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GOVERNOR

State of Louisiana
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF CONSERVATION

STEPHEN CHUSTZ
INTERIM SECRETARY
JAMES H. WELSH
COMMISSIONER OF CONSERVATION

**FIFTH AMENDMENT TO DECLARATION OF EMERGENCY
AND DIRECTIVE**

Pursuant to the authority granted to the Commissioner of Conservation and Assistant Secretary of the Louisiana Department of Natural Resources under La. R.S. 30:1, et seq., particularly La. R.S. 30:6.1, this FIFTH AMENDMENT TO THE DECLARATION OF EMERGENCY AND DIRECTIVE is hereby issued;

It is hereby declared that since issuance of the Fourth Amendment to Declaration of Emergency and Directive effective November 12, 2012 and issued to Texas Brine Company LLC (T149) concerning a sinkhole that formed immediately adjacent to OXY GEISMAR NO. 3 well site (Serial Number 180708) and the associated salt cavern, the following facts have been found to exist:

1) In the Third Amendment to Declaration of Emergency and Directive effective October 11, 2012, Texas Brine Company LLC (T149) was directed and ordered to both upgrade the current seismic array to allow for real-time data processing and micro-seismic data and to collect and interpret geophysical data to determine the nature and extent of the collapse structure from the base of the original cavern to the ground surface. Texas Brine Company LLC (T149) was ordered to prepare and submit plans to accomplish the real-time seismic array upgrade by no later than October 25, 2012 and the geophysical data interpretation by no later than November 13, 2012. Despite several sets of comments, multiple meetings between Texas Brine Company LLC (T149) and consultants working for both the Office of Conservation and Texas Brine Company LLC (T149), and following review of the latest proposed plan, Texas Brine Company LLC (T149) has, to date, failed to provide plans to meet either of these two directives within a reasonable time frame.

2) Sharp seismic events continue to be recorded by the existing seismic monitoring array at the rate of several per month. These events are interpreted to be associated with continued movement of subsurface rock masses. The U.S. Geological Survey and Center for Earthquake Research and Information have verbally stated that the sharp seismic events observed after August 2, 2012 are shallow at depths less than 1 kilometer. The seismic events located prior to August 2, 2012 were located in the general area above the OXY GEISMAR NO. 3 (Serial Number 180708) cavern operated by Texas Brine Company LLC (T149).

3) Based on proximity to the collapse zone and/or the collapsed OXY GEISMAR NO. 3 (Serial Number 180708) cavern, enhanced monitoring/reporting of pressures in the OXY GEISMAR NO. 1 (Serial Number 971564) and NO. 2 (Serial Number 151646) wells and caverns, as well as enhanced monitoring of seismic activity in this area and a more complete understanding of the geophysical nature of these caverns and the collapse zone associated with the sinkhole are required.

FIFTH AMEND. TO THE DECLARATION OF EMERGENCY AND DIRECTIVE

4) Based upon recent groundwater and sinkhole surface water sample results demonstrating an increase in chlorides at nearby industrial water wells operated by Texas Brine Company LLC (T149) and an increase in chlorides and total dissolved solids with depth in the sinkhole, the groundwater monitoring plan submitted by Texas Brine Company LLC (T149) pursuant to the Third Amendment to Declaration of Emergency and Directive and subsequently conditionally approved by the Office of Conservation needs to be amended to generate data regarding the potential movement of water from the failed cavern or the formation(s) that are feeding the crude oil and natural gas that has risen upward along the flanks of the Napoleonville Salt Dome through the collapsed zone.

5) Additional data is needed to determine the characteristics of the collapsed zone, including the potential size of void spaces within the collapsed zone capable of trapping any large pockets of natural gas, as well as data to help identify the source(s) of the natural gas bubbling to surface.

Therefore, until further notice to the contrary, based upon the evidence and findings described both previously and herein, it is determined that the requirements for declaring an Emergency pursuant to La. R.S. 30:6.1 have been met and an emergency is declared and continues to exist due to the incidents which have occurred or threaten to occur imminently at the OXY GEISMAR NO. 3 well (Serial Number 180708) site, the associated cavern, and adjacent/nearby sites, and properties.

It is hereby declared that in response to the emergency, Texas Brine Company LLC (T149) is **hereby ordered** to undertake any and all necessary actions to assess for and abate any associated threats to human safety and the environment.

It is further declared that Texas Brine Company LLC (T149) is specifically directed and is **hereby ordered** to undertake the necessary actions to address the potential danger to human life associated with the this emergency, including but not limited to the following:

1) Install and monitor a temporary seismic array in the currently completed geophone borehole near OXY GEISMAR NO. 3 well site (Serial Number 180708) while the permanent array is being designed. All data from the temporary and permanent arrays shall be made available by Texas Brine Company LLC (T149) to the public on a real-time telemetry basis in either mseed or SAC format. All seismic data shall be made available by Texas Brine Company LLC (T149) upon request in Society of Exploration Geophysicists SEG-Y format and real-time data be made available to Center for Earthquake Research and Information on a seedlink server (<http://www.iris.edu/data/dmc-seedlink.htm>). The work plan including schedule for installation of a temporary and permanent arrays in this borehole shall be submitted to the Office of Conservation by no later than December 15, 2012 and the temporary array shall be installed by no later than January 1, 2013.

