authorized personnel only.
6. Communicate with NexGen personnel and local authorities to initiate evacuation plans, as necessary.
7. Monitor well pressure, temperature, and annulus pressure to determine the cause and extent of failure.
8. Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

Minor Emergency

9. Conduct an assessment to determine whether mechanical integrity has been lost.
10. If there has been a loss of mechanical integrity, initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
11. Reset or repair automatic shutdown devices.
12. Monitor well pressure, temperature, and annulus pressure to determine the cause and extent of failure.
13. Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

11.4.3 Potential Brine or CO_2 Leakage to USDW or the Surface

During the pre-injection, injection, and post-injection phases, elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence of fluid (brine) or CO_2 migration into a USDW will trigger further analysis. Data from the monitoring wells, along with the proposed groundwater and soil monitoring systems outlined in the Testing and Monitoring Plan, will be used to detect any out-of-zone migration of CO_2 from the injection zone.

If measurements suggest a risk of out-of-zone CO_2 migration, injection operations will be suspended until the root cause is identified.

Avoidance Measures:

All injection parameters will be strictly adhered to and not exceeded. Per the Testing and Monitoring Plan, all monitoring equipment will be calibrated as required or, at a minimum, at the manufacturer's recommended frequency. This ensures that all shut-off devices, automatic alarms, and surface shut-off systems operate within planned operational limits and will automatically shut-in if injection or annulus pressures exceed limits, preventing fracturing of the confining zone or damage to the well.

Detection Methods:

According to the Testing and Monitoring Plan, well pressure, temperature, and annulus pressure will be monitored continuously.

Potential Response Actions:

- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the event's severity, based on available information, within 24 hours of notification.

For all Major, Serious, or Minor Emergencies

14. Initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO2 from surface facilities.
15. Collect a confirmation sample(s) of groundwater and analyze for indicator parameters. Potential indicators are listed in the approved Testing and Monitoring Plan.
    a. If the presence of indicator parameters is confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:
16. Install additional groundwater monitoring points near the affected groundwater well(s) to delineate the extent of impact; and
17. Remediate unacceptable impacts to the affected USDW.
18. Arrange for an alternate potable water supply if the USDW was utilized and the emergency caused the drinking water to exceed drinking water standards.
19. Proceed with efforts to remediate USDW to mitigate unsafe conditions (e.g., install a system to intercept/extract brine or CO_2 or pump and treat to aerate CO_2-rich water).
20. Continue groundwater remediation and monitoring frequently (frequency to be determined by NexGen and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.
21. An evacuation plan will be initiated if CO_2 is released to the surface in excess of predetermined parameters.

11.4.4 Natural Disaster

Well problems (integrity loss, leakage, or malfunction) may arise due to a natural disaster affecting the regular 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.

Avoidance Measures: N/A

Detection Methods: N/A

Potential Response Actions:

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

- Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
- Determine the event's severity, based on available information, within 24 hours of notification.

Major or Serious Emergency

22. Initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
23. Limit access to wellhead to authorized personnel only.
24. Communicate with NexGen personnel and local authorities to initiate evacuation plans as necessary.
25. Monitor well pressure, temperature, and annulus pressure continuously to verify well status and determine the cause and extent of any failure.
26. Determine if any leaks to groundwater or surface water occurred.
27. If contamination or endangerment is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).

Minor Emergency

1. Conduct an assessment to determine whether mechanical integrity has been lost.
2. If mechanical integrity is lost, initiate shutdown plan.
    a. Shut in well (close flow valve).
    b. Vent CO_2 from surface facilities.
3. Limit access to wellhead to authorized personnel only.
4. Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of any failure.
5. Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).

11.4.5 Induced or Natural Seismic Event

No significant seismic hazards have been identified within the AoR, and no earthquakes with epicenters within the AoR have been recorded. According to the USGS Earthquake database, no earthquakes exceeding magnitudes of 2.4 (local magnitude) or 2.7 (moment magnitude) have been recorded within the AoR since 1980 (**Figure 11-6)**. The most recent seismic event near the AoR occurred on August 14, 2020, approximately 1 mile south of the AoR boundary, with a magnitude of 1.4. The closest recorded earthquake with a magnitude of 2.5 or greater occurred approximately 75 miles to the south in central Oklahoma in 2016, with a magnitude of 2.8. The proposed injection site is located on the tectonically stable Cherokee Platform, with no identified transmissive faults within the Arbuckle Group upper confining zone or basement rock beneath

the site.

Figure 11-6- Locations of historic 1897 to 2002 earthquakes in Oklahoma and earthquakes attributed to water injection during the seismically active period of 2009 to 2019. Earthquake locations and magnitude are from the Oklahoma Geological Survey. The absence of historic seismic events and recent injection-induced events implies stability at the Vanguard CCS Hub.

