

## FINANCIAL ASSURANCE DEMONSTRATION

### 40 CFR 146.85

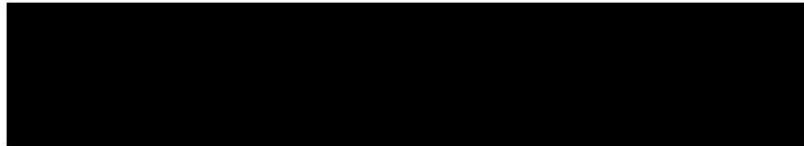


#### 1.0 Facility Information

Facility name: Sutter Energy Center



Facility contact:



Well location: Robbins, Sutter County, CA



[Redacted] is providing financial responsibility pursuant to 40 CFR 146.85.

**Table 1.** Cost Estimates for Activities to be Covered by Financial Responsibility.

Activity	Cost Estimate (\$)
Site Preparation	1,000,000
Construction of Surface Facilities	2,000,000
Construction of Subsurface Facilities	3,000,000
Initial Monitoring and Testing	500,000
Operational Monitoring and Testing	1,000,000
Abandonment and Reclamation	1,500,000
Administrative Costs	500,000
Total Cost Estimate	8,500,000

## 2.0 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 [REDACTED] 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). [REDACTED] is applying for three Class VI permits for the proposed construction and operation of three carbon dioxide (CO<sub>2</sub>) injection wells at a site in the Sutter County, California. This third-party cost estimate was prepared in support of that application.

## 3.0 Basis of Cost Estimates

[REDACTED] to provide a third-party cost estimate for the financial responsibility activities required by EPA. [REDACTED] 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 [REDACTED] professional judgment on the time required from other projects of similar scope. Additionally, EPA's Geologic CO<sub>2</sub> 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 May 2023 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.

[REDACTED] assumed the costs would be incurred via a third party without previous project knowledge and without the involvement of [REDACTED]. 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.

### 3.1 Area of Review and Corrective Action

The assessment of the AoR indicates there is a low probability of need for any corrective action on existing well bores located at or around the AoR. [REDACTED] legacy oil and gas production wells exist within the AoR, and records indicate the operators used good practices to plug and abandon the wells. The costs included in this portion of the permit include the plugging of [REDACTED]. Included in those costs are rig operations, pump operations, support equipment operation, technical oversite, site supervision, and cement operations. The post injection site care includes all the needed testing during and prior to the cessation of injection operations of the project. Site closure includes the retirement of proposed monitoring wells, and well pad removal. The emergency and remedial response include drilling

of a relief well to kill an injection well that may have blown out, entering a well that may charge up during injection operations, CO<sub>2</sub> migration into a USDW that requires remediation, and a surface brine spill.

### **3.2 Plugging Injection Wells**

The estimated costs in this section cover the plugging of the [REDACTED] injection wells 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 casing below the ground surface. 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 [REDACTED] previous experience with the costs incurred or estimated by subcontractors for this and other projects. On a per well basis, [REDACTED] estimates these costs will amount to [REDACTED] for a total of [REDACTED]. These costs are further broken down in Table 2.

**Table 2.** Plugging of injection well costs

Category	Cost Estimate
Well Plugging	[REDACTED]
Site Remediation	[REDACTED]
Structures and Appurtenances	[REDACTED]
Total	[REDACTED]

### **3.3 Post-Injection Site Care**

The estimated costs in this section cover the tracking and modeling of the plume during the [REDACTED]-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 [REDACTED] years following the cessation of injection. [REDACTED] 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, [REDACTED] 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 [REDACTED] previous experience with the costs incurred or estimated by subcontractors for this and other projects.

