

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

IN THE MATTER OF THE HEARING CALLED  
BY THE OIL CONSERVATION DIVISION FOR  
THE PURPOSE OF CONSIDERING:

Case No. 14558  
Order No. R-7900-E  
De Novo

APPLICATION OF MARBOB ENERGY CORPORATION  
(NOW COG OPERATING LLC) FOR VERTICAL  
EXPANSION OF THE BURCH-KEELY UNIT,  
EDDY COUNTY, NEW MEXICO

IN THE MATTER OF THE HEARING CALLED  
BY THE OIL CONSERVATION DIVISION FOR  
THE PURPOSE OF CONSIDERING:

Case No. 14577  
Order No. R-10067-D  
De Novo

APPLICATION OF COG OPERATING, LLC FOR  
VERTICAL EXPANSION OF THE GRAYBURG  
JACKSON (SEVEN RIVERS-QUEEN-GRAYBURG-  
SAN ANDRES) POOL TO CORRESPOND WITH  
THE UNITIZED FORMATION OF THE BURCH-  
KEELY UNIT, EDDY COUNTY, NEW MEXICO

**ORDER OF THE COMMISSION**

IN THIS MATTER, having come before the New Mexico Oil Conservation Commission ("Commission") on July 28, 2011 at Santa Fe, New Mexico, on (i) Marbob Energy Corporation's (now COG Operating LLC ("COG")) Application for vertical expansion of the Burch-Keely Unit, Eddy County, New Mexico and (ii) COG's Application for vertical expansion of the Grayburg Jackson (Seven Rivers-Queen-Grayburg-San Andres) Pool to correspond with the unitized formation of the Burch-Keely Unit, Eddy County, New Mexico, the Commission, having carefully considered the evidence and other materials submitted by the parties, now, on this 22<sup>nd</sup> day of September, 2011:

**FINDS THAT:**

1. Due public notice of the hearing of this matter has been given.

**Background**

2. In Case No. 14558, COG seeks to extend the vertical limit of the Burch-Keely Unit ("Unit") to 5,000 feet below the surface of the ground. (COG Exhibit 1). In Case No. 14577, COG seeks to extend the vertical limit of the Grayburg Jackson (Seven Rivers-Queen-Grayburg-San Andres) Pool ("Pool") to 5,000 feet below the surface of the ground. (COG Exhibit 1).

3. The Unit consists of 5149.44 acres of federal minerals and surface. COG Ex. 6. COG and an affiliated company own all of the working interest in the Unit and the Pool and in the proposed expansion area. Transcript ("Tr.") p. 40.<sup>1</sup>

4. The horizontal boundaries of the Unit are comprised of the following lands.

Township 17 South, Range 29 East, NMPM: Section 12,  
SE/4 SE/4; all of Sections 13, 23, 24, 25 and 26.

Township 17 South, Range 30 East, NMPM: all of  
Sections 18, 19 and 30.

**COG Ex. 6**

5. David Ray Evans, who was accepted by the Commission as an expert petroleum landman (Tr. p. 30), testified that COG obtained its interest in the surface down to 5,000 feet from Marbob Energy Corporation ("Marbob"), that Marbob obtained that interest from Phillips Petroleum Company ("Phillips") and that prior to the sale from Phillips to Marbob, Phillips owned one-hundred percent from surface to all depths. Tr. pp. 33 - 34; COG Exs. 4 and 5.

6. Section V of the Agreement of Purchase and Sale between Phillips and Marbob created the 5,000 foot ownership dividing line. As part of the division, Phillips conveyed to Marbob rights from the surface to 5,000 feet below the surface, retained the right to drill through the surface and the depths that had been conveyed to Marbob so that Phillips could develop depths below 5,000 feet, and agreed, in exercising that right, not to unreasonably interfere with or hamper Marbob's operations in the first 5000 feet. Tr. p. 35 - 36; COG Ex. 5.

