

PROPOSED PRE-OPERATIONAL TESTING

Pelican Sequestration Project

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1.0 Facility Information

Facility name: Pelican CO₂ Sequestration Project
Pelican CCS 1 Well

Facility contact: [REDACTED], Project Manager
5 Greenway Plaza Houston, TX 77046
[REDACTED]

Well location: Holden, Livingston Parish, Louisiana
[REDACTED] (NAD 1927, BLM Zone 15N)

The testing activities at the Pelican CCS 1 described in this attachment are restricted to the pre-injection phase. Testing and monitoring activities during the injection and post-injection phases are described in the Testing and Monitoring Plan, along with other non-well related pre-injection baseline activities such as geochemical monitoring.

The Pelican Sequestration Hub will construct a new well for injection, Pelican CCS 1, [REDACTED]
[REDACTED]

The Pelican MLR 4 stratigraphic well was drilled in 2022, [REDACTED] to the south of the proposed Pelican CCS 1 and acquired advanced geophysical logs as well as [REDACTED] ft of full core and [REDACTED] of SWC. The Project also performed a step rate test in the prospect reservoir and formation integrity test on the proposed confining zone. The results and summary of the data acquisition program for Pelican MLR 4 are shown in Appendix C in the AOR attachment. Pelican MLR 4 stratigraphic well was temporarily abandoned and will be re-completed as In Zone Monitoring well for the project.

2.0 Pre-Injection Test Plan – Injection Well Pelican CCS 1

The following tests and logs will be conducted during drilling, casing installation, and after casing installation in the Pelican CCS 1 in accordance with the testing required under 40 CFR 146.87(a), (b), (c), and (d).

The Pelican CCS 1 well testing program includes a combination of advanced logging, sidewall coring, and formation hydrogeologic testing. This program is complemented with an extensive data acquisition program in the stratigraphic well as well as in the proposed monitoring wells. The pre-operational testing program will determine or verify the depth, thickness, mineralogy, lithology, porosity, and permeability information of the injection zone, overlying confining zone, and other relevant geologic formations. Salinity of formation fluids will also be determined. Table POT-1 lists the logs, tests, and surveys proposed for the Pelican CCS 1 well to comply with 40 CFR 146.87 (a).

Table POT-1—Logs, Test and Surveys for Pelican CCS 1 [(40 CFR 146.87 (a))]

[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a) (3) (i)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a) (3) (i)]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
Cased Hole Logs and surveys Before Injection		
[REDACTED] [40 CFR 146.87 (a)(2) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(3) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (i)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (iv)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (iii)]	[REDACTED]	[REDACTED]

The long string section of Pelican CCS 1 will be drilled with [REDACTED] mud in order to ensure well stability while drilling, logging, and cementing. [REDACTED]

The project will not collect full core while drilling the long string section in Pelican CCS 1, only side wall cores, as allowed by the hole condition. The Pelican Sequestration Hub, LLC will also collect water samples in the injection zone as shown in table POT-2.

As part of the data acquisition program for the Pelican Site, the project acquired reservoir pressure and water samples in 2022 for the reservoir in Pelican MLR 4 stratigraphic well. The project is also planning to acquire additional water samples and pressure in the reservoir, above confining zone, and overburden in the Pelican MLR 1 and Pelican MLR 2. This data will complement the proposed acquisition for the Pelican CCS 1.

