BEFORE THE OIL CONSERVATION DIVISION
EXAMINER HEARING NOVEMBER 2, 2023

CASE NOS. 23614-23617
EXHIBITS B THRU B-6

DOC GOODEN SWD #1 WELL
HERNANDEZ SWD #1 WELL
HODGES SWD #1 WELL
SEAVERS SWD #1 WELL

LEA COUNTY, NEW MEXICO

STATE OF NEW MEXICO
DEPARTMENT OF ENERGY, MINERALS AND NATURAL RESOURCES
OIL CONSERVATION DIVISION

APPLICATIONS OF GOODNIGHT MIDSTREAM PERMIAN, LLC FOR APPROVAL OF A SALTWATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO

CASE NOS. 23614-23617

SELF-AFFIRMED STATEMENT OF PRESTON MCGUIRE

1. My name is Preston McGuire. I work for Goodnight Midstream Permian, LLC ("Goodnight Midstream") as the Geology and Reservoir Engineering Manager.

2. I am familiar with the applications filed by Goodnight Midstream in these cases, and I am familiar with the status of the lands and geology in the subject area. I have conducted a study and review of the reservoirs and geology in the area of the proposed injection wells and of the San Andres formation, which is the saline aquifer that is the intended disposal zone for Goodnight Midstream's proposed injection.

3. I have not previously testified before the New Mexico Oil Conservation Division as an expert witness in petroleum geology or as a reservoir engineer; therefore, I have attached my curriculum vitae as **Goodnight Exhibit B-1**. I believe my credentials qualify me to testify as an expert in petroleum geology and reservoir engineering in these matters.

4. In summary, I have a bachelor's degree in geology from Western State Colorado University and a master's degree in geology from Texas Christian University with 8 years of working experience as a geologist in the oil and gas industry. Most of my experience has been with Goodnight Midstream where I have primarily worked with water disposal wells for the past six years. As the Geology and Reservoir Engineering manager with Goodnight Midstream, my responsibilities include permitting, geologic support for drilling, technical advisor for completion

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Santa Fe, New Mexico
Exhibit No. B
Submitted by: Goodnight Midstream Permian, LLC
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design, testing and performance analysis, remediation, and service life projection. Throughout my time at Goodnight Midstream, I have conducted work in the Permian Basin, primarily on produced water disposal projects.

5. In addition to my responsibilities outlined above, I also manage reservoir performance for Goodnight Midstream's SWDs in North Dakota, Texas, and New Mexico. In North Dakota we manage the movement and disposal of more than 250,000 barrels of produced water a day. In Texas, we have drilled and operate 25 saltwater disposal wells. Additionally, we have 11 saltwater disposal wells drilled and 10 pending permit applications in New Mexico.

Goodnight Midstream Permian, LLC Company Overview

6. Goodnight Midstream was founded in 2011. The company is based in Dallas, but our initial operations were in North Dakota. We have grown to be the largest third-party disposal company in North Dakota. In 2016, we commenced operations in Texas, and then started in New Mexico in early 2018. In New Mexico, we operate one large high-pressure pipeline system in Lea County called the Llano System.

7. **Goodnight Exhibit B-2** is a map depicting the current status of the Llano System along with its active and proposed saltwater disposal wells ("SWD"). Currently, the Llano System is comprised of 110 miles of pipeline with an ultimate projected capacity of 400,000 barrels of water per day with 11 approved SWDs. The system currently serves 12 dedicated operators with 469 producing wells connected at 19 different receipt points, which are denoted as green dots on the map. Active production and drilling is located in the vicinity of the receipt points. Pipelines transport the produced water to the disposal field where we have 11 approved SWDs represented by orange triangles. Our pending applications, the Doc Gooden SWD #1 (Case No. 23614), Hernandez SWD #1 (Case No. 23615), Hodges SWD #1 (Case No. 23616), and Seaver SWD #1 (Case No. 23617), are depicted with purple triangles.

8. As reflected in this exhibit, our approach is to move produced water away from areas with the most intense production, where there is high competition for injection permits and reservoir capacity in the Devonian formation is relatively limited, to areas where we have identified depleted formations on the Central Basin Platform that can sustainably accept large volumes of produced water for disposal. By targeting these depleted formations, we avoid adding to the risk of induced seismicity through deep injection into the Devonian and instead target zones, such as the San Andres, where there has been substantial depletion through decades of water production to supply water for secondary recovery operations in nearby waterfloods.

9. Access to the San Andres formation is of critical importance to these operators as a sustainable and long-term option to dispose of this produced water. The wells connected to the Llano System produced a combined 3.7 MM barrels of oil, 9.0 BCF of gas, and 7.7 MM barrels of water in August 2023 alone. About 2.0 MM barrels of produced water was reclaimed for re-use and about 5.7 MM barrels of produced water was delivered into the Llano System for disposal. Besides serving as a disposal field for substantial oil and gas production, the San Andres itself is also an important source of revenue for the State of New Mexico and Goodnight Midstream's landowners and royalty owners, including the State Land Office, who receive revenue from the transportation and disposal of produced water.

C-108 Applications: Geologic Overview

10. The injection disposal interval for the proposed SWD wells will be within the San Andres formation [SWD; San Andres (Pool Code 96121)] through perforated completions in each well between the following approximate depths: 4,200 feet and 4,900 feet for the Doc Gooden SWD #1, 4,200 feet and 5,300 feet for the Hernandez SWD #1, 4,100 feet and 5,200 feet for the Hodges SWD #1, and 4,200 feet and 5,300 feet for the Seaver SWD #1. The top of the injection intervals for each well will not extend above the top of the San Andres.

11. In **Goodnight Exhibit A-3 through A-6**, which are the C-108 administrative applications for each SWD, the geologic description under Item VIII at page 6 in each for each application contains an overview of the geology and lithology of the target formation within the area of the proposed SWD wells.