7. Charles Angerman, who was accepted by the Commission as an expert geologist (Tr. p. 143), testified that the 5,000 foot demarcation is not a geological demarcation. Tr. pp. 143-44, 153-54; Conoco Ex. 9. Harvin Broughton, who was accepted by the Commission as an expert petroleum geologist (Tr. p. 64), testified that the 5,000 foot

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<sup>1</sup> References to the Transcript are to the transcript of the July 28, 2011 hearing of these matters.

vertical demarcation of COG's interest is a demarcation of title that divides a geologic pool. Tr. pp. 67-72.

8. In 1984 Phillips, predecessor to Marbob, applied for a cooperative waterflood in the area of the Unit, and the Division Director approved the application. Order No. R-7900, COG Exhibit 6. In 1993, Marbob, predecessor of COG, sought approval for a statutory unit pursuant to the Statutory Unitization Act. The Division approved the Burch-Keely Unit Area, and the associated Unit Agreement and Unit Operating Agreement. The vertical depth was set at the lesser of the base of the San Andres formation (which the Order said was also the limit of the Grayburg-Jackson Pool) or a true vertical depth of 5,000 feet below the surface. Order No. R-7900-A, COG Exhibit 6. Order No. R-7900-B noted that the vertical limits of the Grayburg Jackson Pool were extended in 1994 to include the interval from the top of the Seven Rivers formation to 500 feet below the top of the Paddock formation. COG Exhibit 6.

9. The area that COG wishes to include in the Unit and the Pool is between 500 and 600 feet thick on the west side of the Unit and to the east it is closer to 200 feet thick (Tr. pp. 78-9; COG Exhibit 18) and the inclusion will make the Unit and Pool coextensive with COG's ownership interest. (This additional area that COG seeks to include in the Unit and the Pool may be referred to herein as the "Expansion Area.") Mr. Broughton testified that the Expansion Area is illustrated by the pink area on COG Ex. 15. Tr. p. 67.

10. The Unit Agreement allows for expansion of the Unit with the approval of the Bureau of Land Management ("BLM") Administrative Officer. Tr. p. 41; COG Ex. 7, Section 4.

11. The BLM approved the expansion of the Unit to include the top 500 feet of the Paddock formation on March 11, 1994. Tr. p. 42; COG Ex. 8. On October 5, 2010, the BLM concurred with Marbob's application for expanding the Unit to 5,000 feet and agreed with the intent to capture incremental production. Tr. p. 43; COG Exhibit 9.

12. On October 28, 2010, the Oil Conservation Division ("Division") approved the requested expansion of the Unit. COG Exhibit 2.

13. On January 6, 2011, the Division approved the requested expansion of the Pool. COG Exhibit 2.

14. On March 10, 2011, the BLM approved the expansion of the Unit to a true vertical depth of 5,000 feet below the surface and concurred with the Division's approval of the expansion of the Pool. COG Exhibit 9.

#### Issues

15. ConocoPhillips Company ("Conoco") owns a fifty percent undivided interest in the Grayburg Deep Unit, beginning at a vertical depth of 5,000 feet, immediately below the Expansion Area. Tr. p. 123.

16. Conoco filed with the Commission Applications for de novo hearings in Case Nos. 14558 and 14577. Record Proper ("RP")

17. Conoco objects to the extensions requested by COG, claiming that the dividing line between COG's interest above 5,000 feet and Conoco's interest below 5,000 feet is not geologically based, but is merely a creature of title. Because the geology of COG's interest and Conoco's interest is largely homogeneous, Conoco argues, efficiency of production and avoidance of waste demand that the area be developed cooperatively. Tr. p. 24, – p. 27.

18. Conoco further claims that if COG develops its unit by hydraulic fracturing close to the 5,000 foot ownership line, it likely will impair Conoco's correlative rights. Because of this, argues Conoco, absent a joint development agreement, in order to protect its rights, Conoco will be forced to drill a twin well to a depth of just below 5,000 feet for each well drilled by COG, creating economic waste. Id.