**Table 3.** Post Injection Site Care Costs

Category	Cost Estimate
Monitoring and Modeling	[REDACTED]
Site Closure	[REDACTED]
Administrative	[REDACTED]
Total	[REDACTED]

### **3.4 Site Closure**

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

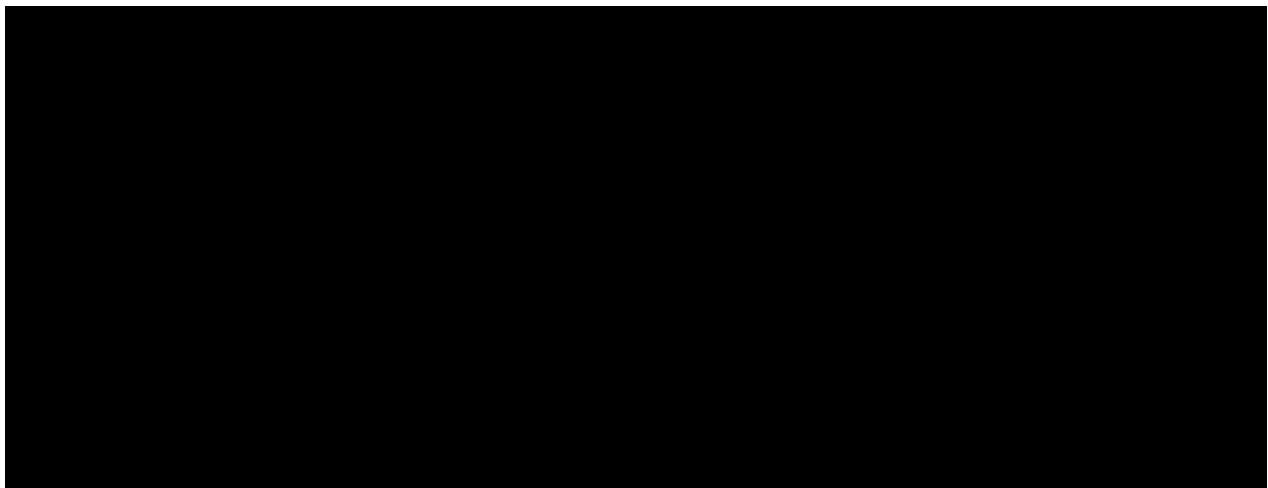
As in the previous sections, plugging of the LUSDW monitoring well includes mechanical integrity testing, plugging the hole with cement the entire depth of the well, and cutting the well off below the ground. All structures and appurtenances at the sites of the monitoring wells would be completely removed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

