FINANCIAL ASSURANCE DEMONSTRATION
40 CFR 146.85

Facility Information

Facility Name: Capio [redacted] Sequestration, LLC
Well Name: Capio [redacted] CCS Well No. 1

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Well location: [redacted]
Pointe Coupee Parish, Louisiana
[redacted]

Capio [redacted] Sequestration, LLC is providing financial responsibility pursuant to 40 CFR 146.85. Capio [redacted] Sequestration, LLC will use a combination of Surety Bonds, Letters of Credit, Insurance, and other available financial instruments that may not yet have been developed for CCS given the maturity of the industry to cover the costs of: corrective action, emergency and remedial response, injection well plugging, post-injection site care, and site closure.

The total estimated costs for each activity, as developed by SCS Engineers and provided by Capio [redacted] Sequestration, LLC, are presented below:

Summary of Costs	
Corrective Action:	[redacted]
Plugging Injection Well:	[redacted]
Post-Injection Site Care:	[redacted]
Site Closure:	[redacted]
Emergency and Remedial Response:	[redacted]
Total:	[redacted]

Introduction

Under 40 CFR 146.85(a), the U.S. Environmental Protection Agency (EPA) requires owners or operators to demonstrate and maintain financial responsibility for the following Geologic Sequestration (GS) activities:

- Performing corrective action on wells in the Area of Review (AOR)
- Injection well plugging

- Post-injection site care and site closure (PISC)
- Emergency and remedial response

This document was prepared to demonstrate that Capio [redacted] Sequestration, LLC (Capio) has the resources to allow third parties to carry out the activities needed to protect Underground Sources of Drinking Water (USDW) as required by 40 CFR 146.85(a). Capio is applying for a Class VI permit for the proposed construction and operation of a carbon dioxide (CO_2) injection well at a site in the [redacted] of Pointe Coupee Parish in Louisiana. This third-party cost estimate was prepared in support of that application.

Activities Considered for Financial Responsibility

To demonstrate financial responsibility for the geologic sequestration of carbon dioxide by Capio at the [redacted] site, SCS Engineering has considered the costs associated with:

- Corrective Action
- Plugging Injection Wells
- Post-injection Site Care
- Site Closure
- Emergency and Remedial Response

Basis of Cost Estimates

Capio contracted with SCS Engineers ("SCS") to provide a third-party cost estimate for the financial responsibility activities required by EPA. SCS used the EPA's UIC Program Class VI Financial Responsibility Guidance as the basis to define the activities required to be included in the cost estimate. The costs of the required activities were then estimated using historic price data, costs extrapolated from subcontractors, and SCS' professional judgment on the time required from other projects of similar scope. Additionally, EPA's Geologic CO_2 Sequestration Technology and Cost Analysis document provided a foundation for costs without reasonably inferred or experiential data. The estimated costs are provided in US dollar valuation from October 2022 and reflect the costs of a previously uninvolved third party to complete the work. The unit costs encompass general and administrative costs with averaged overhead and profit percentages included.

SCS assumed the costs would be incurred via a third party without previous project knowledge and without the involvement of Capio or SCS Engineers. The third party would be tasked with the listed activities to conclude the project in a manner protective of USDWs at no cost to the public. The cost assumptions also presume the third party would not continue the project and that injection would cease immediately.

Area of Review and Corrective Action

The estimated costs in this section outline potential risks and events that could endanger human health, the environment, or the safe functioning of infrastructure at the site as described in Section 5 - Emergency and Remedial Response Plan, of the accompanying permit application. The activities cover the periodic reevaluation of the AOR and the identification and remediation of newly identified deficient wells. For the purposes of this cost estimate, the initial study area was defined as an area of approximately [redacted] acres centered on Capio [redacted] CCS Well No. 1. This area was defined with a computational model assuming injection of [redacted] metric tons of CO_2 annually for 8 years (total of [redacted] metric tons). Based on the model, the area covered by CO_2 plume after plume movement ceased would be contained within the [redacted]-acre area. All deficient wells found in the initial AOR would be remediated before injection begins. Therefore, no cost is included to remediate deficient wells within the initial AOR.

