



Underground Injection Control – Class VI Permit Application for Hummingbird Carbon Storage  
Project Injection Wells No. 01, No. 02, No. 03, No. 04, and No. 05

## SECTION 8 – EMERGENCY AND REMEDIAL RESPONSE PLAN

Hummingbird Carbon Storage Project  
Allen Parish, Louisiana  
ExxonMobil Low Carbon Solutions Onshore Storage, LLC  
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## SECTION 8 – EMERGENCY AND REMEDIAL RESPONSE PLAN

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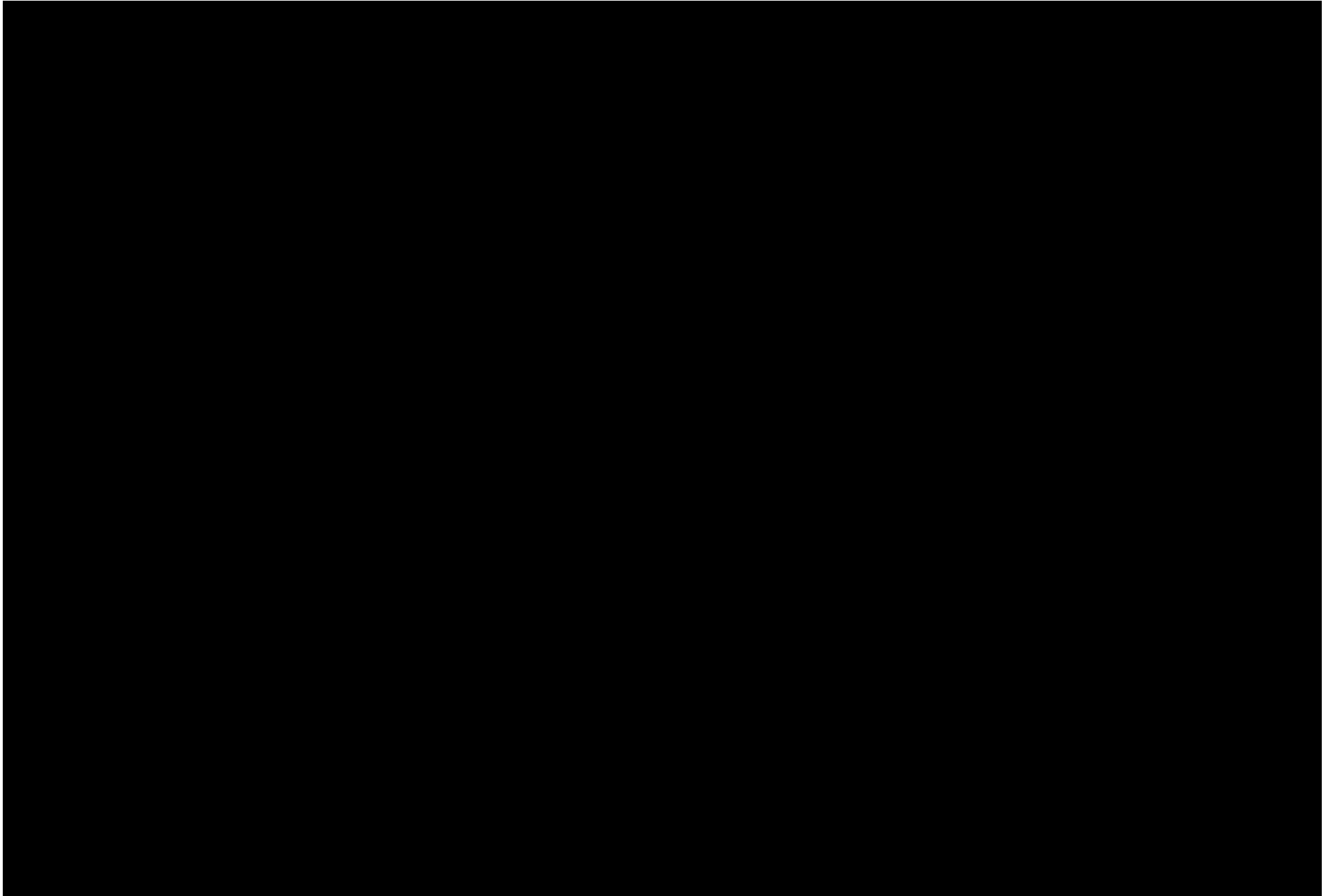
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## 8.1 Emergency and Remedial Response Plan

