ATTACHMENT C

FINANCIAL ASSURANCE DEMONSTRATION [40 CFR 146.85]

1. FACILITY INFORMATION

Facility Name: CarbonFrontier

Facility Contact: Faisal Latif, Storage Development Manager
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Well Locations:

Well Number	County, State	Latitude	Longitude
CI1-64Z-27N	Kern County, CA	35°33'9.4877"N	119°48'26.3702"W
CI2-64Z-35N	Kern County, CA	35°32'32.6713"N	119°47'37.0682"W
CI3-64Z-35N	Kern County, CA	35°32'11.6457"N	119°47'7.5912"W
CI4-64Z-35N	Kern County, CA	35°31'55.4154"N	119°46'51.7864"W
27R-27N	Kern County, CA	35°33'2.4280"N	119°48'28.6103"W
55-26N	Kern County, CA	35°32'43.2520"N	119°47'32.7755"W
64-35N	Kern County, CA	35°31'44.3600"N	119°46'44.9788"W
9-1N	Kern County, CA	35°31'31.6480"N	119°46'37.0154"W
64-27N	Kern County, CA	35°32'38.0979"N	119°47'54.6576"W

Version History

File Name	Version	Date	Description of Change
Attachment C – Aera CCS Financial Responsibility Demonstration.pdf	1	January 19, 2023	Original document
Att C – CarbonFrontier Financial Responsibility Demonstration_REV1_03062023.pdf	2	March 6, 2023	Revisions made based on EPA administrative review comments from February 23, 2023
Attachment C – CarbonFrontier Financial Responsibility Demonstration V3 04182024.pdf	3	April 18, 2024	Revisions made based on costs of additional monitoring well and revised Emergency and Remedial Response
Attachment C – CarbonFrontier Financial Responsibility Demonstration V4 10152024.pdf	4	October 15, 2024	Revisions made based on EPA Technical Review comments from September 12, 2024

This financial assurance demonstration describes how Aera Energy LLC (Aera) will meet the requirements for Title 40 of the Code of Federal Regulations (CFR) 146.85. Required activities

for all nine proposed Class VI injection wells and five monitoring wells for the CarbonFrontier CCS Project are assessed collectively in this demonstration.

2. FINANCIAL INSTRUMENTS [40 CFR 146.85(A)]

Aera is currently evaluating qualifying financial instruments with the support of finance professionals and insurance brokers to fulfill the financial responsibility requirements of 40 CFR 146.85(a). Aera will provide the Underground Injection Control (UIC) Program Director with updates as instrument selections are finalized and will submit the required documentation when instruments are secured, prior to permit approval.

3. COST ESTIMATES [40 CFR 146.85(C)]

Cost estimates for the required activities were prepared by SLB and additional vendors in 2022 with revision in 2024 (**Table 1**). These estimates, reported in 2024 dollars, are based on costs incurred and/or forecasted by comparable oil and gas operations and other carbon capture and storage projects, and assume that activities will be conducted by third-party service providers. Itemized third-party cost estimates for project activities are provided as **Appendix A**.

Table 1: Cost Estimate for All Project Activities to be Covered

Activity	Estimated Cost (2024 USD)
Corrective Action on Wells in the AoR	$0
Plugging of Injection Wells	$2,142,000
Post-Injection Site Care and Closure	$9,513,000
Emergency and Remedial Response	$7,683,000
Total:	**$19,338,000**

4. UPDATES TO FINANCIAL ASSURANCE [40 CFR 146.85(C)(2)(3)(4)]:

As part of the requirements under 40 CFR 146.85(c), cost estimates will be updated during the active life of the project and provided to the UIC Program Director within 60 days prior to the anniversary date of the establishment of the financial instrument(s) and within 60 days of any amendments to the AoR and Corrective Action Plan, Injection Well Plugging Plan, the PISC and Site Closure Plan, and the ERRP. If the cost estimates increase to an amount greater than the face value of the financial instrument(s) in use, Aera will increase the face amount of the existing instrument(s) or acquire additional financial instruments within 60 days and submit evidence to the UIC Program Director.

