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

APPLICATION OF COG OPERATING LLC FOR SPECIAL POOL RULES AND REGULATIONS FOR THE ARTESIA-GLORIETA-YESO POOL, BEAR GRASS DRAW-GLORIETA-YESO POOL, CEDAR LAKE-GLORIETA-YESO POOL, EMPIRE-GLORIETA-YESO POOL, EAST EMPIRE GLORIETA-YESO POOL, FREN GLORIETA-YESO POOL, EAST FREN-GLORIETA-YESO POOL, GRAYBURG JACKSON-SEVEN RIVERS-QUEEN-GRAYBURG-SAN ANDRES-GLORIETA-YESO (PADDOCK) POOL, GRAYBURG JACKSON SEVEN RIVERS-QUEEN-GRAYBURG-SAN ANDRES POOL, GRAYBURG JACKSON-YESO POOL, NORTH LEAMEX-PADDOCK POOL, LOCO HILLS-GLORIETA-YESO POOL, AND WEST MALJAMAR-YESO POOL, AND CANCELLATION OF OVERPRODUCTION, LEA AND EDDY COUNTIES, NEW MEXICO.

CASE NO. 14613

APPLICATION OF BURNETT OIL CO., INC. AND HUDSON OIL COMPANY OF TEXAS FOR CONSOLIDATION AND EXPANSION OF AND ADOPTION OF SPECIAL POOL RULES FOR CERTAIN YESO POOLS, INCLUDING CEDAR LAKE-GLORIETA-YESO POOL ET AL IN LEA AND EDDY COUNTIES, NEW MEXICO.

CASE NO. 14647
ORDER NO. R-13382-E

ORDER OT THE DIVISION

BY THE DIVISION:

These cases came on for hearing before the Oil Conservation Division on May 16 through May 17, 2011, at Santa Fe, New Mexico, before the Oil Conservation Division Examiner Richard I. Ezeanyim. However after the hearing, the examiner allowed the parties to these cases to submit additional pertinent data before the close of business on June 20, 2011.

NOW, on this 8th day of September, 2011, the Division Director, having considered the testimony, the record and the recommendations of the Examiner,

FINDS THAT:

(1) Due public notice has been given, and the Division has jurisdiction of these cases and of the subject matter.

(2) Case Nos. 14613 and 14647 were consolidated for the purpose of testimony; however, one order will be issued for both cases.

(3) In Case No. 14613, Concho Oil and Gas Operating, LLC ("Concho" or "COG") filed an amended application which requested special rules and regulations for thirteen pools in which it is an operator to provide for a depth bracket allowable of 300 barrels of oil a day, no limiting gas-oil ratio, a well density of four wells per 40-acre spacing and proration unit, and cancellation of its overproduction.

(4) Concho requested the above-referenced special rules for the following pools:

a. Artesia-Glorieta-Yeso Pool was created by Division Order No. R-11244, dated October 1, 1999, and currently covers the following lands:

Township 17 South, Range 28 East, NMPM

Section 25:	S/2
Section 26:	S/2
Section 27:	S/2
Section 28:	All
Section 29:	S/2, NW/4
Section 32:	N/2
Section 33:	All
Section 34:	NW/4
Section 35:	W/2, NE/4
Section 36:	NW/4

Township 18 South, Range 28 East, NMPM

Section 4:	NW/4
Section 5:	N/2
Section 6:	W/2, NE/4

b. Bear Grass Draw-Glorieta-Yeso Pool was created by Division Order No. R-12619, dated September 1, 2006, and currently covers the following lands:

Township 17 South, Range 29 East, NMPM

Section 27:	E/2, E/2 W/2, W/2 NW/4

c. Cedar Lake-Glorieta-Yeso Pool was created by Division Order No. R-11067, dated November 1, 1998, and currently covers the following lands:

Township 17 South, Range 30 East, NMPM

Section 13:	E/2, SW/4

Section 24: NE/4

Township 17 South, Range 31 East, NMPM
Section 17: S/2
Section 18: All
Section 19: N/2
Section 20: All

d. Empire-Glorieta-Yeso Pool was created by Division Order No. R-10124, dated June 1, 1994, and currently covers the following lands:

Township 17 South, Range 28 East, NMPM
Section 23: E/2
Section 24: S/2

Township 17 South, Range 29 East, NMPM
Section 18: S/2
Section 19: All
Section 30: All

e. East Empire-Glorieta-Yeso Pool was created by Division Order No. R-10724, dated January 1, 1997, and currently covers the following lands:

Township 17 South, Range 29 East, NMPM
Section 17: SE/4
Section 20: All
Section 29: All

f. Fren-Glorieta-Yeso Pool was created by Division Order No. R-2313, dated October 1, 1962, and currently covers the following lands:

Township 17 South, Range 31 East, NMPM
Section 9: E/2
Section 14: SW/4
Section 15: S/2
Section 16: S/2, NE/4
Section21: NE/4, W/2
Section 22: NW/4

g. East Fren-Glorieta-Yeso Pool was created by Division Order No. R-11824, dated September 1, 2002, and currently covers the following lands:

Township 17 South, Range 31 East, NMPM
Section 14: NE/4

h. Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso (Paddock) Pool was created by Division Order No. R-12678, dated December 1, 2006, and currently covers the following lands:

Township 17 South, Range 29 East, NMPM
Section 15: W/2 SW/4
Section 16: All
Section 21: All
Section 22: W/2 W/2, E/2 NW/4, NE/4 SW/4 and NW/4 NE/4
Section 27: W/2 SW/4
Section 28: All

i. Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres Pool was created by Division Order No. 850, dated January 1, 1950, and currently covers the following lands:

