

STATE OF SOUTH DAKOTA  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
BOARD OF MINERALS AND ENVIRONMENT

<p>IN THE MATTER OF THE PETITION OF LUFF EXPLORATION COMPANY, DENVER, CO, FOR AN ORDER APPROVING THE OPERATION OF A PORTION OF THE CLARKSON RANCH FIELD CONSISTING OF THE S/2 OF SECTION 13, SE/4 OF SECTION 14, E/2 OF SECTION 23, ALL OF SECTION 24, AND N/2 OF SECTION 25, TOWNSHIP 22 NORTH, RANGE 4 EAST, HARDING COUNTY, SD, AS THE CLARKSON RANCH RED RIVER UNIT; PROVIDING FOR THE RECOVERY OF RISK COMPENSATION FROM OWNERS WHO ELECT TO HAVE THEIR SHARE OF UNIT EXPENSES CARRIED; APPROVING THE UNIT AGREEMENT AND UNIT OPERATING AGREEMENT FOR THE UNIT; DESIGNATING LUFF EXPLORATION COMPANY AS UNIT OPERATOR; AND GRANTING SUCH OTHER RELIEF AS THE BOARD DEEMS APPROPRIATE.</p>	<p style="text-align:center">OIL AND GAS CASE NO. 1-2019</p> <p style="text-align:center">ORDER</p>
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**SECRETARY'S ORDER UNDER SDCL 45-9-74**

A Petition ("Petition") of Luff Exploration Company ("Luff") was submitted to the South Dakota Board of Minerals and Environment ("Board") on February 22, 2019. The Board prepared and published a Notice of Opportunity for Hearing ("Notice") and Luff caused a copy of the Petition and the Notice to be served by mail or personally on each party affected by the petition. No petitions to intervene were filed in accordance with the Notice. Therefore, pursuant to South Dakota Codified Laws (SDCL) 45-9-74, and based upon Luff's Petition and the supporting documents filed by Luff, the Secretary makes and enters the following order:

Luff represents the owners of interests in the oil and gas leasehold estate underlying all or portions of the South Half of Section 13, the Southeast Quarter of Section 14, the East Half of

Section 23, All of Section 24, and the North Half of Section 25, Township 22 North, Range 4 East of the Black Hills Meridian. All of said lands are located in Harding County, SD.

By Petition dated February 22, 2019, Luff petitioned the Board for an order approving the operation of a portion of the Clarkson Ranch Field, consisting of the lands described above (the "Unit Area"), for secondary recovery as the "Clarkson Ranch Red River Unit;" approving the Unit Agreement and Unit Operating Agreement for the unit, and designating Luff as operator.

Four producing wells and two dry holes have been drilled in the Unit Area. The Travers 1-25 was drilled as a vertical dry hole by Wyoming Resources in the NE/4 of Section 25. While this well was not completed as a producer, it provides important information regarding secondary recovery potential in the south end of the Unit area. The Alyce K-24 was a vertical dry hole in the SW/4 of Section 24. It was not productive in the Red River "C" and "D" zones.

The Travers 22-24 was a vertical well drilled in 1974 by DEPCO Inc. and produced from the Red River "C" zone, and the well was plugged and abandoned in 1987. The Travers 34-24 was a vertical well drilled by DEPCO Inc. as a dry hole in 1976, but was reentered by Wyoming Resources in 1993 as a producing well in the Red River "D" zone; the well is currently operated by Luff and continues to produce. The Clarkson Ranch N-13H is a horizontal well drilled by Luff in 2014 that produces from the Red River "B" zone. Finally, the State I-14H is a horizontal well drilled by Luff in 2018 that produces from the Red River "B" zone. The Clarkson Ranch N-13H and State I-14H are both currently operated by Luff.

As described in the proposed Unit Agreement, the formation Luff is seeking to unitize within the Unit Area (the "Unitized Formation") is defined as the stratigraphic interval from the top of the Gunton member of the Stony Mountain Formation, found at a depth of 8,806 feet below the Kelly Bushing as identified by the Schlumberger Platform Express Compensated Neutron - Formation Density Log in the vertical DEPCO Travers 34-24 well located in the SW/4SE/4 of Section 24, Township 22 North, Range 4 East, Harding County, SD, and to include all principal zones down to the Red River "C" zone marker, found at a depth of 9,014 feet below the Kelly Bushing as identified by the same log.



Luff seeks to unitize the Unit Area in order to conduct a secondary recovery project consisting of a water flood. Luff anticipates converting the State 1-14H well to water injection service, and recompleting the Alyce K-24 well in the Dakota (Inyan Kara) Formation for use as a water supply well. The Clarkson Ranch N-13H will continue to produce oil and gas. Luff estimates the total cost of the project to be approximately \$1,185,000. In addition, depending on economics and other factors, Luff may also drill an additional vertical well in the Unit, to the south and east of the existing Clarkson Ranch N-13H, and produce oil and gas from the new well for a period of time before converting the new well to water injection service. Luff intends to obtain approval from the Secretary under Chapter 74:12:07 of the Administrative Rules of South Dakota (“ARSD”) prior to commencing injection in the Unit Area.

Luff proposes to divide the Unit into four separate tracts. Within those tracts Luff proposes to allocate expenses and production based on a two-phase formula, with Phase I being based 47.5% on Current Oil Production Rate, defined as a three-month average ending December 31, 2018; 47.5% on Remaining Primary Oil Reserves (as of December 31, 2018); and 5% on Surface Acres. Phase II will be based 70% on Estimated Ultimate Recovery – Primary, and 30% Movable (Mobile) Red River “B” Zone Oil in Place. Conversion to Phase II would occur when 146,445 additional barrels of oil are recovered from the Unitized Formation, from and after December 31, 2018.

