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RAILROAD COMMISSION OF TEXAS

HEARINGS DIVISION

OIL AND GAS DOCKET NO. 7C-0319439

**APPLICATION OF AVAD OPERATING, LLC TO CONSIDER SPECIAL FIELD RULES
FOR THE NOELKE (WOLFCAMP, LOWER) FIELD, CROCKETT COUNTY, TEXAS**

AMENDED PROPOSAL FOR DECISION

EXAMINERS: Ashley Correll, P.G. – Technical Examiner
Kristi M. Reeve – Administrative Law Judge

PROCEDURAL HISTORY:

Application Filed:	April 9, 2019
Notice of Hearing Issued:	May 17, 2019
Hearing Date:	June 17, 2019
Hearing Transcript Received:	July 15, 2019
Motion to Reopen Hearing:	September 20, 2019
Post-Hearing Conference:	November 21, 2020
Post-Hearing Conference Transcript Received:	December 10, 2019
Closing Statements for Post Hearing Conference:	January 7, 2020
Close of Record:	April 6, 2020
Proposal for Decision Issued:	July 7, 2020
Amended Proposal of Decision Issued:	July 14, 2020

APPEARANCES:

For Applicant AVAD Operating, LLC:

Rob Hargrove, Attorney
John N. Davis, Engineer

For Protestant Stone Creek Operating, LLC:

John Hicks, Attorney
Rick Johnston, Consulting Engineer
Keith E. Logan, Exploration Manager/Reservoir Engineer
Ron Bliss, Vice President-Land

For Observer Osborn, W.B. Oil & Gas Operations:

George C. Neale, Attorney

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I. Statement of the Case¹

AVAD Operating, LLC (“AVAD”) (Operator No. 037877) (“AVAD” or “Applicant”) seeks to adopt special oil and gas field rules for the Noelke (Wolfcamp, Lower) Field (“Field”) in Crockett County, Texas. AVAD seeks to set a correlative interval for the Field and zero between-well spacing (“Application”). AVAD clarified in its June 19, 2019 letter they do not “seek to modify or rescind the fieldwide maximum efficient rate (“MER”) of 500 barrels of oil per day (“bopd”) adopted in April of 2005. Other than the correlative interval, zero minimum between-well spacing, and the MER allowable of 500 bopd, the Field would operate under statewide rules.

AVAD contends the elimination of between-well spacing in the Field would allow AVAD to produce hydrocarbons from the pinnacle reef structures that are characteristic of the Field. AVAD claims the pinnacle reef structures trap independent accumulations of oil that are approximately 80 acres in size or less, and the production of oil from one reef does not impact oil reserves in another reef due to the common aquifer beneath the oil accumulations. AVAD states that within each reef is variable porosity and permeability that requires in-fill wells to be drilled to produce hydrocarbons that would otherwise go unrecovered.

The Applications are protested by Stone Creek Operating, LLC (“Stone Creek” or “Protestant”), who has a leasehold in the Field, adjacent to AVAD’s acreage. Stone Creek argues this Wolfcamp field is a conventional reservoir, and if the zero between-well spacing field rule is adopted, AVAD would be able to cluster wells and utilize the 500 bopd MER allowable to disproportionately drain oil from the reefs. Stone Creek argues AVAD’s most productive reef structure is also present on Stone Creek’s acreage, and elimination of between-well spacing would allow AVAD to produce the reef at a rate that could harm Stone Creek’s correlative rights.

Stone Creek also argues the proposed correlative interval does not coincide with the top and bottom of the reef structures as represented in the log provided by AVAD.

The Examiners find AVAD failed to provide sufficient evidence to support its Application for special field rules to allow for zero between-well spacing or designation of a correlative interval. The Examiners recommend denial of the Application.

II. Notice and Jurisdiction

Sections 81.051 and 81.052 of the Texas Natural Resources Code provide the Commission with jurisdiction over all persons owning or engaged in drilling or operating

¹ The hearing transcript in this case is referred to as “Hearing Tr. [page(s):lines(s)].” The post-hearing conference transcript in this case is referred to as “Post-Hearing Tr. [page(s):lines(s)].” AVAD’s exhibits are referred to as “AVAD Ex. [exhibit no(s)].” Stone Creek’s exhibits are referred to as “Stone Creek Ex. [exhibit no(s)].”

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oil or gas wells in Texas and the authority to adopt all necessary rules for governing and regulating persons and its operations under the jurisdiction of the Commission.

AVAD requested a hearing in a letter sent to the Commission dated April 9, 2019. Notice of the hearing (“Notice”) was sent to all operators in the Field and to those entitled to notice more than 10 days before the June 17, 2019 hearing. Everyone who was entitled to notice was noticed.² The Application was protested by Stone Creek Operating, LLC. AVAD and Stone Creek attended and participated in the hearing on the merits. During the hearing, AVAD stated on the record it did not intend to change the MER from 500 bopd for the Field.³ The Hearings Division sent out a supplement Notice on June 21, 2019, clarifying the field rule amendments requested did not include changing the fieldwide MER of 500 bopd, as adopted in April 2005. On November 11, 2019, a post-hearing conference was held at the request of the parties to provide the opportunity for the admittance of additional evidence.