Township 16 South, Range 29 East, NMPM
Section 31: S/2 S/2
Section 32: W/2
Section 33: S/2, NE/4

Township 16 South, Range 31 East, NMPM
Section 24: E/2
Section 25: NE/4
Section 35: All
Section 36: N/2, SW/4, W/2, SE/4 SE/4

Township 16 South, Range 32 East, NMPM
Section 19: W/2
Section 30: NE/4
Section 31: N/2

Township 17 South, Range 28 East, NMPM
Section 1: E/2

Township 17 South, Range 29 East, NMPM
Section 3: SW/4 NW/4
Sections 4 and 5: All
Section 6: SE/4
Section 7: E/2
Section 8: All
Section 9: N/2, SW/4, NE/4 SE/4

Section 12:	SE/4 SE/4
Section 13:	All
Section 15:	NW/4, E/2 SW/4
Section 17:	E/2
Section 19:	SE/4
Sections 20, 23-26:	All
Section 27:	N/2, SE/4, E/2 SW/4
Section 29:	All
Section 31:	S/2 SE/4
Section 32:	All
Section 33:	N/2, SE/4, N/2 SW/4
Section 34:	All
Section 35:	N/2, SE/4, N/2 and SE/4 SW/4
Section 36:	NW/4, N/2, SW/4 NE/4

Township 17 South, Range 30 East, NMPM

Section 7:	SE/4
Section 8:	S/2 SW/4, E/2
Section 9:	S/2
Section 10:	S/2
Section 11:	W/2, W/2 E/2, E/2 SE/4
Section12:	NE/4
Sections 13 -28:	All
Section 29:	N/2
Sections 30, 33-36:	All

Township 17 South, Range 31 East, NMPM

Sections 1-11:	All
Sections 14 -23:	All
Section 26:	N/2, N/2 S/2
Section 27:	N/2
Sections 28-30:	All
Section 31:	N/2
Section 32:	N/2 N/2

The Dodd Federal Unit consists of the following acreage:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

Section 10:	E/2, E/2 W/2
Section 11:	All
Section 14:	All
Section 15:	E/2
Section 22:	SE/4, SE/4 SW/4, E/2 NE/4, SW/4 NE/4

The Burch Keely Unit consists of the following acreage:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM

Section 12:	SE/4 SE/4
Section 13:	All
Sections 23 through 26:	All

TOWNSHIP 17 SOUTH, RANGE 30 EAST, NMPM

Sections 18 and 19:	All
Section 30:	All

j. Grayburg Jackson-Yeso Pool was created by Division Order No. R-12256, dated January 3, 2005, and currently covers the following lands:

Township 17 South, Range 29 East, NMPM

Section 10:	E/2, E/2 W/2
Section 11:	All
Section 14:	All
Section 15:	E/2
Section 22:	SE/4, SE/4 SW/4, E/2 NE/4, SW/4 NE/4

k. North Leamex-Paddock Pool was created by Order No. R-12646, dated October 1, 2006, and currently covers the following lands:

Township 17 South, Range 33 East, NMPM

Section 3:	N/2, SW/4
Section 4:	S/2

l. Loco Hills-Glorieta-Yeso Pool was created by Order No. R-10822, dated July 1, 1997, and currently covers the following lands:

Township 17 South, Range 30 East, NMPM

Section 9:	SE/4
Section 10:	SW/4
Section 11:	All
Section 12:	NW/4
Section 14:	S/2, NW/4
Sections 15-17, 20:	All
Section 21:	N/2, SE/4
Section 22:	All
Section 23:	N/2, SW/4

m. West Maljamar-Yeso Pool was created by Order No. R-27, dated July 28, 1950, and currently covers the following lands:

Township 17 South, Range 32 East, NMPM

Section 17:	S/2

Section 19:	All
Section 20:	N/2, SW/4
Section 21:	All
Section 22:	W/2, NE/4

(5) The Dodd Federal Unit and the Burch Keely Unit are within the horizontal limits of the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres Pool (**28509**).

(6) Tandem Energy Corporation ("Tandem") is an operator of wells in the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso Pool (the Grayburg Jackson Pool) (**97558**). Tandem does not operate any wells that are completed in the Glorieta or Yeso formation, nor does it operate any wells in any other pools included in this application.

(7) Accordingly, Tandem filed a motion to dismiss this application insofar as it applies to the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso Pool.

(8) Upon receipt of Tandem's Motion to Dismiss, COG filed an amended application limiting its request for special pool rules for the Grayburg Jackson Pool to those portions of that pool that are included within the horizontal boundaries of the Dodd Federal Unit and the Burch Keely Unit. However, no Division rule authorizes assignment of a different depth bracket allowable to only a portion of a pool.

(9) Tandem's Motion to Dismiss the Grayburg Jackson Pool from the application was considered, and by Order No. R-13382-D, issued on May 25, 2011, the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso Pool (**97558**) was dismissed without prejudice from this application.

(10) For the same reasons stated in Finding Paragraph number (8) and Order No. R-13382-D, the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres Pool (**28509**), the horizontal boundaries of which include the Dodd Federal Unit and the Burch Keely Unit, should also be dismissed without prejudice from this application.

