Underground Injection Control
Carbon Sequestration
Class VI Permit Application

POST-INJECTION SITE CARE AND SITE CLOSURE PLAN
40 CFR 146.93(a)
Section 10.0

NexGen Carbon Oklahoma, LLC
Vanguard CCS Hub

June 2025

10.0 POST-INJECTION SITE CARE AND SITE CLOSURE PLAN [40 CFR 146.93(a)]

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

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ACRONYMS AND ABBREVIATIONS

ΔP_c	critical pressure differential
%	percent
2D	two dimensional
AZM	above-zone monitoring
A	
AoR	area of review
C	
$CaCO_2$	calcium carbonate
CFR	Code of Federal Regulations
CO_2	carbon dioxide
D	
DAS	distributed acoustic sensing
DTS	distributed temperature sensing
E	
EOI	end of injection
EPA	United States Environmental Protection Agency
GMW	groundwater monitoring well
F	
FO	fiber optics
I	
IZM	in-zone monitoring
M	
mg/L	milligrams per liter
N	
NexGen	NexGen Carbon Oklahoma, LLC
P	
PISC	post-injection site care
PNL	pulsed-neutron log
psi	pounds per square inch
Project	Vanguard CCS Hub
Q	
QASP	quality assurance surveillance plan
S	
SC	site closure
SWD	saltwater disposal
T	
TVD	true vertical depth
U	
UIC	Underground Injection Control
USDW	Underground Source of Drinking Water

10.0 POST-INJECTION SITE CARE AND SITE CLOSURE PLAN [40 CFR 146.93(A)]

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 and Vanguard I-12) and 27 monitoring wells (7 in-zone [Vanguard IZM-1 through IZM-7], 10 above-zone [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 and Vanguard AZM-12], and 10 USDW/groundwater monitoring wells) for the safe sequestration of carbon dioxide (CO_2) in western Osage County, Oklahoma, as part of the Vanguard CCS Hub (the "Project").

This Post-Injection Site Care (PISC) and Site Closure Plan outlines the activities NexGen will undertake to comply with the requirements of 40 CFR §146.93. NexGen will monitor groundwater quality and track the position of the carbon dioxide plume and pressure front for 100 years after the end of injection operations or until the plume stabilizes and the pressure front dissipates, whichever occurs later. Although the pressure front is anticipated to dissipate and the plume to stabilize well before this timeframe, monitoring will continue until a demonstration of non-endangerment to Underground Sources of Drinking Water (USDWs) is approved by the UIC Program Director, as required by 40 CFR §146.93(b)(3). Upon receiving approval for site closure, NexGen will plug all monitoring wells, restore the site to its original condition, and submit a comprehensive site closure report with supporting documentation.

10.1 Pre- and Post-Injection Pressure Differential [40 CFR 146.93(a)(2)(i)]

The maximum pressure differential in the injection zone is predicted to occur at the end of injection (EOI; 2046, model year 20). Peak reservoir pressure within the Arbuckle Group is expected to reach 1,615 psi (datum = 3,200 ft true vertical depth [TVD]) while a maximum incremental pressure of 291 psi is modeled to occur at the location of injector Vanguard I-4. At EOI, the critical pressure front is expected to cover an area of approximately 106,000 acres. The differential pressure required to exceed critical pressure (ΔP_c) varies spatially depending on the TVD between the base of the lowermost USDW and the top of the injection zone. At the 12 injection wells, the ΔP_c ranges from 143 to 181 psi, averaging 164 psi. See *Section 3* for more details, **Figure 10.1** for a map of ΔP_c, and **Figure 10.2** showing maximum differential pressure at EOI.

Reservoir pressure within the Arbuckle injection zone will rapidly decline following the EOI (**Figure 10.3**). Model results indicate that within 2.5 years after injection ceases, reservoir pressure across the Project Area will fall below critical levels, eliminating the critical pressure front area (**Figure 10.4**). Over the PISC period, pressure will continue to decline; by the planned end of PISC, 100 years following the EOI (2146)[1], reservoir pressure across the AoR is predicted to be less than 6% above initial in all areas (approximately 50 psi), and averages 2% (**Figure 10.3, Figure 10.5**).

[1] NexGen has elected to implement a 100-year post-injection site care (PISC) period—double the 50-year minimum required by regulation—and therefore is not requesting approval for an alternative PISC schedule.