III. APPLICABLE LAW

Statewide Rule 37⁴ provides the Commission may grant an exception to the Statewide Rule 37 as follows:

[T]he commission, in order to prevent waste or to prevent the confiscation of property, may grant exceptions to permit drilling within shorter distances than prescribed in this paragraph when the commission shall determine that such exceptions are necessary either to prevent waste or to prevent the confiscation of property.⁵

Statewide Rule 37 further provides:

At any such hearing, the burden shall be on the applicant to establish that an exception to this section is necessary either to prevent waste or to prevent the confiscation of property.⁶

IV. DISCUSSION OF THE EVIDENCE

At the hearing, AVAD presented evidence through its witness, John N. Davis, CEO and President of AVAD.⁷ Mr. Davis is involved in the day-to-day of AVAD’s engineering and geoscience operations.⁸ AVAD provided 39 exhibits at the hearing and post-hearing conference, and four late-filed exhibit following the post-hearing conference. Stone Creek presented evidence by and through its witness, Rick Johnston, Petroleum Engineer. Protestant provided 27 exhibits during the hearing and post-hearing conference.

² Hearing Tr. 139:16-21.

³ Hearing Tr. 139:25-140:12.

⁴ Statewide Rule 37 refers to 16 Tex. Admin. Code § 3.37.

⁵ 16 Tex. Admin. Code § 3.37(a)(1).

⁶ 16 Tex. Admin. Code § 3.37(a)(3).

⁷ AVAD Ex. 2.

⁸ Hearing Tr. 22:1-16.

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Following the post-hearing conference, five additional exhibits were admitted into the record.

Stone Creek requested to reopen the record to submit data for the Shannon Hospital 8H Well drilled by Stone Creek. The well is a horizontal well drilled to produce from a Wolfcamp reef structure.⁹

A. Initial Hearing

1. AVAD's Evidence

AVAD seeks to set a correlative interval for the Field and zero between-well spacing. Mr. Davis with AVAD stated if it's application is granted, it would be able to drill additional wells within the distinct reef structures that are characteristic of the Field.¹⁰ Mr. Davis testified additional wells are needed to produce from the different permeable layers within the reefs, and not drilling the additional wells would cause waste.¹¹

a. *Zero Between-Well Spacing*

The Noelke (Wolfcamp, Lower) Field ("Field") is about ten miles east of Irion, Texas.¹² The Field was discovered by Marathon Oil ("Marathon") in the late 1970s.¹³ From 2001 to 2011 EOG Resources Inc. ("EOG") used seismic data to drill 38 total wells in the Field.¹⁴ AVAD acquired EOG's entire position in the Field in December 2017.¹⁵ AVAD is the predominant operator in the Field producing 80 percent of the oil.¹⁶ The Field has a total of 53 producing wells with AVAD operating 21 oil wells and four injection wells.¹⁷ The Field has produced 10,000,000 barrels of oil from these shallow wells.¹⁸ The current spacing rules in the Field are 467 feet lease line spacing and 1,200 feet between-well spacing.¹⁹ The current MER allowable for the Field is 500 bopd. AVAD does not request to change the MER allowable.²⁰

The Field is located where the Central Basin platform goes into the Midland Basin.²¹ It is unique compared with the other unconventional Wolfcamp fields that require fracture stimulation to produce, because the productive structures are distinct carbonate reefs with varying porosity and permeability that trap oil.²² AVAD plans to drill short horizontal wells, similar to EOG's development plan, to allow for changes in rock

⁹ Post-Hearing Tr. 11:9-16.

¹⁰ AVAD Ex. 24.

¹¹ Hearing Tr. 97:17-25.

¹² Hearing Tr. 23:23-24:4; Ex. 3.

¹³ Hearing Tr. 36:21-38:16; AVAD Ex. 7.

¹⁴ Hearing Tr. 41:17-42:9.

¹⁵ Hearing Tr. 39:22-40:7.

¹⁶ Hearing Tr. 41:17-42:9.

¹⁷ AVAD Ex. 7.

¹⁸ Hearing Tr. 42:17-43:8.

¹⁹ Hearing Tr. 18:4-13; AVAD Ex. 1.

²⁰ Hearing Tr. 19:1-9.

²¹ Hearing Tr. 26: 8-17.

²² AVAD Ex. 6; Hearing Tr. 25:14-23; 27:8-13; 28:5-30:23; 29:2-30:20; 60:20-61:2.

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characteristics within a specific reef.²³ Mr. Davis asserted the reefs are tightly spaced and within 110 feet laterally you can go from the full thickness of the reef to no reef.²⁴

Mr. Davis provided testimony that these reefs are underlain by a common water aquifer, which provides a water drive mechanism to the Field.²⁵ Mr. Davis stated even as the pressure is lowered by producing fluid from the top of the reef, the aquifer under the reefs prevents oil from escaping downward out of each reef.²⁶ Each reef begins with a different oil-water contact, which moves upwards as oil is produced out of the top of the reef and that space is filled with water.²⁷ The rock at the top of the reef provides a barrier in the upward direction.²⁸

Mr. Davis testified that though each of the reefs are separate oil accumulations, the formation of the reefs occurred at approximately the same geologic time and the oil accumulated in the reefs at about the same geologic time.²⁹ Mr. Davis stated production and pressure changes affecting one reef do not have an impact on the hydrocarbon accumulations in another reef.³⁰

AVAD identified multiple distinct reefs in the Shannon Hospital 1 lease area, which is the area Stone Creek has leased.³¹ The reef in which the Shannon Hospital 1-3, 1-4, and 1-7H wells are drilled is approximately 50 acres in size.³² Mr. Davis testified it is not the same reef in which the Shannon Hospital 1-5 was drilled, which is approximately 30 acres in size.³³ The largest reef AVAD has identified is the reef with the Shannon Hospital 1-1, 1-2, and 1-6H wells, which is approximately 80 acres in size.³⁴

AVAD has studied EOG's operations, particularly EOG's experience with the Eagle Draw 11-2 and 11-3 wells, and used that knowledge for developing the Shannon Hospital 1 area.³⁵ Mr. Davis provided a cross section across four reefs in the Eagle Draw area in the southern part of the Field to show the large range of permeability and porosity within the reefs.³⁶ EOG put in different sets of perforations in 2001, 2006, and 2007 in the 11-2, and saw different permeabilities and ability to flow in the same well.³⁷ Mr. Davis testified the pressure in the reef structures needs to be lowered so that poor-permeability rock can contribute to production.³⁸ Mr. Davis stated, "in these kind of reservoirs when you have such varying permeability dropping the pressure is a good thing because you get some

²³ Hearing Tr. 57:23-21.

