San Joaquin Renewables Class VI Permit Application Emergency and Remedial Response Plan

Prepared for

San Joaquin Renewables LLC
McFarland, California

Submitted to

U.S. Environmental Protection Agency Region 9
San Francisco, California

Prepared by

DBS&A
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Project # DB19.1252.SS

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EMERGENCY AND REMEDIAL RESPONSE PLAN
40 CFR 146.94(a)

SAN JOAQUIN RENEWABLES

1 Facility Information

Facility name: San Joaquin Renewables (SJR)
Well Number: SJR-I1

Facility contact: Thomas Paskach/Program Manager
1521 W. F Avenue
Nevada, Iowa
(515) 231-7743
tpaskach@frontlinebioenergy.com

Well location: McFarland, Kern County, California
35.688330, -119.276642

This Emergency and Remedial Response Plan (ERRP) describes actions that San Joaquin Renewables (SJR) 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 at the project location ("the Site").

If SJR obtains evidence that the injected carbon dioxide stream and/or associated pressure front may cause an endangerment to a USDW, SJR 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, SJR will immediately cease injection. However, in some circumstances, SJR 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. Gradual cessation will target a cessation of all injection over a 72-hour period.

2 Local Resources and Infrastructure

Resources in the vicinity of the Site that may be affected as a result of an emergency event include: public water supply wells, USDWs, various public facilities, oil and gas wells, and surface water features.

Infrastructure in the vicinity of the Site that that may be affected as a result of an emergency include: residences, schools, hospitals, roads, bridges.

Resources and infrastructure addressed in this plan are listed in Table 1 and shown in Figure 1. Information for nearby wells in included in Table 2.

3 Potential Risk Scenarios

The following events related to the SJR facility could potentially result in an emergency response:

- 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 carbon dioxide leakage to a USDW or the surface;
- Unexpected carbon dioxide or formation fluid migration (through faults, fractures or wells);
- Unexpected carbon dioxide accumulation in indoor air;
- Groundwater or surface water contamination;
- 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 and their degree of risk are categorized in Table 3. An evaluation of adverse event scenarios is provided in Table 4. Table 5 provides emergency response procedures and Table 6 provides additional information regarding seismic events and response actions.

4 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 are detailed below.

4.1 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), SJR 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: This is considered a high-severity event based on its anticipated impact because this type of event has the potential to shutdown all project operations over the long-term, and there is potential for endangerment of USDWs or effects on human health.

Timing of event: Pre-Injection, injection

Avoidance measures: Well maintenance and pressure monitoring will be conducted continuously to avoid this scenario. Injection pressures will be maintained to avoid mechanical integrity failures.

Detection methods: Pressure and mechanical integrity monitoring instrumentation will be deployed for well maintenance and monitoring.

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. Plant and well shutdown procedures are currently in development and will be completed for appropriate review before operations commence.
  - 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 as described above for a major or serous emergency.

Response personnel: Lead plant personnel and SJR management will direct the initial response actions. Daniel B. Stephens & Associates, Inc. (DBS&A), an environmental remediation contractor, will be contacted immediately to assess the impacts. If during the lifetime of the project this contactor changes, EPA will be notified.

Equipment: Pressure and mechanical integrity monitoring instrumentation will be deployed for well maintenance and monitoring. Response equipment to address an adverse event may include, but are not limited to, drill rig, logging equipment, and cement or casing to address well failures.

4.2 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: This is considered a low-severity event based on its anticipated impact because this type of event can likely be repaired in the short-term without the potential to shutdown all project operations over the long-term.

Timing of event: Pre-injection, injection.

Avoidance measures: Well maintenance and monitoring will be conducted continuously to avoid this scenario. Injection pressures will be maintained to avoid mechanical integrity failures.

Detection methods: Pressure and mechanical integrity monitoring instrumentation will be deployed for well maintenance and monitoring.

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 Minor emergency:
    - Conduct assessment to determine whether there has been a loss of mechanical integrity and determine event severity.
    - If there has been a loss of mechanical integrity, initiate shutdown plan.
    - Implement and repair plan if needed
    - Evaluate resumed injection at reduced pressure upon approval by the UIC Program Director.

