

September 25, 2008

Memorandum

To: Don Peterson, AFM, Lands and Minerals, CFO

From: John S. Simitz, Geologist, Lands and Minerals, RFO

Subject: GeoSciences Technology Report for the SWD Exxon State No. 8 well

The BLM Carlsbad Field Office and the New Mexico Oil Conservation Division (NMOCD) asked this office to review data for the Application for Authorization to Inject salt water. The application was submitted to the NMOCD by Hinkle, Henley, Shanor and Martin, L.L. P. on behalf of Mesquite SWD, Inc. The application requests modifying the existing authorization to increase the volume of salt water disposed (SWD) into the well bore of the Exxon State No. 8 well located in the SW1/4SE1/4, section 15, T. 21S., R. 27 E., NMPM Eddy County New Mexico. The well was originally drilled as an oil well but was converted to SWD in 1977. The injection interval starts at 550 ft. the bottom of the packer into the open hole from 570 ft. to 695 ft. The well is located within the Magruder Yates Oil field.

The geologic structure, stratigraphy and geohydrologic report submitted in support of the modification was undertaken by Mr. Kay Havenor of GeoSciences Technology. Our review found the report to be accurate with some minor differences.

The top of the Capitan reef on the geophysical logs is approximately 50 ft. below the injection interval. It does not get much thicker to the southeast in the direction of dip. In fact some logs of the wells reviewed indicate thinning of the Yates which isn't unusual. However, this does not mean that the porosity of the injection interval grades into the Capitan Reef. The Capitan Reef in this area exhibits none too little porosity in this area and does not appear to be hydrologically connected to the Capitan Reef. This can be said for much of the Capitan Reef. The problem with most SWD wells along the reef is in identifying the top of the Capitan Reef. It is our opinion that the type log in Mr. Havenor's report correctly identifies the top of the Capitan Reef.

Some Seven Rivers formation can be identified between the base of the Yates and the top of the Capitan Reef. However, there are areas to the east where the Seven Rivers formation is much harder to identify. The Yates and Seven Rivers formation in the immediate area to the southeast of the Exxon State No. 8 well contain several beds between the injection interval and the reef which exhibit low to zero porosity. Given this and the fact the top of the reef exhibits zero to minor porosity it is unlikely the reef will be contaminated by the injection of salt water into the Yates formation.

In the same study, the author states there is no evidence to suggest faulting and fracturing occurs in the area which may hydrologically connect the injection interval with the Capitan Reef. This is a true statement because a loss of porosity in the injection interval occurs in several wells and the low to zero porosity in the bedrock between the two prevents the connectivity.

Additionally an acoustic log for a well in sec. 22 penetrating both the injection interval and the

reef shows some minor cycle skip which sometimes suggests fractures are present. The cycle skip signal occurs well below the injection interval and is separated from the zone by a 10 thick non-porous dolostone at the base of the injection interval. However, it is not certain that the signal can be used as an indicator of fractures because of the scarcity of acoustic well logs in the area to make any sort of quantitative or qualitative statement.

Based on the review of the GeoSciences Technology report and our observations of the geophysical well logs this office recommends that the BLM does not objection to the modification of the original application.

