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

Pelican Sequestration Project

1.0 Facility Information

Facility name: Pelican Sequestration Project
Pelican CCS 1 Well

Facility contact: [redacted], Project Manager
5 Greenway Plaza Houston, TX 77046
[redacted]

Well location: Holden, Livingston Parish, Louisiana
[redacted] (NAD 1927, BLM Zone 15N)

This Post-Injection Site Care and Site Closure (PISC) plan describes the activities that the Pelican Sequestration Hub, LLC will perform to meet the requirements of 40 CFR 146.93. The Pelican Sequestration Hub, LLC will monitor ground water quality and track the position of the carbon dioxide plume and pressure front for 50 years. The Pelican Sequestration Hub, LLC may not cease post-injection monitoring until a demonstration of non-endangerment of USDWs has been approved by the UIC Program Director pursuant to 40 CFR 146.93(b)(3). Following approval for site closure, the Pelican Sequestration Hub, LLC will plug all monitoring wells, restore the site to its original condition, and submit a site closure report and associated documentation.

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

Table PIS-1 shows the modeled pressure differential versus time at the top of the [redacted] in injection wells CCS 1 and CCS 2, along with the percent decrease in pressure differential once injection ceases. The simulated maximum pressure increases in the reservoir at the top of the [redacted] perforations in the Pelican CCS 1 injector is [redacted] psi when the 15-year period of injection ceases. The magnitude and area of elevated pressure surrounding the injectors decreases rapidly in the first [redacted] years after injection ceases, then gradually decreases over time to site closure. By site closure (50 years post-injection) the pressure differential is decreasing by [redacted]yr over 5 years.

Error! Reference source not found. shows the simulated pressure versus time for the in-zone monitoring wells [redacted], at the top of the [redacted] and at the top of the [redacted] zone. Table PIS-2 and Table PIS-3 show the pressure differential versus time at the top of the [redacted] and the top of the [redacted] for the monitoring well locations. The intermittent shale layers between zones acts as a leaky pressure boundary, resulting in different pressure response in the lower zones and the upper zones due to the recompletion. Table PIS-4 and Table PIS-5 show the change in pressure differential in the respective zones, once injection into that zone ceases ([redacted]). The differential pressure in the lower zone, [redacted], decreases immediately when the zone is closed, but does slightly increase during the remainder of the injection period and part of the post-injection, as the higher differential pressure upper zone injection equilibrates through the leaky seal.

Additional information on the projected post-injection pressure declines and differentials is presented in the Narrative and the Area of Review and Corrective Action Plan documents of this permit.

Table PIS-1—Pressure Differential to Pre-Injection Conditions and percent decrease post-injection at the top of the injection zone (ANAH4_SS) in injection wells CCS 1 and CCS 2.

Well Name	CCS 1		CCS 2	
Year	dP (psi)	% change	dp (psi)	% change
[redacted]				

Figure PIS-1—Simulated pressure vs. time at the top of the [redacted] zone and the [redacted] zone in monitoring well locations.

Table PIS-2—Pressure Differential to Pre-Injection Conditions at the Top of the [redacted] at Monitoring Well Locations

Item					
Well Name	[redacted]	[redacted]	[redacted]	[redacted]	
Distance from Pelican CCS 1 (ft)	[redacted]	[redacted]	[redacted]	[redacted]	
Distance from Pelican CCS 2 (ft)	[redacted]	[redacted]	[redacted]	[redacted]	
Reference depth for [redacted] (ft)	[redacted]	[redacted]	[redacted]	[redacted]	
Year	**dP (psi)**				
[redacted]					
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Table PIS-3—Pressure Differential to Pre-Injection Conditions at the Top of the [redacted] at Monitoring Well Locations

Item				
Well Name	[redacted]	[redacted]	[redacted]	[redacted]
Distance from Pelican CCS 1	[redacted]	[redacted]	[redacted]	[redacted]
Distance from Pelican CCS 2	[redacted]	[redacted]	[redacted]	[redacted]
Reference depth for [redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Year	**dP (psi)**			
[redacted]				
[redacted]				
[redacted]				
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[redacted]				
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[redacted]				

Table PIS-4—Percent change in pressure differential from recompletion date and during post-injection at the top of the [redacted] at monitoring well locations

Recompletion ([redacted])	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table PIS-5—Percent change in pressure differential from end of injection and during post-injection at the top of the [redacted] at monitoring well locations

15 (end of injection)	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Figure PIS-2 shows the simulated pore-volume weighted pressure differentials from the baseline at the top the upper zone ([redacted]) and the lower zone ([redacted]) at 15 years (end of injection). The high pressure at the injectors has already dissipated in the lower zone, and the upper zone and lower zone begin to equilibrate, consistent with the tabular data. Figure PIS-3 shows the pore-volume weighted average of the differential pressure at site closure (50 years post-injection). The pressure has dissipated to [redacted] psi in all areas of the site. This level of pressure has been determined as non-endangerment to USDW by the risk-based area of review (see AOR document).

Figure PIS-2—Pore-volume weighted average pressure differentials from the baseline condition for the zone [redacted] (left) and the zone [redacted] (right) at 15 years (end of injection).

Figure PIS-3—Pore-volume weighted average pressure differentials from the baseline condition at the top of the injection zone at 65 years after start of injection (50 years post-injection).

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

The reservoir simulation indicates that after injection ceases, the CO_2 plume remains within the [redacted] and [redacted] zones but continues to expand northward in the updip direction of the reservoir with time. To be conservative, the AoR is defined by the plume shape and size in year 115 (100 years after injection ceases). [redacted]

The maps are based on the final AoR delineation modeling results submitted pursuant to 40 CFR 146.84.

Figure PIS-4—Areal extent of the CO_2 plume at site closure in year 65 (50 yr post injection), defined by the pore-volume weighted average over injection zones [redacted]. The purple outline represents the simulated CO_2 plume 100 years post injection.

Figure PIS-5 below shows the CO_2 plume size as a function of time, with year 0 being the initiation of injection. The simulation model predicts [redacted]

Figure PIS-5—Simulated CO_2 plume area for the Pelican Hub over time. The blue dashed line denotes the time of site closure.