As previously stated, this estimate assumes CO_2 injection ceased at (or would cease by) the time a third party took over responsibility for the injection well and storage site. For purposes of the cost estimate, a reevaluation of the AOR would occur at the time a third party took responsibility and then would occur once every five years during the 50- year post-injection period, the default frequency required by the Class VI regulations. Should the injection reservoir tracking data obtained over the five-year period deviate significantly from the predictions of the original (or updated) computational model, the model would be updated to reflect the actual measured shape and extent of the CO_2 plume and improve the accuracy of the predicted AOR. It is assumed this would only be necessary once.

Any newly identified wells are assumed to be either deficient wells within the initial AOR which were not discovered before injection, or deficient wells added because of adjustments to the AOR. Based on current modeling predictions by SCS, there are only two wells within the AOR that penetrate the confining zone within the first 10 years. This is a phased approach.

Table 4-1. Corrective Action Within the Area of Review

Item	Unit	Unit Cost	Total Cost
a. Well Integrity Testing	[redacted] wells	[redacted] per well	[redacted]
b. Plug Deficient Wells	[redacted] well	[redacted] per well	[redacted]
c. Rehabilitation of Existing Well for Reuse	[redacted] well	[redacted] per well	[redacted]
d. Project Management & Oversight	[redacted] hours	[redacted] per hour	[redacted]
		Total:	[redacted]

Plugging Injection Wells

The estimated costs in this section cover the plugging of the single injection well post-injection. Site reclamation for the plugged sites is included in the assumptions as well.

The plugging and abandonment of the injection and Lowermost Underground Source of Drinking Water (LUSDW) wells includes mechanical integrity testing, plugging the hole with cement for the entire depth of the well, and cutting the well off below the ground. All structures and appurtenances at the site of the injection well would be removed except for those directly necessary to the continued monitoring of the plume. Any surface facilities remaining for post-injection monitoring would be removed during site closure.

Well plugging and site remediation costs were estimated based on SCS' previous experience with the costs incurred or estimated by subcontractors for this and other projects.

Table 4-2. Plugging Injection Wells Summary

Item		Total Cost
a. Plugging Injection Wells	(Table 4-3)	[redacted]
b. Citizen Access Improvement	(Table 4-4)	[redacted]
	Total:	[redacted]

Table 4-3. Plugging Injection Wells Detail

Item	Unit	Unit Cost	Total Cost
a. Casing Evaluation	[redacted] well	[redacted] per well	[redacted]
b. Repair / Groundwater Cleanup	[redacted] well	[redacted] per well	[redacted]
c. Plugging Materials	[redacted] well	[redacted] per well	[redacted]
d. Labor & Equipment	[redacted] well	[redacted] per well	[redacted]
e. Decontamination	[redacted] well	[redacted] per well	[redacted]
f. Disposal	[redacted] well	[redacted] per well	[redacted]
g. Contingencies	[redacted] well	[redacted] per well	[redacted]
h. Project Management & Oversight	[redacted] hours	[redacted] per well	[redacted]
		Total:	[redacted]

Table 4-4. Citizen Access Improvement Detail

Item	Unit	Unit Cost	Total Cost
a. Demolition of Structure(s)	[redacted] site	[redacted] per site	[redacted]
b. Access Improvements	[redacted] pads	[redacted] per pad	[redacted]
c. Project Management & Oversight	[redacted] hours	[redacted] per hour	[redacted]
		Total:	[redacted]

Post-Injection Site Care

The estimated costs in this section cover the tracking and modeling of the plume during the 50-year post-injection period.

The PISC activities include monitoring ground water quality and tracking the position of the carbon dioxide plume and pressure front for 50 years following the cessation of injection. Capio [redacted] Sequestration, LLC will 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, Capio [redacted] Sequestration, LLC will plug all monitoring wells, restore the site to a condition to enhance outdoor access, and submit a site closure report and associated documentation.

