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PROPOSED PRE-OPERATIONAL FORMATION TESTING PLAN

South Texas Sequestration Project (Kleberg Hub)

1.0 Facility Information

Facility name: South Texas Sequestration Project (Kleberg Hub)
Well Names: Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, Garcias_CCS_01_02

Facility contact: [redacted], Project Manager
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[redacted]

Well location: Kleberg County, Texas

WELLNAME	LAT_NAD27	LONG_NAD27
Becerra_CCS_01_01	[redacted]	
Becerra _CCS_01_02		
Becerra _CCS_02_01		
Becerra _CCS_02_02		
Garcias_CCS_01_01		
Garcias_CCS_01_02		

Pursuant to 40 CFR §146.87, this plan describes the testing and logging activities proposed by Kleberg Sequestration Hub, LLC (1PointFive) for the Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02 wells, as well as the monitoring wells planned for the Kleberg Hub.

These testing and logging activities are restricted to the drilling, completion, and pre-injection phases of the project. 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 geophysical and geochemical monitoring.

As required by 40 CFR §146.87, all pre-injection testing procedures for logging, sampling, and testing, will be submitted to the Underground Injection Control (UIC) Director for review. The results and data collected during the testing, sampling, and logging operations will be documented in a report and submitted to the UIC Director after the procedures are completed, but before the start of the CO2 injection operations.

1PointFive, will notify the UIC director at least 30 days prior to conducting the tests. Notice and the opportunity to witness these test/logs shall be provided to the UIC Director at least 48 hours in advance of the given procedure.

A table of the wells described in this document is shown in Table POT-1.

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Table POT-1: Kleberg Hub Wells.

Well Name	Purpose	Latitude (°)	Longitude (°)	Status
Becerra_CCS_01_01	CO_2 Injector			
Becerra _CCS_01_02	CO_2 Injector			
Becerra _CCS_02_01	CO_2 Injector			
Becerra _CCS_02_02	CO_2 Injector			
Garcias_CCS_01_01	CO_2 Injector			
Garcias_CCS_01_02	CO_2 Injector			
Laguna_Larga_IZM_01_01	Reservoir Monitor			
Becerra IZM 02-01	Reservoir Monitor			
Garcias IZM 01-01	Reservoir Monitor			
Garcias_ACZ 01-01	Above Confining Zone Monitor			
Becerra_ACZ 01-01	Above Confining Zone Monitor			
Garcias_SAM_01_01	Shallow Aquifer Monitor			
Becerra_SAM_01_01	Shallow Aquifer Monitor			
Santa Cruz_SAM_01_01	Shallow Aquifer Monitor			
Laguna_Larga_SAM_01_01	Shallow Aquifer Monitor			

1PointFive will construct six (6) new wells as CO_2 injectors, Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02. The wells target the [redacted], as detailed in the Injection Well Construction Plan of this application.

1PointFive drilled three (3) stratigraphic test wells, Garcias IZM 01, Garcias IZM 02, and Becerra IZM 01, in 2023-2024. The objective of these three wells was to collect site-based data that includes geophysical logs, rock samples, fluid samples, and formation tests, among others, to

support the existing geological model and numerical simulation model. All three wells were designed to be converted in the future to In Zone monitoring (IZM) or Above Confining Zone monitoring (ACZ) wells to track pressure front and CO_2 plume migration. The current plan will convert the Garcias IZM 01 into the Garcias_ACZ_01_01 and the Becerra IZM 01 into the Becerra_ACZ_01_01.

1PointFive drilled two shallow aquifer monitoring (SAM) wells targeting the upper aquifers as part of the characterization of the site. The first well Garcias_SAM_01_01 (tracking number 650461) was drilled in the same location of Garcias IZM 01 to a depth of [redacted] ft and completed with screens and gravel pack from 1000 to 1300 ft. The second shallow well Becerra_SAM_01_01 (tracking number 660764) was drilled in the same location of Becerra IZM 01 to a depth of [redacted] ft and completed with screens and gravel pack in the interval [redacted] ft.