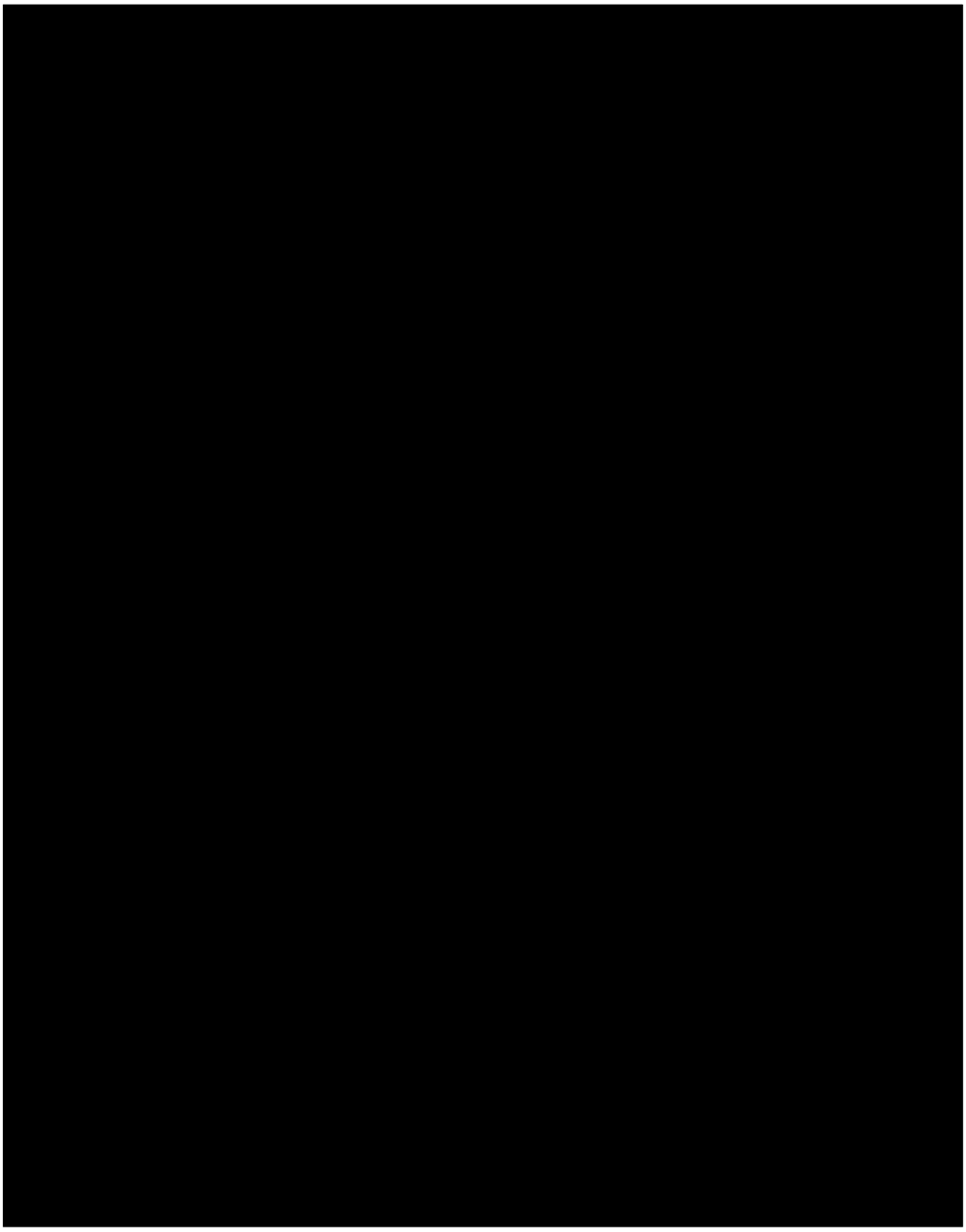


Figure PIS-6—Simulated areal extent of the CO_2 plume from injection start-up to shut-in, then to 50 years after shut-in. Contour lines represent the migration of the [redacted]% average CO_2 saturation front.

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

Performing groundwater quality monitoring and plume and pressure front tracking as described in the following sections during the post-injection phase will meet the requirements of 40 CFR 146.93(a)(2)(iii). The results of all post-injection phase testing and monitoring will be submitted annually, within 60 days of the anniversary of the date that injection ceases, as described under Section 4.3 Schedule for Submitting Post-Injection Monitoring Results.

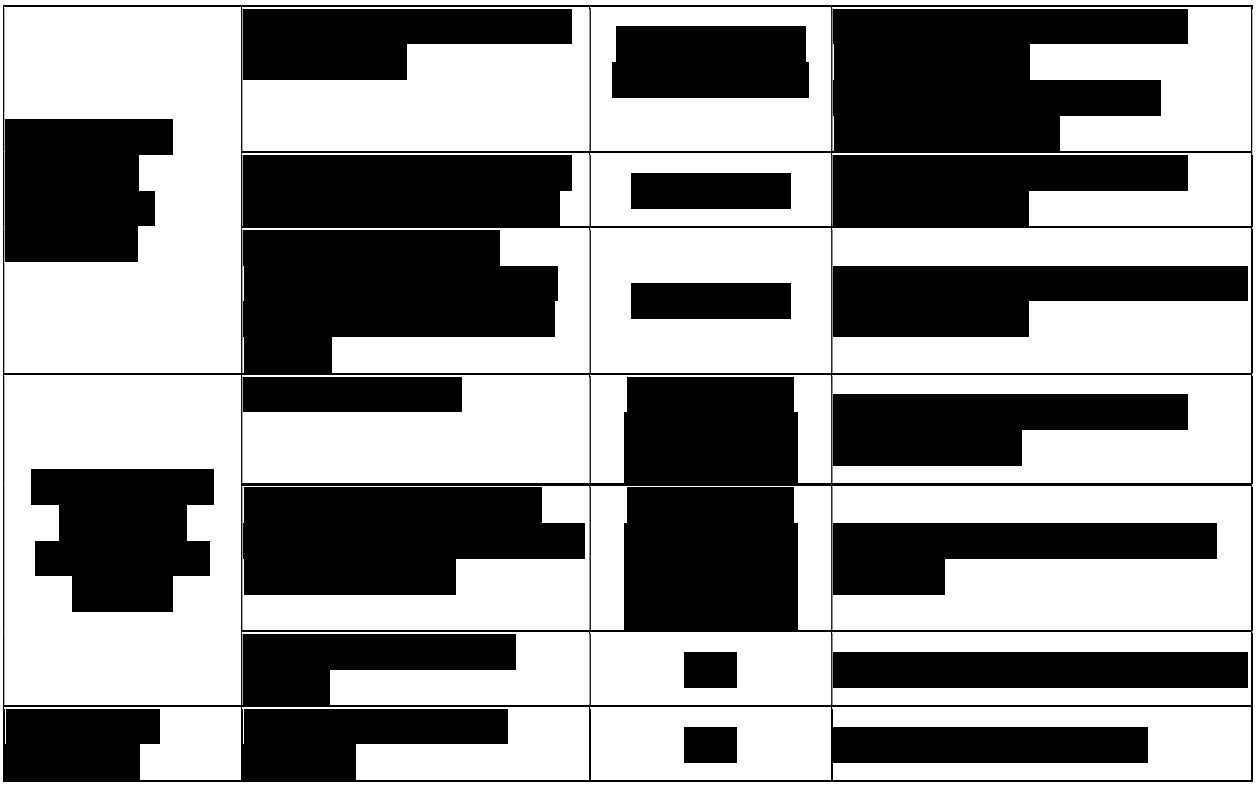
A quality assurance and surveillance plan (QASP) for all testing and monitoring activities during the injection and post injection phases is provided as a separate document of this permit.