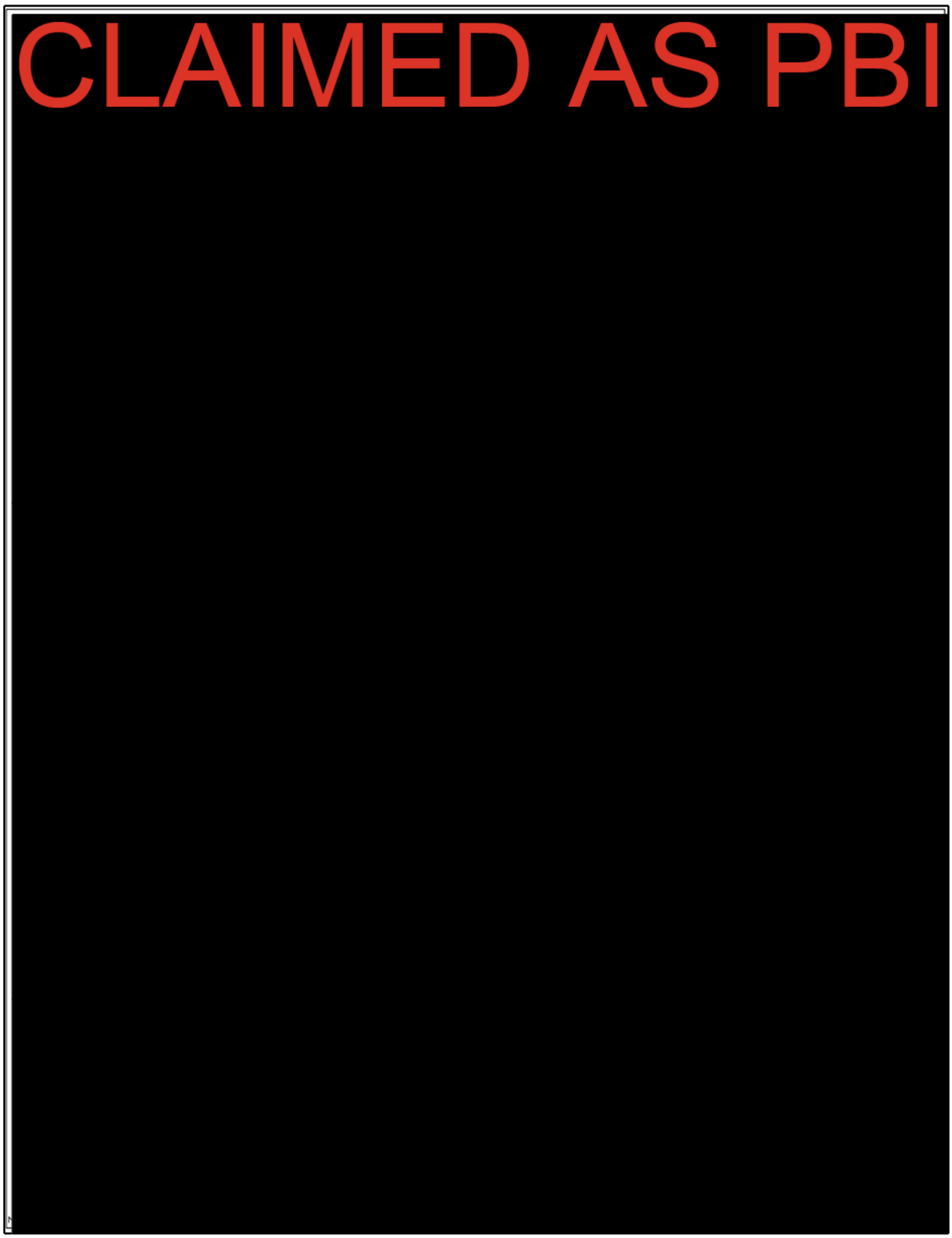

Figure 10.1—Map of the critical pressure differential (ΔP_c) across the model area. See *Section 3.3.1* for details on the calculation.

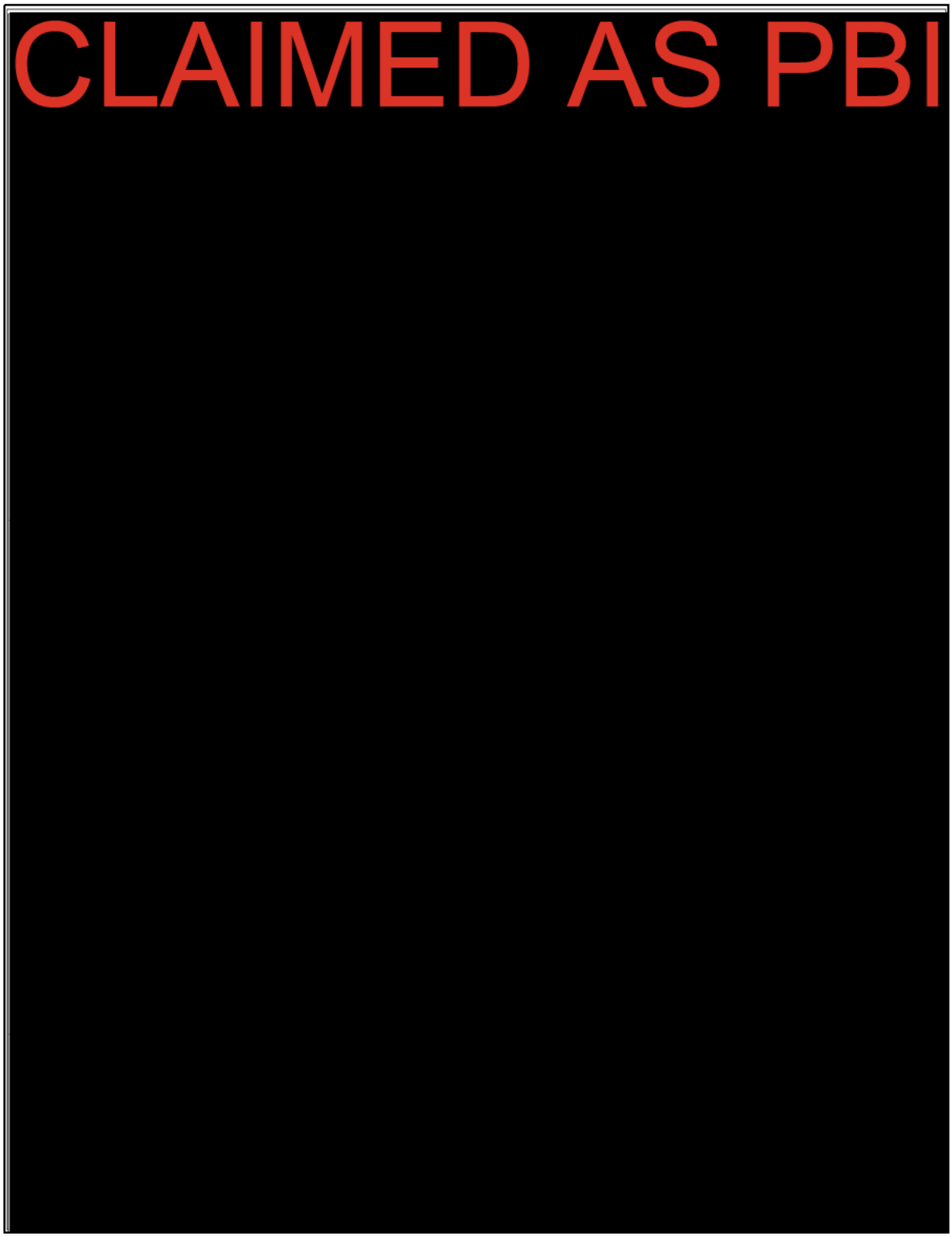

Figure 10.2—Map of maximum differential reservoir pressure (ΔP) within the Arbuckle Group injection zone which occurs at the end of the Project's injection phase.