Response personnel: Lead plant personnel and SJR management will direct the initial response actions.

Equipment: Pressure and mechanical integrity monitoring instrumentation will be deployed for well maintenance and monitoring. Response equipment to address an adverse event may include, but are not limited to, drill rig, logging equipment, and cement or casing to address well failures.

4.3 Potential Brine or Carbon Dioxide Leakage to USDW or the Surface

Indicated by elevated concentrations of indicator parameter(s) in groundwater sample(s) or other evidence of fluid (brine) or carbon dioxide leakage into a USDW.

Severity: This is considered a high-severity event based on its anticipated impact because this type of event has the potential to shutdown all project operations over the long-term, and there is potential for endangerment of USDWs or effects on human health.

Timing of event: Injection, post-injection.

Avoidance measures: Monitoring will be conducted continuously to avoid or detect this scenario. Injection pressures will be maintained to avoid mechanical integrity failures.

Detection methods: Instrumentation will be deployed and sampling will be conducted for monitoring.

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.
    - Notify emergency contacts.
    - 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 carbon dioxide or "pump and treat" to aerate carbon dioxide-laden water).
    - Continue groundwater remediation and monitoring on a frequent basis (frequency to be determined by SJR and the UIC Program Director) until unacceptable adverse USDW impact has been fully addressed.

Response personnel: Lead plant personnel and SJR management will direct the initial response actions. DBS&A, an environmental remediation contractor, will be contact immediately to assess the impacts. If during the lifetime of the project the contactor changes, EPA will be notified.

Equipment: Sampling and monitoring instrumentation will be deployed for monitoring. Response equipment to address the adverse event may include, groundwater remediation equipment to address USDW contamination due to CO_2 leakage, a natural disaster, or a seismic event.

4.4 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: This is considered a medium-severity event based on its anticipated impact because this type of event likely does not have the potential to shutdown all project operations over the long-term.

Timing of event: Pre-injection, injection, post-injection.

Avoidance measures: N/A

Detection methods: Weather event monitoring and communication will be implemented.

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.
    - Notify emergency contacts.
    - 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 and notify emergency contacts and implement procedures as described under the MI failure scenario above.

Response personnel: Lead plant personnel and SJR management will direct the initial response actions. DBS&A, an environmental remediation contractor, will be contact immediately to assess the impacts. If during the lifetime of the project the contactor changes, EPA will be notified.

Equipment: Weather instrumentation will be deployed for monitoring. Response equipment to address the adverse event may include, groundwater remediation equipment to address USDW contamination due to CO_2 leakage, a natural disaster, or a seismic event.

4.5 Induced or Natural Seismic Event

Based on the project operating conditions, it is considered unlikely that injection operations would induce a seismic event. However, this portion of the response plan is developed for any seismic event within a 1-mile radius of the Area of Review (AoR) for the injection well.

To monitor the area for seismicity, strong ground motion accelerometers will be stationed within the monitoring area.

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: The severity of seismic events may encompass a range from minor to severe based on the magnitude of the event and the proximity to the project site. Although improbable, severe seismicity has a limited potential to shutdown all project operations over the long-term.

Timing of event: Pre-Injection, injection, post-injection.

Avoidance measures: Injection will be conducted only within defined permit limits.

Detection methods: Strong ground motion accelerometers will be deployed for detection and monitoring.

Potential Response actions:

The seismic monitoring system structure is presented in Table 6. The table corresponds to each level of operating state with the threshold conditions and operational response actions.

Response personnel: Lead plant personnel and SJR management will direct the initial response actions. DBS&A, an environmental remediation contractor, will be contact immediately to assess the impacts. If during the lifetime of the project the contactor changes, EPA will be notified.

Equipment: Strong ground motion accelerometer instrumentation will be deployed for monitoring. Response equipment to address the adverse event may include, groundwater remediation equipment to address USDW contamination due to CO_2 leakage, a natural disaster, or a seismic event.