The PISC costs were estimated based on SCS' previous experience with the costs incurred or estimated by subcontractors for this and other projects

Table 4-5. Post-Injection Care Summary

Item		Total Cost
a. Monitoring for Geochemical & Geophysical Analysis	(Table 4-6)	[redacted]
b. Mechanical Integrity Testing	(Table 4-7)	[redacted]
c. Site Management & EPA Reporting	(Table 4-8)	[redacted]
	Annual Total:	[redacted]
	50-year Total:	[redacted]

Table 4-6. Monitoring for Geochemical & Geophysical Analysis Detail

Item	Units	Unit Cost	Annual Cost
a. Monitoring Well Analysis (≤200 ft) (geochemical)	[redacted] wells	[redacted]	[redacted]
b. Monitoring Well Analysis (>200 ft) (geochemical)	[redacted] wells	[redacted]	[redacted]
c. Monitoring Well Analysis (>200 ft) (pressure, temperature, ERT)	[redacted] wells	[redacted]	[redacted]
d. Project Management & Oversight	[redacted] hours	[redacted]	[redacted]
		Annual Total:	[redacted]
		50-year Post-Injection Monitoring Total:	[redacted]

Table 4-7. Mechanical Integrity Testing Detail

Item	Units	Well Depth	Unit Cost	Annual Cost
a. Injection Well Monitoring	[redacted] wells	[redacted] ft	[redacted]	[redacted]
b. Project Management & Oversight	[redacted] hours	-	[redacted]	[redacted]
Annual Mechanical Integrity Testing Total:				[redacted]
50-year Mechanical Integrity Testing Total:				[redacted]

Table 4-8. Site Management & EPA Reporting Detail

Item	Unit	Unit Cost	Total Cost
a. Review of existing plume model (every 5 yr)	[redacted] hours	[redacted] per hour	[redacted]
b. Remodel plume (once)	[redacted] hours	[redacted] per hour	[redacted]
c. Review of known wells & mines (every 5 yr)	[redacted] hours	[redacted] per hour	[redacted]
d. Record Keeping & Reporting	[redacted] hours, annually	[redacted] per hour	[redacted]
e. Project Management & Oversight	[redacted] hours, annually	[redacted] per hour	[redacted]
Annual Site Management & EPA Reporting Total:			[redacted]
50-year Site Management & EPA Reporting Total:			[redacted]

Site Closure

The costs in this section cover final closure of the project site. After the default 50-year post-injection and site care period and demonstrating the project no longer posed a risk of endangerment to any USDWs, the site would be permanently closed.

As in the previous sections, plugging of the LUSDW monitoring well includes mechanical integrity testing, plugging the hole with cement the entire depth of the well, and cutting the well off below the ground. All structures and appurtenances at the sites of the monitoring wells would be completely removed and the sites would be restored to enhance outdoor access.

Well plugging and site remediation costs were estimated based on SCS' previous experience with the costs incurred or estimated by subcontractors for this and other projects.

Table 4-9. Site Closure Summary

Item		Total Cost
a. Non-endangerment Demonstration	(Table 4-10)	[redacted]
b. Monitoring Well Plugging	(Table 4-11)	[redacted]
c. Documentation	(Table 4-12)	[redacted]
Total:		[redacted]

Table 4-10. Non-endangerment Demonstration Detail

Item	Total Cost
a. Prepare non-endangerment demonstration report	[redacted]
Total Non-Endangerment Demonstration Detail:	[redacted]

Table 4-11. Monitoring Well Plugging Detail

Item	Unit	Unit Cost	Total Cost
a. Casing Evaluation	[redacted] unit	[redacted] per well	[redacted]
b. Review of Evaluation Results	[redacted] unit	[redacted] per well	[redacted]
c. Plugging Materials & Labor; 140 ft wells	[redacted] unit	[redacted] per well	[redacted]
d. Plugging Materials & Labor; 2,600 ft wells	[redacted] wells	[redacted] per well	[redacted]
e. Plugging Materials & Labor; 3,200 ft wells	[redacted] wells	[redacted] per well	[redacted]
f. Decontamination of Equipment	[redacted] units	[redacted] per well	[redacted]
g. Disposal of Equipment	[redacted] units	[redacted] per well	[redacted]
h. Citizen Access Improvement	[redacted] pads	[redacted] per pad	[redacted]
i. Project Management & Oversight	[redacted] units	[redacted] per hour	[redacted]
		Total:	[redacted]

