

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

**APPLICATION OF GOODNIGHT
MIDSTREAM PERMIAN, LLC TO AMEND
ORDER NO. R-7765, AS AMENDED TO
EXCLUDE THE SAN ANDRES FORMATION
FROM THE UNITIZED INTERVAL OF THE
EUNICE MONUMENT SOUTH UNIT
LEA COUNTY, NEW MEXICO**

CASE NO. 24278

**APPLICATION OF GOODNIGHT
MIDSTREAM PERMIAN, LLC TO AMEND
ORDER NO. R-7767 TO EXCLUDE THE SAN
ANDRES FORMATION FROM THE EUNICE
MONUMENT OIL POOL WITHIN THE
EUNICE MONUMENT SOUTH UNIT AREA,
LEA COUNTY, NEW MEXICO**

CASE NO. 24277

**APPLICATION OF GOODNIGHT PERMIAN
MIDSTREAM, LLC FOR APPROVAL OF A
SALTWATER DISPOSAL WELL, LEA COUNTY,
NEW MEXICO AND, AS A PARTY ADVERSELY
AFFECTED BY ORDER R-22869-A, FOR A
HEARING DE NOVO BEFORE THE FULL
COMMISSION, PURSUANT TO NMSA 1978,
SECTION 70-2-13.**

CASE NO. 24123

**APPLICATION OF GOODNIGHT MIDSTREAM
PERMIAN, LLC TO AMEND ORDER
NO. R-22026/SWD-2403 TO INCREASE THE
APPROVED INJECTION RATE IN ITS ANDRE
DAWSON SWD #1, LEA COUNTY, NEW MEXICO**

CASE NO. 23775

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

CASE NOS. 23614-23617

**APPLICATION OF EMPIRE NEW MEXICO TO
REVOKE THE INJECTION AUTHORITY
GRANTED UNDER ORDER NO. R22026 FOR
THE ANDRE DAWSON SWD #001, LEA COUNTY,
NEW MEXICO**

CASE NOS. 24018-24027

**OIL CONSERVATION DIVISION’S SUPPLEMENTAL REBUTTAL WITNESS
TESTIMONY DISCLOSURE**

The New Mexico Oil Conservation Division (“OCD”) hereby submits its Supplemental Rebuttal Witness testimony Disclosure pursuant to the Oil Conservation Commission’s Pre-Hearing Order entered on June 3, 2024.

I. Reservation of rights

As was stated to the OCC on February 3, 2025 and with the original rebuttal testimony filing, the OCD hereby exercises its reservation of right to supplement its original rebuttal testimony filing. OCD tenders only supplemental rebuttal testimony, starting on page seven (7) of this pleading, and has not added any additional exhibits for consideration.

II. Definitions

In the interest of clarifying the testimony as outlined below, OCD provides the following definitions:

“Act” or “the Act” refers to the New Mexico Oil and Gas Act, codified at Chapter 70, Article 2 of the NMSA 1978

“Empire” refers to Empire of New Mexico.

“Goodnight” refers to Goodnight Permian Midstream LLC.

“Hiss Article” refers to *Movement of Ground Water in Permian Guadalupian Aquifer Systems, Southeastern New Mexico and Western Texas* from the New Mexico Geological Society Guidebook, 31st Field Conference, Trans-Pecos Region, 1980.

“Hiss Paper” or “the Hiss Paper” refers to the 1975 thesis paper for the University of Colorado Department of Geological Sciences entitled STRATIGRAPHY AND

GROUNDWATER HYDROLOGY OF THE CAPITAN AQUIFER, SOUTHEASTERN NEW MEXICO AND WESTERN TEXAS by William Louis Hiss, B.S. Kansas State University, M.S. University of Oklahoma, 1960.

“Legislature” or “the Legislature” refers to the New Mexico Legislature.

“Operators” refers to Empire of New Mexico and Goodnight Permian Midstream, LLC, collectively.

“OCD” refers to the New Mexico Oil Conservation Division.

“OCC” refers to the New Mexico Oil Conservation Commission.

“State” refers to the State of New Mexico.

“San Andres” refers to the San Andres Formation, which underlies the Grayburg Formation, and is in the San Juan Basin in Southeastern New Mexico.