After the injection ceases, the project will plug and abandon the injector wells according to the plugging procedure proposed in the Plugging Plan document of this permit.

[redacted]

Table PIS-6—Post Injection Monitoring Techniques

Description	Method	Location	Post Injection Period
[redacted]			



Specifics of the methods, techniques, and analytics to be tested as part of the proposed monitoring plan are described in detailed in the Testing and Monitoring Plan as wells as in the QASP document.

Figure PIS-6 shows the location of the in-zone and above confining zone monitoring wells, while Figure PIS-7 shows the location of the above confining zone and USDW monitoring wells in relationship with the CO2 Plume

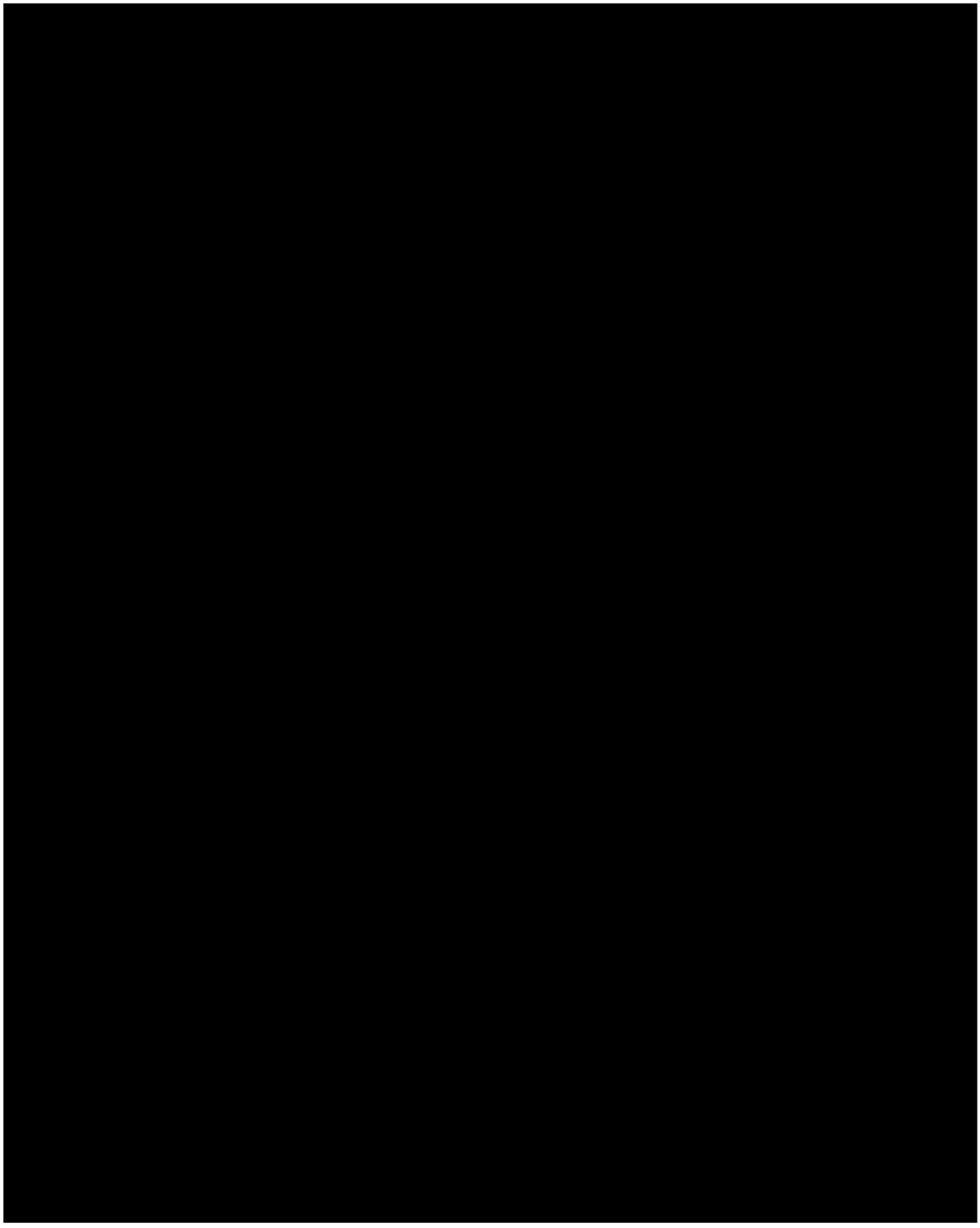


Figure PIS-7—Location of the above confining zone and USDW monitoring wells in relation to the simulated CO_2 plumes.

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

During the PISC period, the monitoring reports will be prepared annually and submitted to the EPA Region 6 UIC Branch Office. These reports will summarize methods and results of ground water quality monitoring, CO_2 storage zone pressure tracking, and indirect geophysical monitoring for CO_2 plume tracking.

The PISC and Site Closure Plan will be reviewed every 5 years during the PISC period. Results of the plan review will be included in the PISC monitoring reports. The operational and monitoring results will be reviewed for adequacy in relation to the objectives of the PISC. The monitoring locations, methods, and schedule will be analyzed in relation to the size of the CO_2 storage zone, pressure front, and protection of USDWs. In case of changes to the PISC plan, a modified plan will be submitted to the EPA Region 6 UIC Branch Office at least 30 days before the planned initiation of the changes.

5.0 Non-Endangerment Demonstration Criteria

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

The owner or operator 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, and the results of wellbore modeling to support the risk-based area of review. The report will detail how the non-endangerment demonstration evaluation uses site-specific conditions and wellbore configuration 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:

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.

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 document 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)].

5.3 Summary of Computational Modeling History

The computational modeling results used for the AoR delineation will be compared to monitoring data collected during the operational and PISC periods. Monitoring data will also be compared with data collected during site characterization, as per 40 CFR 146.82(a)(6) and 146.87(d)(3). The data will be used to update the computational model and monitor the site, and will include both direct (e.g., measurements of pressure, temperature, groundwater quality) and indirect (e.g., 2D seismic, Pulse Neutron logging) geophysical methods.