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

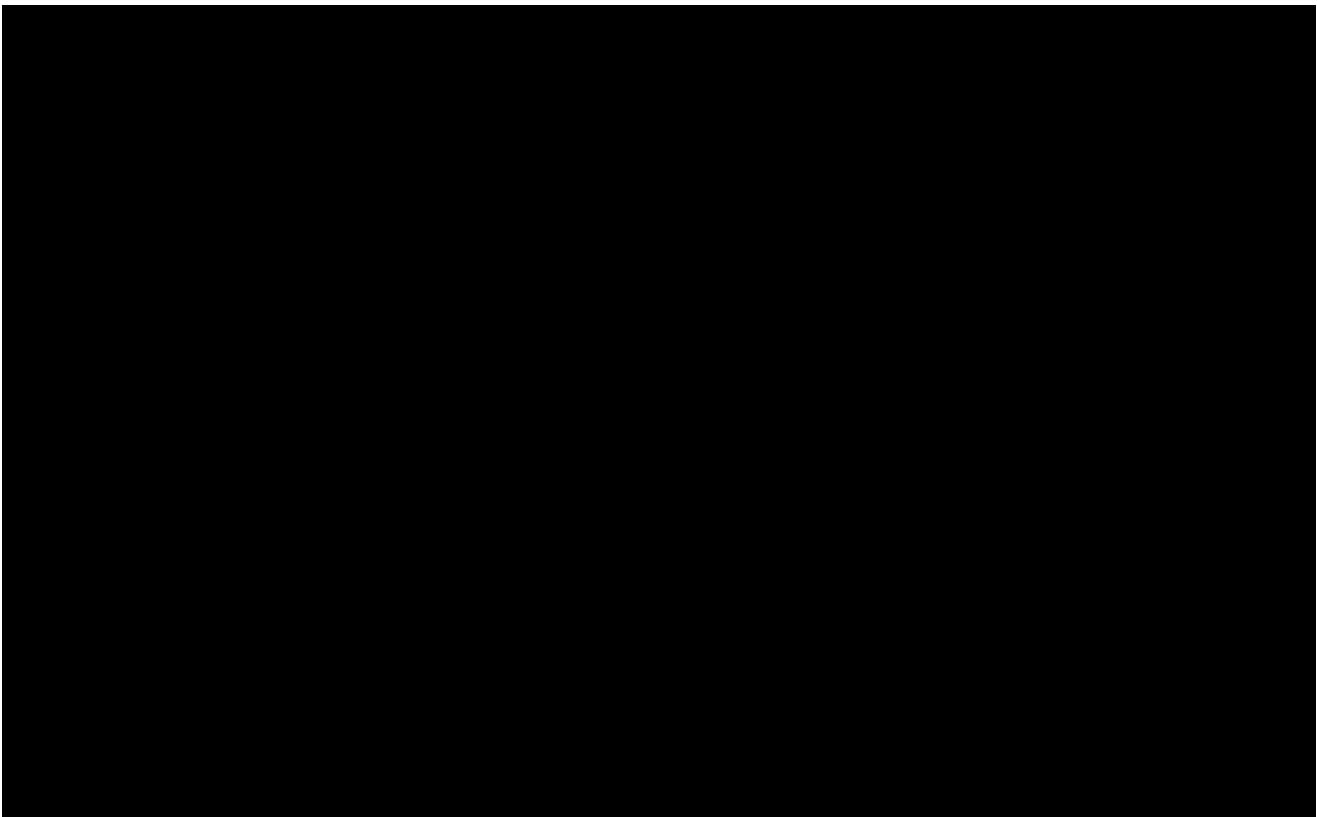
**Table 4.** Site Closure Costs

Category	Cost Estimate
Monitoring and Modeling	[REDACTED]
Site Closure	[REDACTED]
Administrative	[REDACTED]
Total	[REDACTED]

**Table 5.** Well Pad Removal Costs

A large black rectangular redaction box covering the content of Table 5.

**Table 6.** Well Abandonment Costs

A large black rectangular redaction box covering the content of Table 6.

#### **4.0 Emergency and Remedial Response**

The response to discovered CO<sub>2</sub> leaks, regardless of risk category, would be to plug leaks where possible, assess impacts to USDWs, and remediate any contamination of USDWs. 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 [REDACTED] experience. 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<sub>2</sub> seeps which would require groundwater remediation and providing alternative water supplies to affected residents.

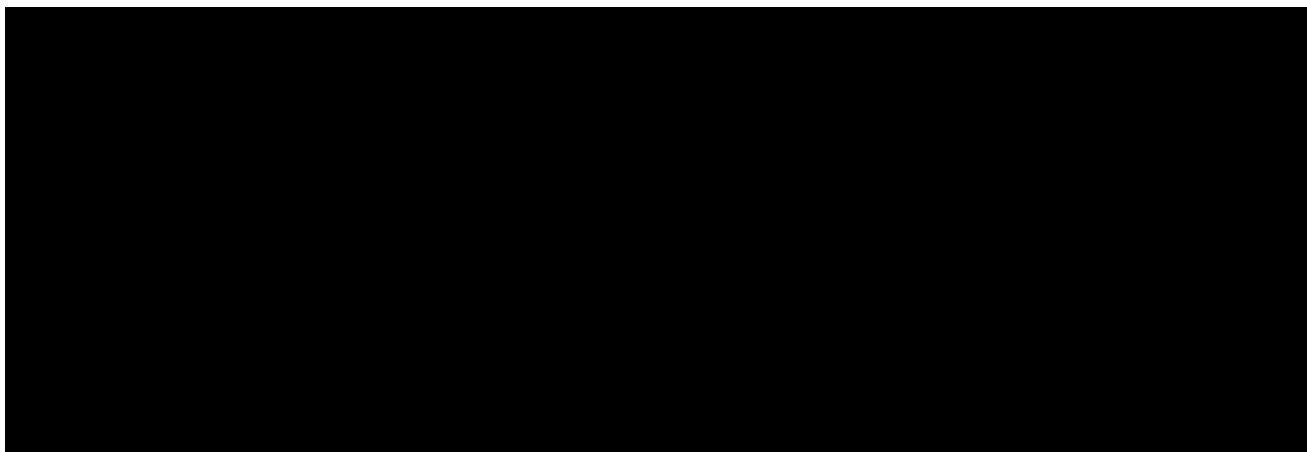
**Table 7.** Emergency and Remedial Response Costs

