# EMERGENCY AND REMEDIAL RESPONSE PLAN40 CFR 146.94(a)

**INSERT PROJECT NAME**

|  |
| --- |
| **INSTRUCTIONS**This template provides a suggested outline for the Emergency and Remedial Response Plan. Permit applicants are not required to use this template. This document does not substitute for promulgated provisions or regulations, nor is it a regulation itself, and it does not impose legally-binding requirements on the U.S. Environmental Protection Agency (EPA), states, or the regulated community. Note that references to EPA’s Class VI Rule in the code of federal regulations (CFR) are provided in this template. States with Class VI primacy have requirements that are at least as stringent as EPA’s. If your Class VI well is in a primacy state, consult your permitting authority about any additional requirements for what must be included in the plan. In this template, instructions or suggestions appear in ***blue text***. These are provided to assist with site- and project-specific plan development. These are recommendations and are not required elements of the federal Class VI Rule. Please delete the ***blue text*** and replace the yellow highlighted text before submitting your document. Similarly, please adjust the example text and tables throughout as necessary (e.g., by adding or removing rows or columns). Appropriate maps, figures, references, etc. should also be included to support the text of the plan. Remember that, pursuant to 40 CFR 146.94(a) of the federal Class VI Rule, the requirement to maintain and implement an approved Emergency and Remedial Response Plan is directly enforceable regardless of whether the requirement is a condition of the permit. For more information, see EPA’s Class VI guidance documents at <https://www.epa.gov/uic/class-vi-guidance-documents>. It is the responsibility of the owner or operator to maintain records of previous revisions to this plan.To avoid duplicative reporting, you are encouraged to provide relevant cross-references to other submissions made with the GSDT. |

## Facility Information

Facility name: INSERT FACILITY NAME
INSERT WELL NUMBER

Facility contact: INSERT CONTACT NAME/CONTACT TITLE
INSERT ADDRESS
INSERT PHONE NUMBER/EMAIL ADDRESS

Well location: INSERT CITY, COUNTY, STATE
INSERT LAT/LONG COORDINATES

This Emergency and Remedial Response Plan (ERRP) describes actions that INSERT PERMIT APPLICANT NAME shall take to address movement of the injection fluid or formation fluid in a manner that may endanger an underground source of drinking water (USDW) during the construction, operation, or post-injection site care periods.

If INSERT PERMIT APPLICANT NAME obtains evidence that the injected CO2 stream and/or associated pressure front may cause an endangerment to a USDW, INSERT PERMIT APPLICANT NAME must perform the following actions:

1. Initiate shutdown plan for the injection well.
2. Take all steps reasonably necessary to identify and characterize any release.
3. Notify the permitting agency (UIC Program Director) of the emergency event within 24 hours.
4. Implement applicable portions of the approved ERRP.

Where the phrase “initiate shutdown plan” is used, the following protocol will be employed: INSERT PERMIT APPLICANT NAME will immediately cease injection. However, in some circumstances, INSERT PERMIT APPLICANT NAME will, in consultation with the UIC Program Director, determine whether gradual cessation of injection (using the parameters set forth in the Summary of Requirements of the Class VI permit) is appropriate.

## Local Resources and Infrastructure

Resources in the vicinity of the INSERT FACILITY NAME that may be affected as a result of an emergency event at the project site include: *[Recommended considerations include relevant resources such as USDWs.]*

Infrastructure in the vicinity of the INSERT FACILITY NAME that that may be affected as a result of an emergency at the project site include: *[Recommended considerations include relevant infrastructure such as drinking water treatment plants.]*

Resources and infrastructure addressed in this plan are shown in Figure 1. *[Use as many figures as needed to appropriately depict resources and infrastructure addressed in this plan.]*

INSERT FIGURE *(full-page size is preferred)*

Figure 1. Map of the site resources and infrastructure.