12. The Doc Gooden SWD #1 will penetrate the following geologic tops at the following approximate depths:

Formation	Top
Tansil	2,525 feet
Yates	2,700 feet
Seven Rivers	2,895 feet
Queen	3,330 feet
Penrose	3,480 feet
Grayburg	3,642 feet
San Andres	4,110 feet
Total Depth	5,000 feet

13. The Hernandez SWD #1 will penetrate the following geologic tops at the following approximate depths:

Formation	Top
Tansil	2,590 feet
Yates	2,795 feet
Seven Rivers	2,985 feet
Queen	3,425 feet
Penrose	3,565 feet
Grayburg	3,735 feet
San Andres	4,188 feet
Total Depth	5,300 feet

14. The Hodges SWD #1 will penetrate the following geologic tops at the following approximate depths:

Formation	Top
Tansil	2,505 feet
Yates	2,690 feet
Seven Rivers	2,895 feet

Queen	3,325 feet
Penrose	3,465 feet
Grayburg	3,610 feet
San Andres	4,065 feet
Total Depth	5,200 feet

15. The Seaver SWD #1 will penetrate the following geologic tops at the following approximate depths:

Formation	**Top**
Tansil	2,570 feet
Yates	2,770 feet
Seven Rivers	2,975 feet
Queen	3,410 feet
Penrose	3,545 feet
Grayburg	3,707 feet
San Andres	4,178 feet
Total Depth	5,300 feet

16. **Goodnight Exhibit B-3** is an overview locator map depicting the location of the Eunice Monument South Unit ("EMSU") with a dark green outline and the EMSU "B" Expansion Area to the northwest in a light green outline. The location of Goodnight's proposed and pending SWDs in this area are indicated with yellow circles. All of Goodnight's proposed locations at issue in these cases are within Sections 3, 4, and 10 in T21S, R36E. The Piazza SWD in Section 9, T21S, R36E, was the subject of Case Nos. 22626 and 23339. Also depicted on the map with an ochre-colored line is the relevant portion of Goodnight Midstream's Llano System serving each of Goodnight Midstream's SWDs.

17. Goodnight's active SWDs are indicated with dark blue circles and include the Banks, Ryno, Sosa, Dawson, Nolan Ryan, Piper, Yaz, Ted, and Pedro SWDs. Rice Operating's active SWDs are indicated with a teal blue color and include the EME #33M, the N11, EME #21, and the State E27 #1 SWDs. OWL SWD Operating has one active SWD, the P15, which is indicated with a light blue circle. Parker Energy has one active SWD, the Parker 5, which is

indicated with a brown circle. Empire also operates one active SWD, the EMSU 1, which is located in Section 4, T21S, R36E. The active SWDs on the map include the last five digits of the API number and the total volume of produced water injected in millions of barrels.

18. In total, 8 active SWDs currently inject produced water into the San Andres within the boundaries of the EMSU, as follows:

WELL	OPERATOR	INJECTED VOLUME
EMSU 1	Empire	4.2 MM
N11	Rice Operating	1.9 MM
EME 21	Rice Operating	39.3 MM
P15	OWL SWD Operating	0.1 MM
Banks	Goodnight Midstream	1.8 MM
Ryno	Goodnight Midstream	13.9 MM
Sosa	Goodnight Midstream	15.7 MM
Dawson	Goodnight Midstream	3.7 MM

19. Seven of the SWDs operating within the EMSU are commercial and, like Goodnight Midstream's proposed SWDs in these cases, are not related to operations of the Unit.

20. Included on the map are the locations of 6 water supply wells ("WSW") that were used to supply water from the San Andres aquifer for waterflood operations within the EMSU. They are identified with pink squares and addressed in more detail in my testimony below.

21. Also included on the map are lines of cross section for each of Goodnight Midstream's proposed SWDs in these cases reflecting the location of representative well logs I used to create cross sections for each of Goodnight Midstream's proposed SWDs in the following set of exhibits. A blue line is used for the Doc Gooden SWD #1 (Case No. 23614) well; a green

line is used for the Hernandez SWD #1 (Case No. 23615); an orange line is used for the Hodges SWD #1 (Case No. 23616); and a red line is used for the Seaver SWD #1 (Case No. 23617).

22. **Goodnight Exhibit B-4 through B-7** are the cross-sections I prepared that show the relative position of the proposed Goodnight SWDs along with representative well logs that span a 1.5-to-2-mile distance in the north half of Township 21 South, Range 36 East. The construction of each cross-section exhibit uses color to indicate impermeable, tight rock within each formation that will function as a barrier to vertical transmission of injection fluids. The lithology of these impermeable rocks are anhydrites, low porosity dolomites, and limestones. The color fill is color coded by formation: Grayburg is green and San Andres is purple-gray. White space represents porous rock that contains either hydrocarbon or saltwater; saltwater-filled porosity is a saline aquifer. The lithology of these porous intervals are dolomitic siltstones and porous dolomites. The gas/oil contact ("GOC") for the Eumont Field is shown at -100 feet subsea. The GOC is marked by a red-green dashed horizontal line that cuts across all formations indicating a common gas-oil contact. The oil/water contact for the Eunice EMSU oil pool is shown as a green-blue horizontal line at -325 feet below sea level. At the proposed locations, the proposed SWD wells will be drilled through both the Eumont and the Eunice pools.

23. Except for the Doc Gooden cross-section, each of the cross-sections includes a San Andres WSW used to source water for the Grayburg EMSU waterflood, a San Andres SWD that is in, or near, the EMSU boundary, and an offset log to the proposed locations that is representative of the anticipated geology at the proposed permit locations that penetrated the entire San Andres section. Two current SWDs and two WSWs were used in all these cross-sections.

24. The EMSU #461 WSW (used in the Hernandez and Seaver cross-sections) is one of the six water supply wells that sourced water for the EMSU waterflood and is referenced in the overview locator map, above. This well has an open hole completion interval between 4200 feet

to 5000 feet where it has withdrawn about 19.3 MM BW that was utilized in the waterflood. It was plugged and abandoned in 2002.

25. The EMSU #458 (used in the Hodges cross-section) is another one of the EMSU waterflood source wells. It has a cased-hole completion interval between 4056 feet to 4870 feet. This well has withdrawn 49.5 MM BW over its lifetime. This well has been listed as temporarily abandoned since 2012.