Luff conducted subsurface mapping and reservoir modeling studies relying on data from other water flood projects previously conducted by Luff. Based on that data, Luff estimates that the water flood proposed for the Unit Area will in the next twelve years recover approximately 140,000 barrels of oil that otherwise would likely not be recovered. The present value of this oil is greater than the estimated cost of implementing the water flood.

All wells located within the Unit Area or within one-half mile of the boundaries of the Unit Area are operated by Luff, so Luff is the only operator affected by this project.

The Unit Agreement and Unit Operating Agreement are fair, reasonable, just and equitable, address the matters set forth in SDCL 45-9-39, and contain all the terms, provisions,

conditions and requirements reasonably necessary and proper to protect and safeguard the respective rights and obligations of the several persons affected and will effectuate and accomplish the purposes of SDCL Chapter 45-9. The Unit Agreement and Unit Operating Agreement provide for the efficient unitized management and control of the further development and operation of the Unit for the recovery of oil and gas from the Unitized Formation defined in said Agreements.

The Unit Operating Agreement provides for the application of a risk penalty in the event any working interest owner elects not to participate in a future unit operation. Currently, there are no non-consenting interests in the existing wells within the Unit Area.

The area included within the Unit is less than the entire pool or common source of supply, but the area is of such size and shape as is reasonably required for the unit operations and the conduct of such operations will have no adverse effect upon other portions of the pool. The unitized management, operation and further development of the Red River "B" zone in the Unit are reasonably necessary to increase substantially the ultimate recovery of oil and gas.

Unitization of the proposed Unit Area and the unitized management, operation and further development thereof as a Unit, all as set forth in the application and the Unit Agreement and Unit Operating Agreement and other exhibits presented by Luff will prevent waste, will equitably distribute the oil and gas among the various owners of the enlarged Unit Area, will result in the recovery of substantially more oil and gas than otherwise will be recovered, and will protect the correlative rights of the several owners.

The plan for unit operations consisting of the Unit Agreement and the Unit Operating Agreement has been approved in writing by those persons who will, under this order, be required to pay at least sixty percent of the cost of the unit operation and by the owners of at least sixty percent of the production or proceeds thereof that will be credited to interests which are free of cost. Original or copies of ratifications evidencing the same have been submitted to the Board by Luff.

The Board has authority to hear and decide this matter pursuant to SDCL Chapter 45-9 and ARSD Chapter 74:12:06, and the Secretary has authority to issue this order pursuant to SDCL 45-9-74.

All notices of the Petition and Notice of Opportunity for Hearing were properly and timely given. The Petition is complete in all respects and contains all required and requested information, and Luff is an “interested person” within the meaning of SDCL 45-9-37.

The Board has jurisdiction pursuant to SDCL 45-9-37 et seq. to issue orders approving the operation of a pool, or part therefor, as a unit.

The operation of the Unit in accordance with the Unit Agreement and the Unit Operating Agreement is reasonably necessary in order to increase substantially the ultimate recovery of oil or gas and the value of the estimated additional recovery of oil or gas exceeds the estimated additional cost incident to conduct such operations.

The Unit Agreement and the Unit Operating Agreement contain terms and conditions that are just and reasonable, and prescribe a plan for unit operations including those matters set forth in SDCL 45-9-39.

The allocation formula set forth in the Unit Agreement is just and reasonable.

The Unit Agreement and the Unit Operating Agreement have been ratified or approved in writing by those persons who will be required to pay at least sixty percent of the cost of the unit operations under the plan of unit operations and by the owners of at least sixty percent of the production or proceeds thereof that will be credited to interests which are free of cost, such as royalties and production payments.

The unit area included in the Unit Agreement is of such size and shape as may be reasonably required for the conduct of the contemplated unit operations and the conduct thereof will have no adverse effect upon any other portions of the pool.



**IT IS THEREFORE ORDERED**

A. That the Petition of Luff to approve the operation of the lands described above as a Unit is granted and approved, and that the Unit is designated the “Clarkson Ranch Red River Unit.”

B. The Unit Agreement and Unit Operating Agreement submitted by Luff are hereby approved and adopted as the plan for unit operations of the Unit.

C. The Unit is hereby created, authorized, and approved effective May 1, 2019.

D. Luff Exploration Company is designated as the initial operator of the Unit.

E. Prior spacing orders of the Board for the Clarkson Ranch Field, including without limitation Order Nos. 9-1993, 14-1995, 6-2014, and 7-2017, are hereby amended to authorize operation of the Unit in accordance with this order, the Unit Agreement, and the Unit Operating Agreement.

F. Luff is hereby authorized as Unit Operator to drill horizontal or vertical wells at any location within the Unit subject only to a setback requirement that any vertical well or the horizontal component of any horizontal well open to the Unitized Formation be no closer than five hundred (500) feet to the boundary line of the Unit.

G. Before the commencement of any water injection into the Unitized Formation, Luff as Unit Operator shall make application for underground injection in accordance with the statutes and regulations of the State of South Dakota, including but not limited to ARSD Chapter 74:12:07, and obtain all necessary approvals.

H. The Unit Agreement and the Unit Operating Agreement as approved hereby shall govern operations for the Unit in all respects. If, pursuant to the terms of the Unit Operating Agreement, a working interest owner elects not to participate in a future Unit operation, Luff must obtain approval from the Board and comply with the “good faith attempt” and notice requirements of ARSD 74:12:10:04 before applying any risk penalty.

Dated and signed this 23<sup>rd</sup> day of April 2019.

A handwritten signature in blue ink, appearing to read 'S. Pirner', with a stylized flourish at the end.

Steven M. Pirner  
Secretary  
Department of Environment and Natural Resources