Appendix A

Financial Responsibility Demonstration Cost Estimate

CarbonFrontier

ATTACHMENT C - FINANCIAL ASSURANCE DEMONSTRATION

Appendix A – Financial Responsibility Demonstration Cost Estimate

1.1 Performing Corrective Action on Wells in the Area of Review (AoR)

As described in the Corrective Action Plan (**Attachment B**), Aera has elected to perform the corrective action on wells within the AoR prior to initiation of injection. For that reason, costs are estimated at $0 and no financial instrument will be needed for corrective action.

1.2 Plugging of Injection Wells

The Injection Well Plugging Plan (**Attachment F**) describes the plugging procedures for both new and repurposed Class VI injection wells. Because of similarities in depth, construction, plugging procedure and costs for plugging of repurposed and newly drilled injection wells, a single summary of plugging costs for all nine injection wells is presented in **Table 1**.

Table 1: Injection Well Plugging Cost Estimate for New and Repurposed Wells

Activity Per Well	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Mobilization	1	each	$50,000	$50,000	8%	$54,000
Rig Cost	4	day	$10,000	$40,000	8%	$43,000
Reporting	1	each	$10,000	$10,000	8%	$11,000
CT Cementing	1	well	$75,000	$75,000	8%	$81,000
Testing and Logging	1	well	$45,000	$45,000	8%	$49,000
					Total Per Well	$238,000
Activity	**Unit**		**Unit Cost (2024)**			**Total Estimated Cost (2024 USD)**
Injection Well Plugging	9	wells	$238,000			$2,142,000
					Injection Well Plugging Total	**$2,142,000**

Notes:

Third Party cost estimate provided by SLB, 2022.

Total cost rounded to the nearest $1,000.

1.3 Post-Injection Site Care and Closure

The Post-Injection Site Care (PISC) and Site Closure Plan is described in **Attachment G** and details the plume, pressure front, and groundwater monitoring activities that will be performed during the post injection period and their frequencies. This plan also describes the process for decommissioning monitoring wells and closing the site. The duration of the PISC period is discussed in the Alternative PISC Timeframe section (**Attachment H**). PISC cost estimates are

presented in **Table 2** while Site Closure costs are estimated in **Table 3**. Total combined costs for both PISC and Site Closure are estimated at $9,513,000.

Table 2: Post-Injection Site Care Cost Estimate

Activity	Unit		Events over 15 Year PISC	Unit Cost	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Injection and Above Zone Fluid Monitoring	5	wells	7	$15,000	$525,000	8%	$567,000
Injection and Above Zone Logging	5	wells	7	$30,000	$1,050,000	8%	$1,134,000
Quarterly Pressure Monitoring	5	wells	60	$13,000	$3,900,000	8%	$4,212,000
Continuous Temperature Monitoring	4	wells	15	$22,500	--	--	$1,350,000
Project management	1	each	15	$22,500	$337,500	8%	$365,000
Annual Post-Injection Reports	1	each	15	$10,000	$150,000	8%	$162,000
						PISC Costs Total	**$7,790,000**

Notes:
Third Party cost estimate provided by SLB, 2022, except Continuous Temperature Monitoring, provided by SLB, 2024.
Continuous temperature monitoring by DTS in four monitoring wells (1-28N, 39-26N, 27-1N, and 25-26N)
Fluid monitoring, logging, and pressure monitoring in all five monitoring wells (1-28N, 39-26N, 27-1N, 25-26N, and 35X-27N)
Total cost rounded to the nearest $1,000.

Table 3: Site Closure Cost Estimate

Activity Per Well	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Perform Non-Endangerment Demonstration	20	days	$9,750	$195,000	8%	$211,000
Monitoring Well Plugging	5	wells	$220,000	$1,100,000	8%	$1,188,000
Facility Closure	30	days	$10,000	$300,000	8%	$324,000
					Site Closure Costs Total	**$1,723,000**

Notes:
Third Party cost estimate provided by SLB, 2022.
Non-Endangerment Demonstration and Facility Closure assume effort by 5 personnel.
Total cost rounded to the nearest $1,000.

