IN THE DISTRICT COURT OF LOGAN COUNTY, OKLAHOMA
STATE OF OKLAHOMA

LISA GRIGGS and APRIL MARLER, on behalf of themselves and all others similarly situated,	§	
PLAINTIFFS	§	
vs.	§	**Case No.** CJ-2016-6
CHESAPEAKE OPERATING, LLC, NEW DOMINION, LLC, DEVON ENERGY PRODUCTION CO., LP and SANDRIDGE EXPLORATION AND PRODUCTION, LLC,	§	
DEFENDANTS	§	

CLASS ACTION PETITION

Plaintiffs Lisa Griggs and April Marler ("Plaintiffs") individually and on behalf of similarly situated owners of real property in Oklahoma, and for their causes of action against Defendants Chesapeake Operating, LLC ("Chesapeake"), New Dominion, LLC ("New Dominion"), Devon Energy Production Co., LP ("Devon"), and SandRidge Exploration and Production, LLC ("Sandridge") (collectively "Defendants") states:

1. This is a class action lawsuit brought by Oklahoma residents who own real property in Oklahoma whose property has suffered damages and losses from human-induced earthquakes caused by Defendants' operations of wastewater disposal wells (also known as "injection wells").

2. Plaintiffs bring this action on behalf of themselves and on behalf of other similarly situated Oklahoma residents who own real property in Oklahoma who have suffered from earthquakes triggered by injection wells owned or operated by the Defendants.

3. Over the past several years, thousands of earthquakes have occurred within the State of Oklahoma, which have only recently been tied to Defendants' injection well operations.

PARTIES

4. Plaintiff Lisa Griggs is a citizen of Oklahoma and a resident of Logan County, Oklahoma. Lisa Griggs owns a real property in Logan County. Ms. Grigg's home in Logan County suffered damages due to earthquakes caused by the Defendants' negligent wastewater disposal operations. Such operations continue, and thus, the earthquakes are continuing and continue to cause damages to Ms. Griggs.

5. Plaintiff April Marler is a citizen of Oklahoma and a resident of Oklahoma County, Oklahoma. April Marler owns real property in Oklahoma County. Ms. Marler's home in Oklahoma County suffered damages due to earthquakes caused by the Defendants' negligent wastewater disposal operations. Such operations continue, and thus, the earthquakes are continuing and continue to cause damages to Ms. Marler.

6. Defendant Chesapeake Operating, LLC ("Chesapeake") is a corporation existing and operating under the laws of the State of Oklahoma that does business within the State of Oklahoma and has its principal place of business at 6100 N. Western Avenue, Oklahoma City, OK 73118-1044.

7. Defendant New Dominion, LLC, ("New Dominion") is a corporation existing and operating under the laws of the State of Oklahoma that does business within the State of Oklahoma and has its principal place of business at 3400 SE 59th St., Oklahoma City, OK 73135.

8. Defendant Devon Energy Production Co., LP ("Devon") is a corporation existing and operating under the laws of the State of Oklahoma that does business in the State of Oklahoma and has its principal place of business at 20 North Broadway, Suite 1500, Oklahoma City, OK 73102-8202.

9. Defendant SandRidge Exploration and Production, LLC ("SandRidge") is a corporation existing and operating under the laws of the State of Oklahoma that does business within the State of Oklahoma, and has its principal place of business at 1601 Northwest Expressway, Suite 1601, Oklahoma City, OK 73118.

JURISIDICTION AND VENUE

10. Jurisdiction in this Court is proper. This Court has personal jurisdiction over Defendants as they do substantial business in the State of Oklahoma, are headquartered in the State, and operate the injection wells at issue in this judicial district.

11. Venue is proper in this Court as a substantial part of the events or omissions giving rise to the claims set forth in this Petition occurred here.

12. The Oklahoma Corporation Commission (or "OCC") does not have jurisdiction over the property damage claims asserted in this complaint. *Ladra v. New Dominion, et al.*, 2015 OK 53, 353 P.3d 529 (2015).

FACTUAL ALLEGATIONS

Significant Increase in Earthquakes in Oklahoma

13. There has been a dramatic increase in the number and intensity of earthquakes in Oklahoma during the last five years. According to the Oklahoma Geological Survey (OGS), the state saw nearly 600 quakes of magnitude 3.0 or greater in 2014, compared to just one or two per year prior to 2009. From 2009 to 2014, Oklahoma experienced a 108-fold increase in total

earthquakes: from 50 earthquakes in 2009 to 5,417 earthquakes in 2014. Even more earthquakes shook the state in 2016. Indeed, more than 6,000 earthquakes were reported in 2015.

14. The scale to classify earthquakes is logarithmic, meaning that a magnitude 4 earthquake is 10 times more powerful than a magnitude 3, and a magnitude 5 earthquake is 100 times more powerful than a magnitude 3. Earthquakes of magnitude 6 to 7 cause widespread damage and considerable loss of life.

15. On November 5, 6, and 8, 2011, three earthquakes of 5.0, 5.7, and 5.0 magnitude, respectively, occurred in and around Prague, Oklahoma.

16. A 5.0 magnitude earthquake is substantial and can cause significant damage to people and property. An earthquake of this magnitude is also rarely seen in the United States east of the Rocky Mountains.

17. The 5.7 magnitude earthquake in Prague, Oklahoma, was the strongest ever recorded in Oklahoma and was followed, in the next few days, by two more earthquakes of 5.0 magnitude or greater. The earthquakes were responsible for destroying six homes and damaging more than 170 others in Prague, a town of approximately 2,300 people and the surrounding area.

18. In 2014, Oklahoma had more than twice the number of earthquakes as California, making it the most seismically active state in the continental United States. Fifteen earthquakes in 2014 measured more than 4.0 in magnitude and 585 measured more than a magnitude 3 or greater.

19. In 2015, more than 800 earthquakes greater than 3.0 magnitude occurred in Oklahoma, 30 of which were more than 4.0 in magnitude.

20. In only the first 10 days of 2016 Oklahoma experienced 36 earthquakes of 3.0 magnitude or greater, 6 of which registered over 4.0, including a 4.8 magnitude earthquake in Edmond, Oklahoma on January 6 and a 4.1 in Fairview, Oklahoma on January 8.

21. Recently, these thousands of earthquakes occurring in Oklahoma were linked to the oil and gas industry.

Hydraulic Fracturing (Fracking)

22. Invented in 1947, hydraulic fracturing (often colloquially referred to as "fracking"), is a technique that has been used for decades in the oil and gas industry. Approximately one million wells were hydraulically fractured in the United States between 1947 and 2010.

23. Hydraulic fracturing is a technique that aims to improve the production of wells by increasing the number and extending the reach of fluid pathways (i.e., fractures) between the formation and the well by injecting fluid, typically water, at high pressure into low-permeability rocks. The fluid pressure fractures the rocks or stimulates slip across pre-existing faults or fractures. Increasing the fracture density and extent of the fracture network enhances fluid flow and allows for more distant fluids to be accessed by a well. In addition to fluid, a propping agent (e.g., sand) is injected to keep the newly formed fractures open. Following hydraulic fracturing, which takes a few hours to a few days, there is a period where the hydraulic fracturing fluid is allowed to flow back to the surface where it is collected for disposal, treatment or reuse.

24. After the hydraulic fracturing fluid flows back to the surface, the extraction of oil or gas from the wells begins. Initially, vertical oil wells were hydraulically fractured to increase production. Then, in the 1990s, extended reach horizontal drilling technology was developed. This allowed drillers to steer wells more precisely so that they could remain within narrow horizontal and sub horizontal oil and gas reservoirs over great distances. This enabled production

along the length of the well within the production formation. This technology, combined with hydraulic fracturing, unlocked gas and oil resources in tight formations (e.g., shales) and is largely responsible for the recent boom in gas and oil production in the United States.

Fracking Wastewater Disposal

25. Waste fluids are often a by-product of many oil and gas extraction operations. In many instances, they are unsuitable for other uses and must be disposed of. When waste fluids are disposed of, they are often injected deep underground into high-permeability formations, usually deeper than the production reservoirs, for permanent sequestration and isolation from oil or gas reservoirs and drinking-water aquifers. The wells in which these fluids are disposed are known as injection wells, wastewater wells or salt-water disposal wells.

26. The contents of wastewater vary. In some places, it is primarily spent hydraulic-fracturing fluid (e.g., Ohio and Arkansas), whereas in other locations, wastewater often consists mostly of formation brines that come to the surface at the same time as the oil and gas that is extracted. For instance, in Oklahoma, only 10% of the fluid injected into disposal wells is spent fluid that was initially used in hydraulic fracturing and cannot be reused.

Mechanism of Induced Seismicity

27. According to the United States Geological Survey ("USGS"), the Nation's largest science mapping agency that collects, monitors, analyzes and provides scientific understanding about natural resource conditions and problems through multi-disciplinary investigations and provides impartial scientific analyses to the public, fluid injection from wastewater wells can induce earthquakes in four ways: (1) the injection of fluids raises pore-fluid pressure within a fault, (2) the injection of fluids fills and compresses fluids within pore spaces causing deformation (poro-elastic effects), (3) the injection of fluid that is colder than the rock into which it is being injected

causes thermoelastic deformation, and (4) the injected fluid adds mass to the injection formation. Observations and numerical modeling indicate that increased fluid pressure within faults most strongly influences whether an injection well will induce earthquakes.

28. Unfortunately, the injected fluids do not need travel the entire distance from the injection well to a fault for the injection to affect the fault's behavior. Injection can affect a fault's behavior via the change in fluid pressure, which can be transmitted greater distances than fluids themselves. The increase in the fluid pressure that is initiated at the injection well is transmitted to the fault without the fluid traveling the full distance between the well and fault.

29. As fluid is injected into a formation, the fluid pressure within that formation rises. If this fluid pressure increase is transmitted to a fault, the increase in pore pressure counteracts the stresses holding the fault closed (the normal stress), resulting in a lower effective stress. With lower effective normal stress clamping a fault, the frictional resistance to slip is lower and the fault is more prone to slip.

Scientific Support for Causal Link Between Earthquakes and Fracking Wastewater Injection

30. In recent years, scientific studies have established a causal link between the injection of production wastes into the ground through disposal wells and earthquakes in Oklahoma. According to the USGS, hydraulic fracturing, long-term wastewater injection, and enhanced oil recovery have all induced earthquakes in the United States and Canada in the past few years. Research has shown that wastewater disposal is responsible for the vast majority of the increase, including the largest and most-damaging induced earthquakes. Wastewater disposal is responsible for this change because of the duration of injection, the magnitude of the fluid pressure increase, and the size of the region affected by injection.

31. The recent increase in injection-induced seismicity is caused by a corresponding increase in wastewater disposal in the central United States. The earthquake rate increase in Oklahoma, where the vast majority of the increase has occurred (585 of 688 M ≥3 earthquakes in the central United States in 2014), corresponds to a doubling of the wastewater disposal rate in the state from 1999 to 2013. Focusing on the areas of increased seismicity within Oklahoma, we find that injection increased by factors of 5–10. Other areas of increased rates of induced earthquakes also experienced sudden increases in wastewater disposal.

32. A March 2013 study investigated the earthquakes in and around Prague, Oklahoma in 2011 and found a correlation between the injection wells operated by the Defendants and the earthquakes devastating the town in November of 2011. *See* Keranen, K.M., Savage, H.M., Abers, G.A., Cochran, E.S. 2013, *Potentially induced earthquakes in Oklahoma, USA: Links between wastewater injection and the 2011 M 5.7 earthquake sequence*, GEOLOGY, Mar. 25, 2013.

33. The USGS also recently issued a statistical analysis showing that the recent increase in Oklahoma's earthquakes are not the result of natural seismic changes. Instead, wastewater injection wells are the most likely culprit. The survey also warns that the rise in seismic activity has raised the chance of a damaging magnitude 5.5 or greater in the state. *See* Record Number of Oklahoma Tremors Raises Possibility of Damaging Earthquakes, USGS-Oklahoma Geological Survey Joint Statement on Oklahoma Earthquakes, Oct. 22, 2013; updated May 2, 2014.

34. On July 3, 2014, the authoritative journal Science published a scientific study showing a sharp increase in central Oklahoma seismicity since 2008. The study linked the earthquakes to wastewater injection operations in central Oklahoma. *See* Keranan, et al., *Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection*, SCIENCE Vol. 345, 448-451, 451 (July 3, 2014) ("Sharp Increase").

35. This phenomenon is not newly discovered. Well-known examples of water injection into wells causing earthquakes have occurred in Colorado, Texas, India, and China. *See* William L. Ellsworth, Injection-Induced Earthquakes, SCIENCE 341, (2013) *available at http://www.gwpc.org/sites/default/files/files/Earthquakes%20and%20fracking(2).pdf.* The Nemaha fault runs north-northwest between Oklahoma City and southern Kansas. Seismologists found that a magnitude 7 earthquake is possible along that fault. *See* Sharp Increase. Furthermore, they stated that "the increasing proximity of the earthquake swarm to the Nemaha fault presents a potential hazard to the Oklahoma City metropolitan area." *Id.*

36. The USGS and the Oklahoma Geological Society (OGS) have conducted research quantifying the changes in earthquake rate in the Oklahoma City region, assessing and evaluating possible links between these earthquakes and wastewater disposal related to oil and gas production activities in the region. In a joint statement, the USGS and OGS identified wastewater injection as a contributing factor to the 2011 earthquake swarm and damaging magnitude 5.6 event.

37. In February 2015, the USGS found that "[l]arge areas of the U.S. that used to experience few or no earthquakes have, in recent years, experienced a remarkable increase in earthquake activity that has caused considerable public concern as well as damage to structures. This rise in seismic activity, especially in the central U.S., is not the result of natural processes." Significantly, the USGS also noted that "[d]eep injection of wastewater is the primary cause of the dramatic rise in detected earthquakes and the corresponding increase in seismic hazard in the central U.S."

38. In April 2015, an OGS report found that it is "very likely" that most of the dramatic increase in earthquakes in the state has been triggered by oil and gas companies injecting wastewater into deep underground disposal wells.

39. Recently, in a year-end review for 2014, the U.S. Environmental Protection Agency (EPA) noted that many experts concluded that a connection exists between disposal well location, injection volume and rates, and seismic activity. EPA Region 6 End of Year Review of UIC Program for 2014 (transmitted on Sept 29, 2015). EPA was concerned by the continued upward trend in earthquakes and recommended a reduction in the volumes of waste injected into the Arbuckle formation, which is the most critical stratum. *Id.* EPA further recommended more assessment and mapping of the Arbuckle formation and its connection to basement rock. *Id.*

40. Based on publicly available data, the causation link is inescapable. Before 2009, the maximum number of earthquakes measured in a given year in Oklahoma was 195 in 1995. By 2014, the number of measured earthquakes soared to over 5,000, and in 2015, the number of earthquakes was over 6,000. The number of earthquakes that residents can feel has shown an even greater rate of increase. In 2014, Oklahoma had 585 earthquakes of magnitude-3 or greater compared to 109 magnitude-3 quakes in 2013. *See* Trevor Hughes, *'Swarms' of earthquakes strike Oklahoma*, USA Today, Mar. 5, 2015, *available at* http://www.usatoday.com/story/news/2015/03/05/oklahoma-quakes-fracking-oil-gas/24444581/. Since late 2009, the rate of magnitude-3 or larger earthquakes in north-central Oklahoma has been nearly 300 times higher than in previous decades. *See* Doyle Rice, *'Reawakened' faults could trigger big Okla. Earthquakes*, USA Today, Mar. 19, 2015, *available at* http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-faultlines/24702741/. Of course, earthquakes do not respect state boundaries. The earthquake swarm in central and northern Oklahoma also extends to southern Kansas. *See, e.g.*, McNamara et al, Earthquake hypocenters ...., Geophysical Research Letters (Jan. 27, 2015) ("Future Hazards") at Figure 2.

41. As discussed in a recent study, "this seismicity appears to be associated with increases in saltwater disposal that originates as 'flow-back' water after multistage hydraulic fracturing operations." F. Rall Walsh III* and Mark D. Zoback, *Oklahoma's recent earthquakes and saltwater disposal*, SCIENCE ADVANCES, 18 June 2015 available at http://advances.sciencemag.org/content/1/5/e1500195.full ("Disposal Study").

42. Importantly, as mentioned above, the risk comes from not only from the increased frequency of earthquakes, but also the likelihood that those earthquakes will continue to be more severe. USGS scientists warn that the smaller earthquakes induced by the injection of production wastes are reawakening long-dormant, 300-million-year-old fault lines across Oklahoma. The faults could trigger much higher-magnitude, and consequently more destructive, earthquakes than the smaller ones that have plagued the state in recent years. *See* Doyle Rice, *'Reawakened' faults could trigger big Okla. Earthquakes*, USA Today, Mar. 19, 2015, *available at* http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-faultlines/24702741/. According to USGS scientists, these reawakened faults in central Oklahoma could produce earthquakes as powerful as magnitude-5 and 6. *Id.* A USGS geologist stated "Many faults are reactivating, with as many as 17 magnitude-4 earthquakes in 2014." *Id.* In 2011, one even reached magnitude-5.4 near Prague, Oklahoma. Daniel McNamara, research geophysicist with the USGS, compared the fault lines in the Fairview and Edmond areas, which recently experienced 4.1 and 4.8 magnitude earthquakes, to the fault around Prague. "I don't know what to say frankly. It's incredible. I've never seen anything like it in the world," stated McNamara. "The working theory we have going on right now is just after decades of wastewater injection, (we) basically have a fault system throughout Oklahoma that's critically stressed...Basically a lot of faults are at a position where it just takes a little bit of added stress to cause them to move into failure."

http://www.koco.com/news/usgs-expert-ive-never-seen-anything-like-it-anywhere-in-the-world/37323746 (January 8, 2016).

43. The OGS determined in the spring of 2015 that "the majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells" and that "seismologists have documented the relationship between wastewater disposal and triggered seismic activity." http://earthquakes.ok.gov/what-we-know/ (visited on October 9, 2015).

44. The USGS fully supports this conclusion. For example, an article in *The New Yorker* recently quoted USGS geologist William Ellsworth in reporting that "[d]isposal wells trigger earthquakes when they are dug too deep, near or into basement rock, or when the wells impinge on a fault line. Ellsworth said, 'Scientifically, it's really quite clear.'" Rivka Galchen, *Weather Underground*, The New Yorker, Apr. 13, 2015 *available at* http://www.newyorker.com/magazine/2015/04/13/weather-underground.

45. Recently, two earthquakes of greater-than-magnitude-4 occurred on the same day; further evidencing the higher frequency of more serious earthquakes in the areas of concern. A magnitude 4.4 earthquake hit northern Oklahoma on October 10, 2015, which a USGS seismologist said "had all the hallmarks of an induced quake" and "seem[ed] to be part of an ongoing swarm of induced quakes in the area." *Oklahoma Earthquake likely caused by wastewater injection, seismologist says*, The Guardian, Oct. 10, 2015, *available at* http://www.theguardian.com/us-news/2015/oct/10/oklahoma-earthquake-fracking-us-geological-survey.

46. On the same day, a magnitude 4.5 earthquake hit near the major oil storage and pipeline area near Cushing, roughly midway between Oklahoma City and Tulsa. *See* Michael

Wines, *New Concern Over Quakes in Oklahoma Near a Hub of U.S. Oil*, The New York Times, Oct. 14, 2015 *available at* http://www.nytimes.com/2015/10/15/us/new-concern-over-quakes-in-oklahoma-near-a-hub-of-us-oil.html. Cushing is the location of the world's largest and most important crude oil storage hub. Scientists reported, in a paper published online in September 2015, that a large earthquake near the storage hub "could seriously damage storage tanks and pipelines." Dr. McNamara, the lead author of that study, stated that the recent earthquake continued a worrisome pattern of moderate quakes, suggesting that a large earthquake is more than a passing concern. "When we see these fault systems producing multiple magnitude 4s, we start to get concerned that it could knock into higher magnitudes," he said. "Given the number of magnitude 4s here, it's a high concern." *Id.*

47. The Cushing oil and pipeline hub stores oil piped from across North America until it is dispatched to refineries. *Id.* The New York Times reports that as of last week, it held 53 million barrels of crude. *Id.* The earth beneath the tanks was comparatively stable until last October, when magnitude 4 and 4.3 earthquakes struck nearby. *Id.* At least three more earthquakes with magnitudes 4 and over have occurred within a few miles of the tanks since then. *Id.* The Department of Homeland Security has concluded that a quake equivalent to the record magnitude 5.7 could significantly damage the tanks. *Id.* Dr. McNamara's study concluded that recent earthquakes have increased stresses along two stretches of fault that could lead to earthquakes of that size. *Id.*

48. USGS scientists have also said that a magnitude 7 quake cannot be ruled out. *U.S. Maps pinpoint earthquakes*, The New York Times, Apr. 23, 2015, *available at* http://www.nytimes.com/2015/04/24/us/us-maps-areas-of-increased-earthquakes-from-human-activity.html.

49. The Future Hazards study confirms that more severe earthquakes are likely as a result of ongoing injection of production wastes into the ground through high-rate disposal wells. It states that earthquake clusters associated with long fault structures could give rise to magnitude 5 to 6 earthquakes. Examples include earthquakes associated with the Nemaha fault near Jones, in the Medford and Stillwater regions, and between Langston and Guthrie. Another example is the area around Cushing. The paper concludes that the increased seismicity poses an elevated hazard to infrastructure and the regional population. According a recent paper, the Cushing area earthquakes are associated with reactivated faults that cut into the Arbuckle formation and a subsidiary fault called the Wilzetta-Whitehall. McNamara et al., McNamara, D., at al., *Efforts to monitor and characterize the recent increasing seismicity in central Oklahoma*, THE LEADING EDGE June 2015 *available at* https://profile.usgs.gov/myscience/upload_folder/ci2015Jun0413582855600McNamaraTLE.pdf. That paper notes that most of the earthquakes do not lie along known fault structures, but there may be other fault structures that are being reawakened by the injection that are associated with these earthquakes. *Id.* The most recent paper notes that earthquake activity in this area has been above forecast and that "[i]nclusion of all recent Oklahoma earthquakes in the NSHM [hazard model] significantly increases ground shaking estimates and earthquake hazard . . ., which would result in serious implications for infrastructure design standards. McNamara et al., *Reactivated faulting near Cushing, Oklahoma: Increased potential for a triggered earthquake in an area of United States strategic infrastructure*, GEOPHYSICAL RESEARCH LETTERS (October 23. 2015) available at http://onlinelibrary.wiley.com/doi/10.1002/2015GL064669/pdf.

50. Thus, the injection of large volumes of production wastes into the ground in Oklahoma is causing large numbers of moderate strength earthquakes.

51. These earthquakes have already caused considerable physical damage and mental disquiet. A series of shocks over magnitude 5 in 2011, the largest of which was magnitude 5.6 in the Prague area of Oklahoma, destroyed at least 16 homes and collapsed an historic spire at Benedictine Hall at St. Gregory's University. http://www.newyorker.com/magazine/2015/04/13/weather-underground. Repairing the spire cost about five million dollars.

52. In addition to property damage, the earthquakes have also caused harm to people. For example, Sandra Ladra was at home watching television in her home in Prague, Oklahoma in November of 2011 when an earthquake caused the rock facing on her fireplace to fall. The rocks struck Ms. Ladra, causing her significant injury. Obviously, if much stronger earthquakes over 6 in magnitude struck, far greater numbers of people could be harmed. Greater earthquake magnitude also increases the risk of rupture in storage tanks for oil and other products, causing widespread environmental damage, in addition to property damage and personal injuries. In particular, if a large earthquake were to strike the massive oil storage area in Cushing, huge amounts of oil could be released, causing massive environmental damage. If a large earthquake hit the Oklahoma City area, it could cause thousands of injuries and even fatalities.

53. In spite of these scientific studies, the oil and gas industry insists that Oklahoma has naturally occurring seismicity, that their operations are not causing the earthquakes, and that recent reports linking injection well operations to Oklahoma quakes are not based upon good science.

Defendants' Negligent and Tortious Conduct

54. Defendants operate wastewater injection wells in and around Plaintiffs' homes and within the Class Area (as defined below). These injection wells have caused the earthquakes occurring in the Class Area, and proximately caused damages to Plaintiffs and the putative Class.

55. Since 2009, Defendants have injected huge amounts of production wastes via disposal wells. The total volume of production wastes injected has gone from 2 billion ("bn") barrels in 2009 to over 12 bn barrels in 2014. Focusing on the Arbuckle formation alone, which is the geologic stratum in which most of the earthquakes originate and in which disposal wells discharge large volumes, Defendants account for over 60% of the total volume of production wastes injected in 2014.

56. Overlaying the locations of Defendants' wells onto the places where earthquakes above magnitude 3.5 have been felt shows that earthquakes are occurring in the vicinity of Defendants' wells and along faults that are close to the wells. As more injection has occurred in the central and northern areas of Oklahoma, more and more earthquakes have occurred in those areas. . *Id.* While not all wells cause earthquakes, studies have found that most high volume disposal wells are linked to earthquakes: "Even though quake-associated wells were only 10 percent of those studied, more than 60 percent of the high-rate wells — 12 million gallons or more — were linked to nearby earthquakes" and "of the 45 wells that pump the most saltwater [waste] at the fastest rate, 34 of them — more than three out of four — were linked to nearby quakes." http://www.nytimes.com/aponline/2015/06/18/science/ap-us-sci-manmade-quakes.html?smprod=nytcore-ipad&smid=nytcore-ipad-share&_r=0.

57. The Disposal Study confirms that "the significant increases in SWD [Production Waste disposal] increase pore pressure in the Arbuckle Group, which spreads out away from the injection wells with time, eventually triggering slip on critically stressed faults in the basement." It also confirms that "[i]njection of large volumes of saltwater into the Arbuckle group appears to be triggering the release of already stored strain energy in crystalline basement."

58. Thus, scientific studies support that injection of production wastes induces earthquakes and that Defendants' injection of production wastes is causing the earthquakes that have impacted Plaintiffs and the putative Class.

Defendants Have Disposed of Production Wastes That Caused Earthquakes or Contributed To Their Occurrence and Are Continuing to Do So

59. Defendants have been disposing of high volumes of production wastes into the ground since at least 2009.

60. As demonstrated in the Figures attached to this Petition, Defendants increased their wastewater disposal activities from 2009 to 2014 by about seven fold (Figures 3 and 5). Moreover, much of their injection disposal is done within the Arbuckle Formation (Figure 4). As found by every scientist studying this issue, there is a direct correlation between Defendants' wastewater injection disposal operations and the earthquakes shaking Oklahoma and damaging Plaintiffs and the Class (Figures 6 – 8).

Thus, Defendants contributed and are contributing to the past and present handling, storage, and disposal of production wastes, which is causing earthquakes in Oklahoma that have damaged Plaintiffs and the members of the putative Class.

Property Damage Sustained by Plaintiffs

A. **Plaintiff Lisa Griggs:**

61. Plaintiff Griggs has owned the real property in Guthrie, Logan County, Oklahoma on which she makes her home since about 2007.

62. The area around Ms. Griggs's home has suffered over one hundred earthquakes of greater than 3.0 in magnitude in the past two years. The most significant earthquakes, and damages to Ms. Griggs's home, occurred beginning in February 2014. Multiple quakes of greater than 4.0

magnitude shook her home between February and about August 2014. In 2015, between about April through about June 2015, several more earthquakes of greater than 4.0 magnitude struck nearby, causing further damage to her home.

63. Upon information and belief, these earthquakes were caused by nearby injection wells owned and operated by Defendants New Dominion, Chesapeake and Devon Energy. Moreover, the earthquakes triggered by their wastewater disposal operations continue around Ms. Griggs's home and areas nearby.

64. As a result of the earthquakes, Plaintiff Griggs has sustained extensive damage to her home, including shifts to the piers of her home's foundation, cracks to the concrete block forming the foundation, separation of the chimney from the home, separation of the cabinets from walls, cracks and separations to exterior brick veneer and mortar joints, cracks to drywall, wracking of doors, damages to door casings, and separations in door and window trim.

65. The damage to her home is in the thousands of dollars.

B. Plaintiff April Marler:

66. Plaintiff Marler has owned the real property in Choctaw, Oklahoma County, Oklahoma, on which she makes her home since about 2012.

67. The area around Choctaw and Ms. Marler's home has suffered nearly one hundred earthquakes of greater than 3.0 in magnitude in the past two years. The most significant earthquakes, and resulting damages to Ms. Marler's home, occurred in mid-2014, when approximately 17 quakes measuring greater than 3.0 occurred in or around the Choctaw area. The largest, measuring 3.7 magnitude, occurred in Choctaw on May 31, 2014. The following day a 3.6 magnitude earthquake struck nearby; and approximately two weeks later magnitude 3.9 and 3.5 earthquakes hit within a few miles of Ms. Marler's home.

68. Upon information and belief, these earthquakes were caused by nearby injection wells owned and operated by Defendants New Dominion and Devon Energy. Moreover, the earthquakes triggered by their wastewater disposal operations continue around Ms. Marler's home and areas nearby.

69. As a result of all of these earthquakes, Plaintiff Marler has sustained damage to her home, including cracks to the foundation, cracks and separations to exterior brick veneer and mortar joints, cracks to drywall, and separations in door and window trim.

70. The damage to her home is in the thousands of dollars.

CLASS ALLEGATIONS

71. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporates each such paragraph as though set forth here in full.

72. Plaintiffs bring this action, on behalf of themselves and all others similarly situated, as a class action pursuant to 12 O.S. § 2023.

73. The class that Plaintiffs seek to represent (the "Class") is defined as follows:

> All residents of Oklahoma owning real property from 2011 through the time the Class is certified, Class notice has been delivered to the Class, and Class members have had the opportunity to opt out.
>
> Excluded from the Class are Defendants and their directors, officers, employees and agents, and the judicial officer presiding over this case and his/her immediate family members, and any member of the Class that files a timely exclusion.

74. Plaintiffs reserve the right to amend the Class definition if discovery and further investigation reveals that the Class should be expanded or otherwise modified.

75. Plaintiffs reserve the right to establish subclasses as appropriate.

76. This action is brought and properly may be maintained as a class action pursuant to 12 O.S. § 2023 and satisfies the requirements those provisions.

Numerosity

77. In recent years, thousands of earthquakes have been triggered across Oklahoma.

78. These earthquakes are continuing across the state of Oklahoma.

79. The Class is sufficiently numerous and scattered across Oklahoma making joinder of all members of the Class in a single action impracticable, and therefore, the resolution of their claims through the procedure of a class action will be to the benefit of the parties and the Court.

Commonality

80. Plaintiffs' claims raise issues of fact or law which are common to the members of the putative Class. These common questions include, but are not limited to:

(a) whether Defendants' operations caused earthquakes in Oklahoma;

(b) whether the earthquakes in Oklahoma caused damage to the personal and real property of Plaintiffs and the members of the putative Class;

(c) whether Defendants owed a duty to the Plaintiffs and the members of the putative Class and whether that duty was breached;

(d) whether Defendants' conduct amounted to a nuisance;

(e) whether Defendants' conduct is an ultra-hazardous activity;

(f) whether Defendants' operations were negligently performed;

(g) whether Defendants caused a trespass;

(h) whether Plaintiffs and the putative Class Members have suffered damages proximately caused by Defendants' operations; and

(i) whether a judgment including punitive damages is appropriate.

Typicality

81. Plaintiffs' claims are typical of the claims of the other members of the Class they seek to represent because Defendants' wastewater injection operations have caused earthquakes, pose a significant danger, and have caused damages to Plaintiffs and the putative Class Members in a similar manner.

Adequacy

82. Plaintiffs are interested in the outcome of this litigation and understand the importance of adequately representing the Class.

83. Plaintiffs will fairly and adequately protect the interests of the Class sought to be certified.

84. Plaintiffs are adequate representatives of the Class because they have no interests which are adverse to the interests of the members of the Class. Plaintiffs are committed to the vigorous prosecution of this action and, to that end, Plaintiffs have retained counsel who are competent and experienced in handling class-action and complex tort litigation and who are qualified to adequately represent the Class.

Predominance

85. Questions of law or fact common to the members of the Class predominate over questions affecting only individual members.

Superiority

86. A class action is superior to other available methods for the fair and efficient adjudication of the controversy. The predicate issues relate to Defendants' wastewater injection operations, actions and activities, and whether these activities pose a nuisance, are an ultra-hazardous activity, were negligently performed, or caused trespasses. The focus of this action will

be on the common and uniform conduct of Defendants in conducting their wastewater injection operations.

87. Absent class action relief, the putative Class Members would be forced to prosecute thousands of similar claims in different venues around the State of Oklahoma. Such an event would cause tremendous amounts of waste of judicial resources, but the prosecution of these claims as a class action will promote judicial economy.

88. The prosecution of separate actions by individual members of the Class would create a risk of:

a. inconsistent or varying adjudications with respect to individual members of the Class which would establish incompatible standards of conduct for the Defendants; and

b. adjudications with respect to individual members of the Class which would as a practical matter be dispositive of the interests of the other members not parties to the adjudications or substantially impair or impede their ability to protect their interests.

89. Plaintiffs are not aware of any difficulty which will be encountered in the management of this litigation which should preclude its maintenance as a class action.

CAUSES OF ACTION

Count I – Private Nuisance

90. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporates each such paragraph as though set forth here in full.

91. Defendants' conduct constitutes a private nuisance.

92. Plaintiffs and the putative Class have property rights and are privileged regarding the use and enjoyment of their homes, businesses, and land. Defendants' actions and operations, as described above, have unlawfully and unreasonably interfered with those rights and privileges.

93. Plaintiffs and the putative Class have suffered harm and damages because of Defendants' creation of a nuisance, including:

(a) Damages to the personal and real property of Plaintiffs and the Class;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on their property caused by Defendants' nuisance;

(d) Loss of peace of mind;

(e) Diminution of property value;

(f) Economic expenses incurred to protect against earthquakes in the future, including additional structural support and repairs to real property, and premiums for earthquake insurance and related appraisals; and

(g) Economic loss from business interruption.

Count II – Ultra-hazardous Activities

94. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporates each such paragraph as though set forth here in full.

95. Defendants' actions described above constitute ultra-hazardous activities that involve a high degree of risk of serious harm to a person or the chattels of others, the risk cannot be eliminated by exercising the utmost care, and is not a matter of common usage.

96. As a direct and proximate result of Defendants' ultra-hazardous activities, Plaintiffs and the putative Class have sustained damages, which are the direct and proximate result of Defendants' ultra-hazardous or abnormally dangerous activities, to which Defendants are strictly liable, including:

(a) Damages to the personal and real property of Plaintiffs and the putative Class;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on their property caused by Defendants' ultra-hazardous activities;

(d) Loss of peace of mind;

(e) Diminution of property value;

(f) Economic expenses incurred to protect against earthquakes in the future, including additional structural support and repairs to real property, and premiums for earthquake insurance and related appraisals; and

(g) Economic loss from business interruption.

Count III - Negligence

97. Plaintiffs realleges each of the preceding paragraphs, and by this reference incorporates each such paragraph as though set forth here in full.

98. Defendants owed a duty to Plaintiffs and the putative Class to use ordinary care not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity. Defendants, experienced in these operations, knew or should have known of the connection between injection wells and seismic activity, and acted in disregard of these facts.

99. Defendants breached their duty to Plaintiffs and the putative Class to use ordinary care and not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity.

100. As a direct and proximate result of these acts, omissions, and fault of the Defendants, the Plaintiffs and the Class have suffered damages and injuries reasonably foreseeable to the Defendants, including:

(a) Damages to the personal and real property of Plaintiffs and the Class;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on their property caused by Defendants' negligence;

(d) Loss of peace of mind;

(e) Diminution of property value;

(f) Economic expenses incurred to protect against earthquakes in the future, including additional structural support and repairs to real property, and premiums for earthquake insurance and related appraisals; and

(g) Economic loss from business interruption.

Count IV - Trespass

101. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporates each such paragraph as though set forth here in full.

102. Plaintiffs and the members of the putative Class are and have been lawfully entitled to possession of their property.

103. Defendants, without the permission or consent of Plaintiffs and any putative Class Members and without legal right, intentionally engaged in activities that resulted in concussions or vibrations entering Plaintiffs' and Class Members' property. Such unauthorized invasion of Plaintiffs' and the Class Members' property interests constitutes a trespass.

104. Because of Defendants' trespass, Plaintiffs and the putative Class have suffered damages, including:

(a) Damages to personal and real property of Plaintiffs and the putative Class;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on their property caused by Defendants' trespass;

(d) Loss of peace of mind;

(e) Diminution of property value;

(f) Economic expenses incurred to protect against earthquakes in the future, including additional structural support and repairs to real property, and premiums for earthquake insurance and related appraisals; and

(g) Economic loss from business interruption.

PUNITIVE DAMAGES

105. Defendants' actions, in knowingly causing seismic activity because of their injection well operations, constitute wanton or reckless disregard for public or private safety, and thus, subject to a claim for punitive damages, for which Plaintiffs and the putative Class seek an amount sufficient to punish the Defendants and to deter them and others similarly situated from such conduct in the future.

DEMAND FOR JURY TRIAL

106. Plaintiffs and the putative Class respectfully demand a trial by jury.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs and the Class pray that this Court enter a joint and several judgment against Defendants and in favor of Plaintiffs and the Class, awarding Plaintiffs and the Class the following relief:

i. An Order certifying the Class as requested in this Petition;

ii. An Order appointing as Class Counsel the undersigned counsel for Plaintiffs and the putative Class;

iii. Compensatory damages according to proof;

iv. Punitive damages;

v. Awarding attorneys' fees, expenses, and costs;

vi. Pre-judgment and post-judgment interest; and

vii. All other relief to which Plaintiffs and the Class are entitled or that the Court deems just and proper.