According to the USGS Quaternary Fault maps (**Figure 11-7**), there are no active surface faults near the AoR. Furthermore, subsurface faulting in the region is restricted to basement-rooted features, such as the Labette Fault, which does not exhibit displacement in the Paleozoic section, including the Arbuckle Group and overlying confining units. Structural mapping and seismic data confirm that there is no evidence of Quaternary faulting or recent tectonic activity that would impact the integrity of the proposed injection site.

Figure 11-7—Surface geologic map (Oklahoma Geological Survey, [OGQ 91]) near the AoR.

Based on Project operating conditions and mapped faults across the injection and confining zone in or near the AoR, it is unlikely for injection operations to induce a seismic event. Therefore, this portion of the response plan is developed for any seismic event with an epicenter within a 50-mile radius of the injection well.

To monitor the area for seismicity, NexGen will utilize regional USGS seismicity stations as well as twelve (12) groundwater monitoring wells equipped with geophones (*Section 5*) within close proximity to the AoR. Based on quarterly analysis of these monitoring data, observed level of seismic activity, and local reporting of "felt events,"[4] the site will be assigned an operating state (**Table 11.4)**. 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 regarding the potential risk of further seismic activity and guides them through a series of response actions.

[4] "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.

Table 11.4—Seismic monitoring and response plan.

Operating State	Threshold Condition[5,6,7]	Response Action[8]
Green	• Seismic events less than or equal to M1.55	• Continue normal operation within permitted levels.
Yellow	• Five or more seismic events within a 30-day period having a magnitude greater than M1.55 but less than or equal to M2.05	• Continue normal operation within permitted levels. • Within 24 hours of the incident, notify the UIC Program Director of the operating status of the well.
Orange	• Seismic events greater than M1.55 and local observation or felt report. • Seismic event greater than M2.05 and no felt report.	• Continue normal operation within permitted levels. • Within 24 hours of the incident, notify the UIC Program Director of the operating status of the well. • Review seismic and operational data. • Report findings to the UIC Program Director and issue corrective actions.
Magenta	• Seismic event greater than M2.05 and local observation or report.	• Initiate rate reduction plan. • Vent CO_2 from surface facilities. • Within 24 hours of the incident, notify the UIC Program 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. • 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 if leaks to groundwater or surface water occurred. • If USDW contamination is detected: • Notify the UIC Program Director within 24 hours of the determination. • Review seismic and operational data. • Report findings to the UIC Program Director and issue corrective actions.

[5] https://www.usgs.gov/programs/earthquake-hazards/modified-mercalli-intensity-scale. Accessed April 2023.
[6] 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.
[7] "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.
[8] Reporting findings to the UIC Program Director and issuing corrective action will occur within 25 business days (five weeks) of change in operating state.

Operating State	Threshold Condition[5,6,7]	Response Action[8]
Red	• Seismic event greater than M2.05, and local observation or report, and local report and confirmation of damage[9] • Seismic event greater than a M3.55	• Initiate shutdown plan. • Vent CO_2 from surface facilities. • Within 24 hours of the incident, notify the UIC Program 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. • 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 if leaks to groundwater or surface water occurred. • If USDW contamination is detected: • Notify the UIC Program Director within 24 hours of the determination. • Review seismic and operational data. • Report findings to the UIC Program Director and issue corrective actions.

11.5 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)
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. NexGen will provide the current site-specific emergency contact list to the UIC Program Director.

[9] 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.

Table 11.5—Contact information for key local, state, and other authorities.

Facility Contact(s)

Name	Title	Telephone
Robert Knappe	(Response Coordinator) Operations Manager	(918) 847-2531
Dustin Kerbs	Engineer	(918) 847-2300
Glenn Security	24-hour emergency contact	(918) 337-0600

Contractor Contacts

Contractor	Telephone
Roustabouts Services (Cody Stout)	(918) 440-9816
Tank Trucks (OK Tank Trucks)	(918) 396-3043
Pipeline Services (Arrowhead Pipeline Service)	(918) 287-2110
Dozer & Equipment Services (R C Dozer Services)	(918) 352-4655

Emergency Response Contacts

Agency Contact	Telephone
Hospital: Pawhuska Hospital, 1101 E. 15th St, Pahuska, OK	(918) 287-3232
Osage County Emergency Management	(918) 287-2285
Osage County Sheriff	(918) 287-1960

Governmental Agency Contacts

Agency	Telephone
National Response Center	(800) 424-8802
EPA Spill Hotline	(866) 372-7745
EPA Spill Prevention Team	(800) 887-6063
Oklahoma DEQ Office	(800) 832-8224

Contacts for Osage County

Agency	Telephone
Bureau of Indian Affairs **Mailing Address:** P.O. Box 1539 Pawhuska, OK 74056	**(918) 287-5721**
Osage Tribe **Mailing Adress:** 813 Grandview Ave. Pawhuska, OK 74056	**(918) 287-5346**

NexGen will use an Incident Command System (ICS) response structure (**Figure 11-8**) when an emergency event has been detected. This structure identifies the individuals designated as team members and the responsibilities required.

