FINANCIAL ASSURANCE DEMONSTRATION

40 CFR 146.85

[redacted]

1.0 Facility Information

Facility name: Sutter Energy Center [redacted]

Facility contact: [redacted]

Well location: Robbins, Sutter County, CA [redacted]

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

[redacted]

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

[redacted]

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_2) 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_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 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_2 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

[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

[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

[redacted]

Table 5. Well Pad Removal Costs

[redacted]

Table 6. Well Abandonment Costs

[redacted]

4.0 Emergency and Remedial Response

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. 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_2 seeps which would require groundwater remediation and providing alternative water supplies to affected residents.

Table 7. Emergency and Remedial Response Costs

[redacted]

Table 8. Relief Well for CCS Blow Out

[redacted]

Table 9. Costs to Address Surface Brine Water Spill

[redacted]

Table 10. Costs to Drill Relief Well

[redacted]

Table 11. Remediate CO_2 Migration