This Emergency and Remedial Response Plan (ERRP) was developed in compliance with the requirements of Louisiana Administrative Code, Title 43 (LAC43): XVII **§3623.A**—to develop and maintain an ERRP that describes actions to be taken to address movement of the injection or formation fluids that may endanger an underground source of drinking water (USDW) during the construction, operation, and post-injection site care (PISC) periods of the Hummingbird Carbon Storage (CS) Project (Hummingbird Project). Under LAC43: XVII **§3625.A.7**, the actions described in the ERRP are to be implemented immediately to address a rare event where the movement of the injection fluid or formation fluid endangers a USDW. ExxonMobil Low Carbon Solutions Onshore Storage, LLC (ExxonMobil) prepared this ERRP to provide both the scope of actions to be taken and the schedule under which the actions would be expected to be implemented.

ExxonMobil is undertaking the project in Allen Parish, Louisiana, to sequester a [REDACTED]. The ERRP was developed for injection of CO<sub>2</sub> into the proposed Hummingbird Injection Wells (INJ) No. 01, No. 02, No. 03, No. 04, and No. 05, which will sequester a total of approximately [REDACTED].

ExxonMobil will use engineering design and planning safeguards (Figure 8-1) to reduce the potential for a rare emergency and remedial response event from occurring. These steps are based on ExxonMobil's global experience and expertise with risk management for rare events in site selection, well drilling and completion, and reservoir operations.



## 8.2 Overview

ExxonMobil took the findings from *Section 1 – Site Characterization* and *Section 3 – Area of Review and Corrective Action Plan* and identified hypothetical risk scenarios that could—in the rare event of occurrence—pose a threat to USDWs. ExxonMobil’s risk assessment process was used to estimate the probability and consequence of each risk scenario based on the experience and judgment of the risk subject matter experts for the project. The ERRP will apply over the life of the project, including throughout the PISC period (LAC43: XVII §3623).

This ERRP describes the actions that ExxonMobil plans to perform in the event of an emergency that could endanger public health and safety or any USDW during the construction, operation, or PISC periods.

If ExxonMobil obtains verified evidence that the injected CO<sub>2</sub> stream and associated pressure front may cause an endangerment to a USDW, ExxonMobil will perform the following actions:

1. Initiate the shutdown plan for the injection well(s).
2. Take all steps reasonably necessary to identify and characterize the release.
3. Notify the permitting agency’s Commissioner of Conservation (Commissioner) of the emergency event within 24 hours.
4. Implement the approved ERRP.
5. Prepare and submit an incident report to the state of Louisiana.

Where the phrase “initiate the shutdown plan” is used, the following protocol will be employed. First, ExxonMobil will implement the steps needed to immediately cease injection. In some circumstances (e.g., for safety reasons), ExxonMobil will, in consultation with the Commissioner, gradually ramp down injection as appropriate—as part of the process of immediately ceasing injection. Second, ExxonMobil will coordinate with the Commissioner to determine if an emergency scenario does not warrant shutdown for wells (e.g., because there is not an endangerment to a USDW).

