

**THE STATE CORPORATION COMMISSION
OF THE STATE OF KANSAS**

Before Commissioners: Jay Scott Emler, Chairman
Shari Feist Albrecht
Pat Apple

In the Matter of an Order Reducing Saltwater)
Injection Rates into the Arbuckle Formation,) Docket No.: 15-CONS-770-CMSC
Applicable to Wells in Defined Areas of Increased) CONSERVATION DIVISION
Seismic Activity in Harper and Sumner Counties.)

SECOND ORDER REDUCING SALTWATER INJECTION RATES

The above-captioned matter comes before the State Corporation Commission of the State of Kansas (Commission). Having examined the files and records, and being duly advised in the premises, the Commission finds and concludes as follows:

JURISDICTION

1. The Commission has exclusive jurisdiction and authority to regulate oil and gas activities in Kansas and specifically saltwater injection.¹ The federal Environmental Protection Agency has delegated primacy of its Class II injection program to the Commission.²

2. K.S.A. 77-536(a) provides an agency with authority to act if there is “an immediate danger to the public health, safety or welfare requiring immediate state agency action” or “as otherwise provided by law.” K.S.A. 55-162(b) provides the Commission with specific authorization “[i]f it appears to the commission that damage may result if immediate remedial action is not taken.”

FINDINGS OF FACT

3. On March 19, 2015, the Commission issued its Order Reducing Saltwater Injection Rates (March 2015 Order). The Commission concluded that an immediate danger to

¹ K.S.A. 74-623; K.S.A. 2014 Supp. 55-901.

² 40 C.F.R. 147.851 (2015).

the public health, safety and welfare existed due to increased seismic activity in Harper and Sumner Counties, Kansas related to saltwater injection.³ The Commission reduced saltwater injection to a maximum rate of 8,000 barrels per well per day for Large Volume Injection Wells within five specified areas in Harper and Sumner Counties.⁴ The five specified areas of seismic concern detailed in the March 2015 Order shall hereinafter be referred to as the 2015 Specified Areas. In addition to the 2015 Specified Areas, the Commission reduced saltwater injection into the Arbuckle Formation for Large Volume Injection Wells within all of Harper and Sumner Counties to a maximum rate of 25,000 barrels per well per day.⁵ The Commission defined Large Volume Injection Wells as wells permitted to inject more than 5,000 barrels of saltwater per well per day into the Arbuckle Formation.⁶ The Commission also required monthly reporting of daily injection volumes and set a monitoring period in which Commission Staff, in conjunction with the Kansas Geological Survey (KGS), would review the data and make recommendations for further Commission action as necessary.⁷

4. On April 17, 2015, SandRidge Exploration and Production, LLC (SandRidge) petitioned to intervene and requested a hearing on the March 2015 Order. SandRidge qualified its request for hearing by stating, “SandRidge is not certain that it will further pursue a hearing in this docket”⁸ Rather, SandRidge only desired to preserve the right to a hearing should it be deemed necessary.⁹ On April 23, 2015, the Commission granted SandRidge’s intervention.

³ Order Reducing Saltwater Injection Rates at 1, 3 (March 19, 2015).

⁴ *Id.* at 4.

⁵ *Id.* at 5.

⁶ *Id.*

⁷ *Id.*

⁸ Motion to Intervene and Request for Hearing at 2 (Apr. 17, 2015).

⁹ *Id.*

5. On October 29, 2015, the Commission, upon motion by Staff and with no objection filed, granted extension of the monitoring period until March 13, 2016, and directed Staff to submit a report and recommendation (R&R) on or before that date.¹⁰

6. On February 19, 2016, Staff filed its R&R. Based on publically available information on the United States' Geological Survey National Earthquake Information Center (NEIC) website, Staff reported the number of felt earthquakes in Harper and Sumner Counties has decreased with each successive timeframe since the Commission's March 2015 Order.¹¹ In the 180 days prior to the Order, the NEIC indicated 107 Magnitude (M) 2.5 or greater earthquakes with forty-four (44) being M 3.0 or greater and four greater than M 4.0.¹² In the 180 days after the Commission Order, there were sixty-five (65) M 2.5 or greater earthquakes with twenty-three (23) registering M 3.0 or greater and one M 4.1.¹³ From September 15, 2015 until February 15, 2016, there have been fifty-two (52) M 2.5 or greater earthquakes with fourteen (14) measuring M 3.0 or greater and zero M 4.0 or larger.¹⁴

7. During 2015, Kansas also benefitted from having an enhanced seismic monitoring network (KCC/KGS network) in place in south central Kansas.¹⁵ While the number of felt earthquakes recorded by the NEIC has modestly decreased and become weaker over the timeframe the restrictions have been in place in this docket, the number of earthquakes recorded by the KCC/KGS network increased over the second half of 2015.¹⁶ The KCC/KGS network

¹⁰ Order Extending Monitoring Period at 4 (Oct. 29, 2015).

¹¹ Report and Recommendation of Commission Staff at 2, fn. 1 (Feb. 19, 2016) [*hereinafter* R&R].

¹² *Id.* at 2

¹³ *Id.*

¹⁴ *Id.*

¹⁵ *Id.*

¹⁶ *Id.*

recorded 4,785 earthquakes statewide ranging from M 0.0 to M 3.7.¹⁷ Eighty-five percent of the earthquakes occurred in Harper and Sumner Counties.¹⁸

8. The KCC/KGS network recorded 1,690 earthquakes in Kansas from January 2015 through June 2015, with 1,206 located within the 2015 Specified Areas.¹⁹ Seventy-nine (79) of the 1,206 earthquakes were M 2.5 or larger.²⁰ Stated another way, over the first half of 2015, 71% of the earthquakes occurred within the 2015 Specified Areas and 7% of those earthquakes recorded at the level to potentially be felt.²¹

9. From July 2015 through December 2015 the KCC/KGS network recorded 3,085 earthquakes in Kansas, with 1,174 occurring within the 2015 Specified Areas.²² Twenty-three of the 1,174 earthquakes were M 2.5 or larger, meaning 38% of the earthquakes recorded by this network in the second half of 2015 occurred within the 2015 Specified Areas and 2% of these earthquakes were at a level to potentially be felt.²³

10. Based on the data gathered following the March 2015 Order, Staff preliminarily concluded that the injection volume reductions ordered in the March 2015 Order are impacting the counties subject to the Order.²⁴ Because the data show increasing seismicity and continued clustering of earthquakes outside the 2015 Specified Areas, however, Staff recommended that in addition to the requirements of the March 2015 Order the geographic scope of the March 2015 Order be expanded to include approximately 1,500 sections in Barber, Harper, Kingman,

¹⁷ R&R at 2.