26. With the depletion of the San Andres aquifer from these two WSWs, along with the other four WSWs in the field, Goodnight Midstream's proposed disposal wells near the former water supply wells will have very low operating pressures, creating an ideal situation for disposal injection.

27. The Rice EME SWD #33M (used in the Hodges cross-section) was drilled in 1960 within 175 feet of the EMSU boundary. The well has an open-hole completion and injects in the interval between 4509 feet to 5100 feet measured depth ("MD"). This well has injected approximately 59.4 MM BW in its lifetime and currently injects on vacuum. This well has never reported positive tubing pressure since Division injection records began in 1994.

28. The Rice N 11 #1 SWD (used in Hernandez, Seaver, and Gooden cross-sections) was drilled in 2020 and is in the EMSU boundary. This well utilizes the San Andres for disposal and has a permitted interval between 4210 feet to 5100 feet MD. It has injected 1.9 MM BW and also injects on vacuum due to the large volume of water extracted from the San Andres.

29. The proposed injection zone for each of Goodnight Midstream's proposed SWDs consists of interbedded carbonate rocks, including dolomites and limestones. The upper San Andres is capped by tight dolomite and anhydrite, which serves as the upper geologic seal to prevent migration to the formations above, including the producing Grayburg formation. Within the target injection zone, there are several thick intervals of porous and permeable carbonate rock

capable of accepting produced water. The injection intervals have a net thickness of more than 600 feet out of a gross thickness of about 1300 feet based on open-hole logs in the area.

30. The lower San Andres lithologic unit consists of approximately 200 feet of limestone with porosity values of 3%-6%, which creates an effective basal seal and barrier against downward fluid migration from the San Andres aquifer into the Glorieta formation below. In addition, below the underlying Paddock interval, the Blinebry interval consists of approximately 580 feet of tight dolomite, which functions as an excellent and exceptionally thick barrier to downward migration.

31. Based on my examination and study of the geology in the area, it is my opinion that these geologic seals above and below the target injection interval will effectively contain injected fluids within the injection zone.

Geologic Barriers Effectively Isolate the San Andres Formation

32. **Goodnight Exhibit B-8** provides direct evidence of a substantial barrier and seal above the San Andres formation against vertical fluid migration into shallower zones, including the Grayburg. This exhibit shows three well logs. From left to right the wells are the EMSU #460 WSW, the Penroc (Chevron) Arnott Ramsay (NCT-C) #17, and the Rice Engineering EME SWD L-21. The Arnott Ramsay #17 produces from the shallower Eumont Y-7R-Q gas pool in the Yates, Seven Rivers, and Queen formations and is a depletion gas production well. It is 350 feet from the EME SWD L-21 disposal well. EME SWD L-21 has an estimated cumulative disposal volume of 39.2 million barrels of saltwater: 21.0 million barrels pre-OCD records [estimated 1966-1993] plus 18.2 million recorded in OCD records. The Arnott Ramsey (NCT-C) #17 has produced 2 BCF of gas from the Eumont Y-7R-Q pool. Despite its proximity to the EME SWD L-21 well, it has produced no water in the last 23 years, demonstrating that there is an effective barrier and seal between the San Andres and Y-7R-Q reservoirs.

33. The presence of an effective barrier between the San Andres and the overlying Grayburg formation is proven by the presence of a regional pressure differential. The early field production behavior of the Grayburg is typical of a solution gas drive reservoir, having a rapid decline in reservoir pressure without a rapid rise in water production. This is why the operators of the EMSU enacted a waterflood, to re-pressure the reservoir and sweep the remaining oil. The San Andres water supply wells saw no decline in the ability to produce water for the flooding project. The reason the waterflood worked and the Grayburg was successfully re-pressurized by the addition of San Andres water is because the geologic seal between the Grayburg and San Andres is effective. The success of the waterflood and re-pressurization of the Grayburg is the first indication that the Grayburg and San Andres are not in communication and are separated by a geologic barrier.

34. The Grayburg has now been pressured up due to being under water flood and the San Andres is depleted due to water being extracted in great quantities. All producing Grayburg wells in the EMSU showed a gradual increase in water cut until they reached more than 98% water. All producing wells have built pressure from the injection of San Andres water into the Grayburg. The presence of water in the Grayburg, however, is not diagnostic of unwanted water encroachment. We must look instead to pressure differential to demonstrate that an effective barrier and seal exists between the two formations.

35. At the time the EMSU was created, the San Andres was identified as the source of water for the water flood operation in the Graybrug. Water withdrawal began in 1987. Since that time, the San Andres has supplied approximately 348 million barrels of water for field operations. **Goodnight Exhibit B-9** is a table I created using OCD records of production volumes for the 6 San Andres water supply wells within the EMSU, initially discussed above. The history on these wells is incomplete in the Division's public well data. Data from hearing case records, and

reconstructed volumes from tests and modeled averages were used to supplement the table. A few of the water supply wells are still active today. No oil production was ever reported for any of these wells.

36. As a result of this substantial fluid withdrawal, the San Andres was de-pressured while the Grayburg was re-pressured by waterflood injection. A large pressure differential was established between these two contiguous formations. We know that an effective geologic barrier and seal exists between the Grayburg and San Andres formations or we would not see the effects of the differential persist through to the present day. The pressure differential has a clear impact on drilling operations in the area and on injection into the San Andres.

37. Goodnight drilled its Snyder (Ryno) SWD #1 in the northwest quarter of Section 17 inside the EMSU in June 2018. Goodnight had no difficulty drilling through the normally pressured Grayburg reservoir. However, once the drill bit passed out of the base of the Upper San Andres anhydrites, which serves as the seal between the Grayburg and San Andres, the well lost circulation in the San Andres. All fluid was lost into the hole. This continued for the next 700 vertical feet as we drilled through the upper and middle San Andres zones. Water was continuously added to the hole to continue drilling. In contrast, the Grayburg held a column of fluid. This confirms that the Grayburg is pressure isolated from the San Andres. The condition repeated when we drilled each of our subsequent wells. All 11 wells have held a column of drilling fluid in the Grayburg but experienced a complete loss of fluid when we pass below the anhydrite boundary layer. The pressure differential between the Grayburg and San Andres is substantial, extends over a large area, and has not equilibrated over time. This strongly establishes that there are effective geologic barriers to flow between the two reservoirs across a substantial area, including the area at issue within the EMSU.

