

## Goetze, Phillip, EMNRD

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**From:** Goetze, Phillip, EMNRD  
**Sent:** Tuesday, October 29, 2013 10:20 AM  
**To:** 'Jesse Parkison'; Dade, Randy, EMNRD; Inge, Richard, EMNRD  
**Cc:** Terri Stathem; Ezeanyim, Richard, EMNRD  
**Subject:** RE: Vermejo SWD #1 30-015-40644 (SWD-1321-0)

Jesse:

I have reviewed the information submitted to the Bureau regarding the two items listed in the Administrative Order SWD-1321 as prerequisites for approval of injection in this well (swab test for hydrocarbon and water analysis). The information includes a letter report, well completion diagram, a cross-section utilizing information of Judah Oil's Red Lake State SWD #1 (SWD-332-A; formerly Lucas Store "KT" State Com #1), and water analysis for proposed injection from Blinebry/Paddock producers.

The information in the letter report concerning the well completion supports the lack of any potential for hydrocarbon shows had a swab test been conducted. The presentation of the cross-section and the associate discussion regarding geology and formation characteristics of the Cisco in this area is adequate to provide a correlation of water quality. With the information provided by Cimarex, the Bureau has decided that the two prerequisites requirements have been sufficiently addressed and that the District may proceed with approval for injection if there are no remaining issues to be resolved. The report along with this e-mail will be posted in the SWD order image file. If there questions concerning this subject, please contact me at your convenience. PRG

Phillip R. Goetze, P.G.

Engineering Bureau, Oil Conservation Division  
1220 South St. Francis Dr., Santa Fe, NM 87505  
O: 505.476.3466 F: 505.476.3462

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**From:** Jesse Parkison [<mailto:jparkison@cimarex.com>]  
**Sent:** Friday, October 25, 2013 4:49 PM  
**To:** Goetze, Phillip, EMNRD  
**Cc:** Terri Stathem  
**Subject:** Vermejo SWD #1 30-015-40644 (SWD-1321-0)

Mr. Goetze

Thank you for speaking with us today. I hope the letter and attachments can answer all of your questions. In regard to the salinity, we did not run a resistivity log on our well. We only ran a neutron density and gamma ray. As such I cannot compare the log characteristics of the two wells. Please let me know if there is another method by which I could show a salinity comparison, and we will be happy to run the numbers.

Jesse Parkison

Cimarex – Permian Production Engineer  
Direct 432-620-1941  
Fax 432-571-7832  
Cell 432-312-1274  
[JParkison@Cimarex.com](mailto:JParkison@Cimarex.com)

Cimarex Energy Co.  
600 N. Marienfeld St.  
Suite 600  
Midland, Texas 79701  
PHONE 432.571.7800



Mr. Phillip Goetze

Below is a list of highlights from the completion of the Vermejo SWD. We believe the report shows that our perforation connected us to a pressurized injection zone caused by an offset SWD (about ½ mile South).

- When the well was perforated (8155-8500' gross interval), we saw 800# at the surface. The next day we bled off 450bbbls of water, flowing at 350# on a 2" choke. Since this flow-back was 100bbbls over the casing volume, there was no need to swab the well.
- The well was then loaded with 450bbbls of 9.9# brine, and still had 50# surface pressure. That calculates to a BHP of 4246# at top perforation.
- 238bbbls of 15% HCl acid with granulated rock salt was used to break down the formation. Then on 12/12/2012 we received verbal permission from the BLM and OCD to perform an injection test with brine water. Afterwards the well was flowed back on 1" choke @ 640#.
- The next day our flow-back tank read 280ppm H2S. After cementing the 7" casing string, we saw similar high pressures while drilling through the injection zone.
- We performed a second injection test because the results from the first were not encouraging. This second test yielded the same results. The well showed a shut-in pressure throughout these pumps. We later killed the well with 10.5# brine before running the injection tubing.

This Cisco Dolomite target would only be over-pressured if it were being injected into. The offset SWD in the area in fact encountered a "cavernous substructure strata" in the Cisco formation. This formation caused heavy losses, and only after 15 days of pumping LCM and 3400 bbls of cement was the well regained. It is because of this data that we are certain the formation in which we are injecting is correlative to the injection zone of the offset SWD. Therefore we are also certain that any water analysis taken either after perforations or after the acid breakdown would match up with the water being injected at the offset SWD. This water is produced from the numerous Blinbry/Paddock wells in the area and is in our experience, heavy/sour brine water. An analysis of that water is included. The Vermejo well bore sketch and a cross section showing the perforation correlation is also attached.