## 8.3 Identification of Resources and Infrastructure in the AOR and Flood Hazard Risk

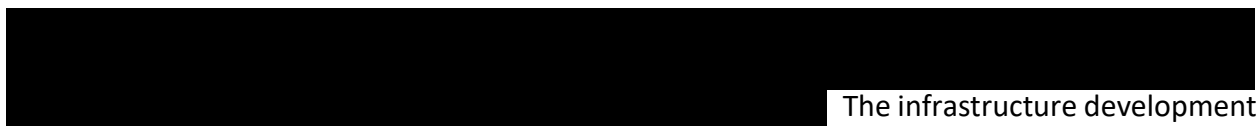
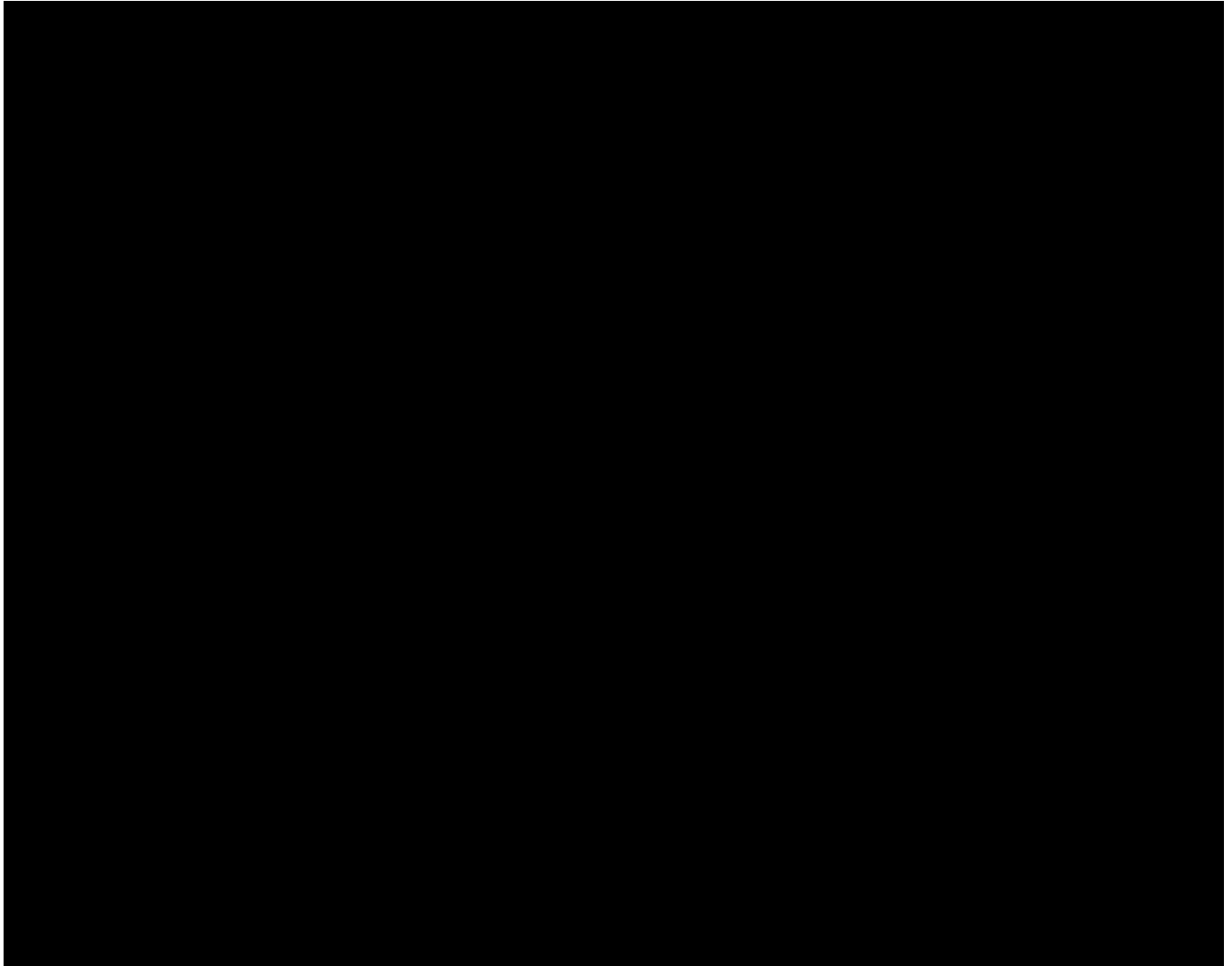