¹⁸ *Id.* at 2-3, fn. 2, Exhibit A.

¹⁹ *Id.* at 2-3.

²⁰ *Id.* at 3

²¹ *Id.*

²² *Id.*

²³ R&R at 3.

²⁴ *Id.*

Sedgwick and Sumner Counties, Kansas.²⁵ The approximate 1,500 sections proposed by Staff will hereinafter be referred to as Staff's 2016 Proposed Area of Reduction (Staff's 2016 PAR).

11. Within Staff's 2016 PAR, Staff recommended that operators of all Arbuckle injection wells permitted for greater than 5,000 barrels per day (Large Volume Injection Wells) be required to keep daily injection records and provide them monthly to Staff.²⁶ As to Arbuckle wells within Staff's 2016 PAR but outside the 2015 Specified Areas, Staff recommended phasing in reduced injection volumes, initially from 16,000 barrels per well per day, then to 12,000 barrels per well per day to ultimately 8,000 barrels of saltwater injection per well per day within 100 days of issuance of any Commission order.²⁷ Staff's R&R further recommended that Staff along with the KGS and the Kansas Department of Health and Environment continue to monitor seismic activity through 2016; that the reductions should remain in place without further Order or extension; and that Staff should make further recommendation within 365 days from the date of the Commission Order.²⁸

12. In February 24, 2016, Tapstone Energy, LLC (Tapstone) filed a petition for intervention and request for hearing. On February 26, 2016, Tapstone clarified its request for hearing stating, "Tapstone is not requesting an immediate hearing at this time."²⁹ Rather, Tapstone reserved the right to request a hearing if concerns could not be addressed through informal means.³⁰ On March 10, 2016, the Commission granted Tapstone's intervention.

13. On March 11, 2016, Staff filed an amendment to the February 19, 2016 R&R. Based on meetings with intervenors SandRidge and Tapstone, Staff recommended deletion of its

²⁵ *Id.* at fn. 9, Exhibits D and E.

²⁶ *Id.* at 3.

²⁷ *Id.* at 3-4.

²⁸ *Id.* at 4.

²⁹ Motion to Clarify Request for Hearing at 1 (Feb. 26, 2016).

³⁰ *Id.*

earlier recommendation [5) c)] to reduce the injection volume of Large Volume Injection Wells within the Staff's 2016 PAR but outside the 2015 Specified Areas to 8,000 barrels per well per day within 100 days.³¹ The effect of this deletion would result in reducing the maximum daily saltwater injection rate to 12,000 barrels per well per day for Large Volume Injection Wells within Staff's 2016 PAR. Staff's R&R also states, "The intervenors will work with staff to provide data to help researchers study seismicity. This data was otherwise unavailable to staff and researchers and will further the understanding and study of the Arbuckle reservoir and the ongoing seismicity."³²

14. Staff indicated the 2015 Specified Areas should continue to be limited to the maximum saltwater injection rate of 8,000 barrels of saltwater injection per well per day and the remaining portions of Harper and Sumner Counties, Kansas should remain capped at 25,000 barrels per well per day as required in the March 2015 Order.³³ Staff's Amended Exhibit D to the Amended R&R is attached hereto as Exhibit A in order to illustrate Staff's 2016 PAR in relation to the 2015 Specified Areas.

15. On April 26, 2016, the Commission directed the parties to submit additional information regarding volume reduction impact inside Staff's 2016 PAR, the impact on areas outside of Staff's 2016 PAR, well spacing, and data sharing.³⁴

16. On May 16, 2016, all parties responded to the Commission's directive. Staff reiterated the fact that while earthquakes M 3.0 and greater declined in number, earthquakes M 0 - 2.99 increased.³⁵ Staff stated that injection volumes in areas outside of the 2015 Specified

³¹ Amended Staff Report and Recommendation at 1 (March 10, 2016) [*hereinafter* Amended R&R].

³² *Id.*

³³ *Id.* at 2.

³⁴ Order Directing Parties to Supplement Record at 1-2 (Apr. 26, 2016).

³⁵ Commission Staff's Supplementary Information Submission at 1-2 (May 16, 2016).

Areas were increasing as well.³⁶ Staff further opined that reduction to 16,000 barrels of saltwater injection per well per day within Staff’s 2016 PAR “may not be sufficient to prevent increases in the magnitude of the current seismicity occurring outside the [2015 Specified Areas].”³⁷ Staff went on to state that an 8,000 barrel per well per day saltwater injection limit would potentially adversely impact exploration and production.³⁸ Staff concluded that a reduction to a maximum rate of 12,000 barrels of saltwater injection per well per day strikes a balance between protecting the public from seismic activity and promoting exploration and production.³⁹

17. On the issue of expanding beyond Staff’s 2016 PAR to include all of Harper and Sumner Counties, Kansas and those portions of Kingman and Sedgwick Counties, Kansas south of U.S. Highway 54, Staff indicated that only two wells would be impacted and any reduction on those wells would have minimal effect.⁴⁰ Staff stated that well spacing is an issue that can be addressed through the permitting process and therefore Commission action is unwarranted at this time.⁴¹ Tapstone indicated that it supports Staff’s recommendations and specifically asks the Commission to not expand the area of reduction beyond Staff’s 2016 PAR although such would not have an impact on Tapstone. Tapstone further characterized Staff’s Amended R&R as striking “a good balance between the Commission’s obligation to prevent waste and the concerns about induced seismicity.”⁴² SandRidge supports Staff’s Amended R&R.⁴³

CONCLUSIONS OF LAW

18. The Commission finds that the continued increase in seismic activity in the areas outside of the 2015 Specified Areas is a matter concerning immediate danger to the public

³⁶ *Id.* at 2.

³⁷ *Id.* at 3.

³⁸ *Id.* at 3.

³⁹ *Id.*

⁴⁰ *Id.* at 4.

⁴¹ *Id.* at 5.

⁴² Statement of Position by Intervenor Tapstone Energy, LLC at 3-4, 5 (May 16, 2016).

⁴³ Intervenor SandRidge Exploration & Production, LLC’s Statement of Position at 3-4 (May 16, 2016).

health, safety and welfare. Pursuant to K.S.A. 55-162(b), 2014 Supp. 55-901, 77-536, and 74-623, the Commission concludes that the use of emergency proceedings continues to be appropriate in this docket.