Table 4-12. Documentation Detail

Item	Units	Unit Cost	Total Cost
a. Supervision & Documentation of Closure	[redacted] unit	[redacted] total	[redacted]
		Total Documentation Costs:	[redacted]

Emergency and Remedial Response

It was assumed the response to discovered CO_2 leaks, regardless of risk category, would be to plug leaks where possible, assess impacts to USDWs, and remediate any contamination of USDWs. These costs assume a maximum affected area of about [redacted]. The extent and costs of treatment were adapted from Federal Remediation Technologies Roundtable website. The cost of study and well installation were derived from previous SCS experience. Costs for municipal water hook-up are not included as this scenario is deemed to be extremely unlikely, although the cost of remediation may make municipal water hook-up preferable. Also note that treatment costs can vary significantly depending on specific contaminants and their concentrations.

The costs of responding to catastrophic events assumed wide areas with groundwater impacted from CO_2 seeps which would require groundwater remediation and providing alternative water

supplies to affected residents. Detailed description of each event is in Section 5 - Emergency and Remedial Response Plan.

Table 4-16. Emergency and Remedial Response Costs

Response Actions for Emergency Scenarios		
Risk	**Injection or Monitoring Well Integrity Failure**	**Cost**
Minor	Verify integrity failure.	[redacted]
	Determine the cause and extent of failure.	[redacted]
	Identify and implement appropriate remedial action.	[redacted]
Serious	Implement site investigation to determine nature and extent, per the ERRP.	[redacted]
	Implement appropriate response, per the ERRP.	[redacted]
Risk	**Migration of CO_2 or Formation Fluid to a USDW**	**Cost**
Serious	Initiate shutdown plan.	[redacted]
	Conduct Hall Plot analysis.	[redacted]
	Collect water quality data in monitoring wells.	[redacted]
	Plume delineation via three additional monitoring well pairs.	[redacted]
	Develop and implement remedial action.	[redacted]
	Obtain thermal UAV data and analyze for caprock breach, as necessary.	[redacted]
	Arrange for an alternate potable water supply, as necessary.	[redacted]
	Remediation/repair of failed borehole.	[redacted]
	Lower injection rate and monitor for decreasing CO2/differential pressure.	[redacted]
	Identification of structural or confining zone failure.	[redacted]
	Appropriate survey identifying plume migration extent.	[redacted]
Risk	**Injection Well Monitoring Equipment Failure**	**Cost**
Minor	Repair damaged wellhead and perform verification survey.	[redacted]
	Repair faulty mechanical or electrical components.	[redacted]
	Evaluate failure via well pressure, temperature, and annulus pressure.	[redacted]
Major	In the event of a well blowout, “kill” the well via pumping fluid.	[redacted]
Risk	**Natural Disaster**	**Cost**
Minor	Identify and implement appropriate stabilization procedures.	[redacted]
Serious / Major	Identify and implement appropriate stabilization procedures.	[redacted]
	Monitor possible failure via well pressure, temp., and annulus pressure.	[redacted]
	Determine the cause and extent of failure.	[redacted]

Table 4-16. Emergency and Remedial Response Costs (cont.)

Risk	Induced seismic event	Cost
Serious / Major	Review seismic and operational data.	[redacted]
	Identify and implement appropriate stabilization procedures.	[redacted]
	Analysis of monitoring, seismic, and reported felt event data.	[redacted]
	Implementation of ERRP Green Operating State, per Table 11-3.	[redacted]
	Implementation of ERRP Yellow Operating State, per Table 11-3.	[redacted]
	Implementation of ERRP Orange Operating State, per Table 11-3.	[redacted]
	Implementation of ERRP Magenta Operating State, per Table 11-3.	[redacted]
	Implementation of ERRP Red Operating State, per Table 11-3.	[redacted]

Summary of Costs

The total estimated costs associated for a third party to take corrective actions at the Capio [redacted] CCS Well No. 1 facility are summarized below. The greatest amount estimated for a single emergency and remedial response action was used for the final category.

Summary of Costs	
Corrective Action:	[redacted]
Plugging Injection Well:	[redacted]
Post-Injection Site Care:	[redacted]
Site Closure:	[redacted]
Emergency and Remedial Response:	[redacted]
Total:	[redacted]