## Potential Risk Scenarios

The following events related to the INSERT FACILITY NAME that could potentially result in an emergency response: *[This list is not exhaustive and is provided as an example; modify as appropriate. This list should match the scenarios described in the next section below.]*

* Injection or monitoring (verification) well integrity failure;
* Injection well monitoring equipment failure (e.g., shut-off valve or pressure gauge, etc.);
* Fluid (e.g. brine) or CO2 leakage to a USDW or the surface;
* A natural disaster (e.g., earthquake, tornado, lightning strike); or
* Induced or natural seismic event.

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

Table 1. Degrees of risk for emergency events. *[This table is provided as an example; modify as appropriate.]*

| **Emergency Condition** | **Definition** |
| --- | --- |
| Major emergency | 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 emergency | Event poses potential serious (or significant) near term risk to human health, resources, or infrastructure if conditions worsen or no response actions taken.  |
| Minor emergency | Event poses no immediate risk to human health, resources, or infrastructure. |

## Emergency Identification and Response Actions

Steps to identify and characterize the event will be dependent on the specific issue identified, and the severity of the event. The potential risk scenarios identified in Part 2 are detailed below.

*[The following sections are provided as examples. Add/delete scenarios and responses to the sections below as appropriate.]*

### Well Integrity Failure

Integrity loss of the injection well and/or verification well may endanger USDWs. Integrity loss may have occurred if the following events occur:

* Automatic shutdown devices are activated:
	+ Wellhead pressure exceeds the specified shutdown pressure specified in the permit.
	+ Annulus pressure indicates a loss of external or internal well containment.
	+ Pursuant to 40 CFR 146.91(c)(3), INSERT PERMIT APPLICANT NAME must notify the UIC Program Director within 24 hours of any triggering of a shut-off system (i.e., down-hole or at the service).
* Mechanical integrity test results identify a loss of mechanical integrity.

**Severity:** *[Describe the severity of the event (i.e., Low, Medium, High) based on a risk evaluation of its potential impact, and how the severity was determined.]*

**Timing of event:** *[Present the phase during which the event could occur (i.e., pre-injection, injection and/or post-injection phases).]*

**Avoidance measures**: *[Describe the planned operational practices (e.g., well maintenance, injection within permitted limits) in place to avoid the scenario.]*

**Detection methods:** *[Describe the activities (i.e., described in the Testing and Monitoring Plan or triggers based on continuous well monitoring) that would detect the event.]*

**Potential response actions:**

* Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
* Determine the severity of the event, based on the information available, within 24 hours of notification.
* For a Major or Serious emergency:
	+ Initiate shutdown plan. *[Insert appropriate additional steps.]*
	+ If contamination is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
* For a Minor emergency:
	+ Conduct assessment to determine whether there has been a loss of mechanical integrity.
	+ If there has been a loss of mechanical integrity, initiate shutdown plan. *[Insert appropriate additional steps.]*

**Response personnel:** *[Identify the on-call or available staff (e.g., operator staff, contractor staff) who would respond to the scenario.]*

**Equipment:** *[Describe the types of equipment (e.g., drill rig, logging equipment, and cement or casing as required) that would be used to implement the response actions described.]*

### Injection Well Monitoring Equipment Failure

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

**Severity:** *[Describe the severity of the event (i.e., Low, Medium, High) based on a risk evaluation of its potential impact, and how the severity was determined.]*

**Timing of event:** *[Present the phase during which the event could occur (i.e., pre-injection, injection and/or post-injection phases).]*

**Avoidance measures**: *[Describe the planned operational practices (e.g., well maintenance, injection within permitted limits) in place to avoid the scenario.]*

**Detection methods:** *[Describe the activities (i.e., described in the Testing and Monitoring Plan or triggers based on continuous well monitoring) that would detect the event.]*

**Potential Response actions:**

* Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
* Determine the severity of the event, based on the information available, within 24 hours of notification.
* For a Major or Serious emergency:
	+ Initiate shutdown plan. *[Insert appropriate additional steps.]*
	+ Identify and, if necessary, implement appropriate remedial actions (in consultation with the UIC Program Director).
* For a Minor emergency:
	+ Conduct assessment to determine whether there has been a loss of mechanical integrity.
	+ If there has been a loss of mechanical integrity, initiate shutdown plan. *[Insert appropriate additional steps.]*

**Response personnel:** *[Identify the on-call or available staff (e.g., operator staff, contractor staff) who would respond to the scenario.]*

**Equipment:** *[Describe the types of equipment (e.g., drill rig, logging equipment, and cement or casing as required) that would be used to implement the response actions described.]*

### Potential Brine or CO2 Leakage to USDW or the Surface

Elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence of fluid (brine) or CO2 leakage into a USDW.