19. Conoco originally requested that the Commission prohibit COG from drilling within 330 feet of the vertical bottom of the Unit and Pool, but abandoned that request at the July 28, 2011, hearing. (Tr. pp. 13 - 14).

20. Conoco urges the Commission to deny the applications for expanding the Unit and the Pool, in order to force COG to negotiate joint development of the Blinebry. Tr. p. 238-241.

#### Correlative Rights

21. Brian Dzubin, who was accepted by the Commission as an expert in hydraulic fracturing (Tr. 193), testified that if COG fractures in order to produce from wells drilled to the base of the Expansion Area, it could intrude into the area immediately below the Expansion Area and impair Conoco's correlative rights. Mr. Dzubin's testimony was the result of a simulation study that he conducted, which predicted the vertical extent of fracturing. Tr. pp. 194-202; Conoco Exs. 12-17.

22. It is undisputed by the parties that the technique of fracturing is used for most wells in New Mexico, including in the area of the Unit. Tr. 16, 19.

23. Mr. Angerman testified that granting of COG's request for an extension would result in the impairment of correlative rights in the form of "unrestricted fracture growth across the arbitrary 5,000 foot boundary." Tr. p. 159.

24. Mr. Tom Scarborough, who was accepted by the Commission as an expert landman (Tr. p. 123), testified that the only way that Conoco could protect its correlative rights would be to drill a twin well to offset the affect of COG's anticipated hydraulic fracturing. Tr. pp. 126-27.

25. Mr. Scarborough testified that Conoco has proposed to COG that the two companies discuss a joint development agreement, but that COG has not responded to that proposal. Tr. p. 125-26; Conoco Ex. 5.

26. The simulation model that Mr. Dzubin constructed did not allow for heterogeneity in any direction other than vertical and was a forward only model with no comparison afterwards to confirm its accuracy. Tr. pp. 224-225. Mr. Dzubin testified that there was a risk of fracturing going below the 5,000 foot title demarcation and that it was not a certainty that fractures would extend below the ownership dividing line. Tr. p. 216. Additionally, the likelihood of fracturing extending below the title demarcation is a function of how deep the well is and the location of the perforations in the well casing. Tr. pp. 212-16.

27. Mr. Broughton testified that the Expansion Area includes parts of the Paddock and Blinebry formations. Tr. p. 66. Both formations are within the Yeso formation and there is little difference in the rock that comprises the two formations. Tr. p. 69-70. The Blinebry and the Paddock formations are a common source of supply. Tr. p. 71. The rock is generally of low porosity and low permeability and is heterogeneous. Tr. p. 73. There are changes from well to well as the wellbore encounters different lenses within the reservoir, Tr. p. 75, and production areas are disconnected vertically and horizontally. COG Exhibit 16.

28. Mr. Scarborough testified that Conoco has no wells producing from the Blinebry formation in the Grayburg Deep Unit and that none are proposed in the current Unit drilling program. Tr. pp. 139-40. Mr. Angerman testified that he has seen no study to determine whether producing Conoco's portion of the Blinebry formation alone is or is not economic. Tr. p. 172.

29. COG argues, in part, that Conoco's concerns that COG will employ hydraulic fracturing above the 5,000 foot ownership line that will extend below the 5,000 foot ownership line should either be heard on a well-by-well basis, when facts concerning, for instance, well-depth are known, or be dealt with under the Commission's rule making procedure. Tr. p. 15.

#### Waste

30. COG significantly developed the Blinebry formation in areas outside the Unit, but it developed no wells to produce from the Blinebry within the Unit before the Division approved the expansion area. COG Exhibit 17.

31. Mr. Evans testified that extending the Unit and the Pool as requested by COG would facilitate producing the oil and gas resources in the Expansion Area. Tr. p. 31, 52-3, 58.

32. Mr. Broughton testified that extending the Unit and the Pool as requested by COG will make it more likely that the Expansion Area will be developed (Tr. pp. 67-68, 81).