(11) In Case No. 14647, Burnett Oil Company, LLC, and Hudson Oil Company of Texas, hereinafter collectively referred to as Burnett/Hudson, in its amended application requested consolidation and expansion of six (6) existing Glorieta-Yeso Oil Pools **described below**; establishing Special Pool Rules for the expanded and consolidated pool (the "Consolidated Pool") providing for a depth bracket allowable of 187 barrels of oil per day, a limiting gas-oil ratio of 2000 standard cubic feet of gas per barrel of oil, a well density of two wells per 40-acre spacing and proration unit, and for a special rule for balancing over and underproduction from the Consolidated Pool on a calendar year basis.

(i) The Cedar Lake-Glorieta-Yeso Pool was created by Division Order No. R-11067, dated November 1, 1998, and currently covers the following lands:

Township 17 South, Range 30 East, NMPM
Section 13: E/2, SW/4
Section 24: NE/4

Township 17 South, Range 31 East, NMPM
Section 17: S/2
Section 18: All
Section 19: N/2
Section 20: All

(ii) The Fren-Glorieta-Yeso Pool was created by Division Order No. R-2313, dated October 1, 1962, and currently covers the following lands:

Township 17 South, Range 31 East, NMPM
Section 9: E/2
Section 14: SW/4
Section 15: S/2
Section 16: S/2, NE/4
Section 21: NE/4, W/2
Section 22: NW/4

(iii) The East Fren-Glorieta-Yeso Pool was created by Division Order No. R-11824, dated September 1, 2002, and currently covers the following lands:

Township 17 South, Range 31 East, NMPM
Section 14: NE/4

(iv) The Loco Hills-Glorieta-Yeso Pool was created by Order No. R-10822, dated July 1, 1997, and currently covers the following lands:

Township 17 South, Range 30 East, NMPM
Section 9: SE/4
Section 10: SW/4
Section 11: All
Section 12: NW/4
Section 14: S/2, NW/4
Sections 15-17, 20: All
Section 21: N/2, SE/4
Section 22: All
Section 23: N/2, SW/4
Section 33: SW/4

(v) The West Maljamar-Yeso Pool was created by Order No. R-27, dated July 28, 1950, and currently covers the following lands:

Township 17 South, Range 32 East, NMPM

Section 17:	S/2
Section 19:	All
Section 20:	N/2, SW/4
Section 21:	All
Section 22:	W/2, NE/4

(vi) The North Maljamar-Paddock Pool currently covers the following lands:

Township 17 South, Range 32 East, NMPM

Section 5:	SW/4

(12) Burnett/Hudson in its original application requested a depth bracket allowable of 240 barrels of oil per day, and a limiting gas-oil ratio of 2500 cubic feet of gas per barrel of oil. However, in further submittals after the hearing, Burnett/Hudson requested a depth bracket allowable of 107 barrels of oil, and a limiting gas-oil ratio of 2000 standard cubic foot of gas per barrel of oil.

(13) At the pre-hearing conference held on May 11, 2011, the parties in these cases agreed that five (5) of the six (6) pools identified in Finding Paragraph (11) above should be abolished and consolidated into one pool with the exception of the West Maljamar-Yeso Pool which currently covers the Finding in Paragraph 11 (v) above.

(14) There are thirteen (13) pools involved in Concho's application, and six (6) pools are involved in Burnett/Hudson's application. Five (5) of Burnett/Hudson's pools correspond with five (5) pools in Concho's application. Further, the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso Pool (**97558**) has been dismissed without prejudice, the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres Pool (**28509**) should be dismissed without prejudice, five pools will be abolished and consolidated into one pool as requested by Burnett/Hudson, bringing the remaining number of pools to eight (8) which will require Special Pool Rules.

(15) Both Apache Energy Corporation ("Apache"), and Premier Oil & Gas, Inc. ("Premier") appeared at the hearing through counsel in support of Concho's application and in opposition to Burnett/Hudson's application.

(16) The Yeso formation consists of several pools covering at least three (3) Townships and six (6) Ranges in Eddy and Lea Counties, New Mexico. There are a total of sixteen (16) operators in these Pools, including Chevron USA, Inc., Cimarex Energy Co. of Colorado, XTO Energy, Inc., Mewbourne Oil Company, Devon Energy Production Company, LP, and Nadel Gussman Permian, LLC among others. Many of these operators wrote letters in support of COG's application, and together they operate approximately ninety-five (95%) percent of the wells in these pools, and Burnett/Hudson operates approximately the remaining five (5%) percent of the wells in the pools.

(17) The development and spacing of the pools proposed in both COG and Burnett/Hudson's applications are governed by the Division's statewide rules. Division Rule 19.15.15.9 NMAC provides that a well within a defined oil pool shall be located on a spacing unit consisting of 40 acres and located no closer than 330 feet to a boundary of the unit. Additionally, a 40-acre oil spacing unit may contain up to four wells.

(18) Division Rules 19.15.20.12 NMAC and 19.15.20.13 NMAC provide that the pools have a depth bracket allowable of 80 barrels of oil per day, with a limiting gas-oil ratio of 2000 cubic feet of gas per barrel of oil.

(19) The Division may, where deemed appropriate, assign to a given pool a special depth bracket allowable at variance to the depth bracket allowable normally assigned to a pool of similar depth and spacing. The special allowable may be more or less than the regular depth bracket allowable and shall be assigned only after notice and hearing in accordance with 19.15.20.12(D) NMAC.

(20) The Division shall assign a greater than regular depth bracket allowable only after sufficient reservoir information is available to ensure that the allowable can be produced without damage to the reservoir and without causing surface or underground waste. In accordance with 19.15.20.12 (F) NMAC, the Division shall also consider the protection of correlative rights; and other pertinent factors.