“UIC” refers to Underground Injection Control, a program originating from § 42 U.S.C. 1421-26, 1431, and 1442-43, as well as 40 C.F.R. Parts 144-48, and which seek to prevent contamination of Underground Sources of Drinking Water (“USDW”).

III. OCD Rebuttal Witness Testimony.

a. Philip Goetze, Engineering UIC Permitting Group Lead

Further review of publications provided three additional exhibits that the OCD is submitting in support of its position. Exhibit 17 is a technical article written by the two principal experts of the screening and criticism criteria for aquifers adopted in the New Mexico Primacy Demonstration for the UIC Class II program. The authors present two scenarios in the Permian Basin involving the San Andres formation and the results of an aquifer evaluation for each using their recommended guidance. The author’s evaluation for the Roswell Artesian Basin endorsed the

alternative which designated protection of only the artesian aquifer which was being used as a drinking water supply. The second scenario in Lea County includes the current subject matter of these cases: the relationship of the Capitan Reef and the San Andres formation that extends north in the area described as the Hobbs Channel. The authors recommendation for the San Andres formation to be classified as an exempt aquifer is not disputed by the OCD; however, the exemption is based on the Hiss model with ground-water flow direction from the Reef north towards the city of Hobbs in the location of the Hobbs Channel. As a result, there is no assessment of impacts to the Capitan Reef and its protectable waters with the dramatic increased use of the San Andres formation for commercial disposal of produced water.

Exhibit 18 presents a focused study by Dr. Lewis Land for the use of the water in the Capitan Reef aquifer to supplement freshwater resources of southeast New Mexico. Details of this presentation relevant to the OCD case:

1. *“The impact of brackish water withdrawals on fresh water resources near Carlsbad, and on the baseflow into the Pecos River, is thought to be minimal because of the presence of the hydraulic barrier (submarine canyons) that separates the eastern and western segments of the reef.”* This observation further supports the isolation of the Reef in the area of the Hobbs Channel. While Dr. Land makes no specific observation on the Hobbs Channel, this barrier would prevent any contribution of rising water levels in the Reef from the eastern segment.
2. The graph presentation of water level measurements on page 15 are the same findings incorporated by OCD for use in Division Case No. 15732 (found in OCD Exhibit No. 10, Attachment 2) to oppose the permitting of commercial disposal wells in the

vicinity of Jal, New Mexico. Dr. Lewis comments *“This remarkable rise in water levels in Lea co. monitoring wells raises interesting questions about sources of recharge and the age of groundwater in the eastern segment of the reef aquifer.”*

3. In his Preliminary Results, Dr. Lewis states *“Preliminary data support the conceptual model of hydrologic isolation of the eastern segment of the Capitan Reef, but do not address the question of why water levels have been steadily rising for the last three decades in the Lea county wells.”*

Exhibit 19 is an expansive study prepared for the Texas Water Development Board of the Capitan Reef Complex that covers the Reef’s occurrence in both Texas and New Mexico. This study again adopts the conceptual model first developed by Hiss and modified with recent observations and sampling events. The inclusion of this study is to recognize that the source of water levels rising in the eastern segment of the Reef could be surface recharge of the Glass Mountains. However, the study does reveal data gaps and sparse geochemical sampling that provides general correlation but not localized characterization of the Reef. An example is provided by Well 46-32-309 located north of Glass Mountain and used for water levels in the Reef in Ward County (the closest data point to the state line). The hydrograph for this well (Figure 4.2.14) shows an increase of water level of approximately 130 feet from 1972 through 1982 then decreases before water level measurements ceased being recorded in 1988. The study also includes a conceptual model summarized in Figure 5.0.1 (Capitan Reef Complex Aquifer Groundwater Availability Model) which includes the San Andres formation for the portion of the Reef in New Mexico. Additionally, the study does caveat the complex relationship and

interaction of the San Andres formation and the Capitan Reef Complex along the eastern segment by stating “where hydraulically connected.”

i. Recommendation to Commission.