Additionally, 1PointFive will drill three new IZM wells, Becerra_IZM_02_01, Garcias_IZM_01_01, and Laguna_Larga_IZM_01_01, and two new Shallow Aquifer Monitoring (SAM) wells Laguna_Larga_SAM_01_01 and Santa Cruz_SAM_01_01.

2.0 Pre-Injection Formation Test Plan – CO_2 Injector Wells (CCS)

The following tests and logs will be run during drilling, casing installation, and completion in the Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02 injector wells in accordance with the testing required under 40 CFR 146.87(a), (b), (c), (d), and (e).

The CO_2 injector well testing program includes a combination of advanced logging, sidewall coring, fluid sampling, and formation hydrogeologic testing. This program is complemented with the extensive data acquisition program 1PointFive executed in 2023-2024 in the stratigraphic test wells, Garcias IZM 01, Garcias IZM 02, and Becerra IZM 01, as well as the data acquisition planned in the additional IZM monitoring wells to be drilled.

The pre-operational testing program will measure the depth, fluid salinity, thickness, mineralogy, lithology, porosity, and permeability information of the injection zone, overlying confining zone, and other relevant geologic formations. This data acquisition program will be used to determine conformance with the injection well construction requirements and to establish accurate baseline data for future monitoring activities.

Table POT-2 lists the logging, testing, surveys, and mud log sampling program for the Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02 wells to comply with 40 CFR 146.87 (a).

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Table POT-2—Logging, testing and surveying plan for CO_2 Injector wells [(40 CFR 146.87 (a))]

Method	Interval (ft)	Purpose
Open hole logs, tests and surveys during construction		
[redacted]		

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Method	Interval (ft)	Purpose
Open hole logs, tests and surveys during construction		
[redacted]		
Cased hole logs, test and surveys CO_2 Injector wells		
[redacted]		

The long string section of the Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02 wells will be drilled with [redacted] based mud for well stability while drilling, logging, and cementing and for optimum hole conditions during the construction of the well. Therefore, it will not be possible to acquire spontaneous potential logs; however, 1PointFive is proposing additional new generation logs to improve reservoir and confining zone characterizations as described in the table above.

1PointFive will not collect full cores while drilling the long string section in Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01, and Garcias_CCS_01_02. Only sidewall cores will be collected, as allowed by 40 CFR 146.87 (b). 1PointFive will also collect water samples in the injection zones as shown in Table POT-3.

As part of the data acquisition program for the Kleberg Hub, 1PointFive acquired full cores in the Garcias IZM 01 as well as sidewall cores, reservoir pressures, and water samples in the Garcias IZM 01, Garcias IZM 02, and Becerra IZM 01 stratigraphic test wells as described in detail in the PBI_Petrophysical Supporting Documents folder. The complete data list and results for the stratigraphic wells Garcias IZM 01, Garcias IZM 02 and Becerra IZM 01 can also be found in this folder.

The below sections describe the additional data acquisition program to be performed during construction of the proposed new wells.

Table POT-3—Sidewall cores and water sampling for CO_2 Injector wells (40 CFR 146.87 (b))

Method	Interval (ft)	Samples	Purpose
[redacted]			

1PointFive will record the fluid temperatures and reservoir pressures obtained from the wireline tool while taking the pressure points and water samples (40 CFR 146.87 (c)). 1PointFive also plans to install downhole gauges to measure the original pressure and temperature at top of the perforations.

The project team plans to perform the following analysis in the Sidewall cores collected from the CO_2 Injector Wells:

Table POT-4- Core analysis to be performed in the sidewall cores samples from CO_2 Injector wells.

RSWC Testing
[redacted]

1PointFive 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-5 shows the minimum analytics to be characterized in the downhole water samples (40 CFR 146.87 (d)(3) and 40 CFR 146.87 (c)).

Table POT-5—Analyses and methods for water samples testing.

Parameter	Analytical Method
[redacted]	

The static fluid level of the injection zones will be determined after the completion of the well during the step rate test, injectivity tests, and fall off tests (40 CFR 146.87 (c)).