38. Persistent low pressure in the San Andres is also demonstrated by the fact that Goodnight Midstream's Sosa SWD #1, Snyder (Ryno) SWD #1, Banks SWD #1, and Andre Dawson SWD #1 wells can inject into the San Andres on vacuum by gravity feed. This would not be possible if there was not an effective seal and barrier to maintain that dis-equilibrium between the two formations. This pressure differential has been maintained for more than 30 years confirming that the geologic barrier and seal between the two formations is effective and prevents water in the Grayburg from migrating to the San Andres, or the inverse. It will prevent water in the San Andres from migrating to the Grayburg.

Injection Will Not Affect Underground Sources of Drinking Water or Freshwater

39. The deepest underground source of groundwater is the Rustler formation at a depth of approximately 1,345 feet. Water well depths in the area range from approximately 195 feet to 213 feet below ground surface. No underground sources of drinking water exist below the injection interval in this area.

40. Based on this review and analysis of freshwater, the geologic seals above and below the injection interval, and the significant vertical offset between the injection zone and shallow zones containing freshwater, it is my opinion that the proposed injection will not threaten drinking water sources or zones containing freshwater.

41. **Goodnight Exhibits B-10 through B-13** are the geology and engineering statements that I prepared for each case. They state that I have reviewed the available geologic and engineering data and have found no evidence of a hydrological connection between the proposed injection intervals and any underground sources of drinking water. In addition, the casing strings has been designed to ensure that there will be no hydrologic connection between the injection interval and overlying underground sources of drinking water.

Injection will not Result in Waste, Impair Correlative Rights, or Interfere with EMSU Operations

42. **Goodnight Exhibit A-2** is a copy of Empire New Mexico LLC's ("Empire") administrative protest. According to the protest, Empire objects to the proposed injection because injection could "cause potential damage to Empire's correlative rights."

43. Previously, in the Piazza SWD #1 Case No. 22626 Empire objected to Goodnight Midstream's proposed injection because the San Andres was included in the unitized formation for secondary recovery when the EMSU was created in 1985. In that case, Empire's objection stated that the Grayburg and San Andres formations have "continued to produce hydrocarbons from same since the unit was formed." *See* Case No. 22626, Goodnight Exhibit B-2. The objection asserted that the EMSU "waterflood project . . . will be adversely affected by the proposed injection operation."

44. The San Andres has been confirmed to be a non-hydrocarbon bearing aquifer and has been permitted for saltwater disposal for 62 years, including within the EMSU boundary. The Division designated it as a saltwater disposal zone and assigned it the pool designation "SWD; San Andres" and pool code "96121" for "Salt Water Disposal."

45. **Goodnight Exhibit B-14** is a copy of Gulf Oil Corporation's Exhibit 5 from Division Case No. 8397, which originally sought approval of the EMSU as a statutory waterflood unit. It is a letter that Gulf sent to royalty and working interest owners explaining the benefits of their proposed waterflood. Page 3 of the exhibit makes clear that even at the time EMSU was proposed, the San Andres was determined to be non-productive and would serve only as a source of water for the waterflood operation. In fact, at the time the EMSU was formed, the original operator of the Unit, Gulf Oil Corporation, determined that "[t]he bottom of the interval must be the base of the San Andres formations (sic) to include the area's most prolific water production

zone[.]" *See* portions of Gulf Hearing Exhibit 21, Case No. 8397, attached as **Goodnight Exhibit B-15**. The San Andres was expressly identified as a zone that would provide the massive quantities of water required for the initial fill-up period. *See* Gulf Hearing Exhibit 22, Case No. 8397, attached as **Goodnight Exhibit B-16** (Gulf anticipated drilling nine water supply wells in the San Andres formation "to provide the water injection requirement which is expected to peak at 2.7 MM barrels per month during fillup"); *see also* Case No. 8397, Hearing Tr. Vol. 2, 214:23-215:4, attached as **Goodnight Exhibit B-17** ("There are currently plans to drill approximately nine water supply wells to provide make-up water from the San Andres formation. This make-up water will be used initially as the primary source of injection water and once we have the unit fully developed, we will be switching over to using produced water as our primary source of injection water.").

46. At the time the Unit was approved, Gulf had no intention of conducting waterflood operations within the San Andres formation. *See* Case No. 8397, Hearing Tr. Vol. 2, 224:22-25 ("Q: Now I understand that you will be injecting only into the Grayburg and Penrose and not the San Andres, is that correct? A: That is correct."). The San Andres was determined to be non-prospective. In fact, Gulf made clear in its hearing testimony that the targeted oil column constituting the "unitized formation" includes only the Grayburg and Penrose formations and does not extend into the San Andres. *See id.*, Hearing Tr. Vol. 1, 52:6-7 ("[T]he oil column in this area thins from the Grayburg up into the lower part of the Penrose."); 53:1-4 ("Q: When you look at the oil column in the unit area, that is included generally in the Grayburg and the lower portion of the Penrose, is that correct? A: That's correct."). The "unitized formation" is defined in Order No. R-7765 as "the entire oil column under the unit area permitting the efficient and effective recovery of secondary oil therefrom." *See* Order No. R-7765, Finding ¶ 10. As explained at the hearing when the EMSU was created, the oil column within the EMSU is not found below the Grayburg. *See* **Goodnight Exhibit B-17**, Case No. 8397, Hearing Tr. Vol. 1, 52:6-7; 53:1-4.

47. The San Andres aquifer remains non-productive to this day. Goodnight Midstream has reviewed the Division's well files and has not found a San Andres well that has produced oil from the Division-designated San Andres disposal zone [SWD; San Andres (Pool Code 96121)]. Injection will not cause waste, impair correlative rights, and will not adversely affect the production of hydrocarbons from the EMSU or unit operations.