Date: January 12, 2016

Respectfully Submitted,

William B. Federman (OK Bar No. 2853)
wbf@federmanlaw.com
FEDERMAN & SHERWOOD
10205 North Pennsylvania Ave.
Oklahoma City, OK 73120
(405) 235-1560
(405) 239-2112 - facsimile

Scott Poynter (*pro hac vice pending*)
scott@poynterlawgroup.com
POYNTER LAW GROUP
400 W. Capitol Ave., Suite 2910
Little Rock, AR 72201
(501) 251-1587

Nate Steel (*pro hac vice pending*)
Jeremy Hutchinson (*pro hac vice pending*)
Alex Gray (*pro hac vice pending*)
STEEL, WRIGHT, & COLLIER
400 W. Capitol Ave., Suite 2910
Little Rock, AR 72201
(501) 251-1587

Robin L. Greenwald (*pro hac vice pending*)
rgreenwald@weitzlux.com
Curt D. Marshall (*pro hac vice pending*)
cmarshall@weitzlux.com
WEITZ & LUXENBERG, P.C.
700 Broadway
New York, NY 10003
Tel: 212-558-5677
Fax: 212-344-5461

Attorneys for Plaintiffs and the Class

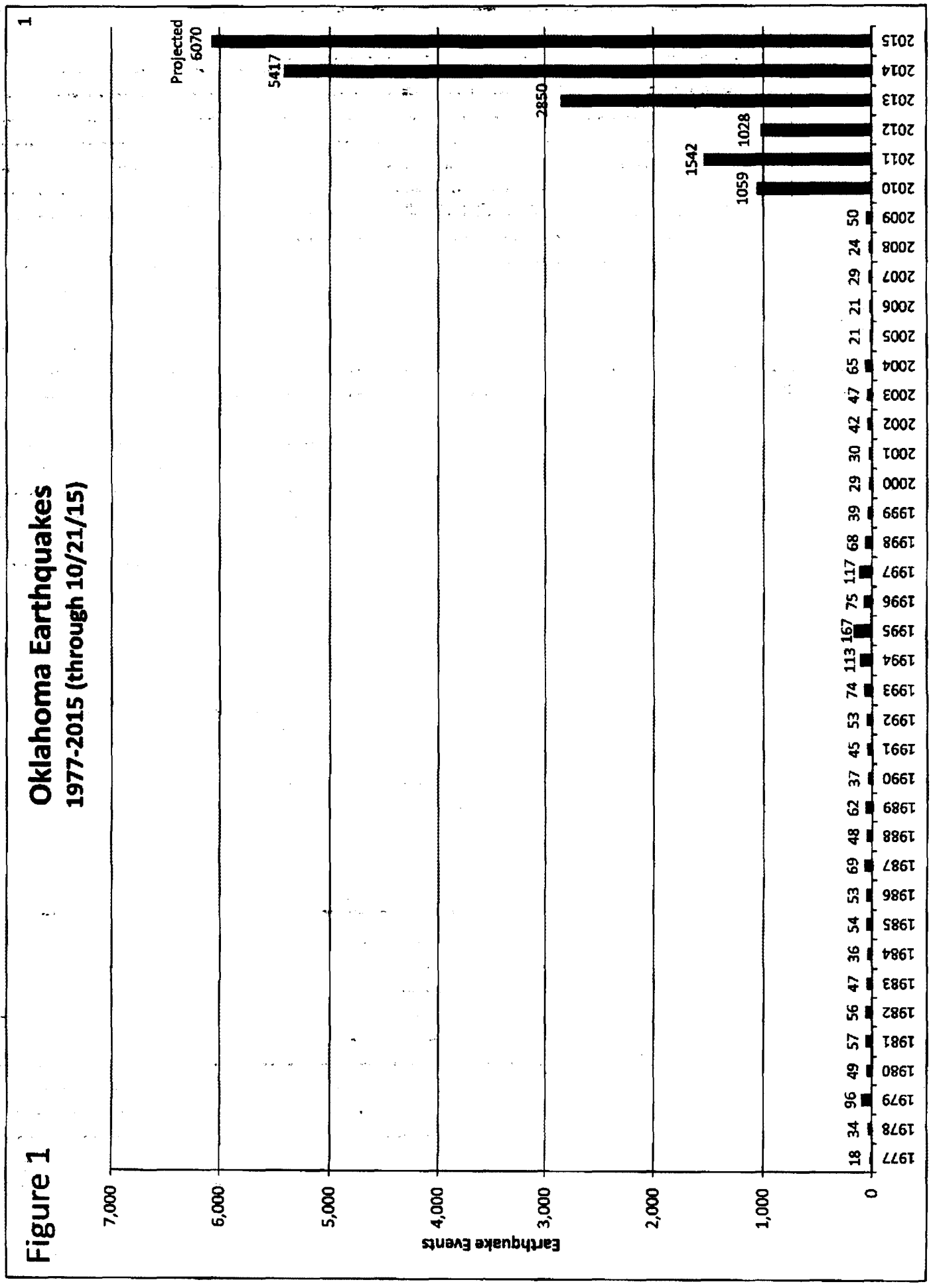


Figure 1
Oklahoma Earthquakes
1977-2015 (through 10/21/15)
Earthquake Events
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Projected 6070
5417
2850
1542
1028
1059
2015
2014
2013
2012
2011
2010
2009 50
2008 24
2007 29
2006 21
2005 21
2004 65
2003 47
2002 42
2001 30
2000 29
1999 39
1998 68
1997 117
1996 75
1995 167
1994 113
1993 74
1992 53
1991 45
1990 37
1989 62
1988 48
1987 69
1986 53
1985 54
1984 36
1983 47
1982 56
1981 57
1980 49
1979 96
1978 34
1977 18
Projection based on average of 16.63 events/day as of 10/21/15
Source: Oklahoma Geological Survey

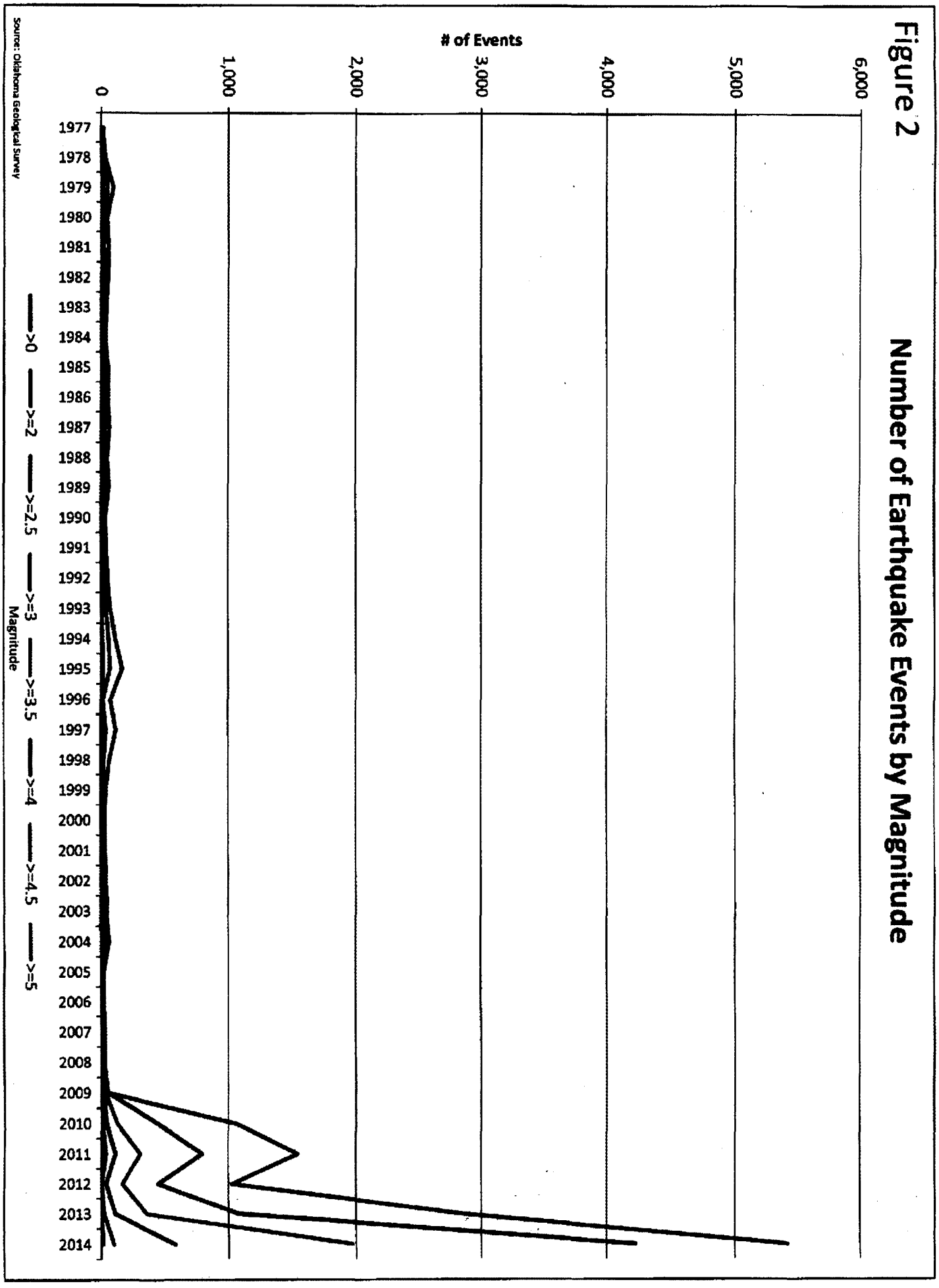


Figure 2
Number of Earthquake Events by Magnitude
# of Events
0
1,000
2,000
3,000
4,000
5,000
6,000
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Magnitude
>0
>=2
>=2.5
>=3
>=3.5
>=4
>=4.5
>=5
Source: Oklahoma Geological Survey

Figure 3

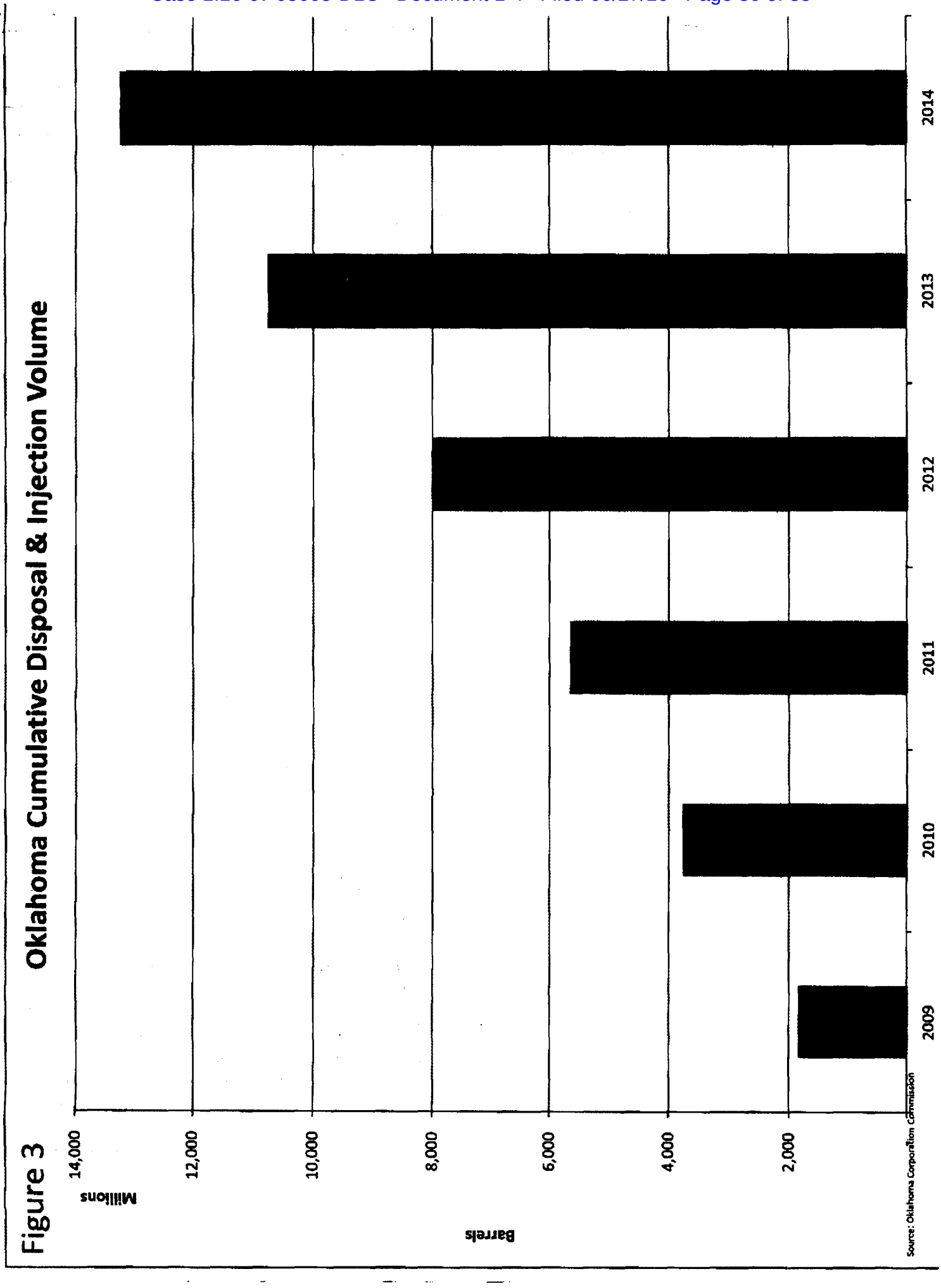
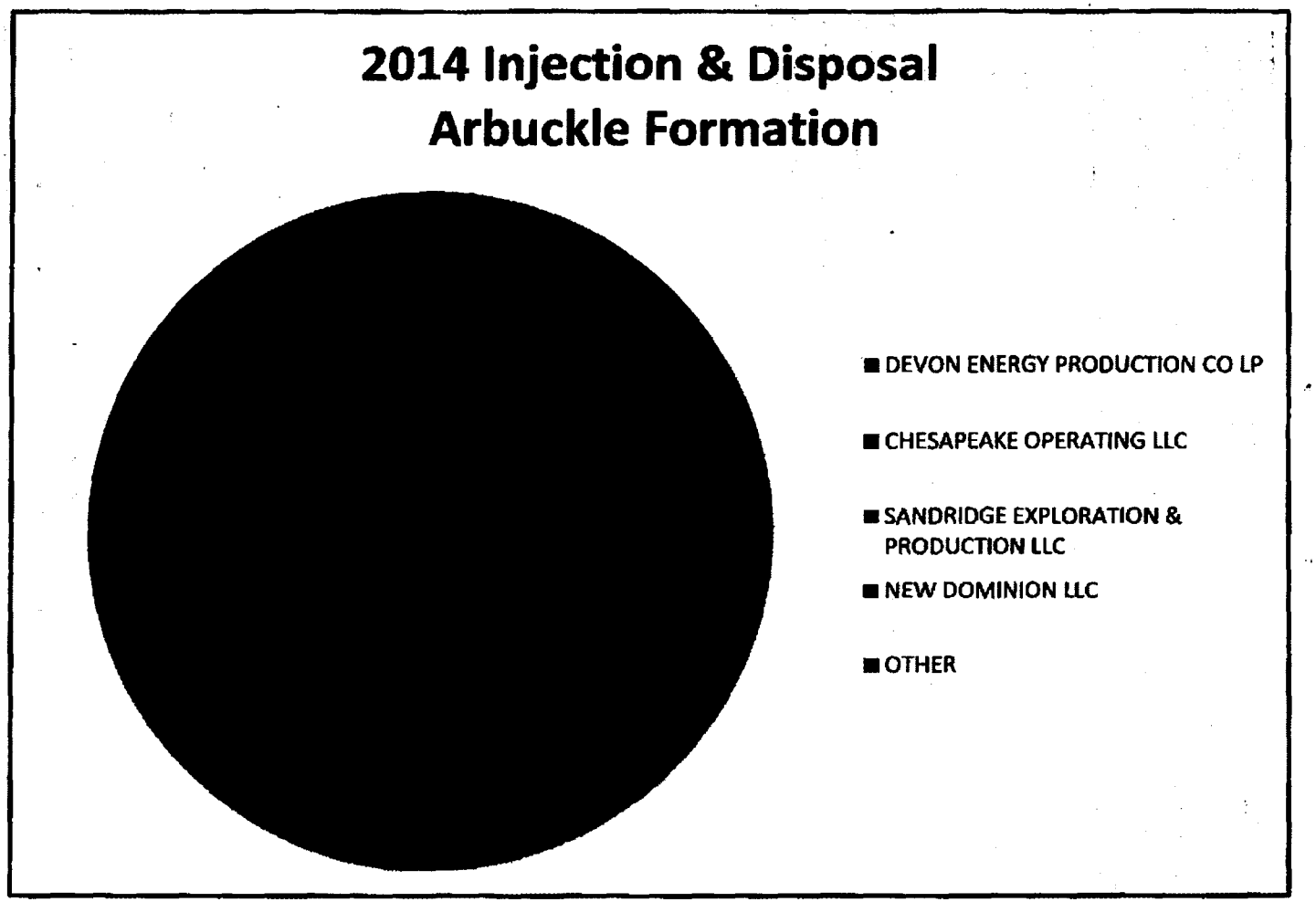

Oklahoma Cumulative Disposal & Injection Volume
Millions
14,000
12,000
10,000
8,000
6,000
4,000
2,000
Barrels
2014
2013
2012
2011
2010
2009
Source: Oklahoma Corporation Commission

Figure 4



Operator	Injection Volume (bbls)
DEVON ENERGY PRODUCTION CO LP	64,555,296
CHESAPEAKE OPERATING LLC	73,885,836
SANDRIDGE EXPLORATION & PRODUCTION LLC	201,767,276
NEW DOMINION LLC	72,081,172
OTHER	261,551,899
TOTAL	**673,841,479**

Operator	# of Wells
DEVON ENERGY PRODUCTION CO LP	36
CHESAPEAKE OPERATING LLC	14
SANDRIDGE EXPLORATION & PRODUCTION LLC	91
NEW DOMINION LLC	6
OTHER	258

Source: Oklahoma Corporation Commission

Figure 5

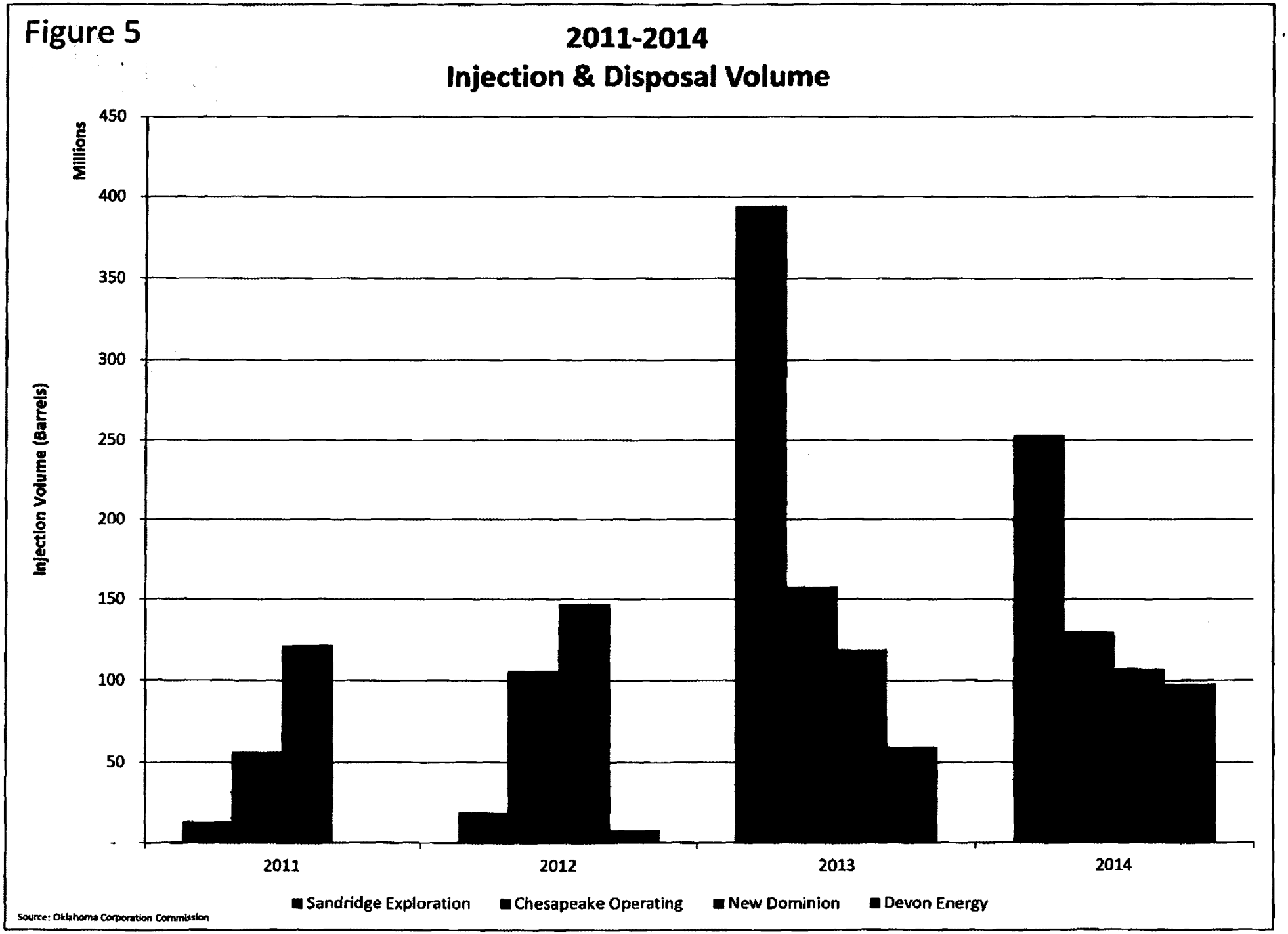

2011-2014
Injection & Disposal Volume
Millions
Injection Volume (Barrels)
450
400
350
300
250
200
150
100
50
-
2011
2012
2013
2014
Sandridge Exploration
Chesapeake Operating
New Dominion
Devon Energy
Source: Oklahoma Corporation Commission

Figure 6

2011-2014 Cumulative Injection & Disposal

New Dominion, Sandridge Exploration, Chesapake Operating, Devon Energy

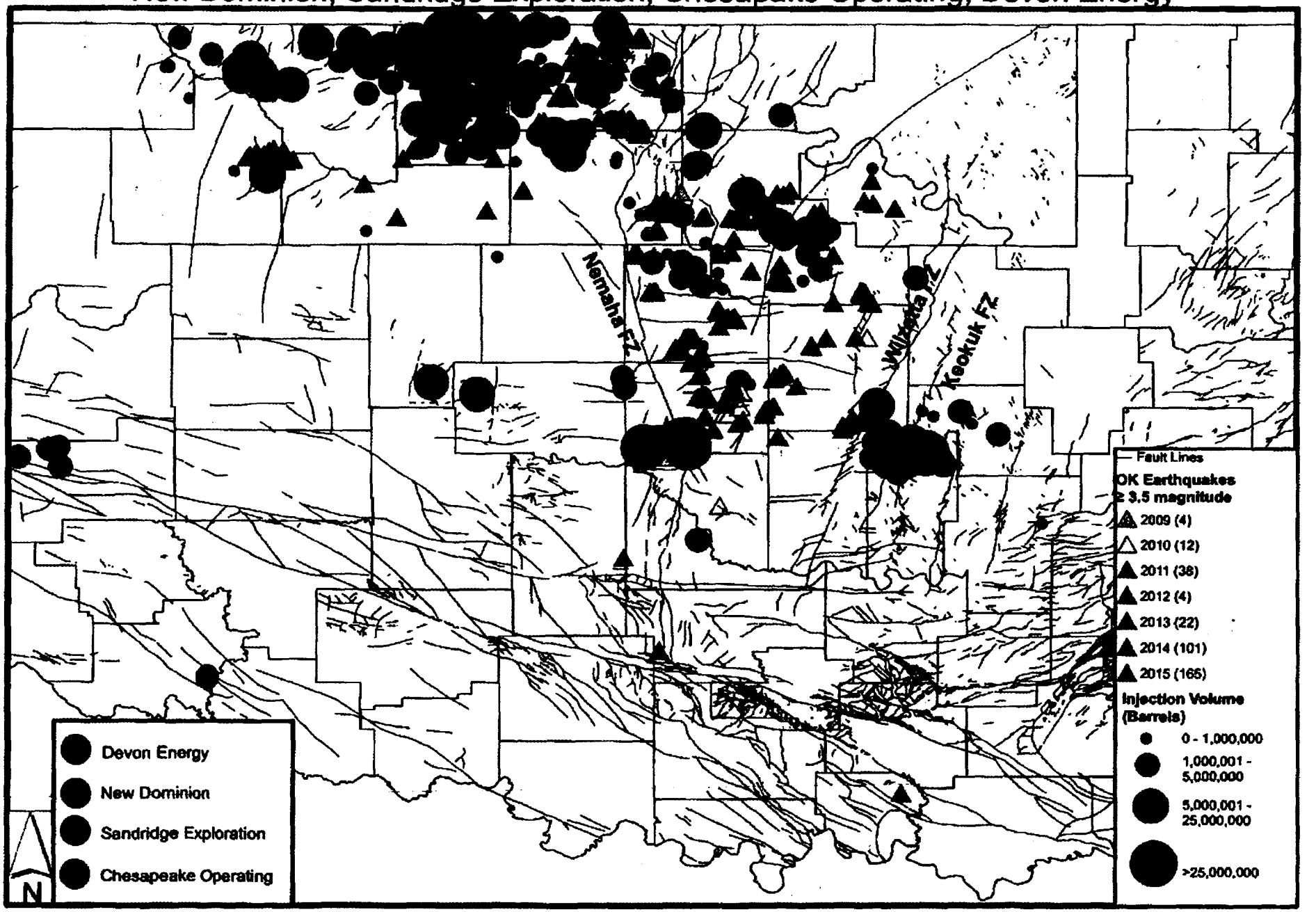
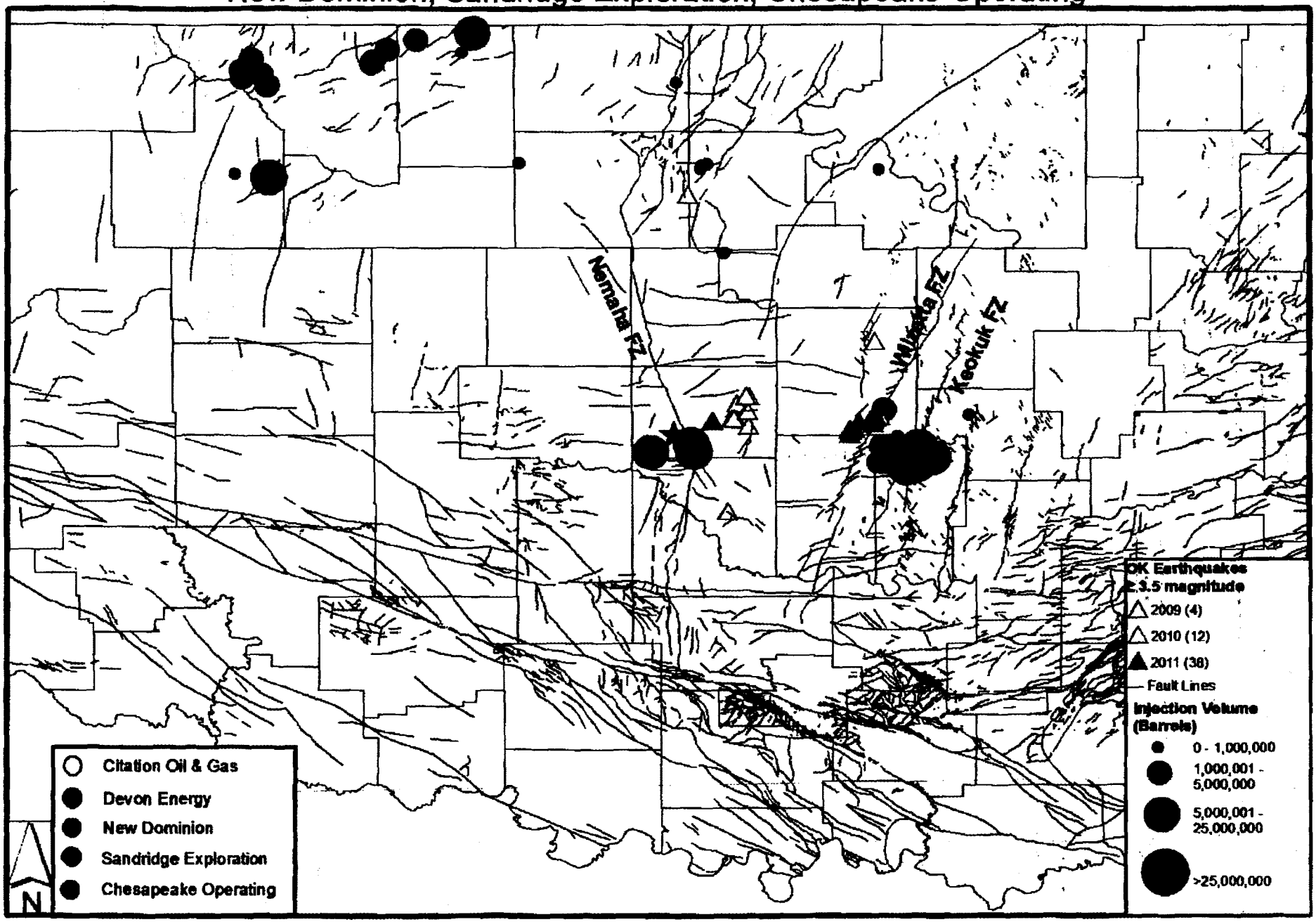


Figure 7

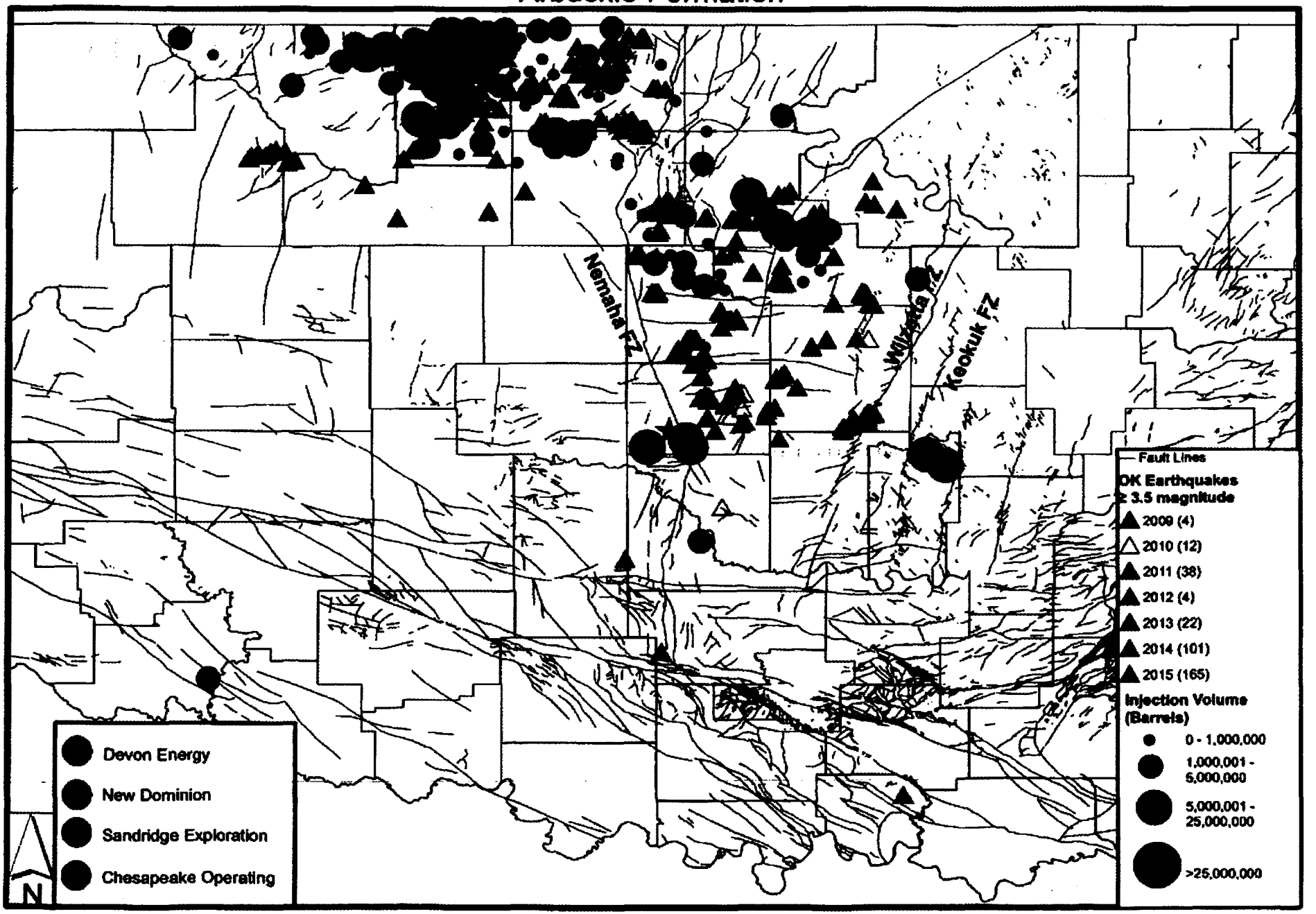
2011 Injection & Disposal
New Dominion, Sandridge Exploration, Chesapeake Operating



Fault Lines & Earthquakes - Oklahoma Geological Survey
Injection Well Locations & Volumes - Oklahoma Corporation Commission
Earthquakes Displayed ≥ 3.5 magnitude, 2015 earthquakes thru 10/12

Figure 8

2014 Injection & Disposal Volume
Arbuckle Formation



IN THE DISTRICT COURT OF OKLAHOMA COUNTY

STATE OF OKLAHOMA

G. Terry Felts, Deborah Felts Adell Scott, John Mirjanich, M.D., Alvis McAffrey, Jerry Novakowski Kelly Novakowski, Ron Wooden Eva Wooden, Raymond Berlioz Richard Novakowski, Debra Novakowski Rick Sparks, and Shirley Sparks, Plaintiffs, vs Devon Energy Production Company, L.P., an Oklahoma limited partnership; Sundance Energy Oklahoma LLC, a Delaware limited liability Company; Grayhorse Operating, Inc., an Oklahoma corporation; Pedestal Oil Company, Inc. an Oklahoma corporation; New Dominion, LLC, an Oklahoma limited liability company; R.C. Taylor Operating Company, LLC, an Oklahoma limited liability company; TNT Operating Company, an Oklahoma corporation; White Operating Company, an Oklahoma corporation; Rainbo Service Co., an Oklahoma corporation; Marjo Operating Mid-Continent LLC, an Oklahoma limited liability company; Special Energy Corporation, a Texas corporation, and Northport Production Company, an Oklahoma corporation Defendants.	CJ - 2016 - 137 Case No. CJ-2016- FILED IN DISTRICT COURT OKLAHOMA COUNTY JAN 11 2016 TIM RHODES COURT CLERK 37

PETITION

COMES NOW the above-named Plaintiffs, by and through their undersigned attorneys, and for their causes of action against the Defendants, and each of them, alleges and states as follows:

THE PARTIES

1. Plaintiffs G. Terry Felts and Deborah Felts are residents of the city of Edmond, Oklahoma County, Oklahoma.

2. Plaintiff Adell Scott is a resident of city of Edmond, Oklahoma County, Oklahoma.

3. Plaintiff John Mirjanich, M.D. is a resident of Oklahoma City, Oklahoma County, Oklahoma.

4. Plaintiff Alvis McAffrey is a resident of Oklahoma City, Oklahoma County, Oklahoma.

5. Plaintiffs Jerry and Kelly Novakowski are residents of the city of Edmond, Oklahoma County, Oklahoma.

6. Plaintiffs Ron and Eva Wooden are residents of the city of Edmond, Oklahoma County, Oklahoma.

7. Plaintiff Raymond G. Berlioz is a resident of the city of Edmond, Oklahoma County, Oklahoma.

8. Plaintiffs Richard and Debra Novakowski are residents of the city of Edmond, Oklahoma County, Oklahoma.

9. Plaintiffs Rick and Shirley Sparks are residents of the city of Edmond, Oklahoma County, Oklahoma.

10. Defendant Devon Energy Production Company, L.P. ("Devon Production") is an Oklahoma limited partnership which maintains its principal place of business in Oklahoma City, Oklahoma County, Oklahoma, with a registered agent for service of process in the State of

Oklahoma, namely: The Corporation Company, 1833 S. Morgan Rd., Oklahoma City, OK 73128.

11. Defendant Sundance Energy Oklahoma LLC. ("Sundance") is a Delaware limited liability company which maintains its principal place of business in Oklahoma City, Oklahoma County, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: The Corporation Company, 1833 S. Morgan Rd., Oklahoma City, OK 73128.

12. Defendant Grayhorse Operating, Inc. ("Grayhorse") is an Oklahoma Corporation which maintains its principal place of business in Tulsa, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Charles A. Ellis, 20 E. 5th Street, Suite 1100, Tulsa, OK 74103.

13. Defendant Pedestal Oil Company, Inc. ("Pedestal") is an Oklahoma Corporation which maintains its principal place of business in Oklahoma City, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: David P. Singer, 204 N. Robinson, Suite 1700, Oklahoma City, OK 73102.

14. Defendant New Dominion, LLC ("New Dominion") is an Oklahoma limited liability company which maintains its principal place of business in Tulsa, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Fred Buxton, 1307 S. Boulder Ave., Suite 400, Tulsa, OK 74119.

15. Defendant R.C. Taylor Operating Company, LLC ("R.C. Taylor") is an Oklahoma limited liability company which maintains its principal place of business in Oklahoma City, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Mike Taylor, 5661 N. Classen Blvd, Oklahoma City, OK 73118.

16. Defendant TNT Operating Company ("TNT") is an Oklahoma corporation which maintains its principal place of business in Oklahoma City, Oklahoma County, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Byron Neher, 1332 S.W. 111th Place, Oklahoma City, OK 73170.

17. Defendant White Operating Company ("White") is an Oklahoma corporation which maintains its principal place of business in Oklahoma City, Oklahoma County, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Lloyd R. White, 2160 Liberty Tower, Oklahoma City, OK 73102.

18. Defendant Rainbo Service Company ("Rainbo") is an Oklahoma corporation which maintains its principal place of business in Oklahoma City, Oklahoma County, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: K.D. Lackey, Jr., 6 N.E. 63rd St., Oklahoma City, OK 73105.

19. Defendant Marjo Operating Mid-Continent, LLC ("Marjo") is an Oklahoma limited liability company which maintains its principal place of business in Tulsa, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: W. Deke Canada, 320 South Boston Ave., Suite 200, Tulsa OK 74103.

20. Defendant Special Energy Corporation ("Special Energy") is a Texas corporation which maintains its principal place of business in Stillwater, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: John F. Special, 4815 S. Perkins Road, Stillwater, OK 74074.

21. Defendant Northport Production Company ("Northport") is an Oklahoma corporation which maintains its principal place of business in Oklahoma City, Oklahoma

County, Oklahoma, with a registered agent for service of process in the State of Oklahoma, namely: Tim Green, 213 E Oklahoma, Guthrie, OK 73044.

JURISDICTION AND VENUE

22. Jurisdiction and venue are proper in this Court. The acts complained of in this action occurred in this State, in Oklahoma County, by Defendants and Defendants' employees and officers, all acting within the course and scope of their agency and employment in this State. Venue is proper pursuant to Title 12 O. S. §132.

GENERAL ALLEGATIONS

23. Plaintiffs are all, and have been at all times pertinent to the acts complained of in this Petition, owners of real and personal property situated in Oklahoma County, Oklahoma.

24. From a time unknown, but upon information and belief, at all times pertinent to this Petition, including but not limited to from and after at least December 29, 2015 to the present, Defendants, and each of them, used, owned or operated certain wells (hereinafter "Disposal Wells") within Oklahoma County and elsewhere within the state of Oklahoma, maintained for the retention of deleterious substances, including but not limited to chemicals, salt water, oil field brine, waste oil, waste emulsified oil, basic sediments, mud, and other injurious substances produced or used in the drilling, development, production, transportation, refining, and processing of oil, gas and/or brine mining (hereinafter "Drilling Waste").

25. At all times pertinent, Defendant Devon Production owned or operated one or more Disposal Wells located in Section 11, Township 15 North, Range 2 West of the Indian

Meridian, Logan County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

26. At all times pertinent, Defendant Sundance owned or operated not less than two Disposal Wells located in Section 23, Township 16 North, Range 3 West and Section 9, Township 15 West, Range 3 West of the Indian Meridian, Logan County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

27. At all times pertinent, Defendant Grayhorse owned or operated not less than two Disposal Wells located in Section 20, Township 13 North, Range 3 West and of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

28. At all times pertinent, Defendant Old Dominion owned or operated not less than one Disposal Well located in Section 25, Township 14 North, Range 1 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

29. At all times pertinent, Defendant Pedestal owned or operated not less than one Disposal Well located in Section 4, Township 14 North, Range 2 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

30. At all times pertinent, Defendant R.C. Taylor owned or operated not less than one Disposal Well located in Section 31, Township 14 North, Range 3 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

31. At all times pertinent, Defendant TNT owned or operated not less than one Disposal Well located in Section 1, Township 11 North, Range 3 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

32. At all times pertinent, Defendant White owned or operated not less than four Disposal Wells located in Section 10, Township 11 North, Range 3 West and Section 11, Township 11 North, Range 3 West and Section 22, Township 11 North, Range 3 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

33. At all times pertinent, Defendant Rainbo owned or operated not less than one Disposal Well located in Section 1, Township 11 North, Range 3 West of the Indian Meridian, Oklahoma County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

34. At all times pertinent, Defendant Special Energy owned or operated one or more Disposal Wells located in Section 35, Township 15 North, Range 1 East of the Indian Meridian, Logan County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

35. At all times pertinent, Defendant Marjo owned or operated one or more Disposal Wells located in Section 14, Township 15 North, Range 1 East of the Indian Meridian, Logan County, Oklahoma which caused or contributed to the earthquakes described in this Petition.

36. Upon information and belief, the exact date and time of which is unknown, but close in time prior to December 29, 2015, with reckless disregard for the consequences to others, Defendants injected large volumes of Drilling Waste in Disposal Wells located near the cities of

Edmond and Oklahoma City, in the vicinity of Plaintiffs' properties, under conditions that Defendants knew or should have known would result in an increased likelihood that earthquakes or other adverse environmental impacts would occur, thereby unreasonably endangering the health, safety and welfare of persons and property, including Plaintiffs and others.

37. On or about December 29, 2015 at 5:39 a.m., Plaintiffs, and each of them, experienced a magnitude 4.3 earthquake, followed by a series of smaller aftershocks, the epicenter of which was located near the intersection of E. Covell Road and N. Midwest Blvd. in Oklahoma County, near Disposal Wells owned, operated and maintained by the Defendants.

38. On or about January 1, 2016, again at 5:39 a.m., Plaintiffs, and each of them experienced a magnitude 4.2 earthquake, followed by a series of smaller aftershocks, the epicenter of which was located near the intersection of E. Covell Road and N. Sooner Road in Oklahoma County, near Disposal Wells owned, operated and maintained by the Defendants.

39. As a direct and proximate result of these earthquakes Plaintiffs suffered damage.

40. Defendants are sophisticated business entities possessing specific and specialized knowledge concerning the dangers associated with the production of oil gas and other minerals, including but not limited to knowledge of the threats and perils associated with depositing Drilling Waste in large volumes under high pressure conditions into deep Disposal Wells located near seismic faults lying beneath or in close proximity to populated areas.

41. Despite their specific and specialized knowledge, with reckless indifference and callous disregard for the potential harm to Plaintiffs and others, Defendants deposited large volumes of Drilling Waste into the Disposal Wells in an unsafe manner, for profit, and continue to do so, thereby posing an unreasonable and ongoing threat of harm to Plaintiffs and others similarly situated.

42. The Drilling Waste knowingly deposited by Defendants into their Disposal Wells is toxic and harmful to humans and other living organisms, and but for the acts of the Defendants, would not occur naturally in the Earth's subsurface strata where it is deposited, either alone or in combination, under such pressure or in such large volumes as when introduced by Defendants.

43. The use of the Disposal Wells by Defendants created conditions which, among other things, are the proximate cause of unnatural and unprecedented earthquakes that continue unabated, increasing in both frequency and magnitude within Oklahoma County and elsewhere in the State of Oklahoma, which have damaged Plaintiffs and others and threaten to do so in the future.

44. At all times mentioned herein, the Defendants have acted by and through their duly – authorized officers, managers, agents, servants, and/or employees, all of whom have acted within the course and scope of their employment or other relationship.

FIRST CAUSE OF ACTION
NEGLIGENCE

45. To the extent they are not inconsistent with the allegations in this First Cause of Action, Plaintiffs incorporate all other allegations of this Petition as though more fully set forth herein.

46. Defendants have a duty to use ordinary care to insure the safety of Plaintiffs and others in conducting their operations and activities related to the Disposal Wells, including but not limited to injecting Drilling Waste, sufficient to eliminate or reduce an unreasonable risk of harm from those operations or activities.

47. Defendants were negligent, careless, and reckless in the following respects, among others:

a. Failing to require and/or provide equipment and engineering controls to eliminate or reduce the risks associated with altering the Earth's subsurface though the disposal of Drilling Waste;

b. Failing to warn others, including Plaintiffs, of the earthquake dangers associated with injecting Drilling Waste beneath the Earth's subsurface;

c. Failing to provide reasonable measures sufficient to protect Plaintiffs from the effects of earthquakes, including but not limited to harm to their persons and property.

48. As a direct and proximate result of Defendants' negligence, Plaintiffs have suffered and will continue to suffer severe and permanent damage to their persons and property. Specifically, Plaintiffs have suffered from damage to their property, including but not limited to, destruction and loss of personal property, cracked and broken interior and exterior walls, bricks and fascia, and movement of the foundations beneath their dwellings or other improvements, all of which has caused and will continue to cause Plaintiffs to experience great pain and suffering, both mental and physical, including mental and emotional anguish, fear, and worry associated with harm to themselves and their property from past and future earthquakes and the associated expenses and inconvenience, including but not limited to physical injury or death, payment of money for the repair and replacement of property, loss of use, dispossession, hidden or lingering threats from damage to infrastructure, diminution in property value, and decreased marketability, among others.