OCD possesses the authority to regulate the oil and gas industry in many respects. OCD regulates injection to avoid flooding of recovery zones and injection, generally. *See* § 70-2-12 NMSA; *see also* Chapter 15, Part 25 NMAC. OCD regulates “[p]revention of drowning of oil or gas producing strata, encroachment by water of productive strata, or any other kind of water encroachment upon productive strata to ensure production from those productive strata. *Id.* OCD also regulates management of produced water in relation to production, among other things, of oil and gas. *Id.* OCD regulates the prevention of water, crude petroleum oil, or natural gas for escaping from strata in which it is found into other strata. *Id.* Finally, OCD possesses authority “to regulate the disposition, handling, transport, storage, recycling, treatment and disposal of produced water during, or for reuse in, the exploration, drilling, production, treatment or refinement of oil or gas, including disposal by injection pursuant to authority delegated under the federal Safe Drinking Water Act, in a manner that protects public health, the environment and freshwater resources.” *Id.*

Based on the above exhibits and testimony, OCD, by and through Philip Goetze, renders the following opinion and recommendation to the OCC:

- (1) That there is a potential risk to the water quality in the Capitan Reef, which is managed as a protected aquifer, from injection operations in the San Andres formation within the hydrologic feature identified as the Hobbs Channel;

- (2) That neither Operator has addressed, in any meaningful way, the risks posed to drinking water due to said injection, nor have the Operators shown concern about this issue;
- (3) That OCD lacks sufficient data, based on the Operators' evidence and currently available through government agencies, to determine the status of the Hobbs Channel or Capitan Reef and the hydrologic relationship between these features;
- (4) To resolve the above, OCD recommends that the OCC order the Operators, as identified individually or collectively, to do the following and to withhold a final decision on the merits of the Operators' respective claims:
- a. Empire shall develop for OCD review and potential approval a pilot project to fully delineate the existence, or lack thereof, of any ROZ for any and all formations and pools for which Empire claims the existence of a ROZ;
 - b. OCD and the Operators shall develop and implement a plan for both the immediate monitoring of the ground water between the Capitan Reef and injection in the San Andres of the Hobbs Channel and a comprehensive investigation of the hydrology in this area as characterize the relationship for possible use in an Aquifer Exemption application; and
 - c. The OCC shall direct the OCD to suspend any new UIC permit applications in review for UIC Class II commercial disposal wells within the Hobbs Channel until the OCD provides initial results of the monitoring effort.

ii. Supplemental Rebuttal

OCD's concern for the hydrologic relationship between San Andres formation and the Capitan Reef aquifer is not new. As cited in OCD Exhibits Nos. 4 and 17, OCD interest and

understanding of this location has been a focused subject of both the original UIC Class II Primacy Demonstration and the associated development of the protocol that the OCD uses in identifying and updating Underground Sources of Drinking Water (“USDW”). The OCD participation in these cases is an effort initiated by the approval of New Mexico’s Primacy for UIC Class II wells in 1982 and is now culminating with this legal confrontation over the San Andres formation in the vicinity of Hobbs Channel.

OCD’s experience in the cumulative impacts of UIC Class II disposal is escalating based on both an exponential growth for disposal capacity and the increased knowledge of subsurface relations of the area’s stratigraphy and structure. This is an experience that OCD is currently addressing with disposal activities that have been linked to induced seismicity. As stated, Goodnight has been cooperative in their effort to address all of the UIC permitting requirements of the New Mexico program. However, OCD must be prepared to observe and respond as the capacity of Goodnight’s disposal network expands in this area. This expansion is reflected by applications for new wells, by both Goodnight and other parties in these cases that are midstream commercial operators, and through applications for injection pressure increase along with potentially upsizing of the diameter of injection tubing. This change in the injection activities in the San Andres formation occurring in what is described as the Hobbs Channel is very significant especially for any influence on the Capitan Reef aquifer.

With regards to the review of the groundwater chemistry used by Dr. Hiss to develop the model (Self-Affirmed Rebuttal Statement of Preston McQuire Statement 74), Goodnight’s claim of unreliability for the use of the historical data as the major component for the delineation of the

Hobbs Channel is an exercise in expunging data while showing no comparable substitution.

Goodnight's Self-Affirmed Rebuttal Statement of Preston MCQuire presents in Statement 26,

"The San Andres water chemistry can vary substantially." and Statement 27,

"The chemistry of the water in the San Andres can have a range of values. The range of values recovered in tests can be from about 7,000 TDS to well over 200,000 TDS, but the bulk average is about 30,000 ppm. Goodnight believes that the use of highly variable water chemistry to prove damaging communication between the Grayburg Oil reservoir and the San Andres water management reservoir is invalid."

