

Corporation Commission

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OKLAHOMA CITY OKLAHOMA 73152-2000

255 Jim Thorpe Building
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OIL & GAS CONSERVATION DIVISION



Tim Baker, Director

January 13, 2016

**Contact: Matt Skinner
405-521-4180
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Media Advisory – Fairview area earthquakes

The Oklahoma Corporation Commission's Oil and Gas Conservation Division (OGCD) is implementing a plan in response to recent earthquakes in the Fairview area. The plan calls for changes to the operations of oil and gas wastewater disposal wells in the area that dispose into the Arbuckle formation.

Under the plan, 27 Arbuckle disposal wells in an area measuring approximately 24 miles by 12 miles will reduce disposal volume. The total disposal volume reduction for the area in question is 54,859 barrels a day*, or about 18 percent.

OGCD Director Tim Baker says work is underway on a much larger plan.

“The data available indicates that a much larger approach to the earthquakes in that entire part of northwestern Oklahoma is needed, and we have been working on such a plan. However, given the recent earthquake activity in the Fairview area, the plan announced today is a necessary step as part of this ongoing process,” said Baker.

“We are also concerned about the possibility of a higher potential risk of earthquakes as a result of a number of disposal wells stopping operation at once because of a general power failure, and then resuming full operation when power is restored,” said Baker. “These conditions existed in the Fairview area. We are now advising operators to gradually restore operations in the event of a sudden shut-down due to power failures.”

A full listing of the wells, operators, and action for each well is attached, as is a map of the impacted area and the letter that has been sent to operators. Also attached is a list of most of the actions taken from the beginning of 2015 to the present regarding earthquake activity.

*One barrel = 42 gallons

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OIL & GAS CONSERVATION DIVISION



Tim Baker, Director

TO:

FROM: Tim Baker, Director, Oil and Gas Conservation Division

RE: Reduction in Volumes for Wells Located in Area of Interest for Induced Seismicity

DATE: January 12th, 2016

The Commission's Oil and Gas Conservation Division (OGCD) is expanding its efforts to reduce the risk of earthquakes potentially triggered by saltwater disposal wells. The following addresses the reduction of volumes being disposed in the Arbuckle formation within the defined area of interest. Any company that has been identified as operating one or more Arbuckle disposal well(s) located in the defined area on the attached map will need to reduce volumes disposed into such well(s) according to the schedule outlined below. The earthquakes are those that have occurred within the last 30 days, as reported by the Oklahoma Geological Survey (OGS).

As part of a joint effort to decrease the risk of induced seismicity, you will need to complete reduction of disposal volumes in accordance with the following schedule by February 9th, 2016. All disposal well volumes shall be calculated on a daily basis. In addition, gauges and flow meters should be placed on any such wells not so equipped on or before January 19th, 2016, so that Commission Field Inspectors can verify pressures and volumes. As has been the practice, pressures and volumes for such wells should continue to be supplied every Monday to the Commission, on a weekly basis, at ogvolumes@occemail.com.

Disposal reduction schedule:

Wells with reduction of 10% or less, by January 19th,
Wells with reduction of more than 10% but less than 20%, by January 26th,
Wells with reduction of more than 20% by February 2nd, 2016.

The seismic events that occurred during the week of January 4th, 2016, in the Fairview area appear to have a very close correlation to the storms that created power outages in such area. It is believed that the power outage may have created a situation where a number of producing wells were shut in, then simultaneously came back on line. When the wells began producing again, this apparently resulted in a tremendous volume of produced water being disposed into the Arbuckle formation at the same time. The OGCD recommends that in the future when a power outage of this magnitude occurs, the production volumes be staged or phased in over a period of time.

Finally, I should inform operators in this region that the OGCD is formulating a plan encompassing a larger portion of the area of interest in the northwestern part of the State than is addressed in this letter, and the plan should be finalized within the next few weeks. Operators of wells in the affected area will receive notification of the recommendations in the plan.

The attached spread sheet is the listing of wells and the proposed reduction in volumes:

If you have any questions contact the OGCD:

Charles Lord or
(405) 522-2751
c.lord@occemail.com

Jim Marlatt
(405) 522-2758
j.marlatt@occemail.com

Thank you in advance for your continued cooperation and attention to this matter.