²⁴ Post-Hearing Tr. 42:11-43:14.

²⁵ AVAD Exs. 31 and 32; Hearing Tr. 32:1-23; 63:10-16; 67:14-19.

²⁶ Hearing Tr. 67:20-68:19.

²⁷ Hearing Tr. 31:21-25; 33:3-16.

²⁸ Hearing Tr. 68:20-23.

²⁹ Hearing Tr. 114:2-23.

³⁰ Hearing Tr. 67:6-13.

³¹ AVAD Ex. 15.

³² Hearing Tr. 66:15-18; 73:7-10.

³³ Hearing Tr. 66:1-21; 73:25-74:4.

³⁴ Hearing Tr. 74:6-21.

³⁵ Hearing Tr. 48:6-24. AVAD Exs. 12 and 13.

³⁶ AVAD Ex. 6.

³⁷ Hearing Tr. 51:6-52:7.

³⁸ Hearing Tr. 87:2-88:2.

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of the worst rocks starting to contribute.”³⁹ The different oil-water contacts throughout the same reef shows the complexity of the reef structures.⁴⁰ Mr. Davis argued adding short horizontal wells across the reef would connect more of the reservoir, allowing efficient production of oil and preventing waste.⁴¹

The first well was drilled by Marathon in the late 1970s, and produced almost 1,000,000 barrels of water and approximately 50,000 barrels of oil.⁴² Mr. Davis testified that EOG found lower pressure in its wells than what was found in the Marathon wells, because Marathon drew down the pressure of the aquifer.⁴³ Mr. Davis contended one of the characteristics of this water drive aquifer is when the oil is produced from the reefs the oil-water contact move upwards, which was seen in the Eagle Draw and Shannon Hospital areas.⁴⁴ Mr. Davis testified as it is a water drive, the wells can water out without any nearby injection wells.⁴⁵

Mr. Davis testified in a water drive, the pressure must decrease for fluids to move from high pressure parts of the reef to low pressure parts, so when oil is produced off the top of the reef, the water from the aquifer rises to the lower pressure parts of the rock.⁴⁶ If it was a gas drive reservoir the gas-oil ratio (“GOR”) would rise, and in the Shannon Hospital 1 lease, there has not been an increase in GOR.⁴⁷ Mr. Davis testified there are no gas caps in the Field, and there is very little gas in the reef system.⁴⁸

AVAD contends the Shannon Hospital 1-3 and 1-5 wells are in two separate reefs due to the different oil gravities. Mr. Davis stated the Shannon Hospital 1-5 and 1-3 wells are 1,200 feet apart, but are in different reefs, and production from one reef will not affect reserves in another reef.⁴⁹

AVAD provided the Examiner’s Report and Recommendation (“ERR”) for Oil and Gas Docket Nos. 7C-0247547 and 7C-024548 which states, “Each of the wells in the Noelke (Wolfcamp, Lower) Field produces from a small patch reef that covers 20-30 acres.”⁵⁰ The ERR also stated there are no significant amounts of gas.⁵¹ The ERR for Oil and Gas Docket 7C-0255099 was also provided to show the finding that producing at a higher rate leads to more efficient production than producing at restricted rates.⁵²

Mr. Davis testified the Commission has approved the zero between-well spacing in similar carbonate reservoirs to authorize in-fill drilling.⁵³ The Russell, North (Devonian) field is a

³⁹ Hearing Tr. 60:11-14.

⁴⁰ Post-Hearing Tr. 68:3-12.

⁴¹ Post-Hearing Tr. 68:18-24.

⁴² Hearing Tr. 32:1-23.

⁴³ Hearing Tr. 32:1-23.

⁴⁴ Hearing Tr. 33:3-16; 202:12-20.

⁴⁵ Hearing Tr. 202:21-203:8.

⁴⁶ Hearing Tr. 205:10-206:9.

⁴⁷ Hearing Tr. 210:22-211:5.

⁴⁸ Hearing Tr. 76:25-77:15.

⁴⁹ Hearing Tr. 66:15-67:13.

⁵⁰ AVAD Ex. 20.

⁵¹ *Id.*

⁵² AVAD Ex. 19; Hearing Tr. 86:21-87:24.

⁵³ AVAD Ex. 22, 22A, and 23; Hearing Tr. 90:11-92:12.

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carbonate field that has zero between-well spacing, where the operators are able to put in-fill wells, and “an example of coming in at the very end of these fields and doing some short horizontals and placing some verticals in the right position that could yield very good results.”⁵⁴

On the date of the initial hearing, Stone Creek did not operate wells in Texas.⁵⁵ Stone Creek drilled the Shannon Hospital 8H well on the Shannon Hospital 1 lease in August 2019, following the hearing.⁵⁶ The record was reopened on November 21, 2019 for a post-hearing conference for the limited purpose of Stone Creek providing evidence from the drilling of its well.