These statements are applicable not only to the location of waterflood but the occurrence of the San Andres formation for the entire area which includes the Hobbs Channel feature. This chemistry is further complicated due to the use of the San Andres formation for produced water disposal operations for approximately 74 years. This furthers clouds the ability to reconfirm the observations of Hiss rather than totally disregard the data.

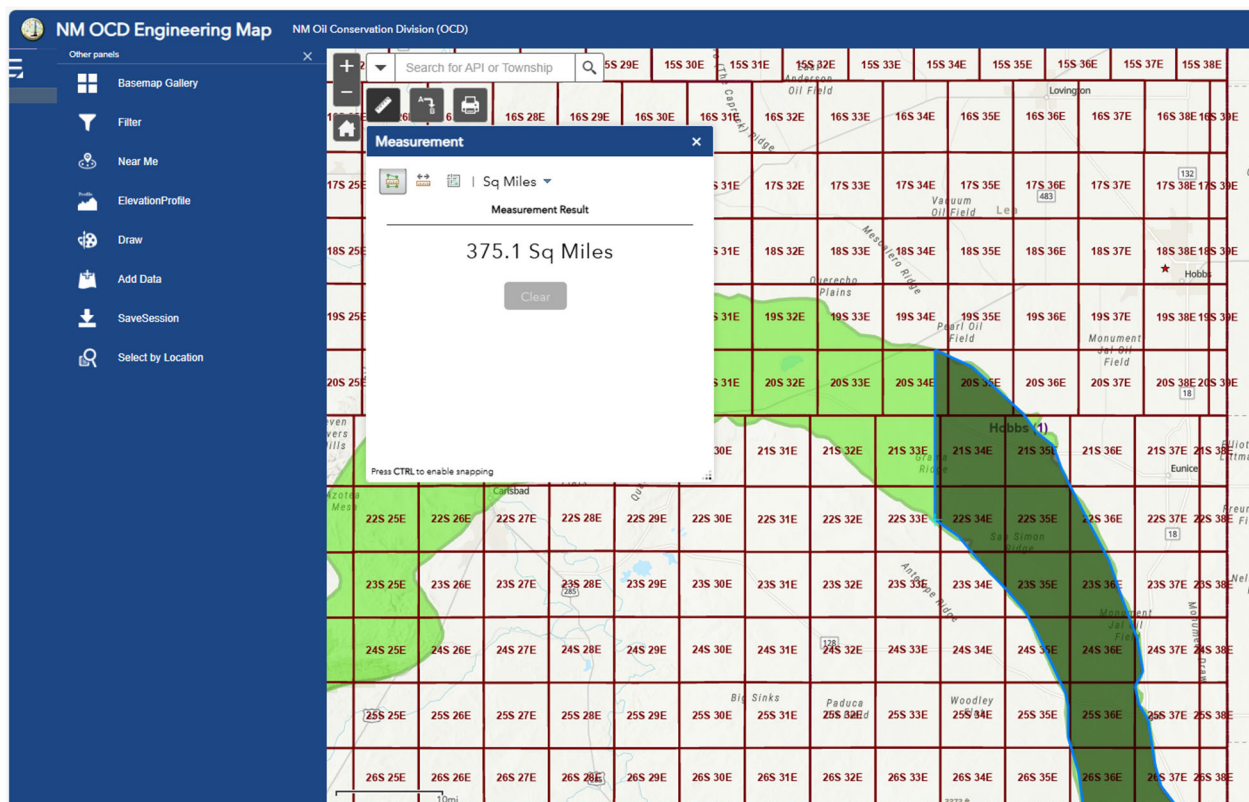
Regarding the Self-Affirmed Rebuttal Statement of Thomas E. Tomastik, Statement 32 through Statement 37, the application and approval by prior OCD administrations for disposal activities recognized the San Andres formation at this location did not qualifying as an USDW. Starting in 1951 with the approval of the Eunice King Well No. 2 under Commission Order R-116, the OCD has continued with the approval of UIC Class II disposal wells though the data provided in support of the Hiss model indicated groundwater with concentrations of TDS below 10,000 parts per million per liter ("PPM/L"). As a result of the USEPA requested Exempt Aquifer review (OCD Exhibit Nos. 10 and 11B) and with input from the USEPA, OCD initiated in 2018 a condition of approval for UIC Class II disposal permits in this area with the San Andres formation as injection intervals. This condition was to conduct sampling of the formation waters for TDS