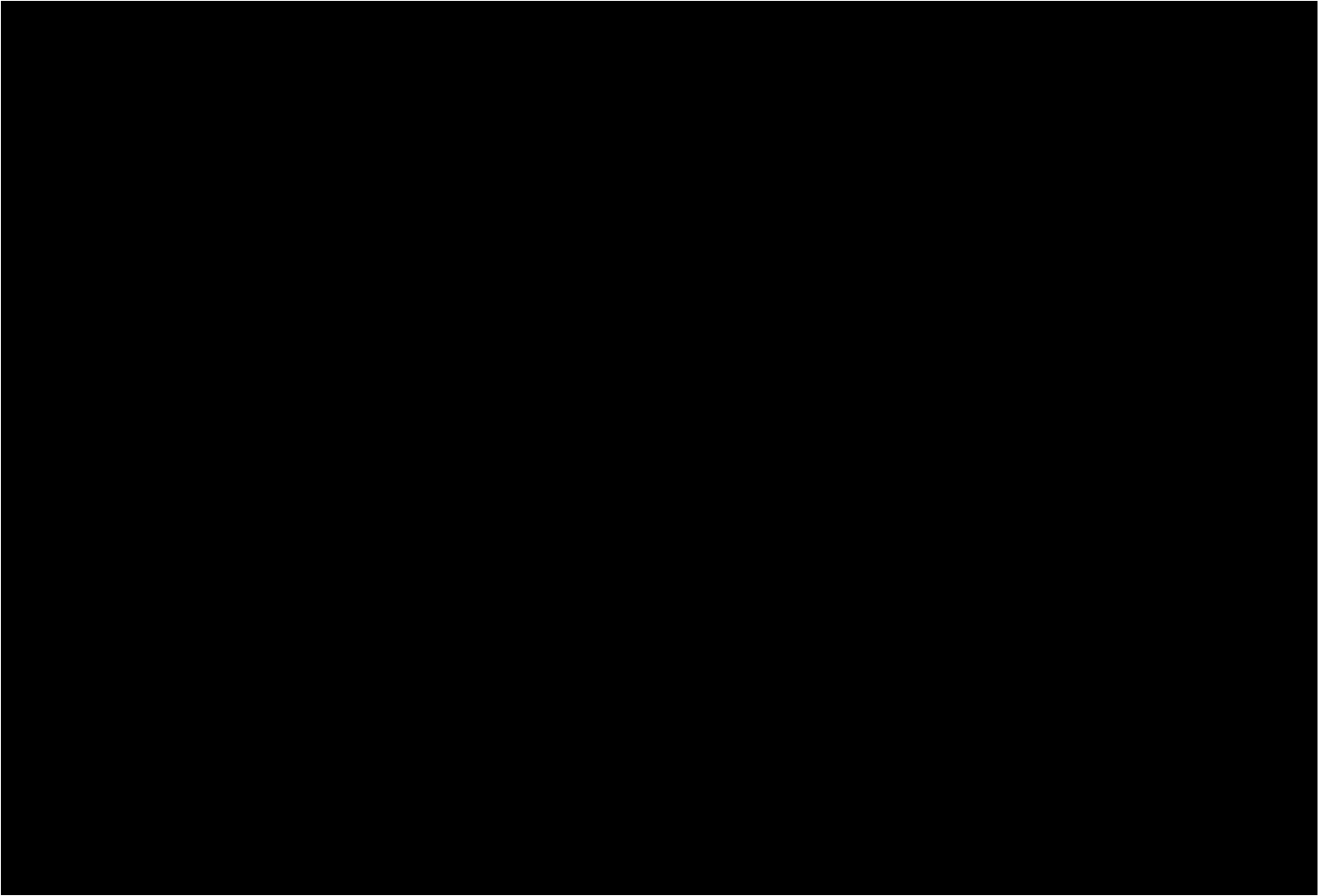
 The infrastructure development is primarily in the form of county and local roads to service the developed areas; and pipelines to transport hydrocarbons downstream.