5 Response Personnel and Equipment

Site personnel, project personnel, and local authorities will be relied upon to implement this ERRP. Site personnel to be notified are listed in Table 7 (not listed in order of notification). A site-specific emergency contact list will be developed prior to the commencement of injection

and maintained during the life of the project. SJR will provide the current site-specific emergency contact list to the UIC Program Director prior to the commencement of injection and will update at least 7 days prior to any personnel changes.

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, SJR shall be responsible for its procurement.

6 Emergency Communications Plan

SJR 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.

SJR 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), SJR will provide periodic updates on the progress of the response action(s).

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

Routine stakeholder communication can be engaged at various stages in the event evaluation, response action, or remedial process as deemed appropriate. The intent of the stakeholder communication plan is to deliver clear and timely project information to interested community members and first-responder personnel that may be involved in the event of a remedial process. This information will be delivered before injections commence as well as in the unlikely occurrence of an adverse event or emergency. The stakeholder communication plan consists of the following elements:

- Community Meetings
- Update Meetings
- Contact Information

Before injections commence, a neighborhood community meeting will be held jointly with the City of McFarland. The meeting will be held to inform residences, businesses, police/fire personnel within the AoR and project vicinity and/or others of the project background, operations, and schedule of upcoming activities such as plant construction or injection. Typically, such information would be provided in slideshow or visual presentation format with appropriate figures, diagrams, and related summary information for handouts. Initial meeting

materials will provide phone and email address information for designated SJR contacts to develop an ongoing two-way line of communication.

As community interest dictates, additional, update meetings may be held to present and discuss the details of adverse events that may have occurred. In addition, as further community interest dictates, update meetings may be held annually to inform the community of project milestones and accomplishments as well as any adverse events. A list of interested community members and their affiliation and contact information may be developed and maintained as project needs or community interest dictates.

7 Plan Review

This plan will be reviewed and updated as needed at least on an annual basis. Plan updates may include additional or alternative project personnel, information regarding plant upgrades, expansions, or modifications, a summary of past adverse events and remedial responses, AoR updates, remedial response effectiveness, plan improvements, communication procedures, lessons learned, or other relevant information. Updates may also be periodically appropriate to identify supplemental remedial response actions, equipment, or personnel training. The plan will also be updated within 1 year of an AoR reevaluation; following any significant changes to the injection process or the injection facility; following an emergency event occurrence; or, as required by USEPA. SJR may also provide documentation supporting a determination that no amendment is necessary.

Post-construction, this plan will be updated to include injection well construction information, schematics, and emergency shutoff controls and instrumentation. A step-by-step injection well shut-down procedure will also be included as a section of the plan as needed. Facility reference schematics and maps will also be included.

In summary, 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 AoR revision or 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, SJR 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 one (1) year following an event that initiates the ERRP review procedure.