Concho appeared through legal counsel and presented the following geological and engineering testimony:

(21) Concho operates 1,089 wells producing from the Yeso pools subject to its application.

(22) Concho has the most extensive data library on the Yeso formation which includes approximately 1,600 vertical and 16 horizontal Yeso wells; 317 wells have been logged using Formation MicroImaging; 69 wells have had sidewall cores; 9 wells have had whole-core logs, totaling approximately 2,800 feet of core data; and more than 220 wells have had mud logs.

(23) In the West Maljamar-Yeso Pool, there is currently no gas-oil ratio limit pursuant to Division Orders Nos. R-199 and R-174. Also the Division authorized 300 barrels of oil per day depth bracket allowable in the Northeast Red Lake-Glorieta-Yeso Pool, pursuant to Order No. R-12199 in Case No. 13185, which was issued on August 30, 2004.

(24) The oil in the Yeso formation exhibits the same composition across the shelf. Concho geochemical and isotopic analysis indicates that the oil also originates from the same distal marine shale source rock.

(25) The Yeso formation is characterized by low permeability, low porosity and high heterogeneity across the formation. The oil and gas lenses or members, are stratigraphic and highly compartmentalized within the reservoir.

(26) All of these pools subject to Concho's and Burnett/Hudson's applications are solution gas drive reservoirs. During initial production the reservoir pressure is very close to or at the bubble point pressure. Bubble point pressures range from approximately 2,100 psi to 2,600 psi within the Yeso shelf. Initial bottomhole pressures measure approximately 2,600 to 2,700 psi.

(27) Since the Yeso wells subject to the applications have been produced without restriction, it is possible to examine whether there has been any waste, damage to the reservoir, or violation of correlative rights. Drilling four wells per 40-acre unit (equated to 10-acre spacing) has produced in excess of 300 barrels of oil a day without evidence of interference or damage to the reservoir.

(28) Production over the existing allowable has not caused interference and has resulted in incremental recovery. When infill wells are drilled in a spacing unit, a reduction in the gas-oil ratio is seen which shows that new lenses are being intersected in the reservoir.

(29) Concho units with three of four wells drilled can produce up to 245 barrels of oil per day, indicating that adding a fourth well would make the unit produce in excess of 300 barrels of oil per day.

(30) Peak rate oil production values have not decreased over time as additional wells have been drilled on the equivalent of 10-acre spacing, which also indicates that reservoir energy has not been depleted over time.

(31) Historically, operators in these pools have produced approximately 300 barrels of oil per day from their spacing units. Accordingly, to allow for full development of the reservoir, a 300 barrel of oil per day allowable is necessary for the prevention of waste. Curtailing production will reduce overall production from the wells due to lost momentum.

(32) Additionally, if the existing allowable remains, it will significantly delay the implementation of potential secondary recovery operations and will reduce the efficiency of any planned secondary operations by allowing gas to form in the reservoir, which decreases the efficiency of injection operations.

(33) Low permeability solution gas drive reservoirs such as these Yeso pools are not damaged by high production rates. The permeability must be high enough for gas to break out within the reservoir, which is not applicable in this low-permeability reservoir. On the other hand, damage may be caused by restricting production.

(34) The gas-oil ratios for Yeso wells have not changed significantly throughout the period of development along the shelf. In fact, gas-oil ratios are trending down since 2007 possibly indicating the intersection of new reserves since Concho began its operations.

(35) In this type of reservoir, the gas-oil ratio will increase over time as an area is depleted. But as noted above, there is no evidence of damage to the reservoir by unrestricted production.

(36) Production on the equivalent of 10-acre spacing captures incremental reserves that would otherwise remain in place if only two wells were allowed per unit (equivalent to 20-acre spacing.) In general, wells on the equivalent of 10-acre spacing produce incremental reserves at nearly 2-to-1 compared to wells on the equivalent of 20-acre spacing. Well density of at least four wells per 40-acre spacing unit is required to fully develop the reservoir

(37) Production of substantial incremental reserves demonstrates that wells on the equivalent 10-acre spacing intersect new reserves and do not interfere with other wells.

(38) A well density rule of two wells per 40-acre spacing and proration unit will unnecessarily prolong primary recovery, delaying secondary recovery operations and decreasing its efficiency.

(39) Large fracture stimulations as proposed by Burnett/Hudson as part of their proposed development on the equivalent of 20-acre spacing decrease the effectiveness of secondary recovery operations, and damage a reservoir's capacity for secondary recovery.

(40) The granting of Concho's application is in the interest of conservation, the prevention of waste, and the protection of correlative rights.

Apache Energy Corporation and Premier Oil Company appeared at the hearing through legal counsel and presented the following testimony.

(41) Producing 300 barrels of oil per day per proration unit with an unlimited gas-to-oil ratio has not harmed and will not harm the reservoir. Both Apache and Premier have produced their units in excess of 300 barrels of oil per day.

(42) Curtailing production will result in high fluid levels in the wells, making it difficult to treat for scale, increasing the risk of mechanical issues, and reducing the life of the well bore. Curtailing production also prolongs the oil recovery time for wells, resulting in a longer period of fixed costs and an increased risk of well-bore and operational issues associated with older well bores.

(43) In the years that Apache and Premier have been operating in the Yeso formation, overproduction has been ongoing, yet no operator has ever brought a case claiming overproduction to the Oil Conservation Division.