According to Mr. Davis’ testimony, the Shannon Hospital 1 lease has three distinct reef structures: the 30-acre reef with the Shannon Hospital 1-5 well; the 50-acre reef with the Shannon Hospital 1-3 well; and the 80-acre reef with the Shannon Hospital 1-1 well.⁵⁷ Mr. Davis asserted these are three different reefs, because the oil-water contacts are different in the Shannon Hospital 1-1, 1-3, and 1-5 wells.⁵⁸ Mr. Davis testified AVAD has seismic data for Stone Creek’s acreage around the Shannon Hospital 1 lease area, and have identified the three reefs AVAD is producing from, and does not show reefs on Stone Creek’s acreage.⁵⁹ Mr. Davis stated the 80-acre reef does not cross AVAD’s lease lines into Stone Creek’s leasehold.⁶⁰ During cross examination, Mr. Davis agreed the reefs do not necessarily remain between lease lines.⁶¹

Mr. Davis testified the Shannon Hospital 1 lease would need to have a 320-acre reef extend onto Stone Creek’s acreage.⁶² Mr. Johnston calculated a 64-acre drainage area for the Shannon Hospital 1-1 well, and Mr. Davis agreed drainage for the Shannon Hospital 1-1 well could be 64 acres.⁶³ In late-filed Exhibit No. 40, AVAD argued the 64.4-acre drainage developed by Mr. Johnston is based on pressure depletion. AVAD produced its own drainage calculations utilizing recovery factors and determined that the highest drainage area would be 28.4 acres with a 34 percent recovery factor.⁶⁴ In addition to the drainage calculations, AVAD provided a map depicting the oil accumulations for the Shannon Hospital 1 lease area, including the addition of a 20-acre oil accumulation on Stone Creek’s lease near or in contact with the oil accumulation for AVAD’s Shannon Hospital 1-3 well.⁶⁵

AVAD plans to produce from the same reef the Shannon Hospital 1-1 and 1-2 wells, which are currently not producing, with the 1-6H well.⁶⁶ Mr. Davis contends if the

⁵⁴ Hearing Tr. 94:4-15. Ex. 23.

⁵⁵ Hearing Tr. 101:18-102:2.

⁵⁶ Stone Creek Ex. 24.

⁵⁷ Hearing Tr. 131:24-132:5.

⁵⁸ Hearing Tr. 212:20-213:21.

⁵⁹ Hearing Tr. 218:17-219:17; 220:11-18.

⁶⁰ Hearing Tr. 130:11-20.

⁶¹ Hearing Tr. 129:19-25.

⁶² Hearing Tr. 203:9-16.

⁶³ Stone Creek Ex. 20; Hearing Tr. 216:5-8.

⁶⁴ AVAD Ex. 40.

⁶⁵ AVAD Ex. 40.

⁶⁶ Hearing Tr. 132:6-15.

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zero between-well spacing field rule was adopted then AVAD would turn on its wells, which would not harm Stone Creek's reserves.⁶⁷

b. Correlative Interval

AVAD proposed the designation of the correlative interval for the Field to be 5,082 feet to 5,756 feet, as shown in the log on the AVAD Operating LLC Eagle Draw 10 lease, Well No. 1, API No. 105-38688.⁶⁸ AVAD provided a gamma ray induction log that shows an approximate depth of 4,900 feet to 5,756 feet.⁶⁹

Mr. Davis testified the correlative interval does not start at the top of the limestone structure and does not end at the bottom of the limestone structure.⁷⁰ During cross examination, Mr. Davis stated the Wolfcamp is "rattier" at the top, and does not get to full reef until 5,170 feet.⁷¹ The reef ends at approximately 5,520 feet, with some "ratty" rock below that hasn't been tested.⁷² Mr. Davis testified the "rattier" section on the top and bottom of the reef should be in the correlative interval because that is the area where water can be injected or that "rattier" rock could contribute to production.⁷³

2. Stone Creek's Evidence

a. Zero Between-Well Spacing

Stone Creek's leasehold in the Shannon Hospital 1 lease area is north of AVAD's acreage with the Shannon Hospital 1-1, 1-2, and 1-6H wells. South of the Shannon Hospital 1-1, 1-2, and 1-6H wells, Stone Creek has another leasehold, where the 8H well was drilled. South of the 8H well, AVAD has acreage with the Shannon Hospital 1-4, 1-3, 1-7H, and 1-5 wells.⁷⁴

Mr. Johnston, Stone Creek's consulting petroleum engineer, stated the reefs are not consistent throughout the Field, specifically the Eagle Draw area is its own hydrocarbon accumulation that is a separate accumulation than the Shannon Hospital 1 area.⁷⁵ Mr. Johnston stated, "In all of the other hearings that I did for EOG we set all the other reef features up as separate fields, with each one having its own correlative interval. A field at the Commission is supposed to be a separate hydrocarbon accumulation."⁷⁶

Mr. Johnston testified the elimination of between-well spacing in the Field would allow for AVAD to cluster wells near Stone Creeks acreage.⁷⁷ He stated the three wells reporting production on the Shannon Hospital 1 lease have recovered almost 30 percent

⁶⁷ Hearing Tr. 103:14-104:15.

⁶⁸ Hearing Tr. 135:12-15.

⁶⁹ Hearing Tr. 135:20-136:1.

⁷⁰ Hearing Tr. 217:128-13.

⁷¹ Hearing Tr. 136: 13-19.

⁷² Hearing Tr. 138:3-8.

⁷³ Hearing Tr. 138:9-22.

⁷⁴ Stone Creek Ex. 12.

⁷⁵ Hearing Tr. 193:24-194:12; 197:2-22.

⁷⁶ Hearing Tr. 197:2-22.

⁷⁷ Hearing Tr. 164:22.