49. The actions, conduct and omissions of Defendants were committed with complete indifference to, or in conscious disregard for, the safety and well – being of the Plaintiffs and others. By virtue of the attitude and conduct of the Defendants, Plaintiffs are entitled to

exemplary or punitive damages in an amount that will properly punish Defendants and deter them and others from like conduct in the future.

WHEREFORE, Plaintiffs pray for judgment under this First Cause of Action for general damages in such sum as is fair and reasonable, for special damages in such sum as proven at trial, for exemplary or punitive damages in an amount that will properly punish Defendants and deter them and others from like conduct, for Plaintiffs costs and expenses, and for such other relief as the court deems just and proper.

SECOND CAUSE OF ACTION
STRICT LIABILITY/ULTRAHAZARDOUS ACTIVITY

50. To the extent they are not inconsistent with the allegations in this Second Cause of Action, Plaintiffs incorporate all other allegations of this Petition as though more fully set forth herein.

51. Defendant's actions in disposing of the Drilling Waste into Disposal Wells is abnormally dangerous and constitutes an ultra-hazardous activity.

52. Defendants are liable to Plaintiffs regardless of the amount of care exercised.

53. As a direct result of the actions and omissions of Defendants, Plaintiffs have been damaged as set forth above in the First Cause of Action, at ¶48.

54. The actions, conduct and omissions of Defendants were committed with complete indifference and with conscious disregard for the safety and well-being of the Plaintiffs and others. By virtue of the attitude and conduct of Defendants, Plaintiffs are entitled to exemplary or punitive damages in an amount that will properly punish Defendants and deter them and others from like conduct in the future.

WHEREFORE, Plaintiffs pray for judgment under this Second Cause of Action for general damages in such sum as is fair and reasonable, for special damages in such sum as proven at trial, for exemplary or punitive damages in an amount that will properly punish defendants and deter them and others from like conduct, for Plaintiffs' costs and expenses, and for such other relief as the Court deems just and proper.

THIRD CAUSE OF ACTION
PERMANENT INJUNCTIVE RELIEF

55. To the extent they are not inconsistent with the allegations in this Third Cause of Action, Plaintiffs incorporate all other allegations of this Petition as though more fully set forth herein.

56. Defendants' actions have caused long term or permanent environmental damage unsusceptible to remediation.

31. The continuing injury and detriment caused by Defendants actions is of such nature and magnitude that it is irreparable and incapable of being fully compensated for in money damages; harm that will continue unless restrained by this Court.

32. Plaintiffs are without an adequate remedy at law and are therefore entitled to permanent equitable relief.

WHEREFORE, Plaintiffs pray for judgment under this Third Cause of Action for permanent injunctive relief to be entered by the Court against Defendants sufficient to prevent future irreparable harm under such terms as are fair and reasonable to protect Plaintiffs and others from future harm to, to be entered after a trial upon the merits, as well as for Plaintiffs' costs and expenses, and for such other relief as the court deems just and proper.

Respectfully submitted,

Garvin A. Isaacs, OBA# 4559
Garvin A. Isaacs, Inc.
1400 N. Shartel Ave.
Oklahoma City, Oklahoma 73103
(405) 232-2060 telephone
(405) 232-9035 facsimile

And

David A. Poarch, OBA #7197
BAILEY & POARCH
301 E. Eufaula St.
Norman, OK 73069
(405) 329-6600 telephone
(405)329-6634 facsimile

ATTORNEYS FOR PLAINTIFFS

JURY TRIAL DEMANDED

IN THE DISTRICT COURT OF POTTOWATOMIE COUNTY
STATE OF OKLAHOMA

LISA WEST, and
STORMY HOPSON,
Individually and as Class Representatives,

Plaintiffs,

vs.

ABC OIL COMPANY, INC.,
BEREXCO, LLC,
CHAPARRAL ENERGY, LLC,
FAIRFIELD OIL & GAS CORP.,
GUINN COMPANY,
HEMBREE A. W. COMPANY,
LEASEHOLD MANAGEMENT CORP.,
NEW DOMINION, LLC,
NEWELL OIL AND GAS, LLC,
OKLA. OIL & GAS MANAGEMENT, INC.,
ONSHORE ROYALTIES, LLC,
PHOENIX OIL & GAS, INC.,
BILLY JACK SHARBER OPERATING, LLC,
SULLIVAN AND COMPANY, LLC, and
TRANSPO ENERGY, LLC,

Defendants.

Case No. CJ-16-49

PETITION

1. Plaintiffs, Lisa West and Stormy Hopson ("Plaintiffs"), individually and on behalf of a proposed plaintiff class of Oklahoma property owners, bring this action against ABC Oil Company, Inc., Berexco, LLC, Chaparral Energy, LLC, Fairfield Oil & Gas Corp., Guinn Company, Hembree A. W. Company, Leasehold Management Corp., New Dominion, LLC, Newell Oil and Gas, LLC, Oklahoma Oil & Gas Management, Inc., Onshore Royalties, LLC, Phoenix Oil & Gas, Inc., Billy Jack Sharber Operating, LLC, Sullivan and Company, LLC, and Transpo Energy, LLC (collectively "Defendants") and a proposed defendant class of other

companies operating in injection wells seeking relief regarding purchase of insurance policies needed because of Defendants' injection of wastewater into the Arbuckle formation has induced or triggered earthquakes and will continue to do so for some time even if injection wells were immediately stopped.

2. Unlike prior cases filed in Oklahoma, the present action does not seek to recover damages per se. Rather, the present action seeks injunctive relief associated with the need for the class to purchase earthquake insurance being caused by Defendants' conduct. Plaintiffs seek injunctive relief regarding the costs of purchasing earthquake insurance. The injunctive relief requested is prospective, Plaintiffs ask the Court to order Defendants to pay earthquake premiums as they are incurred in the future; and the injunctive relief requested is also retrospective. Plaintiffs ask the Court, analogous to the equitable awarding of back wages in an employment case, to award back insurance premiums.

3. Also, unlike prior cases filed in Oklahoma, the present action seeks certification of a defendant class as well as a plaintiff class. There are hundreds of companies that have operated injection wells in Oklahoma over the relevant time frame. One of these companies, or even a significant number of them, arguably cannot bear the ongoing financial consequences associated with earthquakes caused by injection wells. Frankly, given the current price of oil and projections for its pricing throughout the remainder of 2016 and beyond, it is unclear if the entire industry will be able to bear the financial burdens associated with its decisions on how to operate injection wells.[1] Earthquakes in the high 6 magnitude have generated billions in insured losses.

[1] See, e.g., "Is Sandridge Energy, Inc. Close to Crumbling," *Washington Times*, Sarah Terry-Cobo, November 15, 2015; "Can This Oil Baron's Company Withstand Another Quake," *Bloomberg Businessweek*, Benjamin Elgin and Matthew Phillips, April 23, 2015 (questioning New Dominion, LLC's financial viability in view of its exposure to earthquake liability). Regarding the outlook for oil going forward, see "Oil Prices: What's Behind the Drop? Simple Economics," *New York Times*, Clifford Krauss, updated February 16, 2016 (citing industry sources that indicate the price of oil is likely to stay low through 2016 and even beyond).

4. A defendant class is also preferable to fairly apportion liability for the insurance premiums incurred by Oklahoma property owners, and ensure that they can secure the injunctive relief to which they are entitled, it will be necessary to include all of the liable parties as a class of defendants. If all contributors to the problem are included, their percentage of fault and liability can be more fairly assessed and spread among all the parties causing the problems.

5. This case frames the liable parties as those operating the injection wells, and they are the ones who are directly responsible. It is possible that the class of injection well operators named herein (which has some overlap with the production companies, some of which operate their own injection wells), may desire to seek contribution, indemnification, or some other type of relief from the companies that produced the water reinjected by the well operators. However, the liability of the producers is arguably secondary to the liability of the parties that were responsible for its actual injection into deep wells that have caused the earthquakes.

6. Other pending cases seek recovery of property damage previously incurred by Oklahoma property owners as a result of earthquakes. There are cases filed in multiple Oklahoma counties including:

a. Lincoln County - *Ladra v. New Dominion, et al.* (CJ-2014-115); and *Cooper v. New Dominion, et al.* (Case No. CJ-2015-24);

b. Logan County - *Griggs v. Chesapeake, et al.* (Case No. CJ-2016-6); and

c. Oklahoma County – *Felts et al. v. Devon Energy et al.* (Case No. CJ-2016-137)[2]

7. A federal action was recently filed by the Sierra Club against Chesapeake Operating, LLC; Devon Energy Production Co. LP; and New Dominion, LLC (Federal Court for

[2] *Felts* filed in Oklahoma County seeks injunctive relief of an unspecified nature, but from the context the relief appears to relate to reducing the environmental risks posed by the named defendants' conduct.

the Western District of Oklahoma, filed February 16, 2016).[3] The Sierra Club seeks specific injunctive relief under the Solid Waste Disposal Act, amended as the Resource Conservation and Recovery Act, 42 U.S.C. §6901, *et seq.* ("RCRA") regarding injection volumes and monitoring of seismic activity, relief that is generally not available in Oklahoma State courts since those functions are within the exclusive jurisdiction of the Oklahoma Corporation Commission under Oklahoma state law.[4]

INTRODUCTION

8. Oklahoma experienced earthquakes before Defendants started deep saltwater injection. From 1882 – 2008 earthquakes were primarily located in south-central Oklahoma in and around a small projection west from Garvin County that looks like a truncated panhandle. This area is where four counties are in close proximity: Garvin, Grady, McClain and Stephens. See Figure 1.[5] Keep in mind that the quakes represented in Figure 1 represent earthquakes occurring over a 120-year period.

9. From 2008 - 2013 new areas of earthquake activity lit up. See Figure 2. These new earthquake areas overlapped with locations where oil and gas companies had started injecting massive quantities of saltwater into deep wells completed into the Arbuckle formation. See Figure 3 showing overlap of oil producing fields with new earthquake areas.

---

[3] Sandridge Energy was named in the Sierra Club / Public Justice's October 29, 2015 "intent to sue" letter, but it was not named as a defendant in the action filed February 16, 2016. The same counsel involved in the *Griggs* case in Logan County, Oklahoma are involved in the federal case on behalf of the Sierra Club / Public Justice.

[4] *Ladra v. New Dominion, LLC*, 2015 OK 53, ¶¶9-11; 353 P.3d 529.

[5] "Potential for Induced Seismicity in Oklahoma and Recent Cases," Austin Holland, November 11, 2013, then research seismologist with Oklahoma Geological Survey

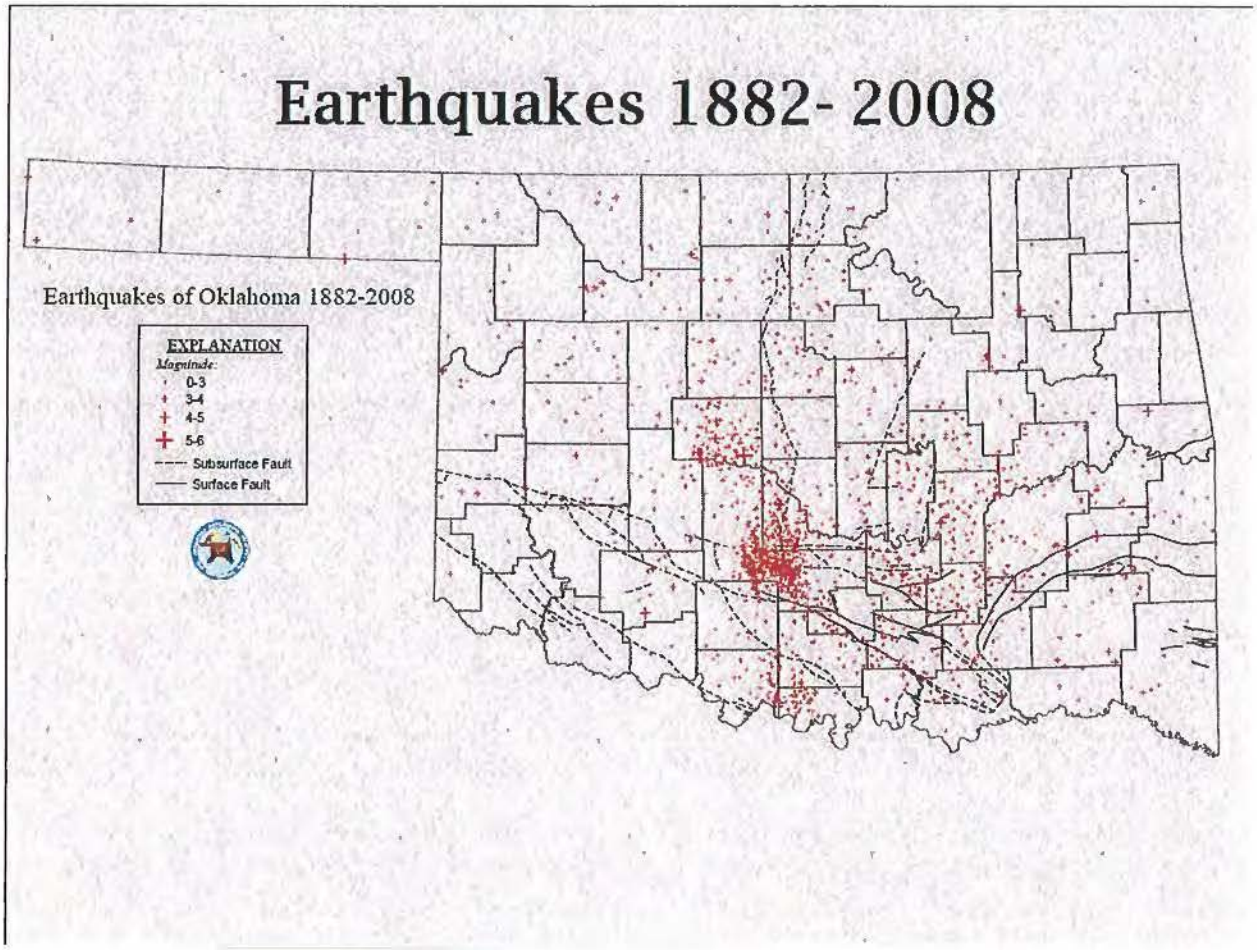


Figure 1: Historical Earthquakes

10. The data shown in Figures 1 – 3 was presented by Austin Holland in November 2013. Holland was then a research seismologist with the Oklahoma Geological Survey ("OGS"). Holland worked day-to-day at the University of Oklahoma where the OGS has its headquarters.

11. Holland's 2013 presentation-and the strong link it demonstrated between earthquakes and wastewater injection-got noticed by the oil and gas industry.

> In November 2013, Austin Holland, Oklahoma's state seismologist, got a request that made him nervous. It was from David Boren, president of the University of Oklahoma, which houses the Oklahoma Geological Survey where Holland works…asked Holland to his office for coffee with Harold Hamm, the billionaire founder of Continental Resources, one of Oklahoma's largest oil and gas operators. Boren sits on the board of Continental, and Hamm is a big donor to the

university, giving $20 million in 2011 for a new diabetes center. Says Holland: "It was just a little bit intimidating."[6]

Holland is the master of understatement: sitting down with his boss -- former senator, OU President, and Oklahoma legend -- David Boren and billionaire Harold Hamm for coffee was a "just a little bit intimidating."

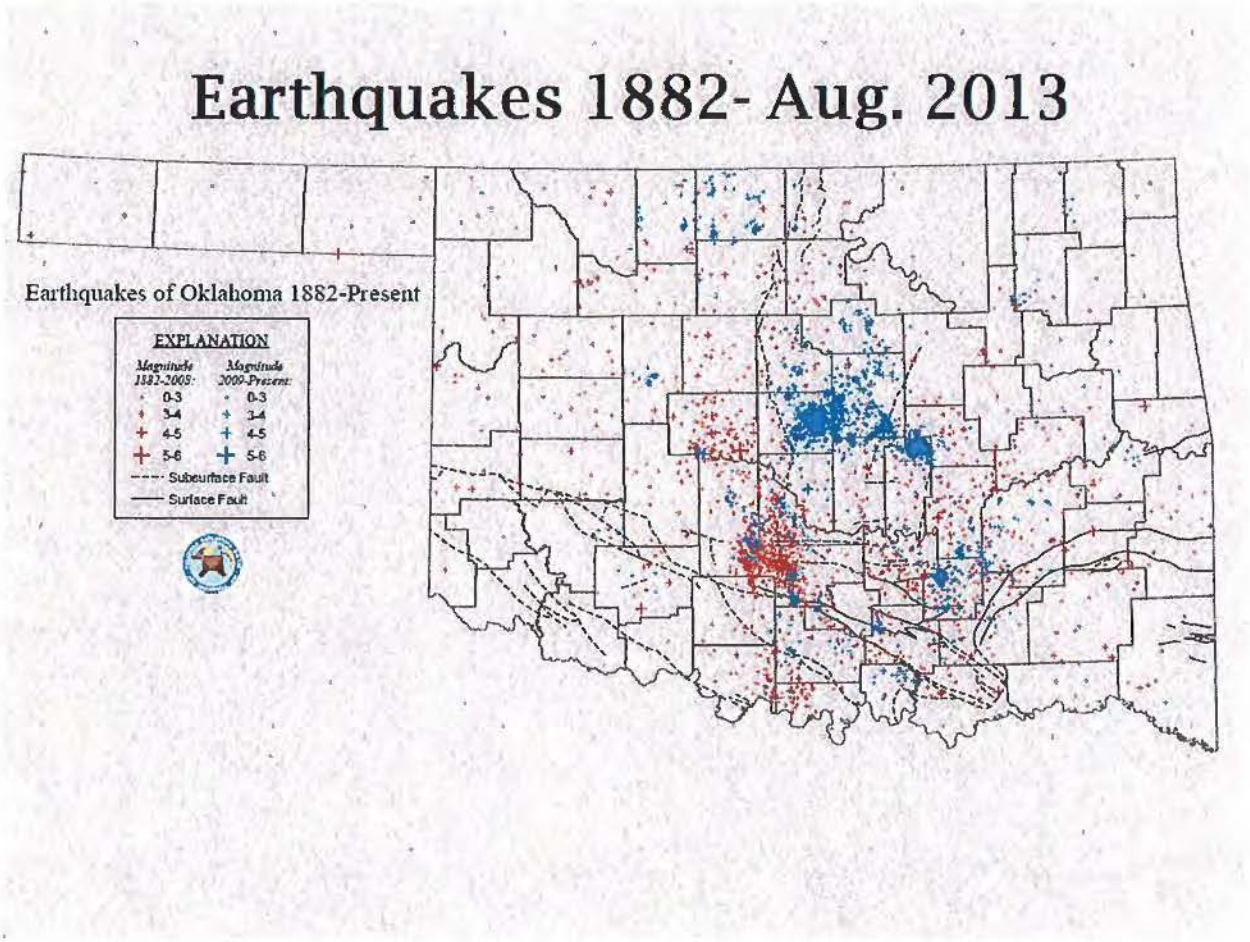


Figure 2: Blue Are New Earthquake Areas After 2008

[6] "Big Oil Pressured Scientists over Fracking Wastewater's Link to Quakes," Benjamin Elgin and Matthew Phillips, Bloomberg Business, March 30, 2015. Note that the title of this article is misleading since the most of the wastewater being injected is not from fracking. See Fig. 6 from "Oklahoma's Recent Earthquakes and Saltwater Disposal, Science Advances," F. Rall Walsh, III and Mark D. Zoback, Jan. 10, 2016 ("hydraulic fracturing flow-back water comprises an extremely small fraction of the injection… nearly all the water being injected into SWD wells in these areas is produced water" not from fracking).

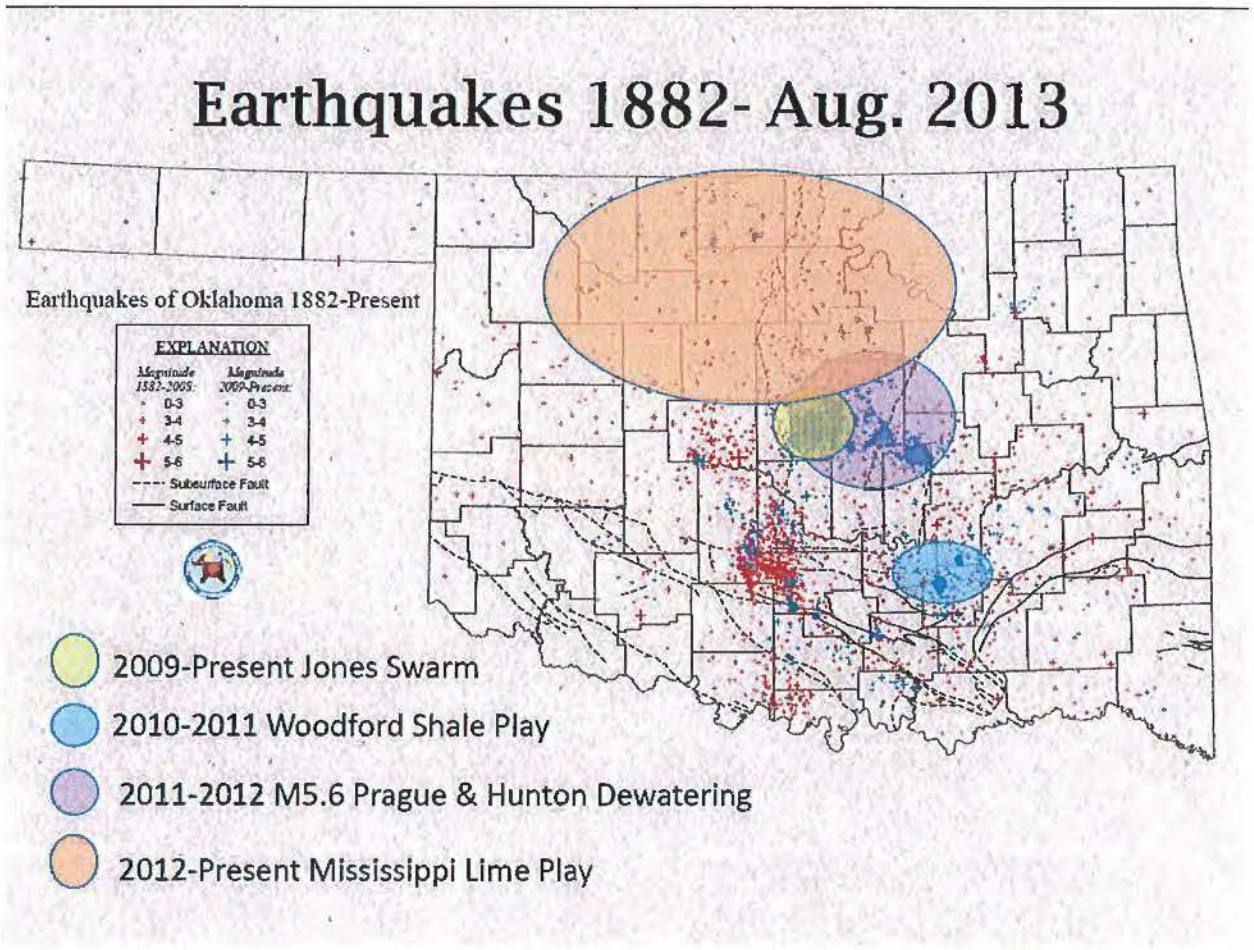


Figure 3: Overlap of Recent Oil Plays with New Earthquake Areas

12. Not surprisingly, Holland's honesty cost him his job at OGS. By July 6, 2015 it was reported that Holland was leaving the OGS for a job in New Mexico.[7] He did not accuse Boren, Hamm, or any other oil and gas-affiliated persons of undue pressure nor did he allege that his departure had anything to do with his billionaire coffee klatch. He did not need to.

13. The contrast between the scientific bases for Plaintiffs' claims as compared to the defenses that have been publicly made by Defendants or their proxies are stark. "***Wastewater***

[7] "Oklahoma's Top Seismologist Accepts USGS New Mexico Job," Paul Monies, *Oklahoman*, July 6, 2015.

injection," says Bill Ellsworth, a seismologist at the U.S. Geological Survey, "***is undoubtedly responsible for the majority of these earthquakes***."[8] In contrast, Defendant New Dominion's former CEO and one of its founders, David J. Chernicky,, summarized the Defendants' position thus:

> If humans can cause an earthquake, then they "can probably fart and shift the orbit of the planet, too." He adds: "Man does not cause tsunamis in Japan. Man did not cause the volcanic blast at Krakatoa. And man does not cause earthquakes."[9]

14. Chernicky's opinions are not an isolated case. They were, and to some extent remain, the standard response of the oil industry. "The science is not clear," or "it is a complicated issue," or some other form of obfuscatory statement is the norm. Chad Warmington, President of the Oklahoma Oil and Gas Association, as recently as April 21, 2015, was still denying the obvious: "There may be a link between earthquakes and disposal wells, but we – industry, regulators, researchers, lawmakers or state residents – still don't know enough about how wastewater injection impacts Oklahoma's underground faults."[10] Warmington went on to assert that "there is no scientific evidence that stopping wastewater injection would result in fewer earthquakes."

---

[8] "Can This Oil Baron's Company Withstand Another Quake," *Bloomberg Businessweek*, Benjamin Elgin and Matthew Phillips, April 23, 2015 (emphasis added). William L. Ellsworth is listed as a "scientist emeritus" with the U.S. Geological Survey and Professor of Geophysics at Standford's School of Earth, Energy & Environmental Sciences. See https://earth.stanford.edu/william-ellsworth and http://earthquake.usgs.gov/regional/nca/directory/?id=57.

[9] *Id.* David J. Chernicky's background is summarized by *Bloomberg Business* online at http://www.bloomberg.com/research/stocks/people/person.asp?personId=47615303&privcapId=225670127. Chernicky's assertion is contrary to well-accepted science. For example, as long ago as 1968 an article was published in the respected journal Science connecting injection of fluids into a deep well with triggered earthquakes. "The Denver Earthquakes: Disposal of Waste Fluids by Injection into a Deep Well Has Triggered Earthquakes Near Denver, Colorado," *Science*, J.W. Healy, W.W. Rubey, D.T. Griggs, C.B. Raleigh, Sept. 27, 1968 (Vol. 161, No. 3848).

[10] Press release from Oklahoma Oil and Gas Association dated April 21, 2015. Available online at http://okoga.com/wp-content/uploads/2015/04/PR-Reponse-OGS-Report.pdf.

15. This is a class action lawsuit brought by Oklahoma residents who own real property in Oklahoma for which they have either purchased earthquake insurance or for which they desire to purchase such insurance, but have been unable to afford to do so. Plaintiffs, on behalf of themselves and a class of others similarly situated seek to recover for premium payments made by them to purchase earthquake insurance and, on a going-forward basis ask for temporary and permanent injunctive relief requiring Defendants and a class of other injection well operators to reimburse the class for earthquake insurance premiums as they are incurred.

16. Many members of the class, including hut not limited to the named plaintiffs, have suffered damage caused by injection-induced earthquakes, but this action does not seek to recover directly for damages caused thereby. As noted above, multiple class actions are pending that address those claims. Rather, this case only relates only to past and future payment of earthquake insurance premiums.

DEFENDANTS

17. The Oklahoma Corporation Commission ("OCC") provides public information relevant to this case including, but not limited to, the following databases: (1) Operator's Directory, current as of January 15, 2016 online at http://www.occeweb.com/og/R97OPER.pdf, which includes operators name, operator number, address, and contact persons; and (2) UIC Injection Volumes 2014 available online at http://www.occeweb.com/og/ogdatafiles2.htm. From the latter database, a compilation of the injection volumes from 2012 – 2014 for Pottatwatomie County was developed, and that spreadsheet is the source of injection volumes noted herein. The information in paragraphs discussing Defendants was derived from the above-noted sources.

18. Defendant ABC Oil Company, Inc. is OCC Op. No. 19055 with offices at 910 Lamar St., PO Box 1469, Wichita Falls, TX 76307-1469. From 2012 to 2014 ABC operated at least one injection well in Pottawatomie County and injected in that time frame circa 5,119,720 BBLs of wastewater.

19. Defendant Berexco, LLC is OCC Op. No. 22550 with offices at 2020 N. Bramblewood St., Wichita KS 67206-1094. It shares offices with Beren Corporation, which is OCC Operator No. 4055. From 2012 to 2014 Berexco operated at least one injection well in Pottawatomie County and injected in that time frame circa 6,653,758 BBLs of wastewater.

20. Defendant Chaparral Energy, LLC is OCC Op. No. 16896 with offices at 701 Cedar Lake Blvd, Oklahoma City, OK 73114-7800. From 2012 to 2014 Chaparral operated at least one injection well in Pottawatomie County and injected in that time frame circa 7,876,473 BBLs of wastewater.

21. Defendant Fairfield Oil & Gas Corp. is OCC Operator No. 2910 and has offices at 300 NW 70th St., Oklahoma City, OK 73116-7804. From 2012 to 2014 Fairfield operated at least one injection well in Pottawatomie County and injected in that time frame circa 5,400,000 BBLs of wastewater.[11]

22. Defendant Guinn Company is OCC Operator No. 13231 and has offices at 45251 Turkey Hill Rd, Asher, OK 74826-6012. From 2012 to 2014 Fairfield operated at least one

[11] Fairfield Oil & Gas Corp. illustrates a curiosity in the data on injection wells. Each of its wells had the exact same injection volume and the exact same injection pressure for each month from 2012 to 2014. Even if an operator tried to accomplish that level of precision, it would have been impossible. Fairfield also illustrates the importance of later parsing out what formations injection was made into. Two wells operated by Fairfield (well names "Jo Ann" and "MG") injected into the Hunton formation, another into the Simpson Dolomite, and a final well injects into the Arbuckle. As discussed elsewhere, the scientific evidence shows that earthquakes are induced or triggered predominantly by injection into the Arbuckle formation, which is located just above the crystalline basement. Therefore, regarding apportionment of fault as among the Defendants, the zone into which injection is accomplished may need to be accounted. Volumes injected from 2012 to 2014 are: into the Hunton, Jo Ann 1,620,000 BBLs and MG 108,000; into the Simpson Dolomite 1,512,000; and into the Arbuckle 2,160,000.

injection well in Pottawatomie County and injected in that time frame circa 5,400,000 BBLs of wastewater.

23. Defendant Hembree A. W. Company is OCC Operator No. 998 and has offices at 1501 N. Shawnee St., PO BOX 1725, Shawnee, OK 74804-1725. From 2012 to 2014 Hembree operated at least one injection well in Pottawatomie County and injected in that time frame circa 4,981,622 BBLs of wastewater.

24. Defendant Leasehold Management Corp. is OCC Operator No. 17592 and has offices at 1141 S.E. Grand Boulevard, Suite 101, Oklahoma City, OK 73129-6708. From 2012 to 2014 Leasehold Management Corp. operated at least one injection well in Pottawatomie County and injected in that time frame circa 5,670,000 BBLs of wastewater.

25. Defendant New Dominion, LLC is OCC Operator No. 20585 and has offices at 1307 S. Boulder Ave., Suite 400, Tulsa OK 74119-3220. From 2012 to 2014 New Dominion operated at least one injection well in Pottawatomie County and injected in that time frame circa 15,629,932 BBLs of wastewater.

26. Defendant Newell Oil and Gas, LLC is OCC Operator No. 21892 and has offices at 35431 Hardesty Road, Shawnee, OK 74801-5753. From 2012 to 2014 Newell operated at least one injection well in Pottawatomie County and injected in that time frame circa 5,195,000 BBLs of wastewater.

27. Defendant Oklahoma Oil & Gas Management, Inc. ("OOGM") is OCC Operator No. 17016 and has offices at 300 NW 70th St., Oklahoma City, OK 73116-7804. From 2012 to 2014 OOGM operated at least one injection well in Pottawatomie County and injected in that time frame circa 10,829,626 BBLs of wastewater.

28. Defendant Onshore Royalties, LLC is OCC Operator No. 23326 and has offices at 3501 S. Texas Ave., Suite 300, PO Box 2326, Victoria, TX 77902-2326. From 2012 to 2014 Onshore operated at least one injection well in Pottawatomie County and injected in that time frame circa 8,874,972 BBLs of wastewater.

29. Defendant Phoenix Oil & Gas, Inc. is OCC Operator No. 10952 and has offices at 35863 Highway 270, PO Box 1859, Seminole, OK 74818-1859. From 2012 to 2014 Phoenix operated at least one injection well in Pottawatomie County and injected in that time frame circa 56,697,887 BBLs of wastewater.

30. Defendant Billy Jack Sharber Operating, LLC is OCC Operator No. 21553 and has offices at 35585 EW 1270 (Seminole), PO Box 71, Konowa, OK 74849-0071. From 2012 to 2014 Billy Jack operated at least one injection well in Pottawatomie County and injected in that time frame circa 4,530,752 BBLs of wastewater.

31. Defendant Sullivan and Company, LLC is OCC Operator No. 20952 and has offices at 1437 S. Boulder Ave., Suite 1200, Tulsa, OK 74119-3636. From 2012 to 2014 Sullivan and Company operated at least one injection well in Pottawatomie County and injected in that time frame circa 5,544,712 BBLs of wastewater.

32. Defendant Transpro Energy, LLC is OCC Operator No. 22297 and has offices at 1818 W. Lindsey St., Suite A105, Norman, OK 73069-4160. From 2012 to 2014 Transpro operated at least one injection well in Pottawatomie County and injected in that time frame circa 6,372,758 BBLs of wastewater.

33. The volumes of wastewater injected by each Defendant are shown in Table 1. Defendant Phoenix injects, by far, the largest volumes. It injected more than a quarter of the total volume injected county-wide in the 2012 to 2014 timeframe. The fifteen named Defendants represent 77% of the injected volume from 2012 to 2014. There are circa 97 operators in Pottawatomie County, so the remaining 80 or so operators represent under one-quarter of the total injection volume from 2012 to 2014.

Phoenix	56,697,887	28.3%
New Dominion	15,629,932	7.8%
OOGM	10,829,626	5.4%
Onshore	8,874,972	4.4%
Chaparral	7,876,473	3.9%
Berexco	6,653,758	3.3%
Transpro	6,372,758	3.2%
Leasehold Mgmt	5,670,000	2.8%
Sullivan and Co.	5,544,712	2.8%
Fairfield	5,400,000	2.7%
Newell	5,195,000	2.6%
ABC	5,119,720	2.6%
Guinn	4,981,622	2.5%
Hembree	4,981,622	2.5%
Billy Jack Sharbe	4,530,752	2.3%
SUB-TOTAL	154,358,834	77.0%
TOTAL	200,415,419	

Table 1: Injection by Defendants, BBLs and % of Total for Pottowatomie County

PLAINTIFFS

34. Plaintiff Lisa West suffered property damage to her home in the large Prague 2011 earthquake and made a claim against her earthquake insurance. Her claim was eventually paid, but no one has reimbursed Plaintiff West for the premiums she incurred and which she will continue to incur as a result of earthquakes induced by Defendants' activities.

35. Plaintiff Stormy Hopson resides in Pottawatomie County, Oklahoma at 16 Limousin Lane, Shawnee, OK 74084. Hopson would like to purchase earthquake insurance, and she believes that it is needed based on the increased rate of earthquakes in her area.

However, due to her other financial commitments, purchase of earthquake insurance has not been practical. Plaintiff Hopson believes that the earthquakes caused by Defendants' activities have resulted in property damage to her home. She worries what will happen to her largest investment, her home, if a big earthquake causes significant damage to her home.

JURISIDICTION AND VENUE

36. Jurisdiction and venue in this Court are proper. This Court has personal jurisdiction over Defendants who inject wastewater in the State of Oklahoma, more specifically within Pottawatomie County.

37. Venue is proper because a substantial part of the events or omissions giving rise to the claims set forth in this Petition occurred in Pottawatomie County, Plaintiffs and many of the Defendants reside in Pottawatomie County, and many injection wells operated by Defendants are in Pottawatomie County.

38. The OCC does not have jurisdiction over the claims asserted herein consistent with the holding in *Ladra v. New Dominion, et al.*, 2015 OK 53, 353 P.3d 529.

TECHNICAL BACKGROUND

39. Recent earthquakes in Oklahoma are induced or triggered by Defendants' injection wells, primarily by produced water injected into the Arbuckle Formation. Figure 4 illustrates a leading scientific model for how the injected water induces or triggers quakes.

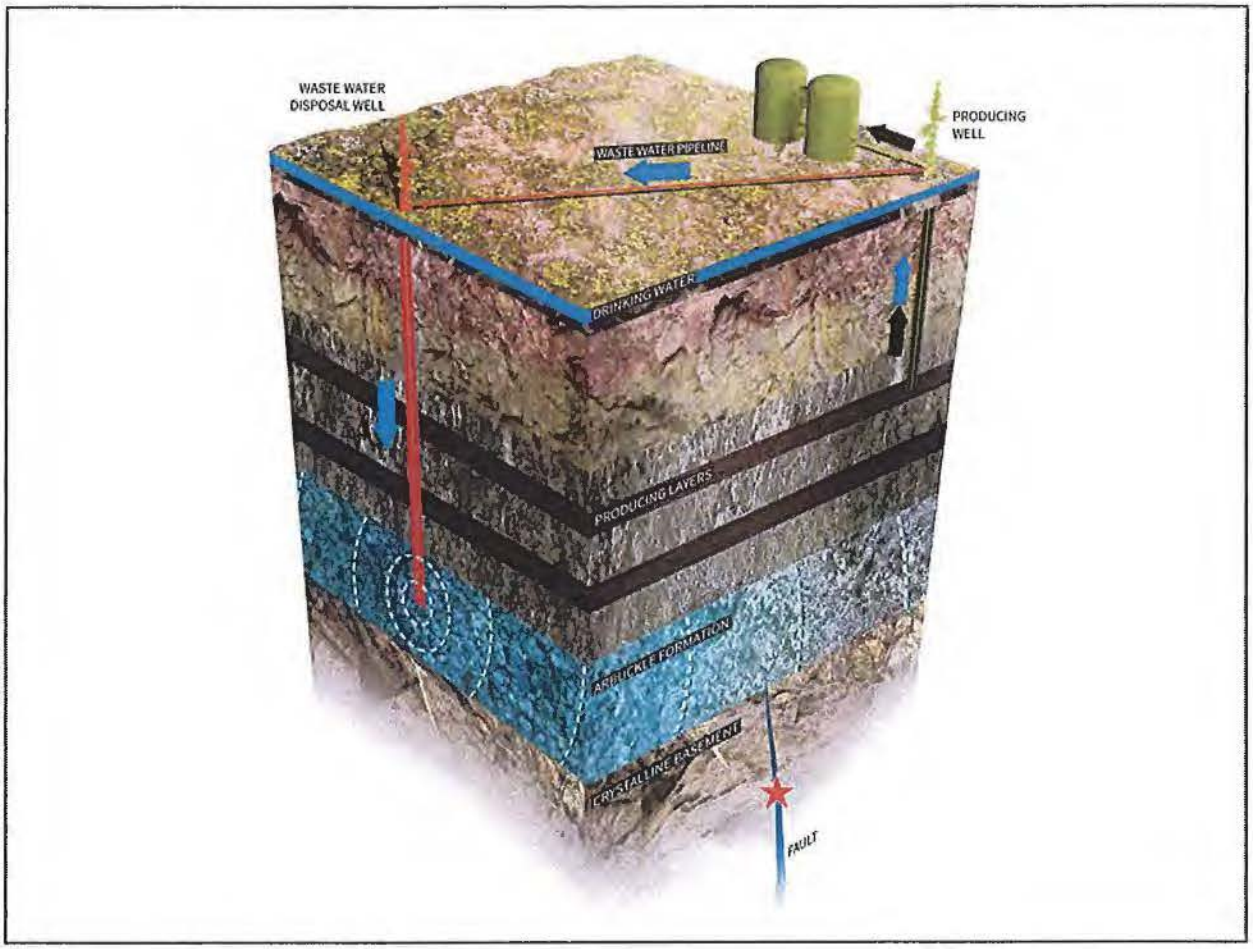


Figure 4: Mechanism of Induced and Triggered Seismicity[12]

40. Water from producing layers – for example from the Mississippi Lime or Woodford Shale – is brought to the surface along with oil. There are often ten barrels of water produced for every barrel of oil produced. The oil and water are separated, and then the water is reinjected. However, it is not put back into the same formation it was produced from; reinjection into the formation from which the water came is more difficult and expensive. To save money, Defendants usually dispose of in the Arbuckle Formation, which is the layer just above the

[12] Illustration from "Oklahoma Earthquakes Linked to Oil and Gas Wastewater Disposal Well, Say Stanford Researchers," by Ker Than, June 18, 2015 with the actual image crediting Professor Mark Zoback and doctoral student Rall Walsh. Article available online at http://news.stanford.edu/news/2015/june/okla-quake-drilling-061815.html

"crystalline basement" layer.[13] The water injected by Defendants increases the water pressure in the Arbuckle formation, and the injected water migrates out in a circle from each injection well. As the water injected by Defendants migrates, it encounters pre-existing fault lines in the crystalline basement. The affected fault may be some distance from the injection point, so there may be an apparent delay between the time of peak injection, the location of the injection, and the location of the induced earthquake.

41. There has been a dramatic increase in the frequency and intensity of earthquakes in Oklahoma since Defendants started large-volume injection of wastewater into the Arbuckle formation, particularly during the last five years. According to OGS, nearly 600 earthquakes magnitude 3.0 or greater were experienced in Oklahoma during 2014; less than one per year occurred in prior to 2009. From 2009 to 2014, Oklahoma experienced more than a 100-fold increase in total earthquakes: from 50 earthquakes in 2009 to more than 5,000 in 2014. Even more earthquakes shook Oklahoma in 2015.

