FINANCIAL ASSURANCE DEMONSTRATION
40 CFR 146.85

Project Name: Tri-State CCS Buckeye 1

Facility Information

Facility contact: Tri-State CCS, LLC
14302 FNB Parkway
Omaha, NE 68154
402-691-9500

Well locations: Carroll County, Ohio

Well Name	Latitude (WGS 84)	Longitude (WGS 84)
TB1-1	40.666280	-81.071521
TB1-2	40.645463	-81.015330
TB1-3	40.610714	-81.028986
TB1-4	40.511233	-81.025860

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List of Acronyms

AoR	Area of Review
CCS	Carbon capture and storage
CO_2	Carbon dioxide
TBD	To Be Decided
TB1- (#)	Tri-State CCS Buckeye 1 injection well number
UIC	Underground Injection Control
U.S. EPA	U.S. Environmental Protection Agency

1. Introduction

Tri-State CCS, LLC will provide financial responsibility pursuant to 40 CFR 146.85. Tri-State CCS, LLC is planning to use one of the qualifying instruments listed at 40 CFR 146.85(a)(1) to cover the costs of corrective action, plugging injection wells, post-injection site care, site closure, and emergency and remedial response associated with Tri-State CCS Buckeye 1 in Carroll County, Ohio (the "project').

Tri-State CCS, LLC contracted with Projeo Corporation (Projeo) to provide a third-party estimate of Financial Responsibility for the project. To determine the costs for the coverage amounts underpinning this Financial Responsibility Demonstration, Projeo used currently available price quotes (in Year 2024 dollars) and assumed the hiring of independent, third-party contractors for each Financial Responsibility activity. The estimated costs of each of these activities are presented in Table 1 below.

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

Activity	Approximate Timeline of Coverage	Total Current Cost Estimate
Corrective Action		
KIC Injection	2027-2057	$26,802,750
MIC Injection	2057-2087	$35,255,925
MIC Monitoring	2057-2087	$ 5,276,250
Injection Well Plugging	2087-2092	$ 739,700
Post-Injection Site Care	2087-2137	$11,296,100
Site Closure	2137	$ 1,487,801
Emergency and Remedial Response	2027-2137	$35,066,334
	Total	**$115,924,860**

Consistent with U.S. EPA's July 2011 guidance, Tri-State CCS, LLC provides this demonstration of Financial Responsibility with the understanding that the financial instruments referenced herein will be updated and verified over time. As each activity is initiated, Tri-State CCS, LLC will ensure that the coverage limits provided by the respective Financial Responsibility mechanisms are sufficient to cover the corresponding project costs prior to initiating the next project phase. All adjustments will be submitted for approval by the UIC Program Director and prior to any adjustment to the coverage amounts of the financial responsibility instruments.

2. Discussion of Financial Responsibility Activities and Cost Estimates

The costs estimated in Table 2 are based on quotes and technical data available during the permit application development process and are projected to cover the cost of employing an independent third-party subcontractor to perform the services or procurement of requisite goods. These estimates are based upon historic price data from other projects managed by Tri-State CCS, LLC and its project partners, cost quotes from third-party companies, regulatory guidance documents, and a best judgment about the level of effort required to complete an activity.

2.1. Corrective Action

As discussed in the Area of Review and Corrective Action Plan, Tri-State CCS, LLC has determined that there are at least 428 wells in the AoR that penetrate the Rochester Shale Formation (confining zone for the Medina Injection Complex (MIC)), with at least 20 of those wells also penetrating the Wells Creek Formation (confining zone for the Knox Injection Complex (KIC)). Additionally, there are 110 wells for which the location is known but not the depth. The Area of Review and Corrective Action Plan states that all 538 of these wells will be assessed to determine if corrective action is necessary. Since the operating plan for the project is to inject first in the KIC for 30 years followed by injection into the MIC for 30 years, Tri-State CCS, LLC plans to phase the assessment and corrective action based on the temporal evolution of the threshold pressure boundary and CO_2 plume over injection into either the KIC or MIC. For purposes of estimating corrective action costs now, prior to assessment, it is assumed that all wells in the KIC will require corrective action that involves well plugging with CO_2 compatible cement. Additionally, all wells in the MIC are assumed to require corrective action except for the 237 wells that sit between the 30-year pressure plume + 1 mile boundary and the AOR boundary (Table 2). Those wells will be monitored during MIC injection to determine if corrective action is needed.

The proposed monitoring during MIC injection includes downhole sensors installed in all 132 wells corrected between the modeled pressure front polygons at 20-years and 30-years of injection into MIC + 1 mile to account for uncertainty in modeling inputs similar to how the AoR was defined. Additionally, an optimized distribution of downhole sensors, based on the plume growth and most recent understanding of the subsurface, will be employed within the remaining 39 wells subject to corrective action in the MIC to allow for accurate plume tracking and a responsive corrective action program (Table 2). Electromagnetic surveys will be conducted every 5 years during the injection into the MIC and surface CO_2 sensors will be installed on a quarter of the remaining 237 wells. In actuality, it is likely that the number of wells requiring corrective action will decrease and not all wells will require the level of corrective action assumed.

Estimated well plugging costs are $206,175 per well. This is based on a compilation of experience with plugging wells associated with storage projects. The plugging cost estimate includes locating the well, assessing its status, and plugging to current standards. A generalized procedure for conducting corrective action is described in the Area of Review and Corrective Action Plan.

Total plugging costs for up to 301 wells at $206,175 per well and monitoring an additional 237 wells amounts to $67,334,925, which includes 110 wells for which there is no depth information available and may be lower as detailed in Table 1. Table 2 shows the phased cost.