8 Staff Training and Exercise Procedures

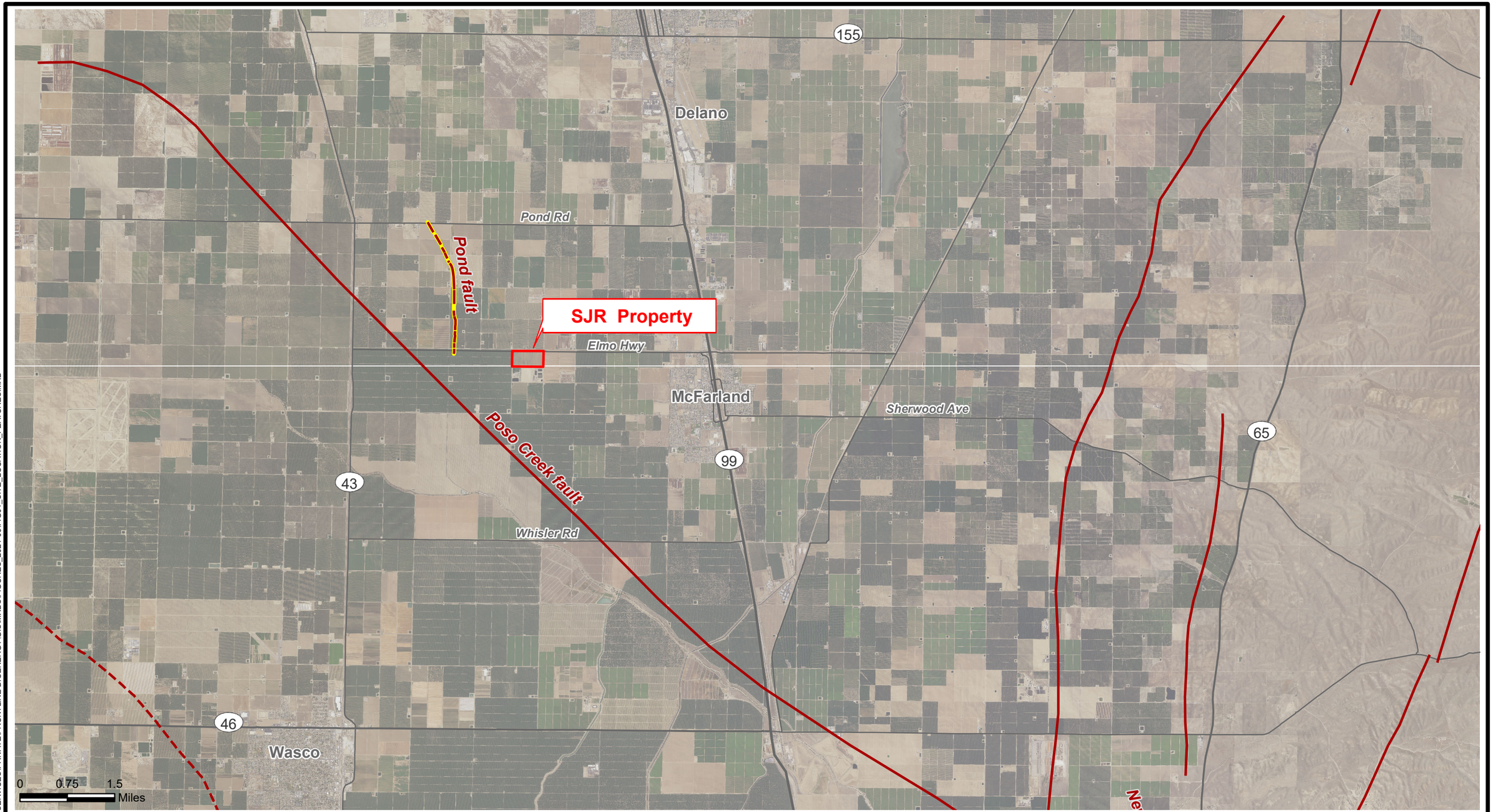
Facility personnel will be properly trained with regard to this plan and companion facility safety or operations plans before injection commences. As noted above this plan is envisioned to be implemented in companion with the plant Health and Safety Plan and master facility operations manual. In addition, facility personnel will be trained to communicate and coordinate in advance with local first-responder personnel.

Training will be updated at least on an annual basis. Mid-year training updates may also be completed as needed if additional equipment or procedures are introduced to facility operations as routine, periodic, or one-time occurrences.

Training will include designation of an onsite plant emergency coordinator and explanatory instruction regarding emergency command center location(s); facility configuration, regular plant operational procedures, safety zones, emergency meeting areas, required equipment, equipment access and storage; seismic safety; Health and Safety plan overview, emergency and remedial response procedures and plan overview, emergency contacts, chain-of-command decision-making, facility shutdown and startup, and related information. A personnel record will be maintained to document completed training and updates. Training will be conducted by appropriate facility operations management, safety professionals, or their designee.

A specialty trained subcontractor will be on-call to address potential injection well blowout, injection well casing failure, or another similar event. SJR recognizes this is a unique event that requires specialty expertise and subcontractors to rapidly evaluate the issue, provide recommendations, and implement a suitable remedy in the field.