19. Therefore, the Commission finds that Staff's Amended R&R should be adopted with two modifications. First, for administrative efficiency and clarity, the Commission modifies Staff's 2016 PAR by defining the expanded area by intersections of township and range instead of by section. The area will hereinafter be referred to as the 2016 Specified Area. This change will minimally expand the area of reduction beyond Staff's 2016 PAR. However, having clear and efficient regulation outweighs the small increase in the affected area.

20. Second, within the 2016 Specified Area, the Commission declines to reduce injection rates to 12,000 barrels of saltwater injection per well per day at the outset. The Commission instead adopts a maximum saltwater injection rate of 16,000 barrels per well per day. In keeping with the requirements for emergency orders, the March 2015 Order established a tailored approach to understanding and mitigating seismic activity by isolating geographic areas within Harper and Sumner Counties for specific regulatory action and further investigation through data gathering from the KCC/KGS network. The Intervenors have additional data specific to their wells and their operations that they have offered to share to assist Staff and KGS with the ongoing investigation of the seismic activity. The Intervenors have expressed no objection to Staff's Amended R&R and support Staff's recommendations, as amended.

21. The Commission appreciates Staff and the Intervenors' support of the 12,000 barrel per well per day maximum saltwater injection rate reduction. However, Staff's belief that a reduction to a maximum saltwater injection rate of 16,000 barrels per well per day would have no effect is untested.

22. The following restrictions shall govern new and existing Arbuckle injection wells in the affected areas. This Order expands the geographic scope of the March 2015 Order and requires a reduced injection rate and additional monitoring for Large Volume Injection Wells located within the 2016 Specified Area.

23. For purposes of this Order, "Large Volume Injection Well" shall mean any well that is permitted to inject more than 5,000 barrels of saltwater per well per day into the Arbuckle formation. Exhibit D is a listing of the Large Volume Injection Wells within the 2016 Specified Area that are subject to this Order.

24. For each Large Volume Injection Well that is located within the 2016 Specified Area but outside the 2015 Specified Areas, beginning 10 days after the effective date of this Order, no operator shall inject more than 16,000 barrels of saltwater per day into any well.

25. Beginning 10 days after issuance of this Order, each operator within the 2016 Specified Area but outside the 2015 Specified Areas shall measure daily volumes for each Large Volume Injection Well for the calendar month and shall report them to the Conservation Division by the end of business on the eighth day of the following calendar month. The monthly reporting required in the March 2015 Order shall remain in effect for the Large Volume Injection Wells subject to that Order.

26. The period between 11 and 180 days after the effective date of this Order, and for so long thereafter as may be needed, shall constitute a monitoring period during which Staff and the KGS will review the available data and make recommendations regarding any further action by the Commission. The Commission shall not be restricted from making any changes to this Order at any time for any reason, regardless of whether the full monitoring period has elapsed.

27. In Harper and Sumner Counties, no Large Volume Injection Well shall be permitted to inject saltwater in excess of 25,000 barrels per well per day.

28. Each Large Volume Injection Well located within the 2015 Specified Areas shall remain restricted to saltwater injection of no more than 8,000 barrels per well per day.

29. The Commission therefore directs Staff, in conjunction with the Intervenors and the KGS, to monitor seismicity in the 2016 Specified Area in accordance with the terms of this Order. The Commission commends the parties' willingness to exchange data to continue to inform the Commission's study of the seismic activity in the areas encompassed by this Order and the Commission's March 2015 Order. Therefore, the Commission orders the data sharing to continue and directs the parties to work through the Prehearing Officer to develop the parameters of data sharing.

30. The Commission also directs Staff to address the matter of well spacing within both the 2016 Specified Areas and the 2015 Specified Areas. The Commission understands that it addressed well spacing in the March 2015 Order, prohibiting from permitting any Large Volume Injection Wells from being closer than one-quarter mile of another. The Commission wants Staff to address the existence of any Large Volume Injections Well currently located within one-quarter mile of another Large Volume Injection Well and to specifically answer the questions as to whether such wells should be treated as one well for purposes of the injection rates.

31. Upon the filing of any data in support, the Commission may, at that time, elect to order further reduction. Should seismic circumstances emerge that necessitate immediate Commission action to remedy the situation, nothing shall prevent the Commission from taking further action.

32. Exhibit A, attached to this Order, is a map depicting Staff's 2016 PAR in relation to the 2015 Specified Areas.

33. Exhibit B, attached to this Order, is a map depicting the 2016 Specified Area of reduction in relation to and overlaid with Staff's 2016 PAR.

34. Exhibit C, attached to this Order, is a map showing the 2016 Specified Area in relation to and overlaid with the 2015 Specified Areas.

35. Exhibit D, attached to this Order, is a list of current Large Volume Injection Wells in the 2016 Specified Area.

36. The Intervenors in this matter have requested a hearing but held such request in abeyance at their own request. K.S.A. 77-536(e) requires the Commission to move as quickly as feasible to hold any proceedings that would be necessary if the matter did not constitute an emergency proceeding. The Commission therefore orders Staff and the current Intervenors, SandRidge and Tapstone, to confer with each other and submit a proposed procedural schedule for the remainder of the proceedings.

37. In the alternative, noting that the Intervenors are supportive of Staff's Amended R&R, the Intervenors may waive the right to a hearing on the matter so long as such waiver is duly filed in the record. If the Intervenors so choose to waive the right to a hearing and the Commission orders any further expansion, modification, rescission or otherwise, the Intervenors are assured that the right to request further proceedings would be reinstated by said act.

38. The Commission designates Dustin L. Kirk, Deputy General Counsel, 1500 SW Arrowhead Road, Topeka, KS 66604-4027, telephone number (785) 271-3198, d.kirk@kcc.ks.gov, to serve as Prehearing Officer in this proceeding.⁴⁴ The Prehearing Officer may conduct any prehearing conferences necessary to address any matters appropriately

⁴⁴ K.S.A. 77-514; K.S.A. 77-516; K.S.A. 77-551(c).

considered in a prehearing conference, including all items listed in K.S.A. 77-517(b) of the Kansas Administrative Procedure Act (KAPA), K.S.A. 77-501 *et seq.* The Commission may designate other staff members to serve in this capacity.

THEREFORE, THE COMMISSION ORDERS:

A. The restrictions described in this Order shall govern the wells subject to this Order. Previously-issued Class II injection permits of all affected wells within the 2016 Specified Area are hereby amended to comply with the requirements of this Order.

