



DEPARTMENT of ENVIRONMENT  
and NATURAL RESOURCES

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

denr.sd.gov

April 17, 2018

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

Re: Oil and Gas Case No. 3-2018 – Approval of Permit to Inject, Cave Hills M-13 SWD Well, SW/4 SW/4 Section 13, Township 22 North, Range 4 East, Harding County

Dear Mr. George:

Thank you for your application filed March 2, 2018, requesting a permit to inject for the Cave Hills M-13 SWD well for the purpose of injecting produced water into the Inyan Kara Formation at a depth of approximately 4,790 feet below land surface. Your application indicates the injection water for the Cave Hills M-13 SWD well will consist of water produced from Red River oil wells in the vicinity of the Clarkson Ranch Field.

The department published a Notice of Recommendation for Case No. 3-2018 recommending approval of the application. The final date for intervention was April 11, 2018, 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.

Please submit a cement bond log and an Inyan Kara water quality sample for the Cave Hills M-13 SWD well to the department at your earliest convenience so the department can coordinate U.S. EPA approval of the recommended Aquifer Exemption. Please note that EPA approval for the Aquifer Exemption must be obtained prior to commencement of injection at the Cave Hills M-13 SWD well.

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

IN THE MATTER OF THE APPLICATION OF LUFF EXPLORATION COMPANY, DENVER, CO, FOR APPROVAL OF A PERMIT TO INJECT PRODUCTION WATER INTO THE CAVE HILLS M-13 WELL LOCATED IN THE SW¼ SW¼ SECTION 13, TOWNSHIP 22 NORTH, RANGE 4 EAST, IN THE CLARKSON RANCH FIELD, HARDING COUNTY, ABOUT 19 MILES NORTH OF BUFFALO, SD.	NOTICE OF RECOMMENDATION FOR A PERMIT TO INJECT  OIL AND GAS CASE NO. 3-2018
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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 Cave Hills M-13 well was permitted for vertical completion under South Dakota Application for Permit to Drill (APD) No. 2076. Permit conditions under APD No. 2076 require 2,000 feet of 8 5/8-inch steel surface casing, cemented to protect underground sources of drinking water, and 4,970 feet of 5 1/2-inch steel production casing, cemented to protect underground sources of drinking water. The injection zone will be in the Inyan Kara Formation. Injection water will be produced water from the Red River Formation from oil wells in the vicinity of the Clarkson Ranch Field. All wells within the one-half mile area of review and maximum calculated radius of influence are constructed such that the injection into the Cave Hills M-13 well will not affect any underground sources of drinking water.

Water from the Inyan Kara Formation, near the proposed injection well, has a total dissolved solids content of less than 10,000 milligrams per liter; therefore, an aquifer exemption is required to conduct injection operations at this well. The Secretary recommends granting a 600-foot radius aquifer exemption in the Inyan Kara Formation around the proposed injection well. The Secretary has made this recommendation because the Inyan Kara Formation, near the proposed injection well, does not currently serve as a source of drinking water, is not expected to supply a public water system, and will not serve as a source of drinking water in the future because its location and depth make recovery of water for drinking water purposes economically impractical.

The requested maximum injection pressure is 1,200 pounds per square inch and the total requested injection volume is 7,300,000 cumulative 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 7,300,000 barrels of water;
- 3) The maximum injection rate must not exceed 2,000 barrels of water per day;
- 4) The life of the permit may not exceed 10 years;

- 5) The maximum pressure must not exceed 1,200 pounds per square inch surface injection pressure during injection operations;
- 6) Prior to the commencement of injection, a water compatibility analysis of the water to be injected and water from the injection formation at the Cave Hills M-13 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;
- 7) Prior to the commencement of injection, the Secretary's recommended Aquifer Exemption for this operation must be approved by the United States Environmental Protection Agency;
- 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 ground water, 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 11, 2018, 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, Environmental Scientist III, 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](mailto:michael.lees@state.sd.us).

March 16, 2018



Steven M. Pirner  
Secretary

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