Figures



Explanation

- SJR Property boundary
- Quaternary fault
- Pre-Quaternary fault
- Pond fault

Sources:

1. Faults from Fault Activity Map of California, Department of Conservation, California Geological Survey, 2010.
2. Property boundaries from Kern County Assesor, 2018.
3. 2016 aerial imagery from USDA NAIP.

SAN JOAQUIN RENEWABLES

Site Location and Features

9/14/2021 JN DB19.1252

Figure 1

K:\PROJECTS\ENVIRONMENTAL SERVICES\PRIVATE\FRONTLINE BIOENERGY\GIS\MXDS\FIGURES_2021-06\FIG01_SITE_LOCATION_FEATURES.MXD

Kern County Fire Station 37
Delano Hospital
Kern County Fire Station 34
Browning Manor Convalescent Hospital
M25S25E10
Delano Waste Treatment Plant
Delano Regional Medical Center
Valle Vista School
Delano Transmitting Station
Delano
Delano Head Start Center
Kern County Sheriff's Department
M25S25E14
Delano Municipal Airport
M25S25E22
0402930522
Jasin
0403022505
0402979821
0402930514
Pond Elementary School
Pond
Vinland
0402930515
0402930513
0402930516
99
Zentner
0402981541
0402959849
Browning Road Elementary School
McFarland Middle School
M26S25E12
0402930616
McFarland
Elmo
Kern County Fire Station 33
0403003222
0402930615
Kern Avenue Elementary School
0402980729
Hollis
0402930608
Mc Farland Police Department
San Joaquin High School
McFarland High School
0402930607
0402930604
0402930614
0402930605
Calico
0402970053
Neufeld
Wasco-Kern County Airport
Wasco
43
46
65
155
0 0.75 1.5 Miles

Explanation

- SJR Property
- AoR,15 and 20-year combined
- AoR-5-year
- City boundary
- Lake/Pond/Reservoir
- Major highway or road
- Railroads
- Pre-Quaternary fault
- Quaternary fault
- River
- DWR public water supply well
- DOGGR oil/gas well
- Waste water treatment plant
- Transmitting station
- Fire station
- School
- Hospital
- Police
- Airport

Sources:
1. DOGGR wells from Division of Oil, Gas, and Geothermal Resources.
2. Public supply wells from CA DWR.
3. Property boundary from Kern County Assesor, 2018.
4. U.S. Geological Survey Topographic Map and ESRI

Notes:
1. AoR = Area of review

SAN JOAQUIN RENEWABLES

Area Resources and Infrastructure

Figure 2

6/25/2021 DB19.1252

K:\PROJECTS\ENVIRONMENTAL SERVICES\PRIVATE\FRONTLINE BIOENERGY\GIS\MXDS\FIGURES_2021-06\FIG02_RESOURCES_INFRASTRUCTURE.MXD

Tables

Table 1. Facilities

Category	Name	Address	City	Zip Code	Phone
School	Pond Elementary School	29585 Pond Road	Wasco	93280	661-792-2545
School	Browning Road Elementary School	410 E Perkins Ave	McFarland	93250	661-792-2113
School	Kern Avenue Elementary School	356 W Kern Ave	McFarland	93250	661-792-3033
School	McFarland Middle School	405 Mast Ave	McFarland	93250	661-792-3340
School	McFarland High School	259 W Sherwood Ave	McFarland	93250	661-792-3126
School	San Joaquin High School	599 5th Street	McFarland	93250	661-792-6312
School	Delano Head Start Center	625 14th Ave	Delano	93215	661-720-9550
School	Valle Vista School	120 Garces Hwy	Delano	93215	661-721-5070
Hospital	Browning Manor Convalescent Hospital	729 Browning Road	Delano	93215	661-725-2501
Hospital	Delano Hospital (Urgent Care)	1201 Jefferson Street	Delano	93215	661-725-2579
Hospital	Delano Regional Medical Center	1401 Garces Hwy	Delano	93215	661-725-4800
Airport	Delano Municipal Airport	1212 Airport Drive	Delano	93215	661-721-3338
Airport	Wasco-Kern County Airport				661-391-1800
Fire station	Kern County Fire Station 34	1001 12th Ave	Delano	93215	661-725-1000
Fire station	Kern County Fire Station 33	700 W Perkins Ave	McFarland	93250	661-792-2131
Fire station	Kern County Fire Station 37	132 W 11th Ave	McFarland	93215	661-725-2222
WWTP	Delano Waste Treatment Plant	1107 Lytle Ave	Delano	93215	661-721-3352
Transmitting station	Delano Transmitting Station	11015 Melcher Road	Delano	93215	661-725-0150
Police/Sheriff	Mc Farland Police Department	401 W Kern Ave	McFarland	93250	661-792-2121
Police/Sheriff	Kern County Sheriff's Department	455 Lexington Street	Delano	93215	661-721-3800