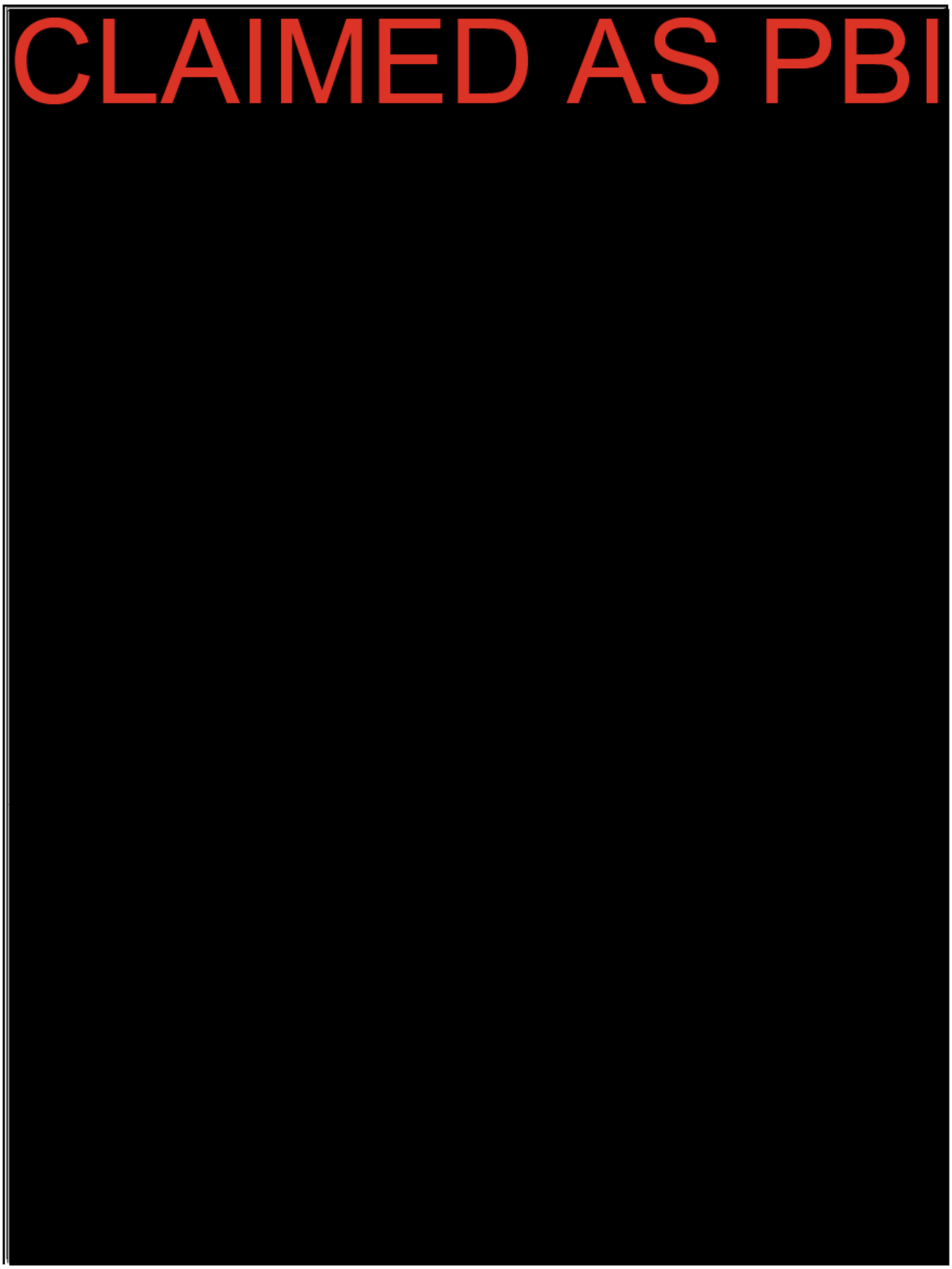

Figure 10.3—Time-series maps illustrating differential pressure at selected model years: 5 years, 10 years, 15 years, 20 years (End of Injection), 70 years (50 years after injection ceases), and 100 years post injection.