Category	Description	Cost (\$)
Emergency Response	Initial Response	1,000,000
Emergency Response	Containment	500,000
Emergency Response	Decontamination	300,000
Emergency Response	Remediation	1,000,000
Emergency Response	Water Supply	500,000
Emergency Response	Evacuation	1,000,000
Emergency Response	Health Monitoring	100,000
Emergency Response	Public Information	50,000
Emergency Response	Administrative	100,000
Emergency Response	Equipment	100,000
Emergency Response	Logistics	100,000
Emergency Response	Training	50,000
Emergency Response	Other	100,000
Remediation	Initial Response	1,000,000
Remediation	Containment	500,000
Remediation	Decontamination	300,000
Remediation	Remediation	1,000,000
Remediation	Water Supply	500,000
Remediation	Evacuation	1,000,000
Remediation	Health Monitoring	100,000
Remediation	Public Information	50,000
Remediation	Administrative	100,000
Remediation	Equipment	100,000
Remediation	Logistics	100,000
Remediation	Training	50,000
Remediation	Other	100,000
Health Monitoring	Initial Response	1,000,000
Health Monitoring	Containment	500,000
Health Monitoring	Decontamination	300,000
Health Monitoring	Remediation	1,000,000
Health Monitoring	Water Supply	500,000
Health Monitoring	Evacuation	1,000,000
Health Monitoring	Health Monitoring	100,000
Health Monitoring	Public Information	50,000
Health Monitoring	Administrative	100,000
Health Monitoring	Equipment	100,000
Health Monitoring	Logistics	100,000
Health Monitoring	Training	50,000
Health Monitoring	Other	100,000
Public Information	Initial Response	1,000,000
Public Information	Containment	500,000
Public Information	Decontamination	300,000
Public Information	Remediation	1,000,000
Public Information	Water Supply	500,000
Public Information	Evacuation	1,000,000
Public Information	Health Monitoring	100,000
Public Information	Public Information	50,000
Public Information	Administrative	100,000
Public Information	Equipment	100,000
Public Information	Logistics	100,000
Public Information	Training	50,000
Public Information	Other	100,000
Administrative	Initial Response	1,000,000
Administrative	Containment	500,000
Administrative	Decontamination	300,000
Administrative	Remediation	1,000,000
Administrative	Water Supply	500,000
Administrative	Evacuation	1,000,000
Administrative	Health Monitoring	100,000
Administrative	Public Information	50,000
Administrative	Administrative	100,000
Administrative	Equipment	100,000
Administrative	Logistics	100,000
Administrative	Training	50,000
Administrative	Other	100,000
Equipment	Initial Response	1,000,000
Equipment	Containment	500,000
Equipment	Decontamination	300,000
Equipment	Remediation	1,000,000
Equipment	Water Supply	500,000
Equipment	Evacuation	1,000,000
Equipment	Health Monitoring	100,000
Equipment	Public Information	50,000
Equipment	Administrative	100,000
Equipment	Equipment	100,000
Equipment	Logistics	100,000
Equipment	Training	50,000
Equipment	Other	100,000
Logistics	Initial Response	1,000,000
Logistics	Containment	500,000
Logistics	Decontamination	300,000
Logistics	Remediation	1,000,000
Logistics	Water Supply	500,000
Logistics	Evacuation	1,000,000
Logistics	Health Monitoring	100,000
Logistics	Public Information	50,000
Logistics	Administrative	100,000
Logistics	Equipment	100,000
Logistics	Logistics	100,000
Logistics	Training	50,000
Logistics	Other	100,000
Training	Initial Response	1,000,000
Training	Containment	500,000
Training	Decontamination	300,000
Training	Remediation	1,000,000
Training	Water Supply	500,000
Training	Evacuation	1,000,000
Training	Health Monitoring	100,000
Training	Public Information	50,000
Training	Administrative	100,000
Training	Equipment	100,000
Training	Logistics	100,000
Training	Training	50,000
Training	Other	100,000
Other	Initial Response	1,000,000
Other	Containment	500,000
Other	Decontamination	300,000
Other	Remediation	1,000,000
Other	Water Supply	500,000
Other	Evacuation	1,000,000
Other	Health Monitoring	100,000
Other	Public Information	50,000
Other	Administrative	100,000
Other	Equipment	100,000
Other	Logistics	100,000
Other	Training	50,000
Other	Other	100,000