Table 2. Wells

Source	Type	MTRS	API	Lease Name	Well Number	Well Status	Operator Name	Section	Township	Range	Latitude	Longitude	AoR 5-year	AoR 15/20-year
DOGGR	Oil/gas		402930513	E.C. Cozart	1	Plugged	Marathon Oil Company	31	25S	25E	35.71146	–119.318		X
DOGGR	Oil/gas		402930514	Williams	1	Plugged	Getty Reserve Oil, Co.	26	25S	25E	35.72866	–119.254		X
DOGGR	Oil/gas		402930515	Davis	1	Plugged	Getty Reserve Oil, Co.	35	25S	25E	35.71451	–119.254	X	
DOGGR	Oil/gas		402930516	Stiles	1	Plugged	Getty Reserve Oil, Co.	35	25S	25E	35.7038	–119.258	X	
DOGGR	Oil/gas		402930522	Curry	1	Plugged	Shell Western E&P Inc.	20	25S	26E	35.73789	–119.198		X
DOGGR	Oil/gas		402930604	K.C.L. 25	1	Plugged	Mobil Oil Corporation	25	26S	25E	35.64264	–119.233	X	
DOGGR	Oil/gas		402930605	KCL	87-25	Plugged	Moriqui Exploration Co.	25	26S	25E	35.63395	–119.225		X
DOGGR	Oil/gas		402930607	Del Fortuna	1	Plugged	Atlantic Oil Company	21	26S	26E	35.64836	–119.182		X
DOGGR	Oil/gas		402930608	Lease by Chevron U.S.A. Inc.	32-15	Plugged	Chevron U.S.A. Inc.	15	26S	26E	35.67201	–119.164		X
DOGGR	Oil/gas		402930614	KCL	16X-30	Plugged	Trico Industries Inc	30	26S	26E	35.63549	–119.223		X
DOGGR	Oil/gas		402930615	Alta	1	Plugged	John H. Webb	16	26S	26E	35.67424	–119.178		X
DOGGR	Oil/gas		402930616	White-Harp	1	Plugged	C. C. White	9	26S	26E	35.68482	–119.171		X
DOGGR	Oil/gas		402959849	Nella	1	Plugged	Atha-Saris	2	26S	25E	35.7005	–119.246	X	
DOGGR	Oil/gas		402970053	Tenneco-Sun	11X-31	Plugged	Arco Western Energy Co.	31	26S	26E	35.63041	–119.223		X
DOGGR	Oil/gas		402979821	Lieber	1	Plugged	Arco Western Energy Co.	28	25S	25E	35.73082	–119.287		X
DOGGR	Oil/gas		402980729	Ingram	13-73	Plugged	Trio Petroleum LLC	13	26S	25E	35.6699	–119.226	X	
DOGGR	Oil/gas		402981541	Rosenberger	1	Plugged	Arco Western Energy Co.	5	26S	25E	35.70134	–119.31		X
DOGGR	Oil/gas		403003222	Parsons	1	Plugged	Dowser Exploration Venture	8	26S	26E	35.67514	–119.203		X
DOGGR	Oil/gas		403022505	Aztec	29-Jan	Plugged	Skyview Holdings, Inc.	29	25S	25E	35.72955	–119.294		X
DWR	Public water supply	M25S25E10							25S	25E10				X
DWR	Public water supply	M25S25E14							25S	25E14				X
DWR	Public water supply	M25S25E22							25S	25E22				X
DWR	Public water supply	M26S25E12							26S	25E12			X	

Table 3. Degrees of risk for emergency events

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.