(44) Significant reserves would not be recovered, resulting in waste, if development in the Yeso proceeds on a maximum of two wells per 40-acre unit, rather than the current statewide density rule of four wells per 40-acre unit.

(45) Drilling on the equivalent of 10-acre spacing has not caused interference between wells and has not negatively impacted correlative rights. Apache and Premier have drilled offset wells on the equivalent of 10-acre spacing to Concho wells, and have found no interference or evidence of drainage.

(46) Premier and its working interest partners spent $86 million to purchase the preferential rights to proven undeveloped (PUD) reserves in the Yeso formation, which were based on the equivalent of 10-acre Paddock spacing. If Burnett/Hudson's application request to reduce well density to the equivalent of 20-acre development is approved, all 20 of Premier's planned PUD wells will be prohibited from being developed.

(47) Many of Apache and Premier's wells operate at a gas-to-oil ratio of 4000 standard cubic feet of gas per barrel of oil, so a limitation of 2000 standard cubic feet of gas per barrel of oil will require curtailing production.

(48) Apache and Premier support Concho's application to increase the proration unit allowable to 300 barrels of oil per day and an unlimited gas-to-oil ratio. Both Apache and Premier oppose Burnett/Hudson's application to increase density to the equivalent of 20-acre spacing, because doing so would be insufficient to produce the remaining reserves and will result in waste.

Burnett/Hudson appeared at the hearing through legal counsel and presented geologic and engineering testimony in support of their application as follows:

(49) The Yeso formation has two producing members: The Paddock or Upper Yeso, and Blinebry or Lower Yeso. Many of the older vertical wells are completed in only the shallower Paddock member and were not drilled deep enough to produce from the Blinebry. The horizontal wells, of necessity, produce only from the Paddock or the Blinebry, with most being drilled in the Paddock. Although the Glorieta formation has been consolidated with the Yeso in these pools, very few wells in these pools now produce from the Glorieta.

(50) The Yeso formation is a dolomite interval over a thousand feet thick that is stratigraphically continuous through the area with porosity developing in larger continuous sections in the Paddock member, and in numerous thinner sections within the Blinebry member. The porosity development in both members is discontinuous in its areal extent throughout the pools. The Glorieta formation above the Paddock, and the Tubb and Drinkard members of the Yeso below the Blinebry, are continuous through the area, but are rarely productive.

(51) Numerous wells have been completed within and in the vicinity of the subject pools by Burnett/Hudson, COG Operating, Apache Corporation, and other operators. The vast majority of these wells are vertical wells. Burnett has, and to a lesser extent other operators have, begun to drill more horizontal wells.

(52) The recently drilled horizontal Yeso wells in this area have proven significantly more productive than the older vertical wells. Improved completion techniques have also allowed the better new vertical wells to produce at rates in excess of existing depth bracket allowable. The horizontal wells also have demonstrated the capability to produce at rates substantially in excess of the depth bracket allowable applicable to their pools, especially during the first year of production.

(53) Although some isolated earlier Yeso wells were drilled, development of the Yeso pools commenced in the early 1990s when operators began implementing large fracture stimulations in completions to enhance the low natural permeability of the formation. Development accelerated after 2000 with more than one thousand Yeso wells in the pools.

(54) Burnett/Hudson drilled its first Yeso well in the pools in 1998; COG drilled its first Yeso well in 2006; Apache drilled its first Yeso well in 2010.

(55) Before COG's acquisition of properties in the Glorieta-Yeso formation in 2006, most operators developed the area on average of 20 acre density, although an average of 10 acre development had begun by COG's predecessors in some areas. COG began extensive development on 10 acre density and continues to rapidly develop its expanded acreage position on 10 acre density.

(56) Many wells of Burnett/Hudson, COG and other operators are capable of production at rates which cause their 40-acre spacing units to exceed depth bracket allowable, especially during their early productive life. The production from wells decline initially at hyperbolic rates, then trends into exponential decline, typically sometimes in a well's second year.

(57) Burnett/Hudson has done extensive studies to characterize the reservoirs with data from core samples, mud logs and open-hole logs performed on every well, and log to core correlation studies. Burnett designs its perforations and fracture stimulations to target zones it determines from log analyses to be net pay.

(58) Burnett/Hudson also uses substantially higher volumes of water and sand in its hydraulic fracturing stimulations. Burnett now uses a "slick water" frac fluid while COG uses a gelled frac fluid.

(59) Burnett/Hudson's wells, using their individual well evaluation and completion design, and larger slick water fracture stimulations, have resulted in wells with substantially greater average estimated ultimate recoveries ("EURs"). Burnett/Hudson's wells had an average EUR of 115,000 barrels of oil per well. However,

Burnett/Hudson's most recent wells utilizing slick water fracture completions have substantially higher EURs, averaging 149,000 barrels of oil from the Paddock completions, and 157,000 barrels of oil from the Blinebry completions.

(60) Burnett/Hudson's wells drilled on 20-acre spacing and utilizing its completion techniques have produced at an average gas-oil ratio of 2334 standard cubic feet of gas per barrel of oil. Wells drilled on 10-acre spacing produce at higher gas-oil ratios than those drilled on 20-acre spacing because of localized pressure depletion and evolution of solution gas. This excessive gas production from closely spaced wells causes waste of recoverable hydrocarbons.

(61) The equivalent of 20-acre density is adequate and appropriate to provide effective and efficient drainage of the Yeso formation

(62) Drainage calculations by Burnett/Hudson convincingly demonstrate that wells can drain 20 acres effectively and efficiently in virtually all instances.