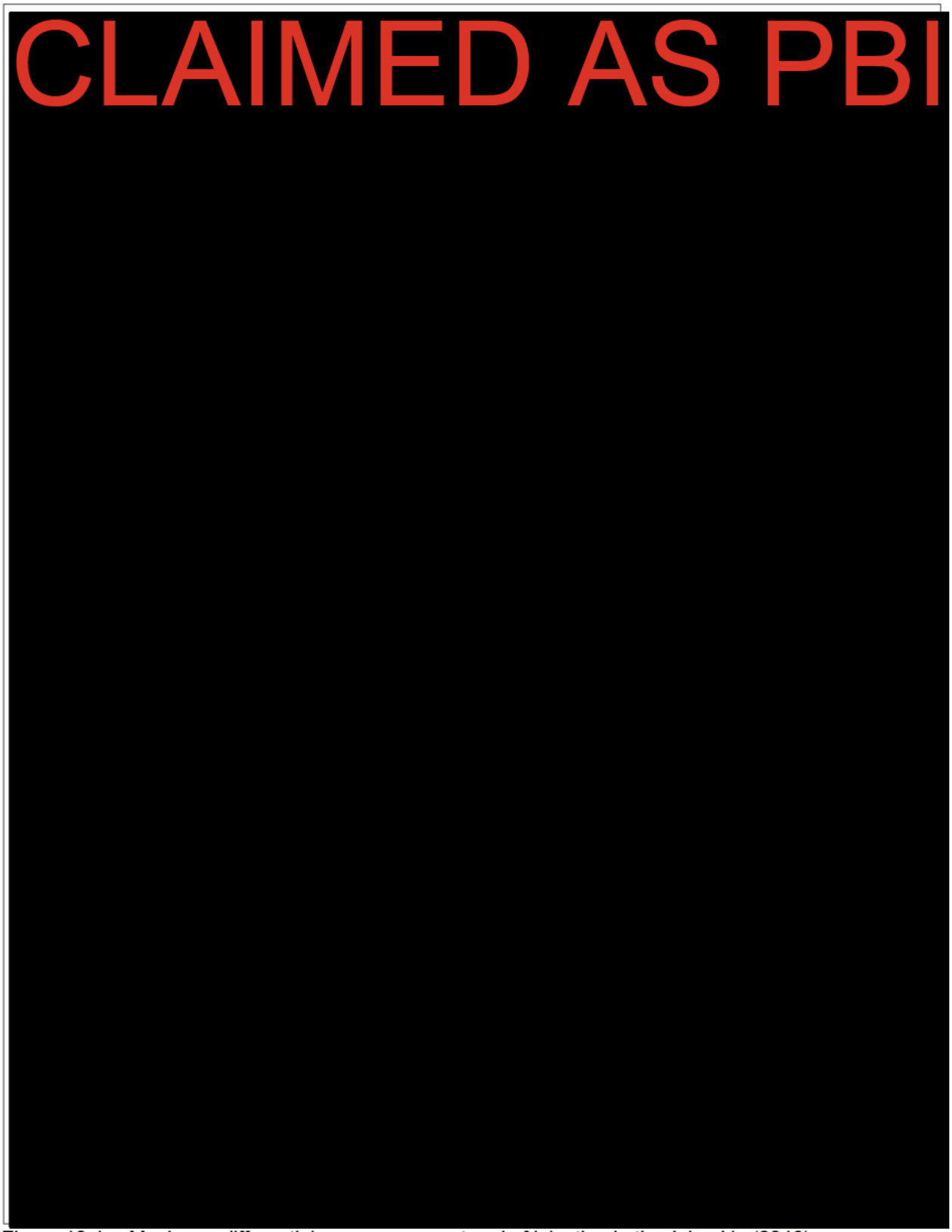

Figure 10.4— Maximum differential pressure map at end of injection in the Arbuckle (2046).

10.2 Predicted Position of the CO_2 Plume and Associated Pressure Front at Site Closure [40 CFR 146.93(a)(2)(ii)]

For this Project, the CO_2 plume has conservatively been defined as any region with greater than two percent injectate saturation from the start of injection until site closure. The plume is predicted to grow, initially rapidly, through the injection phase, with growth slowing significantly after the end of injection. Fifteen (15) years after the end of injection (2061, model year 35), the plume is anticipated to have stabilized, exhibiting a modeled annual increase in radius[2] of less than 0.5% (**Figure 10.6**). By the end of PISC (2096, model year 80), plume radius growth is modeled as less than 0.3%/yr. **Figure 10.7** shows the growth of the CO_2 plume through the injection and post-injection phases, as well as the predicted extent of the stabilized plume at the end of the PISC timeframe. **Figure 10.7** also shows the Project's AoR which is based on the final AoR delineation modeling results submitted pursuant to 40 CFR §146.84 (see *Section 3.3*). The AoR is the union of the predicted maximum pressure front extent, which occurs at the EOI (2046), and the extent of the plume in 2096—conservatively selected based on the negligible growth rate (<0.3 %/yr) of the plume at that time.

[2] Calculation is based on the modeled plume area and assumes the plume is circular.

Figure 10.5—Change in plume radius and area of the critical pressure front over time. In 2061, 15 years after the end of injection (EOI), the CO_2 plume radius is considered stable (less than 0.5% change in plume radius per year).