Table 4. Adverse Event Scenario Evaluation

Event	Impact Severity	Degree of Risk (Emergency Type)	Likelihood	Project Phase	Avoidance Measure(s)	Detection Methods	Response Personnel	Equipment
Injection well failure	High	Major	Low	Pre-injection, Injection	Maintenance Monitoring	Pressure monitoring	Plant Lead/Management	Sensor instrumentation/ telemetry
Unexpected carbon dioxide migration	High	Serious	Medium	Injection, post-injection	Monitoring	Sampling/ testing	Management	Air/groundwater sampling instrumentation
Unexpected carbon dioxide accumulation in indoor air	High	Major	Low	Injection, post-injection	Monitoring	Sampling/ testing	Management	Air monitoring instrumentation
USDW or surface water contamination	High	Serious	Medium	Injection, post-injection	Monitoring	Sampling/ testing	Management	Water sampling instrumentation
Induced or natural seismic event (ground motion/ earthquake)	Minor to High	Minor, Major, or Serious	Low	Injection, post-injection	Monitoring	Ground motion	Plant Lead/Management	Accelerometer(s)
Natural disasters (fire, flood, storm)	Medium	Serious	Low	Pre-Injection, Injection, post-injection	N/A	Fire alarms/ sensors; communication system	Plant Lead/Management	Fire/smoke sensors/alarms; weather alert system

Table 5. Adverse Events and Emergency Response Procedures

Event	Response Action(s)
Injection or monitoring well or equipment failure (including injection pressure, temperature or annulus pressure monitoring equipment)	<u>Major/Serious Emergency:</u> ▪ Initiate shutdown plan ▪ Notify emergency contacts ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity ▪ Employ standard well blowout evaluation methodologies ○ Downhole logging/camera; interval testing; others ▪ Employ standard well blowout repair methodologies ○ Annular seal repair/replacement ○ Casing repair/replacement ○ Grout barrier ▪ Evaluate resumed injection at reduced pressure ▪ Re-establish/resume ongoing monitoring and maintenance (i.e. mechanical integrity testing). ▪ Engage stakeholder communication plan ▪ Identify and implement appropriate remedial actions (in coordination with the UIC Program Director) if contamination is detected.
Injection or monitoring well or equipment failure (including injection pressure, temperature or annulus pressure monitoring equipment)	<u>Minor Emergency:</u> ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity ▪ Evaluate potential loss of mechanical integrity ▪ Implement shut-down plan and repair only if needed ▪ Evaluate resumed injection at reduced pressure ▪ Re-establish/resume ongoing monitoring and maintenance (i.e. mechanical integrity testing). ▪ Engage stakeholder communication plan ▪ Identify and implement appropriate remedial actions (in coordination with the UIC Program Director) if contamination is detected.
Unexpected brine carbon dioxide leakage/migration	▪ Initiate shutdown plan ▪ Notify emergency contacts ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity ▪ Implement groundwater monitoring plan to evaluate if groundwater has been impacted ▪ Evaluate potential alternative remedial technologies and develop corrective action plan in consultation with UIC Program Director: -Develop plan to delineate impacts