Table POT-2—Sidewall cores and water sampling for Pelican CCS 1 (40 CFR 146.87 (b))

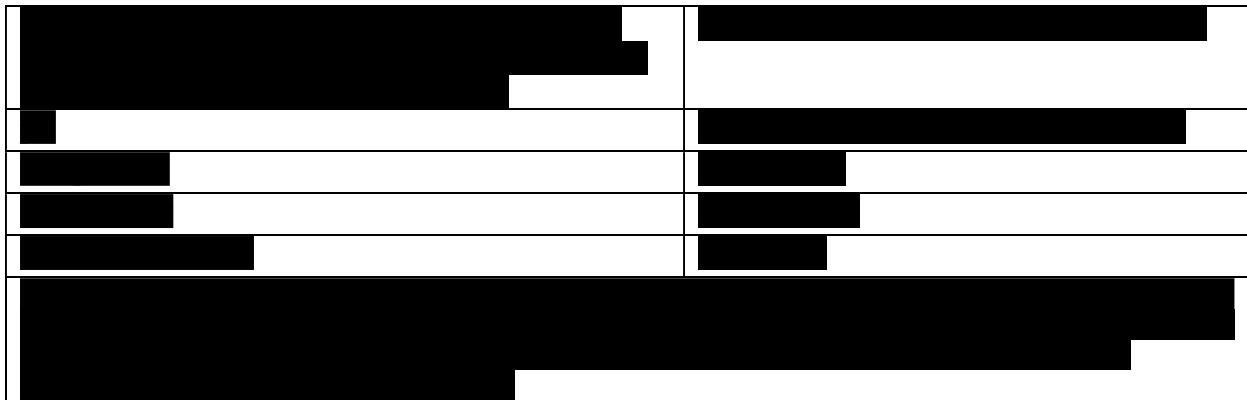
Method	Interval (ft)	Samples	Purpose
Method A	10 ft	10 samples	Geological
Method B	15 ft	8 samples	Geological

Pelican Sequestration Hub, LLC, will record the fluid temperature and reservoir pressure obtained from the wireline tool while taking the water samples. The project also plans to install downhole gauges that will allow us to determine original pressure and temperature at top of the perforations.

The project will send the water samples to a third-party lab for a complete analysis including pH, conductivity, major cations, major anions, trace metals, dissolved gases, density, and TDS among others. Table POT-3 shows the analytics to be characterized in the reservoir samples defined as minimum by the project (**40 CFR 146.87 (d)(3)**).

Table POT-3—Analyses and Methods for Water Samples Testing in reservoir, above confining zone and overburden

Parameter	Analytical Method
Parameter 1	Method A (black), Method B (white), Method C (black)
Parameter 2	Method A (black), Method B (white), Method C (black)
Parameter 3	Method A (black), Method B (white), Method C (black)
Parameter 4	Method A (black), Method B (white), Method C (black)
Parameter 5	Method A (black), Method B (white), Method C (black)
Parameter 6	Method A (black), Method B (white), Method C (black)
Parameter 7	Method A (black), Method B (white), Method C (black)
Parameter 8	Method A (black), Method B (white), Method C (black)
Parameter 9	Method A (black), Method B (white), Method C (black)
Parameter 10	Method A (black), Method B (white), Method C (black)



The static fluid level of the injection zones will be determined during the step rate test and fall off test (**40 CFR 146.87 (c)**). The Pelican Sequestration Hub, LLC does not recommend acquiring the fluid samples though the open hole DST or swabbing after the well is closed due to the excessive sand production observed in the stratigraphic well testing when negative when drawdown is applied to the reservoir.

From **40 CFR 146.87 (d)**, at minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zones:

- 1) Fracture pressure
- 2) Other physical and chemical characteristics of the injection and confining zones

The acquired data in the proposed Pelican CCS 1 injection well includes formation testing/logging, rotary sidewall core sampling and analyses, and hydrogeologic testing to determine the physical and chemical characteristics of the injection and confining zones. This data will allow calibration of the data acquired in the 2022 Pelican MLR 004 Stratigraphic Test well during the initial site characterization and further serves as a baseline prior to commencing CO₂ injection. The combined knowledge from these two wells will strengthen the static subsurface and dynamic operational testing interpretation and increase confidence in the injection and confining zone characteristics prior to CO₂ injection.