48. As demonstrated above, the proposed injection fluids will not migrate to vertically offsetting hydrocarbon intervals and will remain contained within the target injection zone, which is neither productive nor prospective for hydrocarbons in the area of the proposed injection well. The geologic seals above and below the injection interval, addressed in my testimony above, will isolate the disposal fluids from offsetting zones capable of producing hydrocarbons.

49. **Goodnight Exhibit B-18** shows a table I prepared tabulating the total volume of produced water injected into the San Andres within and immediately adjacent to the EMSU area. Included in the table is the operator for each injection well, the well's location, date of first injection, volumes injected, days in operation, average barrels of water injected per day, and a notation on whether the well is located within the boundaries of the EMSU. A total of 269 million barrels of produced water has been injected into these 17 saltwater disposal wells without any indication of communication with the overlying Grayburg formation in available production records. Active injection into the San Andres occurred before, during, and after the EMSU Grayburg waterflood commenced operations. There is a 62-year track record of no impact to Grayburg production and subsequent EMSU operations from concurrent and continuous produced water injection into the San Andres.

50. As reflected on the tables in the exhibit, Goodnight Midstream is not the only operator with active SWDs inside the EMSU. Rice Engineering, OWL, and Empire operate SWDs inside the EMSU that currently dispose water into the San Andres and do no harm to the Grayburg

reservoir or to EMSU operations. **Goodnight Exhibit B-3** is a map I prepared locating each of the SWDs included in the previous exhibit. Included on the map are Goodnight Midstream's Llano System and its nearby connected SWDs indicated with blue circles. The proposed SWDs are marked with a yellow circle. Also included are the locations of EMSU water supply wells with the approximate volume of water produced from the San Andres by each supply well. Of note, Empire operates the Empire EMSU #001 SWD, which actively injects produced water into the San Andres and is located approximately a mile from three of Goodnight Midstream's proposed SWD wells.

51. The EMSU #457, #458, #460, #461, and #462 water supply wells are all within the EMSU boundary and proximal to the proposed SWD wells. As shown in **Goodnight Exhibit B-18**, these water supply wells have produced a combined total of approximately 350 million barrels of water from the San Andres over more than 30 years with no show of oil. Three hundred fifty-million barrels over three decades with no oil production is a sufficient test to confirm that the San Andres is devoid of hydrocarbons here.

52. In summary, hundreds of millions of barrels of water have been taken out of the San Andres and hundreds of millions of barrels of water have been put back in with no effect on Grayburg production.

The San Andres Aquifer is not a ROZ Target in the EMSU

53. As outlined above, the San Andres aquifer has been disturbed by these two types of water operations on a vast scale. Original conditions no longer exist. Nevertheless, historical data are available to assess whether the San Andres may be a candidate for a residual oil zone ("ROZ") development. Setting aside all other considerations, it might be considered a potential ROZ candidate if the San Andres aquifer never reached the bubble point. As pressures were dropping as a result of the de-watering operations did the San Andres ever produce gas?

54. Once the bubble point pressure is reached in a reservoir it is no longer a candidate for a ROZ play because the reservoir energy needed to drive a residual oil zone play has been lost through depletion. The bubble point is the pressure at which the first bubble of gas appears from a fluid at a specific temperature or pressure. When a reservoir is depleted and its pressure falls below the bubble point pressure, free gas starts to form in the reservoir.

55. In the San Andres, the bubble point was reached some time ago and no oil was produced. In 2013, XTO filed an application to allow flaring a small volume of gas from the EMSU #458 and #459 water supply wells, which were completed and producing water from the San Andres. That means the San Andres was drawn down sufficiently to reach the bubble point and to release dissolved gas. **Goodnight Exhibit B-19** is a copy of the sundry notice filed with OCD showing that on page 4 XTO requested authority to flare these wells in 2013. No oil was produced with the gas, confirming that the San Andres is not an oil reservoir and is not a suitable candidate for a future ROZ play.

56. It is doubtful that an ROZ play that recovers commercial amounts of oil from the San Andres can exist in this space. Water has been extracted from what Goodnight Midstream refers to as the San Andres until the bubble point was reached and no oil was recovered. A sufficient amount of water over a sufficient amount of time has been extracted to prove that the San Andres aquifer is a water supply source and not oil productive.

57. Goodnight Midstream's pick for the San Andres top is functional as it is at the boundary of the mappable barrier to flow that exists between the Grayburg and San Andres. Goodnight Midstream has presented data to demonstrate that this barrier is real and effective. It appears that Empire wants to pursue the interval immediately below the Eunice Monument Pool oil column as having economic potential. Goodnight Midstream's geologic model does not include this interval as part of the San Andres. It is part of the Grayburg by the top we have chosen.

Goodnight Midstream has chosen a deeper top as our pick for the San Andres, which is our operational ceiling for injection. Goodnight Midstream does not propose to inject above it.

58. Goodnight Midstream believes that the ROZ that Empire appears interested in developing is actually the transition zone below and contiguous with the Grayburg oil column and is of the same natural origin and directly associated thereto. Saltwater has been disposed into the same San Andres zones accessed by the water supply wells without doing harm to the Grayburg water flood above. Multiple operators have saltwater disposal wells inside and near the EMSU actively injecting water while doing no harm to the unit or its operations. Goodnight Midstream believes that both Empire and Goodnight Midstream can pursue their separate goals without interfering with or harming the other. It is compatible for Empire to investigate the viability of producing oil from the Grayburg ROZ while Goodnight Midstream continues to dispose produced water into the San Andres through its existing and proposed SWD wells.

59. In addition to SWD operations within the EMSU, there are 14 different operators with 394 active producing wells inside the EMSU boundary. Of those, Empire operates 297 active wells. The other 13 operators have 97 active wells inside the unit boundary. **Goodnight Exhibit B-20** is a map of wells located within the EMSU boundary that identifies each active well within the EMSU by operator. The proposed SWD wells are marked with yellow triangles. Goodnight Midstream's proposed injection wells would be part of an active oil field where many companies use the same space to their advantage.