42. The scale to classify earthquakes is logarithmic, meaning that a magnitude 2 earthquake is 10 times more powerful than a magnitude 1, and a magnitude 3 earthquake is 100 times more powerful than a magnitude 1. A magnitude 6 earthquake is 100,000 times as powerful as a magnitude 1 earthquake. Thus, with each increase in magnitude of quakes, the resulting damage is, by definition, an order of magnitude greater.

---

[13] Basement rock is the thick foundation of ancient, and oldest metamorphic and igneous rock that forms the crust of continents, often in the form of granite. Basement rock is contrasted to overlying sedimentary rocks such as sandstone and limestone which are laid down on top of the basement rocks after the continent was formed. The sedimentary rocks deposited on top of the basement usually form a relatively thin veneer, but can be more than three miles thick. The basement rock of the crust can be 20–30 miles thick, or more. The basement rock can be located under layers of sedimentary rock, or be visible at the surface. Basement rock is visible at the bottom of the Grand Canyon, consisting of 1.7-2 billion year old granite (Zoroaster granite) and schist (Vishnu Schist). The Vishnu Schist is believed to be highly metamorphosed igneous rocks and shale, from basalt, mud and clay laid from volcanic eruptions, and the granite is the result of magma intrusions into the Vishnu schist. An extensive cross section of sedimentary rocks laid down on top of it through the ages is visible as well. The sedimentary layers are those from which oil is produced, and wastewater injection is occurring to the very lowest level – the Arbuckle – right above the crystalline basement.

43. Earthquakes of magnitude 6 to 7 cause widespread damage and considerable loss of life. The destructive capacity of earthquakes near this magnitude was felt in Pottawatomie County in 2011.

44. In the first week of November 2011 three earthquakes of 5.0 to 5.7 occurred in and around Prague, Oklahoma. Prague is within a handful of miles of Pottawatomie County, and its effects were felt at St. Gregory in Shawnee, which suffered damage to all four of the turrets of Benedictine Hall. See Figure 5, adjacent.[14]

Figure 5: Damage to St. Gregory's Benedictine Hall 2011

[14] Figure 5 was taken by Sue Ogrocki and appeared courtesy of the Associated Press along with "A Seasoned Combatant of Tornadoes Now Finds the Earth Is Moving, Too," Marc Lacey, *New York Times*, Nov. 7, 2011.

45. The 5.7 magnitude earthquake in Prague, Oklahoma, in November 2011 was the strongest ever recorded in Oklahoma.

46. In 2014, Oklahoma had more than twice as many earthquakes as California. Oklahoma became the most seismically active state in the continental United States. Fifteen earthquakes in 2014 measured more than 4.0 in magnitude and 585 measured more than a magnitude 3 or greater. This trend continued in 2015 and does not seem to be letting up. Figure 6, adjacent shows earthquakes magnitude 4.0 or greater in the continental United States in 2015.[15] There were 15 in California which is considered an seismic active state, but there were 30 in Oklahoma.

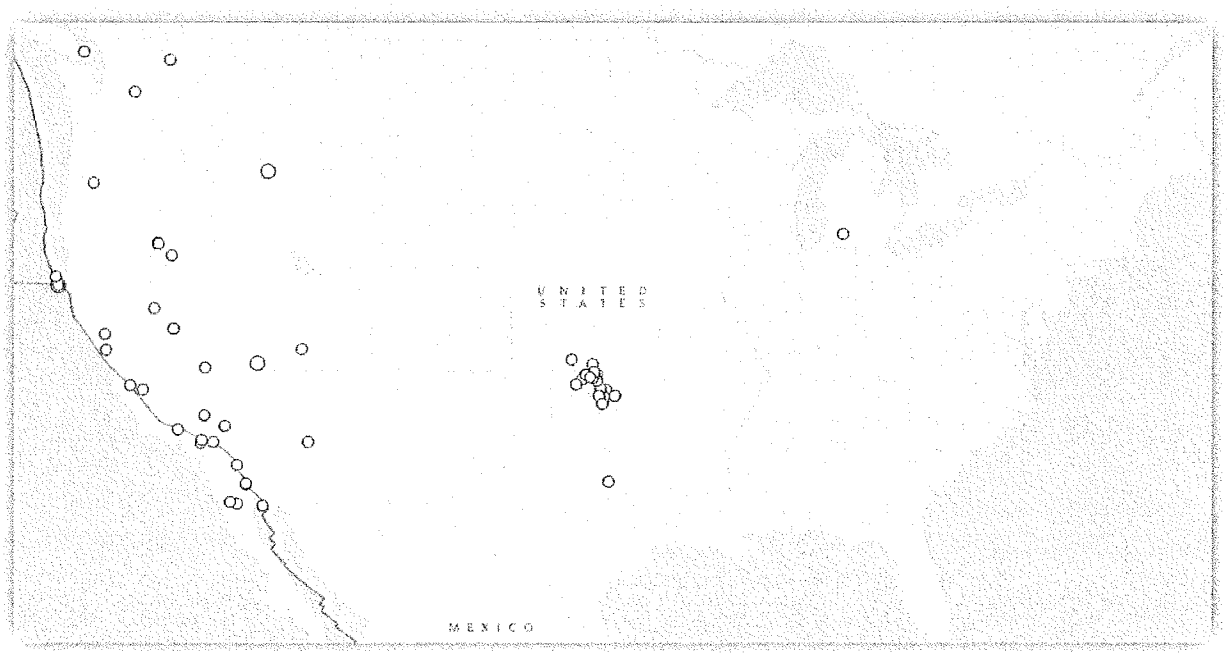


Figure 6: Magnitude 4.0+ Earthquakes in 2015

[15] Figure 6 was generated by a query of the database tool available on http://earthquake.usgs.gov/. at the following web site http://earthquake.usgs.gov/earthquakes/map/ by clicking on the gear icon at the upper right corner of the screen.

47. Another large swarm of earthquakes just happened on February 13, 2016 centered around Fairview and Waynoka, Oklahoma. The largest quake in this swarm has been characterized as a magnitude 5.1 quake. This quake was the third largest ever in the State of Oklahoma after the Prague earthquake discussed above, and a presumably-natually-occuring magnitude 5.5 earthquake near El Reno, Oklahoma in 1952. The large quake on February 13 was part of a swarm of at least 10 smaller quakes around the same time. This swarm was noted in an insurance industry publication, which likely foretells even higher insurance rates ahead for Oklahomans.[16]

48. Fluid injection from wastewater wells can induce earthquakes in at least four ways: (1) the injection of fluids raises pore-fluid pressure within a fault; (2) the injection of fluids fills and compresses fluids within pore spaces causing deformation (poroelastic effects); (3) the injection of fluid that is colder than the rock into which it is being injected causes thermoelastic deformation, and (4) the injected fluid adds mass to the injection formation. Observations and numerical modeling indicate that increased fluid pressure within faults most strongly influences whether an injection well will induce earthquakes.

49. Injected fluids do not need travel the entire distance from the injection well to a fault for the injection to affect the fault's behavior. Injection can affect a fault's behavior via the change in fluid pressure, which can be transmitted greater distances than fluids themselves. The increase in the fluid pressure that is initiated at the injection well is transmitted to the fault without necessarily traveling the full distance between the well and fault.

> The fact that increased pore pressure at depth resulting from fluid injection can trigger slip on preexisting, already-stressed faults is well documented and the

[16] "5.1 M Quake Among Latest Swarm of Temblors in Oklahoma," *Insurance Journal*, Ken Miller, February 16, 2016. Available online at http://www.insurancejournal.com/news/southcentral/2016/02/16/398727.htm

> mechanisms by which triggered fault slip occurs are generally well known. Simply put, increased fluid pressure acts to unclamp a fault....
>
> The rate of widely felt M≥4 earthquakes has gone from about one per decade before 2009 (going all the way back to 1882) to 24 in 2014 alone, roughly a 200-fold increase....[17]

50. Injection wells can be operated without dramatically increasing the rate of triggered and induced earthquakes: reinject into the producing formation. There is an area around Ardmore, Oklahoma where there has been a very large and long-term injection of wastewater that has not resulted in the huge swarms of earthquakes triggered in other places with smaller injection volumes.[18] However, the injection methods that would prevent huge swarms of earthquakes are typically more expensive, so they have not been preferred. When operators choose methods that appear superficially cheaper, i.e., deep well injection instead of reinjection into the producing formation, they should have to bear the actual costs associated with those nominally cheaper injection methods, to wit: payment of the resulting earthquake insurance premiums.

51. As fluid is injected into a formation, the fluid pressure within that formation rises. If this fluid pressure increase is transmitted to a fault, the increase in pore pressure counteracts the stresses holding the fault closed (the normal stress), resulting in a lower effective stress. With lower effective normal stress clamping a fault, the frictional resistance to slip is lower and the fault is more prone to slip.

---

[17] "Oklahoma's Recent Earthquakes and Saltwater Disposal," *Sci. Adv.*, F.Rall Walsh III and Mark D. Zoback, June 18, 2015 at p.1.

[18] *Id.* at p.4. Figure 4 of the referenced article shows injection rates for Ardmore, which have arranged steadily upward from more than 10 million barrels per month well before 2000 up to 40 million barrels per month in recent years, yet there have been relatively few earthquakes. The article explains the relative paucity of earthquakes around Ardmore thus: "Because nearly all of the injection is occurring into enhanced oil recovery wells (that is, the injection is back into shallower producing formations), one would not expect a pressure buildup that could affect critically stressed basement faults."

52. There is an established a causal link between the injection of production wastes into the ground through disposal wells and earthquakes in Oklahoma. According to the USGS, hydraulic fracturing, long-term wastewater injection, and enhanced oil recovery have all induced earthquakes in the United States and Canada in the past few years. Wastewater disposal is responsible for the vast majority of the increase, including the largest and most-damaging induced earthquakes.

53. The recent increase in injection-induced seismicity is caused by a corresponding increase in wastewater disposal in the central United States. The earthquake rate increase in Oklahoma, where the vast majority of the increase has occurred, corresponds in time to a doubling of the wastewater disposal rate in the state from 1999 to 2013. Focusing on the areas of increased seismicity within Oklahoma, injection increased by factors of 5-10. Other areas of increased rates of induced earthquakes also experienced sudden increases in wastewater disposal.

54. A March 2013 study investigated the earthquakes in and around Prague, Oklahoma in 2011 and found a correlation between injection wells and the earthquakes devastating the town in November of 2011.[19]

55. A wide range of authoritative sources have established beyond reasonable scientific doubt that injection of wastewater is the cause of the increased earthquake activity in Oklahoma: this fact is scientifically undisputed.[20] Even the OGS, in the face of relentless pressure from the oil and gas industry has conceded the point:

---

[19] "Potentially Induced Earthquakes in Oklahoma, USA: Links Between Wastewater Injection and the 2011 M 5.7 Earthquake Sequence," *Geology*, K.M. Keranen, et al., Mar. 25, 2013.

[20] USGS-Oklahoma Geological Survey Joint Statement on Oklahoma Earthquakes, Oct. 22, 2013; updated May 2, 2014. "Sharp Increase in Central Oklahoma Seismicity since 2008 Induced by Massive Wastewater Injection" *Science*, Keranan, et al., July 3, 2014. "Oklahoma's Recent Earthquakes and Saltwater Disposal," Sci. Adv., F.Rall Walsh III and Mark D. Zoback, June 18, 2015.

> [W]e know that the recent rise in earthquakes cannot be entirely attributed to natural causes....[T]he majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells.[21]

56. Earthquakes as large as magnitude 7 or even higher may occur. As previously noted, the damage from a magnitude 7 earthquake could be devastating. Even well-built structures could collapse.

> "I do think there's a really strong chance that Oklahoma will receive some strong shaking," said Daniel McNamara, a research geophysicist at the National Earthquake Information Center in Colorado, who has followed the state's quakes. Referring to the shocks that occurred Wednesday night, he added, "I'm surprised it didn't rupture into a larger event."[22]

DEFENDANT'S IMPROPER CONDUCT

57. Defendants operate wastewater injection wells in Pottawatomie County into which they inject huge volumes of wastewater under high pressures. These injection wells have caused the earthquakes occurring in and around Pottawatomie County. The earthquakes caused by Defendants' injection activities have resulted in property damage in Pottawatomie County. See, for example, Figure 5 above showing damage Benedictine Hall at St. Gregory's.

58. Instead of addressing the harm they have caused or, at least having the good sense to keep their mouths closed, Defendants and the oil and gas industry more generally have engaged in a campaign of disinformation that would have made the tobacco companies proud.

---

[21] Oklahoma Office of the Secretary of Energy and Environment on the "Earthquakes in Oklahoma" web site under the "What We Know" page. The web site was posted by the Oklahoma Sec. of Energy on or about April 21, 2015 as reported in "Oklahoma Recognizes Role of Drilling in Earthquakes," *New York Times*, Michael Wines, April 21, 2015.

[22] "Earthquakes in Oklahoma Raise Fears of a Big One," *New York Times*, Michael Wines, Jan. 7, 2016 (quoting Michael McNamara, research geophysicist with the USGS; his bio is available online at https://profile.usgs.gov/professional/mypage.php?rfs=y&name=mcnamara, but suffice it to say that his qualifications and publications give that statement great gravitas).

Defendant New Dominion's former CEO and one of its founders, David J. Chernicky,, summarized the Defendants' position thus:

> If humans can cause an earthquake, then they "can probably fart and shift the orbit of the planet, too." He adds: "Man does not cause tsunamis in Japan. Man did not cause the volcanic blast at Krakatoa. And man does not cause earthquakes."[23]

59. Harold Hamm tried to silence OGS scientist, Austin Holland. Hamm enlisted Boren, Holland's then boss, to invite Holland to sit down for coffee with the University President / former senator and the powerful billionaire to discuss Holland's findings. Holland told the truth about the connection between earthquakes and injection wells, and he was eventually forced out at OGS.

CLASS ALLEGATIONS

60. Plaintiffs incorporate by reference the paragraphs outside of this section.

Plaintiff Class

61. Plaintiffs bring this action, on behalf of themselves and all others similarly situated, as a class action pursuant to 12 O.S. § 2023.

62. The class that Plaintiffs seek to represent (the "Class") is defined as follows: "All persons having an insurable interest in real property in the Class Area from 2011 through the time the Class is certified, and thereafter while any injunctive relief granted remains in force." "Class Area" means Pottawatomie County and counties surrounding and touching it, to wit: Cleveland, Lincoln, McClain, Okfuskee, Oklahoma, Pontotoc, and Seminole.

63. Two subclasses are defined: first, an insured subclass comprising Class Members who paid earthquake insurance premiums on real property in the Class Area from 2011 through

[23] "Can This Oil Baron's Company Withstand Another Quake," *Bloomberg Businessweek*, Benjamin Elgin and Matthew Phillips, April 23, 2015

the time the Class is certified ("Insured Subclass"); and second, Class Members not included in the first subclass ("Uninsured Subclass").

64. The following are excluded from the Class: Defendants and their directors, officers, employees and agents, and the judicial officer presiding over this case and his/her immediate family members.

65. Plaintiffs reserve the right to amend the Class definition -- including addition, deletion or modification of subclasses -- if discovery and further investigation reveals that the Class should be expanded or otherwise modified.

66. This action is brought and properly may be maintained as a class action pursuant to 12 O.S. § 2023 and satisfies the requirements those provisions.

67. ***Numerosity***. Each of the eight counties included in the Class Area have thousands of individuals that are included in the class definition. Joinder of all members of the Class in a single action impracticable, and therefore, the resolution of their claims through the procedure of a class action will be to the benefit of the parties and the Court.

68. ***Commonality***. Plaintiffs' claims raise issues of fact or law which are common to the members of the putative Class. These common questions include, but are not limited to whether: (a) Defendants' injection operations caused earthquakes in the Class Area; (b) Defendants owed a duty to the Plaintiffs and the members of the putative Class and whether that duty was breached; (d) Defendants' conduct amounted to a nuisance; (e) Defendants' conduct is an ultra-hazardous activity; (f) Defendants' operations were negligently performed; (g) Defendants caused a trespass; and (h) Plaintiffs and the putative Class Members are entitled to injunctive relief regarding Defendants' operations.

69. ***Typicality***. Plaintiffs' claims are typical of the claims of the other members of the Class they seek to represent because Defendants' wastewater injection operations have caused earthquakes, pose a significant danger, and have caused damages to Plaintiffs and the putative Class Members in a similar manner.

70. ***Adequate Representation***. Plaintiffs are interested in the outcome of this litigation and understand the importance of adequately representing the Class. Plaintiffs will fairly and adequately protect the interests of the Class sought to be certified. Plaintiffs are adequate representatives of the Class because they have no interests which are adverse to the interests of the members of the Class.

71. Plaintiffs are committed to the vigorous prosecution of this action and, to that end, Plaintiffs have retained counsel who are competent and experienced in handling class-action and complex tort litigation and who are qualified to adequately represent the Class.

72. ***Predominance***. Plaintiffs have pled this action seeking injunctive relief, not damages, so predominance and superiority do not have to be established as this action is presently formulated. Nevertheless, questions of law or fact common to the members of the Class predominate over questions affecting only individual members. A class action is superior to other available methods for the fair and efficient adjudication of the controversy because, inter alia, the dominant questions relate to Defendants' wastewater injection operations and whether these activities pose a nuisance, are ultrahazardous activities, were negligently performed, or caused trespasses such that entry of injunctive relief, both retroactive and prospective, is proper. The focus of this action will be Defendants' joint and cumulative conduct of injecting wastewater so as to cause earthquakes making purchase of earthquake insurance necessary.

73. Absent class action relief, the putative Class Members would be forced to prosecute thousands of similar claims in different venues around the State of Oklahoma. Such an event would cause tremendous amounts of waste of judicial resources, but the prosecution of these claims as a class action will promote judicial economy.

74. Prosecution of separate actions by individual members of the Class would create a risk of: (a) inconsistent or varying adjudications with respect to individual members of the Class which would establish incompatible standards of conduct for the Defendants; and (b) adjudications with respect to individual members of the Class which would as a practical matter be dispositive of the interests of the other members not parties to the adjudications or substantially impair or impede their ability to protect their interests. The first risk is inherent in prosecution of a multiplicity of actions, different cases will provide varying results.

75. The second factor brings in concerns regarding the financial ability of Defendants to bear the liability associated with the earthquakes they have created. Certainly, if there is a large and devastating earthquake near any major population center, Defendants named herein, and even the entire defendant class would be unable to bear the hundreds of millions, or even billions of dollars in liability that could easily result. See Table 2, below. Therefore, prudent class members wisely are procuring earthquake policies for their real property. Defendants, even a class of all operators in the State of Oklahoma could not bear the $1.8 billion in insured losses caused by a 6.9M quake in Santa Cruz, California, not to mention the $24 billion in damage caused in Los Angeles by a magnitude 6.7. Prudent property owners cannot simply sit back and hope that Defendants have enough money to pay the damages that would result if the "big one" hits Oklahoma – they will not have enough money, even in good financial times, and these are not good financial times.

TABLE 2
INSURED LOSSES CAUSED BY URBAN EARTHQUAKES

DATE	LOCATION	MAGNITUDE	INSURED LOSSES (2014 dollars)[24]
October 17, 1989	Santa Cruz, CA	6.9	$1.8 billion
January 17, 1994	Los Angeles, CA	6.7	$24 billion
February 28, 2001	Olympia, WA	6.8	$400 million

76. Plaintiffs have pled this action seeking injunctive relief, not damages, so manageability does not have to be established as this action is presently formulated.

Defendant Class

77. Plaintiffs bring this action, on behalf of themselves and all others similarly situated, against a class of defendants similarly situated pursuant to 12 O.S. § 2023.

78. The class of defendants that Plaintiffs seek to include (the "Defendant Class") is defined as follows: "All persons operating an underground injection well in the Class Area from 2011 through the time the Class is certified, and thereafter while any injunctive relief granted remains in force."

79. Plaintiffs reserve the right to amend the Class definition -- including addition, deletion or modification of subclasses -- if discovery and further investigation reveals that the Class should be expanded or otherwise modified.

80. This action is brought and properly may be maintained as a class action against defendants pursuant to 12 O.S. § 2023 and satisfies the requirements those provisions.

81. ***Numerosity***. In Pottawatomie County alone, nearly 100 companies have operated at least one injection well from 2012 to 2014. Additional numbers of operators have wells in the

[24] Insured losses in 2014 dollars are taken from "Earthquakes: Risk and Insurance Issues," *Insurance Information Institute,* September 2015. Available online at http://www.iii.org/issue-update/earthquakes-risk-and-insurance-issues

other seven counties included in the Class Area. Naming hundreds of defendants in a single action is impractical.

82. ***Commonality***. Plaintiffs' claims raise issues of fact or law which are common to the members of the putative Defendant Class. These common questions include, but are not limited to whether: (a) Defendants' injection operations caused earthquakes in the Class Area; (b) Defendants owed a duty to the Plaintiffs and the members of the putative Class and whether that duty was breached; (d) Defendants' conduct amounted to a nuisance; (e) Defendants' conduct is an ultra-hazardous activity; (f) Defendants' operations were negligently performed; (g) Defendants caused a trespass; and (h) Plaintiffs and the putative Class Members are entitled to injunctive relief regarding Defendants' operations.

83. ***Typicality***. Plaintiffs' claims against the named defendants are typical of the claims of the other members of the Defendant Class they seek to pursue because Defendants' wastewater injection operations have caused earthquakes, pose a significant danger, and have caused injuries to Plaintiffs and the putative Class Members in a similar manner. Named defendants are typical of the operators of injection wells, and their defenses are typical of the class Plaintiffs seek to certify.

84. ***Adequate Representation***. The named Defendants are interested in the outcome of this litigation and understand the importance of adequately representing their own interests and thus those of the defendant class. Defendants will fairly and adequately protect the interests of the Defendant Class sought to be certified. Defendants are the largest injectors in Pottawatomie County and some of the largest in the state, but the named Defendants also include smaller "mom and pop" type injection well operators, so the interests of both small and large members of the defendant class are adequately represented. Named defendants are adequate

representatives of the Class because they have no interests which are adverse to the interests of the members of the Class.

85. There is every reason to believe that the named Defendants will be committed to the vigorous prosecution of this action and, to that end, will retain counsel who are competent and experienced in handling class-action and complex tort litigation and who are qualified to adequately represent the Defendant Class.

86. ***Predominance***. Plaintiffs have pled this action seeking injunctive relief, not damages, so predominance and superiority do not have to be established as this action is presently formulated. Nevertheless, questions of law or fact common to the members of the Defendant Class predominate over questions affecting only individual members. A class action is superior to other available methods for the fair and efficient adjudication of the controversy because, inter alia, the dominant questions relate to Defendants' wastewater injection operations and whether these activities pose a nuisance, are ultrahazardous activities, were negligently performed, or caused trespasses such that entry of injunctive relief, both retroactive and prospective, is proper. The focus of this action will be Defendants' joint and cumulative conduct of injecting wastewater so as to cause earthquakes making purchase of earthquake insurance necessary.

87. Absent certification of a Defendant Class, the putative Class Members could be forced to name hundreds of injection well operators to secure complete relief. Such an event would cause tremendous amounts of waste of judicial resources, but the prosecution of these claims as a class action will promote judicial economy.

88. Prosecution of separate actions against individual members of the Defendant Class would create a risk of: (a) inconsistent or varying adjudications with respect to individual

members of the Defendant Class which would establish incompatible standards of conduct for the Defendants; and (b) adjudications with respect to individual members of the Defendant Class which would as a practical matter be dispositive of the interests of the other members not parties to the adjudications or substantially impair or impede their ability to protect their interests.

89. Plaintiffs have pled this action seeking injunctive relief, not damages, so manageability does not have to be established as this action is presently formulated. Plaintiffs are not aware of any difficulty which will be encountered in the management of this litigation which should preclude its maintenance as a class action.

CAUSES OF ACTION

90. Plaintiffs incorporate by reference the paragraphs outside of this section.

Count I - Private Nuisance

91. Defendants' conduct constitutes a private nuisance.

92. Plaintiffs and the putative Class have property rights and are privileged regarding the use and enjoyment of their homes, businesses, and land. Defendants' actions and operations, as described above, have unlawfully and unreasonably interfered with those rights and privileges.

Count II - Ultrahazardous Activities

93. Defendants' actions described above constitute ultra-hazardous activities that involve a high degree of risk of serious harm to a person or the chattels of others, the risk cannot be eliminated by exercising the utmost care, and is not a matter of common usage.

94. As a direct and proximate result of Defendants' ultra-hazardous activities, Plaintiffs and the putative Class have sustained injuries that are the direct and proximate result of

Defendants' ultra-hazardous or abnormally dangerous activities, to which Defendants are strictly liable.

Count III - Negligence

95. Defendants owed a duty to Plaintiffs and the putative Class to use ordinary care not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity.

96. Defendants, experienced in these operations, knew or should have known of the connection between injection wells and seismic activity, and acted in disregard of these facts.

97. Defendants breached their duty to Plaintiffs and the putative Class to use ordinary care and not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity.

98. As a direct and proximate result of these acts, omissions and fault of the Defendants, the Plaintiffs and the Class have suffered injuries reasonably foreseeable to the Defendants.

Count IV - Trespass

99. Plaintiffs and the members of the putative Class are and have been lawfully entitled to possession of their property.

100. Defendants, without the permission or consent of Plaintiffs and any putative Class Members and without legal right, intentionally engaged in activities that resulted in concussions or vibrations entering Plaintiffs' and Class Members' property. Such unauthorized invasion of Plaintiffs' and the Class Members' property interests constitutes a trespass.

101. Because of Defendants' trespass, Plaintiffs and the putative Class have suffered injuries.

WHEREFORE, Plaintiffs and the Class pray that this Court award injunctive relief against Defendants and in favor of Plaintiffs and the Class, awarding Plaintiffs and the Class the following relief:

a. Certification of the Plaintiff Class and Defendant Class as requested in this Petition;

b. Appointment as Class Counsel the counsel for Plaintiffs named below;

c. Appointment of Defendant Class counsel;

d. Entry of a temporary injunction directing Defendant Class to reimburse Class Members for earthquake insurance premiums as they are incurred;

e. Entry of permanent injunction -

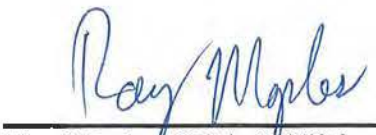
1. Directing Defendant Class to reimburse Plaintiff Class for earthquake insurance premiums incurred during the Class Period,

2. Directing Defendant Class to reimburse Class Members for earthquake insurance premiums as they are incurred until such time as Defendant Class shows the Court by satisfactory evidence that their activities no longer present a reasonable risk of creating earthquakes or as otherwise directed by the Court;

f. Award of attorney fees, costs, expenses, including pre-judgment and post-judgment interest; and

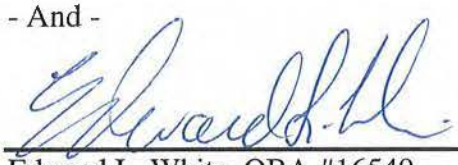
g. Grant of all other relief to which Plaintiffs and the Class are entitled or which the Court deems just.

Respectfully submitted,



Ray Maples, OBA #18586
Glendell Nix, OBA #13747
Maples, Nix & Diesselhorst, PLLC
15401 North May Avenue
Edmond, Oklahoma 73013
Telephone: (405) 478-3737
Facsimile: (405) 513-5005
Email: ray@mndlawfirm.com
glendell@mndlawfirm.com

- And -



Edward L. White, OBA #16549
Kerry D. Green, OBA #31998
Edward L. White, P.C.
829 East 33rd Street
Edmond, Oklahoma 73013
Telephone: (405) 810-8188
Facsimile: (405) 608-0971
Email: ed@edwhitelaw.com
kerry@edwhitelaw.com

ATTORNEYS FOR PLAINTIFFS

ATTORNEY LIEN CLAIMED
JURY TRIAL DEMANDED

ent

IN THE DISTRICT COURT OF LOGAN COUNTY, OKLAHOMA
STATE OF OKLAHOMA

BRENDA LENE and JON DARRYN LENE, Plaintiffs	)	
vs.	)	Case No. CJ-2016-27
CHESAPEAKE OPERATING, LLC, NEW DOMINION, LLC, DEVON ENERGY PRODUCTION CO., LP, SANDRIDGE EXPLORATION AND PRODUCTION, LLC, and JOHN DOES 1-100 Defendants	)	

PETITION

COMES NOW Plaintiffs Brenda Lene and Jon Darryn Lene and for their causes of action against Chesapeake Operating, LLC, New Dominion, LLC, Devon Energy Production Co., LP, SandRidge Exploration and Production, LLC, and John Does 1 - 100 (collectively "Defendants") allege and state as follows:

PARTIES

1. Plaintiffs Brenda Lene and Jon Darryn Lene are citizens of Oklahoma and residents of Logan County, Oklahoma. Their home in Logan County suffered damages due to earthquakes caused by the Defendants' wastewater disposal operations. Such operations continue, and thus, the earthquakes are continuing and continue to cause damages to Mr. and Mrs. Lene.

2. Defendant Chesapeake Operating, LLC ("Chesapeake") is a corporation existing and operating under the laws of the State of Oklahoma, does business within the State of

Oklahoma, and has its principal place of business at 6100 N. Western Avenue, Oklahoma City, OK 73118-1044.

3. Defendant New Dominion, LLC, ("New Dominion") is an Oklahoma corporation doing business in Oklahoma, with its principal place of business at 3400 SE 59th St., Oklahoma City, OK 73135.

4. Defendant Devon Energy Production Co., LP ("Devon") is an Oklahoma corporation doing business in Oklahoma, with its principal place of business at 20 North Broadway, Suite 1500, Oklahoma City, OK 73102-8202.

5. Defendant SandRidge Exploration and Production, LLC ("SandRidge") is a corporation existing and operating under the laws of the State of Oklahoma, does business within the State of Oklahoma, and has its principal place of business at 1601 Northwest Expressway, Suite 1601, Oklahoma City, OK 73118.

6. John Does 1 – 100 are other Oklahoma entities that have engaged in injection well operations in the vicinity around Plaintiffs' home, and which have also contributed to the earthquakes and resulting damages to Plaintiffs.

JURISIDICTION AND VENUE

7. Jurisdiction in this Court is proper. This Court has personal jurisdiction over Defendants as they do substantial business in the State of Oklahoma, are headquartered in the State, and operate the injection wells at issue in this judicial district.

8. Venue is proper in this Court as a substantial part of the events or omissions giving rise to the claims set forth in this Petition occurred here.

9. The Oklahoma Corporation Commission (or "OCC") does not have jurisdiction over the property damage claims asserted in this complaint. *Ladra v. New Dominion, et al.*, 2015 OK 53, 353 P.3d 529 (2015).

FACTUAL ALLEGATIONS

Significant Increase in Earthquakes in Oklahoma

10. Oklahoma has experienced a dramatic increase in the number of earthquakes during the last five years. According to the Oklahoma Geological Survey (OGS), the state saw nearly 600 quakes of magnitude 3.0 or greater in 2014, compared to just one or two per year prior to 2009. From 2009 to 2014, Oklahoma experienced a 108-fold increase in total earthquakes: from 50 earthquakes in 2009 to 5,417 earthquakes in 2014.

11. In 2014, Oklahoma had more than twice the number of earthquakes as California, making it the most seismically active state in the continental United States. Fifteen earthquakes in 2014 were more than 4.0 in magnitude.

12. In 2015, more than 800 earthquakes greater than 3.0 magnitude occurred in Oklahoma, 30 of which were more than 4.0 in magnitude.

13. Recently, these thousands of earthquakes occurring in Oklahoma were linked to the oil and gas industry.

Hydraulic Fracturing (Fracking)

14. Invented in 1947, hydraulic fracturing (often colloquially referred to as "fracking"), is a technique that has been used for decades in the oil and gas industry. Approximately one million wells were hydraulically fractured in the United States between 1947 and 2010.

15. Hydraulic fracturing is a technique that aims to improve the production of wells by increasing the number and extending the reach of fluid pathways (i.e., fractures) between the

formation and the well by injecting fluid, typically water, at high pressure into low-permeability rocks. The fluid pressure fractures the rocks or stimulates slip across pre-existing faults or fractures. Increasing the fracture density and extent of the fracture network enhances fluid flow and allows for more distant fluids to be accessed by a well. In addition to fluid, a propping agent (e.g., sand) is injected to keep the newly formed fractures open. Following hydraulic fracturing, which takes a few hours to a few days, there is a period where the hydraulic fracturing fluid is allowed to flow back to the surface where it is collected for disposal, treatment or reuse.

16. After the hydraulic fracturing fluid flows back to the surface, the extraction of oil or gas from the wells begins. At first, vertical oil wells were hydraulically fractured to increase production. Then, in the 1990s, extended reach horizontal drilling technology was developed. This allowed drillers to steer wells more precisely so that they could remain within narrow horizontal and subhorizontal oil and gas reservoirs over great distances. This enabled production along the length of the well within the production formation. This technology, combined with hydraulic fracturing, unlocked gas and oil resources in tight formations (e.g., shales) and is largely responsible for the recent boom in gas and oil production in the United States.

Fracking Wastewater Disposal

17. Waste fluids are often a by-product of many oil and gas extraction operations. In many instances, they are unsuitable for other uses and must be disposed. When waste fluids are disposed, they are often injected deep underground into high-permeability formations, usually deeper than the production reservoirs, for permanent sequestration and isolation from oil or gas reservoirs and drinking-water aquifers. The wells in which these fluids are disposed are known as injection wells, wastewater wells or salt-water disposal wells.

18. The contents of wastewater vary. In some places, it is primarily spent hydraulic-fracturing fluid (e.g., Ohio and Arkansas), whereas in other locations, wastewater often consists mostly of formation brines that come to the surface at the same time as the oil and gas that is extracted. For instance, in Oklahoma, only 10% of the fluid injected into disposal wells is spent fluid that was initially used in hydraulic fracturing and cannot be reused.

Mechanism Of Induced Seismicity

19. According to the United States Geological Survey ("USGS"), fluid injection can induce earthquakes in four different ways: (1) the injection of fluids raises pore-fluid pressure within a fault, (2) the injection of fluids fills and compresses fluids within pore spaces causing deformation (poro-elastic effects), (3) the injection of fluid that is colder than the rock into which it is being injected causes thermoelastic deformation, and (4) the injected fluid adds mass to the injection formation. Observations and numerical modeling indicate that increased fluid pressure within faults most strongly influences whether an injection well will induce earthquakes.

20. Unfortunately, the injected fluids need not travel the entire distance from the injection well to a fault for the injection to affect the fault's behavior. Injection can affect a fault's behavior via the change in fluid pressure, which can be transmitted greater distances than fluids themselves. The increase in the fluid pressure that is initiated at the well is transmitted to the fault without the fluid traveling the full distance between the well and fault.

21. As fluid is injected into a reservoir, the fluid pressure within that reservoir rises. If this fluid pressure increase is transmitted to a fault, the increase in pore pressure counteracts the stresses holding the fault closed (the normal stress), resulting in a lower effective stress. With lower effective normal stress clamping a fault, the frictional resistance to slip is lower and the fault is more prone to slip.

Scientific Support For Causal Link Between Earthquakes and Fracking Wastewater Injection

22. In recent years, scientific studies have established a causal link between the injection of production wastes into the ground through high rate disposal wells and earthquakes in Oklahoma. According to the USGS, hydraulic fracturing, long-term wastewater injection, and enhanced oil recovery have all induced earthquakes in the United States and Canada in the past few years. Research has shown that wastewater disposal is responsible for the vast majority of the increase, including the largest and most-damaging induced earthquakes. Wastewater disposal is responsible for this change because of the duration of injection, the magnitude of the fluid pressure increase, and the size of the region affected by injection.

23. The recent increase in injection-induced seismicity is caused by a corresponding increase in wastewater disposal in the central United States. The earthquake rate increase in Oklahoma, where the vast majority of the increase has occurred (585 of 688 M $\geq$3 earthquakes in the central United States in 2014), corresponds to a doubling of the wastewater disposal rate in the state from 1999 to 2013. Focusing on the areas of increased seismicity within Oklahoma, we find that injection increased by factors of 5–10. Other areas of increased rates of induced earthquakes also experienced sudden increases in wastewater disposal.

24. A March 2013 study investigated the earthquakes in and around Prague, Oklahoma in 2011 and found a correlation between the injection wells operated by the Defendants and the earthquakes devastating the town in November of 2011. *See* Keranen, K.M., Savage, H.M., Abers, G.A., Cochran, E.S. 2013, *Potentially induced earthquakes in Oklahoma, USA: Links between wastewater injection and the 2011 M 5.7 earthquake sequence*, GEOLOGY, Mar. 25, 2013.

25. The U.S. Geological Survey also recently issued a statistical analysis showing the recent increase in Oklahoma's earthquakes are not the result of natural seismic changes. Instead, wastewater injection wells are the most likely culprit. The survey also warns that the rise in seismic activity has raised the chance of a damaging magnitude 5.5 or greater in the state. *See* Record Number of Oklahoma Tremors Raises Possibility of Damaging Earthquakes. USGS-Oklahoma Geological Survey Joint Statement on Oklahoma Earthquakes, Oct. 22, 2013; updated May 2, 2014.

26. On July 3, 2014, the journal Science published a scientific study showing a sharp increase in central Oklahoma seismicity since 2008. The study linked the earthquakes to wastewater injection operations in central Oklahoma. *See* Keranan, et al., *Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection*, SCIENCE Vol. 345, 448-451, 451 (July 3, 2014) ("Sharp Increase").

27. This phenomenon is not newly discovered. Well-known examples of water injection into wells causing earthquakes have occurred in Colorado, Texas, India, and China. *See*William L. Ellsworth, Injection-Induced Earthquakes, SCIENCE 341, (2013) *available at http://www.gwpc.org/sites/default/files/files/Earthquakes%20and%20fracking(2).pdf.* The Nemaha fault runs north-northwest between Oklahoma City and southern Kansas. Seismologists found that a magnitude 7 earthquake is possible along that fault. *See* Sharp Increase. Furthermore, they stated that "the increasing proximity of the earthquake swarm to the Nemaha fault presents a potential hazard to the Oklahoma City metropolitan area." *Id.*

28. The U.S. Geological Survey (USGS) and OGS have conducted research quantifying the changes in earthquake rate in the Oklahoma City region, assessing and evaluating possible links between these earthquakes and wastewater disposal related to oil and gas production

activities in the region. In a joint statement, the USGS and OGS identified wastewater injection as a contributing factor for the 2011 earthquake swarm and damaging magnitude 5.6 event.

29. In February 2015, the USGS found that "[l]arge areas of the U.S. that used to experience few or no earthquakes have, in recent years, experienced a remarkable increase in earthquake activity that has caused considerable public concern as well as damage to structures. This rise in seismic activity, especially in the central U.S., is not the result of natural processes." Significantly, the USGS also noted that "[d]eep injection of wastewater is the primary cause of the dramatic rise in detected earthquakes and the corresponding increase in seismic hazard in the central U.S."

30. In April 2015, an OGS report found that it is "very likely" that most of the dramatic increase in earthquakes in the state has been triggered by oil and gas companies injecting wastewater into deep underground disposal wells.

31. Recently, in a year-end review for 2014, EPA noted that many experts have concluded that a connection likely exists between disposal well location, injection volume and rates, and seismic activity. EPA Region 6 End of Year Review of UIC Program for 2014 (transmitted on Sept 29, 2015). EPA was concerned by the continued upward trend in earthquakes and recommended a reduction in the volumes of waste injected into the Arbuckle formation, which is the most critical stratum. *Id.* EPA further recommended more assessment and mapping of the Arbuckle formation and its connection to basement rock. *Id.*

32. Based on publicly available data, the causal link is inescapable. Before 2009, the maximum number of earthquakes measured in a given year in Oklahoma was 195 in 1995. By 2014, the number of measured earthquakes soared to over 5,000, and in 2015, the number of earthquakes was over 6,000. The number of earthquakes that residents can feel has shown an even

greater rate of increase. In 2014, Oklahoma had 585 earthquakes of magnitude-3 or greater compared to 109 magnitude-3 quakes in 2013. *See* Trevor Hughes, *'Swarms' of earthquakes strike Oklahoma*, USA Today, Mar. 5, 2015, *available at* http://www.usatoday.com/story/news/2015/03/05/oklahoma-quakes-fracking-oil-gas/24444581/. Since late 2009, the rate of magnitude-3 or larger earthquakes in north-central Oklahoma has been nearly 300 times higher than in previous decades. *See* Doyle Rice, *'Reawakened' faults could trigger big Okla. Earthquakes*, USA Today, Mar. 19, 2015, *available at* http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-faultlines/24702741/. Of course, earthquakes do not respect state boundaries. The earthquake swarm in central and northern Oklahoma also extends to southern Kansas. *See, e.g.,* McNamara et al, Earthquake hypocenters …., Geophysical Research Letters (Jan. 27, 2015) ("Future Hazards") at Figure 2.

33. As discussed in a recent study, "this seismicity appears to be associated with increases in saltwater disposal that originates as 'flow-back' water after multistage hydraulic fracturing operations." F. Rall Walsh III* and Mark D. Zoback, *Oklahoma's recent earthquakes and saltwater disposal*, SCIENCE ADVANCES, 18 June 2015 available at http://advances.sciencemag.org/content/1/5/e1500195.full ("Disposal Study").

34. Importantly, as mentioned above, the risk is not only the more frequent occurrence of earthquakes, but also that those earthquakes will continue to be more severe. USGS scientists warn that the smaller earthquakes induced by the injection of production wastes are reawakening long-dormant, 300-million-year-old fault lines across Oklahoma. The faults could trigger much higher-magnitude, and consequently more destructive, earthquakes than the smaller ones that have plagued the state in recent years. *See* Doyle Rice, *'Reawakened' faults could trigger big Okla.*

Earthquakes, USA Today, Mar. 19, 2015, *available at* http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-faultlines/24702741/. According to USGS scientists, these reawakened faults in central Oklahoma could produce earthquakes as powerful as magnitude-5 and 6. *Id.* A USGS geologist stated "Many faults are reactivating, with as many as 17 magnitude-4 earthquakes in 2014." *Id.*

35. The Oklahoma Geological Survey ("OGS") determined in the spring of 2015 that "the majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells" and that "seismologists have documented the relationship between wastewater disposal and triggered seismic activity." http://earthquakes.ok.gov/what-we-know/ (visited on October 9, 2015).