Figure 8-3 displays the proposed injection wells and the AOR with respect to flood hazard areas, with the data shown in a digital FEMA layer based on FIRM panels. Three wells are located in flood zone X, which corresponds to areas outside the 500-year floodplain (0.2% annual chance of flood). Two wells are located in flood zone A, which has a 1% annual chance of flooding.





## 8.4 Potential Risk Scenarios

The following are events that could potentially result in an emergency response:

- USDW-quality impact event
- An equipment integrity, control system, or monitoring system failure, such as damage to a wellhead, valve, pipe, or flange connection that may cause a CO<sub>2</sub> release to the atmosphere
- A natural disaster or other unplanned event (e.g., hurricane, tornado, lightning strike, earthquake)

Response actions will depend on the severity of the event(s) triggering an emergency response. “Emergency events” are categorized as shown in Table 8-1.

Table 8-1 – Degrees of Risk for Emergency Events

Emergency Condition	Definition
Major	Event poses immediate substantial risk to human health, resources, or infrastructure. Emergency actions involving local authorities (evacuation or isolation of areas) should be initiated.
Serious	Event poses a potential, significant near-term risk to human health, resources, or infrastructure if conditions worsen, or no response actions are taken.
Minor	Event poses no immediate risk to human health, resources, or infrastructure—but could escalate if not addressed.

## 8.5 Emergency Identification and Response Actions

Steps to identify and characterize an emergency event will depend on specific issues identified and the severity of the event. The potential risk scenarios are detailed below.

### 8.5.1 Well Integrity Failure

Integrity failure of an injection or monitoring well may have occurred with the potential to endanger USDWs if monitoring results identify a loss of mechanical integrity, or automatic shutdown devices are activated as follows:

- Wellhead pressure exceeds the maximum injection pressure specified in the permit.
- Annulus pressure indicates a loss of external or internal well containment.



**Emergency Condition:** Minor to major, depending on the results of the investigation into the incident and identified remedial activities

**Timing of Event:** Construction, pre-injection, injection, and post-injection phases

**Avoidance Measures:**

- Proper well design, construction, inspection, and maintenance
- Routine mechanical integrity testing
- Routine inspection of monitoring equipment

**Detection Methods:**

- Well pressure monitoring
- Annulus pressure and fluid-level monitoring
- Monitoring drilling-fluid returns and parameters during well construction and workovers

**Potential Response Actions:**

- Notify the Commissioner within 24 hours of the emergency event.
- Determine the severity of the event based on the information available within 24 hours of notification.
- Begin an investigation into the source and extent of the problem and determine an appropriate course of action to repair and/or remediate the issue.
- Prepare and submit an incident report to the state of Louisiana.
- For a major or serious emergency:

[REDACTED]

**Response Personnel:** Drilling, workover, or injection crew; supervisory personnel

**Equipment:** Depending on the severity of the event, the equipment required may include a workover rig, drilling rig, casing and cementing equipment, drilling fluids/muds/kill fluids, logging equipment, and surface monitoring equipment.

### 8.5.2 Injection Well Monitoring Equipment Failure

The failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure may indicate a problem that could endanger USDWs.