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of the oil in the Field.⁷⁸ In cross examination, based on reviewing the logs, knowledge of bottom hole pressure, and structure maps, Mr. Johnston asserted there is one reef structure in the Shannon Hospital 1 lease area.⁷⁹ He determined Stone Creek's 8H well is possibly in the same reef and would be competing for reserves with AVAD's Shannon Hospital 1 wells.⁸⁰

Based on cross section log data, Mr. Johnston testified gamma ray density neutron logs show porosity development in the reef at approximately 15 to 20 percent, with the Shannon Hospital 1-1 well having better porosity and greater thickness than AVAD's other wells.⁸¹ Mr. Johnston stated there is variable reef thickness, but does not believe the reef thins out completely in the Shannon Hospital 1 area.⁸² He testified that in the area of the Shannon Hospital 1-1 and 1-3 wells, there would need to be structural features for those oil wells to not be producing from the same oil accumulations.⁸³ Mr. Johnston stated the reef structure for the Shannon Hospital 1 lease is bigger than the 20-acre to 30-acre reefs discussed in the EOG docket, because the one feature recovered 30 percent of the total production for the Field.⁸⁴

In cross examination, Mr. Johnston asserted the reefs can trap oil and the oil may be trapped by the underlying aquifer to create separate accumulations.⁸⁵ If there is production from isolated reefs, the oil-water contact will move up the structure.⁸⁶

Mr. Johnston testified he does not believe the Field is a strong water drive reservoir, because the GOR of the Shannon Hospital 1 lease went down in response to a water flood.⁸⁷ Mr. Johnston stated the decline curve provided by Stone Creek shows the GOR in the Field increased around 2007 and went down in 2008 due to the water injection and repressurization of the Field.⁸⁸ In cross examination, Mr. Johnston testified the reservoir may have a minor water drive component but not a strong water drive based on the lower reservoir pressure and EOG's past drilling of injection wells.⁸⁹ Mr. Johnston asserted operators typically do not inject water back into a water drive reservoir.⁹⁰ Mr. Johnston also testified EOG applied for an enhanced oil recovery ("EOR") project with Oil and Gas Docket 7C-0254598 for the Shannon Hospital 1 lease.⁹¹

Mr. Johnston asserted oil could potentially move between reefs due to unusual pressures of 1,100 to 1,200 pounds in a reservoir of decent porosity and permeability.⁹² Mr. Johnston testified the bottom hole pressure for the wells on the Shannon Hospital 1

⁷⁸ Hearing Tr. 175:16-19.

⁷⁹ Stone Creek Ex. 17; AVAD Ex. 3; Hearing Tr. 184:2-17.

⁸⁰ Hearing Tr. 182:3-13; Post-Hearing Tr. 26:14-28:12.

⁸¹ Stone Creek Ex. 24; Hearing Tr. 149:2-13.

⁸² Hearing Tr. 149:19-150:9.

⁸³ Hearing Tr. 150:10-15.

⁸⁴ Hearing Tr. 183:2-18.

⁸⁵ Post-Hearing Tr. 25:7-26:13.

⁸⁶ Hearing Tr. 200:4-18.

⁸⁷ Hearing Tr. 176:1-20.

⁸⁸ Hearing Tr. 173:14-22.

⁸⁹ Hearing Tr. 186:2-11.

⁹⁰ Hearing Tr. 188:1-11.

⁹¹ Hearing Tr. 190:17-191:1.

⁹² Hearing Tr. 192:8-193:20.

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lease are similar and would show pressure communication if it is a water drive reservoir.⁹³ He argued there could be a spill point once the pinnacle structures fill with oil and that oil could migrate between structures.⁹⁴

Stone Creek provided a calculation of a drainage area of 64.4 acres for the Shannon Hospital 1-1 well.⁹⁵ Mr. Johnston testified adopting zero between-well spacing will accelerate drainage in a competitive conventional reservoir and harm Stone Creek's correlative rights.⁹⁶ Mr. Johnston stated he does not believe the additional wells that AVAD wants to drill are needed and will only accelerate drainage.⁹⁷ Using the production report for the Shannon Hospital 1 lease,

Mr. Johnston stated the oil gravity during the initial potential tests as reported on the completion reports for the Shannon Hospital 1-1 well was 33 and for the Shannon Hospital 1-3 well was 35.⁹⁸ Mr. Johnston testified he does not consider those oil gravities different enough to be a separate accumulation.⁹⁹

b. Correlative Interval

Mr. Johnston provided testimony regarding the correlative interval. Mr. Johnston's interpretation of the well log is AVAD's picks are an additional 100 feet above the top of the reef and an additional 200 to 300 feet below the base of the reef.¹⁰⁰ Mr. Johnston stated:

If it was me, I think I would define the field interval as being the reef interval because that's what's being produced. I'm not aware of any wells in the field that produce out of the confines of the reef structure.¹⁰¹

Mr. Johnston also testified it is important "to pick the top of and bottom of the designated field interval to be a marker that's easy to pick on the log."¹⁰² Mr. Johnston stated an easily identifiable marker, such as the top and bottom of the reef structure should be used to establish a field interval.¹⁰³

B. Post-Hearing Conference

1. Stone Creek's Evidence

Stone Creek requested to reopen the record to present data from its Shannon Hospital 8H well drilled in August 2019. During the post-hearing conference, Mr. Johnston asserted there is continuity in the thickness of the reef as you move from the Shannon Hospital 1-1 well to the Stone Creek No. 8H well to the No. 3 well.¹⁰⁴ The logs for the

⁹³ Hearing Tr. 176:21-177:14.

⁹⁴ Hearing Tr. 192:8-193:20.

⁹⁵ Stone Creek Ex. 20.

⁹⁶ Hearing Tr. 178:8-180:9.

⁹⁷ Hearing Tr. 180:10-19.

⁹⁸ Hearing Tr. 191:10-192:3.

⁹⁹ *Id.*

¹⁰⁰ Hearing Tr. 147:10-19.

¹⁰¹ Hearing Tr. 147:10-19.