2) Two geotechnical and geophone boreholes shall be installed in accordance with the following requirements. The work plan for these wells, testing, and the temporary geophysical arrays shall be submitted to the Office of Conservation by no later than December 28, 2012.

a. By no later than January 15, 2013, initiate drilling of a deep geophone borehole/well Geophone-01 at the location shown on Figure 1.

FIFTH AMEND. TO THE DECLARATION OF EMERGENCY AND DIRECTIVE

- iii. This borehole shall have a standard suite of geophysical logs including logs equivalent to the Baker tool GSLAM, XMAC, and STAR tool suites of logs.
- iv. Formation testing and sampling shall be conducted on all potential oil and gas production zones below a depth of 2,000 feet using repeat formation test (RFT) tools or equivalent. All water, crude oil, and gas samples recovered by RFT shall be tested for hydrocarbon production zone characterization and fingerprinting purposes. The crude oil shall have chromatographic fingerprints performed similar to that presented in Attachment 1. Gas samples shall be analyzed for composition and carbon isotopes. The exact test protocol and analyses shall be specified in the work plan. Split samples shall be provided to LDNR or their representative.
- v. By no later than June 1, 2013, a temporary seismic monitoring array will be installed in this well while a permanent system is designed. The permanent system shall be installed by no later than August 1, 2013. All data from the temporary and permanent arrays shall be made available by Texas Brine Company LLC (T149) to the public on a real-time telemetry basis in either mseed or SAC format. All seismic data shall be made available by Texas Brine Company LLC (T149) upon request in Society of Exploration Geophysicists SEG-Y format and real-time data be made available to Center for Earthquake Research and Information on a seedlink server (<http://www.iris.edu/data/dmc-seedlink.htm>).

3) By January 31, 2013, TBC shall install three cluster wells, MRAA-01, MRAA-02, and MRAA-03 within 150 feet of the locations shown on Figure 1 to monitor for salt-water migration into the Mississippi River Alluvial Aquifer. At each location, wells will be installed at the bottom and middle of the alluvium. The work plan for installation of these wells and testing shall be submitted to the Office of Conservation by December 28, 2012.

- a. At each location, 4-inch inside diameter wells will be installed with screens at the bottom and middle of the alluvial aquifer.
- b. Mud-rotary must be used on the alluvial aquifer portion of the borehole. Drive surface casing can be used for construction. Lithologic cuttings logs shall be developed by a professional geologist using cuttings collected at no greater than five-foot intervals.
- c. At each well cluster location, resistivity, induction, SP, gamma, density, caliper, and PDK geophysical logs shall be run on the deepest borehole in the cluster. Each well shall be slug tested using pneumatic slug test methods.
- d. Each cluster well will have a 10-foot screen section and a 15-foot sand pack section and be installed in accordance with Louisiana Dept. of Natural Resources and Dept. of Environmental Quality requirements for monitor well construction. The planned depth of each screen placement must be submitted to the Office of Conservation for approval prior to construction of the well.
- e. Each well will be sampled using the same analyses suite and schedule currently being used on the area industrial water supply wells. Split samples shall be provided to Office of Conservation or their designated representative.

FIFTH AMEND. TO THE DECLARATION OF EMERGENCY AND DIRECTIVE

4) In developing the investigation plan for the imaging of the collapse zone in Directive No. 6 of the Third Amendment to Declaration of Emergency and Directive, include the use of one or both of these wells in the vertical seismic and cross-hole seismic imaging through the collapse zone. At a minimum this shall include the use of cross-hole tomography to image the collapse zone. Additionally, vertical seismic profile (VSP) surveys to define the edge of salt to a depth of 6,000 feet shall be run to locate the edge of salt in the vicinity of OXY GEISMAR NO. 1 (Serial Number 971564) and 3 (Serial Number 180708) caverns. Work shall begin on the VSP imaging of the edge of salt within 30 days from installation of the well casing to total depth in Geophone-01 well. Work shall begin on the cross-hole imaging within 30 days from installation of the well casing to total depth on Geophone-02. The work plan for this imaging shall be submitted to the Office of Conservation by no later than December 28, 2012. Both the VSP imaging and the cross-hole imaging shall be completed on or before August 1, 2013. A final seismic investigation report shall be submitted to the Office of Conservation and to the Assumption Parish Office of Homeland Security and Emergency Preparedness by no later than November 4, 2013.

5) Immediately begin recording the tubing and casing pressure on the OXY GEISMAR NO. 1 well (Serial Number 971564) on fifteen (15) minute intervals and report daily to the Office of Conservation and to the Assumption Parish Office of Homeland Security and Emergency Preparedness in conjunction with the OXY GEISMAR NO. 3A observation well (Serial Number 974265) casing and tubing pressures. This pressure data shall be reported in an Excel file or files.