33. Mr. Broughton further testified that, because the Expansion Area is small, it has not been drilled as a separate producing zone below the original Unit boundary. Tr. p. 76; COG Exhibit 17. Adding the Expansion Area to the Unit will make it more likely to be drilled because a well could be completed in several formations, including the Expansion Area. Generally, it has not been thought to be economically worthwhile to drill a separate vertical well to capture hydrocarbons from only the Expansion Area. Tr. pp. 67-68, 81.

34. Mr. Broughton testified that, by including the Expansion Area in the Unit and the Pool, COG production would likely increase by approximately 5 million barrels of oil due to production from the upper Blinebry formation. Tr. pp. 112 – 113. If the extension of the Unit is not approved and the upper Blinebry is not included in the Unit, the 5 million barrels likely would be left in the ground because it would not be economic to drill a vertical well just to produce the upper Blinebry. Id.

35. Ken Craig, who was accepted by the Commission as an expert petroleum engineer (Tr. p. 108), testified that COG is on pace to produce 5 million barrels from the upper Blinebry formation, that COG has spudded 23 wells in its first year of drilling and that it has two rigs running in the area. If the Expansion Area were not approved as part of the Unit and Pool, those wells likely would not have been drilled. Tr. p. 112.

36. Mr. Broughton testified that the most economic and efficient way to produce the Blinebry formation would be for Conoco and COG to develop it jointly, and that COG would develop the entire interval if COG owned it. Tr. p. 87-88.

37. Mr. Angerman testified that the Blinebry formation thickens "dramatically" from the northwest to the southeast and that in the southeast portion of the Burch Kelly Unit a "significant" portion of the Blinebry lies below the 5,000 foot ownership demarcation. Tr. pp. 153-58. He further testified that even if the extensions that are requested by COG are granted, there will be waste nonetheless because it will be uneconomic for Conoco to develop the Blinebry formation below 5,000 feet in the northwest because the Blinebry is thin in that location. Similarly, it would be uneconomic for COG to develop the Paddock formation above 5,000 feet in the southeast because the Paddock is thin in that location. Tr. pp. 153-58; Conoco Ex. 9.

**AND CONCLUDES THAT:**

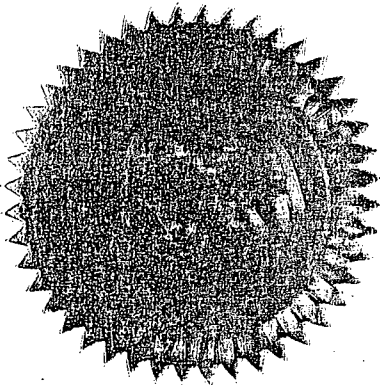
- A. The Commission has jurisdiction over this matter and the parties hereto.
- B. The regulations provide no mechanism for the Commission to require joint development of the interests of COG and Conoco in this case.
- C. The risk of COG impairing Conoco's correlative rights is speculative.

- D. Impeding COG from developing the Expansion Area by denying the applications to expand the Unit and Pool is more likely to result in waste than is granting the applications.
- E. The Unit Agreement in this case allows for expansion, with the approval of the Authorizing Official of the BLM. That approval has been given.
- F. A pool may be designated for areas of an underground reservoir that are a common source of supply of oil or gas. The Blinebry and the Paddock zones are members of the Yeso formation and are a common source of supply.

**NOW THEREFORE**, the Application of Marbob Energy Corporation (now COG Operating LLC) for Vertical Expansion of the Burch-Keely Unit, Eddy County, New Mexico and the Application of COG Operating, LLC for Vertical Expansion of the Grayburg Jackson (Seven Rivers- Queen-Grayburg-San Andres) Pool to Correspond with the Unitized Formation of the Burch-Keely Unit, Eddy County, New Mexico should be and hereby are approved.

DONE at Santa Fe, New Mexico on the 22<sup>nd</sup> day of September 2011.

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION



  
ROBERT.BALCH, Member

  
SCOTT DAWSON, Member

  
JAMI BAILEY, Chair

SEAL