36. The USGS fully supports this conclusion. For example, an article in *The New Yorker* recently quoted USGS geologist William Ellsworth in reporting that "[d]isposal wells trigger earthquakes when they are dug too deep, near or into basement rock, or when the wells impinge on a fault line. Ellsworth said, 'Scientifically, it's really quite clear.'" Rivka Galchen, *Weather Underground*, The New Yorker, Apr. 13, 2015 *available at* http://www.newyorker.com/magazine/2015/04/13/weather-underground.

37. Recently, two earthquakes of greater-than-magnitude-4 occurred on the same day; further evidencing the higher frequency of more serious earthquakes in the areas of concern. A magnitude 4.4 earthquake hit northern Oklahoma on October 10, 2015, which a USGS seismologist said "had all the hallmarks of an induced quake" and "seem[ed] to be part of an ongoing swarm of induced quakes in the area." *Oklahoma Earthquake likely caused by wastewater injection, seismologist says*, The Guardian, Oct. 10, 2015, *available at*

http://www.theguardian.com/us-news/2015/oct/10/oklahoma-earthquake-fracking-us-geological-survey.

38. On the same day, a magnitude 4.5 earthquake hit near the major oil storage area of Cushing, roughly midway between Oklahoma City and Tulsa. *See* Michael Wines, *New Concern Over Quakes in Oklahoma Near a Hub of U.S. Oil*, The New York Times, Oct. 14, 2015 *available at* http://www.nytimes.com/2015/10/15/us/new-concern-over-quakes-in-oklahoma-near-a-hub-of-us-oil.html. Cushing is the location of the world's largest and most important crude oil storage hub. Scientists reported, in a paper published online in September 2015, that a large earthquake near the storage hub "could seriously damage storage tanks and pipelines." Dr. McNamara, the lead author of that study, stated that the recent earthquake continued a worrisome pattern of moderate quakes, suggesting that a large earthquake is more than a passing concern. "When we see these fault systems producing multiple magnitude 4s, we start to get concerned that it could knock into higher magnitudes," he said. "Given the number of magnitude 4s here, it's a high concern." *Id.*

39. The Cushing oil hub stores oil piped from across North America until it is dispatched to refineries. *Id.* The New York Times reports that as of last week, it held 53 million barrels of crude. *Id.* The earth beneath the tanks was comparatively stable until last October, when magnitude 4 and 4.3 earthquakes struck nearby. *Id.* At least three more earthquakes with magnitudes 4 and over have occurred within a few miles of the tanks since then. *Id.* The Department of Homeland Security has concluded that a quake equivalent to the record magnitude 5.7 could significantly damage the tanks. *Id.* Dr. McNamara's study concluded that recent earthquakes have increased stresses along two stretches of fault that could lead to earthquakes of that size. *Id.*

40. USGS scientists have also said that a magnitude 7 quake cannot be ruled out. *U.S. Maps pinpoint earthquakes*, The New York Times, Apr. 23, 2015, *available at* http://www.nytimes.com/2015/04/24/us/us-maps-areas-of-increased-earthquakes-from-human-activity.html.

41. The Future Hazards study confirms that more severe earthquakes are likely as a result of ongoing injection of production wastes into the ground through high-rate disposal wells. It states that earthquake clusters associated with long fault structures could give rise to magnitude 5 to 6 earthquakes. Examples include earthquakes associated with the Nemaha fault near Jones, in the Medford and Stillwater regions, and between Langston and Guthrie. Another example is the area around Cushing. The paper concludes that the increased seismicity poses an elevated hazard to infrastructure and the regional population. According a recent paper, the Cushing area earthquakes are associated with reactivated faults that cut into the Arbuckle formation and a subsidiary fault called the Wilzetta-Whitehall. McNamara et al., McNamara, D., at al., *Efforts to monitor and characterize the recent increasing seismicity in central Oklahoma*, THE LEADING EDGE June 2015 *available at* https://profile.usgs.gov/myscience/upload_folder/ci2015Jun0413582855600McNamaraTLE.pdf. That paper notes that most of the earthquakes do not lie along known fault structures, but there may be other fault structures that are being reawakened by the injection that are associated with these earthquakes. *Id* The most recent paper notes that earthquake activity in this area has been above forecast and that "[i]nclusion of all recent Oklahoma earthquakes in the NSHM [hazard model] significantly increases ground shaking estimates and earthquake hazard . . ., which would result in serious implications for infrastructure design standards. McNamara et al., *Reactivated faulting near Cushing, Oklahoma: Increased potential for a triggered earthquake in an area of United States strategic infrastructure*,

GEOPHYSICAL RESEARCH LETTERS (October 23. 2015) available at http://onlinelibrary.wiley.com/doi/10.1002/2015GL064669/pdf.

42. Thus, the injection of large volumes of production wastes into the ground in Oklahoma is causing large numbers of moderate strength earthquakes.

43. In spite of these scientific studies, the oil and gas industry insists that Oklahoma has naturally occurring seismicity, that their operations are not causing the earthquakes, and that recent reports linking injection well operations to Oklahoma quakes are not based upon good science.

Defendants' Tortious Conduct

44. Defendants operate wastewater injection wells in and around Plaintiffs' home. These injection wells have caused the earthquakes affecting Plaintiffs' home, and proximately caused damages to Plaintiffs.

45. Since 2009, Defendants have injected huge amounts of production wastes via disposal wells. The total volume of production wastes injected has gone from 2 billion ("bn") barrels in 2009 to over 12 bn barrels in 2014. Focusing on the Arbuckle formation alone, which is the geologic stratum in which most of the earthquakes originate and in which large volume disposal wells discharge, Defendants account for over 60% of the total volume of production wastes injected in 2014.

46. Overlaying the locations of Defendants' wells onto the places where earthquakes above magnitude 3.5 have been felt shows that earthquakes are occurring in the vicinity of Defendants' wells and along faults that are close to the wells. As more injection has occurred in the central and northern areas of Oklahoma, more and more earthquakes have occurred in those areas. *Id.* While not all wells cause earthquakes, studies have found that most high volume disposal

wells are linked to earthquakes: "Even though quake-associated wells were only 10 percent of those studied, more than 60 percent of the high-rate wells — 12 million gallons or more — were linked to nearby earthquakes" and "of the 45 wells that pump the most saltwater [waste] at the fastest rate, 34 of them — more than three out of four — were linked to nearby quakes." http://www.nytimes.com/aponline/2015/06/18/science/ap-us-sci-manmade-quakes.html?smprod=nytcore-ipad&smid=nytcore-ipad-share&_r=0.

47. The Disposal Study confirms that "the significant increases in SWD [Production Waste disposal] increase pore pressure in the Arbuckle Group, which spreads out away from the injection wells with time, eventually triggering slip on critically stressed faults in the basement." It also confirms that "[i]njection of large volumes of saltwater into the Arbuckle group appears to be triggering the release of already stored strain energy in crystalline basement."

48. Thus, scientific studies support that injection of production wastes induces earthquakes and that Defendants' injection of production wastes is causing the earthquakes that have impacted Plaintiffs.

Defendants Have Disposed of Production Wastes That Caused Earthquakes or Contributed To Their Occurrence and Are Continuing to Do So

49. Defendants have been disposing of high volumes of production wastes into the ground since at least 2009.

50. As demonstrated in the Figures attached to this Petition, Defendants increased their wastewater disposal activities from 2009 to 2014 by about seven fold (Figures 3 and 5). Moreover, much of their injection disposal is done within the Arbuckle Formation (Figure 4). As found by every scientist studying this issue, there is a direct correlation between Defendants' wastewater injection disposal operations and the earthquakes shaking Oklahoma.

51. Thus, Defendants have contributed and are contributing to the past and present handling, storage, and disposal of production wastes, which is causing earthquakes in Oklahoma that have damaged Plaintiffs.

CAUSES OF ACTION

Count I – Private Nuisance

52. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporate each such paragraph as though set forth here in full.

53. Defendants' conduct constitutes a private nuisance.

54. Plaintiffs have property rights and are privileged regarding the use and enjoyment of their home and land. Defendants' actions and operations as described above have unlawfully and unreasonably interfered with those rights and privileges.

55. Plaintiffs have suffered harm and damages because of Defendants' creation of a nuisance, including:

(a) Damages to the personal and real property of Plaintiffs;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on her property caused by Defendants' nuisance;

(d) Loss of peace of mind; and

(e) Diminution of property value.

Count II – Ultra-hazardous Activities

56. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporate each such paragraph as though set forth here in full.

57. Defendants' actions described above constitute ultra-hazardous activities that involve a high degree of some risk of serious harm to a person or the chattels of others, the risk cannot be eliminated by exercising the utmost care, and is not a matter of common usage.

58. As a direct and proximate result of Defendants' ultra-hazardous activities, Plaintiffs have sustained damages, which are the direct and proximate result of Defendants' ultra-hazardous or abnormally dangerous activities, to which Defendants are strictly liable, including:

(a) Damages to the personal and real property of Plaintiffs;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on her property caused by Defendants' ultra-hazardous activities;

(d) Loss of peace of mind; and

(e) Diminution of property value.

Count III - Negligence

59. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporate each such paragraph as though set forth here in full.

60. Defendants owed a duty to Plaintiffs to use ordinary care and not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity. Defendants, experienced in these operations, knew or should have known of the connection between injection wells and seismic activity, and acted in disregard of these facts.

61. Defendants breached their duty to Plaintiffs to use ordinary care and not to operate or maintain their injection wells in such a way to cause or contribute to seismic activity.

62. As a direct and proximate result of these acts, omissions, and fault of the Defendants, the Plaintiffs have suffered damages and injuries reasonably foreseeable to the Defendants, including:

(a) Damages to the personal and real property of Plaintiffs;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on her property caused by Defendants' negligence;

(d) Loss of peace of mind; and

(e) Diminution of property value.

Count IV - Trespass

63. Plaintiffs reallege each of the preceding paragraphs, and by this reference incorporate each such paragraph as though set forth here in full.

64. Plaintiffs are and have been lawfully entitled to possession of their property.

65. Defendants, without the permission or consent of Plaintiffs and without legal right, intentionally engaged in activities that resulted in concussions or vibrations entering Plaintiffs' property. Such unauthorized invasion of Plaintiffs' property interests constitutes a trespass.

66. Because of Defendants' trespass, Plaintiffs have suffered damages, including:

(a) Damages to personal and real property of Plaintiffs;

(b) Interference with the use and enjoyment of property;

(c) Annoyance, discomfort and inconvenience on her property caused by Defendants' trespass;

(d) Loss of peace of mind; and

(e) Diminution of property value.

PUNITIVE DAMAGES

67. Defendants' actions, in knowingly causing seismic activity because of their injection well operations, constitute wanton or reckless disregard for public or private safety, and thus, subject to a claim for punitive damages, for which Plaintiffs seek an amount sufficient to punish the Defendants and to deter them and others similarly situated from such conduct in the future.

DEMAND FOR JURY TRIAL

68. Plaintiffs respectfully demand a trial by jury.

PRAYER FOR RELIEF

WHEREFORE, Plaintiffs pray that this Court enter a joint and several judgment against Defendants and in favor of Plaintiffs, awarding Plaintiffs the following relief:

i. Compensatory damages according to proof;

ii. Punitive damages;

iii. Awarding attorneys' fees, expenses, and costs;

iv. Pre-judgment and post-judgment interest; and

v. All other relief to which Plaintiffs are entitled or that the Court deems just and proper.

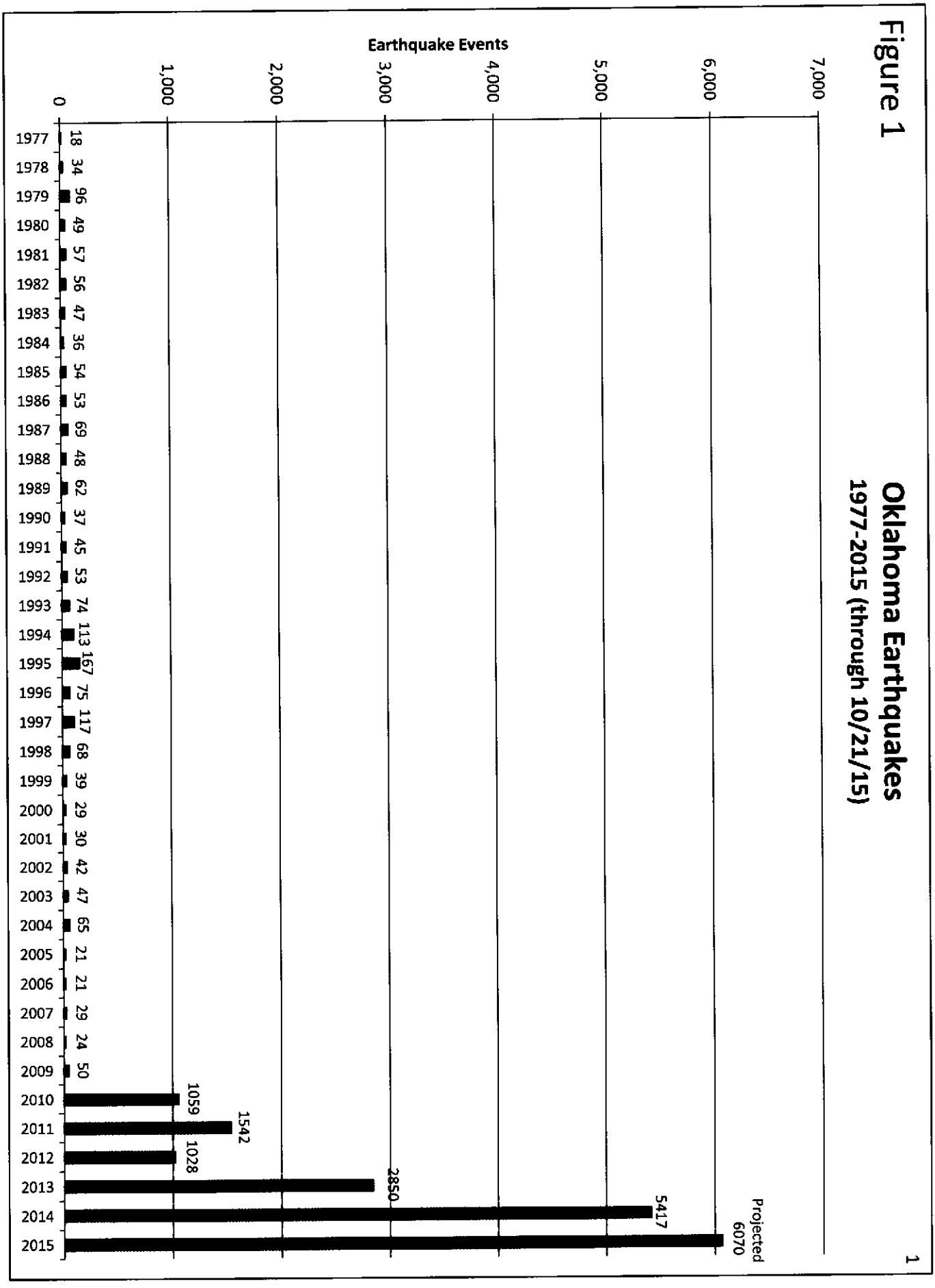
DATED: February 12, 2016

Respectfully Submitted,

William B. Federman
wbf@federmanlaw.com
FEDERMAN & SHERWOOD
10205 North Pennsylvania Ave.
Oklahoma City, OK 73120
(405) 235-1560

Attorney for Plaintiffs

Figure 1



Source: Oklahoma Geological Survey

Projection based on average of 16.63 events/day as of 10/21/15

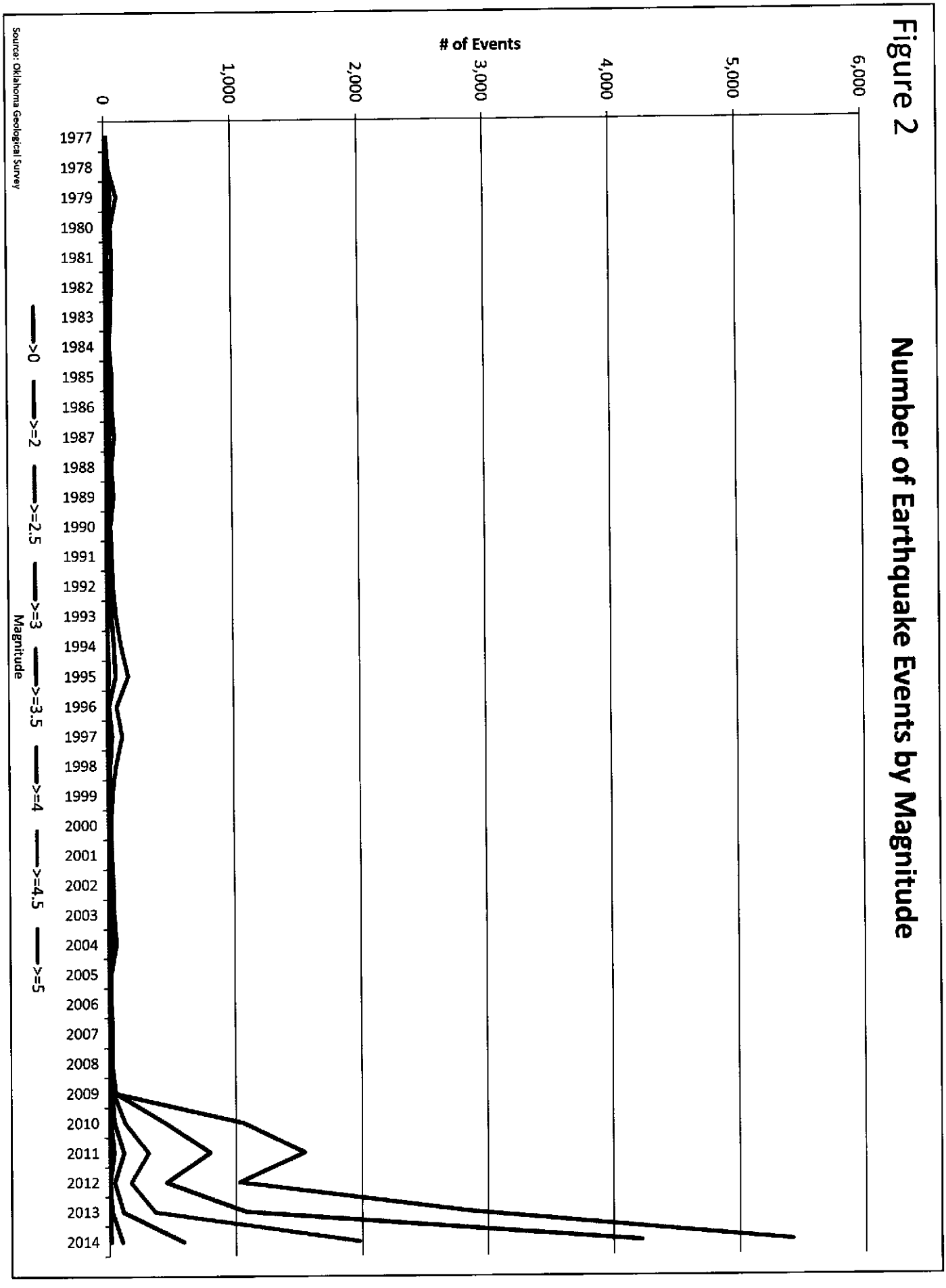


Figure 2
Number of Earthquake Events by Magnitude
# of Events
0
1,000
2,000
3,000
4,000
5,000
6,000
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
Source: Oklahoma Geological Survey
Magnitude
>0
>=2
>=2.5
>=3
>=3.5
>=4
>=4.5
>=5

Figure 3

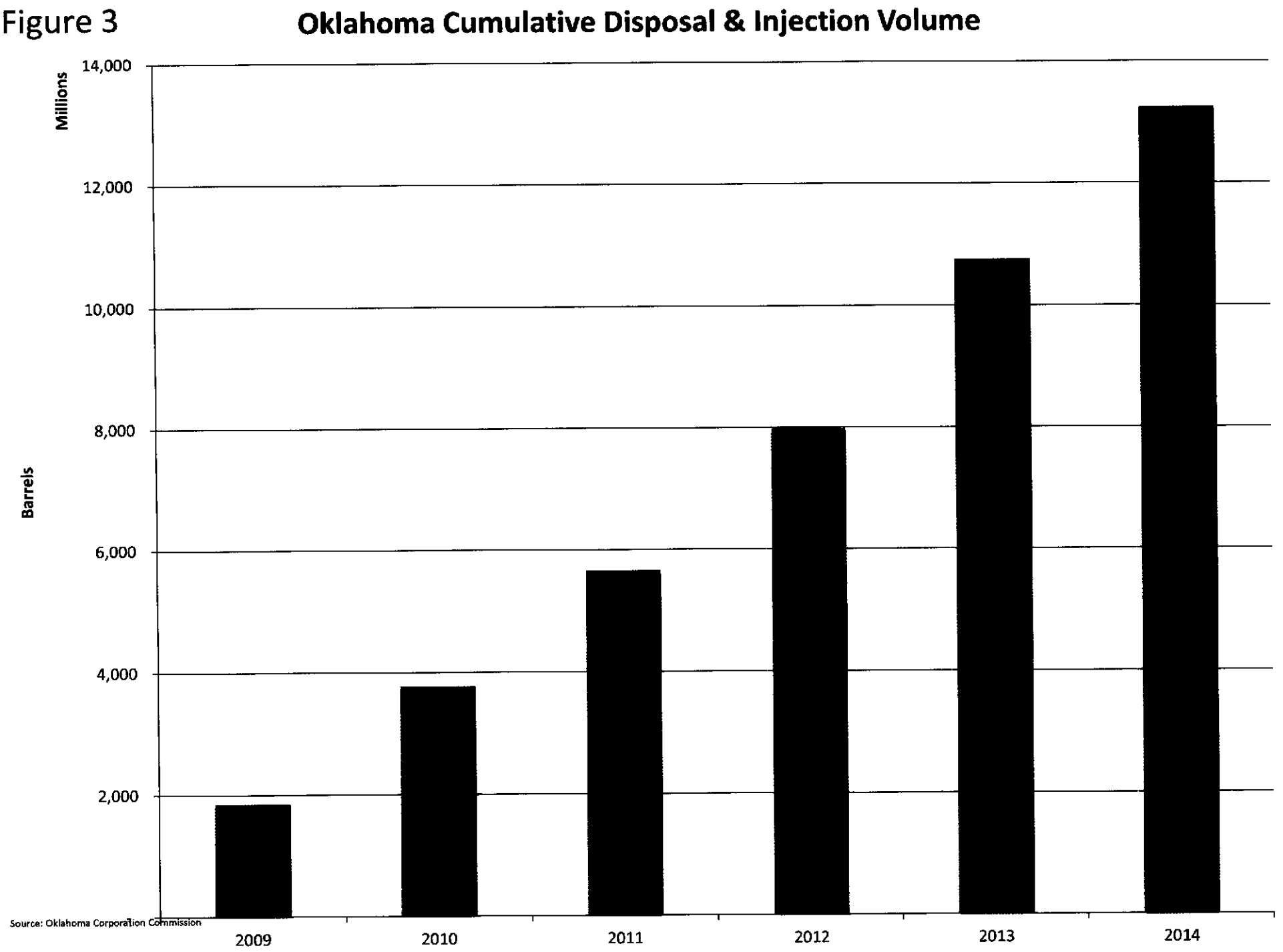
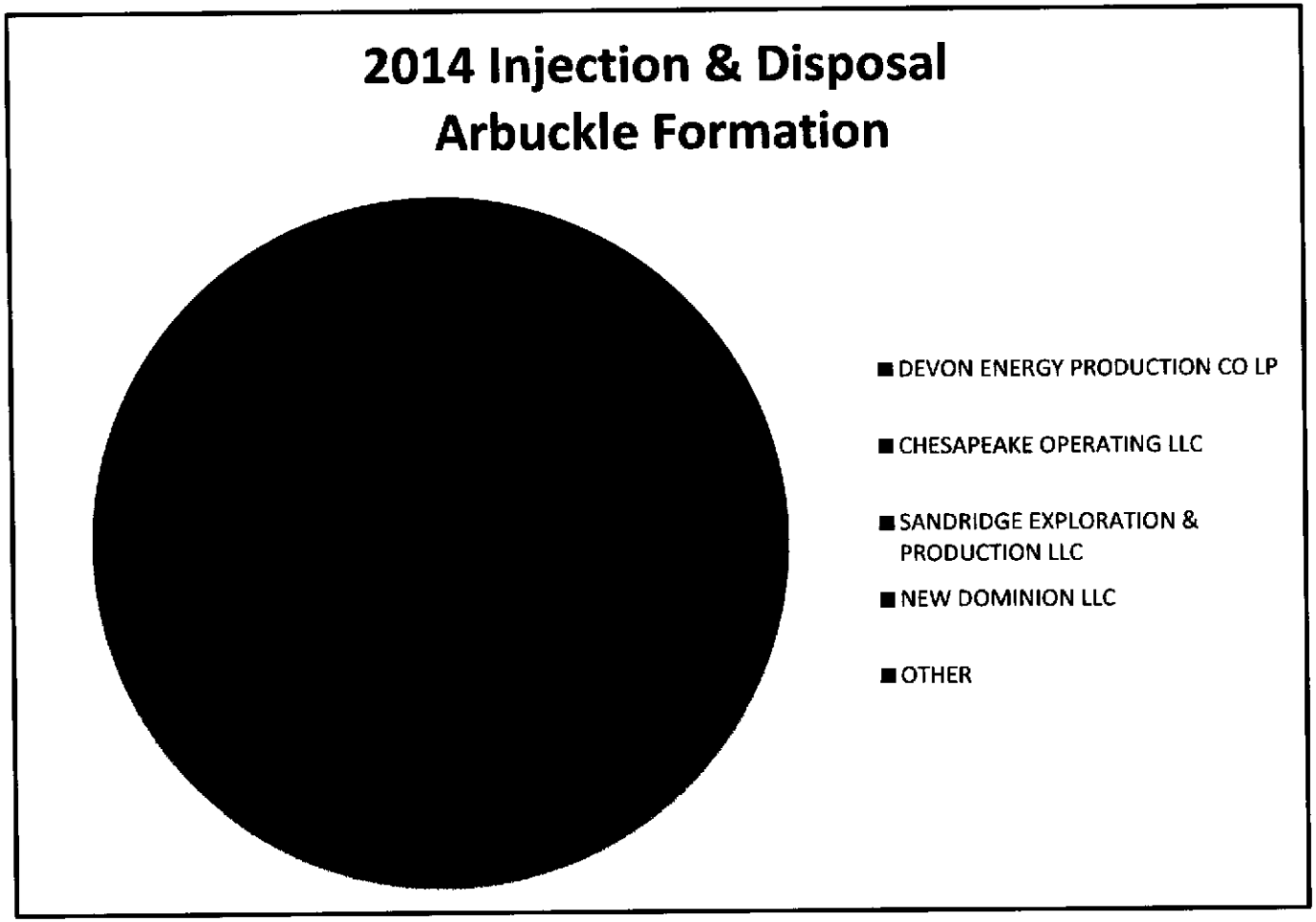

Oklahoma Cumulative Disposal & Injection Volume
Millions
Barrels
14,000
12,000
10,000
8,000
6,000
4,000
2,000
2009
2010
2011
2012
2013
2014
Source: Oklahoma Corporation Commission

Figure 4



Operator	Injection Volume (bbls)
DEVON ENERGY PRODUCTION CO LP	64,555,296
CHESAPEAKE OPERATING LLC	73,885,836
SANDRIDGE EXPLORATION & PRODUCTION LLC	201,767,276
NEW DOMINION LLC	72,081,172
OTHER	261,551,899
TOTAL	**673,841,479**

Operator	# of Wells
DEVON ENERGY PRODUCTION CO LP	36
CHESAPEAKE OPERATING LLC	14
SANDRIDGE EXPLORATION & PRODUCTION LLC	91
NEW DOMINION LLC	6
OTHER	258

Source: Oklahoma Corporation Commission

Figure 5

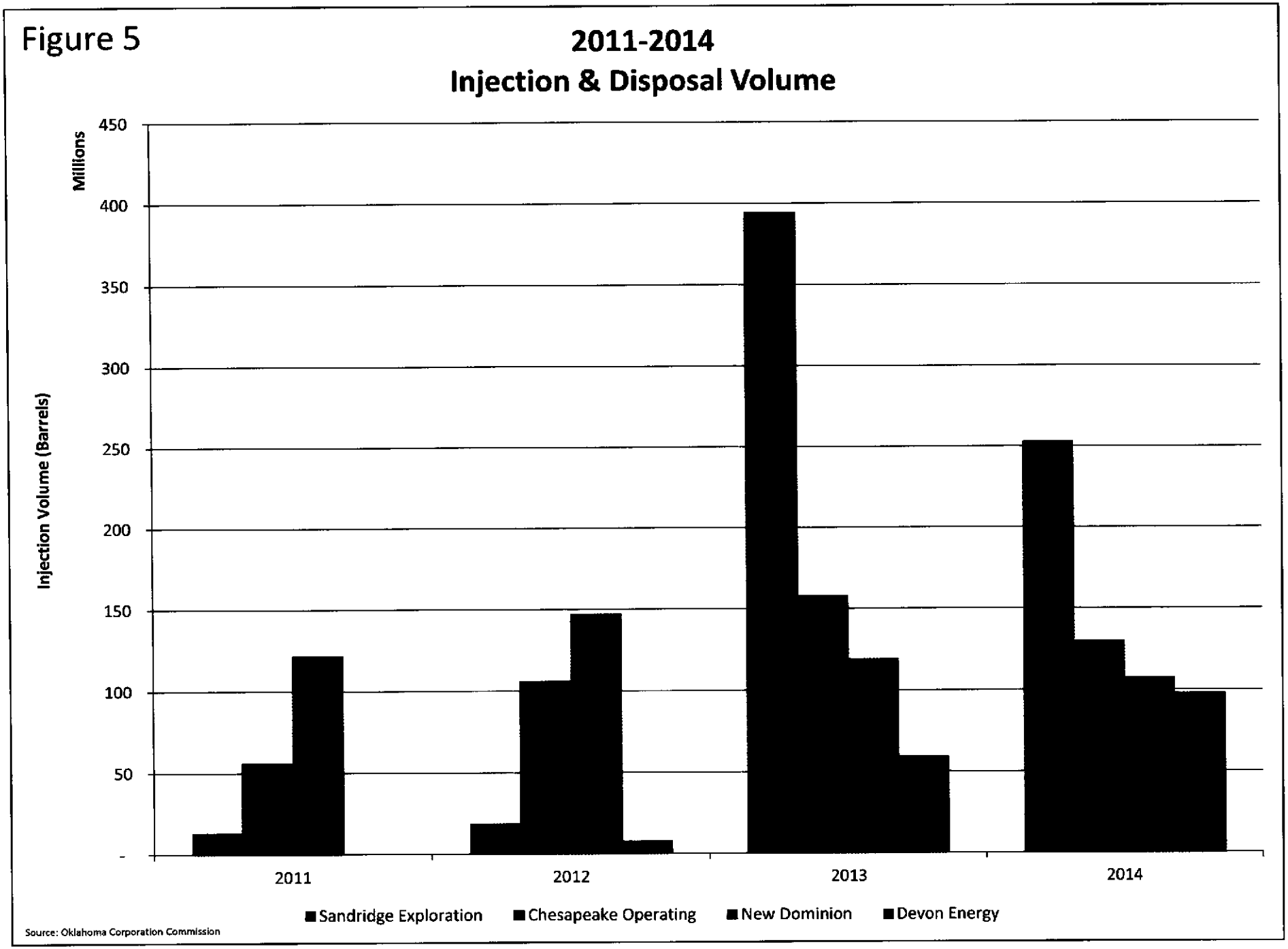

2011-2014
Injection & Disposal Volume
Millions
Injection Volume (Barrels)
450
400
350
300
250
200
150
100
50
-
2011
2012
2013
2014
Sandridge Exploration
Chesapeake Operating
New Dominion
Devon Energy
Source: Oklahoma Corporation Commission

Figure 6

2011-2014 Cumulative Injection & Disposal
New Dominion, Sandridge Exploration, Chesapake Operating, Devon Energy

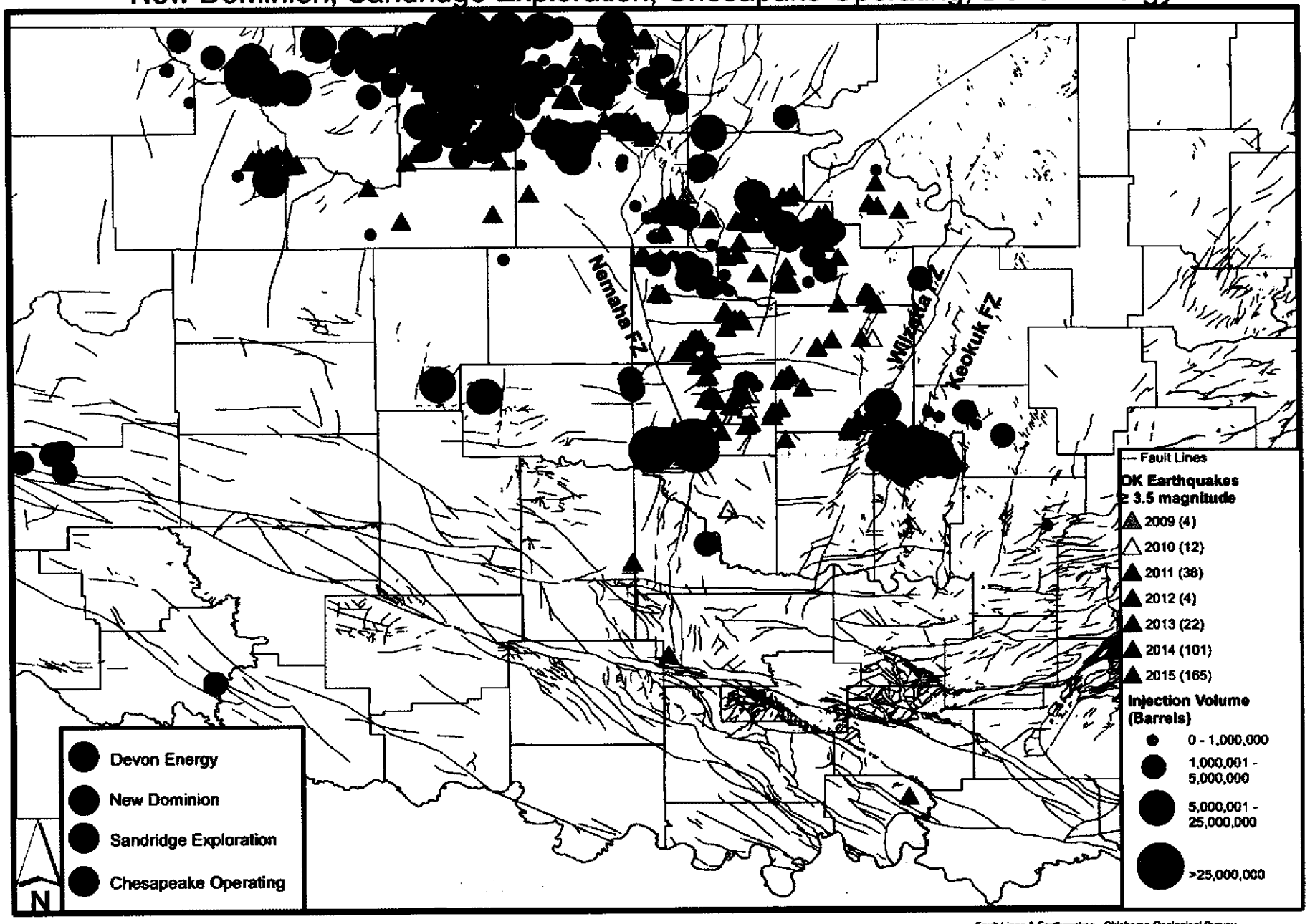


Figure 7

2011 Injection & Disposal

New Dominion, Sandridge Exploration, Chesapeake Operating

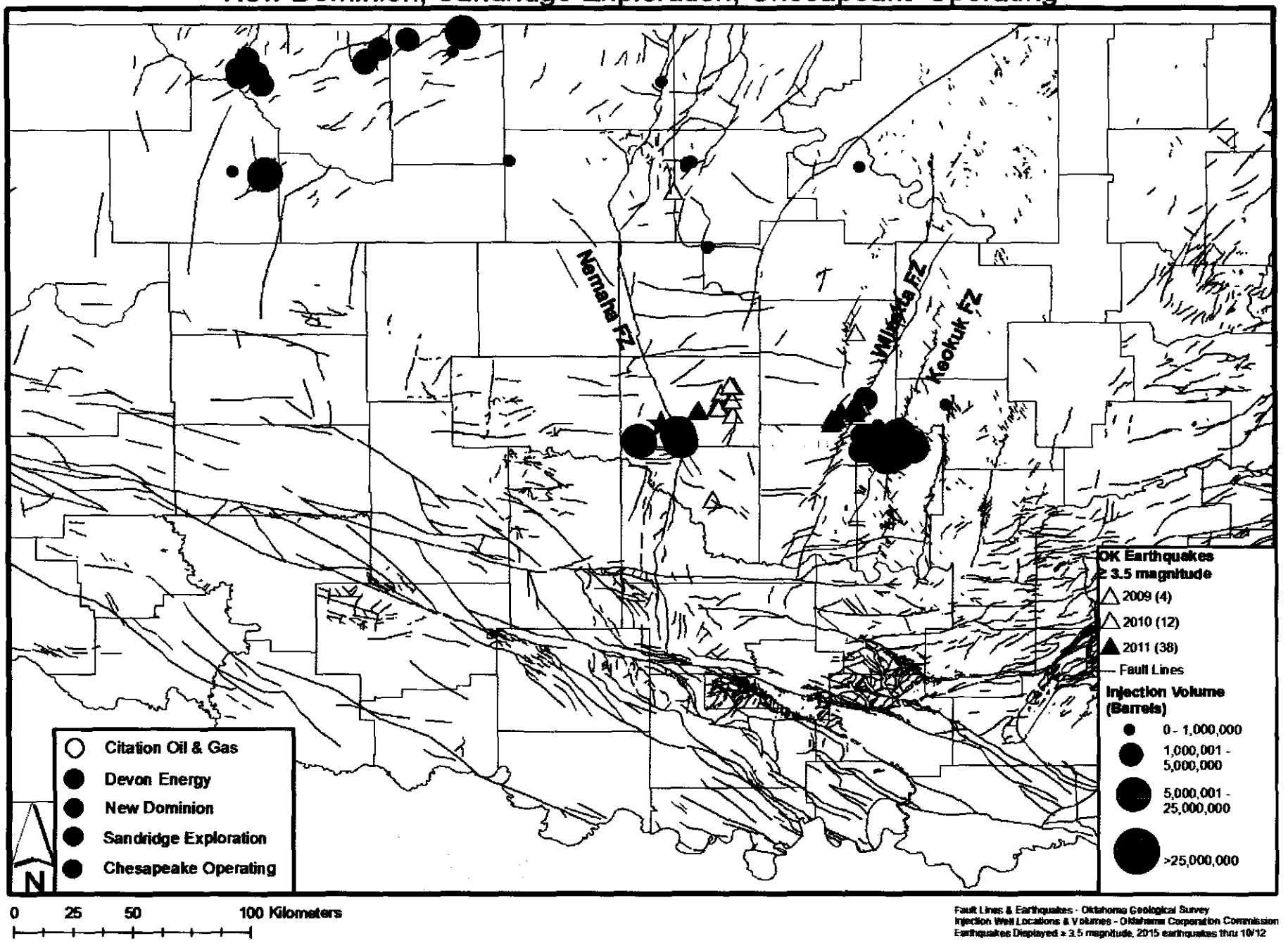
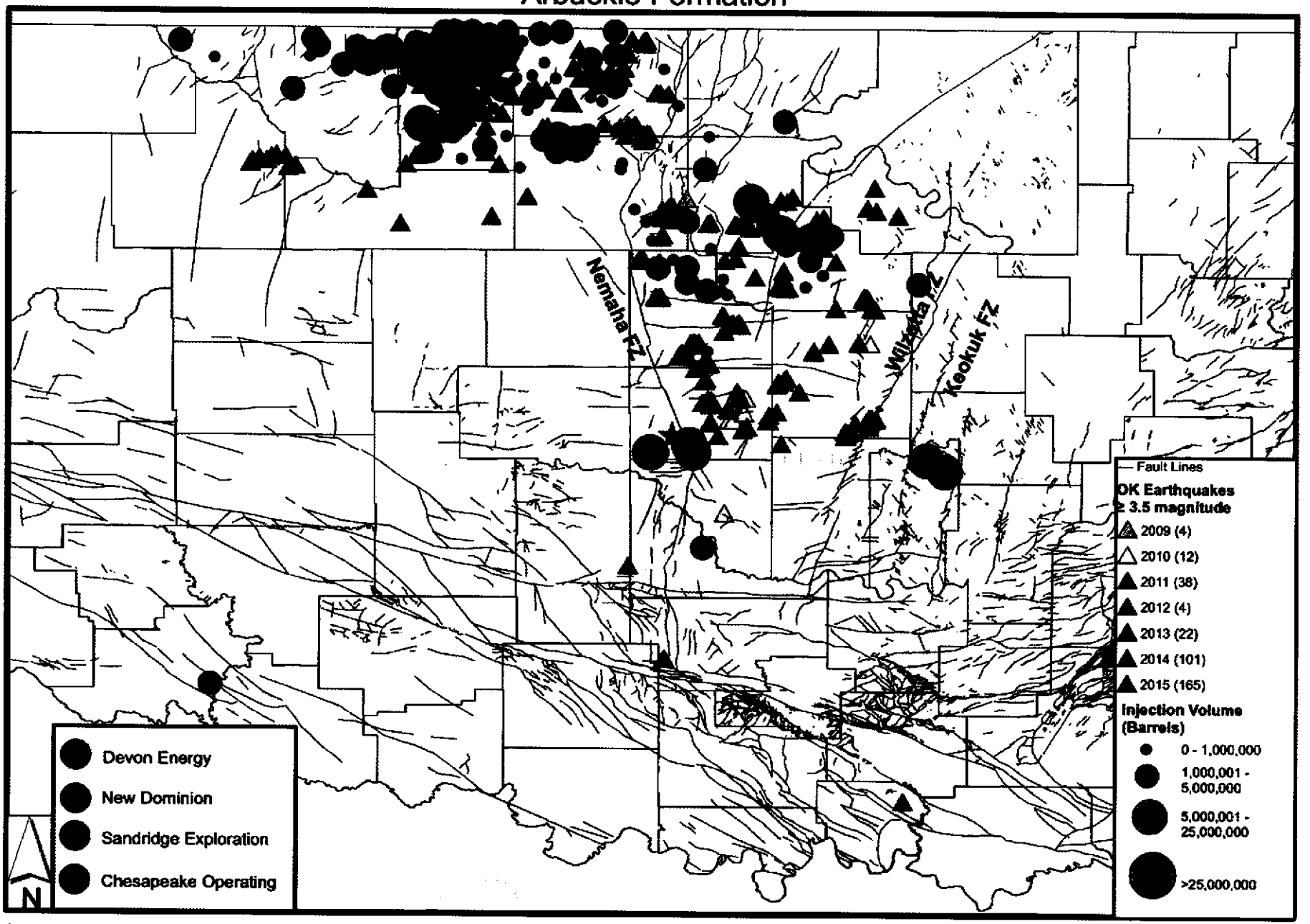


Figure 8

2014 Injection & Disposal Volume
Arbuckle Formation



UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF OKLAHOMA

SIERRA CLUB, Plaintiff, v. CHESAPEAKE OPERATING LLC; DEVON ENERGY PRODUCTION CO. LP; and NEW DOMINION, LLC, Defendants.	Civil Case No. CIV-16-134-F COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF UNDER 42 U.S.C. § 6972(a)(1)(B)

COMPLAINT FOR DECLARATORY AND INJUNCTIVE RELIEF

Plaintiff Sierra Club, through the undersigned counsel, for its complaint against Defendants Chesapeake Operating LLC, Devon Energy Production Co. LP, and New Dominion, LLC (collectively, "Defendants"), alleges as follows:

INTRODUCTION

1. This is a civil action for declaratory and injunctive relief, and costs and fees, under the citizen suit provision of the Solid Waste Disposal Act, amended as the Resource Conservation and Recovery Act, 42 U.S.C. § 6901, *et seq.* ("RCRA"), specifically section 7002(a)(1)(B) of RCRA, 42 U.S.C. § 6972(a)(1)(B). This action is brought to enforce significant and ongoing violations of RCRA, Section 7002(a)(1)(B), that are placing people and the environment in Oklahoma and Kansas at significant and immediate risk from major man-made earthquakes induced by Defendants' waste disposal practices.