(63) Wells drilled on the equivalent of 10- acre spacing cause interference with each other, and have overlapping drainage areas, and reduce the estimated ultimate recoveries as compared with wells drilled on the equivalent of 20-acre spacing.

(64) Reservoir modeling and simulation studies confirm that 20-acre density is appropriate for effective and efficient drainage of the Yeso pools, and will prevent economic and physical waste.

(65) This is a solution gas drive system of reservoirs that are adversely affected by increased gas production from higher gas-oil ratio wells. Development of increased areas on the equivalent of 10-acre density will lead to lower per well recoveries and higher gas-oil ratios, and thereby cause physical and economic waste

(66) Reservoir performance and reservoir modeling and simulation both demonstrate that a producing gas-oil ratio of 2000 standard cubic feet of gas per barrel of oil is necessary to prevent waste, as high gas production causes decreased reservoir pressure and energy, and lower ultimate oil production.

(67) The pools and the areas Burnett/Hudson seeks to consolidate into a single pool are geologically similar and constitute an appropriate single pool for development.

(68) All operators have produced their properties at capacity for the last several years, which has resulted in most, if not all, operators accumulating large amounts of overproduction.

(69) The Burnett/Hudson's application as proposed will prevent waste of hydrocarbons, protect correlative rights, and is in the interest of conservation.

THE DIVISION CONCLUDES AS FOLLOWS:

(70) The vertical limit of these pools is established as from the top of the Glorieta formation, as found at a drilled depth of 4,519 feet in the EOG Resources Inc. Oak Lake 11 Federal Well No. 1 located 1070 feet from the South line and 860 feet from the East line, Unit P of Section 11, Township 17 South, Range 30 East, Eddy County, New Mexico, as shown on the Baker-Hughes Induction Electric Log of this well, through the top of the Abo formation or base of the Yeso formation, as found at the drilled depth of 6,674 feet as shown on the same electric log.

(71) The Yeso formation in this area includes the Paddock, Blinebry, Tubb and the Drinkard members. The Yeso formation consists of several pools covering at least three townships and six ranges in Eddy and Lea Counties, New Mexico. Oil production occurs mostly in the Paddock and the Blinebry members of these pools.

(72) The Yeso reservoir is characterized by very low porosity and low permeability with high degree of heterogeneity. It is thick, stratigraphic, lenticular and highly compartmentalized. The lower permeability in this reservoir decelerates recovery and protracts depletion.

(73) The reservoir produces by solution gas drive or dissolved gas drive mechanism. There is no primary or pre-existing gas cap; further, upon depletion, there is no secondary or developed gas cap. As a result, there is no segregation or gravity drainage in this reservoir. In this type of solution gas drive or dissolved gas drive reservoir, the available predominant energy is the expansion of the solution gas, probably aided initially by connate water expansion or pore volume contraction. Without gravity drainage, typical primary recovery range by solution gas drive mechanism of this type is between ten (10%) to twenty-five (25%) percent of the original oil in place (OOIP) by pressure depletion.

(74) The reservoir pressure is very close to or at the bubble point pressure in the area covered by these pools. The solution gas drive mechanism applies once the pressure falls below the bubble point pressure.

(75) The Division is obligated to prevent waste and protect correlative rights based on the reservoir descriptions detailed above in Finding Paragraphs (70) through (74). However, Correlative Rights is defined by 19.15.2.7 (15) NMAC as follows:

"Correlative Rights means the opportunity afforded, as far as it is practicable to do so, to the owner of each property in a pool to produce **without waste** the owner's just and equitable share of the oil or gas in the pool, being an amount, so far as can be practically determined, and so far as can be practically obtained **without waste,** substantially in the proportion that the quantity of recoverable oil or gas under the property bears to the total recoverable oil or gas in the pool, and for the purpose to use the owner's just and equitable share of the reservoir energy."

(76) In these low permeability solution gas drive reservoirs without gravity drainage, high production rate does not affect ultimate recovery. High production rate does not damage or harm the reservoir. On the other hand, lower production rates will result in lower ultimate recoveries. At lower production rate, gas migrates rapidly out of solution resulting in rapid dissipation of reservoir energy.

(77) Since rate of withdrawal or rate of oil production in this type of solution gas drive reservoir does not harm or damage the reservoir, it is then very beneficial to employ production schemes or practices that will recover more oil than gas. At lower production rates, the producing gas-oil ratio rises much more rapidly. At the same time, any production scheme that allows unlimited gas-oil ratio will result in lower ultimate oil recovery.

(78) Evidence presented by the parties at the hearing demonstrates that gas-oil ratios in these pools range from approximately 2,300 to 4,000 standard cubic feet of gas per barrel of oil. To prevent waste and for orderly development in these pools, an average gas-oil ratio of 3,000 standard cubic feet of gas per barrel of oil should be approved.

(79) Formation fracturing is a production scheme or practice, and indeed an advancing technology employed by operators to enhance the extraction of hydrocarbons from formations. Evidence presented at the hearing by the parties indicates that Concho uses Gelled Water fracturing technology, while Burnett/Hudson uses Slick Water fracturing technology. The fracture technology employed by any operator is simply a business decision as long as the particular fracture technology does not induce waste, does not violate correlative rights, and will not impede or delay secondary recovery operations. The Division is not obligated to recommend certain types of fracturing technologies to operators.