prior to commencing injection and included a limitation should the sample analysis results show a TDS concentration of 10,000 PPM/L or less. The effort was to compile a current database of San Andres chemistry using USEPA sampling protocols that would address any concerns that this area is protectable and avoid the situation of “aquifers historically treated as exempt” observed in the California UIC Class II program (OCD Exhibit No. 12). It has been effective in supporting the status of the San Andres formation in this area as not protectable as an USDW.

Finally, the statement that “water quality data confirms the Capitan Reef in this region far exceeds the criteria for an Underground Source of Drinking Water (USDW)” is not persuasive. This statement has been repeated in other cases involving disposal wells that were identified as injecting into the Capitan Reef aquifer. However, the evidence offered did not satisfy the requirements for the classification as an Exempt Aquifer as summarized in OCD Exhibit 11A. It is unknown if Goodnight applied the same historical water data used by Hiss for his model which was dismissed by Goodnight as a basis for this interpretation. OCD has attempted to compile a reliable database of current water analytical results for the Capitan Reef Complex for the portion that extends from the Hobbs Channel to the New Mexico state line south of Jal. The status of this portion of the Capitan Reef aquifer has been maintained as protectable by the OCD supported by the findings of hearing orders of the OCD and the approval of the New Mexico Office of the State Engineer (OCD Exhibit Nos. 11C and 11D).

OCD has reviewed the interpretations of correlation provided in the White Testimony and Rebuttal Exhibit Packet and does not see any contradiction or error in the interpretations. However, OCD contends that the interpretation along with the total discounting of Dr. Hiss’ effort as not sufficient to determine the vulnerability the Capitan Reef aquifer to the current commercial

disposal activities in San Andres formation which is predicted to expand exponentially in the foreseeable future.



IV. OCD's Exhibit List

OCD offers the following exhibits, for which a link will be sent to counsel for access and download, with rebuttal exhibits found in ***bold italics***:

- a. Exhibit 1: General Site Map Showing Area of Interest and Locations of Wells
Including UIC Class II Disposal Wells
- b. Exhibit 2: Map Showing Locations of Goodnight's UIC Class II Disposal Wells
and Empire East Monument South Unit Within the Hobbs Channel
- c. Exhibit 3: UIC Program: New Mexico Oil and Gas Act

**OCD'S SUPPLEMENTAL
REBUTTAL WITNESS TESTIMONY
FOR CASE NOS. 23614-23617, 23775,
24018-24020, 24025, 24277, 24278,
and 24123**

- d. Exhibit 3A: Enumeration of Powers excerpt from the New Mexico Oil and Gas Act
- e. Exhibit 3B: Statutory Unit Act excerpt from the New Mexico Oil and Gas Act
- f. Exhibit 4: UIC Program: Appendix II from the New Mexico Primacy Demonstration
- g. Exhibit 5: Permian Guadalupian Ground Water References by W. L. Hiss
- h. Exhibit 5A: *Movement of Ground Water in Permian Guadalupian Aquifer Systems, Southeastern New Mexico and Western Texas* from the New Mexico Geological Society Guidebook, 31st Field Conference, Trans-Pecos Region, 1980
- i. Exhibit 5B: *Stratigraphy and Ground-Water Hydrology of the Capitan Aquifer, Southeastern New Mexico and Western Texas* by William L. Hiss, Doctor of Philosophy Thesis, 1975 [text only]
- j. Exhibit 5C: Figure 19 from W. L. Hiss Doctor of Philosophy Thesis
- k. Exhibit 5D: Figure 26 from W. L. Hiss Doctor of Philosophy Thesis
- l. Exhibit 6: Summary of Permian Production in the Area of Interest
Exhibit 7: Summary of Disposal Operations into Permian Formations in the Area of Interest
- m. Exhibit 7A: Chronology of UIC Class II Disposal Permits and Disposal Operations
- n. Exhibit 7B: Excerpts of Testimony from Cases Involving Disposal Well Applications
- o. Exhibit 7C: Summary of Injection Volumes by UIC Class II Disposal Wells