6) Immediately begin recording the tubing and casing pressure on the OXY GEISMAR NO. 2 well (Serial Number 151646) on two-hundred-and-forty minute (6 hour) intervals and report daily to the Office of Conservation and to the Assumption Parish Office of Homeland Security and Emergency Preparedness in conjunction with the OXY GEISMAR NO. 3A observation well (Serial Number 974265) casing and tubing pressures. This pressure data shall be reported in an Excel file or files.

7) Perform a Sonar survey on the OXY GEISMAR NO. 1 (Serial Number 971564) and the OXY GEISMAR NO. 2 (Serial Number 151646) caverns and have a professional engineer prepare an annual report noting any changes in cavern dimensions and configuration with particular attention to features that may demonstrate instability of either cavern. The Office of Conservation and the Assumption Parish Office of Homeland Security shall be notified at least 48 hours prior to running the sonar surveys. The results of the survey analysis shall be submitted to the Office of Conservation and to the Assumption Parish Office of Homeland Security by no later than January 30, 2012.

It is further declared that, consistent with La. R.S. 30:6.1.B, if Texas Brine Company LLC (T149) fails to begin the actions listed above within the deadlines set forth, orders demanding compliance and civil penalties may be issued to Texas Brine Company LLC (T149) R.S. 30:1, et seq.

FIFTH AMEND. TO THE DECLARATION OF EMERGENCY AND DIRECTIVE

It is further declared that for purposes of this Declaration of Emergency and Directive the required plans, reports, and other correspondence associated with the above emergency declaration shall be submitted to the Office of Conservation via e-mail at conservationorder@la.gov and to the Assumption Parish Office of Homeland Security and Emergency Preparedness. Please reference “Emergency Declaration – Texas Brine Company LLC – 12/03/2012” on any and all related correspondence. Beginning Monday, December 10, 2012, Texas Brine Company LLC (T149) shall provide daily updates to the Office of Conservation by e-mail at conservationorder@la.gov and to the Assumption Parish Office of Homeland Security and Emergency Preparedness regarding Texas Brine Company LLC’s (T149) progress in implementing all Directives found herein.

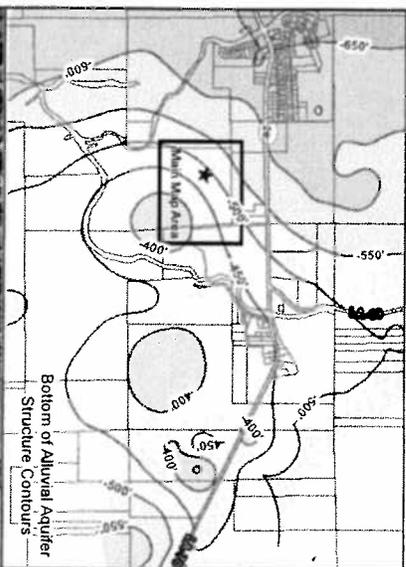
In the event Texas Brine Company LLC (T149) believes it is aggrieved by this action, then within 20 days of receipt of this Emergency Declaration and Directive, Texas Brine Company LLC (T149) may make a written request for a public hearing. A public hearing request must be accompanied by a check or money order in the non-refundable amount of \$755 as provided by LAC 43:XIX.Chapter 7, or the request for hearing will be denied. Be advised that pursuant to La. R.S. 30:6.1.D, “any request for hearing, appeal, or request for review [of this emergency declaration and directive] shall not suspend the implementation of the action ordered.”

Texas Brine Company LLC’s (T149) failure to request a hearing, or to file an appeal, or the withdrawal of a request for hearing on this Emergency Declaration and Directive shall not preclude Texas Brine Company LLC (T149) from contesting the commissioner’s findings of facts in any subsequent administrative or judicial proceeding or action.

SO DECLARED, ORDERED, AND DONE this 7th day of December 2012 at Baton Rouge, Louisiana.



JAMES H. WELSH
COMMISSIONER OF CONSERVATION



Legend

- ★ Sinkhole Location
- ◆ Well Location
- ▲ Monitoring Well
- Geophone Well
- ☁ Cavern Footprint
- Bottom of Alluvium Elevation Contour (ft msl)

NOTE

1. Contours were generated using Geostatistical Analyst or Arc Hydro. Kriging parameters included a spherical variogram, lag size of 300 ft, and a search radius of 2000 ft. A smoothing factor of 0.2 was applied to the resulting grid.
2. The bottom of alluvium structure presented on this map is based on interpolation of the data available as of October 15, 2012. As new data become available, the structure contours will be updated.
3. This map is based on a 2012 map and not a gas accumulation map. It is being used to assess areas of potential gas accumulation.
4. Cavern data digitized from 2007 (Dwy 3), 2012 (Dwy 2), and 2012 (Dwy 1) source surveys.



LOUISIANA DEPARTMENT OF
NATURAL RESOURCES

WORK PLAN FOR GAS RECOVERY AND
OBSERVATION WELL INSTALLATION

FIGURE NUMBER	ALLUVIAL AQUIFER MONITORING LOCATIONS
1	