2. As detailed below, Defendants generate, handle, transport, and dispose of large volumes of liquid wastes from oil and gas extraction activities ("Production Wastes"). They

dispose of these wastes by injecting them into wells drilled deep into the ground. Defendants have contributed and continue to contribute to the increased seismicity triggered by the waste handling, transport, and disposal activities at the injection wells owned or operated by the Defendants throughout the State of Oklahoma and southern Kansas. The earthquakes induced by these waste management activities may, and in fact, do, present an imminent and substantial endangerment to health and the environment in violation of RCRA Section 7002(a)(1)(B), 42 U.S.C. § 6972(a)(1)(B).

3. As shown on Figure 1 attached to this complaint, the number of earthquakes in Oklahoma has increased more than 300 fold, from a maximum of 167 before 2009 to 5,838 in 2015. As the number of earthquakes has increased, so has their severity. For example, the number of magnitude 3.5 earthquakes has increased fifty fold from 4 in 2009 to 220 in 2015. *See* Figure 2. These waste-induced earthquakes have toppled historic towers, caused parts of houses to fall and injure people, cracked basements, and shattered nerves, as people fear there could be worse to come.

4. A large number of earthquakes is an indication that more severe earthquakes are likely. According to the Gutenberg-Richter Relation, a series of small earthquakes suggests that a larger one may take place in the same area. As a result of the large number of earthquakes in the area, seismologists have stated that a magnitude 7 quake is possible along the Nemaha fault. *See* Figure 6. Such a quake could cause devastating harm. Further illustrating this risk, a 5.1 earthquake shook northwest Oklahoma on February 13, 2106, two days ago. *E.g.* http://www.cbsnews.com/news/5-1-magnitude-earthquake-among-several-to-shake-oklahoma/

5. To reduce this substantial risk of harm from waste-induced earthquakes, Plaintiff seeks an Order requiring Defendants to reduce immediately and substantially the amounts of Production Wastes they are injecting into the ground to levels that seismologists believe will not cause or contribute to increased earthquake frequency and severity. At a minimum, the current rates of injection, particularly into the Arbuckle Formation, a layer of rock just above the basement rock in which the earthquakes originate, must be substantially reduced in order to abate the currently unacceptable earthquake risks.

6. Because a reduction in injection volumes would take some time to result in a reduction in earthquakes, Plaintiff also seeks an Order requiring Defendants to reinforce vulnerable structures that current forecasts indicate could be impacted by large magnitude earthquakes during the interim period.

7. Because no government body is currently taking a holistic or proactive view of waste injection and its potential to induce earthquakes, Plaintiff further seeks an Order requiring the establishment of an independent earthquake monitoring and prediction center to determine the amount of Production Wastes which may be injected into a specific well or formation before induced seismicity occurs. Additionally, the center would be responsible for tracking the degree to which the ongoing earthquakes conform to researchers' predictions, which would necessitate further investigation and characterization of the underlying rock formations, including the Arbuckle.

8. Finally, Plaintiff requests that the Court award Plaintiff reasonable attorneys' fees, expert witness fees, and costs incurred in bringing this action, and any further relief it deems appropriate.

JURISDICTION

9. This Court has jurisdiction over the claims set forth in this complaint under Section 7002(a) of RCRA, 42 U.S.C. § 6972(a), under 28 U.S.C. § 1331, the federal question statute, and the Declaratory Judgment Act, 28 U.S.C. § 2201 *et seq.*

10. This Court has jurisdiction over each of the Defendants in that each of them have purposely availed themselves of Oklahoma laws by, among other things, seeking permits for injection wells and drilling and operating such wells within the district of this court. Defendants Chesapeake Operating, LLC, and Devon Energy Production Co., LP have corporate headquarters and principal places of business located in Oklahoma City. Defendant New Dominion, LLC has significant drilling and operating activities and maintains offices and employees in this district. All of the Defendants operate wastewater injection wells within the district of this Court which have caused and contributed to, and continue to cause and contribute to, the damages suffered by Plaintiff.

11. Section 7002(a)(1)(B) of RCRA, 42 U.S.C. § 6972(a)(1)(B), allows citizens to bring suit in order to stop an "imminent and substantial endangerment to health or the environment." It provides that any person may commence an action against "any person [. . .] including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility, who has contributed or is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment[.]"

12. On October 29, 2015, Plaintiff gave notice of the violations and its intent to file suit to the Defendants, the Defendants' registered agents, United States Attorney General, United States Environmental Protection Agency ("EPA"), EPA Region VI, Oklahoma

Department of Environmental Quality, and the Oklahoma Corporation Commission, as required by Section 7002(a) of RCRA, 42 U.S.C. § 6972(a). The registered mail receipts show the notice letter was received by Defendants and other entities to whom the letter was sent on or before November 5, 2015. Plaintiff's notice letter is attached as Exhibit A and is incorporated by reference herein.

13. More than ninety days have passed since Plaintiff provided its notice of intent to file suit to Defendants and others.

14. The endangerment complained of in the notice is continuing at this time or is reasonably likely to continue, because Defendants have failed to take corrective actions sufficient to abate the endangerment conditions.

15. Neither the EPA nor the State of Oklahoma have commenced or are diligently prosecuting a civil or criminal action in a state or federal court to abate the imminent and substantial endangerment to health and the environment alleged in Plaintiff's notice of intent letter. Nor is the EPA, under the Comprehensive Environmental Response, Compensation and Liability Act, engaged in any of the actions described in 42 U.S.C. 6972(b)(2)(B) with respect to the conditions described herein.

VENUE

16. Venue is properly vested in this Court under Section 7002(a) of RCRA, 42 U.S.C. § 6972(a), because the Defendants own or operate within this district injection wells and related facilities for the handling, storage, treatment, transportation, or disposal of waste fluids from oil extraction and hydraulic fracturing ("fracking") activities industries and the alleged endangerment occurred and continues to occur within this district.

PLAINTIFF

17. Plaintiff Sierra Club is a California non-profit organization and has its principal place of business at 85 Second Street, 2nd Floor, San Francisco, California 94105.

18. The Sierra Club has a chapter within the State of Oklahoma, the Oklahoma Sierra Club, with its principal place of business at 600 NW 23rd Street, Suite 204, Oklahoma City, Oklahoma 73103.

19. In addition, the Sierra Club has a chapter within the State of Kansas, the Kansas Chapter of the Sierra Club, with its principal place of business at 9844 Georgia Avenue, Kansas City, Kansas 66109, which includes the Southwind Group, covering southern Kansas, based in Wichita, Kansas.

20. The Sierra Club is America's oldest and largest grassroots environmental organization. Sierra Club has more than 2 million members and supporters, with over 3,000 members within the State of Oklahoma and over 4,000 members within the State of Kansas. Founded in 1892, the Sierra Club has been working for well over a century to protect communities, wild places, and the planet itself. The Sierra Club is dedicated to exploring, enjoying, and protecting the wild places of the Earth; to practicing and promoting the responsible use of the Earth's resources and ecosystems; to educating and enlisting humanity to protect and restore the quality of the natural and human environment; and to using all lawful means to carry out these objectives. The Sierra Club's concerns encompass the exploration, enjoyment, and protection of the lands and waters of Oklahoma.

21. At least 10 of Sierra Club's members that are affected by the endangerment are prepared to be standing witnesses. These members have already experienced concrete harms from the earthquakes, such as cracking of the walls of their homes. In addition, the waste induced earthquakes detract from their enjoyment of their homes and the surrounding

environment. Furthermore, they have a reasonable fear that if effective action is not taken to stem the earthquake swarm, their homes and their environment could suffer far more damage that could be catastrophic.

22. Plaintiff was and is a "person" within the meaning of Section 1004(15) of RCRA, 42 U.S.C. § 6903(15). Plaintiff has standing because its members are being harmed by Defendants' waste management activities, the relief requested would redress these harms, and the interests Plaintiff seeks to protect are germane to the organization's purpose.

23. Neither the claims asserted in this Complaint, nor the relief requested, require the participation of the individual members of the organizations in this lawsuit.

DEFENDANTS

24. Defendant Chesapeake Operating, LLC ("Chesapeake") is a corporation existing and operating under the laws of the State of Oklahoma that does business within the State of Oklahoma and has its principal place of business at 6100 N. Western Avenue, Oklahoma City, Oklahoma 73118-1044.

25. Defendant New Dominion, LLC ("New Dominion") is a corporation existing and operating under the laws of the State of Oklahoma that has substantial activity within the State, including drilling and operating wells and maintaining offices and employees.

26. Defendant Devon Energy Production Co., LP ("Devon") is a corporation existing and operating under the laws of the State of Oklahoma that does business in the State of Oklahoma and has its principal place of business at 20 North Broadway, Suite 1500, Oklahoma City, Oklahoma 73102-8202.

27. Defendants were and are "persons" within the meaning of Section 1004(15) of RCRA, 42 U.S.C. § 6903(15).

28. All of the Defendants are oil and gas companies that transport, handle, and dispose of waste fluids from oil and gas production activities by taking them from the point of production to waste injection wells, where the wastes are disposed by injecting them deep into the ground.

29. All of the defendants have purposely availed themselves of Oklahoma laws by, among other things, seeking permits for injection wells and drilling and operating such wells within the district of this Court. Defendants Chesapeake Operating, LLC, and Devon Energy Production Co., LP have corporate headquarters and principal places of business located in Oklahoma City. Defendant New Dominion, LLC has significant drilling and wastewater injection activities and maintains offices and employees in this district. All of the Defendants operate wastewater injection wells within the district of this Court which have caused and contributed to, and continue to cause and contribute to, the damages suffered by Plaintiff.

FACTS

I. Earthquakes Induced By Defendants' Waste Injection are Causing Endangerment in Central Oklahoma and Southern Kansas

30. In recent years, it has been established that the injection of Production Wastes into the ground through high rate disposal wells causes earthquakes. After much local controversy, the Oklahoma Geological Survey ("OGS") determined in the spring of 2015 that "the majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells" and that "seismologists have documented the relationship between wastewater disposal and triggered seismic activity." http://earthquakes.ok.gov/what-we-know/ (visited on October 9, 2015).

31. The United States Geological Survey ("USGS") fully supports this conclusion. For example a *New Yorker* article recently quoted USGS geologist William Ellsworth in reporting that "[d]isposal wells trigger earthquakes when they are dug too deep, near or into basement rock, or when the wells impinge on a fault line. Ellsworth said, 'Scientifically, it's really quite clear.'" http://www.newyorker.com/magazine/2015/04/13/weather-underground.

32. Similar conclusions were reached by the authors of one of the first peer-reviewed papers on this issue, published in July 2014, titled "Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection." Keranan et al., Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection, 448-451, 451 (July 3, 2014).

33. Thephenomenon that adding fluids into the earth can cause earthquakes is not newly discovered. Well-known examples of water injection into wells causing earthquakes have occurred in Colorado, Texas, India, and China. Most recently, in a year-end review, EPA noted that many experts have concluded that a connection likely exists between disposal well location, injection volume and rates, and seismic activity. EPA was concerned with the continued upward trend in earthquakes and recommended a reduction in the volumes of waste injected into the Arbuckle formation, which is the most critical stratum in regards to induced seismicity. EPA further recommended additional assessment and mapping of the Arbuckle formation and its connection to basement rock.

34. Based on publicly available data, the conclusion that wastewater injection and the recent spate of earthquakes in Oklahoma and southern Kansas are related is inescapable. Before 2009, the maximum number of earthquakes measured in a given year in Oklahoma was 195 in 1995. By 2014, the number of measured earthquakes soared to over 5,000, and in 2015

the number of earthquakes reached over 5,800. The number of earthquakes that residents can feel has shown an even greater rate of increase. In 2014, Oklahoma had 585 earthquakes of magnitude-3 or greater compared to 109 magnitude-3 quakes in 2013. Since late 2009, the rate of magnitude-3 or larger earthquakes in north-central Oklahoma has been nearly 300 times higher than in previous decades. Of course, earthquakes do not respect state boundaries. The earthquake swarm in central and northern Oklahoma also extends into southern Kansas. McNamara et al, Earthquake hypocenters …., Geophysical Research Letters (Jan 27, 2015) ("Future Hazards") at Figure 2.

35. As discussed in a recent study, "this seismicity appears to be associated with increases in saltwater disposal that originates as 'flow-back' water after multistage hydraulic fracturing operations." F. Rall Walsh III and Mark D. Zoback, Oklahoma's recent earthquakes and saltwater disposal, Science Advances, 18 Jun 2015 available at http://advances.sciencemag.org/content/1/5/e1500195.full ("Disposal Study").

36. Since 2009, Defendants have injected huge amounts of Production Wastes via disposal wells. The total cumulative volume of Production Wastes injected in Oklahoma has increased from 2 billion ("bn") barrels in 2009 to over 12 bn barrels in 2014. Figure 3. Focusing on the Arbuckle formation alone, which is the geologic stratum in which large volume disposal wells discharge and which lies directly above the basement rock where most of the earthquakes originate, Defendants account for over 30% of the total volume of Production Wastes injected in 2014. Figure 4. In specific regions, individual Defendants have much larger shares of the local amount of injection. New Dominion has been injecting large volumes since 2011, but since then, Devon has almost matched New Dominion's volumes, while Chesapeake has surpassed them. Figure 5.

37. Overlaying the locations of Defendants' wells onto the places where earthquakes above magnitude 3.5 have occurred shows that earthquakes are occurring in the vicinity of Defendants' wells and along faults that are close to the wells. Figure 6. As the frequency and volume of wastewater injection has increased in the central and northern areas of Oklahoma, earthquake occurrences in those regions have correspondingly increased. *Compare* Figure 7 with Figure 6.

38. While not all wells cause earthquakes, studies have found that most high volume disposal wells are linked to earthquakes: "Even though quake-associated wells were only 10 percent of those studied, more than 60 percent of the high-rate wells — 12 million gallons or more — were linked to nearby earthquakes" and "of the 45 wells that pump the most saltwater [waste] at the fastest rate, 34 of them — more than three out of four — were linked to nearby quakes." http://www.nytimes.com/aponline/2015/06/18/science/ap-us-sci-manmade-quakes.html?smprod=nytcore-ipad&smid=nytcore-ipad-share&_r=0.

39. For example, just four wells owned by New Dominion have caused 20% of all the seismic activity in the central U.S. from 2008 to 2013. Keranan et al., Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection, Science Vol. 345, 448-451, 448 (July 3, 2014) ("Sharp Increase"). In addition, Wells have been shown to induce earthquakes over 20 miles away.

40. The Disposal Study confirms that "the significant increases in SWD [Salt Water or Production Waste disposal] increase pore pressure in the Arbuckle Group, which spreads out away from the injection wells with time, eventually triggering slip on critically stressed faults in the basement." It also confirms that "[i]njection of large volumes of

saltwater into the Arbuckle group appears to be triggering the release of already stored strain energy in crystalline basement." Disposal Study.

41. It has therefore been scientifically established that injection of Production Wastes induces earthquakes. Moreover, as previously stated, Defendants are injecting much of the Production Wastes that are causing the earthquakes about which Plaintiff complains.

42. Importantly, as mentioned above, the risk is not only that there are more frequent earthquakes, it is also that those earthquakes have been and will continue to increase in severity. USGS scientists are warning that the smaller earthquakes induced by the injection of Production Wastes are reawakening long-dormant, 300-million-year-old fault lines across Oklahoma. The faults could trigger much higher-magnitude, and consequently more destructive, earthquakes than the smaller ones that have plagued the state in recent years. According to USGS scientists, these reawakened faults in central Oklahoma could produce earthquakes as powerful as magnitude-5 and 6. One USGS geologist stated, "Many faults are reactivating, with as many as 17 magnitude-4 earthquakes in 2014." http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-fault-lines/24702741/. In 2011, one even reached magnitude-5.4 in strength near Prague, Oklahoma and just three days ago a 5.1 earthquake occurred in northwest Oklahoma.

43. Recently, two earthquakes of greater-than-magnitude-4 occurred in Oklahoma on the same day-, which is further evidence of the increased frequency of more serious earthquakes in the areas of concern. A magnitude 4.4 quake hit northern Oklahoma on October 10, 2015, which one USGS researcher said "had all the hallmarks of an induced quake" and "seem[ed] to be part of an ongoing swarm of induced quakes in the area." *Guardian*, October 10, 2015, Oklahoma Earthquake likely caused by wastewater injection,

seismologist says, available at http://www.theguardian.com/us-news/2015/oct/10/oklahoma-earthquake-fracking-us-geological-survey.

44. On the same day, a magnitude 4.5 earthquake hit about 100 miles southeast, near the major oil storage area of Cushing, Oklahoma. Cushing is the location of the world's largest and most important crude oil storage hub. The emergency manager reported that "the whole house shook." The oil tanks did not suffer significant damage, but it "shattered nerves." *New York Times*, October 14, 2015 New Concern Over Quakes in Oklahoma Near a Hub of U.S. Oil, *available at* http://www.nytimes.com/2015/10/15/us/new-concern-over-quakes-in-oklahoma-near-a-hub-of-us-oil.html. Scientists reported in a paper published online in September that a large earthquake near the storage hub "could seriously damage storage tanks and pipelines." Dr. McNamara, the lead author of that study, stated that the recent earthquake continued a worrisome pattern of moderate quakes, suggesting that a large earthquake is more than a passing concern. "When we see these fault systems producing multiple magnitude 4s, we start to get concerned that it could knock into higher magnitudes," he said. "Given the number of magnitude 4s here, it's a high concern." *Id.*

45. The Cushing oil hub stores oil piped from across North America until it is dispatched to refineries. As of last week, it held 53 million barrels of crude oil. The earth beneath the tanks was comparatively stable until last October, when magnitude 4 and 4.3 earthquakes struck nearby in quick succession, revealing long-dormant faults beneath the complex. Three more earthquakes with magnitudes 4 and over occurred within a few miles of the tanks within a month. The Department of Homeland Security has gauged potential earthquake dangers to the hub and concluded that a quake equivalent to the record magnitude 5.7 could significantly damage the tanks. Dr. McNamara's study concludes that recent

earthquakes have increased stresses along two stretches of fault that could lead to earthquakes of that size. Despite these risks, some oil companies have challenged the right of the State of Oklahoma to reduce injection volumes.

46. Further south, the Nemaha fault runs north-northwest between Oklahoma City and southern Kansas. Figure 6 attached. In a peer-reviewed paper in Science magazine published in July 2014, seismologists found that a magnitude 7 earthquake is possible along that fault. Furthermore, they stated that "the increasing proximity of the earthquake swarm to the Nemaha fault presents a potential hazard to the Oklahoma City metropolitan area." Keranan et al., Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection, Science Vol. 345, 448-451, 451 (July 3, 2014) ("Sharp Increase"). USGS scientists have also said that a magnitude 7 quake cannot be ruled out.

47. The Future Hazards study confirms that more severe earthquakes are likely as a result of ongoing injection of Production Wastes into the ground through high-rate disposal wells. It states that earthquake clusters associated with long fault structures could give rise to magnitude 5 to 6 earthquakes. Examples include earthquakes associated with the Nemaha fault near Jones, in the Medford and Stillwater regions, and between Langston and Guthrie. Another example is the area around Cushing. Future Hazards at Figure 2. The paper concludes that the increased seismicity poses an elevated hazard to infrastructure and the regional population.

48. According to a recent paper referenced below, the Cushing area earthquakes are associated with reactivated faults that cut into the Arbuckle formation and a subsidiary fault called the Wilzetta-Whitehall. That paper noted that most of the earthquakes do not lie along known fault structures but there may be other fault structures that are being reawakened by the

injections that are associated with these earthquakes. The paper notes that earthquake activity in this area has been above forecast and that "[i]nclusion of all recent Oklahoma earthquakes in the NSHM [hazard model] significantly increases ground shaking estimates and earthquake hazard . . ., which would result in serious implications for infrastructure design standards." McNamara et al., Reactivated faulting near Cushing, Oklahoma: Increased potential for a triggered earthquake in an area of United States strategic infrastructure, Geophysical Research Letters (October 23. 2015) available at http://onlinelibrary.wiley.com/doi/10.1002/2015GL064669/pdf.

49. These earthquakes have already caused considerable physical damage and mental disquiet. The scale to classify earthquakes is logarithmic, meaning that a magnitude 4 earthquake is 10 times more powerful than a magnitude 3, and a magnitude 5 earthquake is 100 times more powerful than a magnitude 3. Earthquakes of magnitude 6 to 7 cause widespread damage and considerable loss of life. A series of shocks over magnitude 5 in 2011, the largest of which was magnitude 5.6 in the Prague area of Oklahoma, destroyed at least 16 houses and collapsed an historic spire at Benedictine Hall at St. Gregory's University. Repairing the spire cost about $5 million dollars. In addition to the property damage, in nearby Prague the quakes have not only caused property damage but have also caused harm to people. For example, Sandra Ladra was at home watching television in her home in Prague, Oklahoma in November of 2011 when an earthquake caused the rock facing on her fireplace to fall. The rocks struck Ms. Ladra causing her significant injury.

50. If earthquakes of over 6 in magnitude struck Oklahoma or Kansas, there is a very real danger that large numbers of people could be harmed or even killed. In addition, storage tanks for oil and other products could be ruptured, pipes carrying oil, gas, or other

chemicals could be ruptured, and other damage to infrastructure could occur. This would cause widespread environmental damage, in addition to property damage and personal injuries. In particular, if a large earthquake struck the massive oil storage area in Cushing, huge amounts of oil could be released, causing massive environmental damage.

51. The earthquakes are continuing in 2016. Oklahoma City residents were awakened on January 1, 2016 with a 4.1 magnitude earthquake. Six days later, 4.3 and 4.8 magnitude earthquakes occurred back-to-back. Oklahoma has had 131 earthquakes from January 1 through 16, 2016 ranging from 2.01 to 4.8.

52. On February 13, 2016 at 11:07 a.m. a 5.1 magnitude earthquake struck 17 miles northwest of Fairview, Oklahoma. It was quickly followed by aftershocks of magnitude 3.9, 3.7, 3.6, 3.5, 3.1 and 3.0. According to the Oklahoma Geological Survey, this was the third largest earthquake recorded in Oklahoma history and was felt from Kansas City, Missouri to Dallas, Texas. Of particular concern is the fact that the epicenter was approximately 75 miles west of Cushing and its vulnerable oil storage tanks and pipelines.

53. Thus, the injection of large volumes of Production Wastes into the ground in Oklahoma has caused and is causing large numbers of moderate strength earthquakes in Oklahoma and southern Kansas. The constant increase in the number of these size earthquakes, standing alone, causes an imminent and substantial endangerment to health and the environment. That endangerment is exacerbated by the increasing likelihood of a devastating earthquake that could injure or kill large numbers of people and cause massive environmental devastation.

54. Plaintiff and its members seek relief from this Court, as set forth in this Complaint, to protect themselves and their environment by requiring the Defendants to reduce

substantially the volumes of Production Wastes that they are injecting and take the other measures outlined in this Complaint to abate the present endangerment.

II. Defendants Have Violated and Are Violating RCRA by Causing Earthquakes and/or Contributing to Their Cause

55. Having provided the required notice, Plaintiff is now entitled to bring suit against "any person . . . who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment." A potential endangerment exists when there is some reasonable cause for concern that someone or something may be exposed to a risk of harm.

56. As discussed above, and shown in even more detail below, Defendants have contributed and are contributing to past and present handling, storage, transport, and disposal of Production Wastes which is causing earthquakes that may present an imminent and substantial endangerment to health or the environment. They are therefore jointly and severally liable for the abatement of this endangerment.

III. New Dominion Has Disposed of Production Wastes that Caused Earthquakes and/or Contributed To Their Occurrence and is Continuing to Do So

57. The Sharp Increase study describes the mechanism for how high volume waste disposal wells cause earthquakes. The rate of wastewater injection increased rapidly from 2004 onwards, doubling between 2004 and 2008. The need for Production Waste disposal increased as non-conventional "dewatering" oil production increased. Dewatering production wells produce as much as 200 times the Production Wastes as conventional oil wells. This led to a rapid increase in disposal via injection. At the same time, the rate of earthquakes went up, establishing a direct correlation between injection and earthquake frequency. The Sharp

Increase study went beyond that and showed that the high rate of injection was causing the swarm of earthquakes around Jones, which lies close to Oklahoma City to the northeast.

58. New Dominion started operating the first high rate injection well just south of Oklahoma City in 2004. This well and the other three in the same area that followed built up to an injection rate of 3 million barrels per month. This high rate of injection caused pressure to build up in the ground. Sharp Impact at Figure 3. The Jones earthquake swarm started concurrently with the reporting of positive pressure at the wells. The scientists who wrote Sharp Increase showed that the wells were contributing to an expanding zone of high pressure moving northeast. *Id.* at Figure 4. As the high-pressure zone moved northeast so did the earthquakes. The four high -volume New Dominion wells were responsible for 85% of the increase in pressure in this area. Analysis of the ground conditions showed that higher pressures than were present in 2014 would be needed to cause an earthquake directly along the Nemaha fault. However, the Sharp Increase scientists warned that if pressure built up further it could cause an earthquake of magnitude 7.

59. The Figures attached to this Complaint, based on publicly available information and showing the spatial and temporal correlation, confirm the Sharp Increase findings. From 2011 to 2014 New Dominion has been injecting large volumes of Production Wastes. Figure 5. In 2011, New Dominion disposed of higher volumes of waste than the other Defendants combined. *Id.* New Dominion's disposal mainly occurred through four wells close to Oklahoma City on the Nemaha fault and a number near the Wilzetta fault to the east. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation. Figure 8. Between 2009 and 2011, 53 of the 54 greater than 3.5 magnitude earthquakes in Oklahoma occurred close to New Dominion's wells. Figure 7. Since then, the

earthquake swarm in the Jones area has continued and extended into the Guthrie area. Figure 6.

60. New Dominion's disposal of Production Wastes is causing or contributing to the earthquake risks in these areas. In addition, it is likely that New Dominion is contributing to the earthquake risk in the Cushing area.

61. Thus, New Dominion has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that present an imminent and substantial endangerment to health or the environment.

IV. Chesapeake Has Disposed of Production Wastes that Caused Earthquakes or Contributed To Their Occurrence and is Continuing to Do So

62. Chesapeake has been disposing of high volumes of Production Wastes into the ground since before 2011. Figure 5. In 2011, it had a few major wells in the north central part of Oklahoma, but no earthquakes occurred near them between 2009 and 2011. Figure 7. It doubled its disposal volume in 2012, tripled it in 2013 and then reduced it slightly from 2013 levels in 2014. Figure 5. Furthermore, most of these wells are in the north central part of Oklahoma close to the Kansas border. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation. Figure 8. Since late 2013, a swarm of greater than magnitude 3 earthquakes developed in this area. Figure 6. This swarm extends into southern Kansas. These earthquakes are continuing in 2016 and, as detailed above, are becoming increasingly severe.

63. Therefore, Chesapeake's handling and disposal of the Production Wastes has contributed and is contributing to the northern swarm of earthquakes. In addition, it is probable that Chesapeake is contributing to the earthquake risk in the Cushing area.

64. Thus, Chesapeake has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that present an imminent and substantial endangerment to health and/or the environment.

V. Devon Has Disposed of Production Wastes that Caused Earthquakes or Contributed To Their Occurrence and is Continuing to Do So

65. Devon started to dispose of high volumes of Production Wastes into the ground in 2012, but then ramped up its volume rapidly. Figure 5. All but two of its wells are between the Sandridge and Chesapeake wells in the north and the New Dominion wells in the south. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation. Figure 8. Since 2013 a swarm of greater than magnitude 3.5 earthquakes developed in this area. Figure 6. This swarm extends into at least the Cushing area. These earthquakes are continuing in 2015 and, as detailed above, are becoming more severe.

66. Therefore, Chesapeake is contributing to the earthquake risk in the Cushing area and it may also be contributing to the other earthquake swarms.

67. Thus, Devon has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that present an imminent and substantial endangerment to health and/or the environment.

CLAIM FOR RELIEF

RCRA – Imminent and Substantial Endangerment

68. Plaintiff incorporates by reference the allegations of the preceding paragraphs of this Complaint and the attachments to this Complaint.

69. Pursuant to RCRA Section 7002(a)(1)(B), having given the required notice, Citizens may commence a citizen suit against "any person," "including any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment." RCRA § 7002(a)(1)(B), 42 U.S.C. § 6972(a)(1)(B).

70. Pursuant to 42 U.S.C. § 6903(15), all Defendants are "persons" subject to the citizen suit provisions of RCRA, 42 U.S.C. § 6972.

71. The Production Wastes are "solid waste" under RCRA section 1004 because they are "discarded material," which includes liquid or semisolid material resulting from industrial or commercial operations. 42 U.S.C. § 6903(27).

72. As set forth above, all Defendants have engaged in the operations of handling, storage, treatment, transportation, or disposal of Production Wastes. Thus, all Defendants have contributed and are contributing to the past and present handling, storage, treatment, transportation, or disposal of a solid waste under RCRA.

73. Defendants have contributed and continue to contribute to the increased seismicity triggered by the treating, storing, transporting and disposal of Production Wastes at injection wells owned or operated by the Defendants throughout the State of Oklahoma.

74. Consequently, as set forth above, Defendants' treatment, handling, storage, transportation, and disposal of the Production Wastes may present an imminent and substantial endangerment to public health and the environment as those terms are used in Section 7002(a)(1)(B) of RCRA, 42 U.S.C. § 6972(a)(1)(B).

75. In accordance with this provision, Defendants are subject to injunctive relief requiring them to take necessary actions to abate this endangerment.

RELIEF REQUESTED

WHEREFORE, Plaintiff respectfully requests that the Court enter a judgment:

1. Declaring that Defendants' past and/or present treatment, handling, storage, transportation, and disposal of Production Wastes presents, or may present, an imminent and substantial endangerment to public health and/or to the environment in violation of RCRA.

2. Preliminarily and permanently enjoining Defendants by ordering them to reduce immediately and substantially the amounts of Production Wastes they are injecting into the ground to levels that seismologists believe will not cause or contribute to increased earthquake frequency and severity, including, at a minimum, requiring a substantial reduction in the current unacceptable rates of injection of Production Wastes into the Arbuckle Formation.

3. Preliminarily and permanently enjoining Defendants by ordering them to reinforce vulnerable structures that current forecasts show could be impacted by large magnitude earthquakes during the interim period.

4. Ordering the establishment of an independent earthquake monitoring and prediction center to analyze and forecast the volume of Production Wastes which can be injected into a particular well or formation in a given area before seismicity is induced; and monitor how closely ongoing earthquakes conform to researchers' predictions. This prediction effort will likely involve further investigation and characterization of the underlying rock formations, including the Arbuckle.

5. Ordering an award of Plaintiff's reasonable attorneys' fees, expert witness fees, and costs incurred in bringing this action, as authorized by 42 U.S.C § 6972(e).

6. Such other and further relief as the Court deems just and proper.

RESPECTFULLY SUBMITTED this 16th day of February, 2016.

s/ William B. Federman
William B. Federman
10205 N. Pennsylvania Ave.
Oklahoma City, Oklahoma 73120
Tel: (405) 235-1560
Fax: (405) 239-2112
Email: WBF@federmanlaw.com

Richard Webster*
Public Justice P.C.
1825 K Street, NW, Suite 200
Washington, D.C.
Tel.: (202) 797-8600
Email: rwebster@publicjustice.net

Scott Poynter*
Poynter Law Group
400 W. Capitol Avenue, Suite 2910
Little Rock, Arkansas 72201
Tel.: (501) 251-1587
Email: scott@poynterlawgroup.com

Robin L. Greenwald*
Curt D. Marshall*
Weitz & Luxenberg, PC
700 Broadway
New York, NY 10003
Tel: (212) 558-5500
Fax: (212) 344-5461
Email: rgreenwald@weitzlux.com
Email: cmarshall@weitzlux.com

Counsel for Plaintiff

* To Be Admitted *Pro Hac Vice*

Exhibit A

PUBLIC JUSTICE

October 29, 2015

Via Certified Mail, Return Receipt Requested

Mr. Bob G. Alexander
President and Chief Executive Officer
Sandridge Exploration and Production, LLC
1601 Northwest Expressway
Suite 1600
Oklahoma City, OK 73118

Via Certified Mail, Return Receipt Requested

Mr. Kevin A. Easley
President and Chief Executive Officer
New Dominion, LLC
1307 South Boulder Ave W # 400
Tulsa, OK 74119

Via Certified Mail, Return Receipt Requested

Mr. Robert D. Lawler
President and Chief Executive Officer
Chesapeake Operating LLC
6100 N Western Ave
Oklahoma City, OK, 73118

Via Certified Mail, Return Receipt Requested

Mr. J. Larry Nichols
President and Chief Executive Officer
Devon Energy Production Co. LP
20 North Broadway
Suite 1500
Oklahoma City, OK 73102-8202

RE: ***Notice of Intent to Sue for Violations of the Resource Conservation and Recovery Act Involving Earthquakes Induced by the Injection and Disposal of Oil and Gas Production Wastes into the Ground***

Dear Sirs:

We are writing on behalf of the Sierra Club[1] and its members ("Citizens") to provide you with notice of their intent to file suit against Sandridge Exploration And Production, LLC ("Sandridge"), New Dominion, LLC ("New Dominion"), Devon Energy Production Co. LP ("Devon") and Chesapeake Operating LLC ("Chesapeake") (collectively "Defendants") for ongoing violations of the Resource Conservation and Recovery Act ("RCRA")[2] resulting from the injection and disposal of waste fluids from the oil and fracking industries ("Production Wastes") into the ground via wells in Oklahoma. This injection has caused or contributed to a huge increase in the number and severity of earthquakes being experienced in Oklahoma and southern Kansas. These earthquakes have already caused injuries and property damage and are threatening much more damage that is potentially devastating. Therefore, as is more fully explained below, Defendants are violating RCRA as a result of past and present handling and disposal of Production Wastes in a manner that may present an imminent and substantial endangerment to health and the environment. Indeed, the threat caused poses a clear and present danger to the health of Oklahoma residents and their environment.

By failing to comply with RCRA, Defendants have injured or threatened to injure, and will continue to injure or threaten to injure, the health, environmental, aesthetic, and economic interests of Citizens. These injuries or risks are traceable to Defendants' violations discussed above and redressing these ongoing violations will redress the Citizens' injuries or risks.

After providing notice, Citizens are entitled to bring suit against "any person . . . who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment."[3] This citizen suit provision also allows the recovery of reasonable attorney and expert fees in addition to other costs by prevailing plaintiffs. Therefore, Citizens intend to bring suit to enjoin waste handling and disposal activities that present an imminent and substantial endangerment to health or the environment, to abate such endangerment by requiring Defendants to take at least the steps outlined below, to recover attorneys' fees and costs of litigation, and to obtain other appropriate relief. To abate the present endangerment, at minimum, Defendants must:

1) Immediately substantially reduce the amounts of Production Wastes they are injecting into the ground to levels that seismologists believe will not cause or contribute to increased earthquake frequency and severity. At minimum, the current rates of injection, particularly into the Arbuckle Formation, must be reduced substantially to cause a major reduction in the current unacceptable earthquake risks;
2) Reinforce vulnerable structures that current forecasts show could be hit by large magnitude earthquakes during the interim period;
3) Establish an independent earthquake monitoring and prediction center to analyze and forecast how much Production Wastes can be injected without inducing earthquakes and track how closely the ongoing earthquakes conform to predictions. This may involve further investigation and characterization of the underlying rock, including the Arbuckle Formation.

---

1 85 Second Street, 2nd Floor San Francisco, CA 94105 USA Phone: 415-977-5500
2 42 U.S.C. § 6901, *et seq.*
3 42 U.S.C. § 6972(a)(1)(B).

In accordance with Section 7002(b)(2)(A) of RCRA,[4] this letter serves to notify Defendants that unless Defendants remedy the violations detailed in this letter, Citizens intend to file suit in federal district court at any time beginning ninety (90) days after the certified receipt of this letter.[5]

I. Earthquakes Induced By Defendants' Waste Injection are Causing Endangerment in Central Oklahoma and Southern Kansas

In recent years, it has been established that the injection of Production Wastes into the ground through high rate disposal wells causes earthquakes. After much local controversy, the the Oklahoma Geological Survey ("OGS") determined in the spring of 2015 that "the majority of recent earthquakes in central and north-central Oklahoma are very likely triggered by the injection of produced water in disposal wells" and that "seismologists have documented the relationship between wastewater disposal and triggered seismic activity.[6] The United States Geological Survey ("USGS") fully supports this conclusion. For example a New Yorker article recently quoted USGS geologist William Ellsworth in reporting that "[d]isposal wells trigger earthquakes when they are dug too deep, near or into basement rock, or when the wells impinge on a fault line. Ellsworth said, 'Scientifically, it's really quite clear.'"[7] Similar conclusions were reached by the authors of one of the first peer-reviewed papers on this issue, published in July 2014, titled "Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection."[8] This phenomenon is not newly discovered. Well-known examples of water injection into wells causing earthquakes have occurred in Colorado, Texas, India, and China.[9] Most recently, in a year end review, EPA noted that many experts have concluded that a connection likely exists between disposal well location, injection volume and rates, and seismic activity.[10] EPA was concerned with the continued upward trend in earthquakes and recommended a reduction in the volumes of waste injected into the critical Arbuckle formation, which is the most critical stratum. *Id.* EPA further recommended more assessment and mapping of the Arbuckle formation and its connection to basement rock. *Id.*

Looking at the data, this conclusion is inescapable. Before 2009 the maximum number of earthquakes measured in a given year in Oklahoma was 167 in 1995. Figure 1. By 2014, the number of measured earthquakes soared to over 5,000, and in 2015 the number of earthquakes is predicted to be over 6,000. *Id.* The number of earthquakes that residents can feel has shown an even greater rate of increase. In 2014, Oklahoma had 585 earthquakes of magnitude-3 or greater compared to 109 magnitude-3 quakes in 2013.[11] Since late 2009, the rate of magnitude-3 or larger earthquakes in north-central Oklahoma has been nearly 300 times higher than in previous decades.[12] Of course, earthquakes do not respect state boundaries. The earthquake swarm in

---

4 42 U.S.C. § 6972(b)(2)(A).

5 40 C.F.R. § 254.2.

6 http://earthquakes.ok.gov/what-we-know/ (visited on October 9, 2015)

7 http://www.newyorker.com/magazine/2015/04/13/weather-underground

8 Keranan et al., Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection, 448-451, 451 (July 3, 2014)

9 William L. Ellsworth, Injection-Induced Earthquakes , Science 341, (2013) *available at http://www.gwpc.org/sites/default/files/files/Earthquakes%20and%20fracking(2).pdf*

10 EPA Region 6 End of Year Review of UIC Program for 2014 (transmitted on Sept 29, 2015)

11 http://www.usatoday.com/story/news/2015/03/05/oklahoma-quakes-fracking-oil-gas/24444581/

12 http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-fault-lines/24702741/

central and northern Oklahoma does not stop at the state boundary, but also extends to southern Kansas.[13] Figure 2 illustrates these trends and shows that the earthquakes are continuing to grow in number and to become stronger.