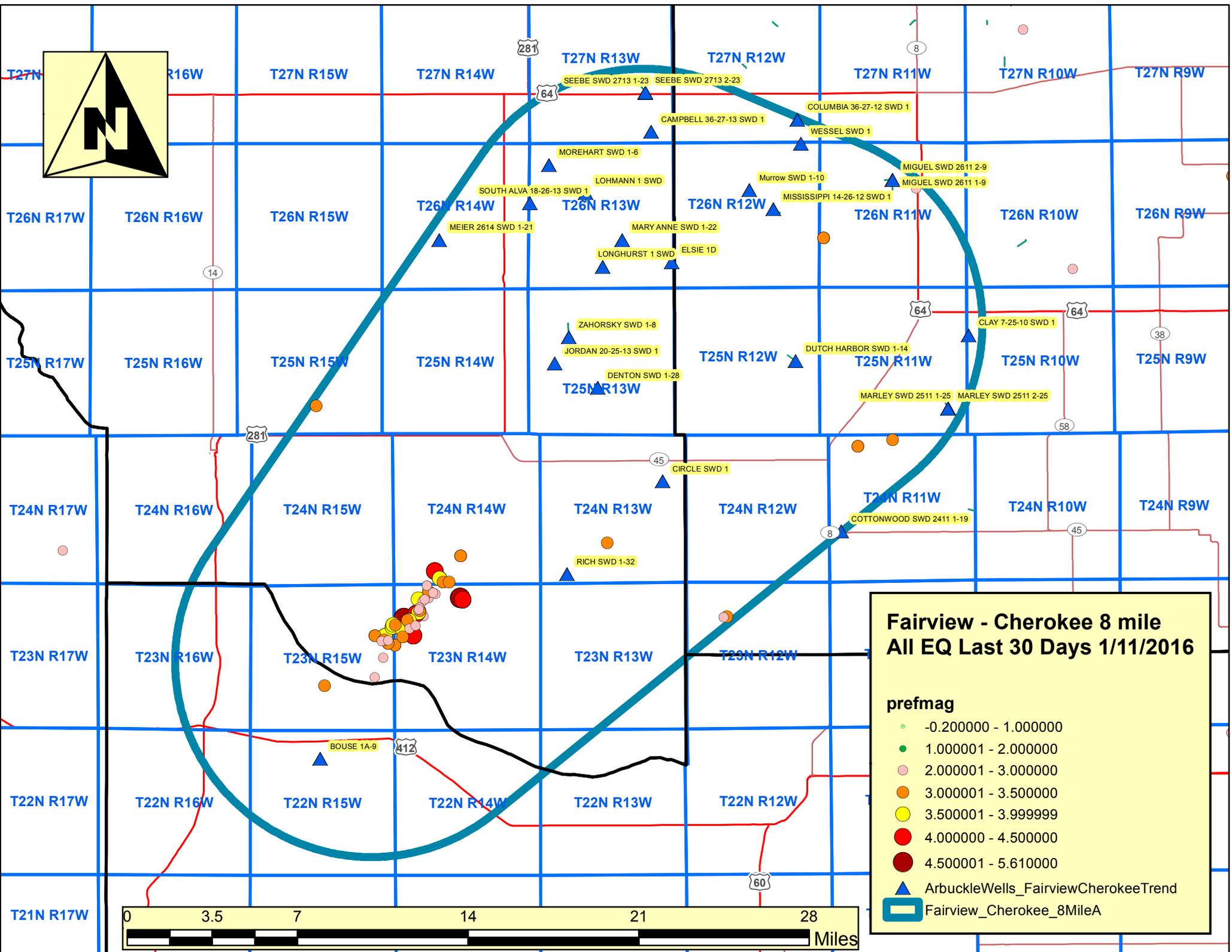
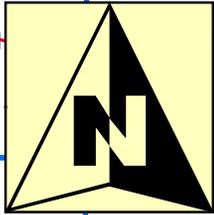
Sincerely,



Tim Baker, Director
Oil and Gas Conservation Division

The wells in this area operated by your company, and the volume reduction schedule are listed below:

| Volume_Rep | Reduction % | Amount Reduced | Volume Requested Avrage | API | WellName | Well Number | Operator | Company | Weather Event-#Days |
|------------|-------------|----------------|-------------------------|------------|--------------------------|---------------|----------|---------------------------------|---------------------|
| 1411 | 1.41% | 20 | 1391 | 3515123526 | ELSIE | 1D | 16896 | CHAPARRAL ENERGY LLC | 24 |
| 3844 | 3.84% | 148 | 3696 | 3500322345 | WESSEL SWD | 1 | 16896 | CHAPARRAL ENERGY LLC | 4 |
| 11664 | 11.66% | 1361 | 10304 | 3515123514 | CAMPBELL 36-27-13 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 6 |
| 6699 | 6.70% | 449 | 6251 | 3500322523 | CLAY 7-25-10 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 3 |
| 5124 | 5.12% | 263 | 4861 | 3500322710 | COLUMBIA 36-27-12 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 5 |
| 20364 | 20.36% | 4147 | 16217 | 3500321931 | DUTCH HARBOR SWD | 1-14 | 17441 | CHESAPEAKE OPERATING INC | 0 |
| 864 | 0.86% | 7 | 857 | 3515123770 | JORDAN 20-25-13 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 3 |
| 19062 | 19.06% | 3634 | 15428 | 3500322152 | MISSISSIPPI 14-26-12 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 6 |
| 8200 | 8.20% | 672 | 7528 | 3515123729 | SOUTH ALVA 18-26-13 SWD | 1 | 17441 | CHESAPEAKE OPERATING INC | 4 |
| 1300 | 1.30% | 17 | 1283 | 3515123752 | RICH SWD | 1-32 | 23419 | D & B OPERATING | 8 |
| 1654 | 1.65% | 27 | 1627 | 3515121599 | CIRCLE SWD | 1 | 22940 | EAGLE CHIEF MIDSTREAM LLC | 1 |
| 23228 | 23.23% | 5396 | 17833 | 3515124293 | DENTON | SWD 1-28 | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 8 |
| 27691 | 27.69% | 7668 | 20023 | 3515123534 | LOHMANN | 1 SWD | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 4 |
| 33447 | 33.45% | 11187 | 22260 | 3515122963 | LONGHURST | 1 SWD | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 3 |
| 22636 | 22.64% | 5124 | 17512 | 3515124369 | MEIER 2614 SWD | 1-21 | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 1 |
| 15749 | 15.75% | 2480 | 13269 | 3515123819 | MOREHART SWD | 1-6 | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 4 |
| 15121 | 15.12% | 2286 | 12834 | 3500322489 | Murrow | SWD 1-10 | 23080 | MIDSTATES PETROLEUM COMPANY LLC | 2 |
| 19557 | 19.56% | 3825 | 15732 | 3515123533 | ZAHORSKY SWD | 1-8 | 23079 | MIDSTATES PETROLEUM COMPANY LLC | 4 |
| 2738 | 2.74% | 75 | 2663 | 3500322548 | COTTONWOOD SWD 2411 | 1-19 | 22281 | SANDRIDGE EXPL & PROD, LLC | 6 |
| 6810 | 6.81% | 464 | 6346 | 3500322476 | MARLEY SWD 2511 | 1-25 | 22281 | SANDRIDGE EXPL & PROD, LLC | 6 |
| 7418 | 7.42% | 550 | 6868 | 3500322805 | MARLEY SWD 2511 | 2-25 | 22281 | SANDRIDGE EXPL & PROD, LLC | 6 |
| 8129 | 8.13% | 661 | 7468 | 3500322600 | MIGUEL SWD 2611 | 1-9 | 22281 | SANDRIDGE EXPL & PROD, LLC | 2 |
| 7842 | 7.84% | 615 | 7227 | 3500322973 | MIGUEL SWD 2611 | 2-9 | 22281 | SANDRIDGE EXPL & PROD, LLC | 1 |
| 12590 | 12.59% | 1585 | 11005 | 3515124150 | SEEBE | SWD 2713 1-23 | 22281 | SANDRIDGE EXPL & PROD, LLC | 1 |
| 14791 | 14.79% | 2188 | 12604 | 3515124258 | SEEBE | SWD 2713 2-23 | 22281 | SANDRIDGE EXPL & PROD, LLC | 1 |
| 996 | 1.00% | 10 | 986 | 3515123689 | MARY ANNE SWD | 1-6 | 10399 | TRIAD ENERGY INC | 7 |
| 442 | 0.44% | 2 | 440 | 3509323212 | BOUSE | 1A-9 | 22190 | WPX Energy | 5 |
| 299372 | 18% | 54859 | 244513 | | | | | | |



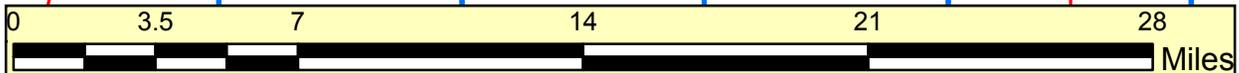
Fairview - Cherokee 8 mile
All EQ Last 30 Days 1/11/2016

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- 0.200000 - 1.000000
- 1.000001 - 2.000000
- 2.000001 - 3.000000
- 3.000001 - 3.500000
- 3.500001 - 3.999999
- 4.000000 - 4.500000
- 4.500001 - 5.610000

▲ ArbuckleWells_FairviewCherokeeTrend

▭ Fairview_Cherokee_8MileA



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Overview of OCC earthquake response

It is important to note that based on the data provided by researchers, the focus of the earthquake response is directed at oil and gas wastewater disposal wells disposing into the Arbuckle formation, the state's deepest formation. The source of most of the wastewater is not from hydraulic fracturing or drilling operations, but rather from existing, producing oil and gas wells. The wastewater is "produced" water; i.e., salt water that already exists underground and comes up with the oil and natural gas.