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Table 2: Worst case scenario of wells requiring corrective action, phased based on the temporal evolution of the threshold pressure boundary and the CO_2 plume.

Corrective Action Timeline		Rose Run (with depth info)	Rose Run (without depth info)	Medina (with depth info)	Total Wells Corrected	Total Cost
Before Injection Starts	Total wells intersected by modeled KIC pressure front between 0 and 5 yrs of injection into KIC	3	1	0	13	$ 2,680,275
	Total wells intersected by modeled KIC pressure front between 5 and 10 yrs of injection into KIC	1	5	0		
	Total wells intersected by modeled KIC plume at site closure	2	1	0		
8th year of Injection	Total wells intersected by modeled KIC pressure front between 10 and 20 yrs of injection into KIC	5	4	0	9	$ 1,855,575
18th year of Injection	Total wells intersected by modeled KIC pressure front between 20 and 30 yrs of injection into KIC	4	25	0	29	$ 5,979,075
25th year of Injection	Total wells intersected by modeled KIC pressure front between 30 yrs of injection into KIC and AoR boundary	5	74	0	104	$ 21,442,200
	Total wells intersected by modeled MIC pressure front between 0 and 5 yrs of injection into MIC	0	0	6		
	Total wells intersected by modeled MIC pressure front between 5 and 10 yrs of injection into MIC	0	0	10		
	Total wells intersected by modeled MIC plume at site closure	0	0	9		
38th year of Injection	Total wells intersected by modeled MIC pressure front between 10 and 20 yrs of injection into MIC	0	0	14	14	$ 2,886,450
48th year of Injection	Total wells intersected by modeled MIC pressure front between 20 and 30 yrs of injection into MIC	0	0	37	37	$ 7,628,475
55th year of Injection	Total remaining wells intersected by modeled MIC pressure front at 30 yrs injection + 1-mile into MIC	0	0	95	95	$ 19,586,625
	Total wells between modeled MIC 30-year plume + 1-mile and AoR boundary - These wells will be monitored and corrected as necessitated by the development of the plume	0	0	237	237	$ 4,536,000
				TOTAL	**538**	**$64,266,675**

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2.2. Plugging Injection Wells

In estimating Financial Responsibility coverage values for injection well plugging, it was assumed that all injection wells would first be converted to in-zone observation wells after cessation of CO_2 injection into the MIC in Year 2087, that these wells would monitor pressure for 5 years post-injection and subsequently be plugged in Year 2092. Injection well plugging is detailed in the Plugging Plan for each well and assumed to fill the entire wellbore with cement. Costs for plugging and abandoning wells are based on regional estimated costs associated with the plugging of oil, gas, and disposal wells. Based on current information, the injection well plugging and abandonment costs are estimated at approximately $184,925 per injection well for a total of $739,700 for four wells (in Year 2024 dollars). Note that this cost is less than that associated with plugging legacy wells, as the injection wells would have already been completed to Class VI standards.

2.3. Post-Injection Site Care

Tri-State CCS, LLC's activities during the Post-Injection Site Care (PISC) time period are discussed in the Post-Injection Site Care and Site Closure Plan. The activities include monitoring for a period of 50 years once injection ceases, on-going well maintenance, periodic reevaluation of the AoR, maintenance of associated facilities, and field personnel costs. Tri-State CCS, LLC anticipates that the PISC activity will begin in Year 2087, after injection ceases, and continue through Year 2137. The total Financial Responsibility cost estimate for PISC is $11,296,100 (in Year 2024 dollars), based on industry estimates and independent, third-party engineering data, some of which is based on regional experience with oil, gas, and disposal well site care.

2.4. Site Closure

The Financial Responsibility rules state that the well sites must be returned to original conditions, and the observation wells must be securely plugged and abandoned (P&A). Tri-State CCS, LLC's activities for site closure, including the plugging and abandonment of project wells and site remediation, are detailed in the Post-Injection Site Care and Site Closure Plan. It was assumed that site closure activity will occur in Year 2137 for this estimate. The total Financial Responsibility cost estimate for site closure is $1,487,801 (in Year 2024 dollars), based on industry estimates and independent, third-party engineering data, some of which is based on regional experience with oil, gas, and disposal well site closure.

2.5. Emergency and Remedial Response

A leakage scenario could result from a loss of mechanical integrity in the wellbore or a loss of geologic containment in the confining interval. The Financial Responsibility estimate assumed a CO_2 leak from the injection interval due to the loss of mechanical integrity in an injection well. The cost estimate assumed a rapid remedial response and includes the cost of the following:

- Isolating the leak
- Controlling the leaky project well
- Plugging the leaky project well
- Safely disposing any produced fluids

- Drilling a relief well
- Drilling additional in-zone and above-zone monitoring wells

The total estimated cost for this emergency and remedial response scenario is $35,066,664.

3. Plan for Financial Mechanisms

Tri-State CCS, LLC intends to demonstrate Financial Responsibility for the project by executing a combination of qualifying instruments. For Corrective Action, Injection Well Plugging, Post-Injection Site Care, and Site Closure, Tri-State CCS, LLC intends to use an instrument with a pay-in schedule and attendant balance to assure sufficient monies are available in the future to cover estimated costs for each activity during its anticipated timeline, including to account for phasing of the Corrective Action timeline. Tri-State CCS, LLC will ensure that any third parties used will have a credit rating in the top four categories from either Standard & Poor's or Moody's, or a comparable rating from another credible credit rating agency. Additionally, Tri-State CCS, LLC will ensure that each instrument comprises the protective conditions of coverage in 40 CFR 146.85(a)(4). The financial mechanisms will provide appropriate assurances to the UIC Program Director of Tri-State CCS, LLC's ability to fulfill its financial responsibilities for the project.