1.4 Emergency and Remedial Response (Including Endangerment to USDW)

Cost estimates for emergency and remedial response activities are complicated by the uncertainty as to whether such events will occur and the nature of the events, and therefore the cost of responding. Emergency events and response actions are described in the Emergency and Remedial Response Plan (ERRP, **Attachment I**). Cost estimates are based on the response actions to the major event scenarios. A summary of the emergency events and cost estimates for a major event are shown in **Table 4**. Itemized third-party estimates for each event are given in **Tables 4.1-4.5.**

Due to the low probabilities of event occurrence and the statistically improbable likelihood of multiple failures occurring over the course of the project lifetime, the single highest cost scenario was selected as the value for financial assurance. This scenario accounts for the emergency and remedial response actions to a major seismic event causing leakage of CO_2 and/or formation fluids to an underground source of drinking water (USDW) and plugging of a damaged legacy well. These conservative response actions include incident assessment and testing of wells and pipelines, geophysical surveys to identify subsurface leakage, surface and near-surface monitoring, corrective action of a damaged well, and completion of groundwater remediation.

Table 4: Summary of Emergency and Remedial Response Cost Estimate

Emergency Scenario	Estimated Cost (2024 USD)
Injection and/or Monitoring Well Integrity Failure	$5,921,000
Injection Well Monitoring Equipment Failure	$159,000
Fluid or CO_2 leakage to USDW or the Land Surface	$6,474,000
Natural Disaster	$7,683,000
Induced Seismic Event	**$7,683,000**

Table 4.1: Injection and Monitoring Well Integrity Failure Cost Estimate

Activity	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Incident Assessment	2	day	$10,000	$20,000	8%	$21,600
Incident Logging	1	log	$45,000	$45,000	8%	$48,600
Soil Gas sampling and analysis	1	each	$15,000	$15,000	8%	$16,200
FLIR camera leak detection and analysis	1	each	$7,000	$7,000	8%	$7,560
Fluid Sampling and Analysis	1	each	$20,000	$20,000	8%	$21,600
Groundwater Remediation P&T System	1	each	$5,375,000	$5,375,000	8%	$5,805,000
					Total	**$5,920,560**

Notes:
Groundwater remediation assumes drilling an extraction well with operations and maintenance (O&M) costs for 5 years.
Third Party cost estimate provided by SLB, 2022, except, soil gas and FLIR camera cost estimates provided by Geosyntec Consultants, 2022.
P&T: pump and treat

Table 4.2: Injection and Monitoring Well Equipment Failure Cost Estimate

Activity	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Incident Assessment - Field Investigation	1	day	$10,000	$10,000	8%	$10,800
Incident Logging	1	log	$45,000	$45,000	8%	$48,600
Soil gas sampling and analysis	1	each	$15,000	$15,000	8%	$16,200
FLIR camera leak detection and analysis	1	each	$7,000	$7,000	8%	$7,560
Fluid Sampling and Analysis	1	each	$20,000	$20,000	8%	$21,600
Pipeline Analysis	1	each	$50,000	$50,000	8%	$54,000
					Total	**$158,760**

Notes:
Groundwater remediation assumes drilling an extraction well with O&M costs for 5 years.
Third Party cost estimate provided by SLB, 2022, except, soil gas and FLIR camera cost estimates provided by Geosyntec Consultants, 2022.

Table 4.3: Fluid or CO_2 Leakage to Freshwater Aquifer or Surface Cost Estimate

Activity	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Incident Assessment - Field Investigation	3	day	$10,000	$30,000	8%	$32,400
Incident Logging	1	log	$45,000	$45,000	8%	$48,600
Fluid Sampling and Analysis	1	each	$20,000	$20,000	8%	$21,600
Geophysical Surveys	2	sq mile	$95,000	$190,000	8%	$205,200
Geophysical Survey Interpretation	2	sq mile	$25,000	$50,000	8%	$54,000
Soil gas sampling and analysis	1	each	$15,000	$15,000	8%	$16,200
FLIR camera leak detection and analysis	1	each	$7,000	$7,000	8%	$7,560
Pipeline Analysis	1	each	$50,000	$50,000	8%	$54,000
Damaged Legacy Well Assessment - Field Investigation	14	day	$10,000	$140,000	8%	$151,200
Damaged Well Logging	1	day	$50,000	$50,000	8%	$54,000
Damaged Legacy Well P&A	1	day	$22,000	$22,000	8%	$23,760
Groundwater Remediation P&T System	1	each	$5,375,000	$5,375,000	8%	$5,805,000
					Total	**$6,473,520**

Notes:
Geophysical surveys assumed to investigate 2 square miles of area surrounding identified fluid or CO_2 leakage pathway.
Event assumes one legacy well will require corrective action.
Groundwater remediation assumes drilling an extraction well with O&M costs for 5 years.