(1) [REDACTED]

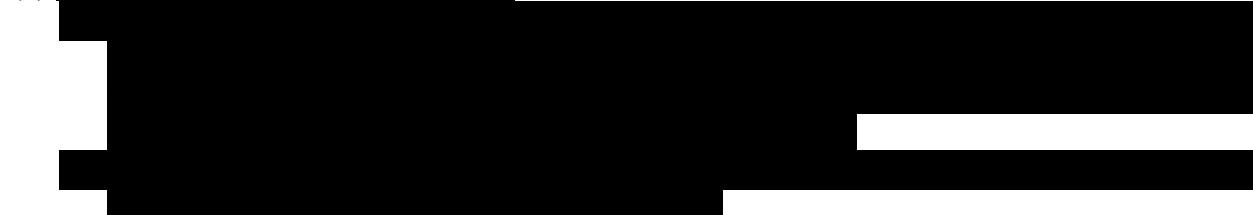


Table POT-5—Logging, survey and sampling for Pelican MLR 01 and Pelican MLR 02

[REDACTED]	[REDACTED]	[REDACTED]

Original pressure in the reservoir will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

Table POT-6—Water sampling for Pelican MLR 2

Method	Interval (ft)	Samples	Purpose
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

3.2 Pelican MLR 4

As described in the previous section, the Pelican MLR 4 stratigraphic well will be re-completed as In zone monitoring well. Additional to the data acquired previously during the stratigraphic campaign, the well will be tested for mechanical integrity after the recompletion. Pulse neutron baseline will be acquired as well. Table POT-7 shows the logs and test will be performed during and after the recompletion of the well.

Table POT-7—Cased hole logs for Pelican MLR 4

Cased Hole Logs during and after recompletion as In Zone monitoring well		
Method	Interval (ft)	Purpose
[REDACTED]	[REDACTED]	[REDACTED]

Original pressure in the reservoir will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

4.0 Pre-Injection Test Plan – Above-Confining-Zone Well – [REDACTED]

[REDACTED] will be a new well drilled as part of the Project. Table POT-8 shows the proposed logging, survey, and mud log sampling for this well. This well will be completed with a [REDACTED] [REDACTED] that allows to acquire downhole samples as part of the monitoring plan. This system is described in the QASP attachment, and the frequency and testing required is described in the Testing and Monitoring Plan Attachment. Table POC-8 shows the proposed logging, survey and mud log sampling for this well.

Table POT-8—Logging, survey and sampling for Pelican ACZ 1

Method	Interval (ft)	Purpose
Open Hole Logs, Surveys and Sampling During Construction		
[REDACTED]	[REDACTED]	[REDACTED]

[REDACTED]	[REDACTED]	[REDACTED]
Cased Hole Logs and surveys Before Injection		
[REDACTED]	[REDACTED]	[REDACTED]

The original pressure in the above confining zone will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

5.0 Pre-Injection Test Plan – USDW Monitoring Wells

[REDACTED] will be shallow wells drilled in the USDW section to monitor ground water. Table POT-9 shows the proposed logging and survey for these wells. These wells are described in the Testing and Monitoring Plan Attachment, as well as the frequency and testing required. Table POC-8 shows the proposed logging and survey for this well.

Table POT-9—Logging, survey and sampling for USDW monitoring wells

Method	Interval (ft)	Purpose
Open Hole Logs, Surveys and Sampling During Construction		

Notes:

Details for the tests and procedures are described in the QASP attachment to this permit.

All pre-injection testing procedures for logging, sampling, and testing, as required by 40 CFR 146.87, will be submitted to the Director for review. The results of the testing activities will be documented in a report and submitted to the US Environmental Protection Agency (EPA) after the well drilling and testing activities have been completed, but before the start of CO₂ injection operations.

The Pelican Sequestration Hub, LLC will notify the EPA at least 30 days prior to conducting the test and provide a detailed description of the testing procedure. Notice and the opportunity to witness these tests/logs shall be provided to the EPA at least 48 hours in advance of a given test/log.