¹⁰² Hearing Tr. 147:20-148:7.

¹⁰³ Hearing Tr. 147:20-148:7.

¹⁰⁴ Post-Hearing Tr. 13:17-14:10.

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Stone Creek No. 8H well and AVAD's 1-3 wells show comparable resistivities.¹⁰⁵ The oil gravity for Well No. 8H was approximately 29 at 60 degrees.¹⁰⁶ AVAD's Shannon Hospital 1-1 well had an API gravity of 29.5 and 1-7 had an API gravity of 29 which is comparable to Stone Creek's 8H well.¹⁰⁷

Mr. Johnston testified Stone Creek encountered depleted bottom hole pressure while drilling the 8H well.¹⁰⁸ Mr. Johnston stated in order to be a separate reef structure for the 8H well, there must be a significant structural change in a short distance between the 1-3 and 8H wells, and the 1-2I and 8H wells, and he does not believe that amount of structural change is realistic.¹⁰⁹

Mr. Johnston asserted zero between-well spacing is inappropriate for the Field. He stated the between-well spacing rules are in place to "prevent operators from clustering wells to get allowable advantage over other competitors in the field, which is exactly what AVAD has done here."¹¹⁰

On redirect, Mr. Johnston clarified there could be spillover capability and the oil accumulations may not be independent of each other and he believes AVAD's Shannon Hospital 1-1 and 1-3 wells and Stone Creek's 8H well are in the same reservoir.¹¹¹ He testified the Shannon Hospital 1-1 and 8H wells have the same oil-water contacts and oil columns.¹¹² The Shannon Hospital 1-2I also has a similar oil water contact as the 8H.¹¹³

In further redirect examination, Mr. Johnston confirmed he identified original oil-water contacts at the same depth and the oil-water contact for the 8H moved upward.¹¹⁴ He testified the resistivity log for the 8H well shows a zone from 5,815 feet to 5,870 feet where oil was present but has been removed from the feature, which Stone Creek refers to as a swept zone.¹¹⁵

2. AVAD's Evidence

During the post-hearing conference, Mr. Davis testified Stone Creek found a new accumulation separate from AVAD's productive reefs.¹¹⁶ Mr. Davis stated he is not surprised Stone Creek found a potential small reef, because they drilled a 500 foot horizontal.¹¹⁷ Mr. Davis used log data to calculate the oil-water contact for the Shannon Hospital 8H well and determined it has a similar original oil-water contact to the Shannon Hospital 1-1 and 1-2.¹¹⁸ Mr. Davis created a cross section showing the similar calculated original water saturation in AVAD's Shannon Hospital 1-1, 1-2, 1-4, 1-3, and 1-5 wells

¹⁰⁵ Post-Hearing Tr. 14:18-15:3.

¹⁰⁶ Stone Creek Ex. 24; Post-Hearing Tr. 16:19-17:4.

¹⁰⁷ Stone Creek Ex. 25; Post-Hearing Tr. 18:7-19:13.

¹⁰⁸ Post-Hearing Tr. 19:21-20:6.

¹⁰⁹ Stone Creek Ex. 27; Post-Hearing Tr. 21:20-22:17.

¹¹⁰ Post-Hearing Tr. 23:11-24:10.

¹¹¹ Post-Hearing Tr. 30:5-31:6.

¹¹² Post-Hearing Tr. 33:5-17.

¹¹³ Post-Hearing Tr. 35:7-36:5.

¹¹⁴ Post-Hearing Tr. 78:7-16.

¹¹⁵ Post-Hearing Tr. 78:21-79:24.

¹¹⁶ Post-Hearing Tr. 69:7-16.

¹¹⁷ Post-Hearing Tr. 51:21-52:19.

¹¹⁸ Post-Hearing Tr. 56:11-17.

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and Stone Creek's 8H well.¹¹⁹ He testified AVAD's Shannon Hospital 1-1 and 1-2 wells, and Stone Creek's 8H well have similar original oil-water contacts, which demonstrates separate oil accumulations.¹²⁰ Another cross section of the oil-water contacts from September 2018 was provided to show how the water contacts rise over time.¹²¹ Mr. Davis reviewed the resistivity log and determined the original oil-water contact is present in Stone Creek's 8H well, but there is variation in the resistivity log based on changes in minerology.¹²²

As a reef is produced, the oil-water contact would move upwards as is seen in the 1-3 and 1-5 wells separate oil accumulations.¹²³ Mr. Davis stated:

We've seen the oil-water contact change in all three separate oil accumulations. EOG thought they were all three separate oil accumulations. And now we find the 1-8 at original water contact at original conditions. There has to be a separation between them.¹²⁴

Mr. Davis testified the bottomhole pressure encountered in newer wells in shows the Field depleted.¹²⁵ He stated there are about 50 different reefs in a continual reef deposit with separate oil accumulations, all connected with a common aquifer with a pressure of 1,000 to 1,300 pounds.¹²⁶ Mr. Davis argued the recently drilled Smith Shannon Hospital Est 201 well has a pressure of 1,200 pounds, showing the well is connected by the same underlying aquifer.¹²⁷

AVAD provided a cross section demonstrating the oil-water contact rises as wells are produced, which leads to an increasing water cut in each of the wells.¹²⁸ The Shannon Hospital 1-2 well to north of Stone Creek's 8H well has a 30 percent water cut; and the Shannon Hospital 1-4 well has a 99 percent water cut, with the Shannon Hospital 8H well with no water cut.¹²⁹ Mr. Davis argues if the oil accumulations are connected and the Shannon Hospital 1-2 and 1-4 wells have been injecting, the water would travel up dip to Stone Creek's 8H well, but the 8H well's original oil-water has not risen.¹³⁰ Mr. Davis also contends the Stone Creek 8H should be producing more water with perforations only seven feet above the oil water contact, but the well is producing 300 bopd with no water production.¹³¹

¹¹⁹ AVAD Ex. 37; Post-Hearing Tr. 57:1-19.