B. Each failure to abide by the restrictions or reporting requirements in this Order may result in a Penalty Order of up to \$10,000 per day of a continuing violation, pursuant to K.S.A. 2015 Supp. 55-164. The Commission Staff is directed to shut-in and seal any well found to be operating in violation of this Order.

C. Staff and Intervenors shall propose a procedural schedule to govern the remainder of the proceedings. In the alternative, the Intervenors may waive the right to request hearing and so file such position in the Docket.

D. Staff shall continue to monitor the seismic activity in the 2016 Specified Area and to the extent capable and necessary beyond the 2016 Specified Area and document the findings in a report and recommendation due on or before April 1, 2017.

E. Dustin L. Kirk, Deputy General Counsel, is designated as Prehearing Officer.

F. All other provisions of the Commission's March 2015 Order not modified herein shall remain in full force and effect.

G. Any party affected by this Order may file with the Commission a petition for reconsideration pursuant to K.S.A. 77-529(a). The petition shall be filed within 15 days after service of this Order. If service of this Order is by mail, three days are added to the deadline. The petition shall be addressed to the Commission and sent to 266 N. Main, Ste. 220, Wichita, Kansas 67202. Pursuant to K.S.A. 55-606 and K.S.A. 77-529(a), reconsideration is prerequisite for judicial review of this Order. Any party taking an action permitted by this summary proceeding before the deadline for a petition for reconsideration does so at their own risk.

H. The Commission retains jurisdiction over the subject matter and parties for the purpose of entering such further orders as it may deem necessary.

BY THE COMMISSION IT IS SO ORDERED.

Emler, Chairman; Albrecht, Commissioner (Dissenting); Apple, Commissioner

Dated: AUG 09 2016



Amy L. Green
Secretary to the Commission

Mailed Date: August 9, 2016

DLK/sc

The record reflects that the last reduction in injection volumes in Harper and Sumner Counties occurred in June 2015.¹ The total volume reduction within the 2015 Specified Areas was 7, 137,145 barrels for the first six months of 2015, which coincided with a reduction in the number of M 2.5 or larger earthquakes within the 2015 Specified Areas.² (Underlining added). However, the number of M 0-2.99 earthquakes increased in the last six months of 2015.³ At the time of filing its position in response to the Commission Order to Supplement the Record, Staff noted the correlation between the increasing disposal volumes within the 2016 PAR and the increasing low-level seismicity measured by the KCC/KGS network.⁴

Staff has identified 48 Large Volume Injection Wells outside the 2015 Specified Areas, eight of which had daily averages exceeding 16,000 barrels of saltwater per day for at least one month since January 2015. Two of the eight wells had daily averages exceeding 16,000 barrels per day from January 2015 through March 2016. (Underlining added). As Staff noted, a volume reduction to 16,000 barrels per well per day for the two wells within Staff's 2016 PAR would result in a total volume reduction of 2,729,105 barrels over the course of one year.⁵ (Underlining added).

With respect to a volume reduction to 12,000 barrels of saltwater per well per day, all of the eight wells have disposed 12,000 barrels per day for at least one month since January 2015 and seven of the wells have maintained this daily average from January 2015 through March 2016. (Underlining added). A volume reduction to 12,000 barrels per well per day for the seven wells within the Staff's 2016 PAR would result in a total volume reduction of 10, 137,145 barrels over one year.⁶

With a further volume reduction to 8,000 barrels of water per well per day, thirteen wells would be affected, having exceeded 8,000 barrels per day for at least one month since January 2015. Ten of these wells have averaged 8,000 barrels per day for each month from January 2015 through March 2016. (Underlining added). A volume reduction to 10,000 barrels per well per day for these ten wells within the Staff's 2016 PAR would result in a total volume reduction of 21,595,225 barrels over one year.⁷ (Underlining added).

From the data gathered following January 2015 until March 2016, it would appear as Staff has observed that the volume reductions required by the March 2015 have had a positive impact on reducing the earthquake magnitude within the 2015 Specified Areas. Given the apparent trend of the increasing number of smaller magnitude earthquakes and their similar cluster pattern within the Staff's 2016 PAR, the majority's decision to cap the volume reductions in the 2016 Specified Area at 16,000 barrels of water per well per day would do little to change the status quo and provide minimal data from which to draw any conclusion as to the smaller magnitude earthquake trend.

The Intervenor do not support a volume reduction to 8,000 barrels per well per day due to the impact such a reduction would have on potential exploration and production and Staff concurs that a reduction to 8,000 barrels per well per day may create waste.⁸ Reducing the injection volume to 8,000 barrels per well per day would provide a significant reduction in total injection volume, especially when the total reduction is compared to the initial reduction volume resulting from the March 2015 Order. Moreover, a reduction to 8,000 barrels per well per day for wells within the Staff's 2016 PAR would make these wells equivalent to the final volume reductions for wells within the 2015 Specified Area where larger magnitude earthquakes were occurring. Such a marked reduction for the smaller magnitude earthquake trend observed within the Staff's 2016 PAR does not appear to be warranted without further evidence.

¹ Staff's Position on Commission Order to Supplement Record at 3 (May 16, 2016).

² *Id.*

³ *Id.* at 1. See graph at 2.

⁴ *Id.* at 2.