- p. Exhibit 7D: Summary of Form C-108 Applications for the Area of Interest
Exhibit 8: Current Issues Regarding Disposal in San Andres formation
- q. Exhibit 8A: *Permian Operators Squeezed by Growing Water Pressure*; Journal of Petroleum Technology, April 2019
- r. Exhibit 8B: Well completion forms from the Well File for E M E Well No. 8 (API No. 30-025-06017)
- s. Exhibit 8C: OCD E-mail communications regarding cement work for the N-11 SWD Well No.1 dated July 13, 2020
- t. Exhibit 8D: OCD E-mail communications regarding cement work for the Andre Dawson SWD Well No.1 dated December 21, 2022
- u. Exhibit 9: Division Order No. R-22869-A
- v. Exhibit 10: *Update of Underground Injection Control Class II Activities within the State of New Mexico for Possible Injection into Underground Sources of Drinking Water: The Capitan Reef Aquifer System*, Oil Conservation Division correspondence to the United States Environmental Protection Agency dated May 28, 2020
- w. Exhibit 11: Safe Drinking Water Act Aquifer Exemption Program
- x. Exhibit 11A: *Enhancing Coordination and Communication with States on Review and Approval of Aquifer Exemption Requests Under SWDA*, United States Environmental Protection Agency Memorandum dated July 24, 2014
- y. Exhibit 11B: *Review of Underground Injection Control Class II Activities within the State of New Mexico for Possible Injection into Underground Sources of*

Drinking Water, Soil Conservation Division correspondence to the United States Environmental Protection Agency dated October 24, 2016

- z.** Exhibit 11C: Oil Conservation Division correspondence to the New Mexico State Engineer dated April 23, 1992
- aa.** Exhibit 11D: Oil Conservation Division correspondence to the New Mexico State Engineer dated March 23, 1993
- bb.** Exhibit 11E: Figure Showing Current Exempted Aquifer Designations for the Capitan Reef.
- cc.** Exhibit 12: State of California Experience
- dd.** Exhibit 12A: United States Environmental Protection Agency correspondence dated to the California Department of Conservation and California State Water Resources Control Board dated December 22, 2014
- ee.** Exhibit 12B: California Department of Conservation and California State Water Resources Control Board correspondence to the United States Environmental Protection Agency dated February 6, 2015
- ff.** Exhibit 12C: United States Environmental Protection Agency correspondence dated to the California Department of Conservation and California State Water Resources Control Board dated March 9, 2015
- gg.** Exhibit 12D: California Department of Conservation and California State Water Resources Control Board correspondence to the United States Environmental Protection Agency dated March 3, 2017

- hh.** Exhibit 13: Capitan Reef Excerpt from *Overview of Fresh and Brackish Water Quality in New Mexico*; New Mexico Bureau of Geology and Mineral Resources Open File Report 583; 2016
- ii.** Exhibit 14: Proposed Investigation and Monitoring Plan Regarding the Capitan Reef Aquifer and Disposal in the San Andres Formation in the Area of Interest
- jj.** Exhibit 15: Resume of Brandon Powell
- kk.** Exhibit 16: Resume of Phillip Goetze
- ll.** *Exhibit 17: Wilson, L. and Holland, M., 1984; Aquifer Classification for the UIC Program: Prototype Studies in New Mexico; Ground Water Volume 22, Number 6; November-December 1984; pages 706-716*
- mm.** *Exhibit 18: Land, Lewis, 2016; Using Brackish Water from Karstic Aquifers to Augment Freshwater Resources in the Semi-arid Southwest, Geological Society of America Annual Meeting, Denver, Colorado, January 2016*
- nn.** *Exhibit 19: Jones, I., 2016; Conceptual Model: Capitan Reef Complex Aquifer of Texas; Texas Water Development Board; August 3, 2016; 184 p.*
- oo.** Any and all documents or exhibits disclosed in any capacity by any Party, including any such documents or exhibits relied-upon by the Parties in deposition or at any merits hearing in this matter.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I certify that on February 17, 2025 this pleading was served by electronic mail on:

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