¹²⁰ Post-Hearing Tr. 38:8-39:1.

¹²¹ AVAD Ex. 38; Post-Hearing Tr. 61:3 -62:23.

¹²² AVAD Ex. 36; Post-Hearing Tr. 86:4-87:23

¹²³ Post-Hearing Tr. 40:5-20.

¹²⁴ Post-Hearing Tr. 74:12-19.

¹²⁵ Post-Hearing Tr. 49:12-50:18

¹²⁶ Post-Hearing Tr. 42:11-19; 43:15-44:5; 49:15-50:1.

¹²⁷ Post-Hearing Tr. 49:12-50:18

¹²⁸ AVAD Ex. 38; Post-Hearing Tr. 61:1-62:4.

¹²⁹ AVAD Ex. 42.

¹³⁰ AVAD Ex. 38; Post-Hearing Tr. 62:9-25.

¹³¹ Post-Hearing Tr. 16:7-18.

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Mr. Davis stated AVAD's Shannon Hospital 1-7H well was being drilled along the edge of the reef containing the Shannon Hospital 1-3 and 1-4.¹³² He stated the 1-7H well may target a productive zone outside of the reef with the Shannon Hospital 1-3 and 1-4 wells, potentially finding a new oil accumulation."¹³³ Mr. Davis testified finding the oil accumulation on Stone Creek's acreage shows the complexity of the reservoir.¹³⁴ During the post-hearing conference, in response to cross examination, Mr. Davis stated EOG was able to enhance production in the Eagle Draw area while staying in compliance with field rules.¹³⁵

Mr. Davis provided a cross section representing oil-water contacts in the Shannon Hospital 1 lease area and determined that the swept zone on the log for the Stone Creek's 8H well is also present on the logs for AVAD's wells.¹³⁶ AVAD argues the resistivity curve change is not a swept zone at all, but a minerology change.¹³⁷

Following the post-hearing conference, AVAD provided water saturation calculations for Stone Creek's 8H well and a cross section comparing oil-water contact and water cut information for the wells in the Shannon Hospital 1 lease area.¹³⁸ Oil purchase tickets were submitted to show the Shannon Hospital 1-6H well, in the same reef as the Shannon Hospital 1-1 well, had an oil gravity ranging from 32.4 to 33.2.¹³⁹ These oil gravity results were from the same day Stone Creek's 8H well was tested with an oil gravity of 28.¹⁴⁰

V. EXAMINERS ANALYSIS

The Examiners find AVAD failed to provide sufficient evidence to support its Application to for special field rules to allow for zero between-well spacing for the Field or to designate the correlative interval. The Examiners recommend denial of the Application.

A. Zero-Between Well Spacing

While the Examiners find AVAD's testimony of the reef structures being finite in size across the Field and traps for oil accumulations credible, the Examiners also find the reef structures can extend across lease lines. The 500 MER allowable and zero minimum between-well spacing in a conventional reservoir would allow an operator to cluster multiple wells and potentially drain hydrocarbons across lease lines and harm adjacent operators' correlative rights.

AVAD references the Examiners Report and Recommendation for Oil and Gas Docket Nos. 7C-0247547 and 7C-024548 which state the reefs are 20 to 30 acres in size,

¹³² AVAD Ex. 39; Post-Hearing Tr. 72:12-25.

¹³³ Post-Hearing Tr. 73:1-15.

¹³⁴ Post-Hearing Tr. 73:1-15.

¹³⁵ Post-Hearing Tr. 71:3-18.

¹³⁶ AVAD Ex. 36, 38; Post-Hearing Tr. 85:11-88:11.

¹³⁷ Post-Hearing Tr. 86:22-87:23

¹³⁸ AVAD Ex. 41, 42.

¹³⁹ AVAD Ex. 43.

¹⁴⁰ Post-Hearing Tr. 16:19-17:4.

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but testimony provided during the hearing refers to 50 and 80-acre reefs in the Field. AVAD provided evidence for the size of the pinnacle reef structures in the Eagle Draw area, but this is a small area of approximately 1.7 miles in length and width,¹⁴¹ that is not necessarily representative of the entire Field, which is approximately 10 miles from north to south, and 5 miles from east to west.¹⁴² The Eagle Draw area is in the southern portion of the Field. AVAD stated these reefs are isolated accumulations from the rest of the Field. The Examiners find the evidence for the size of the reefs cannot be applied to the entire Field.

AVAD and Stone Creek provided extensive evidence on oil gravities, oil-water contacts, and water cuts to show similarities and distinctions between what was found in AVAD's Shannon Hospital 1 wells and Stone Creek's 8H well. The Shannon Hospital 1 lease area is approximately 1.5 miles from north to south and 0.7 miles from east to west.¹⁴³ As this was not a hearing for a Statewide Rule 37 exception for the Shannon Hospital 1 lease and this data is restricted to a portion of the Field, the Examiners find this data does not necessarily apply fieldwide.

AVAD provided evidence for the size of reefs in the Eagle Draw area but did not show if these reefs are within lease lines. At the hearing, Mr. Davis provided testimony that he studied seismic information for the Shannon Hospital 1 lease area and was able to determine the location and size of the pinnacle reefs. Based on his review of the seismic data, he did not anticipate Stone Creek finding a productive reef on its leasehold. The seismic data was not provided during the hearing.