⁵ *Id.*

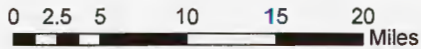
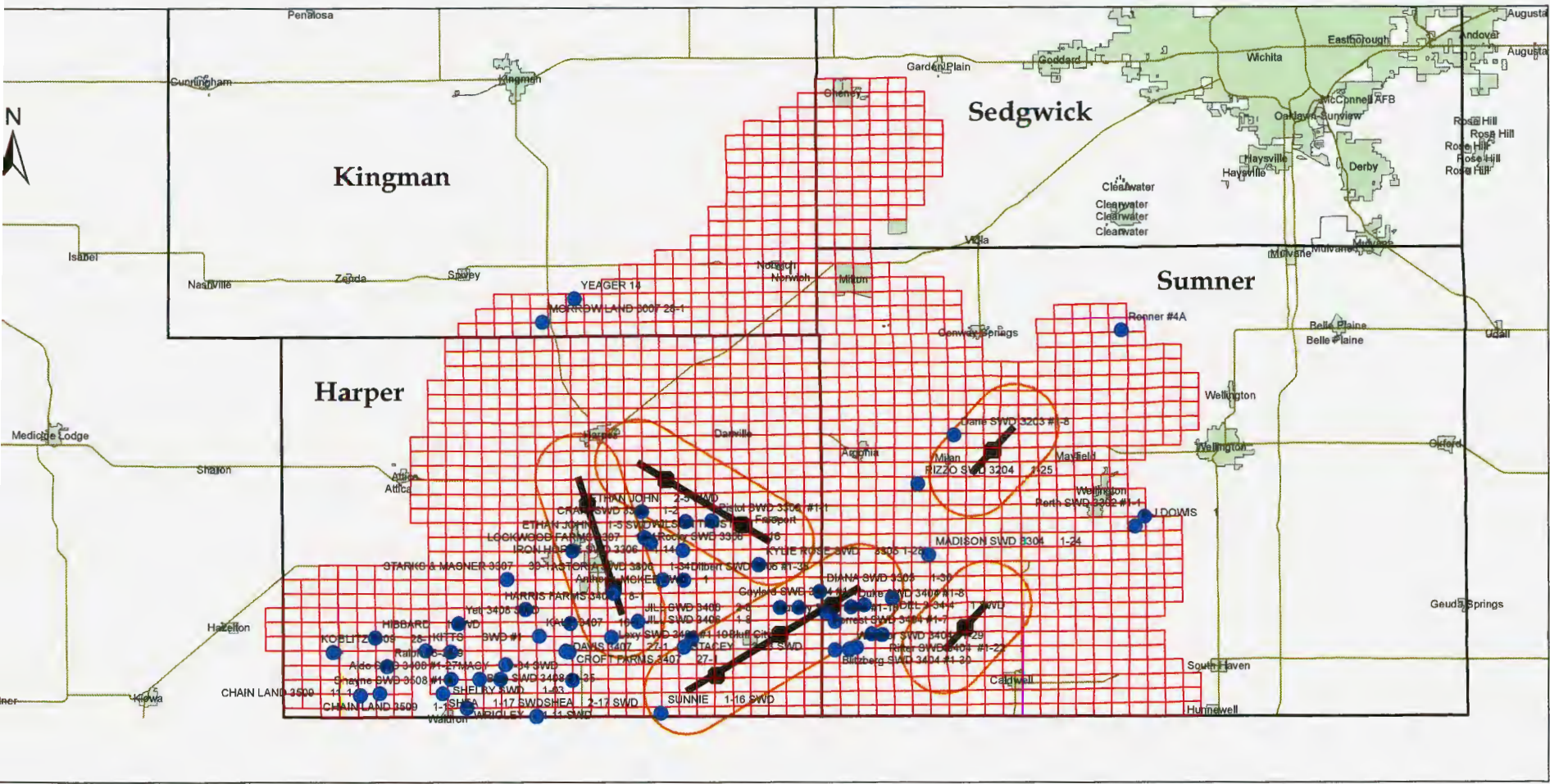
⁶ *Id.* at 3.

⁷ *Id.*

⁸ Intervenor SandRidge Exploration & Production, LLC's Statement of Position at 3 (May 16, 2016); Statement of Position Tapstone Energy, LLC at 3 (May 16, 2016); Staff's Position on Commission Order to Supplement Record at 3 (May 16, 2016).

In keeping with the requirements for emergency orders, the March 2015 Order established a tailored approach to understanding and mitigating seismic activity by isolating geographic areas within Harper and Sumner Counties for specific regulatory action and further investigation through data gathering from the KCC/KGS network. The Intervenors have additional data specific to their wells and their operations that they have offered to share to assist Staff and KGS with the ongoing investigation of the seismic activity. As noted by Staff and supported by the Intervenors, a 12,000 barrel per day per well reduction represents a reasonable balance between too little information from a reduction to 16,000 barrels per well per day and insufficient evidence to support a larger reduction to 8,000 barrels per well per day at this time. The record in this matter supports reducing the injection volume for Large Volume Injection Wells within the Staff's 2016 PAR to 16,000 barrels of water per well per day within 10 days of the effective date of this Order for a period of 55 days thereafter and further reducing the injection volume to 12,000 barrels of water per well per day. Establishing a 180-day study period for these volume reductions is reasonable for tailoring the response to induced seismicity in Harper and Sumner Counties. For the reasons stated here, I respectfully dissent.

