# ATTACHMENT F

# TESTING AND MONITORING PLAN [40 CFR 146.90]

## 1. FACILITY INFORMATION

Facility name: River Parish Sequestration – RPN 1

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Well name/location: RPN-1-INJ, Ascension Parish, Louisiana

[redacted]

This Testing and Monitoring Plan (TMP) describes how River Parish Sequestration, LLC (RPS), will monitor the carbon dioxide ($CO_2$) injection operation through [redacted] pursuant to 40 Code of Federal Regulations (CFR) 146.90. In addition to demonstrating that the wells are operating as planned, RPS will ascertain whether the $CO_2$ plumes and pressure fronts are moving as predicted and that there is no endangerment to Underground Sources of Drinking Water (USDWs). The monitoring data will be used to validate and adjust geological models for predicting the distribution of the $CO_2$ within the storage zone to support Area of Review (AoR) reevaluations and a non-endangerment demonstration.

If the field data indicate deviations from the models' predicted results enough to justify a recalibration of the model, the geological and reservoir simulation models will be recalibrated, and the application plans will be updated. These deviations are described in the AoR and Corrective Action Plan (**Attachment B**), as well as this TMP and its accompanying Quality Assurance and Surveillance Plan (**QASP**). [redacted]. If the field data indicate no deviations within the model's predicted results significant enough to justify a recalibration of the model, the evidence will be demonstrated and submitted to the U.S. Environmental Protection Agency (EPA) Underground Injection Control (UIC) Program

Director and Louisiana Department of Natural Resources (LDNR) Office of Conservation Commissioner.

Results of the testing and monitoring described below may trigger action according to the Emergency and Remedial Response Plan (**Attachment I**).

## 2. OVERALL STRATEGY AND APPROACH FOR TESTING AND MONITORING

The operating plans for the [redacted] North Fairway Site include a robust testing and monitoring program, which is designed to satisfy the requirements of 40 CFR 146.90. The monitoring program is designed to:

- Collect the necessary data at appropriate locations and at frequencies that will help RPS track the evolution of each $CO_2$ plume and pressure front over time in the injection zone
- Provide early detection of fluid migration out of the storage complex. The early warning system will be used to:
    - Modify the operating conditions to stop further fluid migration, or
    - Perform remedial work to stop $CO_2$ release into the USDWs.

[redacted]

[redacted]

- [redacted]
- [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

## 2.1. Quality assurance procedures

This TMP describes the methods and procedures for collecting data and monitoring the $CO_2$ plume and pressure front movement at the RPS project site to ensure that USDWs are protected. RPS will follow the procedures and approach outlined in the **QASP** to ensure that the collected data are accurate and representative of the field. The **QASP** also describes the tool specifications and their calibration schedules to ensure the quality of the collected data throughout the injection and post-injection phases. This satisfies the requirements of 40 CFR 146.90(k).

## 2.2. Reporting procedures

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

## 3. CARBON DIOXIDE STREAM ANALYSIS [40 CFR 146.90(A)]

RPS will analyze the $CO_2$ stream during the operation period to yield data representative of its chemical and physical characteristics and to meet the requirements of 40 CFR 146.90(a).

### 3.1. Sampling location and frequency

RPS will sample the $CO_2$ injection stream and evaluate any potential interactions of $CO_2$ and other injectate components. [redacted]

[redacted]

[redacted]

### 3.2. Sampling methods

$CO_2$ stream samples will be collected from the $CO_2$ pipeline in a location where injection conditions are representative. [redacted]

### 3.3. Laboratory to be used/chain of custody and analysis procedures

$CO_2$ samples will be analyzed by a Louisiana Environmental Laboratory Accreditation Program (LELAP) accredited laboratory. RPS will observe standard chain-of-custody procedures and maintain records to allow full reconstruction of the sampling procedure, storage, and transportation, including problems encountered.

[redacted]

## 4. CONTINUOUS RECORDING OF OPERATIONAL PARAMETERS [40 CFR 146.88(E)(1), 146.89(B) AND 146.90(B)]

RPS will install and use continuous recording devices to monitor injection pressure, rate, and volume; pressure on the annulus between the tubing and the long string casing; annulus fluid volume added; and temperature of the $CO_2$ stream, as required by 40 CFR 146.88(e)(1), 146.89(b), and 146.90(b). [redacted]

### 4.1. Monitoring location and frequency

[redacted]

[redacted]

[redacted]

## 4.2. Monitoring details

RPS will continuously monitor the injection pressures, rates and volumes, and annulus pressures to meet the 40 CFR 146.90(b) requirements. Calibration standards, precision, and quality control requirements for devices listed in **Table 4.1-1** are described in the **QASP**. A[redacted]