(80) Typical primary recovery range by solution gas drive mechanism of this type is between ten (10%) to twenty-five (25%) percent of the original oil in place (OOIP) by pressure depletion. In calculating drainage area, Concho used a primary recovery factor of fifteen (15%) percent, while Burnett/Hudson used a primary recovery factor of ten (10%) percent. Again the recovery factor used by any operator is a business decision. However, given the advances in fracturing technologies now available to operators, it is reasonable to conclude that a primary recovery factor of fifteen (15%) percent is more appropriate under these circumstances.

(81) Porosity can never be measured, but only calculated. In calculating porosity from logs, assumptions have to be made. The assumptions made by one operator may be different from the assumptions made by another operator resulting in different porosities obtained. Additionally, net pay calculations are based on assumptions, and as such the net pay results obtained are different among the operators.

(82) Drainage area is inversely proportional to recovery factor, porosity and net pay, which implies that the larger the recovery factor, porosity, and net pay, the smaller the drainage area and vice versa. Burnett/Hudson requested a well density of two (2)

wells per 40-acre spacing and proration unit while Concho requested four (4) wells per 40-acre spacing and proration unit in accordance with the Division's statewide rules. Given the tight nature of this reservoir, the Division concludes that four (4) wells per 40-acre spacing and proration unit will be more appropriate to exploit this reservoir.

(83) The Division concludes that in this type of reservoir, drilling on the equivalent of 10-acre spacing will not cause interference between wells, will not cause waste, and will not impact correlative rights.

(84) All the operators in these pools have overproduced applicable allowables in one form or the other over the years. These overproductions should be cancelled for all the operators up to the effective date of this order. Any future overproduction by any operator should be made up by a balancing rule on a calendar year basis.

(85) To prevent waste and protect correlative rights, the depth bracket allowable in these pools should be increased to 300 barrels of oil per day with a limiting gas-oil ratio of 3000 standard cubic feet of gas per barrel of oil. Temporary Special Pool Rules should be promulgated for the orderly exploitation of these pools.

(86) The horizontal limits of the pools to be included in the Temporary Special Pool Rules are described below:

(i) Artesia-Glorieta-Yeso Pool which currently covers the following lands:

Township 17 South, Range 28 East, NMPM

Section 25:	S/2
Section 26:	S/2
Section 27:	S/2
Section 28:	All
Section 29:	S/2, NW/4
Section 32:	N/2
Section 33:	All
Section 34:	NW/4
Section 35:	W/2, NE/4
Section 36:	NW/4

Township 18 South, Range 28 East, NMPM

Section 4:	NW/4
Section 5:	N/2
Section 6:	W/2, NE/4

(ii) Bear Grass Draw-Glorieta-Yeso Pool which currently covers the following lands:

Township 17 South, Range 29 East, NMPM

Section 27:	E/2, E/2 W/2, W/2 NW/4

(iii) Empire-Glorieta-Yeso Pool which currently covers the following lands:

Township 17 South, Range 28 East, NMPM
Section 23: E/2
Section 24: S/2

Township 17 South, Range 29 East, NMPM
Section 18: S/2
Section 19: All
Section 30: All

(iv) East Empire-Glorieta-Yeso Pool which currently covers the following lands:

Township 17 South, Range 29 East, NMPM
Section 17: SE/4
Section 20: All
Section 29: All

(v) Grayburg Jackson-Yeso Pool which currently covers the following lands:

Township 17 South, Range 29 East, NMPM
Section 10: E/2, E/2 W/2
Section 11: All
Section 14: All
Section 15: E/2
Section 22: SE/4, SE/4 SW/4, E/2 NE/4, SW/4 NE/4

(vi) North Leamex-Paddock Pool which currently covers the following lands:

Township 17 South, Range 33 East, NMPM
Section 3: N/2, SW/4
Section 4: S/2

(vii) West Maljamar-Yeso Pool which currently covers the following lands:

Township 17 South, Range 32 East, NMPM
Section 17: S/2
Section 19: All
Section 20: N/2, SW/4
Section 21: All
Section 22: W/2, NE/4

(viii) The consolidated Mar Loco- Glorieta-Yeso Pool (**Pool Code 97866**) now covers the following lands:

Township 17 South, Range 30 East, NMPM

Section 9:	SE/4
Section 10:	SW/4
Section 11:	All
Section 12:	NW/4
Section 13:	E/2, SW/4
Section 14:	S/2, NW/4
Sections 15-17, 20:	All
Section 21:	N/2, SE/4
Section 22:	All
Section 23:	N/2, SW/4
Section 24:	NE/4
Section 33:	SW/4

Township 17 South, Range 31 East, NMPM

Section 9:	E/2
Section 14:	SW/4, NE/4
Section 15:	S/2
Section 16:	S/2, NE/4
Section 17:	S/2
Section 18:	All
Section 19:	N/2
Section 20:	All
Section 21:	NE/4, W/2
Section 22:	NW/4

Township 17 South, Range 32 East, NMPM

Section 5:	SW/4

(87) The requested expansion of the Mar Loco-Glorieta-Yeso Pool (**97866**) whose horizontal limits are described above in Finding Paragraph 85 (viii) was not included in the public notices of this case, nor considered at the May 16 and 17, 2011 hearing, and therefore should not be granted at this time. Expansion of this pool should only be considered after notice and hearing

IT IS THEREFORE ORDERED THAT:

(1) The application of COG Operating, L.L.C. ("COG" or "Concho") requesting a depth bracket allowable of 300 barrels of oil per day in these pools is hereby approved. COG's request for an unlimited gas-oil ratio is hereby denied. The limiting gas-oil ratio of 3000 standard cubic feet of gas per barrel of oil is hereby approved for orderly development of these pools.