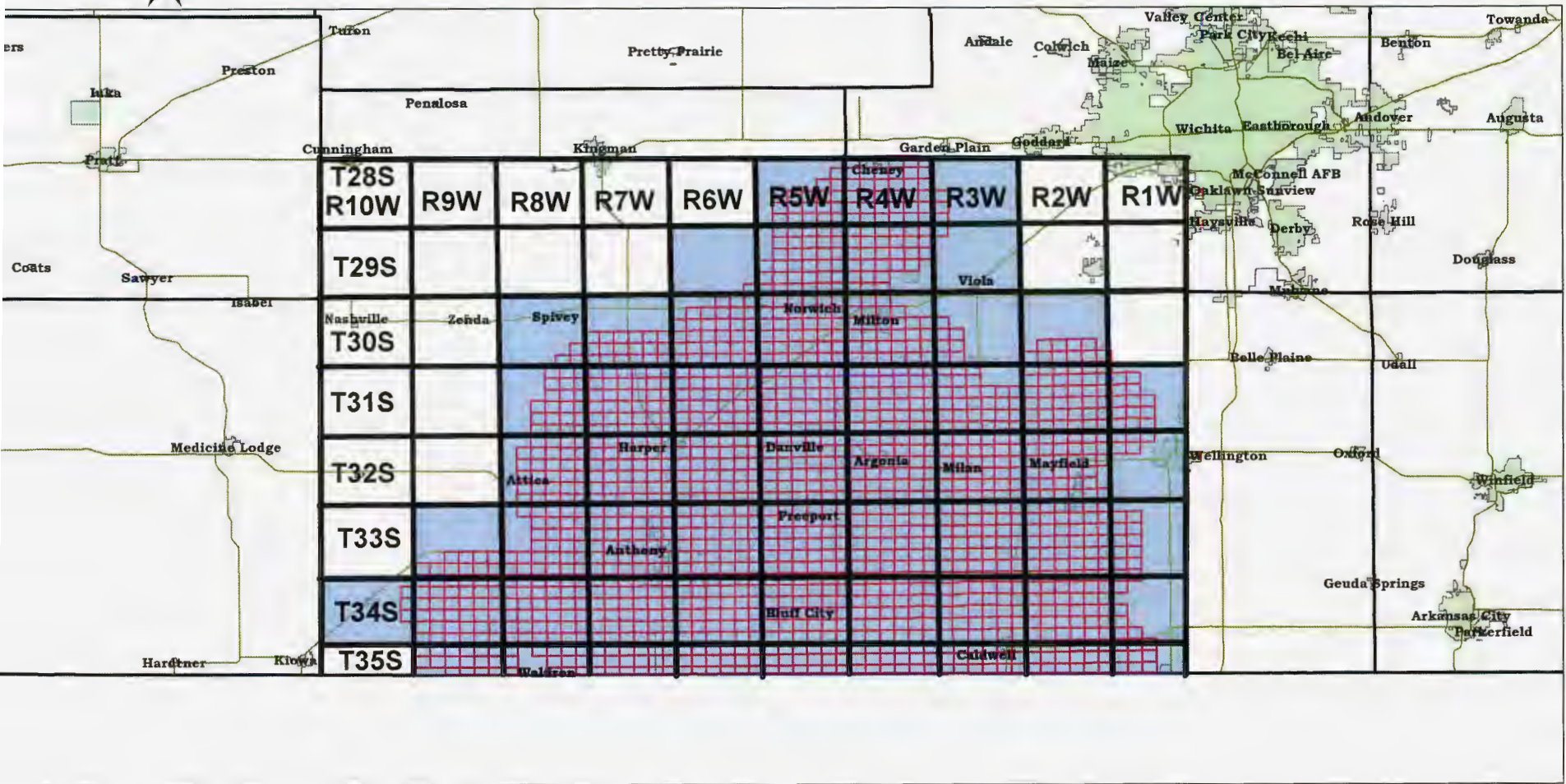
Large Volume Arbuckle Injection Wells



- Arbuckle Disposal Wells**
- Arbuckle Wells over 5000 Barrels
 - ▭ Proposed Area of Reduction
 - ▭ Area of Seismic Concern Boundary

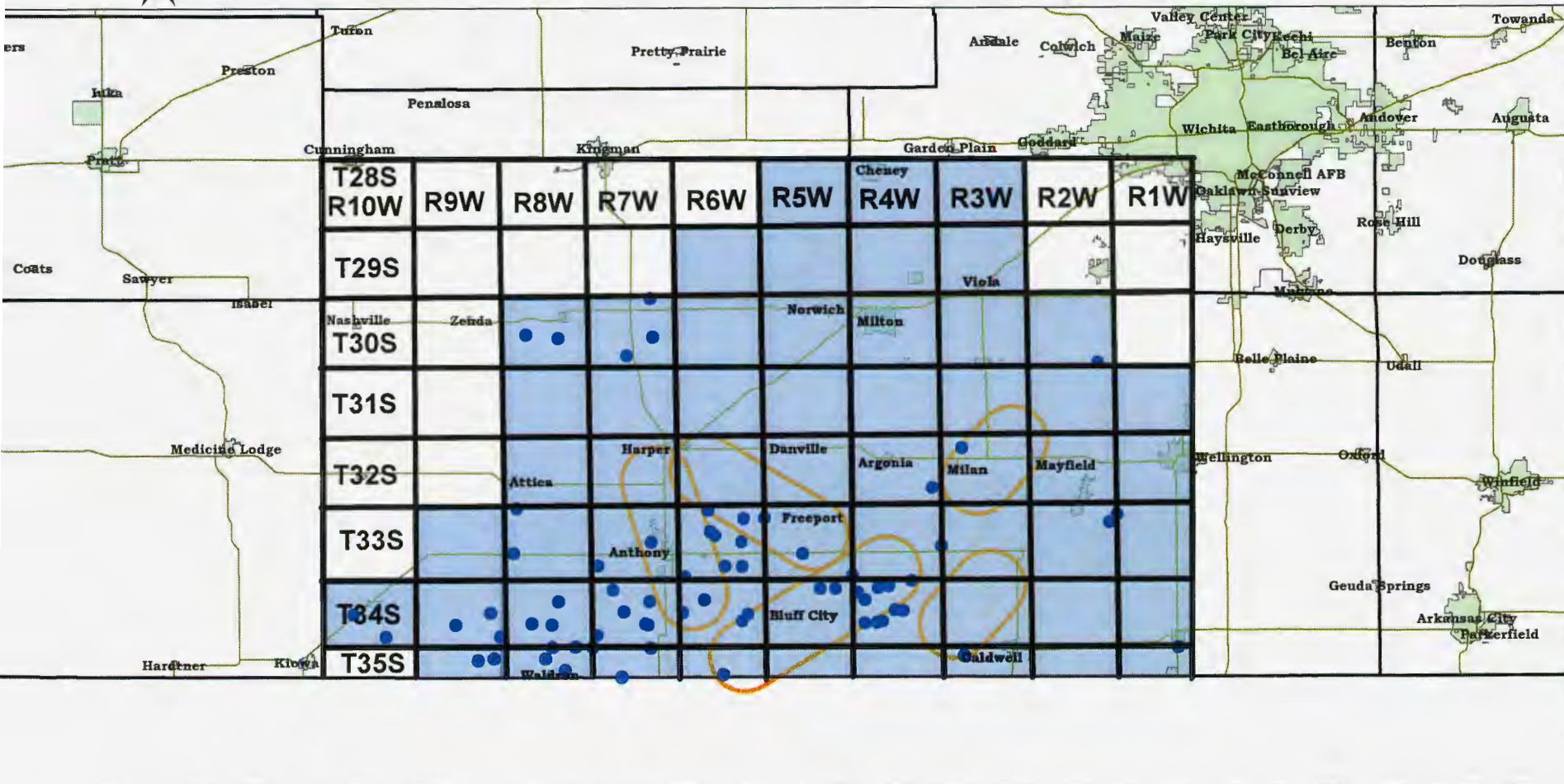
Staff's PAR & Commission's 2016 Specified Area

EXHIBIT B



2016 Specified Area
 Staff's PAR

2015 Specified Areas, Commission's 2016 Specified Area & LVD Wells



- Large Volume Disposal Wells (5001+bpd)
- 2016 Specified Area
- 2015 Specified Area