Data generated during the PISC period will be used to show that the computational model accurately represents the storage site and can be used as a proxy to determine the plume's properties and size. The Pelican Sequestration Hub, LLC will demonstrate this degree of accuracy by comparing the monitoring data obtained during the operational and PISC period with the model's predicted properties (i.e., plume location, rate of movement, and pressure decay). Statistical methods will be employed to correlate the data and confirm the model's ability to represent the storage site accurately. The validation of the computational model with the large quantity of measured data will be a significant element to support the non-endangerment demonstration.

5.4 Evaluation of Reservoir Pressure

The Pelican Sequestration Hub, LLC will demonstrate non-endangerment to USDWs by showing that during the PISC period, the pressure within the Frio and Anahuac reservoir will rapidly decrease and stabilize to levels near its pre-injection static reservoir pressure. Because increased pressure is the primary driving force for fluid movement, which might endanger a USDW, the decay in the pressure differential provides strong justification that the injectant will no longer pose a risk to any USDWs. In addition, the risk-based area of review has indicated even the maximum pressure increase observed in simulation does not result in leakage to a UDW.

The Pelican Sequestration Hub, LLC will monitor the downhole reservoir pressure at various locations and intervals using a combination of surface and downhole pressure gauges. The measured pressure at a specific depth interval will be compared with the pressure predicted by the computational model, which was previously shown in Tables PIS-1 through PIS-5, and **Error! Reference source not found.**, Figure PIS-2 and **Error! Reference source not found.**. Agreement between the actual and predicted values will validate the accuracy of the model and further demonstrate non-endangerment.

5.5 Evaluation of Carbon Dioxide Plume

The Pelican Sequestration Hub, LLC will use a combination of monitoring data, logs, geophysical surveys, and seismic methods to locate and track the movement of the CO_2 plume. The data produced by these activities will be compared with the modeled predictions (previously shown in

Figure PIS-) using statistical methods to validate the model's ability to represent the storage site accurately. Regarding the separate-phase carbon dioxide plume, the PISC monitoring data will show the stabilization of the CO_2 plume as the reservoir pressure returns to its near pre-injection state. The risk to USDWs will decrease when the extent of pure-phase CO_2 ceases to grow either laterally or vertically. The stabilization of the CO_2 plume combined with the lack of local penetrations in the direction of migration will be significant factors in the Pelican Sequestration Hub, LLC's demonstration of non-endangerment.

Project monitoring wells located above the confining layer and USDW monitoring wells may be used to determine aqueous-phase CO_2 concentrations and mobilized constituents to assess USDW endangerment. If a demonstration can be made, in conjunction with monitoring data, that a vast majority of the CO_2 has been immobilized via trapping mechanisms, then there is strong evidence that the risk to USDWs posed by the CO_2 plume has decreased. Modeling results, including sensitivity analyses, may also be used to demonstrate that plume migration rates are negligible based on available site characterization, monitoring, and operational data.

5.6 Evaluation of Emergencies or Other Events

In addition to the CO_2 plume, mobilized fluids may also pose an ongoing risk to USDWs, as the reservoir fluids include brines high in TDS and other drinking water contaminants . The geochemical data collected from monitoring wells will be used to demonstrate that no degradation or contamination of fluid has occurred above the confining formation, and no mobilized fluids have moved into any USDWs. Of particular importance are any monitoring wells above the primary confining zone, within any USDWs, and in the vicinity of any known leakage pathways. Monitoring data indicating steady or decreasing trends of potential drinking water contaminants below actionable levels (e.g., secondary and maximum contaminant levels) will be used for this demonstration.

To demonstrate non-endangerment, the Pelican Sequestration Hub, LLC will compare the operational and PISC period samples of the lowermost USDW with the pre-injection characterization of the aquifers. This evaluation will demonstrate that no mobilized formation fluids have moved into the lowermost USDW. In addition, this validation of confining zone integrity will demonstrate that the injectant and/or mobilized fluids will not represent an endangerment to any USDWs.

Other than the project and monitoring wells, other potential conduits for fluid movement or leakage pathways within the AoR will be adequately plugged and abandoned. Based on this information, the potential for fluid movement through artificial penetrations of the confining formation does not present a risk of endangerment to any USDWs.

6.0 Site Closure Plan

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

Sequestration Hub, LLC will plug the remaining 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.

The Louisiana Department of Natural Resources, the City of Oberlin, and Allen Parish agencies will be notified prior to the scheduled site closure. Currently, there are no federally recognized Native American Tribes located within the AoR; however, if a federally recognized Native American Tribe becomes known within the AoR at the time of site closure, that tribe(s) will be notified of the site closure.

6.1 Plugging Monitoring Wells

Upon conclusion of the 50-year post-injection site care period, any remaining monitoring well will be plugged and capped below grade in accordance with the approved plugging and abandonment plans, which is included as Appendix A in the Injection Well Plugging Plan.

After the completion of the plugging activities, a plugging report will be submitted to the UIC Program Director describing the methods used and tests performed on the well during plugging. This report will be submitted to the UIC Program Director within 60 days of completing the plugging activities.

6.2 Planned Remedial and Site Restoration Activities

At the end of the PISC phase, the Pelican Sequestration Hub, LLC will ensure the site is reclaimed and returned to predevelopment condition to meet the requirements of 40 CFR 146.93(e).

Surface equipment decommissioning will occur in two phases: the first phase will occur after the active injection phase and the second phase will occur at the end of the PISC phase.

At the end of the active injection period, plume monitoring will continue, but there will be no further need for the pumping and control equipment. The process control building at the surface pumping facility will remain. This building serves as a hub for control and monitoring of the well network, so it will remain operational. The pumping system and above-ground pipe, valves, and fittings at the surface pumping facility will be demolished.

The injection wells will be plugged and capped below grade as per the Injection Well Plugging Plan document of this permit. The process control building at the pumping facility site will act as the collection node for data from the plume monitoring equipment. This building will contain the equipment required to receive real-time data from the monitoring wells and other monitoring stations and send the data via an internet connection to be analyzed offsite during the 50-year post-injection monitoring period.

All surface facilities will be removed at the end of the PISC phase. That includes the process control building at the surface pumping facility site. The site will be reclaimed and returned to predevelopment condition.

The soil will be backfilled around the monitoring and geophysical wells to bring the area around the wells back to the pre-installation grade. Any remaining surface facilities associated with the monitoring wells will be reclaimed and the area will be returned to the predevelopment condition. All gravel pads and surface facilities will be removed, and the land will be reclaimed for preconstruction uses.