(2) The application of Burnett Oil Company, Inc., and Hudson Oil Company of Texas, hereinafter collectively called Burnett/Hudson, requesting a depth bracket allowable of 187 barrels of oil per day, and a limiting gas-oil ratio of 2000 standard cubic feet of gas per barrel of oil is hereby denied.

(3) Burnett/Hudson's request for abolishment of Cedar Lake-Glorieta-Yeso Pool, Fren-Glorieta-Yeso Pool, East Fren-Glorieta-Yeso Pool, Loco Hills-Glorieta-Yeso Pool, and North Maljamar-Paddock Pool, and consolidation of these Pools into one Pool called the Mar Loco;-Glorieta-Yeso Pool is hereby approved. In addition, Burnett/Hudson's request to expand the Mar Loco-Glorieta-Yeso Pool at this time is hereby denied without prejudice. Expansion of any pool requires notice to all operators in the pool and a hearing conducted to determine if the pool should be expanded.

(4) Pursuant to Section 70-2-18, NMSA, 1978, an operator of any well that, by virtue of any of the above pool consolidation, is subject to pool rules providing for spacing or proration units larger than the one presently dedicated thereto, shall have 60 days from the effective date of this order to file Form C-102 dedicating a standard unit for the pool to that well or to obtain a non-standard unit approved by the Division. Pending such compliance, the well shall receive a maximum allowable in the same proportion to a standard allowable for the pool that the acreage dedicated to the well bears to a standard unit for the pool. Failure to file Form C-102 dedicating a standard unit to the well or to obtain a non-standard unit approved by the Division within that 60-day period shall subject the well to cancellation of allowable.

(5) A balancing rule as requested by Burnett/Hudson to allow operators in the pools to balance their over and underproduction in a calendar year is hereby approved.

(6) COG's request for a density rule of four wells per 40-acre spacing and proration unit, in accordance with the current statewide rules, is hereby approved.

(7) Burnett/Hudson's request for a maximum of two wells per 40-acre spacing and proration unit is hereby denied.

(8) All past overproduction by all the operators in these pools is hereby cancelled up to the effective date of this order, since all operators overproduced from these pools in one form or the other.

(9) By Division Order No. R-13382-D, issued on May 25, 2011, the Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres-Glorieta-Yeso Pool (**97558**) was dismissed without prejudice from COG's application. The Grayburg Jackson-Seven Rivers-Queen-Grayburg-San Andres Pool (**28509**) is hereby also dismissed without prejudice from COG's application since this pool contains the horizontal boundaries of the Dodd Federal Unit and the Burch Keely Unit.

(10) The following Temporary Special Pool Rules are promulgated for the Glorieta-Yeso Pools with the horizontal boundaries described in Finding Paragraph 86 (i) through (viii)

TEMPORARY SPECIAL POOL RULES
FOR
THE GLORIETA-YESO OIL POOLS LISTED BELOW:

Artesia-Glorieta-Yeso Pool (96830)

Bear Grass Draw-Glorieta-Yeso Pool (97534)

Empire-Glorieta-Yeso Pool (96210)

East Empire-Glorieta-Yeso Pool (96610)

Grayburg Jackson-Yeso Pool (28509)

North Leamex-Paddock Pool (97549)

West Maljamar-Yeso Pool (44500)

Mar Loco-Glorieta-Yeso Pool (97866)

Rule 1: Any well completed in the Glorieta-Yeso formations within the horizontal boundaries of these Glorieta-Yeso oil pools, or within one mile of the outer boundaries of said pools, and not within, or closer to, another Glorieta- Yeso pool, shall be governed by these special rules.

Rule 2: The allowable for the Glorieta- Yeso production from units dedicated to wells described in Rule 1 shall be 300 barrels of oil per day, per standard 40- acre spacing and proration unit. This rule shall be effective retroactively from the date of first production of the first well completed in the Glorieta- Yeso formations in each unit.

Rule 3: A producing gas-oil ratio of 3000 standard cubic feet of gas per barrel of oil is applicable to these Glorieta-Yeso Pools. Any unit in the Glorieta-Yeso Pools which is producing at a gas-oil ratio greater than 3000 standard cubic feet of gas per barrel of oil and is capable of producing more than 300 barrels of oil per day or 900 MCFPD shall have its daily oil allowable reduced by 300 multiplied by a fraction, the numerator of which is 3,000, and the denominator of which is its producing gas-oil ratio.

Rule 4: No more than four wells shall be drilled on a 40-acre spacing and proration unit. Nothing in these rules shall prohibit an operator from drilling one or two wells per 40-acre spacing and proration unit as long as the maximum of four wells per 40-acre spacing and proration unit is not exceeded.

Rule 5: Operators may make up or balance overproduction and underproduction of oil from each unit in a calendar year; and any unit on which a new well is completed during a year shall combine that year with the following year for balancing over and underproduction. Each Operator shall calculate and report the over or underproduced status of each unit it operates in compliance with these Rules, and file a report with the Division no later than each March 1 of the preceding year, showing the over or

underproduced status of each unit it operates as of the previous December 31.

Rule 6: In all other respects, the wells in these Glorieta-Yes Pools shall remain subject to statewide rules.

(11) These temporary special pool rules shall expire on September 1, 2014, unless extended or made permanent by a Division Order entered on or before this date.

(12) Jurisdiction of this case is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JAMI BAILEY
Director

SEAL