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3.1 [REDACTED]	6
3.2 Pelican MLR 4	8
4.0 Pre-Injection Test Plan – Above-Confining-Zone Well – [REDACTED]	9
5.0 Pre-Injection Test Plan – USDW Monitoring Wells	10

1.0 Facility Information

Facility name: Pelican CO₂ Sequestration Project
Pelican CCS 2Well

Facility contact: [REDACTED], Project Manager
5 Greenway Plaza Houston, TX 77046
[REDACTED]

Well location: Holden, Livingston Parish, Louisiana
[REDACTED] (NAD 1927, BLM Zone 15N)

The testing activities at the Pelican CCS 2 described in this attachment are restricted to the pre-injection phase. Testing and monitoring activities during the injection and post-injection phases are described in the Testing and Monitoring Plan, along with other non-well related pre-injection baseline activities such as geochemical monitoring.

The Pelican Sequestration Hub will construct a new well for injection, Pelican CCS 2, [REDACTED]
[REDACTED]

The Pelican MLR 4 stratigraphic well was drilled in 2022, [REDACTED] to the south of the proposed Pelican CCS 2 and acquired advanced geophysical logs as well as [REDACTED] ft of full core and [REDACTED] of SWC. The Project also performed a step rate test in the prospect reservoir and formation integrity test on the proposed confining zone. The results and summary of the data acquisition program for Pelican MLR 4 are shown in Appendix C in the AOR attachment. Pelican MLR 4 stratigraphic well was temporarily abandoned and will be re-completed as In Zone Monitoring well for the project.

2.0 Pre-Injection Test Plan – Injection Well Pelican CCS 2

The following tests and logs will be conducted during drilling, casing installation, and after casing installation in the Pelican CCS 2 in accordance with the testing required under 40 CFR 146.87(a), (b), (c), and (d).

The Pelican CCS 2 well testing program includes a combination of advanced logging, sidewall coring, and formation hydrogeologic testing. This program is complemented with an extensive data acquisition program in the stratigraphic well as well as in the proposed monitoring wells. The pre-operational testing program will determine or verify the depth, thickness, mineralogy, lithology, porosity, and permeability information of the injection zone, overlying confining zone, and other relevant geologic formations. Salinity of formation fluids will also be determined. Table POT-1 lists the logs, tests, and surveys proposed for the Pelican CCS 2 well to comply with 40 CFR 146.87 (a).

Table POT-1—Logs, Test and Surveys for Pelican CCS 2 [(40 CFR 146.87 (a))]

Method	Interval (ft)	Purpose
Open Hole Logs, Surveys and Sampling During Construction		
(1)]	[40 CFR 146.87 (a)]	
(2) (i)]	[40 CFR 146.87 (a)]	
	[40 CFR 146.87 (a) (2) (i)]	
[40 CFR 146.87 (a) (2) (i)]		
	[40 CFR 146.87 (a) (3) (i)]	
	[40 CFR 146.87 (a) (3) (i)]	
	[40 CFR 146.87 (a) (3) (i)]	
	[40 CFR 146.87 (a) (3) (i)]	
146.87 (a) (3) (i)]	[40 CFR	
(i)]	[40 CFR 146.87 (a) (3)]	
	[40 CFR 146.87 (a) (3) (i)]	
	[40 CFR 146.87 (a) (3) (i)]	

[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a) (3) (i)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a) (3) (i)]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]
Cased Hole Logs and surveys Before Injection		
[REDACTED] [40 CFR 146.87 (a)(2) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(3) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (i)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (ii)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (iv)]	[REDACTED]	[REDACTED]
[REDACTED] [40 CFR 146.87 (a)(4) (iii)]	[REDACTED]	[REDACTED]

The long string section of Pelican CCS 2 will be drilled with [REDACTED] mud in order to ensure well stability while drilling, logging, and cementing. [REDACTED]

The project will not collect full core while drilling the long string section in Pelican CCS 2, only side wall cores, as allowed by the hole condition. The Pelican Sequestration Hub, LLC will also collect water samples in the injection zone as shown in table POT-2.