6.3 Site Closure Report

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

- Plugging of all injection and monitoring wells,
- Details of site restoration activities,
- Location of the sealed injection well on a plat survey submitted to the local zoning authority,
- Notifications to state and local authorities,
- Records regarding the nature, composition, and volume of CO_2 injected,
- Pre-injection, injection, and post-injection monitoring records, and
- Certifications that all injection and storage activities have been completed.

The Pelican Sequestration Hub, LLC 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.

7.0 Quality Assurance and Surveillance Plan (QASP)

The Quality Assurance and Surveillance Plan is presented as a separate document.

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

Pelican Sequestration Project

1.0 Facility Information

Facility name: Pelican Sequestration Project
Pelican CCS 2 Well

Facility contact: [redacted], Project Manager
5 Greenway Plaza Houston, TX 77046
[redacted]

Well location: Holden, Livingston Parish, Louisiana
[redacted] (NAD 1927, BLM Zone 15N)

This Post-Injection Site Care and Site Closure (PISC) plan describes the activities that the Pelican Sequestration Hub, LLC will perform to meet the requirements of 40 CFR 146.93. The Pelican Sequestration Hub, LLC will monitor ground water quality and track the position of the carbon dioxide plume and pressure front for 50 years. The Pelican Sequestration Hub, LLC may not cease post-injection monitoring until a demonstration of non-endangerment of USDWs has been approved by the UIC Program Director pursuant to 40 CFR 146.93(b)(3). Following approval for site closure, the Pelican Sequestration Hub, LLC will plug all monitoring wells, restore the site to its original condition, and submit a site closure report and associated documentation.

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

Table PIS-1 shows the modeled pressure differential versus time at the top of the [redacted] in injection wells CCS 1 and CCS 2, along with the percent decrease in pressure differential once injection ceases. The simulated maximum pressure increases in the reservoir at the top of the [redacted] perforations in the Pelican CCS 1 injector is [redacted] psi when the 15-year period of injection ceases. The magnitude and area of elevated pressure surrounding the injectors decreases rapidly in the first [redacted] years after injection ceases, then gradually decreases over time to site closure. By site closure (50 years post-injection) the pressure differential is decreasing by [redacted]yr over 5 years.

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Additional information on the projected post-injection pressure declines and differentials is presented in the Narrative and the Area of Review and Corrective Action Plan documents of this permit.

Table PIS-1—Pressure Differential to Pre-Injection Conditions and percent decrease post-injection at the top of the injection zone (ANAH4_SS) in injection wells CCS 1 and CCS 2.

Well Name	CCS 1		CCS 2	
Year	dP (psi)	% change	dp (psi)	% change
[redacted]				

Figure PIS-1—Simulated pressure vs. time at the top of the [redacted] zone and the [redacted] zone in monitoring well locations.

Table PIS-2—Pressure Differential to Pre-Injection Conditions at the Top of the [redacted] at Monitoring Well Locations

Item					
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Distance from Pelican CCS 2 (ft)	[redacted]	[redacted]	[redacted]	[redacted]	
Reference depth for [redacted] (ft)	[redacted]	[redacted]	[redacted]	[redacted]	
Year	**dP (psi)**				
[redacted]					
[redacted]					
[redacted]					
[redacted]					
[redacted]					
[redacted]					
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Table PIS-3—Pressure Differential to Pre-Injection Conditions at the Top of the [redacted] at Monitoring Well Locations

Item				
Well Name	[redacted]	[redacted]	[redacted]	[redacted]
Distance from Pelican CCS 1	[redacted]	[redacted]	[redacted]	[redacted]
Distance from Pelican CCS 2	[redacted]	[redacted]	[redacted]	[redacted]
Reference depth for [redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Year	**dP (psi)**			
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
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[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				
[redacted]				

Table PIS-4—Percent change in pressure differential from recompletion date and during post-injection at the top of the [redacted] at monitoring well locations

Recompletion ([redacted])	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table PIS-5—Percent change in pressure differential from end of injection and during post-injection at the top of the [redacted] at monitoring well locations

15 (end of injection)	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Figure PIS-2 shows the simulated pore-volume weighted pressure differentials from the baseline at the top the upper zone ([redacted]) and the lower zone ([redacted]) at 15 years (end of injection). The high pressure at the injectors has already dissipated in the lower zone, and the upper zone and lower zone begin to equilibrate, consistent with the tabular data. Figure PIS-3 shows the pore-volume weighted average of the differential pressure at site closure (50 years post-injection). The pressure has dissipated to [redacted] psi in all areas of the site. This level of pressure has been determined as non-endangerment to USDW by the risk-based area of review (see AOR document).

Figure PIS-2—Pore-volume weighted average pressure differentials from the baseline condition for the zone [redacted] (left) and the zone [redacted] (right) at 15 years (end of injection).

Figure PIS-3—Pore-volume weighted average pressure differentials from the baseline condition at the top of the injection zone at 65 years after start of injection (50 years post-injection).

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

The reservoir simulation indicates that after injection ceases, the CO_2 plume remains within the [redacted] and [redacted] zones but continues to expand northward in the updip direction of the reservoir with time. To be conservative, the AoR is defined by the plume shape and size in year 115 (100 years after injection ceases). [redacted]

The maps are based on the final AoR delineation modeling results submitted pursuant to 40 CFR 146.84.

Figure PIS-4—Areal extent of the CO_2 plume at site closure in year 65 (50 yr post injection), defined by the pore-volume weighted average over injection zones [redacted]. The purple outline represents the simulated CO_2 plume 100 years post injection.

Figure PIS-5 below shows the CO_2 plume size as a function of time, with year 0 being the initiation of injection. The simulation model predicts [redacted]

Figure PIS-5—Simulated CO_2 plume area for the Pelican Hub over time. The blue dashed line denotes the time of site closure.