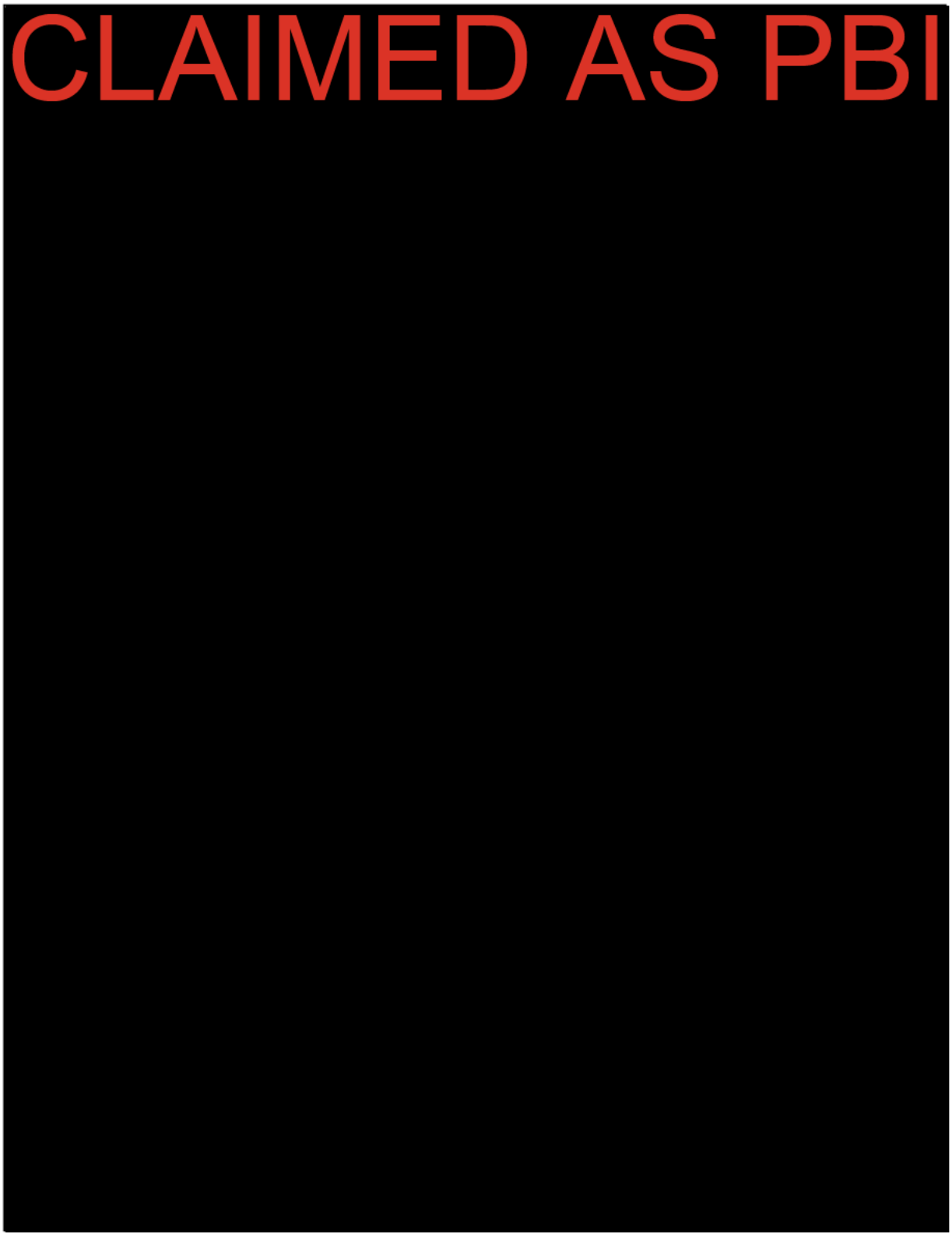

Figure 10.6—Map showing the modeled growth of the CO_2 plume from 2031 through the end of PISC (2146, thick red line).

10.3 Post-Injection Monitoring Plan [40 CFR 146.93(b)(1)]

Post-injection monitoring of the CO_2 plume, associated pressure front, USDWs, and mechanical integrity is planned for 100 years after the end of injection or until measurements confirm plume stabilization, whichever occurs later. **Table 10.1** and the following sections detail the post-injection site care (PISC) monitoring plans that will meet the requirements of 40 CFR §146.93(b)(1). All post-injection phase testing and monitoring results will be submitted annually, within 60 days of the anniversary of injection ending.

FO = fiber optic

*PNL = pulsed neutron log/*logging

Schedule for Submitting Post-Injection Monitoring Results [40 CFR 146.93(a)(2)(iv)]. *Re*-purposed injection wells, AZM, IZM, and USDW monitoring wells will remain accessible for data collection and sampling throughout the PISC period.

Table 10-1—Summary of post-injection surveillance activities.

Type of Monitoring	Frequency	Comments
Near-Surface Monitoring (USDW Monitoring Wells)		
Groundwater Sampling	Annual until pressure front dissipates, every 10 years thereafter (minimum)	Test USDW
Storage Reservoir Monitoring (Re-purposed Injection Wells & In-Zone Monitoring Wells)		
Direct Plume/ Pressure	Pressure gauges and FO sensors: continuous PNL: annual until pressure front dissipates, every 10 years thereafter (minimum)	Pressure gauges in the injection zone, periodic PNL, and FO-DTS in the injection zone for 50 years or until measurements indicate that the plume has reached stabilization, whichever occurs later
Above Confining Zone Monitoring (Above Zone Monitoring Wells)		
Groundwater Quality and Geochemical Changes	Annual PNL and temperature logging until pressure front dissipates; every 10 years thereafter (minimum); continuous for FO sensors	FO-DTS, PNL, and temperature logs
Geophysical Monitoring (Indirect Plume Monitoring)		
Time-lapse 2D seismic	Every 10 years	Confirm plume extent & stabilization
Mechanical Integrity (All injection, above-zone monitoring, and in-zone monitoring wells)		
USIT, caliper log, or equivalent	Annual	Casing inspection

DTS = distributed temperature sensing
FO = fiber optic
PNL = pulsed neutron log/logging

If monitoring indicates additional time is needed to confirm stabilization, the monitoring program will be adjusted. An amended Post-Injection Site Care and Site Closure Plan will be submitted to the UIC Program Director within 30 days of any program change.

A comprehensive Quality Assurance and Surveillance Plan (QASP), detailed in *Section 8.9*, governs all testing and monitoring activities during injection and post-injection phases.

The plan ensures compliance with EPA requirements and provides a structured approach to verifying the safety and stability of the sequestration site.

10.3.1 Monitoring Above the Confining Zone

This section presents the monitoring methods, locations, and frequencies for monitoring above the confining zone (see **Table 10-1**). **Table 10-3** identifies the parameters to be monitored and the analytical methods NexGen will employ.

Monitoring above the confining zones (the Woodford Shale and lower Mississippian Limestone) will focus on the upper Mississippian Limestone (the first permeable layer above the confining zone) via the 10 above-zone monitoring (AZM) wells located approximately 250 ft from each injection well. The base of the upper Mississippian Limestone lies approximately 110 ft above the top of the target injection zone. The AZM wells will be monitored continuously via fiber optic distributed temperature sensor (FO-DTS) and intermittently via PNL. FO-DTS and PNL in the seven IZM wells located at the periphery of the AoR will also support these activities. USDWs will be monitored through 10 shallow (<400 ft) groundwater monitoring wells (GMW) via direct sampling and analysis.

Above-zone monitoring (PNL in the AZM wells and groundwater sampling in the USDW monitoring wells) intervals are as follows:

- **Baseline sampling and PNL prior to commencing injection**.
- **Quarterly during the first year of injection**, to establish a robust baseline of potential impacts.
- **Annually during the injection phase**, to monitor for long-term trends and ensure early detection of any changes.
- **Annually during the early stages of the PISC** phase until the pressure front has dissipated.
- **Every 10 years thereafter**, following pressure front dissipation, for the remainder of the PISC phase.

PNL and groundwater sampling will be conducted sooner than scheduled if continuous monitoring methods detect anomalies. If FO and/or PNL in an AZM well detects an anomaly above the injection zone, potentially indicating an above-confining zone migration event, the interval where the anomaly was detected will be perforated, and a fluid sample will be collected. Should a sample be collected, the parameters and analytical methods to be used are outlined in **Table 10-3**. Any evidence that the injected carbon dioxide stream or associated pressure front has or may cause an endangerment to a USDW will be reported to the Program Director within 24 hours of the determination.