API	Permit	Well	Sec	T	R	Operator	Lat	Long	PermitDate	MaxRate	MaxPSI
15-191-22754-00-00	D31902.0	Renner #4A	35	30	2	Jclen Operating Company	37.391147	-97.500271	8/4/2014	7500	0
15-095-22237-00-00	D31064.0	MORROW LAND 3007 28-1	28	30	7	Tapstone Energy, LLC	37.40019	-98.086833	11/30/2011	20000	800
15-095-21405-00-00	D22418.0	YEAGER 14	23	30	7	Oil Producers, Inc. of Kansas	37.423771	-98.054466	12/13/1983	10000	500
15-095-01345-00-00	D07122.0	JANIE CATLIN 1	2	30	7	T & C Mfg. & Operating, Inc.	37.471649	-98.05777	4/16/1959	9600	50
15-095-01567-00-00	D04772.0	FRANK D RALL 1	22	30	8	Linn Operating, Inc.	37.422119	-98.172333	12/9/1955	21500	500
15-095-21052-00-01	D27434.0	NICHOLAS 1	20	30	8	Messenger Petroleum, Inc.	37.42694	-98.21198	9/4/1997	6000	250
15-191-22726-00-00	D31889.0	Dane SWD 3203 #1-8	8	32	3	SandRidge Exploration and Production LLC	37.284492	-97.668505	5/16/2014	20000	500
15-191-22682-00-00	D31584.0	RIZZO SWD 3204 1-25	25	32	4	SandRidge Exploration and Production LLC	37.235079	-97.704972	8/20/2013	20000	500
15-191-22699-00-01	D31859.0	Perth SWD 3302 #1-1	1	33	2	SandRidge Exploration and Production LLC	37.201549	-97.476653	7/16/2014	20000	500
15-191-01384-00-02	D31324.0	A J DOWIS 1	12	33	2	Bear Petroleum, LLC	37.191551	-97.486214	7/30/2013	20000	0
15-191-22686-00-00	D31586.0	MADISON SWD 3304 1-24	24	33	4	SandRidge Exploration and Production LLC	37.162625	-97.693947	8/23/2013	19900	1300
15-077-21870-00-00	D31341.0	KYLIE ROSE SWD 3305 1-28	28	33	5	SandRidge Exploration and Production LLC	37.152997	-97.866601	9/20/2012	40000	1200
15-077-21988-00-00	D31800.0	DIANA SWD 3305 1-36	36	33	5	SandRidge Exploration and Production LLC	37.125517	-97.804947	2/8/2014	20000	500
15-077-21972-00-00	D31716.0	ASTORIA SWD 3306 1-34	34	33	6	SandRidge Exploration and Production LLC	37.137604	-97.964494	12/11/2013	60000	1500
15-077-21798-00-00	D31069.0	ETHAN JOHN 1-5 SWD	5	33	6	SandRidge Exploration and Production LLC	37.207183	-97.985532	3/4/2012	60000	1500
15-077-21799-00-00	D31070.0	ETHAN JOHN 2-5 SWD	5	33	6	SandRidge Exploration and Production LLC	37.207185	-97.986047	3/6/2013	60000	1500
15-077-21973-00-00	D31711.0	IRON HORSE SWD 3306 1-14	14	33	6	SandRidge Exploration and Production LLC	37.167721	-97.943829	1/8/2014	60000	1450
15-077-22086-00-00	D32007	Rocky SWD 3306 1-16	16	33	6	SandRidge Exploration and Production LLC	37.175416	-97.976736	9/6/2014	32000	500
15-077-21980-00-00	D31794.0	CRAIG SWD 3306 1-2	2	33	6	SandRidge Exploration and Production LLC	37.196817	-97.940819	1/0/2014	30000	1525
15-077-22002-00-00	D31808.0	Dilbert SWD 3306 #1-35	35	33	6	SandRidge Exploration and Production LLC	37.137365	-97.942733	4/9/2014	30000	500
15-077-22044-00-00	D31944.0	Pistol SWD 3306 #1-1	1	33	6	SandRidge Exploration and Production LLC	37.197404	-97.914481	6/6/2014	20000	500
15-077-01045-00-02	D28225.0	MCKEE SWD 1	31	33	6	SandRidge Exploration and Production LLC	37.12431	-98.014473	1/3/2014	18000	1400
15-077-00146-00-01	D27884.0	WILSON TRUST 1	16	33	6	SandRidge Exploration and Production LLC	37.180595	-97.982793	7/2/2011	12000	2500
15-077-21755-00-00	D30994.0	STARKS & MASNER 3307 30-1	30	33	7	Tapstone Energy, LLC	37.138272	-98.12271	6/12/2012	20000	0
15-077-21762-00-00	D30995.0	LOCKWOOD FARMS 3307 14-1	14	33	7	Tapstone Energy, LLC	37.167428	-98.056283	4/2/2012	20000	0
15-077-21748-00-00	D30967.1	SENF 3308 19-1	19	33	8	Tapstone Energy, LLC	37.153626	-98.227977	1/5/2012	20000	0
15-077-21183-00-01	D30504.0	JOEL SWD	6	33	8	AGV Corp.	37.209275	-98.224358	3/9/2010	10000	0
15-191-22681-00-01	D31585.0	JUNEBUG SWD 3404 1-20	20	34	4	SandRidge Exploration and Production LLC	37.068815	-97.767473	12/3/2013	60000	1500
15-191-22625-00-00	D30899.0	DEL 3-34-4 1 SWD	3	34	4	Chesapeake Operating, Inc.	37.118951	-97.730976	11/8/2011	60000	500
15-191-22721-00-00	D31842.0	Blitzberg SWD 3404 #1-30	30	34	4	SandRidge Exploration and Production LLC	37.066302	-97.789255	4/4/2014	20000	500
15-191-22739-00-00	D31943.0	Windsor SWD 3404 #1-29	29	34	4	SandRidge Exploration and Production LLC	37.06684	-97.774286	6/9/2014	20000	500
15-191-22722-00-00	D31894.0	Ritter SWD 3404 #1-22	22	34	4	SandRidge Exploration and Production LLC	37.08149	-97.741174	5/8/2014	20000	500
15-191-22736-00-00	D31924.0	Kingston SWD 3404 #1-16	16	34	4	SandRidge Exploration and Production LLC	37.08257	-97.751798	6/6/2014	20000	500
15-191-22733-00-00	D31921.0	Murphy SWD 3404 #1-18	18	34	4	SandRidge Exploration and Production LLC	37.095295	-97.78918	6/13/2014	20000	500
15-191-22730-00-00	D31919.0	Forrest SWD 3404 #1-7	7	34	4	SandRidge Exploration and Production LLC	37.104353	-97.798377	6/9/2014	20000	500
15-191-22729-00-00	D31920.0	Duke SWD 3404 #1-8	8	34	4	SandRidge Exploration and Production LLC	37.110016	-97.772821	7/2/2014	20000	500
15-191-22717-00-00	D31817.0	Gaylord SWD 3404 #1-4	4	34	4	SandRidge Exploration and Production LLC	37.112078	-97.759527	4/15/2014	20000	500
15-077-22016-00-00	D31850.0	Evan B SWD 3405 #1-11	11	34	5	SandRidge Exploration and Production LLC	37.109354	-97.825752	5/16/2014	20000	500
15-077-22014-00-00	D31824.0	Saratoga SWD 3405 #1-10	10	34	5	SandRidge Exploration and Production LLC	37.109362	-97.844896	4/4/2014	20000	500
15-077-21910-00-00	D31477.0	JILL SWD 3406 1-8	8	34	6	SandRidge Exploration and Production LLC	37.095334	-97.989562	4/11/2013	60000	1600
15-077-21926-00-00	D31580.0	JILL SWD 3406 2-8	8	34	6	SandRidge Exploration and Production LLC	37.095746	-97.989558	6/18/2013	60000	1400
15-077-21767-00-00	D31006.0	STACEY 1-23 SWD	23	34	6	SandRidge Exploration and Production LLC	37.077425	-97.934962	2/4/2012	40000	1600