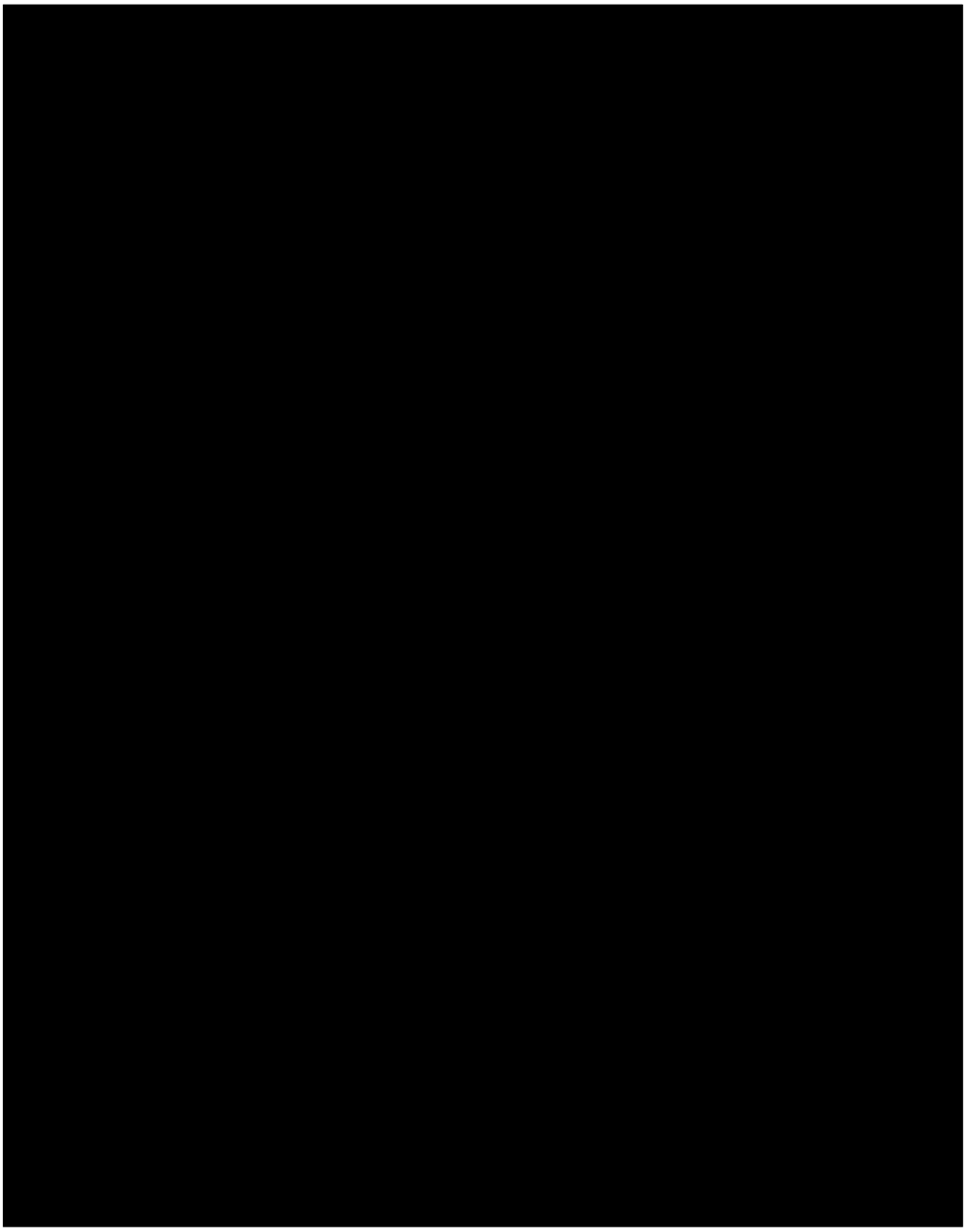


Figure PIS-6—Simulated areal extent of the CO_2 plume from injection start-up to shut-in, then to 50 years after shut-in. Contour lines represent the migration of the [redacted]% average CO_2 saturation front.

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

Performing groundwater quality monitoring and plume and pressure front tracking as described in the following sections during the post-injection phase will meet the requirements of 40 CFR 146.93(a)(2)(iii). The results of all post-injection phase testing and monitoring will be submitted annually, within 60 days of the anniversary of the date that injection ceases, as described under Section 4.3 Schedule for Submitting Post-Injection Monitoring Results.

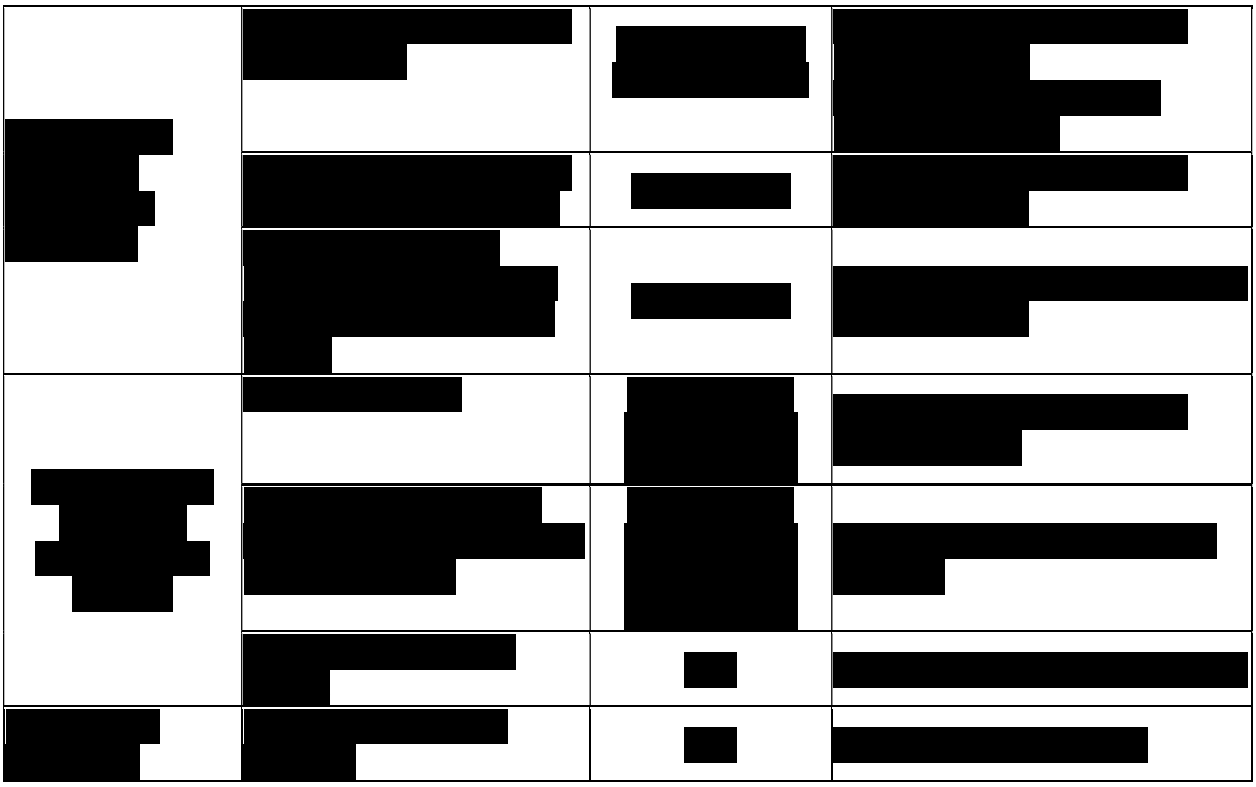
A quality assurance and surveillance plan (QASP) for all testing and monitoring activities during the injection and post injection phases is provided as a separate document of this permit.