The decreased monitoring frequency during the PISC phase reflects the anticipated slowdown of plume growth and the substantial reduction in the pressure front, thereby lowering the risk to USDWs and the potential for out-of-zone migration.

All sampling and analysis activities will align with the procedures outlined in the *Section 8.0—Testing and Monitoring Plan*. Additional specifics regarding sampling equipment, handling, custody, and quality control are provided in *Section 8.9—Quality Assurance and Surveillance Plan* (QASP). If fluid migration from below the confining zone is detected, the Program Director will be notified within 24 hours, and the Emergency and Remedial Response Plan (*Section 11.0)* will guide the necessary corrective actions.

Table 10-2—Summary of groundwater quality and geochemical monitoring above the confining zone during the PISC period.

Target Formation	Monitoring Activity	Monitoring Location(s)	Spatial Coverage	Frequency
Upper Mississippian (First permeable interval above the confining layer)	FO-DTS & pulsed neutron and temperature logging	Primary: All ten (10) above-zone monitoring wells Secondary: All seven (7) in-zone monitoring wells (IZM 1–7)	Wellbore	FO-DTS: Continuous Logging: Annual Until Pressure Front Dissipates, Every 10 Years Thereafter (Minimum)
USDWs	FO-DTS, PNL, temperature log	Primary: All ten (10) above-zone monitoring wells Secondary: All seven (7) in-zone monitoring wells (IZM 1–7)	Wellbore	FO-DTS: Continuous Logging: Annual Until Pressure Front Dissipates, Every 10 Years Thereafter (Minimum)
Primary USDWs	Direct Sample	All ten (10) groundwater monitoring wells (GWM 1–12)	Wellbore	Annual Until Pressure Front Dissipates, Every 10 Years Thereafter (Minimum)

DTS = distributed temperature sensing
FO = fiber optic
PNL = pulsed neutron log/logging

Table 10-3—Summary of analytical and field parameters for groundwater samples.

Parameters	Analytical Methods
Shallow USDW Zones and (If Necessary) Upper Mississippian Limestone (First Permeable Interval Above Confining Zone)	
Cations: Al, Ba, Mn, As, Cd, Cr, Cu, Pb, Sb, Se, Tl	ICP-MS, EPA Method 6020
Cations: Ca, Fe, K, Mq, Na, HCO_3, Si	ICP-OES, EPA Method 6010B
Anions: Br, Cl, NO_3 and SO_4	Ion Chromatography, EPA Method 300.0
Dissolved CO_2	Coulometric titration, ASTM D513-11
Total Dissolved Solids	Gravimetry, APHA 2540C
Alkalinity	APHA2320B
pH (Field)	EPA 150.1
Specific Conductance (Field)	APHA 2510
Temperature (Field)	Thermocouple

Table 10-4—Sampling and recording frequencies for continuous monitoring.

Parameter	Device(s)	Location	Min. Sampling Frequency	Min. Recording Frequency
Injection Pressure	Pressure transmitter	Wellhead and Flowline	Daily	TBD
Injection Rate	Coriolis Flowmeter	Flowline	Continuous	TBD
Injection Volume	SCADA	Flowline	Continuous	TBD
Annulus Fluid Volume	Pressure gauge/ Visual Inspection	Wellhead	Continuous	TBD
Annular Pressure	Pressure gauge	Wellhead	Continuous	TBD
CO_2 Stream Temperature	Temperature transmitter	Flowline	Continuous	TBD

Sampling frequency specifies the interval at which a sensor is interrogated for a given parameter—for instance, polling an injection-pressure transducer every two seconds to read its current value. Recording frequency defines how often those sampled readings are logged to the data system—for example, writing the pressure reading to a database once per minute.

10.3.2 Carbon Dioxide Plume and Pressure Front Tracking [40 CFR 146.93(a)(2)(iii)]

NexGen will employ direct and indirect methods to track the extent of the CO_2 plume and the presence or absence of elevated pressure during the PISC period to meet the requirements of 40 CFR §146.90(g).

Pressure Front Tracking

Post-injection monitoring will evaluate pressure differentials between pre-injection and post-injection conditions within the target injection zone (Arbuckle Group). These pressures will be compared against projected values from the most up-to-date AoR model. Data will be collected from 10 injection wells re-purposed as in-zone monitoring (IZM) wells and the seven original IZM wells at the AoR periphery.

Monitoring will continue in all 10 re-purposed injectors until reservoir pressure in each well declines below critical levels—defined as levels that no longer pose a risk of fluid migration that could endanger a USDW (see *Section 3.3.5* for critical pressure calculations). At that point, nine re-purposed injectors will be plugged and abandoned. The remaining three re-purposed wells, selected in consultation with the UIC Program Director, likely ensuring full north-south coverage of the AoR, will remain operational for pressure monitoring until site closure. All seven (7) original IZM wells will continue monitoring in-zone pressure and plume migration throughout the post-injection period. Pressure in the re-purposed injectors and IZM wells will be continuously monitored via pressure gauges(s) within the injection zone.

Table 10-5 presents the direct and indirect methods that NexGen will use to monitor the pressure front, including the activities, locations, and frequencies NexGen will employ. *Section 8.9*, the Quality Assurance Surveillance Plan (QASP), presents quality assurance procedures for each monitoring method.

Table 10-5—Post-injection phase pressure-front monitoring.

Target Formation	Monitoring Activity	Monitoring Location(s)	Spatial Coverage	Frequency
DIRECT PRESSURE-FRONT MONITORING				
Arbuckle Group	Pressure gauge	Former ten (10) injection wells	Wellbore	Continuously
Arbuckle Group	Pressure gauges in the upper Arbuckle and near the base Arbuckle	All seven (7) in-zone monitoring wells (IZM 1–7)	Wellbore	Continuously

* All 12 wells will be monitored initially. Following pressure declining below critical levels that could endanger USDWs, nine wells will be abandoned. The remaining three wells will continue as pressure monitoring wells until site closure.