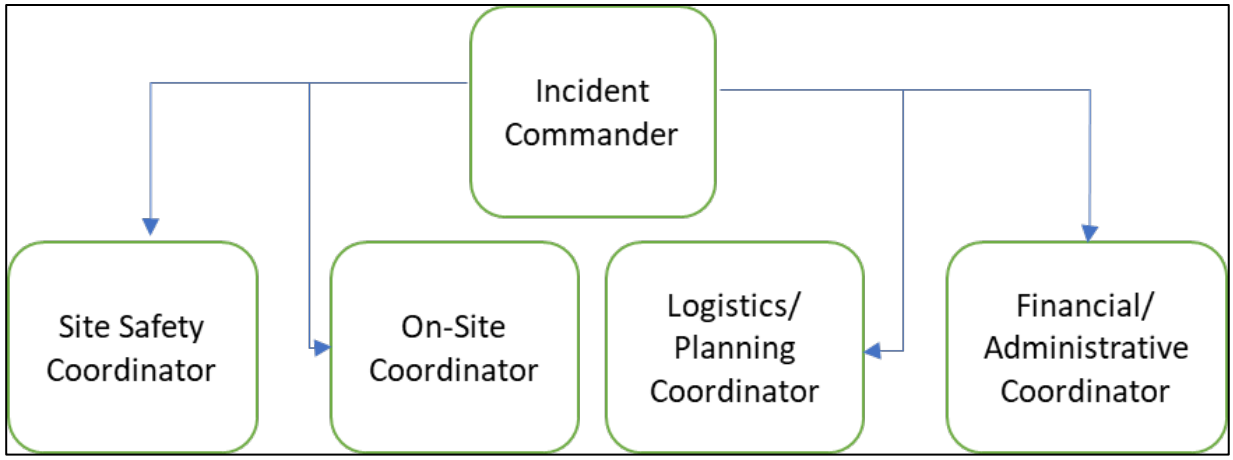

Figure 11-8—Incident command system response structure.

Incident Commander: is responsible for managing emergency events and will coordinate emergency response activities. The Incident Commander must be fully briefed and have a written delegation of authority. Initially, tactical resources will be assigned, and operations will be overseen under the direct supervision of the Incident Commander.

The Incident Commander is responsible for ensuring incident safety, providing information services to internal and external stakeholders, and establishing and maintaining liaison with other agencies participating in the incident. These responsibilities include the following:

- Meet with the Site Safety and On-Site Coordinators for a briefing on the situation and current activities of on-site personnel.
- Work on-scene with state and federal officials in a support and advisory role.
- Prepare for post-emergency operations to make repairs and return the facility to service.
- Conduct containment and cleanup operations to minimize personnel and community exposure.
- Communicate with the media.

Site Safety Coordinator: ensures site, public, and employee safety; establishes the site safety plan; coordinates environmental response; maintains contact with the area/region Environmental, Health, and Safety (EHS) Project Manager and other EHS personnel as required; and maintains contact with local, state, and Federal emergency response organizations or other agencies as necessary.

On-Site Coordinator: manages on-site activities.

Logistics/Planning Coordinator: obtains the necessary response equipment, materials, contractors, and other company personnel.

Financial/Administration Coordinator: arranges for humanitarian assistance, lodging, meals, and manages purchase orders and contracts.

Equipment

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 needed, NexGen will be responsible for its procurement.

NexGen will coordinate with local and county personnel to discuss the ERRP and coordinate response actions, including annual drills.

11.6 Emergency Communications Plan

NexGen will promptly communicate with the public regarding any event requiring an emergency response, ensuring clarity on what occurred and any potential environmental or safety implications. The information shared, its timing, and the communication method(s) will be tailored to the event's severity, its impact on drinking water or other environmental resources, and the surrounding community's awareness.

NexGen will explain the event, its impact on the environment or other local resources, the investigation process, the response actions taken, and the status of the response. Periodic updates will be provided for ongoing and/or long-term responses (e.g., ongoing cleanups).

Additionally, NexGen will notify relevant entities, including local water systems, CO_2 source and pipeline operators, landowners, and Regional Response Teams (as part of the National Response Team), who may need to take action in response to the event.

11.7 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 reevaluation.
- Within a prescribed period (to be determined by the permitting agency) following 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, NexGen 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 the event.

11.8 Staff Training and Exercise Procedures

NexGen will integrate the ERRP into the plant-specific standard operating procedures and training program as described in the SOP entitled 180.60.ENV.130 "Environmental Training, Awareness

and Competence." Periodic training will be provided, not less than annually, to well operators, plant safety and environmental personnel, the plant manager, plant superintendent, 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.

11.9 References

U.S. Geological Survey (USGS), 2024, Quaternary fault and fold database of the United States: *U.S. Geological Survey database*, accessed January 27, 2025, https://www.usgs.gov/programs/earthquake-hazards/faults.