**Severity:** *[Describe the severity of the event (i.e., Low, Medium, High) based on a risk evaluation of its potential impact, and how the severity was determined.]*

**Timing of event:** *[Present the phase during which the event could occur (i.e., pre-injection, injection and/or post-injection phases).]*

**Avoidance measures**: *[Describe the planned operational practices (e.g., injection within permitted limits) in place to avoid the scenario.]*

**Detection methods:** *[Describe the activities (i.e., described in the Testing and Monitoring Plan or triggers based on continuous well monitoring) that would detect the event.]*

**Potential Response actions:**

* Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
* Determine the severity of the event, based on the information available, within 24 hours of notification.
* For all emergencies (Major, Serious, or Minor):
	+ Initiate shutdown plan.
	+ *[Insert appropriate additional steps.]*
	+ If the presence of indicator parameters are confirmed, develop (in consultation with the UIC Program Director) a case-specific work plan to:
		- * + Install additional groundwater monitoring points near the affected groundwater well(s) to delineate the extent of impact; and
				+ Remediate unacceptable impacts to the affected USDW.
	+ Arrange for an alternate potable water supply, if the USDW was being utilized and has been caused to exceed drinking water standards.
	+ Proceed with efforts to remediate USDW to mitigate any unsafe conditions (e.g., install system to intercept/extract brine or CO2or “pump and treat” to aerate CO2-laden water).
	+ Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by INSERT PERMIT APPLICANT NAME and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.

**Response personnel:** *[Identify the on-call or available staff (e.g., operator staff, contractor staff) who would respond to the scenario.]*

**Equipment:** *[Describe the types of equipment (e.g., groundwater remediation equipment) that would be used to implement the response actions described.]*

### Natural Disaster

Well problems (integrity loss, leakage, or malfunction) may arise as a result of a natural disaster affecting the normal operation of the injection well. An earthquake may disturb surface and/or subsurface facilities; and weather-related disasters (e.g., tornado or lightning strike) may affect surface facilities.

**Severity:** *[Describe the severity of the event (i.e., Low, Medium, High) based on a risk evaluation of its potential impact, and how the severity was determined.]*

**Timing of event:** *[Present the phase during which the event could occur (i.e., pre-injection, injection and/or post-injection phases).]*

**Avoidance measures**: N/A

**Detection methods:** N/A

**Potential Response actions:**

If a natural disaster occurs that affects normal operation of the injection well, perform the following:

* Notify the UIC Program Director within 24 hours of the emergency event, per 40 CFR 146.91(c).
* Determine the severity of the event, based on the information available, within 24 hours of notification.
* For a Major or Serious emergency:
	+ Initiate shutdown plan. *[Insert appropriate additional steps.]*
	+ If contamination or endangerment is detected, identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
* For a Minor emergency:
	+ Conduct assessment to determine whether there has been a loss of mechanical integrity.
	+ If there has been a loss of mechanical integrity, initiate shutdown plan. *[Insert appropriate additional steps.]*

**Response personnel:** *[Identify the on-call or available staff (e.g., operator staff, contractor staff) who would respond to the scenario.]*

**Equipment:** *[Describe the types of equipment (e.g., groundwater remediation equipment, drill rig, logging equipment, and cement or casing as required) that would be used to implement the response actions described.]*

### Induced or Natural Seismic Event

*[The following introductory text is provided as an example.]* Based on the project operating conditions, it is highly unlikely that injection operations would ever induce a seismic event outside an INSERT X mile radius from the wellhead. Therefore this portion of the response plan is developed for any seismic event with an epicenter within an INSERT X mile radius of the injection well.