I sincerely apologize for the oversight on my part. The approved injection authority clearly states that swab and water test must be performed, but that information was not made clear to our completions department. I assure the OCD that Cimarex will do everything to make sure this doesn't happen again, including establishing a completion checklist to insure that all conditions of approval are followed precisely. These SWDs are extremely valuable to our production operations especially in the high water production areas, and our ability to produce the maximum recoverable reserves hinges on affordable water disposal.

Thanks in advance,

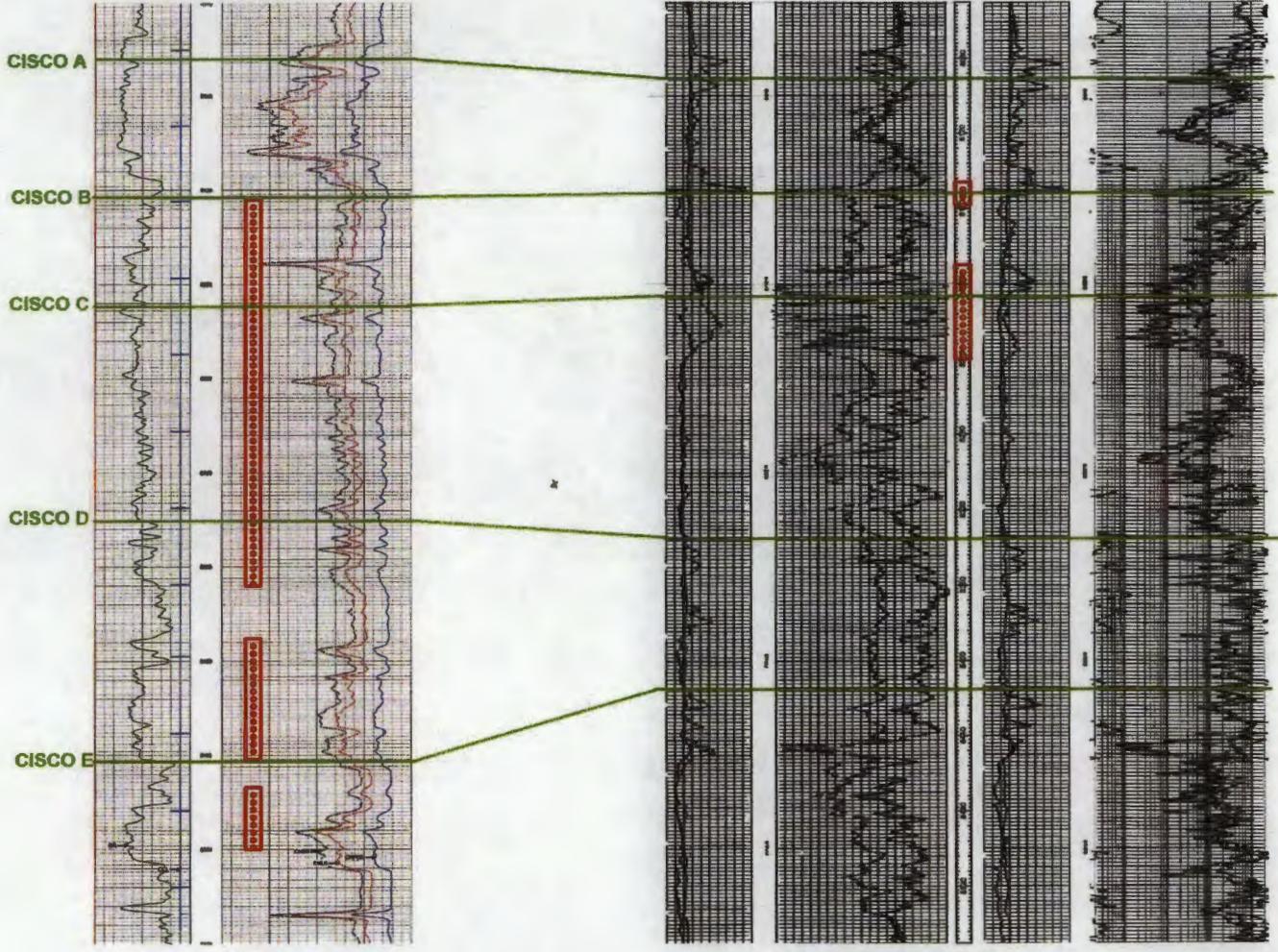
Jesse Parkison  
Cimarex – Permian Production Engineer  
Direct 432-620-1941  
Cell 432-312-1274