Please find below a list of highlights of some of the major actions taken thus far in relation to earthquakes. There are links for more details.

01/13/16 - Fairview area: 27 disposal wells to reduce volume. Total volume reduction for the area in question: 54,859 barrels a day or about 18 percent. (A barrel is 42 gallons).

01/04/2016 - Edmond area: 5 disposal wells to reduce volumes by 25 to 50 percent. Wells 15 miles from epicenter to conduct reservoir pressure testing.

<http://www.occeweb.com/News/01-04-16EQ%20ADVISORY.pdf>

12/03/15 – Byron/Cherokee area: 4 disposal wells shut-in, volume cuts of 25 to 50 percent for 47 other disposal wells. http://www.occeweb.com/News/12-03-15BYRON-CHEROKEE_MEDFORD%20EARTHQUAKE%20RESPONSE.pdf

http://www.occeweb.com/News/12-03-15BYRON-CHEROKEE_MEDFORD%20EARTHQUAKE%20RESPONSE.pdf

12/03/15 – Medford: 3 disposal wells shut-in, volume cuts of 25 to 50 percent for 19 other disposal wells.

http://www.occeweb.com/News/12-03-15BYRON-CHEROKEE_MEDFORD%20EARTHQUAKE%20RESPONSE.pdf

11/20/15 – Crescent: 4 disposal wells shut-in, 7 others reduce volume 50 percent.

<http://www.occeweb.com/News/11-20-15CRESCENT%20ADVISORY.pdf>

(MORE)

(RESPONSE, pg 2)

11/19/15 – Cherokee: 2 disposal wells shut-in, 23 others reduce volume 25 to 50 percent.

<http://www.occeweb.com/News/CHEROKEE%20ADVISORY-VOLUME,%20OPERATOR.PDF>

11/16/15 – Fairview: 2 wells reduce volume 25 percent, 1 well stop operations and reduce depth.

<http://www.occeweb.com/News/11-16-15FAIRVIEW%20and%20MAP.pdf>

11/10/15 – Medford: 10 wells reducing volume disposed 25 to 50 percent. <http://www.occeweb.com/News/11-10-15MEDFORD02.pdf>

10/19/2015 – Cushing: 13 wells either ceasing operations or cutting volume disposed 25 percent.

<http://www.occeweb.com/News/10-19-15CUSHING%202.pdf>

8/3/2015 – Volume cutback plan for area that includes portions of northern Oklahoma, Logan, Lincoln, and Payne counties. Goal is to bring total disposed volume in area to 30 percent below 2012 total (pre seismicity).

Plan covers 23 wells. <http://www.occeweb.com/News/08-03-15VOLUME%20ADVISORY%20RELEASE.pdf>

July 28, 2015 – Crescent: 2 wells shut in, 1 reducing volume 50 percent.

<http://www.occeweb.com/News/Crescent%20wells.pdf>

**** July 17, 2015 – Directive for 211 disposal wells in the Arbuckle to check depth, not resume until it is proven that depth is not in communication with basement rock, or a plug back operation is completed to bring the bottom of the well at least 100 feet up into the Arbuckle. <http://www.occeweb.com/News/DIRECTIVE-2.pdf>**

**** March 25, 2015 – Directive for 347 wells in the Arbuckle to check depth, etc.**

<http://www.occeweb.com/News/2015/03-25-15%20Media%20Advisory%20-%20TL%20and%20related%20documents.pdf>

**** To date, the July 17 and March 25 directives have resulted in 222 wells plugging back (i.e., reducing depth). The response to the directives continues.**

Some of the other actions taken:

All applications for Arbuckle disposal wells must go through a seismicity review. If approved, permit is only good for six months and well can be shut in at any time because of seismicity concerns. Monitoring for seismicity and other requirements are also placed on the wells.

All Arbuckle disposal wells operating in earthquake areas (“areas of interest”) have to record daily and report weekly their volumes and pressures. The data is then put on a website where it can be accessed by researchers.

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