Empire's Documents Confirm that EMSU Production is Limited to the Grayburg and that San Andres Injection will not Cause Waste, Impair Correlative Rights, or Interfere with EMSU Operations

60. In response to a subpoena for documents, communications, data, analyses, reports and summaries that address whether the San Andres contains hydrocarbons, Empire produced seven documents and two Division Orders, none of which support the position that the San Andres

in this area contains hydrocarbons capable of being produced or that it is a candidate for ROZ development.

61. In response to Goodnight Midstream's subpoena for documents, Empire produced a single document that was generated by Empire itself, attached as **Goodnight Exhibit B-21**. All the other documents produced by Empire were third-party studies or reports generally discussing ROZ development and Division Order Nos. R-7767 and R-7767-A.

62. The Empire document is titled "BO/d Bubble Maps, Log Data Coverage (XOM & NUTECH) EMSU "A" – CO2 Pilot High-Grade." In it, Empire specifically calls out six production wells within the EMSU—the EMSU #200H, #214, #642, #294, #325, and #319—and includes details on each well's production history. However, none of these wells, are completed within or produce from the San Andres aquifer.

63. To confirm this I pulled the well logs for each of the six wells identified in Empire's document and created a cross-section from A to A' including the well log for Goodnight Midstream's Ryno SWD #1 that includes the top of the San Andres in this area.

64. **Goodnight Exhibit B-22** is an exhibit I prepared depicting a line of cross-section from A to A' and the cross-section showing the well logs for each of Empire's wells and Goodnight Midstream's Ryno SWD #1. As noted on the Ryno SWD #1 well log, the top of the San Andres aquifer is well below the total depth of any of these producing wells called out by Empire. None of the EMSU wells identified in the document extend into the San Andres aquifer; they all produce from the Grayburg.

65. As stated above, we have not identified a San Andres well that has produced oil from the Division-designated San Andres disposal zone [SWD; San Andres (Pool Code 96121)]. That assessment includes all the EMSU wells, including the six wells identified in this document.

CONCLUSION

66. In my opinion, granting this application will help conserve resources, avoid waste, and protect correlative rights. As demonstrated by existing and long-term injection into the San Andres formation adjacent to and inside the EMSU boundaries, the proposed injection through the Doc Gooden SWD #1 (Case No. 23614), Hernandez SWD #1 (Case No. 23615), Hodges SWD #1 (Case No. 23616), and Seaver SWD #1 (Case No. 23617) will not cause waste or impair correlative rights in offsetting Grayburg production, and will not interfere with EMSU operations.

67. **Goodnight Exhibits B-1 through B-22** were prepared by me or compiled under my direction from company business records or from the public records of the OCD.

68. I affirm under penalty of perjury under the laws of the State of New Mexico that the foregoing statements are true and correct. I understand that this self-affirmed statement will be used as written testimony in this case. This statement is made on the date next to my signature below.

Preston McGuire

Preston McGuire

10/25/2023

Date

Preston McGuire

5420 Dennis Ave.
Fort Worth, TX 76114
Pmcg1992@yahoo.com / (575) 937-5351
linkedin.com/in/preston-mcguire-382771129/

Summary of Skills:

As a geologist currently specializing in saltwater disposal wells and underground storage reservoirs. I have a proven track record of using my skills in geology, reservoir engineering, and operational management to contribute to the successful development of permanent, large-volume disposal reservoirs. These skills are also applicable to CO2 sequestration and gas storage. My work involves analyzing geological data to identify and evaluate suitable reservoirs for disposal and managing the drilling and completion of disposal wells. I am skilled in monitoring and managing reservoir performance, including pressure and flow rate, and using this information to optimize disposal operations (i.e. pipeline balancing/optimization). In addition, I have experience developing plans for induced seismicity mitigation to ensure safe disposal operations.

Work Experience:

Goodnight Midstream, Geology and Reservoir Engineering Manager, September 2023-Present
Responsible for various aspects of the company's operations, involving the evaluation and troubleshooting of existing produced water injection wells and the selection of new disposal sites/zones to meet specific reservoir capacity and economic development criteria. Worked in close collaboration with the Business Development/Finance, Land, Regulatory, and Engineering groups to achieve common business goals. Served as regulatory lead in New Mexico, Texas, and North Dakota for all SWD regulatory filings.
Duties: Managed the Geology and Reservoir Engineering personnel. Provide geologic and reservoir analysis to support project decision making. Analyze SWD performance metrics, including flow rate vs. pressure, Fall-off tests, and step-rate tests to assess reservoir performance and well life. Perform analysis to understand and mitigate induced seismicity risk for injection wells. Provide mechanical and operation enhancement recommendations for existing assets. Serve as technical representative for company in meetings and conferences.

-Senior Geologist, May 2021-September 2023
Worked as a subsurface team lead for Texas assets with a team of geologists and engineers conducting geological assessments for saltwater disposal sites, resulting in optimized injection well placements and increased disposal capacity. Assisted finance team in evaluating oil & gas production of current and potential clients to underwrite gathering contracts.
Duties: Prepare comprehensive technical reports and presentations summarizing geological findings, reservoir analyses, and disposal system performance for management and stakeholders. Identify and address operational challenges, proposing and implementing innovative solutions to enhance injection efficiency and reduce costs. Monitored injection data to analyze well health and current injection capacity and optimize pipeline balancing. Performed oil and gas production analysis of potential customer leaseholds to forecast and underwrite cashflows. Served as company representative on multiple industry groups that advises regulators in developing regulations that are needed and operationally feasible.

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-1
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
Case Nos. 23614-23617

-Geologist, May 2017- May 2021
Worked as a geologist on a multidisciplinary team to locate, drill, complete, and monitor saltwater disposal wells in Texas, New Mexico, and North Dakota.
Duties: Perform detailed geological mapping and interpretation using industry-standard software to identify optimal locations for saltwater disposal wells (structure contour, isopachs, net pay, pore volume). Analyze well logs and interpret subsurface data to evaluate reservoir characteristics and optimize reservoir utilization. Developed structural analyses and stratigraphic framework of multiple geologic horizons and conducted petrophysical analyses to identify reservoirs with suitable characteristics to support SWD viability and longevity. Involved in SWD permitting process in New Mexico and Texas working with regulators to achieve approved injection permits.