15-077-21777-00-00	D31007.0	STACEY 2-23 SWD	23	34	6 SandRidge Exploration and Production LLC	37.069282	-97.942587	7/2/2012	40000	1300
15-077-22034-00-00	D31890.0	Lexy SWD 3406 #1-19	19	34	6 SandRidge Exploration and Production LLC	37.079329	-98.016778	6/9/2014	20000	500
15-077-21842-00-00	D31392.0	CROFT FARMS 3407 27-1	27	34	7 Tapstone Energy, LLC	37.064398	-98.059578	2/19/2013	20000	800
15-077-21884-00-00	D31502.0	KAUP 3407 16-1	16	34	7 Tapstone Energy, LLC	37.080626	-98.090015	4/4/2013	20000	800
15-077-21845-00-00	D31290.0	HARRIS FARMS 3407 8-1	8	34	7 Tapstone Energy, LLC	37.107726	-98.104165	11/28/2012	20000	800
15-077-21807-00-00	D31197.0	CROFT FARMS 3407 30-1	30	34	7 Tapstone Energy, LLC	37.051656	-98.123998	11/16/2012	20000	0
15-077-21792-00-00	D31095.0	DAVIS 3407 27-1	27	34	7 Tapstone Energy, LLC	37.065326	-98.063156	8/7/2012	20000	0
15-077-21768-00-00	D31025.0	ALBRIGHT CROFT 3407 15-1	15	34	7 Tapstone Energy, LLC	37.093263	-98.058396	5/30/2012	20000	0
15-077-21770-00-00	D31047.0	MACY 1-34 SWD	34	34	8 SandRidge Exploration and Production LLC	37.036822	-98.179389	4/10/2012	60000	1650
15-077-21848-00-00	D31223.0	ROBIN 36-34-8 SWD 1	36	34	8 SandRidge Exploration and Production LLC	37.036965	-98.129163	8/14/2012	60000	1000
15-077-22121-00-00	D27137.2	Yeti 3408 SWD	15	34	8 SandRidge Exploration and Production LLC	37.093324	-98.171632	2/26/2015	30000	1000
15-077-22001-00-00	D31809.0	Blue SWD 3408 #1-35	35	34	8 SandRidge Exploration and Production LLC	37.036946	-98.150482	4/23/2014	20000	500
15-077-22037-00-00	D31895.0	Aldo SWD 3408 #1-27	27	34	8 SandRidge Exploration and Production LLC	37.064451	-98.179812	5/16/2014	20000	500
15-077-21827-00-01	D31775.0	KITTS SWD #1	20	34	8 SandRidge Exploration and Production LLC	37.065781	-98.205166	3/11/2014	20000	500
15-077-22115-00-00	D27137.1	Ralph 36-34-9	36	34	9 Tapstone Energy, LLC	37.049912	-98.244346	2/26/2015	20000	1000
15-077-21854-00-00	D31414.0	KOBLITZ 3409 28-1	28	34	9 Tapstone Energy, LLC	37.064312	-98.297878	1/25/2013	20000	800
15-077-21719-00-00	D30773.0	HIBBARD 1 SWD	23	34	9 Woolsey Operating Company, LLC	37.07902	-98.256875	1/28/2011	15000	0
15-007-23925-00-00	D31501.0	KNORP FARMS 3410 34-1	34	34	10 Tapstone Energy, LLC	37.04958	-98.38754	7/31/2012	20000	800
15-007-22366-00-01	D30383.0	GUTHRIE V1-20 OW	20	34	10 Val Energy, Inc.	37.077441	-98.427903	11/7/2008	8000	0
15-191-21531-00-01	D31483.0	YEAROUT 1	2	35	1 Hewitt Energy Group, Inc.	37.036423	-97.399903	2/18/2013	12000	300
15-191-22602-00-00	D30871.0	WILLEY 1-5 SWD	5	35	3 Devon Energy Production Company, L.P.	37.025417	-97.665193	10/11/2011	20000	500
15-077-21779-00-00	D31010.0	SUNNIE 1-16 SWD	16	35	6 SandRidge Exploration and Production LLC	37.002071	-97.966124	3/1/2012	40000	1600
15-077-21839-01-00	D31188.0	SHELBY SWD 1-03	3	35	7 SandRidge Exploration and Production LLC	37.035736	-98.056466	8/9/2012	80000	1300
15-077-21782-00-00	D31001.0	SHEA 2-17 SWD	17	35	7 SandRidge Exploration and Production LLC	36.999172	-98.092547	3/20/2012	40000	1600
15-077-21781-00-00	D31002.0	SHEA 1-17 SWD	17	35	7 SandRidge Exploration and Production LLC	36.998828	-98.092543	3/22/2012	40000	1500
15-077-21849-00-00	D31059.0	WRIGLEY 1-11 SWD	11	35	8 SandRidge Exploration and Production LLC	37.007494	-98.163243	8/6/2012	60000	1500
15-077-22015-00-00	D31834.0	Shayne SWD 3508 #1-4	4	35	8 SandRidge Exploration and Production LLC	37.022114	-98.187777	6/5/2014	20000	500
15-077-21808-00-00	D31160.0	CHAIN LAND 3509 11-1	11	35	9 Tapstone Energy, LLC	37.020329	-98.271801	9/26/2012	20000	800
15-077-21871-00-00	D31375.0	CHAIN LAND 3509 1-1	1	35	9 Tapstone Energy, LLC	37.022277	-98.252072	1/30/2013	20000	800

CERTIFICATE OF SERVICE

I certify that on August 9, 2016, I caused a complete and accurate copy of this Order to be served via United States mail, with the postage prepaid and properly addressed to the following:

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