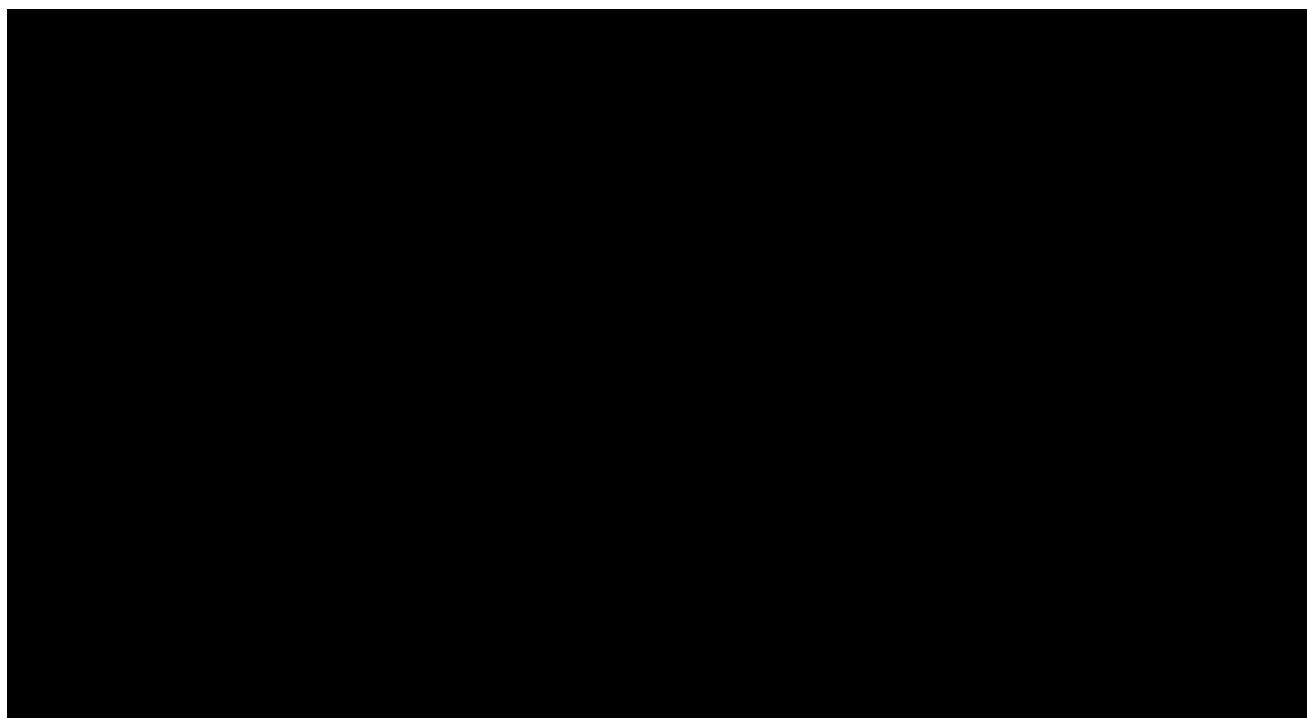
**Table 8.** Relief Well for CCS Blow Out

Category	Description	Cost (\$)
Initial Response	Initial Response	1,000,000
Containment	Containment	500,000
Decontamination	Decontamination	300,000
Remediation	Remediation	1,000,000
Water Supply	Water Supply	500,000
Evacuation	Evacuation	1,000,000
Health Monitoring	Health Monitoring	100,000
Public Information	Public Information	50,000
Administrative	Administrative	100,000
Equipment	Equipment	100,000
Logistics	Logistics	100,000
Training	Training	50,000
Other	Other	100,000

**Table 9.** Costs to Address Surface Brine Water Spill

A large black rectangular redaction box covering the majority of the page below the caption.

**Table 10.** Costs to Drill Relief Well

A large black rectangular redaction box covering the majority of the page below the caption.

**Table 11.** Remediate CO<sub>2</sub> Migration