Antero Resources, Geologic Intern summers of 2015 & 2016
Skills learned: Working within a multidisciplinary team for an E&P company to achieve a common goal and becoming familiar with the E&P process from prospect to market.
Duties: Mapping project of Upper Devonian shales in eastern Kentucky and western West Virginia. Project included structure contour maps and pay zone isopach maps produced in Petra.

Paragon Geophysical Services, Geotechnical Intern summer of 2014
Skills learned: Designing spreads of seismic shoots as well as working with the seismic data files.
Duties: Assisted in designing the spread and layout of extensive seismic surveys in the U.S. and Canada using Mesa and DeLorme XMap 8. Gathered and uploaded raw seismic data from crews for the client's geoscientist.

Western State Colorado University, Research Assistant to Dr. Allen Stork, 2013-2015
Skills learned: GIS experience and lab techniques.
Duties: Digitized geologic quadrangles for use in GIS and completed general petrographic work.

Education:

Texas Christian University
M.S. in Geology
Thesis: U-Pb detrital zircon signature of the Ouachita Orogenic Belt, Advisor: Xangyang Xie
May 2017. GPA: 3.8/4.0

Western State Colorado University
B.S. in Geology with an emphasis in Petroleum Geology, minors in Mathematics and Psychology
December 2014. GPA: 3.3/4.0; Geology 3.6/4.0

Accomplishments & Memberships:

NMOGA Company Representative 2019-Present
- Served on NMOGA Delaware Mountain Group Capacity Technical Team
- Served on NMOGA Deep Disposal & Seismicity Technical Team

TXRRC SRA Company Representative
TXOGA Company Representative 2019-Present
Imperial Barrel Award team member, TCU 2016
Fort Worth Geological Scholarship, Fort Worth Geological Society 2016-2017
Petroleum Geology Award/Scholarship, Roswell Geologic Society, 2011-2017
AAPG Student Chapter Member 2012-2017, Treasurer 2013-2014
Mountaineer Award/Scholarship, Western State Colorado University, 2010-2014

Goodnight Midstream

- Active SWD
- Proposed SWD
- Receipt Points
- Active Pipelines
- In-Construction

GOODNIGHT MIDSTREAM

20S 33E | 20S 34E | 20S 35E | 20S 36E | 20S 37E

21S 31E | 21S 32E | 21S 33E | 21S 34E | 21S 35E | 21S 36E | 21S 37E

22S 31E | 22S 32E | 22S 33E | 22S 34E | 22S 35E | 22S 36E | 22S 37E

23S 31E | 23S 32E | 23S 33E | 23S 34E | 23S 35E | 23S 36E | 23S 37E

24S 32E | 24S 33E | 24S 34E | 24S 35E | 24S 36E | 24S 37E

25S 32E | 25S 33E | 25S 34E | 25S 35E | 25S 36E | 25S 37E

Eddy

Lea

New Mexico

Hodges

Doc Gooden

Piazza

Seaver

Hernandez

RYNO 17-1 SWD

ERNIE BANKS

NOLAN RYAN SWD 1

SOSA SA 17 2

ANDRE DAWSON

PIPER #1 SWD

TED 28 SWD 1

YAZ SWD 1

PEDRO SWD

ROBINSON SWD

SCULLY SWD

Dee Osbourne

Llano Central RP

Blueberry RP

Dagger State

Cheddar RP

Huckleberry RP

Tanks RP

Ojo Chiso

3Bear RP

Jalapeno RP

Maxus East

Squints

Northridge

Avant

Rio Blanco RP

South Ridge

Florence CTB

Red Bull 30

Red Bull

Serrano RP

Jeff Hart West

Jeff Hart

Irvin Wall

Stateline Delivery Point

0 2 4 8 Miles

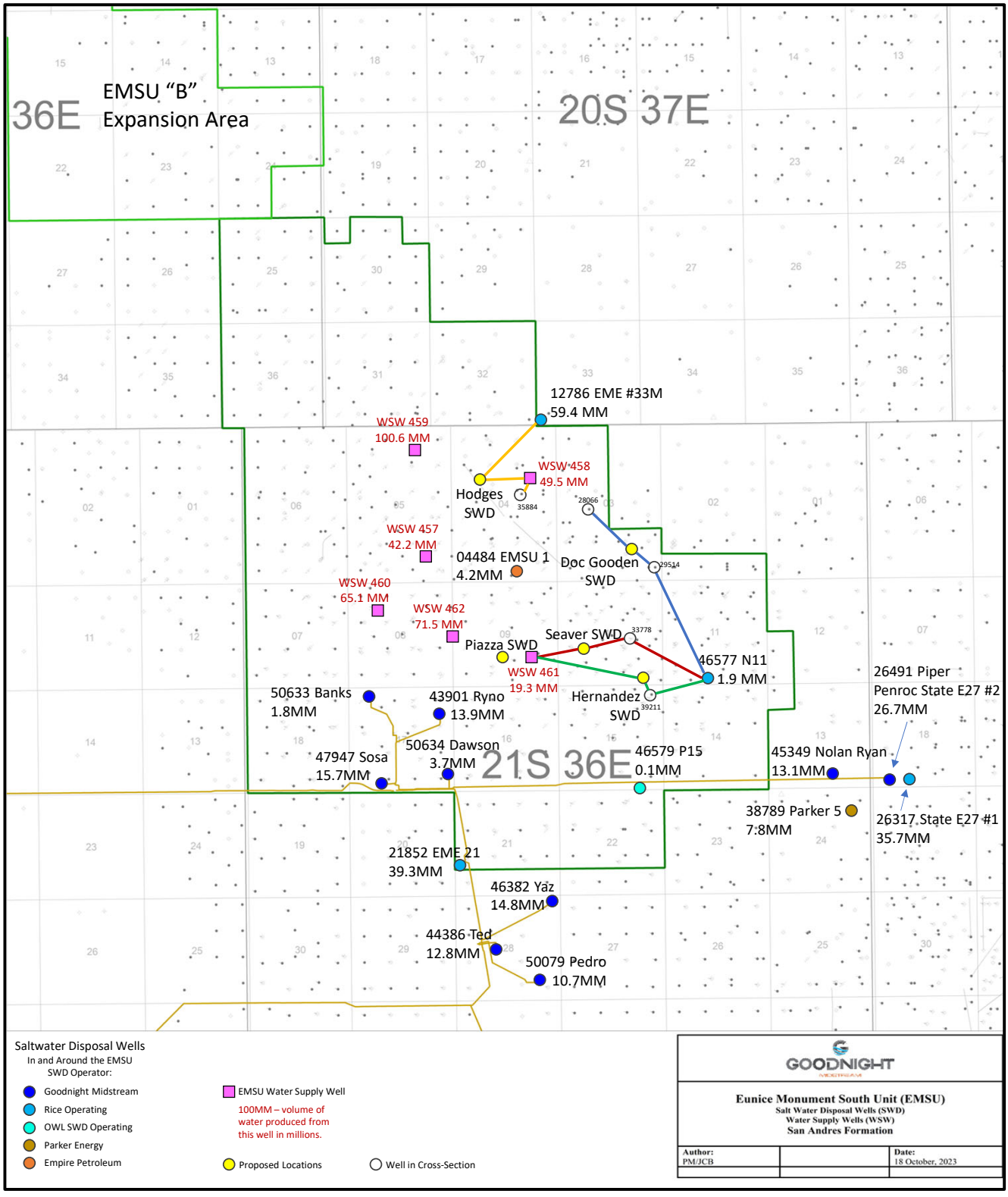
BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-2
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
Case Nos. 23614-23617