Third Party cost estimate provided by SLB, 2022, except, soil gas and FLIR camera cost estimates provided by Geosyntec Consultants, 2022.
P&A: plugging and abandonment
sq mile: square mile

Table 4.4: Natural Disaster Cost Estimate

Activity	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Incident Assessment - Field Investigation	3	day	$10,000	$30,000	8%	$32,400
Incident Logging	1	log	$45,000	$45,000	8%	$48,600
Fluid Sampling and Analysis	1	each	$20,000	$20,000	8%	$21,600
Geophysical Surveys	10	sq mile	$95,000	$950,000	8%	$1,026,000
Geophysical Survey Interpretation	10	sq mile	$25,000	$250,000	8%	$270,000
Soil gas sampling and analysis	1	each	$15,000	$15,000	8%	$16,200
FLIR camera leak detection and analysis	1	each	$7,000	$7,000	8%	$7,560
Pipeline Analysis	1	each	$50,000	$50,000	8%	$54,000
Damaged Legacy Well Assessment - Field Investigation	30	day	$10,000	$300,000	8%	$324,000
Damaged Well Logging	1	day	$50,000	$50,000	8%	$54,000
Damaged Legacy Well P&A	1	day	$22,000	$22,000	8%	$23,760
Groundwater Remediation P&T System	1	each	$5,375,000	$5,375,000	8%	$5,805,000
					Total	**$7,683,120**

Notes:
Geophysical surveys assumed to investigate 10 square miles of area surrounding earthquake epicenter and potentially damaged wells.
Event assumes one legacy well will require corrective action.
Groundwater remediation assumes drilling an extraction well with O&M costs for 5 years.
Third Party cost estimate provided by SLB, 2022, except, soil gas and FLIR camera cost estimates provided by Geosyntec Consultants, 2022.

Table 4.5: Induced Seismic Event Cost Estimate

Activity	Unit		Unit Cost (2022 USD)	Total Estimated Cost (2022 USD)	Inflation	Total Estimated Cost (2024 USD)
Incident Assessment - Field Investigation	3	day	$10,000	$30,000	8%	$32,400
Incident Logging	1	log	$45,000	$45,000	8%	$48,600
Fluid Sampling and Analysis	1	each	$20,000	$20,000	8%	$21,600
Geophysical Surveys	10	sq mile	$95,000	$950,000	8%	$1,026,000
Geophysical Survey Interpretation	10	sq mile	$25,000	$250,000	8%	$270,000
Soil gas sampling and analysis	1	each	$15,000	$15,000	8%	$16,200

FLIR camera leak detection and analysis	1	each	$7,000	$7,000	8%	$7,560
Pipeline Analysis	1	each	$50,000	$50,000	8%	$54,000
Damaged Legacy Well Assessment - Field Investigation	30	day	$10,000	$300,000	8%	$324,000
Damaged Well Logging	1	day	$50,000	$50,000	8%	$54,000
Damaged Legacy Well P&A	1	day	$22,000	$22,000	8%	$23,760
Groundwater Remediation P&T System	1	each	$5,375,000	$5,375,000	8%	$5,805,000
					Total	**$7,683,120**

Notes:
Geophysical surveys assumed to investigate 10 square miles of area surrounding earthquake epicenter and potentially damaged wells.
Event assumes one legacy well will require corrective action.
Groundwater remediation assumes drilling an extraction well with O&M costs for 5 years.
Third Party cost estimate provided by SLB, 2022, except, soil gas and FLIR camera cost estimates provided by Geosyntec Consultants, 2022.