**Emergency Condition:** Minor to major, depending on the results of the investigation into the incident and identified remedial activities

**Timing of Event:** Injection, post-injection phases

**Avoidance Measures:**

- Preventative and routine maintenance of monitoring equipment
- Backup monitoring equipment

**Detection Methods:**

- Continuous monitoring and recording of well parameters (*Section 5 – Testing and Monitoring Plan*)

**Potential Response Actions:**

- Notify the Commissioner within 24 hours of the emergency event.
- Determine the severity of the event based on the information available within 24 hours of notification.
- Begin an investigation into the source and extent of the problem and determine an appropriate course of action to repair and/or remediate the issue.
- Prepare and submit an incident report to the state of Louisiana.

[REDACTED]

**Response Personnel:** Supervisory personnel, maintenance technicians, contract personnel

**Equipment:** Applicable equipment for repair and/or replacement of monitoring systems

### 8.5.3 Fluid (CO<sub>2</sub>, Brine, Formation Fluid) Leakage to USDW

Elevated concentrations of indicator parameter(s) in groundwater sample(s) as identified in the Testing and Monitoring Plan—or other verified evidence—indicate a fluid (brine) leakage into a USDW.

**Emergency Condition:** Major, due to potential contamination of USDWs

**Timing of Event:** Injection, post-injection phases

**Avoidance Measures:**

- Following the methods and sampling schedules as specified in the Testing and Monitoring Plan (*Section 5*).

**Detection Methods:**

- Elevated concentrations of indicator parameters in USDW samples
- Anomalies in the results of any monitoring outlined in the Testing and Monitoring Plan or during the post-injection site care period may be cause for additional samples to be taken in the USDW to investigate a potential leakage.

**Potential Response Actions:**

- Notify the Commissioner within 24 hours of the emergency event.
- Determine the severity of the event based on the information available within 24 hours of notification.
- Begin an investigation into the source and extent of the problem and determine an appropriate course of action to repair and/or remediate the issue.
- Prepare and submit an incident report to the state of Louisiana.
- [REDACTED]



**Response Personnel:** Supervisory personnel, environmental professionals/subcontractors

**Equipment:** Depending on the severity of the event, response equipment may include water testing and treatment/sampling equipment, and water supply equipment.

#### **8.5.4 Fluid (CO<sub>2</sub>, Brine, Formation Fluid) Leakage to Surface**

Elevated concentrations of indicator parameter(s) in surface water, soil gas, or ambient air sample(s) as specified in the Testing and Monitoring Plan—or other verified evidence—indicate a CO<sub>2</sub> or brine leakage to the surface.

**Emergency Condition:** Major, due to potential contamination of surface water, soil, and ambient air

**Timing of Event:** Injection, post-injection phases

#### **Avoidance Measures:**

- Following the methods and sampling schedules as specified in the Testing and Monitoring Plan (*Section 5*)

#### **Detection Methods:**

- Elevated concentrations of indicator parameters in surface water, soil gas, and ambient air samples
- Anomalies in the results of any monitoring outlined in the Testing and Monitoring Plan or during the post-injection site care period may be cause for additional samples to be taken to investigate a potential leakage.

#### **Potential Response Actions:**

- Notify the Commissioner within 24 hours of the emergency event.
- Determine the severity of the event based on the information available within 24 hours of notification.
- Begin an investigation into the source and extent of the problem and determine an appropriate course of action to repair and/or remediate the issue.
- Prepare and submit an incident report to the state of Louisiana.



**Response Personnel:** Supervisory personnel, environmental professionals/subcontractors

**Equipment:** Depending on the severity of the event, response equipment may include sampling equipment for surface water, soil gas, and ambient air, and surface water remediation equipment.

#### 8.5.5 Induced or Natural Seismicity Event

Natural or induced seismicity events of sufficient magnitude to create damage were found to be (1) highly improbable for the site location and (2) under permitted operating conditions that are below the critical fracture pressure. In the very rare chance that such seismicity conditions occurred, the consequences could be of significance regarding the integrity of the artificial penetrations of the upper confining zone (UCZ) and the natural faults and fractures. Therefore, the following response actions were developed to gather information regarding the potential for CO<sub>2</sub> and brine confinement issues to arise under such events.