Carbon Dioxide Plume Tracking

Table 10-6 presents the direct and indirect methods NexGen will use to monitor the CO_2 plume, including the activities, locations, and frequencies NexGen will employ. No direct fluid sampling of the injection zone is planned. NexGen can adequately track the CO_2 plume, in compliance with 40 CFR § 146.93(b), using the methods specified **Table 10-6**, without acquiring fluid samples from the injection zone.

Cased-hole pulsed neutron saturation logs (PNL) and periodic 2D seismic surveys will serve as the primary methods for tracking the CO_2 plume during the post-injection period, in compliance with 40 CFR §146.90(g). These methods will be supplemented by FO-DTS installed in re-purposed injection wells, serving as monitoring wells during PISC, and the in-zone monitoring (IZM) wells. The fiber optic sensors will provide additional temperature data, enhancing plume tracking capabilities.

PNL will be conducted periodically in the in-zone monitoring and above-zone monitoring (AZM) wells during the post-injection period to evaluate plume migration and detect any potential movement above the confining zone. Initially, PNL will be performed annually in each monitoring well until the pressure front dissipates and all areas fall below critical pressure. Based on initial modeling, this is anticipated to occur within 2.5 years after the end of injection. Once this milestone is reached, as plume growth and risks to USDWs are significantly diminished, PNL frequency will be reduced to once every 10 years (minimum) until site closure.

Indirect CO_2 plume monitoring will include periodic 2D seismic surveys to track plume extent. A baseline survey will be conducted before injection begins, with additional surveys scheduled every 10 years or as needed in consultation with the UIC Program Director. More frequent surveys and logging may be conducted if the plume or pressure front migrates unexpectedly, extends beyond the AoR, or behaves inconsistently with the AoR model. Seismic surveys, combined with PNL and pressure monitoring data, as well as regularly updated AoR models, will delineate the plume's extent over time and confirm stabilization. Plume stabilization will be confirmed when no significant movement is detected in two consecutive seismic surveys within detection limits.

Quality assurance procedures for seismic monitoring methods are presented in *Section 8.9—Quality Assurance and Surveillance Plan*.

Table 10-6—Post-injection phase plume monitoring.

Target Formation	Monitoring Activity	Monitoring Location(s)	Spatial Coverage	Frequency
DIRECT PLUME MONITORING				
Arbuckle Group	FO-DTS, PNL	In-Zone Monitoring Wells (IZM 1–7)	Wellbore	DTS: Continuously (approximately 1-sec. intervals); PNL: Annual Until Pressure Front Dissipates, Every 10 Years Thereafter (Minimum)
INDIRECT PLUME MONITORING				
Arbuckle Group	2D Seismic	Seismic Line(s)	AoR	Every 10 Years

DTS = distributed temperature sensing
FO = fiber optic
PNL = pulsed neutron log/logging

10.3.3 Schedule for Submitting Post-Injection Monitoring Results [40 CFR 146.93(a)(2)(iv)]

All post-injection site care monitoring data and monitoring results, collected using the methods described above, will be submitted to the U.S. Environmental Protection Agency (EPA) in reports submitted within 60 days of the anniversary of injection cessation. The reports will contain all data collected, their interpretation, and any new findings requiring further review.

10.4 Alternative Post-Injection Site Care Timeframe [40 CFR 146.93(c)]

NexGen is not currently seeking an alternative post-injection site care timeframe.

10.5 Non-Endangerment Demonstration Criteria

Prior to approval of the end of the post-injection phase, NexGen will submit a demonstration of non-endangerment of USDWs to the UIC Program Director, per 40 CFR 146.93(b)(2) and (3).

NexGen will issue a report to the UIC Program Director. This report will make a demonstration of USDW non-endangerment based on the evaluation of the site monitoring data used in conjunction with the Project's computational model. The report will detail how the non-endangerment demonstration evaluation uses site-specific conditions to confirm and demonstrate non-endangerment. The report will include all relevant monitoring data and interpretations upon which the non-endangerment demonstration is based, model documentation and all supporting data, and any other information necessary for the UIC Program Director to review the analysis. The report will include the following sections:

10.5.1 Introduction and Overview

A summary of relevant background information will be provided, including the operational history of the injection project, the date of the non-endangerment demonstration relative to the post-injection period outlined in this PISC and Site Closure Plan, and a general overview of how monitoring and modeling results will be used together to support a demonstration of USDW non-endangerment.

10.5.2 Summary of Existing Monitoring Data

A summary of all previous monitoring data collected at the site, pursuant to the Testing and Monitoring Plan of this permit and this PISC and Site Closure Plan, including data collected during the injection and post-injection phases of the project, will be submitted to help demonstrate non-endangerment. Data submittals will be in a format acceptable to the UIC Program Director [40 CFR 146.91(e)], and will include a narrative explanation of monitoring activities, including the dates of all monitoring events, changes to the monitoring program over time, and an explanation of all monitoring infrastructure that has existed at the site. Data will be compared with baseline data collected during site characterization [40 CFR 146.82(a)(6) and 146.87(d)(3)].

10.5.3 *Summary of Computational Modeling History*

The computational modeling for the Vanguard CCS Hub site, detailed in *Section 3.3*, provides an initial evaluation of pressure increases and plume migration during the injection and post-injection phases. Model inputs are based on regional datasets and data from nearby wells. In the absence of site-specific data, the model incorporates conservative parameters to ensure safety and compliance.

As detailed site-specific data becomes available, including results from the stratigraphic test well, the geologic model and dynamic reservoir simulation will be updated accordingly. As described in *Section 3.5*, the models will be continuously refined and improved with new site-specific data, as well as results from testing and monitoring activities, to enhance accuracy and reduce uncertainty.

The modeling results will ultimately support the demonstration of non-endangerment by predicting pressure and plume migration within the Area of Review (AoR). Key comparisons between modeled and observed data will include reservoir pressure, plume position, and pressure front extent. Metrics for comparison will involve statistical measures of agreement, such as differences between predicted and observed values at monitoring well locations, ensuring the results fall within acceptable tolerances. Monitoring data, including pressure and saturation measurements from in-zone monitoring wells, will be compared directly to the model's outputs.