Event	Response Action(s)
Unexpected brine carbon dioxide leakage/migration (cont.)	-Develop remedial plan as needed -Implement remedial plan/remedial monitoring ▪ Conduct area survey to map leakage area ▪ Engage stakeholder communication plan ▪ Develop monitoring program ▪ Evaluate resumed injection at reduced pressure ▪ Implement monitoring during resumed injection
Unexpected carbon dioxide accumulation in indoor air	▪ Initiate shutdown plan ▪ Notify emergency contacts and determine event severity ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation ▪ Conduct area survey to map leakage area ▪ Develop monitoring program (sensor deployment) ▪ Develop air abatement program (ventilation, scrubbing) ▪ Engage stakeholder communication plan ▪ Evaluate resumed injection at reduced pressure ▪ Implement monitoring during resumed injection
Groundwater or surface water contamination	▪ Initiate shutdown plan ▪ Notify emergency contacts Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity ▪ Conduct area survey to map leakage area ▪ Develop water quality monitoring program of the USDWs ▪ Evaluate potential alternative remedial technologies and develop corrective action plan in consultation with UIC Program Director: -Develop plan to delineate impact with new monitoring wells -Develop plan to remediate USDW as needed -Arrange for alternative drinking water supply if appropriate -Implement remedial plan/remedial monitoring ▪ Engage stakeholder communication plan ▪ Evaluate resumed injection at reduced pressure ▪ Implement monitoring during resumed injection ▪ Supply alternate water to affected populations if USDWs are impacted
Induced or natural seismic event (ground motion/earthquake)	▪ The response action and determination to stop injection is determined by the magnitude of the seismic event and distance from the injection well. See Table 6 for response action details. ▪ Notify emergency contacts ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity

Event	Response Action(s)
Induced or natural seismic event (ground motion/earthquake) (cont.)	▪ Conduct area survey to inspect and map potential damage ▪ Engage stakeholder communication plan ▪ Develop corrective action plan as needed ▪ Evaluate resumed injection at reduced pressure as needed ▪ Implement monitoring during resumed injection
Natural disasters (fire/flood/storm)	▪ Initiate shutdown plan if there is a loss in mechanical integrity or contamination is detected (implement Shut-down Procedure) ▪ Notify emergency contacts ▪ Notify USEPA UIC Program Director within 24 hours ▪ Conduct causal investigation and determine event severity ▪ Conduct area survey to inspect and map potential damage ▪ Engage stakeholder communication plan ▪ Develop remedial action plan as needed ▪ Evaluate resumed injection ▪ Implement monitoring during resumed injection

Table 6. Seismic monitoring system for seismic events > M1.0 with an epicenter within a 1-mile mile radius of the injection well

Operating State	Threshold Condition	Response Action
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 Seismic event greater than M2.0 and no 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.
Magenta	Seismic event greater than M2.0 and local observation or report	1. Initiate rate reduction plan. 2. Vent CO_2 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). 7. Determine if leaks to ground water or surface water occurred. If USDW contamination is detected, notify the UIC Program Director within 24 hours of the determination. 8. Review seismic and operational data. 9. Report findings to the UIC Program Director and issue corrective actions.

Operating State	Threshold Condition	Response Action
Red	Seismic event greater than M2.0, and local observation or report, and local report and confirmation of damage Seismic event >M3.5	1. Initiate shutdown plan. 2. Vent CO_2 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). 7. Determine if leaks to ground water or surface water occurred. If USDW contamination is detected notify the UIC Program Director within 24 hours of the determination. 8. Review seismic and operational data. 9. Report findings to the UIC Program Director and issue corrective actions.

Notes:

Specified magnitudes refer to magnitudes determined by USGS seismic monitoring stations or reported by the USGS National Earthquake Information Center using the national seismic network. "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. Reporting findings to the UIC Program Director and issuing corrective action will occur within 25 business days (five weeks) of change in operating state.

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.

Table 7. Contact information for key local, state, and other authorities

Agency	Phone Number
McFarland Police Department 401 Kern Ave, McFarland, CA	911 or (661) 792-2121
Kern County Sheriff 1350 Norris Road, Bakersfield, CA	911 or (661) 861-3110 1350 Norris Road, Bakersfield, CA
State police	911
California Department of Conservation Geologic Energy Management (Cal-GEM) Bakersfield office	(800) 852-7550 (661) 322-4031
Onsite Contractor/Operation Manager/Safety Officer TBD	TBD before operations commence (24-hour contact)
UIC Program Director (David Albright)	(415) 972-3971
EPA National Response Center (24 hours)	800-424-8802
SJR Operations Manager (Arlon Binning)	(515) 263-6334
SJR Program Manager (Thomas Paskach)	(515) 231-7743
Kern County Fire Station 33 401 Kern Ave, McFarland, CA	911 or (661) 758-6447