ExxonMobil will rely on U.S. Geologic Survey seismicity monitoring data for the site and surrounding area to provide information on a seismicity event, should one occur. If a review of the data indicates that the event was more than likely not associated with the injection zone in or near the AOR, ExxonMobil will notify the Commissioner of the intent to install a site-specific network of seismicity stations to provide additional information with the regional seismicity data. The details of the site-specific seismicity monitoring system will be provided to the Commissioner as a modification of *Section 5 – Testing and Monitoring Plan*. Table 8-2 provides the response actions depending on severity of the seismicity event.

A natural disaster (e.g., hurricane, tornado, lightning strike) affecting the normal operation of the injection well(s) could impact site operations by loss of well integrity, fluid leakage, and/or equipment malfunction. A seismicity event may disturb surface and/or subsurface facilities, and weather-related events may affect surface facilities.

<sup>2</sup> Based on Railroad Commission of Texas Seismicity Review: <https://www.rrc.texas.gov/oil-and-gas/applications-and-permits/injection-storage-permits/oil-and-gas-waste-disposal/injection-disposal-permit-procedures/seismicity-review/>

Due to the proximity of the location to the Gulf of Mexico, hurricanes and severe storms involving tornadoes are the most likely natural disasters/severe weather events to occur at the facility.

**Emergency Condition:** Minor to major, depending on the type and severity of the natural disaster. Any immediate, near-term, or prolonged risk to human health, resources, or infrastructure will be assessed immediately to determine emergency actions that will be taken.

### Timing of Event: Construction, pre-injection, injection, and post-injection phases

### Avoidance Measures:

- Preparation measures may be taken by monitoring current and predicted conditions.

### Detection Methods:

- Weather forecast monitoring

**Potential Response Actions:** If a natural disaster occurs that affects the normal operation of the injection well(s), ExxonMobil will perform the following:

- Notify the Commissioner within 24 hours of the emergency event.
- Determine the severity of the event based on the information available within 24 hours of notification.
- Begin an investigation into the extent of the problem and determine an appropriate course of action to repair and/or remediate any issues caused by or resulting from the disaster.
- Prepare and submit an incident report to the Commissioner.

-

**Response Personnel:** Supervisory personnel, and applicable personnel to diagnose, repair, and remediate as needed

**Equipment:** Applicable equipment to diagnose, repair, and remediate as needed

## 8.6 Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP and will be dispatched in the case of an emergency. In such an event, appropriate city, county, and state emergency responders and agencies may be notified based on the severity of the risk. Contact information for ExxonMobil Emergency Authorities and state and local emergency services is outlined in Tables 8-3 and 8-4, respectively.

A site-specific emergency notification chart will be developed and maintained during the life of the Hummingbird Project. ExxonMobil will provide the current site-specific emergency contact list to the Commissioner.

Table 8-3 – Contact Information of ExxonMobil Emergency Authorities

Name	Title	Telephone Number
[REDACTED]	Low Carbon Solutions (LCS) U.S. Gulf Coast Venture Executive	[REDACTED]
[REDACTED]	Emergency Response & Preparedness Manager	[REDACTED]
[REDACTED]	Advisor, Public & Government Affairs – Low Carbon Solutions	[REDACTED]

Table 8-4 – Emergency Services

Agency	Telephone Number
Allen Parish Sheriff	911 or 337-639-4353
State Police	337-491-2511 or 888-225-5577 (Lake Charles Troop)
Allen Parish Office of Emergency Preparedness	214-509-4400
Allen Parish Fire District 6, Station 1	318-215-9003
Allen Parish Fire District 5, Oberlin Station	337-639-4228
Louisiana Department of Environmental Quality	225-219-5337



Agency	Telephone Number
Louisiana Department of Energy and Natural Resources – Injection & Mining Division	225-342-5515
Louisiana Department of Public Safety	512-424-2000
EPA Region 6	1-800-887-6063 or 214-665-2760
National Response Center	1-800-424-8802
EPA National Response Center (24 hours)	1-800-424-8802

Necessary equipment for emergency and remedial response may vary depending on the event. Generally, no specialized equipment will be required for response actions (such as cessation of injection, well shut-in, and evacuation). If specialized equipment (such as a drilling rig or logging equipment) is required, ExxonMobil will be responsible for its procurement.