To comply with 40 CFR 146.87 (d), the proposed data acquisition program in the CO_2 injector wells includes formation testing/logging, rotary sidewall core sampling and analyses, wireline mini-frac (Table POT-1), and hydrogeologic testing to determine the physical and chemical characteristics of the injection and confining zones. This program will complement the data that was acquired in 2023-2024 by the stratigraphic wells during the initial site characterization and add baseline data prior to commencing CO_2 injection.

Upon completion and prior to injection in the Becerra_CCS_01_01, Becerra_CCS_01_02, Becerra_CCS_02_01, Becerra_CCS_02_02, Garcias_CCS_01_01 and Garcias_CCS_01_02 wells, 1PointFive will conduct the tests described in Table POT-6 to verify hydrogeologic characteristics of the injection zone, define fracture pressure for the injection zone, and identify the maximum parameters for injection (40 CFR 146.87 (d) (1) and 40 CFR 146.87 (e)).

Table POT-6— [redacted] in CO_2 Injectors.

Method	Comments
[redacted]	

3.0 Pre-Injection Formation Test Plan – In-Zone Monitoring Wells (IZM)

1PointFive plans to drill 3 new IZM wells as described previously. Table POT-7 shows the proposed logging, testing, surveys, and mud log sampling programs for these wells.

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Table POT-7—Logging, testing and surveying for In Zone Monitoring (IZM) wells

Method	Interval (ft)	Purpose
Open hole logs, tests and surveys during construction		
[redacted]		

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Method	Interval (ft)	Purpose
Cased hole logs, test and surveys		
[redacted]		

Note: Specific depths for each test will be selected after the well is drilled and formations are identified with the electric logs.

Detailed procedures and descriptions for each of the logging tools and test are included in the QASP (Quality Assurance and Surveillance Plan) Plan of this application.

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4.0 Pre-Injection Test Plan – Above-Confining-Zone (ACZ) Monitoring Well

Garcias IZM 01 and Becerra IZM 01 stratigraphic wells will be converted as ACZ monitoring wells. These wells acquired a robust set of geophysical data as well as formation samples and fluid samples. The wells have also been tested hydraulically to be used as calibration point for the model. Data description and test results are presented in PBI_Petrophysical Supporting Documents folder of the AoR and Corrective actions attachment.

Garcias IZM 01 was perforated and tested in [redacted] during the stratigraphic campaign 2023-2024 and will be permanently plugged from the [redacted] Confining Zone to the bottom of the well and will be renamed Garcias_ACZ_01_01. Becerra IZM 01 was perforated and tested in 2024 and will be permanently plugged from the [redacted] Confining Zone to the bottom of the well and will be renamed Becerra_IZM_01_01. Table POT-8 shows the proposed tests to be performed after the wells are recompleted.

Table POT-8—Logging, testing and surveying for ACZ monitoring wells.

Method	Interval (ft)	Purpose
Cased hole logs, test and surveys Above Confining Zone wells.		
[redacted]		

Note:
PBTD: plugged back total depth.

The original pressure and temperature in the above confining zone will be measured with a downhole gauge installed in the tubing, as described in the Testing and Monitoring Plan. This well will be acquiring water samples in the Miocene sands, above the Anahuac confining zones, and the samples will be analyzed as described in the Testing and Monitoring Plan of this application.

5.0 Pre-Injection Test Plan – Shallow-Aquifer Monitoring Wells

Becerra_SAM_01_01, Garcias_SAM_01_01, Santa_Cruz_SAM_01_01, and Laguna_Larga_SAM_01_01 will be shallow wells drilled in the USDW section. These wells will include [redacted] from surface to TD. These wells will not have any additional logs. These wells will be sampled as part of the testing and monitoring program to monitor groundwater during the construction, injection, and post injection periods of the Kleberg Hub operation.

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Notes:

Detailed procedures and descriptions for each of the logging tools and test are included in the QASP (Quality Assurance and Surveillance Plan) Plan of this application.