[redacted]

# 5. CORROSION MONITORING

[redacted]

## 5.1. Monitoring location and frequency

[redacted]

## 5.2. Sample description

[redacted]

**Table 5.2-1: List of equipment coupon with material of construction**

| [redacted] | [redacted] |
|---|---|
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |
| [redacted] | [redacted] |

## 5.3. Monitoring details

[redacted]

[redacted]

[redacted]

## 6. ABOVE CONFINING ZONE MONITORING

[redacted]

[redacted]

### 6.1. Monitoring location and frequency

[redacted]

[redacted]

[redacted]

initiate [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

## 6.2. Analytical parameters

**Table 6.2-1** identifies the groundwater quality parameters to be monitored and their analytical methods. RPS will test water samples and maintain results for the parameters listed. Testing results will be stored in an electronic database.

[redacted]

- [redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

## 6.3. Sampling methods

[redacted]

### 6.4. Laboratory to be used/chain of custody procedures

Water samples will be submitted to a LELAP-accredited laboratory. RPS will observe standard chain-of-custody procedures and maintain records to allow full reconstruction of the sampling procedure, storage, and transportation, including problems encountered.

[redacted]

## 7. MECHANICAL INTEGRITY TESTING

RPS will conduct mechanical integrity tests periodically, as listed in **Table 7.3-1**, in accordance with 40 CFR §146.89(b) and 40 CFR §146.89(c).

### 7.1. Internal mechanical integrity testing

In accordance with 40 CFR §146.89(b), RPS will conduct internal mechanical integrity tests after the well has been completed, before the start of injection, after any workover operation involving the removal and replacement of the tubing and packer, and at least annually. RPS will notify LDNR at least 5 days in advance of planned mechanical integrity tests so that the tests can be witnessed by an agent of LDNR.

[redacted]

- [redacted]
- [redacted]
- [redacted]

[redacted]

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[redacted]

[redacted]

## 7.2. External mechanical integrity testing

In adherence to the requirements of 40 CFR §146.89(c) and 40 CFR §146.90(e), RPS will perform an annual external mechanical integrity test during the injection phase to demonstrate external mechanical integrity of the injection well.

## 7.3. Testing location and frequency

RPS will perform at least one external mechanical integrity test on the injection well annually during the injection phase. [redacted]

[redacted]

## 7.4. Testing details

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

[redacted] Following a successful test, all logs recorded will be submitted to the UIC Program Director and Office of Conservation Commissioner within 30 days of log run completion. In the event of an unsuccessful test, results will be submitted to the UIC Program Director and Office of Conservation Commissioner within 24 hours, as per 40 CFR 146.91(c), and an investigation will be conducted to evaluate the cause of the mechanical integrity failure.

## 8. PRESSURE FALL-OFF TESTING

RPS will perform pressure fall-off tests during the injection phase as described below to meet the requirements of 40 CFR 146.90(f).

### 8.1. Testing location and frequency

RPS will perform a required pressure fall-off test on the injection well every 5 years per 40 CFR 146.90(f). [redacted]

### 8.2. Testing details

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

## 9. INDUCED SEISMIC MONITORING

RPS will perform continuous induced seismicity monitoring to assess seismicity levels before and during injection of $CO_2$. [redacted]

# 10. CARBON DIOXIDE PLUME AND PRESSURE FRONT TRACKING

RPS will employ direct and indirect methods to track the extent of the $CO_2$ plume and the presence or absence of elevated pressure during the operation period to meet the requirements of 40 CFR 146.90(g).

## 10.1. Plume monitoring location and frequency

**Table 10.1-1** presents the methods that RPS will use to monitor the position of the $CO_2$ plume, including the activities, locations, and frequencies RPS will employ.

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

## 10.2. Plume monitoring details

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

## 10.3. Pressure-front monitoring location and frequency

**Table 10.3-1** presents the methods that RPS will use to monitor the position of the pressure front, including the activities, locations, and frequencies. Quality assurance procedures for these methods are presented in **Section B.9.c** of the **QASP**.

[redacted]

[redacted]

[redacted]

## 10.4. Pressure-front monitoring details

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

# Appendix A

# Quality Assurance and Surveillance Plan

***The Quality Assurance and Surveillance Plan (QASP) is attached separately.***

# Figures

[redacted]

Ascension, Assumption and Iberville Parishes
Area of Donaldsonville, Louisiana

RIVER PARISH

| RPS Project | May 2023 | Figure 2-1 |
|---|---|---|

[redacted]

Ascension Parish
Outside Donaldsonville, Louisiana

RIVER PARISH

| RPS Project | May 2023 | Figure 2-2 |
|---|---|---|