To monitor the area for seismicity, INSERT BRIEF DESCRIPTION OF THE SEISMIC MONITORING APPROACH BASED ON THE TESTING AND MONITORING PLAN.

Based on the periodic analysis of the monitoring data, observed level of seismic activity, and local reporting of felt events, the site will be assigned an operating state. The operating state is determined using threshold criteria which correspond to the site’s potential risk and level of seismic activity. The operating state provides operating personnel information about the potential risk of further seismic activity and guides them through a series of response actions.

**Severity:** *[Describe the severity of the event (i.e., Low, Medium, High) based on a risk evaluation of its potential impact, and how the severity was determined.]*

**Timing of event:** *[Present the phase during which the event could occur (i.e., pre-injection, injection and/or post-injection phases).]*

**Avoidance measures**: N/A *[Describe the planned operational practices (e.g., injection within permitted limits) in place to avoid the scenario.]*

**Detection methods:** *[Describe the activities (i.e., described in the Testing and Monitoring Plan or triggers based on continuous well monitoring) that would detect the event.]*

**Potential Response actions:**

The seismic monitoring system structure is presented in Table 2. The table corresponds each level of operating state with the threshold conditions and operational response actions.

Table 2. Seismic monitoring system, for seismic events > M1.0 with an epicenter within an INSERT X mile radius of the injection well. *[This table is provided as an example; replace or modify it as appropriate.]*

| **Operating State** | **Threshold Condition[[1]](#footnote-2),[[2]](#footnote-3)** | **Response Action[[3]](#footnote-4)** |
| --- | --- | --- |
| **Green** | Seismic events less than or equal to M1.5 | 1. Continue normal operation within permitted levels.
 |
| **Yellow** | Five (5) or more seismic events within a 30 day period having a magnitude greater than M1.5 but less than or equal to M2.0  | 1. Continue normal operation within permitted levels.
2. Within 24 hours of the incident, notify the UIC Program Director of the operating status of the well.
 |
| **Orange** | Seismic event greater than M1.5 and local observation or felt report | 1. Continue normal operation within permitted levels.
2. Within 24 hours of the incident, notify the UIC Program Director, of the operating status of the well.
3. Review seismic and operational data.
4. Report findings to the UIC Program Director and issue corrective actions.
 |
| Seismic event greater than M2.0 and no felt report |
| **Magenta** | Seismic event greater than M2.0 and local observation or report | 1. Initiate rate reduction plan.
2. Vent CO2 from surface facilities.
3. Within 24 hours of the incident, notify the UIC Program Director, of the operating status of the well.
4. Limit access to wellhead to authorized personnel only.
5. Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary. *[Insert additional appropriate steps.]*
6. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Program Director).
7. Determine if leaks to ground water or surface water occurred.
8. If USDW contamination is detected:
	1. Notify the UIC Program Director within 24 hours of the determination.
	2. *[Insert additional appropriate steps.]*
9. Review seismic and operational data.
10. Report findings to the UIC Program Director and issue corrective actions.
 |
| **Red** | Seismic event greater than M2.0,andlocal observation or report, and local report and confirmation of damage[[4]](#footnote-5) | 1. Initiate shutdown plan.
2. Vent CO2 from surface facilities.
3. Within 24 hours of the incident, notify the UIC Program Director of the operating status of the well.
4. Limit access to wellhead to authorized personnel only.
5. Communicate with facility personnel and local authorities to initiate evacuation plans, as necessary.
6. Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure; identify and implement appropriate remedial actions (in consultation with the UIC Program Director). *[Insert additional appropriate steps.]*
7. Determine if leaks to ground water or surface water occurred.
8. If USDW contamination is detected:
	1. Notify the UIC Program Director within 24 hours of the determination.
	2. *[Insert additional appropriate steps.]*
9. Review seismic and operational data.
10. Report findings to the UIC Program Director and issue corrective actions.
 |
| Seismic event >M3.5 |

**Response personnel:** *[Identify the on-call or available staff (e.g., operator staff, contractor staff) who would respond to the scenario.]*

**Equipment:** *[Describe the types of equipment (e.g., groundwater remediation equipment, drill rig, logging equipment, and cement or casing as required) that would be used to implement the response actions described.]*

## Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP.