As discussed in a recent study, "this seismicity appears to be associated with increases in saltwater disposal that originates as 'flow-back' water after multistage hydraulic fracturing operations."[14] Since 2009, Defendants have injected huge amounts of Production Wastes via disposal wells. The total volume of Production Wastes injected has gone from 2 billion ("bn") barrels in 2009 to over 12 bn barrels in 2014. Figure 3. Focusing on the Arbuckle formation alone, which is the geologic stratum closest to the basement rock in which most of the earthquakes originate and into which large volume disposal wells discharge, Defendants account for over 60% of the total volume of Production Wastes injected in 2014. Figure 4. New Dominion has been injecting large volumes since 2011, but since then, the other three Defendants have matched or surpassed New Dominion's volumes. Figure 5.

Overlaying the locations of Defendants' wells onto the places where earthquakes above magnitude 3.5 have been felt shows that earthquakes are occurring in the vicinity of Defendants' wells and along faults that are close to the wells. Figure 6.[15] As more injection has occurred in the central and northern areas of Oklahoma, more and more earthquakes have occurred in those areas. *Id.* While not all wells cause earthquakes, studies have found that most high volume disposal wells are linked to earthquakes: "Even though quake-associated wells were only 10 percent of those studied, more than 60 percent of the high-rate wells — 12 million gallons or more — were linked to nearby earthquakes" and "of the 45 wells that pump the most saltwater [waste] at the fastest rate, 34 of them — more than three out of four — were linked to nearby quakes"[16] For example, just four wells owned by New Dominion have caused 20% of all the seismic activity in the central U.S. from 2008 to 2013.[17] Wells have been shown to induce earthquakes over 20 miles away.[18] The Disposal Study confirms that "the significant increases in SWD [Production Waste disposal] increase pore pressure in the Arbuckle Group, which spreads out away from the injection wells with time, eventually triggering slip on critically stressed faults in the basement." It also confirms that "[i]njection of large volumes of saltwater into the Arbuckle group appears to be triggering the release of already stored strain energy in crystalline basement." It is therefore scientifically beyond dispute that injection of Production Wastes

---

[13] McNamara et al, Earthquake hypocenters …., Geophysical Research Letters (Jan 27, 2015) ("Future Hazards") at Figure 2.

[14] F. Rall Walsh III* and Mark D. Zoback, Oklahoma's recent earthquakes and saltwater disposal, Science Advances, 18 Jun 2015 available at http://advances.sciencemag.org/content/1/5/e1500195.full ("Disposal Study")

[15] The Figures attached to this notice letter are based on publicly available information, which are incomplete in some regards. We believe that Defendants have better information on their own wells. Therefore, we will refine the spatial analysis once we obtain better information from Defendants.

[16] http://www.nytimes.com/aponline/2015/06/18/science/ap-us-sci-manmade-quakes.html?smprod=nytcore-ipad&smid=nytcore-ipad-share&_r=0

[17] http://www.bloomberg.com/news/articles/2015-04-23/can-this-oklahoma-oilman-s-company-withstand-another-earthquake- stating "A July 2014 study published in Science found that four high-volume disposal wells owned by New Dominion on the outskirts of Oklahoma City may have accounted for 20 percent of all seismic activity in the central U.S. from 2008 to 2013."

[18] Sharp Increase at 448.

induces earthquakes and that Defendants are injecting the bulk of the Production Wastes that are causing the earthquakes about which Citizens complain.

Importantly, as mentioned above, the risk is not only that there are more frequent earthquakes, it is also that those earthquakes have been and will continue to be more severe. USGS scientists are warning that the smaller earthquakes induced by the injection of Production Wastes are reawakening long-dormant, 300-million-year-old fault lines across Oklahoma. The faults could trigger much higher-magnitude, and consequently more destructive, earthquakes than the smaller ones that have plagued the state in recent years.[19] According to USGS scientists, these reawakened faults in central Oklahoma could produce earthquakes as powerful as magnitude-5 and 6. *Id.* A USGS geologist stated "Many faults are reactivating, with as many as 17 magnitude-4 earthquakes in 2014." *Id.* In 2011, one even reached magnitude-5.4 in strength near Prague, Okla.

Recently, two earthquakes of greater-than-magnitude-4 occurred on the same day; further evidence of the higher frequency of more serious earthquakes in the areas of concern. A magnitude 4.4 quake hit northern Oklahoma on October 10, 2015, which a USGS said "had all the hallmarks of an induced quake" and "seems to be part of an ongoing swarm of induced quakes in the area."[20] On the same day, a magnitude 4.5 earthquake hit near the major oil storage area of Cushing about 100 miles southeast.[21] Cushing is the location of the world's largest and most important crude oil storage hub. The emergency manager reported that "the whole house shook." The oil tanks did not suffer significant damage, but it "shattered nerves." *Id.* Scientists reported in a paper published online in September that a large earthquake near the storage hub "could seriously damage storage tanks and pipelines." Dr. McNamara, the lead author of that study, stated that the recent earthquake continued a worrisome pattern of moderate quakes, suggesting that a large earthquake is more than a passing concern. "When we see these fault systems producing multiple magnitude 4s, we start to get concerned that it could knock into higher magnitudes," he said. "Given the number of magnitude 4s here, it's a high concern." *Id.*

The Cushing oil hub stores oil piped from across North America until it is dispatched to refineries. *Id.* As of last week, it held 53 million barrels of crude. *Id.* The earth beneath the tanks was comparatively stable until last October, when magnitude 4 and 4.3 earthquakes struck nearby in quick succession, revealing long-dormant faults beneath the complex. *Id.* Three more earthquakes with magnitudes 4 and over have occurred within a few miles of the tanks in the past month. *Id.* The Department of Homeland Security has gauged potential earthquake dangers to the hub and concluded that a quake equivalent to the record magnitude 5.7 could significantly damage the tanks. *Id.* Dr. McNamara's study concludes that recent earthquakes have increased stresses along two stretches of fault that could lead to earthquakes of that size. *Id.* Despite these risks, oil companies are challenging the right of the State of Oklahoma to reduce injection volumes. *Id.*

Further south, the Nemaha fault runs north-northwest between Oklahoma City and southern Kansas. Figure 6. In a peer-reviewed paper in Science magazine published in July

---

[19] http://www.usatoday.com/story/news/nation/2015/03/10/oklahoma-earthquakes-fault-lines/24702741/

[20] Guardian, October 10, 2015, Oklahoma Earthquake likely caused by wastewater injection, seismologist says, available at http://www.theguardian.com/us-news/2015/oct/10/oklahoma-earthquake-fracking-us-geological-survey

[21] New York Times, October 14, 2015 New Concern Over Quakes in Oklahoma Near a Hub of U.S. Oil, *available at* http://www.nytimes.com/2015/10/15/us/new-concern-over-quakes-in-oklahoma-near-a-hub-of-us-oil.html

2014, seismologists found that a magnitude 7 earthquake is possible along that fault.[22] Furthermore, they stated that "the increasing proximity of the earthquake swarm to the Nemaha fault presents a potential hazard to the Oklahoma City metropolitan area." *Id.* USGS scientists have also said that a magnitude 7 quake cannot be ruled out.[23]

The Future Hazards study confirms that more severe earthquakes are likely as a result of ongoing injection of Production Wastes into the ground through high-rate disposal wells. It states that earthquake clusters associated with long fault structures could give rise to magnitude 5 to 6 earthquakes. Examples include earthquakes associated with the Nemaha fault near Jones, in the Medford and Stillwater regions, and between Langston and Guthrie. Another example is the area around Cushing. Future Hazards at Figure 2. The paper concludes that the increased seismicity poses an elevated hazard to infrastructure and the regional population. According a recent paper, the Cushing area earthquakes are associated with reactivated faults that cut into the Arbuckle formation and a subsidiary fault called the Wilzetta-Whitehall.[24] That paper noted that most of the earthquakes do not lie along known fault structures but there may be other fault structures that are being reawakened by the injection that are associated with these earthquakes. *Id* The most recent paper notes that earthquake activity in this area has been above forecast and that "[i]nclusion of all recent Oklahoma earthquakes in the NSHM [hazard model] significantly increases ground shaking estimates and earthquake hazard . . ., which would result in serious implications for infrastructure design standards.[25]

These earthquakes have already caused considerable physical damage and mental disquiet. The scale to classify earthquakes is logarithmic, meaning that a magnitude 4 earthquake is 10 times more powerful than a magnitude 3, and a magnitude 5 earthquake is 100 times more powerful than a magnitude 3. Earthquakes of magnitude 6 to 7 cause widespread damage and considerable loss of life. A series of shocks over magnitude 5 in 2011, the largest of which was magnitude 5.6 in the Prague area of Oklahoma, destroyed at least 16 houses and collapsed an historic spire at Benedictine Hall at St. Gregory's University.[26] Repairing the spire cost about $5M dollars. In addition to the property damage, in nearby Shawnee the quakes have not only caused property damage but have also caused harm to people. For example, Sandra Ladra was at home watching television in her home in Prague, Oklahoma in November of 2011 when an earthquake caused the rock facing on her fireplace to fall. The rocks struck Ms. Ladra causing her significant injury. Appendix A contains a few photographs of the harm done to visually illustrate the harm already done and the potential for future harm. Obviously, if much stronger earthquakes over 6 in magnitude struck, far greater numbers of people could be harmed. In addition, storage tanks for oil and other products could be ruptured, causing widespread

---

[22] Keranan et al., Sharp increase in central Oklahoma seismicity since 2008 induced by massive wastewater injection, Science Vol. 345, 448-451, 451 (July 3, 2014) ("Sharp Increase")

[23] NYT – April 27, 2015 – U.S. Maps pinpoint earthquakes available at http://www.nytimes.com/2015/04/24/us/us-maps-areas-of-increased-earthquakes-from-human-activity.html

[24] McNamara et al., McNamara, D., at al., Efforts to monitor and characterize the recent increasing seismicity in central Oklahoma, The Leading Edge June 2015 *available at* https://profile.usgs.gov/myscience/upload_folder/ci2015Jun0413582855600McNamaraTLE.pdf

[25] McNamara et al., Reactivated faulting near Cushing, Oklahoma: Increased potential for a triggered earthquake in an area of United States strategic infrastructure, Geophysical Research Letters (October 23. 2015) available at http://onlinelibrary.wiley.com/doi/10.1002/2015GL064669/pdf

[26] http://www.newyorker.com/magazine/2015/04/13/weather-underground

environmental damage, in addition to property damage and personal injuries. In particular, if a large earthquake struck the massive oil storage area in Cushing, huge amounts of oil could be released, causing massive environmental damage. If a large earthquake hit the Oklahoma City area, it could cause thousands of injuries and even fatalities.

Thus, the injection of large volumes of Production Wastes into the ground in Oklahoma is causing large numbers of moderate strength earthquakes. The constant increase in the number of these size earthquakes, standing alone, causes an imminent and substantial endangerment. That endangerment is only exasperated by the increasing likelihood of a devastating earthquake that could kill large numbers of people and cause massive environmental devastation. This notice letter serves to warn the four leading companies that are making money from this practice that Citizens will sue in federal court to protect themselves and their environment unless these companies substantially reduce the volumes of Production Wastes that they are injecting and take the other measures outlined in this letter to abate the present endangerment.

II. Defendants Have Violated and Are Violating RCRA by Causing Earthquakes and/or Contributing to Their Cause

After providing notice, Citizens are entitled to bring suit against "any person . . . who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment."[27] To show such a potential endangerment, Plaintiffs must show that "there is some reasonable cause for concern that someone or something may be exposed to a risk of harm." *Interfaith Community Organization v. Honeywell International*, Inc, 399 F. 3d 248, 259 (3d Cir. 2005). As discussed above, and shown in even more detail below, Defendants have contributed and are contributing to past and present handling, storage, and disposal of Production Wastes which is causing earthquakes that may present an imminent and substantial endangerment to health or the environment. They are therefore jointly and severally liable for the abatement of this endangerment.

A. New Dominion Has Disposed of Production Wastes that Caused Earthquakes or Contributed to Their Occurrence and is Continuing to Do So

The Sharp Increase study describes the mechanism for how high volume waste disposal wells cause earthquakes. The rate of wastewater injection increased rapidly from 2004 onwards, doubling between 2004 and 2008. The need for Production Waste disposal increased as non-conventional "dewatering" oil production increased. Dewatering production wells produce as much as 200 times the Production Wastes as conventional oil wells. This led to a rapid increase in disposal via injection. At the same time, the rate of earthquakes went up, establishing a direct correlation between injection and earthquake frequency. The Sharp Increase study went beyond that and showed that the high rate of injection was causing the swarm of earthquakes around Jones, which lies close to Oklahoma City to the northeast. New Dominion started operating the first high rate injection well just south of Oklahoma City in 2004. This well and the other three in the same area that followed built up to an injection rate of 3 million barrels per month. This high rate of injection caused pressure to build up in the ground. Sharp Impact at Figure 3. The Jones earthquake swarm started concurrently with the reporting of positive pressure at the wells. The scientists who wrote Sharp Increase showed that the wells were

[27] 42 U.S.C. § 6972(a)(1)(B).

contributing to an expanding zone of high pressure moving northeast. *Id.* at Figure 4. As the high-pressure zone moved northeast so did the earthquakes. *Id.* The four high volume New Dominion wells were responsible for 85% of the increase in pressure in this area. Analysis of the ground conditions showed that higher pressures than were present in 2014 would be needed to cause an earthquake directly along the Nemaha fault. However, the Sharp Increase scientists warned that if pressure built up further it could cause an earthquake of magnitude 7.

The diagrams showing the spatial and temporal correlation confirm the Sharp Increase findings. From 2011 to 2014 New Dominion has been injecting large volumes of Production Wastes. Figure 5. In 2011, New Dominion disposed of higher volumes of waste than the other Defendants combined. *Id.* New Dominion's disposal mainly occurred through four wells close to Oklahoma City on the Nemaha fault and a number near the Wilzetta fault to the east. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation.[28] Figure 8. Between 2009 and 2011, 53 of the 54 greater than 3.5 magnitude earthquakes in Oklahoma occurred close to New Dominion's wells. Figure 7. Since then, the earthquake swarm in the Jones area has continued and extended into the Guthrie area. Figure 6. New Dominion's disposal of Production Wastes is causing or contributing to the earthquake risks in these areas. In addition, it is likely that New Dominion is contributing to the earthquake risk in the Cushing area. Thus, New Dominion has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that may present an imminent and substantial endangerment to health and the environment.

B. Sandridge Has Disposed of Production Wastes that Caused Earthquakes or Contributed to Their Occurrence and is Continuing to Do So

Before 2011 Sandridge had not injected high volumes of Production Wastes into the ground. Figure 5. In 2011 it had one or two major wells in the north central part of Oklahoma, but no earthquakes occurred near them between 2009 and 2011. Figure 7. That changed dramatically in 2013 and 2014 when Sandridge started injecting huge volumes of Production Waste into the ground. Figure 5. Furthermore, all of these wells are in the north central part of Oklahoma close to the Kansas border. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation.[29] Figure 8. Since late 2013 a swarm of greater than magnitude-3 earthquakes developed in this area. Figure 6. This swarm extends into southern Kansas.[30] These earthquakes are continuing in 2015 and, as detailed above, are becoming more severe. Therefore, it is almost certain that Sandridge's handling and disposal of Production Wastes has contributed and is contributing to the northern swarm of earthquakes. In addition, it is probable that Sandridge is contributing to the earthquake risk in the Cushing area.. Thus, Sandridge has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that may present an imminent and substantial endangerment to health and the environment.

---

[28] The injection databases for other years do not state the formation into which injection occurs. Even in 2014, some of this data is missing.

[29] The injection databases for other years do not state the formation into which injection occurs. Even in 2014, some of this data is missing.

[30] Future Hazards at Figure 2.

C. Chesapeake Has Disposed of Production Wastes that Caused Earthquakes or Contributed to Their Occurrence and is Continuing to Do So

Chesapeake has been disposing of high volumes of Production Wastes into the ground since before 2011. Figure 5. In 2011 it had a few major wells in the north central part of Oklahoma, but no earthquakes occurred near them between 2009 and 2011. Figure 7. It doubled its disposal volume in 2012, tripled it in 2013 and then reduced it slightly from 2013 levels in 2014. Figure 5. Furthermore, most of these wells are in the north central part of Oklahoma close to the Kansas border. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation.[31] Figure 8. Since late 2013 a swarm of greater than magnitude 3 earthquakes developed in this area. Figure 6. This swarm extends into southern Kansas.[32] These earthquakes are continuing in 2015 and, as detailed above, are becoming increasingly severe. Therefore, it is almost certain that Chesapeake's handling and disposal of the Production Wastes has contributed and is contributing to the northern swarm of earthquakes. In addition, it is probable that Chesapeake is contributing to the earthquake risk in the Cushing area. Thus, Chesapeake has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that may present an imminent and substantial endangerment to health and the environment.

D. Devon Has Disposed of Production Wastes that Caused Earthquakes or Contributed to Their Occurrence and is Continuing to Do So

Devon started to dispose of high volumes of Production Wastes into the ground in 2012, but then ramped up its volume rapidly. Figure 5. All but two of its wells are between the Sandridge and Chesapeake wells in the north and the New Dominion wells in the south. Figure 6. In 2014, and probably other years, the bulk of this injection was into the Arbuckle Formation.[33] Figure 8. Since 2013 a swarm of greater than magnitude 3.5 earthquakes developed in this area. Figure 6. This swarm extends into at least the Cushing area. *Id.* These earthquakes are continuing in 2015 and, as detailed above, are becoming more severe. Therefore, it is probable that Chesapeake is contributing to the earthquake risk in the Cushing area and it may also be contributing to the other earthquake swarms. Thus, Devon has contributed and is contributing to the past and present handling, storage, and disposal of Production Wastes which is causing earthquakes in Oklahoma and southern Kansas that may present an imminent and substantial endangerment to health and the environment.

III. Conclusion

Defendants have violated, are currently violating, and will likely continue to violate the Resource Conservation and Recovery Act by managing and disposing of Production Wastes in the current manner and failing to abate the endangerment to which their past and present injection of Production Wastes have contributed and continue to contribute. Accordingly, unless these violations are corrected, Citizens intend to file suit to enjoin and abate the violations described above, ensure future compliance with federal law, recover attorneys' fees and costs of litigation, and obtain other appropriate relief.

---

[31] The injection databases for other years do not state the formation into which injection occurs. Even in 2014, some of this data is missing.

[32] Future Hazards at Figure 2.

[33] The injection databases for other years do not state the formation into which injection occurs. Even in 2014, some of this data is missing.

Case 5:16-cv-00134 Document 1-1 Filed 02/16/16 Page 13 of 24

More specifically, Citizens seek reduction or abatement of the volumes of Production Wastes being injected into the ground so that earthquake risks subside to natural levels, the establishment of an independent forecasting body that could investigate, analyze and predict the cumulative effect of injecting Production Wastes, reinforcement of structures that could be vulnerable to the current elevated earthquake risks, and other appropriate relief.

If you have any questions regarding the allegations in this notice or believe any of the foregoing information may be in error, please contact Richard Webster at the number listed below. In the absence of any questions, we would also welcome an opportunity to discuss a resolution of this matter prior to the initiation of litigation if you are prepared to address the violations noticed above within a reasonable time.

Sincerely,

/s

Richard Webster, Esq.

Public Justice
1825 K Street, NW Suite 200
Washington, D.C. 20006
rwebster@publicjustice.net
(202) 797-8600

Robin Greenwald
Weitz & Luxenberg, PC
700 Broadway
New York, NY 10003
rgreenwald@weitzlux.com
(212) 558-5802

Scott Poynter
Poynter Law Group
400 W. Capitol Ave., Suite 2910
Little Rock, AR 72201
scott@poynterlawgroup.com
(501) 251-1587

Counsel for Citizens

Bill Federman
Federman & Sherwood
10205 N Pennsylvania Ave,
Oklahoma City, OK 73120
wbf@federmanlaw.com
(405) 239-2112

Local Counsel for Citizens

cc:

Via Certified Mail, Return Receipt Requested

Gina McCarthy
Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, N.W.
Mail Code: 1101A
Washington, DC 20460

Via Certified Mail, Return Receipt Requested

Ron Curry
Regional Administrator
U.S. Environmental Protection Agency Region 6
1445 Ross Avenue, Suite 1200.
Dallas, Texas 75202

Via Certified Mail, Return Receipt Requested

Loretta E. Lynch,
U.S. Attorney General
U.S. Department of Justice
950 Pennsylvania Avenue N.W.
Washington, DC 20530-0001

Via Certified Mail, Return Receipt Requested

Mr. Gary Sherrer
Secretary
Oklahoma Departmentof Environmental Quality
P.O. Box 1677
Oklahoma City, OK 73101-1677

Via Certified Mail, Return Receipt Requested

Mr Tim Baker
Oil and Gas Conservation Division
Oklahoma Corporation Commission
P.O. Box 52000
Oklahoma City, OK 73152-2000

cc. to service agents

Via Certified Mail, Return Receipt Requested

Chesapeake Operating, L.L.C.
Registered Agent: The Corporation Company
1833 S. Morgan Road
Oklahoma City, OK 73128

Via Certified Mail, Return Receipt Requested

Devon Energy Production Company, L.P.
Registered Agent: The Corporation Company
1833 S. Morgan Road
Oklahoma City, OK 73128

Via Certified Mail, Return Receipt Requested

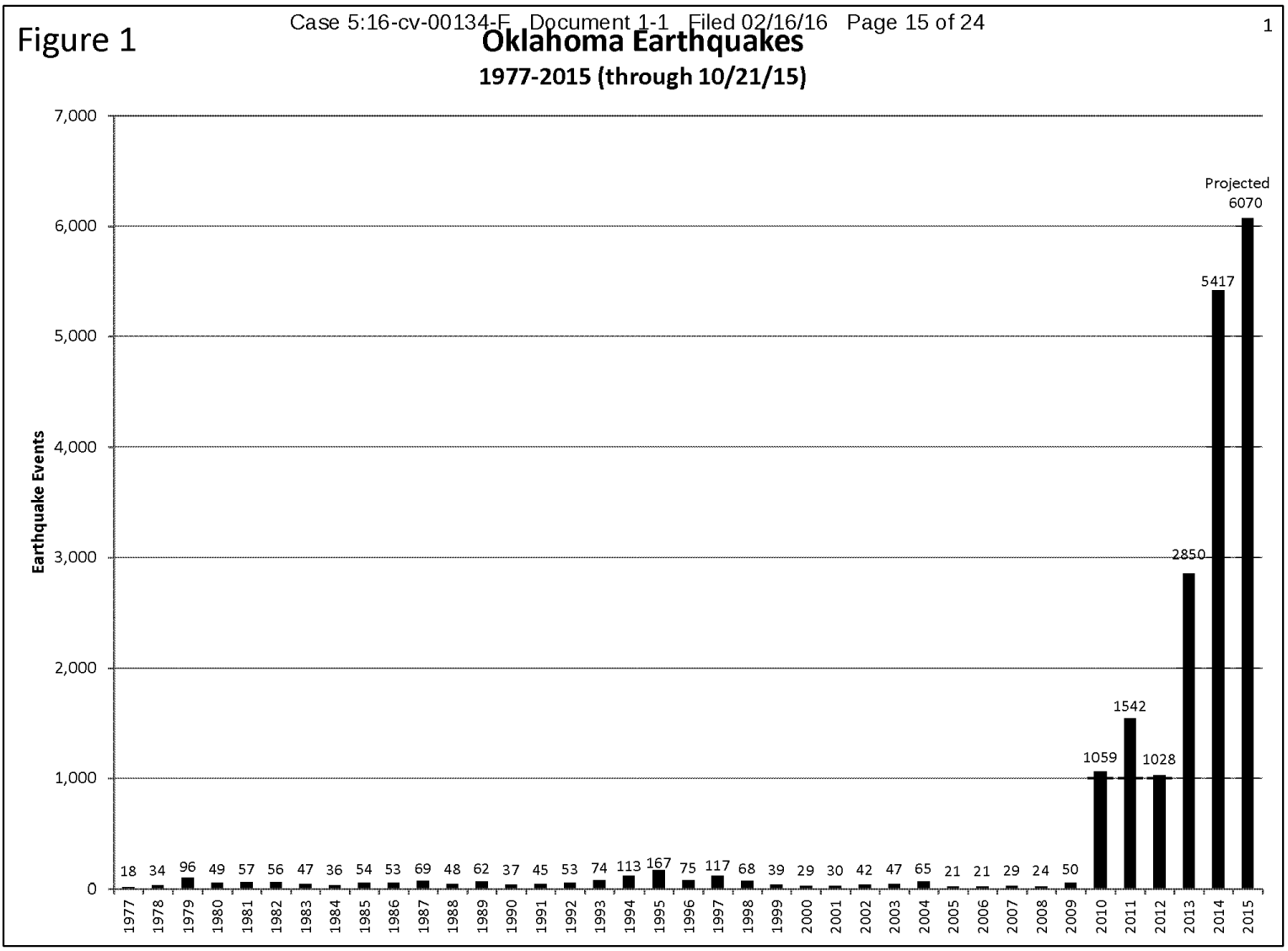
New Dominion, LLC
Registered Agent: Fred Buxton
1307 S. Boulder Ave., Suite 400
Tulsa, OK 74119

Via Certified Mail, Return Receipt Requested

Sandridge Exploration and Production LLC
Registered Agent: The Corporation Company
1833 S. Morgan Road
Oklahoma City, OK 73128

Figures 1-8

Figure 1



Source: Oklahoma Geological Survey

Projection based on average of 16.63 events/day as of 10/21/15

Figure 2

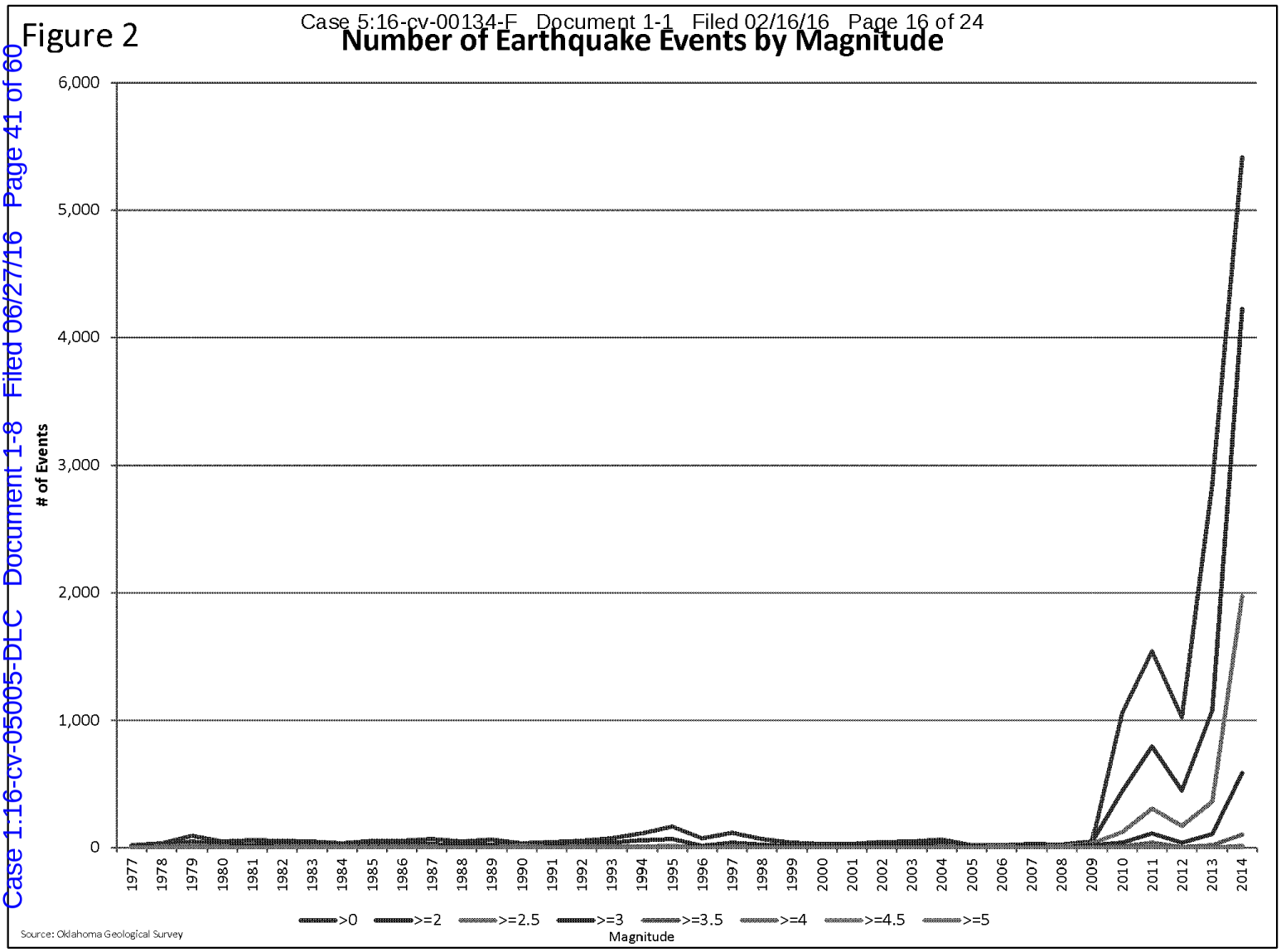


Figure 3

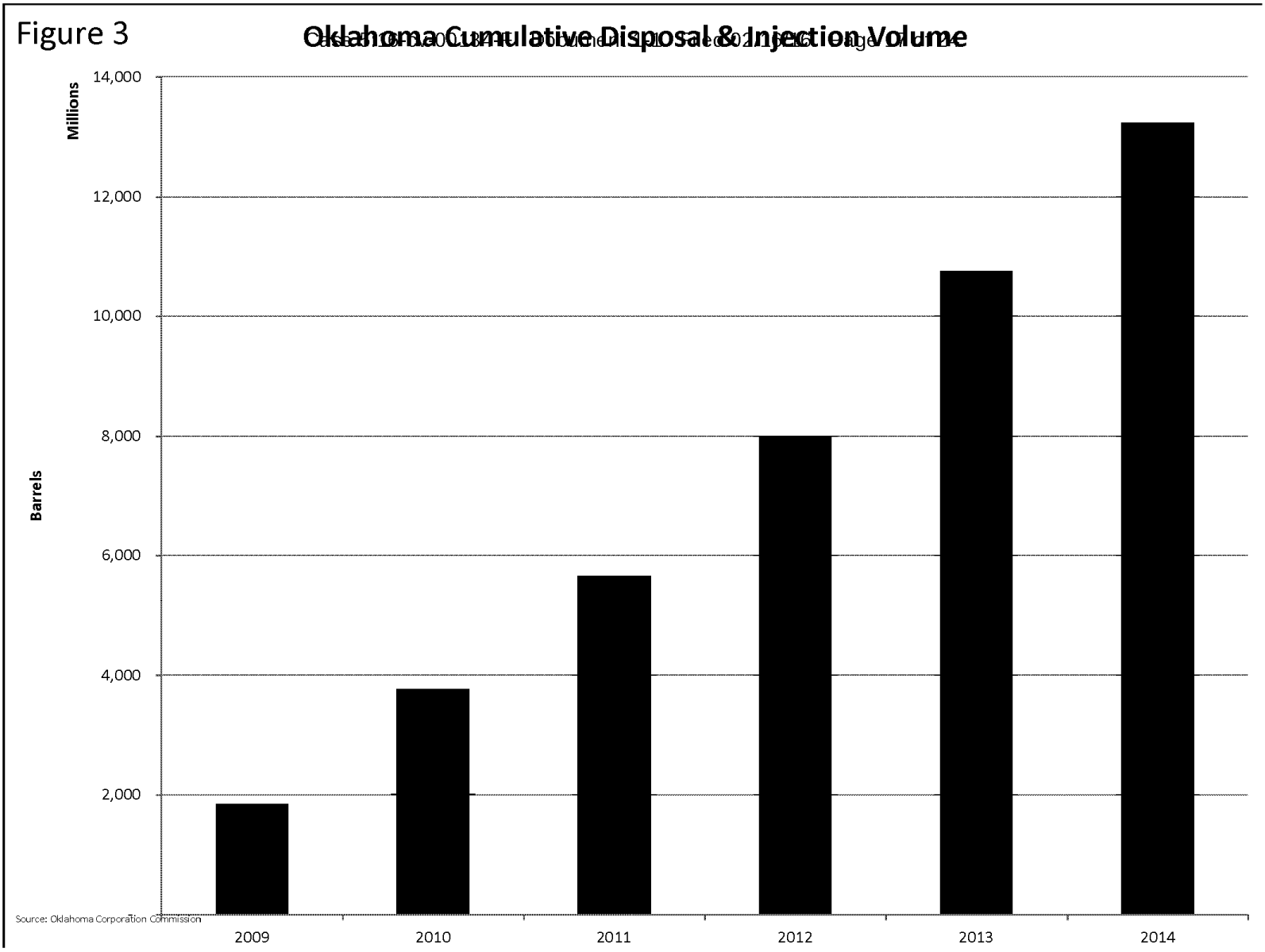
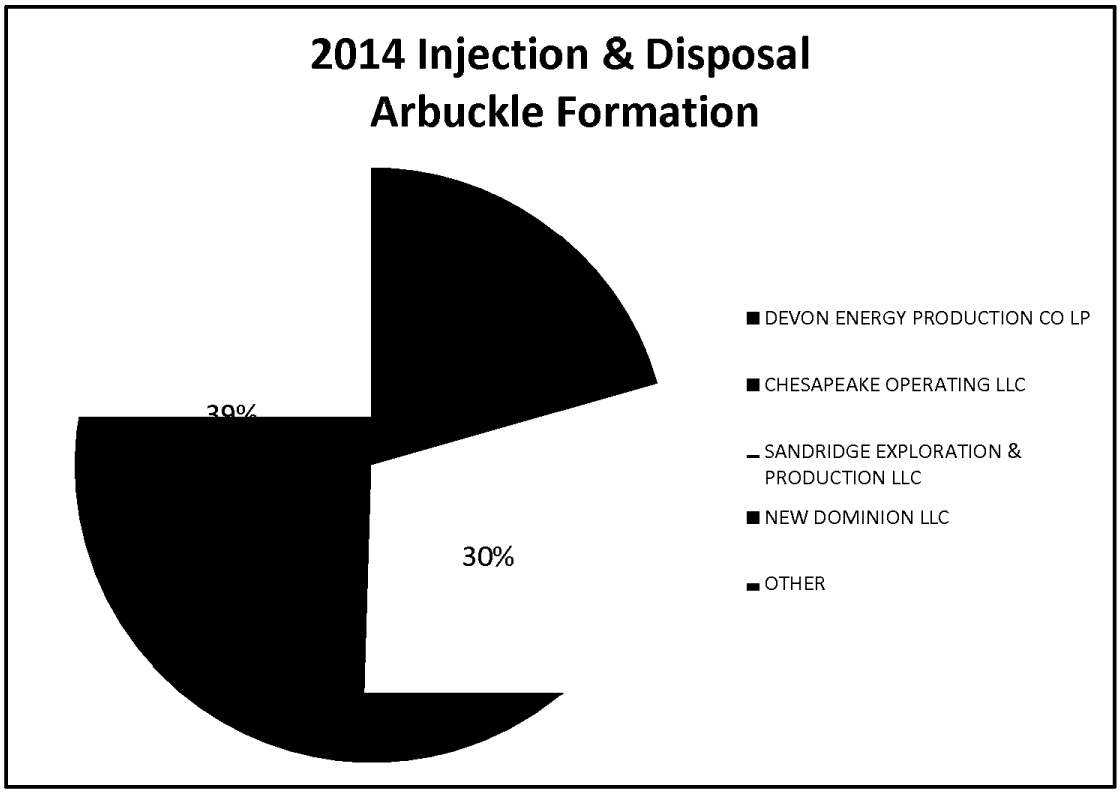

Oklahoma Cumulative Disposal & Injection Volume
Millions
Barrels
14,000
12,000
10,000
8,000
6,000
4,000
2,000
2009
2010
2011
2012
2013
2014
Source: Oklahoma Corporation Commission

Figure 4



Operator	Injection Volume (bbls)
DEVON ENERGY PRODUCTION CO LP	64,555,296
CHESAPEAKE OPERATING LLC	73,885,836
SANDRIDGE EXPLORATION & PRODUCTION LLC	201,767,276
NEW DOMINION LLC	72,081,172
OTHER	261,551,899
TOTAL	**673,841,479**

Operator	# of Wells
DEVON ENERGY PRODUCTION CO LP	36
CHESAPEAKE OPERATING LLC	14
SANDRIDGE EXPLORATION & PRODUCTION LLC	91
NEW DOMINION LLC	6
OTHER	258

Source: Oklahoma Corporation Commission

Figure 5

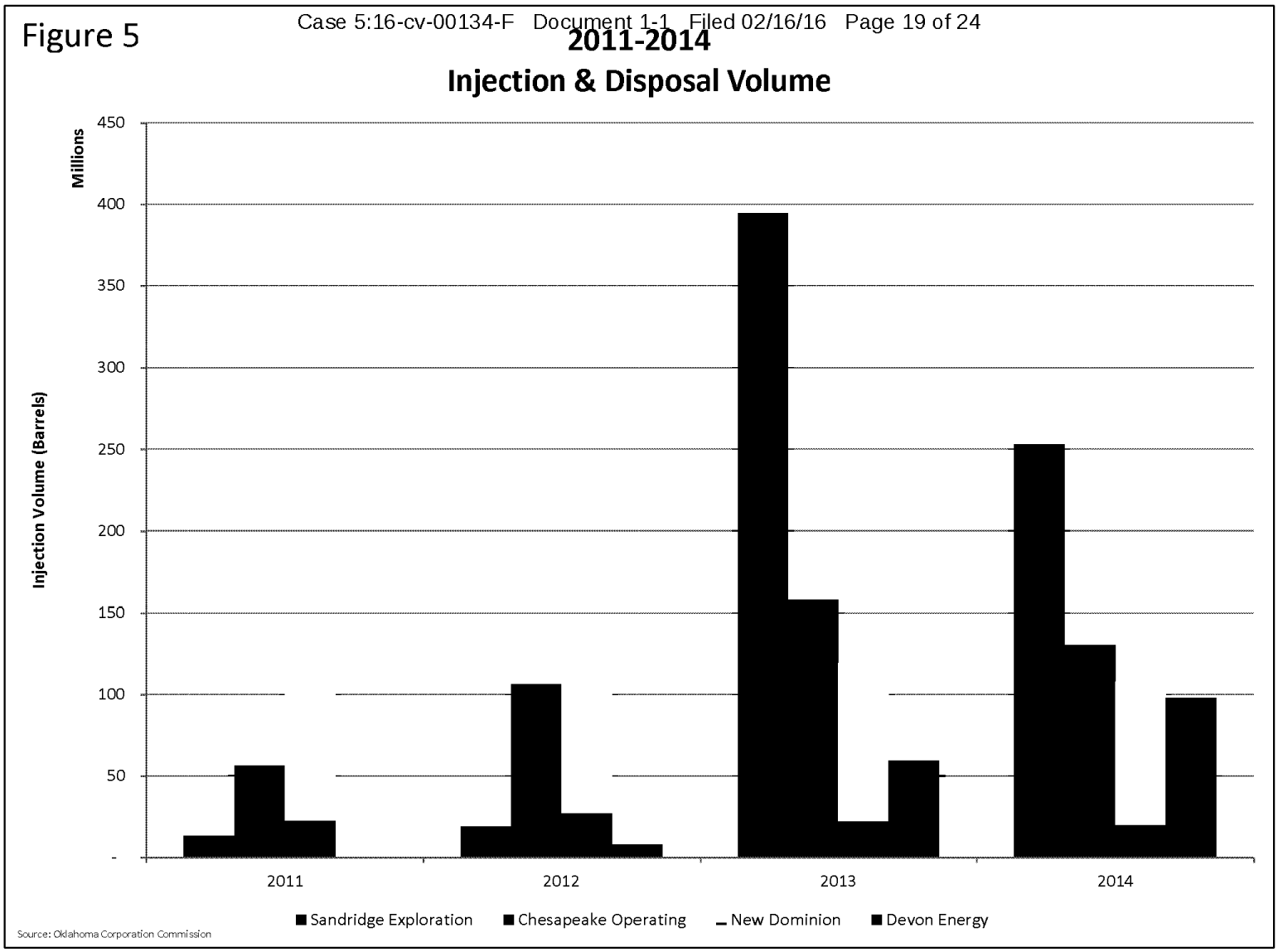

2011-2014
Injection & Disposal Volume
Millions
Injection Volume (Barrels)
450
400
350
300
250
200
150
100
50
-
2011
2012
2013
2014
Sandridge Exploration
Chesapeake Operating
New Dominion
Devon Energy
Source: Oklahoma Corporation Commission

Figure 6

2011-2014 Cumulative Injection & Disposal
New Dominion, Sandridge Exploration, Chesapeake Operating, Devon Energy