### **8.7 Communications Plan and Emergency Notification Procedures**

As appropriate, ExxonMobil will communicate to the relevant public authorities about an event that may require emergency response—so that the public understands the emergency event—and if there are any environmental, health, or safety concerns. Based on the emergency event, ExxonMobil will determine the appropriate information, timing, and communication method for the event. This information may include the following:

- Description of the event
- Severity
- Potential impact to the environment
- Investigation steps
- Mitigation actions taken or planned
- Current status

ExxonMobil will notify the LDENR and state/local emergency management agencies of any event that requires an emergency response and that has the potential to impact the public immediately, within 24 hours.

If required, ExxonMobil will also communicate with other entities who may need to be informed about or act in response to the event. These may include local water purveyors or operators, CO<sub>2</sub> suppliers, pipeline operators, oil and gas operators, landowners, regional response teams, and other departments or authorities as guided by the Commissioner.

### **8.8 Plan Review**

The Commissioner will evaluate this proposed ERRP to verify that it meets the requirements of LAC43: XVII §3623 and that the plan accounts for all site-specific conditions. The approved ERRP

is enforceable—whether or not it is a condition of the permit—because the plan itself and the Commissioner’s approval are required by the Class VI Rule (LAC43: XVII **§3633.A.1**).

This ERRP will be reviewed as follows:

- At least once every 5 years following its approval by the permitting agency [LAC43: XVII **§3623.A.4**]
- Within 1 year of any AOR reevaluation [LAC43: XVII **§3623.A.4.a**]
- Following any significant changes to the facility, such as addition of injection or monitoring wells, on a schedule determined by the Commissioner [LAC43: XVII **§3623.A.4.b**]
- When required by the Commissioner [LAC43: XVII **§3623.A.4.c**]

If the review indicates that no amendments to the ERRP are necessary, ExxonMobil will provide the permitting agency with the documentation supporting the “no amendment necessary” determination. If the review indicates that amendments to the ERRP are necessary, amendments will be made and submitted to the permitting agency within 30 days following an event that initiates the ERRP review procedure.

The amended plan must be approved by the Commissioner and would then be incorporated into the Class VI permit. Any amendments to the ERRP must be approved by the Commissioner, must be incorporated into the permit, and are subject to the permit modification requirements at LAC43: XVII **§3613**, as appropriate.

## **8.9 Staff Training and Exercise Procedures**

ExxonMobil will train all personnel on the knowledge they need to conduct their job safely. Incident Command System (ICS) training is required for personnel who are named in either the Spill Management Team in a Facility Plan or the ERRP—or who are reasonably expected to fulfill a supervisory role in the management of an incident/emergency. All personnel expected to participate in an emergency response will be trained annually on the hazardous substances that they may encounter during an emergency response, and will be provided training on mitigating those hazards.

Hazardous Waste Operations (HAZWOPER) and Emergency Response Operations level training is required for personnel who are required to participate in the active response to an incident/emergency. The training program administrator will certify personnel as HAZWOPER trained through the completion of comprehensive quarterly training, hands-on training, response drill participation, and applicable on-the-job experiences.

ExxonMobil will offer appropriate training and provide response plans to emergency first responders as required by organizations with geographic and logistical jurisdiction at the facility.

*Appendix G – Emergency and Remedial Response Plan:*

