



DEPARTMENT of ENVIRONMENT
and NATURAL RESOURCES

JOE FOSS BUILDING
523 EAST CAPITOL
PIERRE, SOUTH DAKOTA 57501-3182

denr.sd.gov

May 6, 2019

Richard D. George, P.E.
Manager of Engineering
Luff Exploration Company
1580 Lincoln Street, Suite 850
Denver, CO 80203

Re: Case No. 2-2019 – Approval of Permit to Inject, Crooked Creek RRU F-3H well,
SE/4 NW/4 Section 3, Township 22N, Range 6E, Harding County

Dear Mr. George:

Thank you for your application filed March 22, 2019, requesting a permit to inject for the Crooked Creek RRU F-3H well to support the water flood in the "B" zone of the Red River Formation in the Crooked Creek Red River Unit for enhanced recovery of oil and gas. Your application indicates the injection water for the Crooked Creek RRU F-3H well will consist of fresh water produced from the Johnson B-16 water supply well in the Pete's Creek Field.

The department published a Notice of Recommendation for Case No. 2-2019 recommending approval of the application. The final date for intervention was April 24, 2019, and no parties petitioned the Board of Minerals and Environment for a hearing on the application by the deadline.

Therefore, in accordance with the Administrative Rules of South Dakota (ARSD) 74:12:07 and 74:12:09, approval of the application is hereby granted. The permit is conditioned on compliance with all applicable requirements of South Dakota Codified Laws 45-9 and ARSD 74:12. Please refer to the enclosed Notice of Recommendation for specific terms and conditions.

Thank you for your interest in protecting the water resources of the state.

Sincerely,

Steven M. Pirner
Secretary

Enclosure

STATE OF SOUTH DAKOTA
SECRETARY OF THE
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

<p>IN THE MATTER OF THE APPLICATION OF LUFF EXPLORATION COMPANY, DENVER, CO, FOR APPROVAL OF A PERMIT TO INJECT INTO THE CROOKED CREEK RRU F-3H WELL LOCATED IN THE SE1/4 NW1/4 SECTION 3, TOWNSHIP 22 NORTH, RANGE 6 EAST, IN THE CROOKED CREEK RED RIVER UNIT OF THE COREY BUTTE FIELD, HARDING COUNTY; APPROXIMATELY 23 MILES NORTHEAST OF BUFFALO, SD, TO SUPPORT THE WATER FLOOD IN THE "B" ZONE OF THE RED RIVER FORMATION IN THE CROOKED CREEK RED RIVER UNIT FOR ENHANCED RECOVERY OF OIL AND GAS.</p>	<p>NOTICE OF RECOMMENDATION FOR A PERMIT TO INJECT</p> <p>OIL AND GAS CASE NO. 2-2019</p>
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Notice is hereby given to the public and to all interested persons that pursuant to South Dakota Codified Laws (SDCL) Chapter 1-26 and Chapter 45-9 and further pursuant to the Administrative Rules of South Dakota (ARSD) 74:12:07 and 74:12:09, the following matter has come to the attention of the Secretary of the Department of Environment and Natural Resources, hereinafter "Secretary."

The Crooked Creek RRU F-3H well was completed with 2,022 feet of 9 5/8-inch steel surface casing, cemented to protect underground sources of drinking water, and 9,256 feet of 7-inch steel production casing, cemented to protect underground sources of drinking water. The injection zone will be in the "B" zone of the Red River Formation. Injection water will be fresh water from the Inyan Kara Formation produced from the Johnson B-16 water supply well in the Pete's Creek Field. All wells within the one-half mile area of review and maximum calculated radius of influence are constructed such that the injection into this well will not affect any underground sources of drinking water.

The requested maximum injection pressure is 1,700 pounds per square inch and the total requested injection volume is 2,510,000 barrels of water.

The Secretary recommends approval of the application with the following conditions:

- 1) Injection operations authorized under the permit to inject must be conducted in accordance with SDCL Chapter 45-9, ARSD 74:12 and any applicable orders or rules promulgated by the South Dakota Board of Minerals and Environment;
- 2) The total number of barrels injected during the life of this permit may not exceed 2,510,000 barrels of water;
- 3) The maximum injection rate must not exceed 1,250 barrels of water per day;
- 4) The life of the permit may not exceed 25 years;
- 5) The maximum pressure must not exceed 1,700 pounds per square inch surface injection pressure during injection operations;
- 6) Prior to the commencement of injection, a water quality analysis of the water produced from the Kelly and Gilbert water wells must be completed and submitted to the department for review;

- 7) Prior to the commencement of injection, a water compatibility analysis of the water to be injected and water from the injection formation at the Crooked Creek RRU F-3H well must be completed and submitted to the department for review. If the analysis indicates the waters are incompatible, action must be taken to prevent potential damage to the injection well or the injection formation;
- 8) A mechanical integrity test must be successfully conducted prior to the commencement of injection activity. The well must pass the mechanical integrity test at 1,000 pounds per square inch surface pressure. The operator is required to notify the Secretary a minimum of 72 hours prior to running a mechanical integrity test;
- 9) Once mechanical integrity is established, the well must be retested at least once every five years to ensure that mechanical integrity is maintained;
- 10) If an unsuccessful pressure test occurs, the operator must cease operations immediately if it is determined the injection will threaten any underground source of drinking water. If the failure is not threatening groundwater, the operator must cease operations within 48 hours after receipt of the department Secretary's notice, and take corrective action on the well as soon as feasible. Corrective action options include repairing the well so that a successful test result can be obtained, plugging and abandoning the well, or any other action approved by the department.

Authority for the Secretary to approve this application is contained in ARSD 74:12:07 and 74:12:09. Unless a person files a petition requesting a hearing on the above application pursuant to the provisions of ARSD 74:09:01 on or before April 24, 2019, the Secretary's recommendation will be considered final and the Secretary will approve the application in accordance with that recommendation.

The application and notice of recommendation are also posted on the department's website at: <http://denr.sd.gov/des/og/pubhearing.aspx> and <http://denr.sd.gov/public>. Additional information about this application is available from Mike Lees, Administrator, Minerals and Mining Program, Department of Environment and Natural Resources, 523 East Capitol Avenue, Pierre, SD 57501, telephone (605) 773-4201, email michael.lees@state.sd.us.

March 29, 2019



Steven M. Pirner
Secretary

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