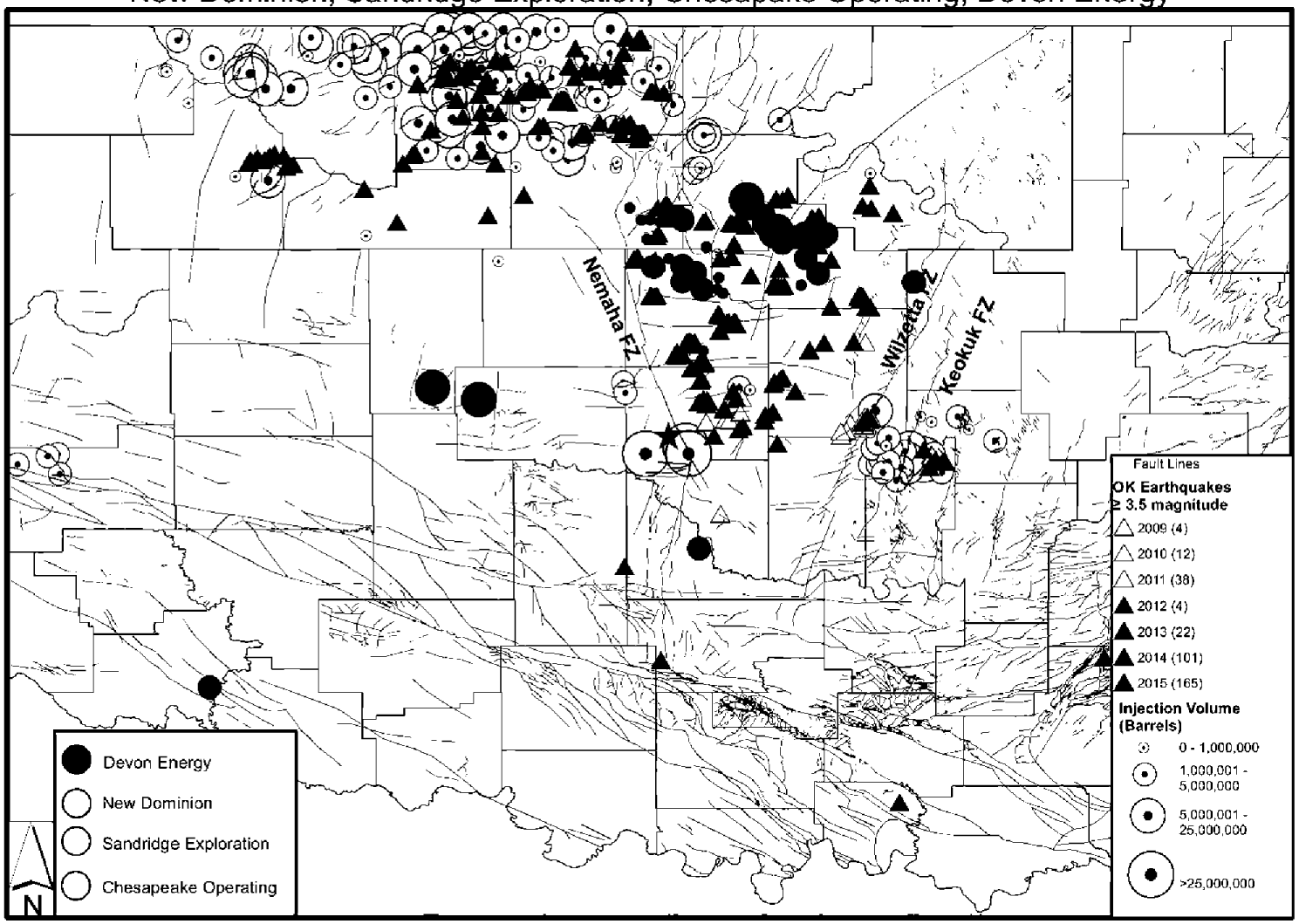


Figure 7

2011 Injection & Disposal
New Dominion, Sandridge Exploration, Chesapeake Operating

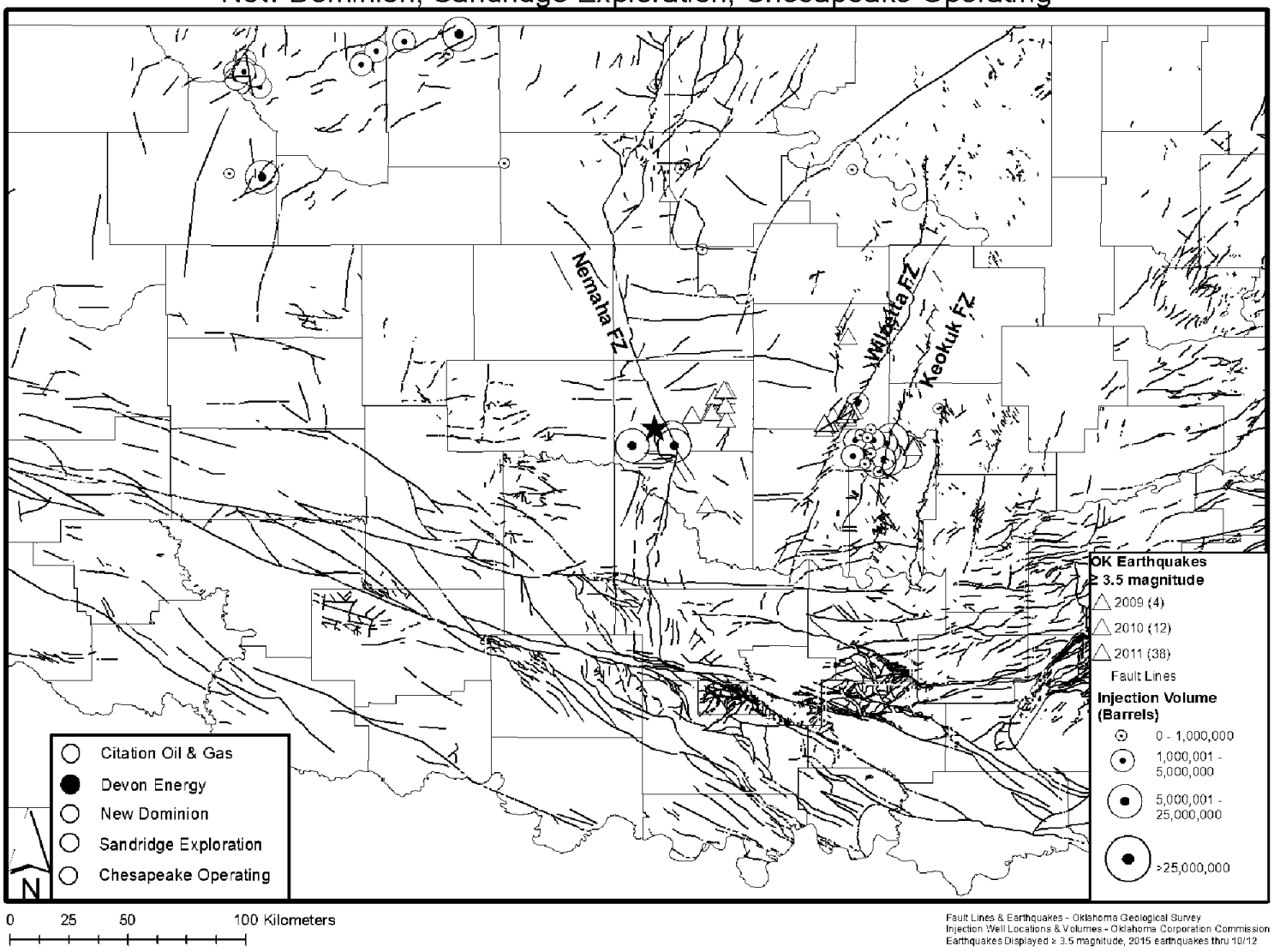
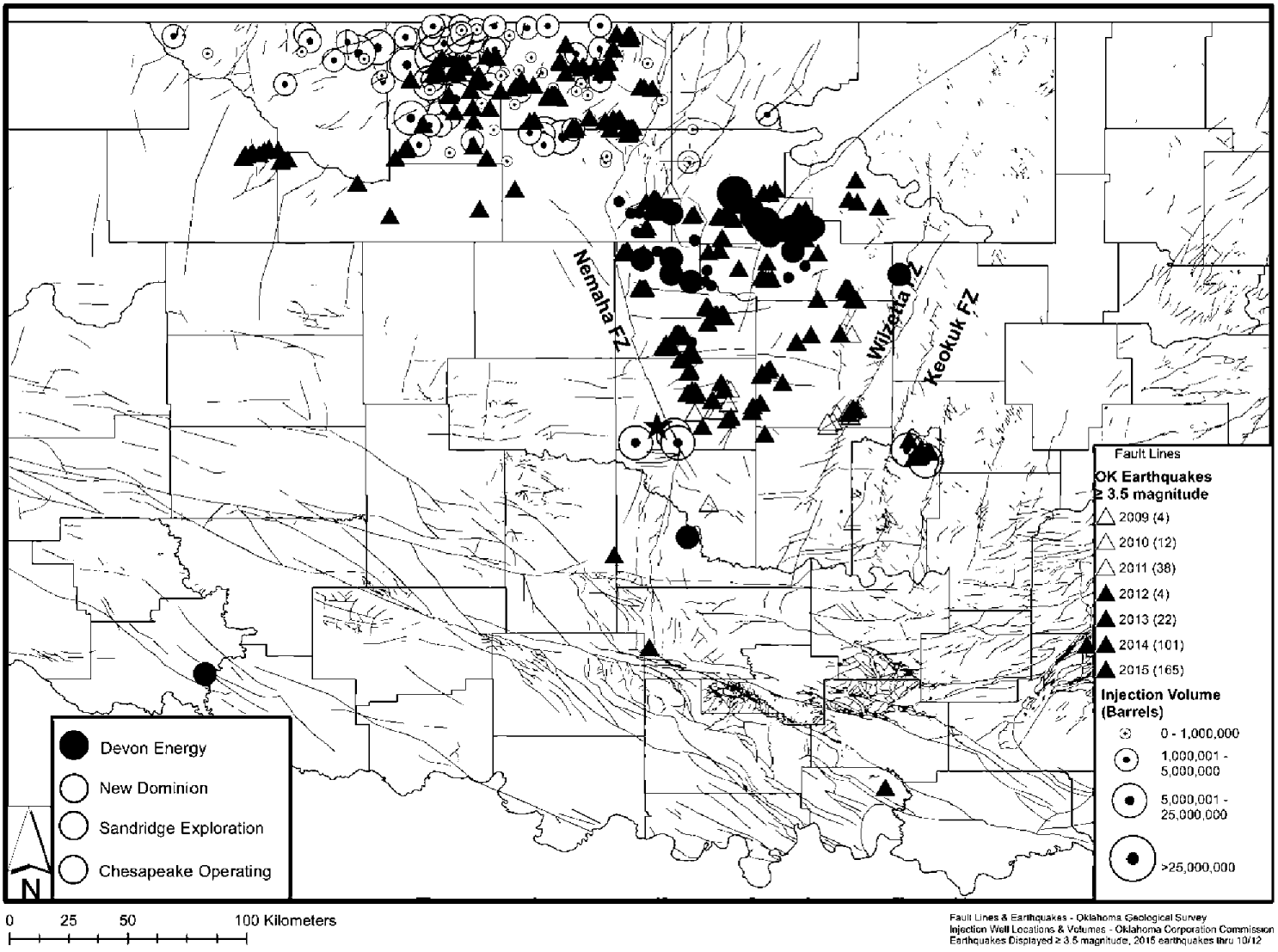
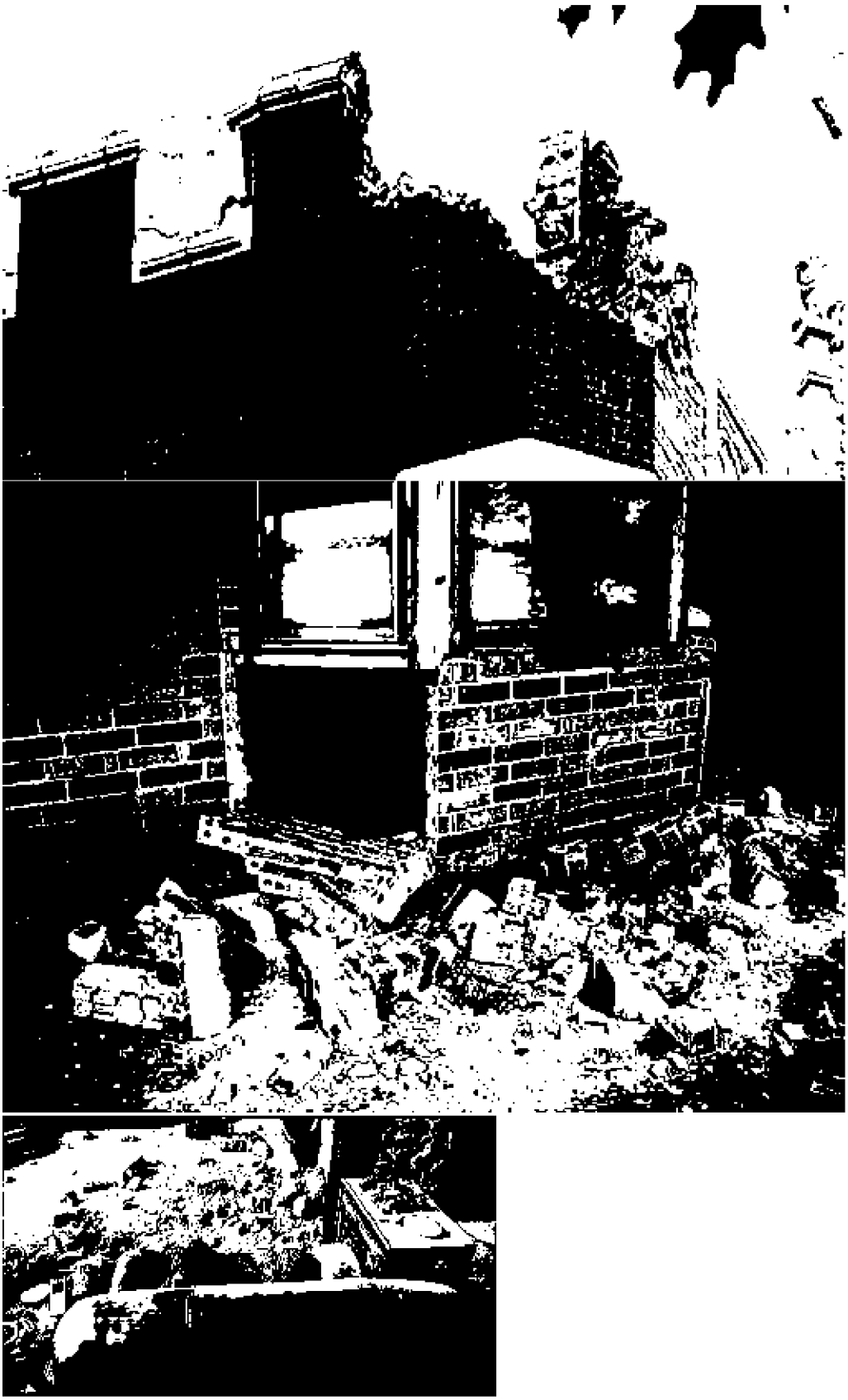


Figure 8

2014 Injection & Disposal Volume
Arbuckle Formation

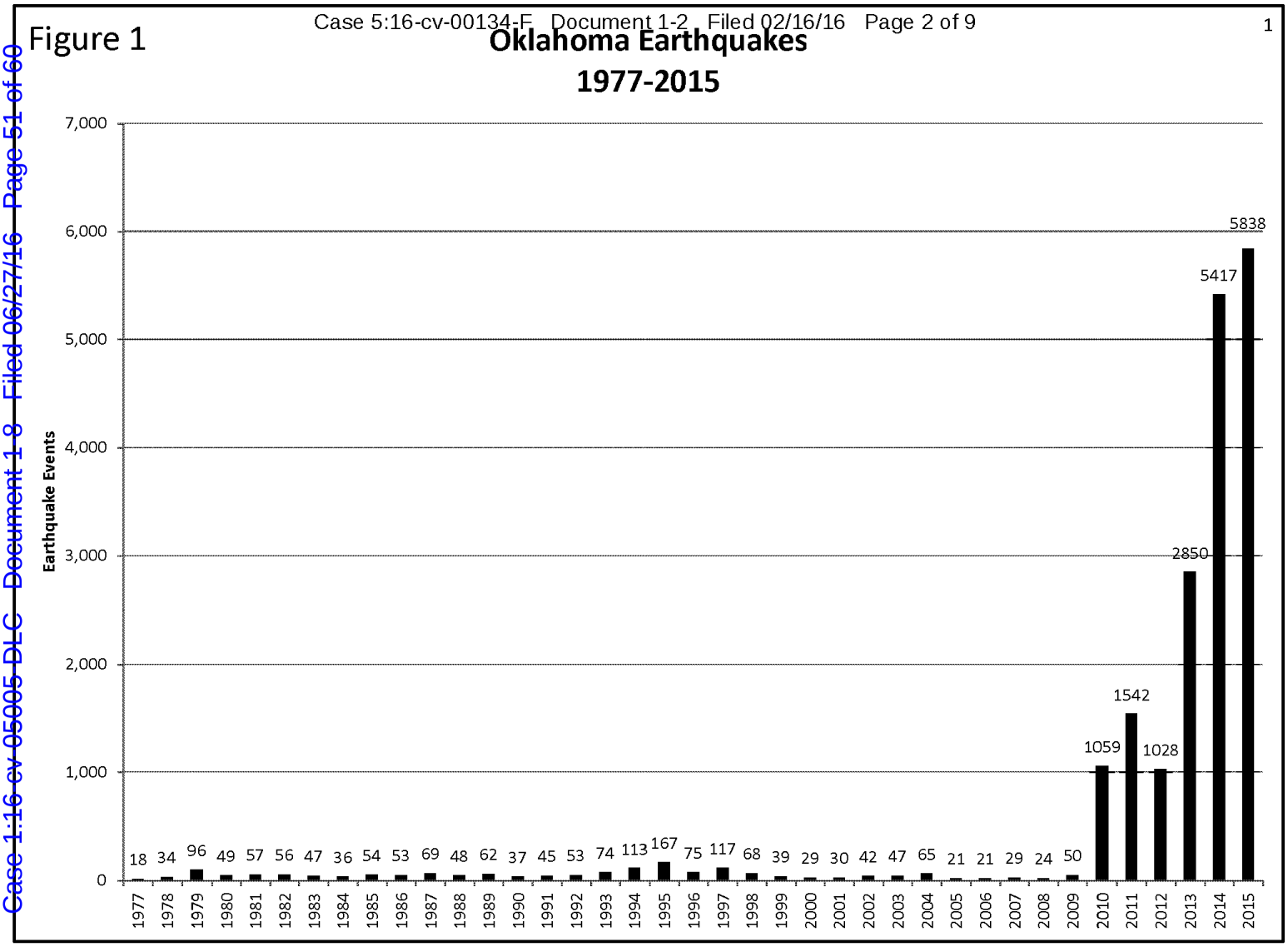


Appendix A – Damage Already Caused By Earthquakes in Oklahoma



Figures 1-8

Figure 1



Source: Oklahoma Geological Survey

Figure 2

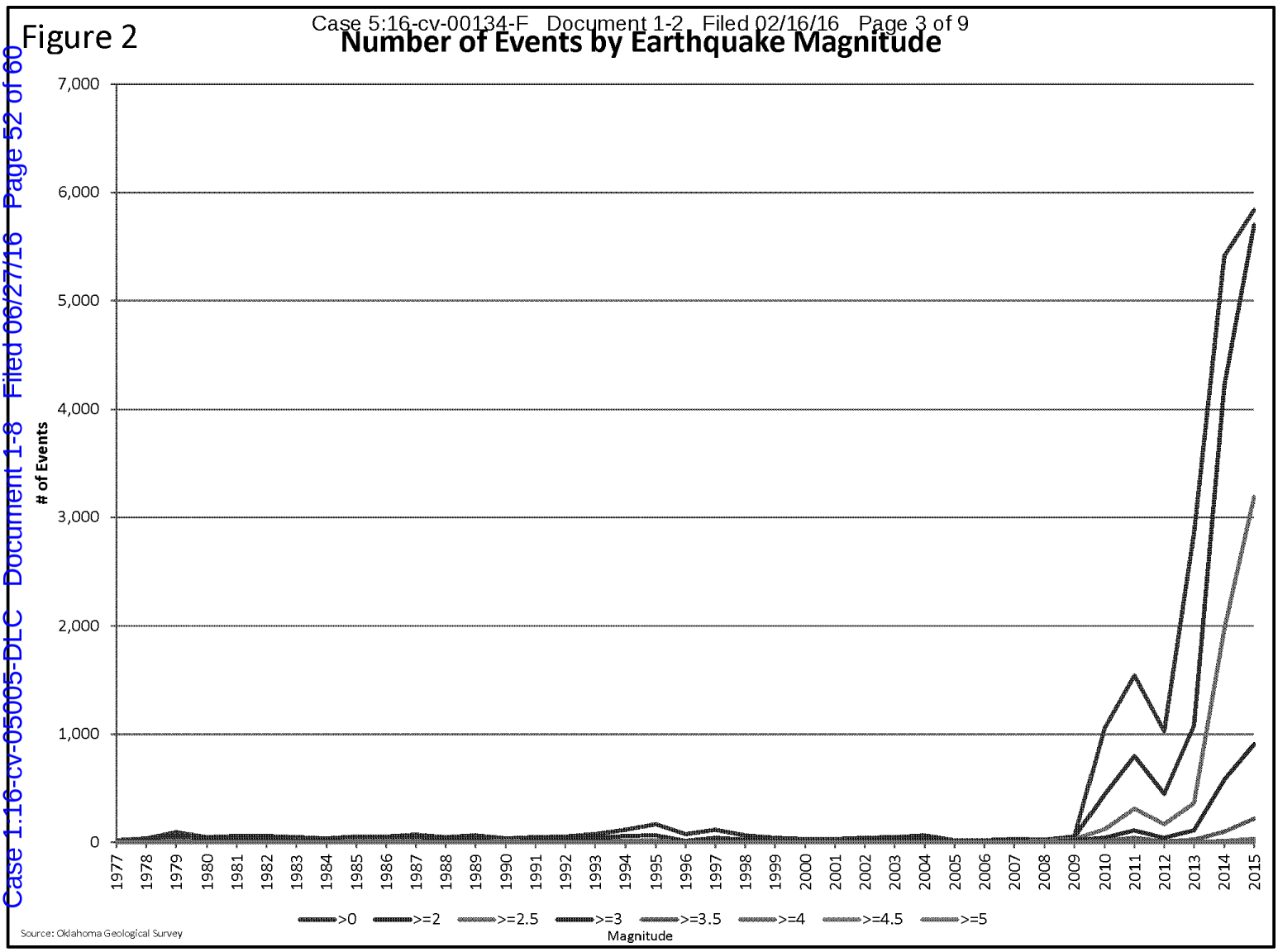


Figure 3

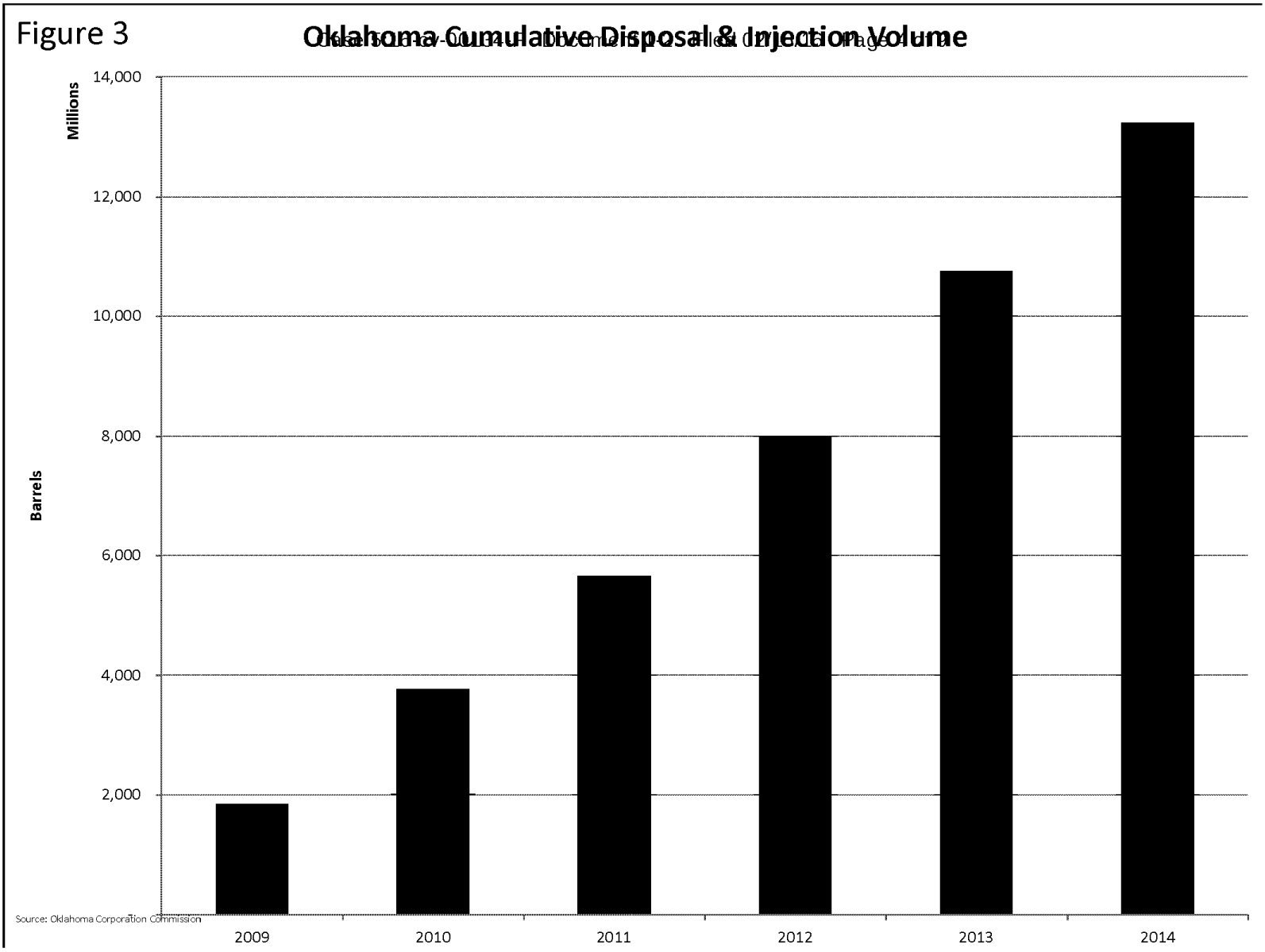
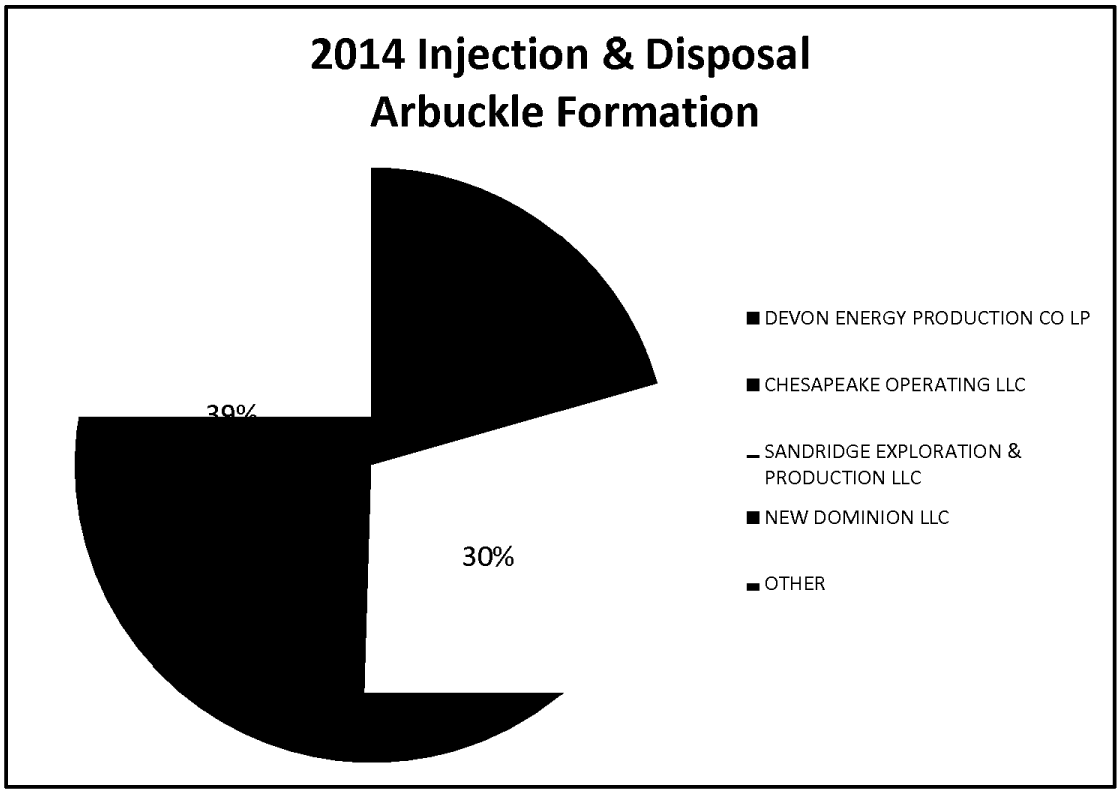

Oklahoma Cumulative Disposal & Injection Volume
Barrels
Millions
14,000
12,000
10,000
8,000
6,000
4,000
2,000
2009
2010
2011
2012
2013
2014
Source: Oklahoma Corporation Commission

Figure 4



Operator	Injection Volume (bbls)
DEVON ENERGY PRODUCTION CO LP	64,555,296
CHESAPEAKE OPERATING LLC	73,885,836
SANDRIDGE EXPLORATION & PRODUCTION LLC	201,767,276
NEW DOMINION LLC	72,081,172
OTHER	261,551,899
TOTAL	**673,841,479**

Operator	# of Wells
DEVON ENERGY PRODUCTION CO LP	36
CHESAPEAKE OPERATING LLC	14
SANDRIDGE EXPLORATION & PRODUCTION LLC	91
NEW DOMINION LLC	6
OTHER	258

Source: Oklahoma Corporation Commission

Figure 5

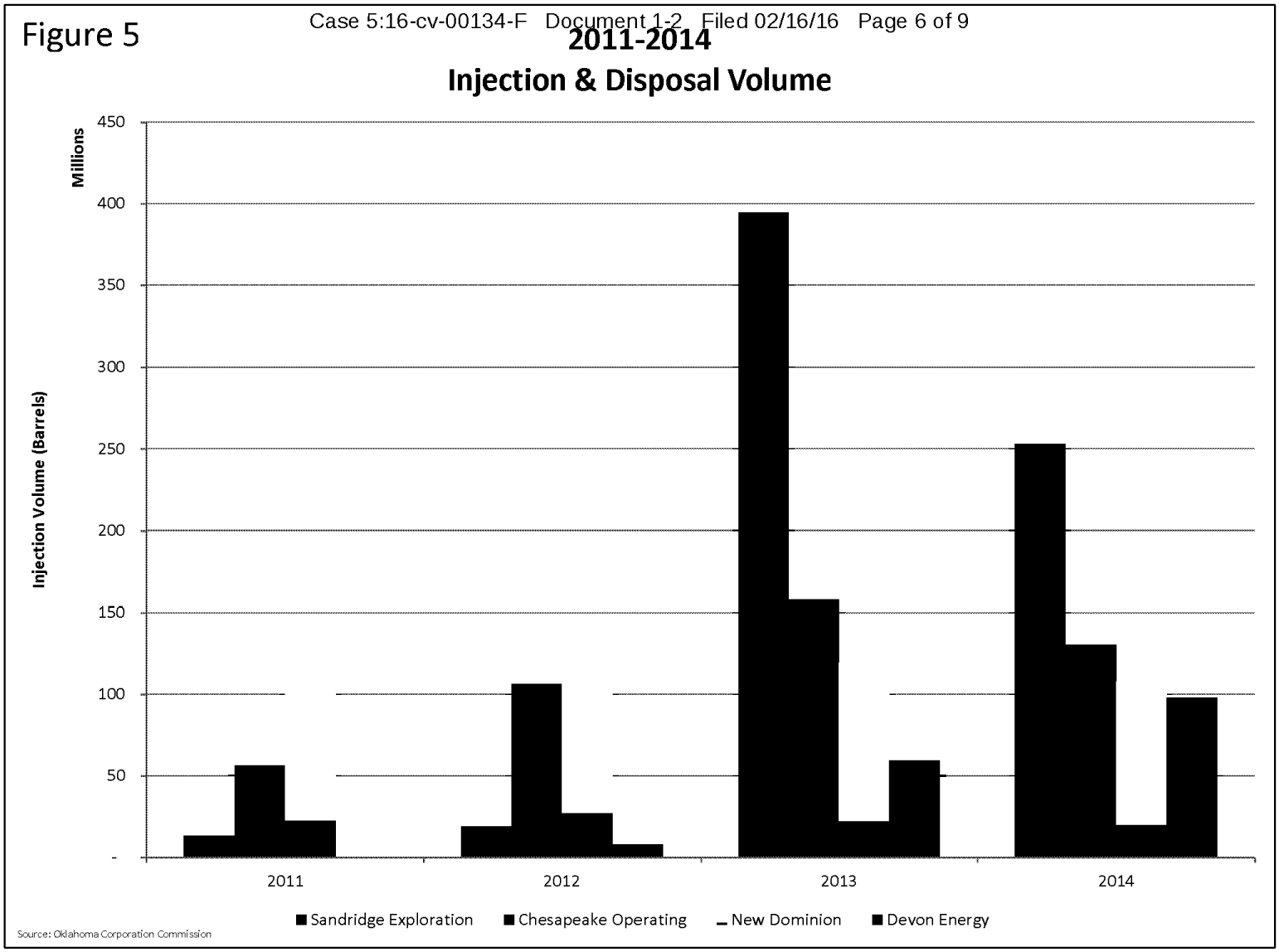

2011-2014
Injection & Disposal Volume
Millions
Injection Volume (Barrels)
450
400
350
300
250
200
150
100
50
-
2011
2012
2013
2014
Sandridge Exploration
Chesapeake Operating
New Dominion
Devon Energy
Source: Oklahoma Corporation Commission

Figure 6

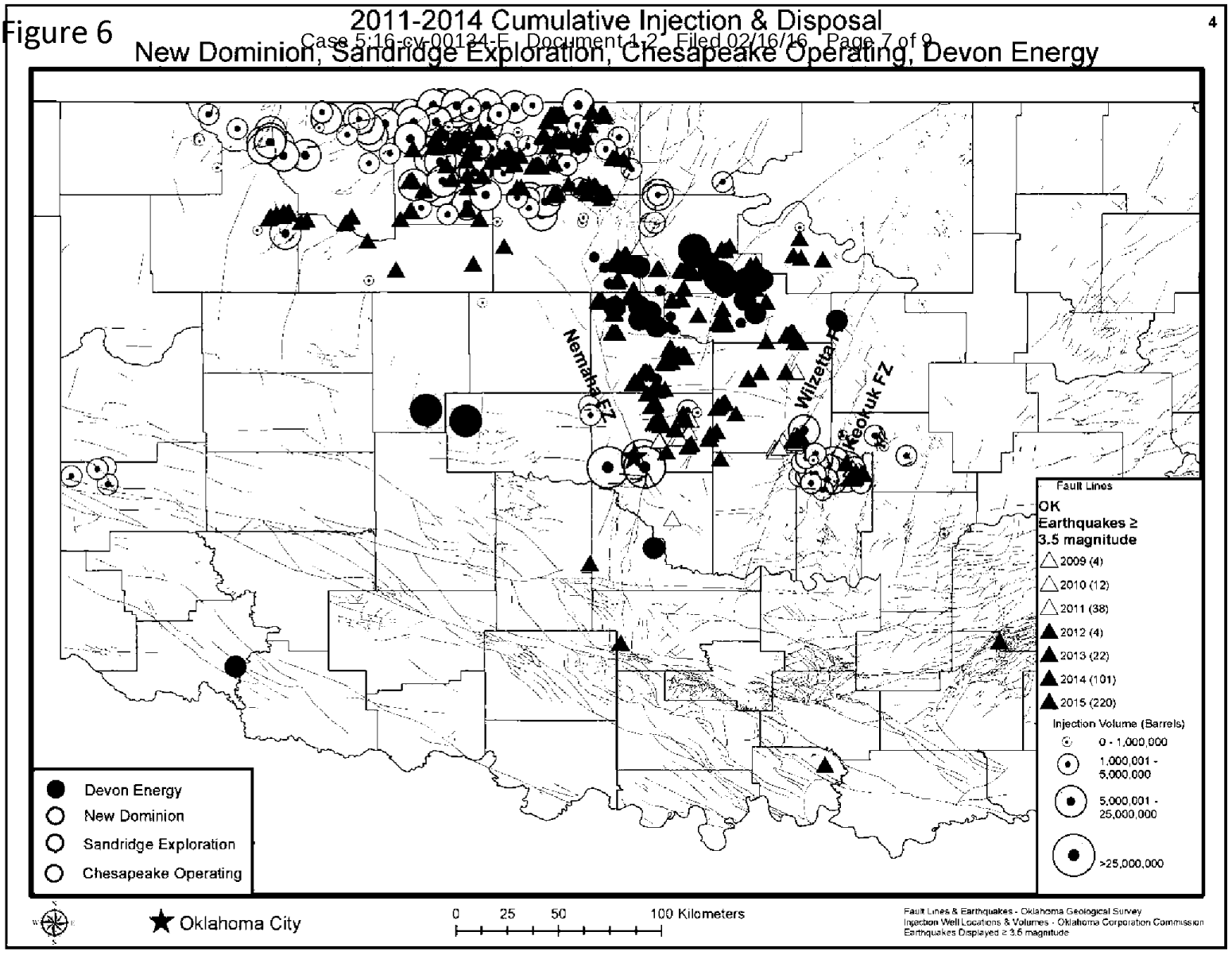

2011-2014 Cumulative Injection & Disposal
New Dominion, Sandridge Exploration, Chesapeake Operating, Devon Energy
Nemaha FZ
Wilzetta FZ
Wilzetta FZ
Fault Lines
OK
Earthquakes ≥ 3.5 magnitude
2009 (4)
2010 (12)
2011 (38)
2012 (4)
2013 (22)
2014 (101)
2015 (220)
Injection Volume (Barrels)
0 - 1,000,000
1,000,001 - 5,000,000
5,000,001 - 25,000,000
>25,000,000
Devon Energy
New Dominion
Sandridge Exploration
Chesapeake Operating
Oklahoma City
0 25 50 100 Kilometers
Fault Lines & Earthquakes - Oklahoma Geological Survey
Injection Well Locations & Volumes - Oklahoma Corporation Commission
Earthquakes Displayed ≥ 3.5 magnitude

Figure 7

2011 Injection & Disposal
New Dominion, Sandridge Exploration, Chesapeake Operating

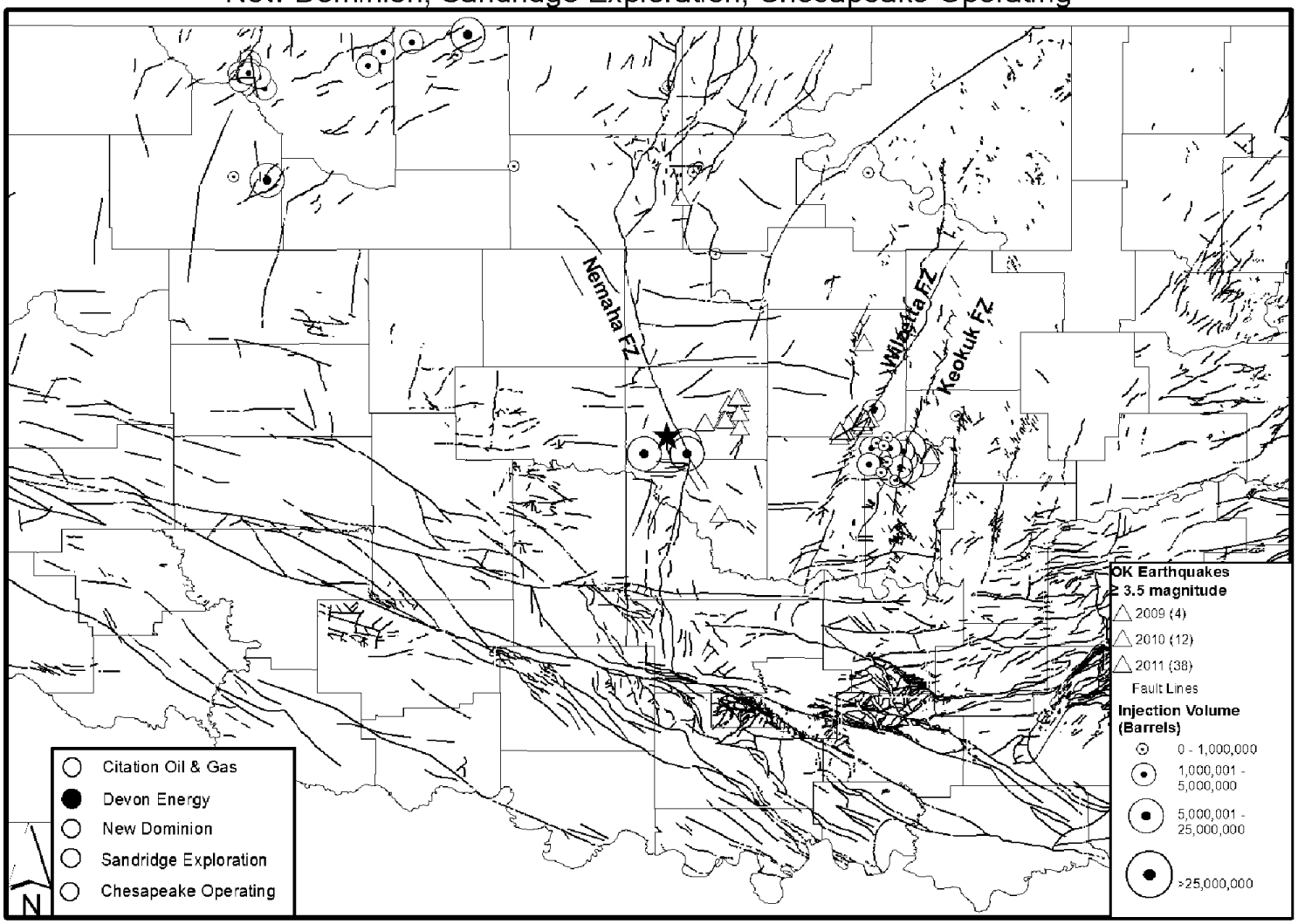


Figure 8

2014 Injection & Disposal Volume
Arbuckle Formation