If significant discrepancies are observed between modeling and monitoring results during the demonstration of non-endangerment, the model will be revised to reflect updated geologic interpretations or additional site-specific data. Iterative history-matching will reconcile differences, ensuring the model provides a reliable basis for demonstrating plume stabilization and pressure dissipation, as regulatory guidelines require.

10.5.4 Evaluation of Reservoir Pressure

Reservoir pressure within the injection zone will be evaluated using a combination of static measurements and continuous monitoring. Static pressure measurements will be collected from each injection well and in-zone monitoring well to provide a baseline assessment. Continuous pressure monitoring will be conducted directly at the in-zone monitoring wells and the re-purposed injection wells, via pressure gauges. These datasets will provide detailed temporal and spatial insights into reservoir pressure behavior.

The observed pressure data will be compared to model predictions to evaluate the extent of the pressure front. This comparison will involve statistical metrics, such as differences between observed and predicted pressure values at key monitoring locations. Initial modeling suggests that actual pressure build-up may be lower than predicted estimates due to conservative assumptions used in the model. Any discrepancies between the observed and predicted data will be analyzed to refine and improve the reservoir model.

Pressure data will be incorporated into an iterative history-matching process to update the reservoir model and ensure alignment with monitoring results. This updated model will enhance predictions of pressure

front extent, pressure dissipation rates, and overall reservoir behavior. The improved model will provide a robust framework for evaluating the pressure front extent during the post-injection period and assist in demonstrating non-endangerment.

10.5.5 Evaluation of Carbon Dioxide Plume

Seismic and well-based monitoring will evaluate the carbon dioxide plume extent in compliance with 40 CFR §146.93(a)(2)(iii). Baseline 2D seismic surveys will be conducted prior to injection, followed by periodic surveys during the injection phase every 10 years. During the post-injection site care (PISC) period, seismic surveys will occur every 10 years or more frequently if plume behavior deviates from model predictions.

Cased-hole pulsed neutron saturation logging (PNL) in IZM and AZM wells will complement seismic data to track CO_2 presence within the injection and confining zones. PNL will be conducted annually until pressure levels fall below critical thresholds, anticipated within 2.5 years post-injection, and then every 10 years until site closure.

Plume monitoring results will be compared to model predictions using metrics such as plume extent, saturation levels, and pressure changes. In cases of significant deviations from predicted behavior, NexGen will implement an adaptive workflow to address discrepancies. This may include revisiting model assumptions, acquiring additional data, and conducting updated simulations. Any significant findings and responses will be reported to the UIC Program Director as required.

As described, the PISC monitoring program will integrate seismic and well-based datasets to track the plume. This data, particularly the 2D seismic will be vital in identifying plume stabilization—defined as no significant movement observed in two consecutive seismic surveys—critical for the non-engagement demonstration.

10.5.6 Evaluation of Emergencies or Other Events

The Emergency and Remedial Response Plan submitted in *Section 11.0* outlines NexGen's approach to addressing emergencies during injection well construction, operational activity, and post-injection monitoring phases. This plan emphasizes regular sampling and analysis of groundwater systems and USDW zones within the AoR to address potential risks proactively.

All artificial penetrations (AP) of the upper confining zones that are not adequately constructed to permanently isolate formation fluids and injected CO_2 within the Arbuckle Group will be remediated before the plume or pressure front reaches them. All artificial penetrations have been mapped and evaluated for their proximity to the projected plume and pressure front, as described in *Section 3* and shown on maps therein. The integrity of well construction and plugging for all penetrations has been assessed through well records, historical construction data, and mechanical integrity tests (MITs), where available.

Testing and monitoring during both the injection and post-injection phases will confirm that no above-confining zone migration occurs, whether through geologic features or artificial pathways. This includes periodic monitoring of pressure and fluid movement within the confining zone and above-zone intervals.

10.6 Site Closure Plan

NexGen will conduct site closure activities to meet the requirements of 40 CFR 146.93(e) as described below. NexGen will submit a final Site Closure Plan and notify the permitting agency at least 120 days prior to its intent to close the site. Once the permitting agency has approved closure of the site, NexGen

will plug the monitoring wells and submit a site closure report to EPA. The activities, as described below, represent the planned activities based on information provided to EPA. The actual site closure plan may employ different methods and procedures. A final Site Closure Plan will be submitted to the UIC Program Director for approval with the notification of the intent to close the site.

10.7 Plugging Monitoring Wells

Detailed plugging plans for all injection and monitoring wells associated with the Project are provided in *Section 9.0—Plugging Plan*. Please refer there for details on the plugging procedures and well test to be conducted prior to plugging of the monitoring wells.

10.7.1 Plugging Procedures

See *Section 9.0* for plugging procedures of each monitoring well.

10.7.2 Well Testing Prior to Plugging

See *Section 9.0* for details on well tests to be conducted prior to plugging the monitoring wells.

10.7.3 Site Restoration

NexGen will conduct comprehensive remediation and reclamation activities for each injection and monitoring well sites, ensuring compliance with all applicable federal, state, and local regulations. These efforts will extend to all well site locations developed as part of this carbon storage project, with the goal of restoring the site to meet regulatory standards and minimize environmental impact.

10.7.4 Site Closure Report

A site closure report will be prepared and submitted within 90 days following site closure, documenting the following:

- Plugging of the verification and geophysical wells (and the injection wells if it has not previously been plugged),
- Location of sealed injection wells on a plat of survey that has been submitted to the local zoning authority,
- Notifications to state and local authorities as required at 40 CFR 146.93(f)(2),
- Records regarding the nature, composition, and volume of the injected CO_2, and
- Post-injection monitoring records.

NexGen will record a notation to the property's deed on which the injection well was located that will indicate the following:

- That the property was used for carbon dioxide sequestration,
- The name of the local agency to which a plat of survey with injection well location was submitted,
- The volume of fluid injected,
- The formation into which the fluid was injected, and

- The period over which the injection occurred.

The site closure report will be submitted to the permitting agency and maintained by the owner or operator for a period of 10 years following site closure. Additionally, the owner or operator will maintain the records collected during the post-injection period for a period of 10 years after which these records will be delivered to the UIC Program Director.