After the injection ceases, the project will plug and abandon the injector wells according to the plugging procedure proposed in the Plugging Plan document of this permit.

[redacted]

Table PIS-6—Post Injection Monitoring Techniques

Description	Method	Location	Post Injection Period
[redacted]			



Specifics of the methods, techniques, and analytics to be tested as part of the proposed monitoring plan are described in detailed in the Testing and Monitoring Plan as wells as in the QASP document.

Figure PIS-6 shows the location of the in-zone and above confining zone monitoring wells, while Figure PIS-7 shows the location of the above confining zone and USDW monitoring wells in relationship with the CO2 Plume

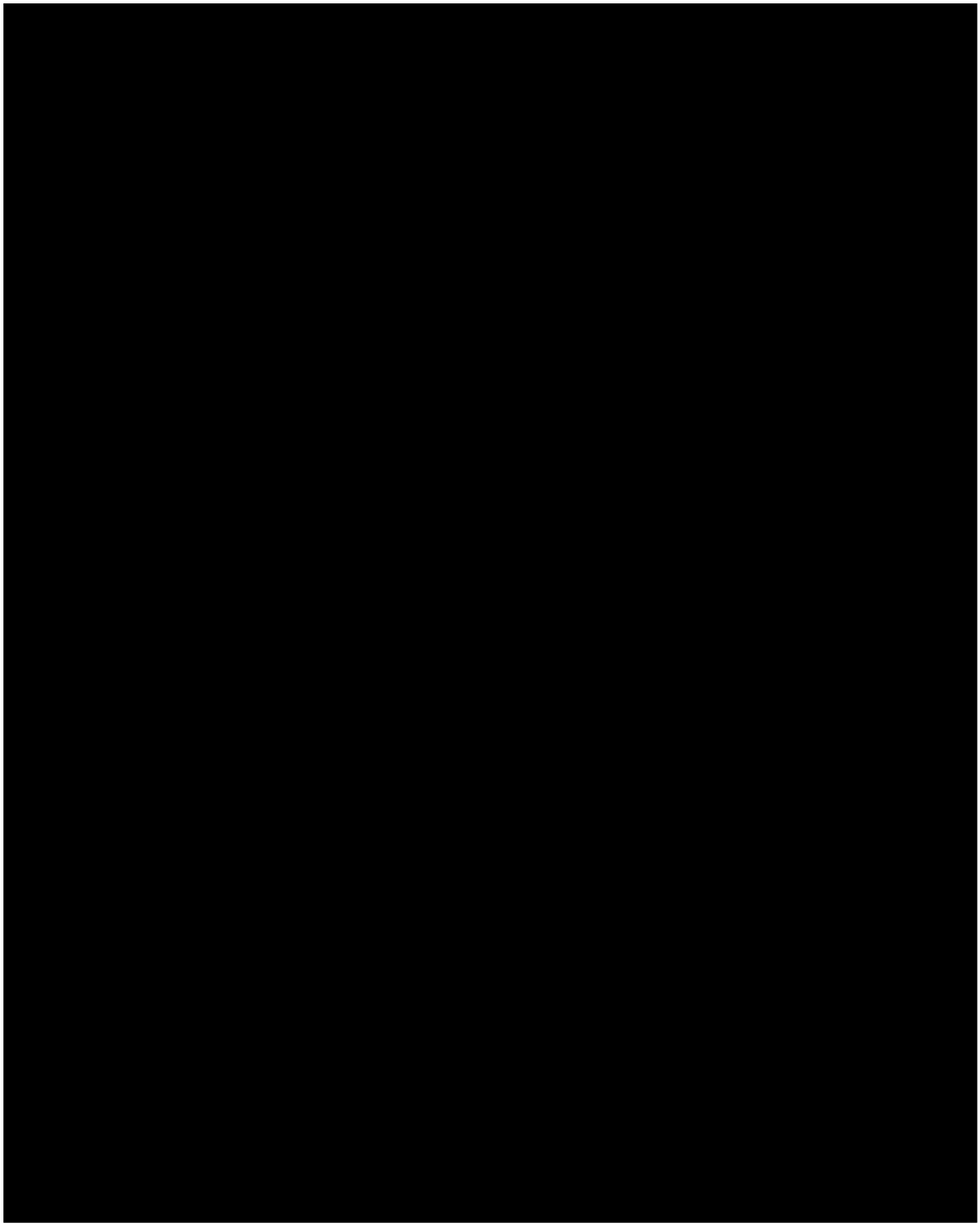


Figure PIS-7—Location of the above confining zone and USDW monitoring wells in relation to the simulated CO_2 plumes.

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

During the PISC period, the monitoring reports will be prepared annually and submitted to the EPA Region 6 UIC Branch Office. These reports will summarize methods and results of ground water quality monitoring, CO_2 storage zone pressure tracking, and indirect geophysical monitoring for CO_2 plume tracking.

The PISC and Site Closure Plan will be reviewed every 5 years during the PISC period. Results of the plan review will be included in the PISC monitoring reports. The operational and monitoring results will be reviewed for adequacy in relation to the objectives of the PISC. The monitoring locations, methods, and schedule will be analyzed in relation to the size of the CO_2 storage zone, pressure front, and protection of USDWs. In case of changes to the PISC plan, a modified plan will be submitted to the EPA Region 6 UIC Branch Office at least 30 days before the planned initiation of the changes.

5.0 Non-Endangerment Demonstration Criteria

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

The owner or operator 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, and the results of wellbore modeling to support the risk-based area of review. The report will detail how the non-endangerment demonstration evaluation uses site-specific conditions and wellbore configuration 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:

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.

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 document 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)].

5.3 Summary of Computational Modeling History

The computational modeling results used for the AoR delineation will be compared to monitoring data collected during the operational and PISC periods. Monitoring data will also be compared with data collected during site characterization, as per 40 CFR 146.82(a)(6) and 146.87(d)(3). The data will be used to update the computational model and monitor the site, and will include both direct (e.g., measurements of pressure, temperature, groundwater quality) and indirect (e.g., 2D seismic, Pulse Neutron logging) geophysical methods.

Data generated during the PISC period will be used to show that the computational model accurately represents the storage site and can be used as a proxy to determine the plume's properties and size. The Pelican Sequestration Hub, LLC will demonstrate this degree of accuracy by comparing the monitoring data obtained during the operational and PISC period with the model's predicted properties (i.e., plume location, rate of movement, and pressure decay). Statistical methods will be employed to correlate the data and confirm the model's ability to represent the storage site accurately. The validation of the computational model with the large quantity of measured data will be a significant element to support the non-endangerment demonstration.