As part of the data acquisition program for the Pelican Site, the project acquired reservoir pressure and water samples in 2022 for the reservoir in Pelican MLR 4 stratigraphic well. The project is also planning to acquire additional water samples and pressure in the reservoir, above confining zone, and overburden in the Pelican MLR 1 and Pelican MLR 2. This data will complement the proposed acquisition for the Pelican CCS 2.

Table POT-2—Sidewall cores and water sampling for Pelican CCS 2 (40 CFR 146.87 (b))

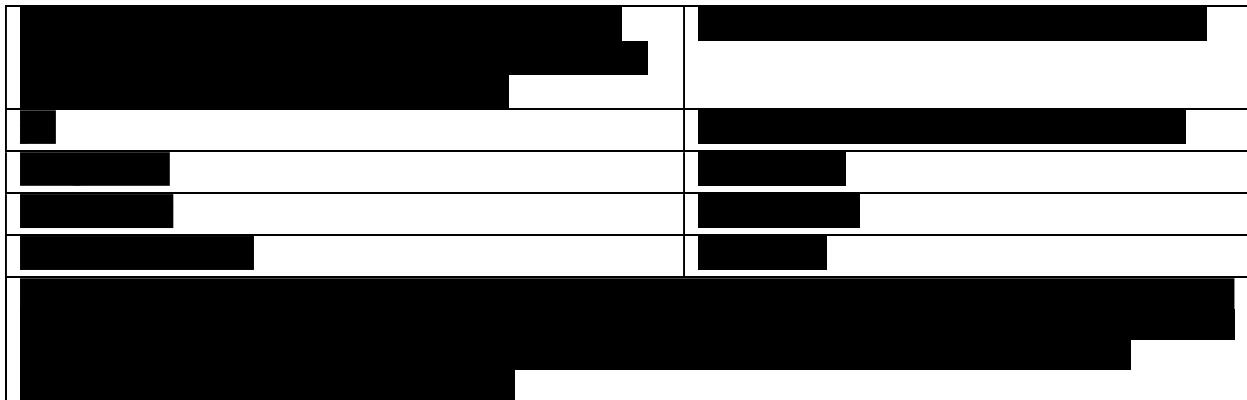
Method	Interval (ft)	Samples	Purpose
Method A	10 ft	10 samples	Geological
Method B	15 ft	8 samples	Geological

Pelican Sequestration Hub, LLC, will record the fluid temperature and reservoir pressure obtained from the wireline tool while taking the water samples. The project also plans to install downhole gauges that will allow us to determine original pressure and temperature at top of the perforations.

The project will send the water samples to a third-party lab for a complete analysis including pH, conductivity, major cations, major anions, trace metals, dissolved gases, density, and TDS among others. Table POT-3 shows the analytics to be characterized in the reservoir samples defined as minimum by the project (**40 CFR 146.87 (d)(3)**).

Table POT-3—Analyses and Methods for Water Samples Testing in reservoir, above confining zone and overburden

Parameter	Analytical Method
Parameter 1	Method A (black), Method B (white), Method C (black)
Parameter 2	Method A (black), Method B (white), Method C (black)
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Parameter 4	Method A (black), Method B (white), Method C (black)
Parameter 5	Method A (black), Method B (white), Method C (black)
Parameter 6	Method A (black), Method B (white), Method C (black)
Parameter 7	Method A (black), Method B (white), Method C (black)
Parameter 8	Method A (black), Method B (white), Method C (black)
Parameter 9	Method A (black), Method B (white), Method C (black)
Parameter 10	Method A (black), Method B (white), Method C (black)



The static fluid level of the injection zones will be determined during the step rate test and fall off test (**40 CFR 146.87 (c)**). The Pelican Sequestration Hub, LLC does not recommend acquiring the fluid samples though the open hole DST or swabbing after the well is closed due to the excessive sand production observed in the stratigraphic well testing when negative when drawdown is applied to the reservoir.