Following the initial hearing, Stone Creek drilled a productive well in an area AVAD had concluded would not be productive based on its seismic interpretation. Further, AVAD's late-filed Exhibit 40, submitted after the post-hearing conference, has a rendering of Shannon Hospital 1 lease oil accumulations that shows the oil accumulation associated the Shannon Hospital 1-3 well crosses AVAD's lease boundary onto Stone Creek's leasehold. AVAD also provided a depiction of a 20-acre oil accumulation for Stone Creek's 8H well is close to or in contact with the Shannon Hospital 1-3 well accumulation. AVAD did not provide evidence to support its determination that 8H well's oil accumulation is limited to 20 acres, nor did it provide evidence of a structural feature that separates Stone Creek's 8H well's oil accumulation from the Shannon Hospital 1-3 well oil accumulation. Mr. Davis stated Stone Creek's productive 8H well demonstrates the complexity of the reef structures in the Field, and is further proof of the need for zero between well-spacing to allow operators the flexibility to produce reserves that would otherwise remain unrecovered. The Examiners conclude the productive well on Stone Creek's acreage demonstrates the reef structures can potentially cross lease boundaries, and multiple operators may be able to produce from common oil accumulations in the Field; therefore, zero between-well spacing may harm to correlative rights.

¹⁴¹ AVAD Ex. 6.

¹⁴² Stone Creek Ex. 21.

¹⁴³ AVAD Ex. 15.

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B. Correlative Interval

AVAD has not demonstrated the correlative interval is representative across the horizontal extent of the Field. The correlative interval was not set at the top and bottom of the reef structures, but approximately 100 feet above and 200 to 300 feet below the picks for the reef. AVAD provided one well log in support of its correlative interval application to be representative of the entire Field. The Examiners find this is insufficient to support a fieldwide correlative interval.

VI. EXAMINER'S RECOMMENDATION

The Examiners recommend denial of AVAD Operating, LLC ("AVAD") application to consider special field rules for the Noelke (Wolfcamp, Lower) Field, as proposed by AVAD. The Examiners recommend adoption of the following findings of fact and conclusions of law.

VII. FINDINGS OF FACT

1. AVAD Operating, LLC (Operator No. 037877) ("AVAD") seeks the following special field rules for the Noelke (Wolfcamp, Lower) Field ("Field") in Crockett County, Texas:
 - a. a designation of correlative interval for the filed as 5,082' to 5,756', as shown in the log of the AVAD Operating, LLC Eagle Draw "10" Lease, Well No. 1 (API No. 42-105-38688); and
 - b. zero minimum between-well spacing.
2. The Field (No. 65674400) was discovered by Marathon Oil in the late 1970s. The fieldwide maximum efficient rate ("MER") of 500 barrels of oil per day ("bopd") was adopted in April of 2005.
3. On April 9, 2019, AVAD filed the subject Application.
4. The Application is protested by Stone Creek Operating, LLC ("Stone Creek").
5. Notice of the hearing ("Notice") was sent to all operators in the Field and to those entitled to notice more than 10 days before the June 17, 2019 hearing. The Hearings Division sent out a supplement Notice on June 21, 2019, clarifying that the field rule amendments requested did not include changing the fieldwide MER of 500 BOPD, as adopted in April 2005.
6. A hearing was held on June 17, 2019, as noticed. A post-hearing conference was convened on November 21, 2019, to admit additional evidence not available at the time of the initial hearing.
7. As of the date of the hearing, the Field had a total of 53 producing wells, with AVAD

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- operating 21 oil wells and four injection wells at the time of the June 17, 2019 hearing. The Field has produced 10,000,000 barrels of oil from these shallow wells.
8. In August 2019, Stone Creek drilled the Shannon Hospital 8H well on its acreage adjacent to AVAD's leasehold.
 9. Oil accumulations in the Field are trapped in distinct carbonate reef structures of varying size with varying porosity and permeability within each reef which are trapped by a common aquifer.
 10. AVAD provided data for the Eagle Draw and Shannon Hospital 1 areas of the Field but did not demonstrate that the data from these areas applies to the entire Field.
 11. AVAD's evidence demonstrated the oil accumulation associated with AVAD's Shannon Hospital 1-3 well may cross AVAD's lease boundary onto Stone Creek's leasehold. The evidence also shows the oil accumulation for Stone Creek's 8H well close to or in contact with AVAD's Shannon Hospital 1-3 well oil accumulation.
 12. The reef structures can potentially cross lease boundaries, and multiple operators may be able to produce from common oil accumulations in the Field.
 13. The 500 MER allowable and zero minimum between-well spacing in a conventional reservoir would allow an operator to cluster multiple wells and potentially drain hydrocarbons across lease lines and harm adjacent operators' correlative rights.
 14. AVAD's one well log in support of its correlative interval application is not representative of the entire Field. The correlative interval was not set at the top and bottom of the reef structures, but approximately 100 feet above and 200 feet below the picks for the reef.
 15. AVAD did not provide evidence sufficient to show that the requested field rules would prevent waste and protect correlative rights.

VIII. CONCLUSIONS OF LAW

1. Proper notice was issued in accordance with all applicable statutes and regulatory codes. See 16 Tex. Admin. Code §§ 3.37(a)(2) and (a)(3), and 1.46.
2. The Commission has jurisdiction in this matter. See, e.g., Tex. Nat. Res. Code §§ 81.051 and 81.052.
3. AVAD did not meet its burden of proof and did not satisfy the requirements of Statewide Rule 37. 16 Tex. Admin. Code § 3.37.

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4. AVAD did not provide sufficient evidence the special field rules will prevent waste and protect correlative rights.

Respectfully submitted,

DocuSigned by:

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Ashley Correll, P.G.
Technical Examiner

DocuSigned by:

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Kristi M. Reeve
Administrative Law Judge