5.4 Evaluation of Reservoir Pressure

The Pelican Sequestration Hub, LLC will demonstrate non-endangerment to USDWs by showing that during the PISC period, the pressure within the Frio and Anahuac reservoir will rapidly decrease and stabilize to levels near its pre-injection static reservoir pressure. Because increased pressure is the primary driving force for fluid movement, which might endanger a USDW, the decay in the pressure differential provides strong justification that the injectant will no longer pose a risk to any USDWs. In addition, the risk-based area of review has indicated even the maximum pressure increase observed in simulation does not result in leakage to a UDW.

The Pelican Sequestration Hub, LLC will monitor the downhole reservoir pressure at various locations and intervals using a combination of surface and downhole pressure gauges. The measured pressure at a specific depth interval will be compared with the pressure predicted by the computational model, which was previously shown in Tables PIS-1 through PIS-5, and **Error! Reference source not found.**, Figure PIS-2 and **Error! Reference source not found.**. Agreement between the actual and predicted values will validate the accuracy of the model and further demonstrate non-endangerment.

5.5 Evaluation of Carbon Dioxide Plume

The Pelican Sequestration Hub, LLC will use a combination of monitoring data, logs, geophysical surveys, and seismic methods to locate and track the movement of the CO_2 plume. The data produced by these activities will be compared with the modeled predictions (previously shown in

Figure PIS-) using statistical methods to validate the model's ability to represent the storage site accurately. Regarding the separate-phase carbon dioxide plume, the PISC monitoring data will show the stabilization of the CO_2 plume as the reservoir pressure returns to its near pre-injection state. The risk to USDWs will decrease when the extent of pure-phase CO_2 ceases to grow either laterally or vertically. The stabilization of the CO_2 plume combined with the lack of local penetrations in the direction of migration will be significant factors in the Pelican Sequestration Hub, LLC's demonstration of non-endangerment.

Project monitoring wells located above the confining layer and USDW monitoring wells may be used to determine aqueous-phase CO_2 concentrations and mobilized constituents to assess USDW endangerment. If a demonstration can be made, in conjunction with monitoring data, that a vast majority of the CO_2 has been immobilized via trapping mechanisms, then there is strong evidence that the risk to USDWs posed by the CO_2 plume has decreased. Modeling results, including sensitivity analyses, may also be used to demonstrate that plume migration rates are negligible based on available site characterization, monitoring, and operational data.

5.6 Evaluation of Emergencies or Other Events

In addition to the CO_2 plume, mobilized fluids may also pose an ongoing risk to USDWs, as the reservoir fluids include brines high in TDS and other drinking water contaminants . The geochemical data collected from monitoring wells will be used to demonstrate that no degradation or contamination of fluid has occurred above the confining formation, and no mobilized fluids have moved into any USDWs. Of particular importance are any monitoring wells above the primary confining zone, within any USDWs, and in the vicinity of any known leakage pathways. Monitoring data indicating steady or decreasing trends of potential drinking water contaminants below actionable levels (e.g., secondary and maximum contaminant levels) will be used for this demonstration.

To demonstrate non-endangerment, the Pelican Sequestration Hub, LLC will compare the operational and PISC period samples of the lowermost USDW with the pre-injection characterization of the aquifers. This evaluation will demonstrate that no mobilized formation fluids have moved into the lowermost USDW. In addition, this validation of confining zone integrity will demonstrate that the injectant and/or mobilized fluids will not represent an endangerment to any USDWs.

Other than the project and monitoring wells, other potential conduits for fluid movement or leakage pathways within the AoR will be adequately plugged and abandoned. Based on this information, the potential for fluid movement through artificial penetrations of the confining formation does not present a risk of endangerment to any USDWs.

6.0 Site Closure Plan

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

Sequestration Hub, LLC will plug the remaining 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.

The Louisiana Department of Natural Resources, the City of Oberlin, and Allen Parish agencies will be notified prior to the scheduled site closure. Currently, there are no federally recognized Native American Tribes located within the AoR; however, if a federally recognized Native American Tribe becomes known within the AoR at the time of site closure, that tribe(s) will be notified of the site closure.

6.1 Plugging Monitoring Wells

Upon conclusion of the 50-year post-injection site care period, any remaining monitoring well will be plugged and capped below grade in accordance with the approved plugging and abandonment plans, which is included as Appendix A in the Injection Well Plugging Plan.

After the completion of the plugging activities, a plugging report will be submitted to the UIC Program Director describing the methods used and tests performed on the well during plugging. This report will be submitted to the UIC Program Director within 60 days of completing the plugging activities.

6.2 Planned Remedial and Site Restoration Activities

At the end of the PISC phase, the Pelican Sequestration Hub, LLC will ensure the site is reclaimed and returned to predevelopment condition to meet the requirements of 40 CFR 146.93(e).

Surface equipment decommissioning will occur in two phases: the first phase will occur after the active injection phase and the second phase will occur at the end of the PISC phase.

At the end of the active injection period, plume monitoring will continue, but there will be no further need for the pumping and control equipment. The process control building at the surface pumping facility will remain. This building serves as a hub for control and monitoring of the well network, so it will remain operational. The pumping system and above-ground pipe, valves, and fittings at the surface pumping facility will be demolished.

The injection wells will be plugged and capped below grade as per the Injection Well Plugging Plan document of this permit. The process control building at the pumping facility site will act as the collection node for data from the plume monitoring equipment. This building will contain the equipment required to receive real-time data from the monitoring wells and other monitoring stations and send the data via an internet connection to be analyzed offsite during the 50-year post-injection monitoring period.

All surface facilities will be removed at the end of the PISC phase. That includes the process control building at the surface pumping facility site. The site will be reclaimed and returned to predevelopment condition.

The soil will be backfilled around the monitoring and geophysical wells to bring the area around the wells back to the pre-installation grade. Any remaining surface facilities associated with the monitoring wells will be reclaimed and the area will be returned to the predevelopment condition. All gravel pads and surface facilities will be removed, and the land will be reclaimed for preconstruction uses.

6.3 Site Closure Report

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

- Plugging of all injection and monitoring wells,
- Details of site restoration activities,
- Location of the sealed injection well on a plat survey submitted to the local zoning authority,
- Notifications to state and local authorities,
- Records regarding the nature, composition, and volume of CO_2 injected,
- Pre-injection, injection, and post-injection monitoring records, and
- Certifications that all injection and storage activities have been completed.

The Pelican Sequestration Hub, LLC 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.

7.0 Quality Assurance and Surveillance Plan (QASP)

The Quality Assurance and Surveillance Plan is presented as a separate document.