From **40 CFR 146.87 (d)**, at minimum, the owner or operator must determine or calculate the following information concerning the injection and confining zones:

- 1) Fracture pressure
- 2) Other physical and chemical characteristics of the injection and confining zones

The acquired data in the proposed Pelican CCS 2 injection well includes formation testing/logging, rotary sidewall core sampling and analyses, and hydrogeologic testing to determine the physical and chemical characteristics of the injection and confining zones. This data will allow calibration of the data acquired in the 2022 Pelican MLR 004 Stratigraphic Test well during the initial site characterization and further serves as a baseline prior to commencing CO₂ injection. The combined knowledge from these two wells will strengthen the static subsurface and dynamic operational testing interpretation and increase confidence in the injection and confining zone characteristics prior to CO₂ injection.

(1))



Table POT-5—Logging, survey and sampling for Pelican MLR 01 and Pelican MLR 02

[REDACTED]	[REDACTED]	[REDACTED]

Original pressure in the reservoir will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

Table POT-6—Water sampling for Pelican MLR 2

Method	Interval (ft)	Samples	Purpose
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

3.2 Pelican MLR 4

As described in the previous section, the Pelican MLR 4 stratigraphic well will be re-completed as In zone monitoring well. Additional to the data acquired previously during the stratigraphic campaign, the well will be tested for mechanical integrity after the recompletion. Pulse neutron baseline will be acquired as well. Table POT-7 shows the logs and test will be performed during and after the recompletion of the well.

Table POT-7—Cased hole logs for Pelican MLR 4

Cased Hole Logs during and after recompletion as In Zone monitoring well		
Method	Interval (ft)	Purpose
[REDACTED]	[REDACTED]	[REDACTED]

Original pressure in the reservoir will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

4.0 Pre-Injection Test Plan – Above-Confining-Zone Well – [REDACTED]

[REDACTED] will be a new well drilled as part of the Project. Table POT-8 shows the proposed logging, survey, and mud log sampling for this well. This well will be completed with a [REDACTED] [REDACTED] that allows to acquire downhole samples as part of the monitoring plan. This system is described in the QASP attachment, and the frequency and testing required is described in the Testing and Monitoring Plan Attachment. Table POC-8 shows the proposed logging, survey and mud log sampling for this well.

Table POT-8—Logging, survey and sampling for Pelican ACZ 1

Method	Interval (ft)	Purpose
Open Hole Logs, Surveys and Sampling During Construction		
[REDACTED]	[REDACTED]	[REDACTED]

Cased Hole Logs and surveys Before Injection		

The original pressure in the above confining zone will be measured with a downhole gauge installed in the tubing ported to the reservoir below the packer.

5.0 Pre-Injection Test Plan – USDW Monitoring Wells

██████████ will be shallow wells drilled in the USDW section to monitor ground water. Table POT-9 shows the proposed logging and survey for these wells. These wells are described in the Testing and Monitoring Plan Attachment, as well as the frequency and testing required. Table POC-8 shows the proposed logging and survey for this well.

Table POT-9—Logging, survey and sampling for USDW monitoring wells

Method	Interval (ft)	Purpose
Open Hole Logs, Surveys and Sampling During Construction		

Notes:

Details for the tests and procedures are described in the QASP attachment to this permit.

All pre-injection testing procedures for logging, sampling, and testing, as required by 40 CFR 146.87, will be submitted to the Director for review. The results of the testing activities will be documented in a report and submitted to the US Environmental Protection Agency (EPA) after the well drilling and testing activities have been completed, but before the start of CO₂ injection operations.

The Pelican Sequestration Hub, LLC will notify the EPA at least 30 days prior to conducting the test and provide a detailed description of the testing procedure. Notice and the opportunity to witness these tests/logs shall be provided to the EPA at least 48 hours in advance of a given test/log.