N

Printed Date: October 6, 2023

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-3
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
Case Nos. 23614-23617

Water injected into and withdrawn from the San Andres Formation and cross-section lines



Received by OCD: 10/27/2023 3:56:36 PM

Rice Operating Co. | N 11 #001 | 30-025-46577 | N-11-21S-36E | KB: 3,586′ | 6/29/2020 | TD: 5,100′

Chevron USA | J A Akens #012 | 30-025-29514 | P-03-21S-36E | KB: 3566 | 12/03/1985 | TD: 7,000′

ME-TEX O&G | Wallace State #010 | 30-025-28066 | F-03-21S-36E | KB: 3,553′ | 3/01/1983 | TD: 7,007′

Goodnight Midstream | Gooden SWD#1 | 30-025-0000 | P-03-21S-36E | KB: XXXXX | 00/00/2023 | TD: 5,000′

Tansill 2679′

Yates 2783′

7R 2982′

Queen 3425′

Penrose 3540′

Grayburg 3735′

EMSU Gas-Oil Contact

EMSU Oil-Water Contact

San Andres 4175′

Barrier

Inj. Interval Top 4210′

Inj. Interval Top 4200′

Inj. Interval Base 4900′

Inj. Interval Base 5100′

Barrier

San Andres SWD

Cum. Inj. Vol: 1,854,544 BW

Recent Avg inj. Pressure: 0 PSI

Plug

Plug

Plug

Plug

Plug

Glorieta

Tested Wtr Never Produced

Paddock

Blinebry

Tubb

Drinkard

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-4
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
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Released to Imaging: 10/27/2023 3:58:41 PM

Chevron USA EMSU #461 WSW
30-025-29621 I-9-21S-36E
KB: 3,602′ 2/18/1987 TD: 5,000′

ConocoPhillips State D15 #02
30-025-39211 A-15-21S-36E
KB: 3,588′ 3/16/2009 TD: 7,197′

Rice Operating Co. N 11 #001
30-025-46577 N-11-21S-36E
KB: 3,586′ 6/29/2020 TD: 5,100′

Goodnight Midstream Hernandez SWD#1
30-025-0000 P-10-21S-36E
KB: XXXXX 00/00/2023 TD: 5,300′

Plug

Plug

Plug

Plug

Plug

Tansill 2679′

Yates 2783′

7R 2982′

Queen 3425′

Penrose 3540′

EMSU Gas-Oil Contact

Grayburg 3735′

EMSU Oil-Water Contact

Injection Interval Top
4,200′

San Andres 4175′

Inj. Interval Top
4210′

Injection Interval Base
5,300′

Inj. Interval Base
5100′

San Andres
Water Supply Well
Cumulative Extracted Vol:
19,365,192 BW

San Andres SWD
Cum. Inj. Vol: 1,854,544 BW
Recent Avg inj. Pressure: 0 PSI

Glorieta

Paddock

Blinebry

CIBP @ 6849
Perforations Not Shown
Blinebry:
6357-3682, 6407-6410
6443-6647, 6484-6511
Drinkard:
6971-7085

TD - 7,197′

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-5
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
Case Nos. 23614-23617

Rice Operating Co.
30-025-12786
KB: 3,519′ 4/20/1960

E M E SWD #033M
M-33-20S-37E
TD: 5,100′

Goodnight Midstream
30-025-0000
KB: XXXXX 00/00/2023

Hodges SWD#1
C-04-21S-36E
TD: 5,200′

Empire New Mexico
30-025-29618
KB: 3,556′ 5/19/1986

EMSU #458
I-04-21S-36E
TD: 5,000′

PENROC OIL
30-025-35884
KB: 3,561′ 4/16/2003

MEYER B 4 #033
B-04-21S-36E
TD: 8,790′

Tansill 2530′

Yates 2730′

7R 2928′

Queen 3367′

Penrose 3503′

EMSU Gas-Oil Contact

Grayburg 3666′

EMSU Oil-Water Contact

San Andres 4078′

Inj. Interval Top
4100′

Inj. Interval Top
4509′

Inj. Interval Base
5100′

Inj. Interval Base
5200′

San Andres SWD
Cum. Inj. Vol: 59,370,620 BW
Recent Avg inj. Pressure: 0 PSI

San Andres
Water Supply Well
Cumulative Extracted Vol:
49,532,614 BW

Glorieta

Paddock

Blinebry

Tubb

Drinkard

CIBP @ 7950
Perforations Not Shown
Strawn:
8001′-8078′

TD = 8790′

BEFORE THE OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Exhibit No. B-6
Submitted by: Goodnight Midstream Permian, LLC
Hearing Date: November 2, 2023
Case Nos. 23614-23617