Site personnel to be notified (not listed in order of notification): *[This list is provided as an example; modify as appropriate to include all appropriate facility staff and their titles/roles.]*

1. Project Engineer(s)
2. Plant Safety Manager(s)
3. Environmental Manager(s)
4. Plant Manager
5. Plant Superintendent

A site-specific emergency contact list will be developed and maintained during the life of the project. INSERT PERMIT APPLICANT NAME will provide the current site-specific emergency contact list to the UIC Program Director.

Table 3. Contact information for key local, state, and other authorities. *[The organizations in this table are provided as examples.]*

| **Agency** | **Phone Number** |
| --- | --- |
| Local police |  |
| State police |  |
| State emergency management agency |  |
| Environmental services contractor |  |
| UIC Program Director |  |
| EPA National Response Center (24 hours) | 800-424-8802 |
| State geological survey |  |
| INSERT *add rows as needed* |  |

Equipment needed in the event of an emergency and remedial response will vary, depending on the triggering emergency event. Response actions (cessation of injection, well shut-in, and evacuation) will generally not require specialized equipment to implement. Where specialized equipment (such as a drilling rig or logging equipment) is required, INSERT NAME OR ORGANIZATION shall be responsible for its procurement.

## Emergency Communications Plan

*[The following items are provided as examples. Add/delete/expand upon the activities the activities listed below to describe public communication in the event of an emergency.]*

INSERT PERMIT APPLICANT NAME will communicate to the public about any event that requires an emergency response to ensure that the public understands what happened and whether or not there are any environmental or safety implications. The amount of information, timing, and communications method(s) will be appropriate to the event, its severity, whether any impacts to drinking water or other environmental resources occurred, any impacts to the surrounding community, and their awareness of the event.

INSERT PERMIT APPLICANT NAME will describe what happened, any impacts to the environment or other local resources, how the event was investigated, what responses were taken, and the status of the response. For responses that occur over the long-term (e.g., ongoing cleanups), INSERT PERMIT APPLICANT NAME will provide periodic updates on the progress of the response action(s).

INSERT PERMIT APPLICANT NAME will also communicate with entities who may need to be informed about or take action in response to the event, including local water systems, CO2 source(s) and pipeline operators, land owners, and Regional Response Teams (as part of the National Response Team).

## Plan Review

This ERRP shall be reviewed:

* At least once every five (5) years following its approval by the permitting agency;
* Within one (1) year of an area of review (AOR) reevaluation;
* Within INSERT TIME following any significant changes to the injection process or the injection facility, or an emergency event; or
* As required by the permitting agency.

If the review indicates that no amendments to the ERRP are necessary, INSERT PERMIT APPLICANT NAME 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 shall be made and submitted to the permitting agency within INSERT TIME following an event that initiates the ERRP review procedure.

## Staff Training and Exercise Procedures

 *[Recommended considerations include:*

* *What training or drill procedures will be implemented? (For example, provide a list of steps or similar description, or attach a manual if available.)*
* *Who will receive the training and how often will it be provided?]*
* *What training or drill procedures will be implemented? (For example, provide a list of steps or similar description, or attach a manual if available.)*
1. Specified magnitudes refer to magnitudes determined by local INSERT ORGANIZATION NAME or USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network. [↑](#footnote-ref-2)
2. “Felt report” and “local observation and report” refer to events confirmed by local reports of felt ground motion or reported on the USGS “Did You Feel It?” reporting system. [↑](#footnote-ref-3)
3. Reporting findings to the UIC Program Director and issuing corrective action will occur within 25 business days (five weeks) of change in operating state. [↑](#footnote-ref-4)
4. Onset of damage is defined as cosmetic damage to structures, such as bricks dislodged from chimneys and parapet walls, broken windows, and fallen objects from walls, shelves, and cabinets. [↑](#footnote-ref-5)