CIMAREX ENERGY CO.  
VERMEJO #3SWD 1  
900 F8L 2530 FEL  
T17S R28E S16

ELEV\_KB : 3,677  
3001540644

JUDAH OIL  
LUCS STOKKT STT CM #1  
1960 F8L 1960 FEL  
T17S R28E S22

SWD  
ELEV\_KB : 3,605  
30015228930000



TD : 6,700

TD : 10,413

13-3/8" 48# J55 csg @ 362'  
Cmt w/ 370 sx, TOC - SURF

TOC @ 160'

9-5/8" 36# J55 csg @ 2105'  
Cmt w/ 770 sx, TOC - SURF

WS 7422'-7434'  
225 sx cement Kick Off Plug  
KOP @ 7,420'

Liner Hanger @ 8009'

4-1/2" Hornet Packer @ 8122'

4-1/2" 11.6# I80 BTC Liner 8,039'-8,691'  
Cmt w/ 50 sxs TOC @ TOL

| Quantity | Description                            | Length  | Setting Depth |
|----------|--|---------|---------------|
|          | KB                                     | 18.00   | 18.00         |
| 1        | Tbg Sub Stainless Steel                | 1.00    | 19.00         |
| 251      | 3-1/2" 9.3# L80 EUE Fiber LinedTbg     | 7894.40 | 7913.40       |
| 1        | X-Over Sub 3-1/2" Box X 2-3/8" Pin     | 0.80    | 7914.20       |
| 6        | 2-3/8" 4.7# L80 8rd EUE Fiber LinedTbg | 197.30  | 8111.50       |
| 1        | X-Over Sub 2-3/8" Box X 2-3/8" Pin     | 0.71    | 8112.21       |
| 1        | On/Off Tool                            | 1.50    | 8113.71       |
| 1        | Profile Nipple                         | 1.00    | 8114.71       |
| 1        | 4-1/2" Hornet Packer                   | 6.78    | 8121.49       |
| 1        | Tbg Sub                                | 8.10    | 8129.59       |
| 1        | BX-Nipple w/No-Go                      | 0.88    | 8130.47       |
| 1        | LWEG                                   | 0.45    | 8130.92       |

DV Tool @ 6786'

7" 26# L80 csg @ 8,130'  
Cmt w/ 830 sx, TOC @ 160'

Perf'd Cisco:  
8155'-8360', 8388'-8452' & 8476'-8500' (586 holes).

PBTD:

TVD: 8699

MD: 8700'

North Permian Basin Region  
P.O. Box 740  
Sundown, TX 79372-0740  
(806) 229-8121  
Lab Team Leader - Sheila Hernandez  
(432) 495-7240

## Water Analysis Report by Baker Petrolite

|                                  |   |
|----------------------------------|---|
| Company: CIMAREX ENERGY          | Sales RDT: 33521                                |
| Region: PERMIAN BASIN            | Account Manager: STEVE HOLLINGER (575) 910-9393 |
| Area: DAYTON, NM                 | Sample #: 559222                                |
| Lease/Platform: MARACAS 22 STATE | Analysis ID #: 115988                           |
| Entity (or well #): 1            | Analysis Cost: \$90.00                          |
| Formation: UNKNOWN               |   |
| Sample Point: WELLHEAD           |   |

| Summary                          | Analysis of Sample 559222 @ 75 F |         |         |            |         |         |
|----------------------------------|----------------------------------|---------|---------|------------|---------|---------|
|                                  | Anions                           | mg/l    | meq/l   | Cations    | mg/l    | meq/l   |
| Sampling Date: 12/29/11          | Chloride:                        | 90139.0 | 2542.49 | Sodium:    | 55887.9 | 2430.99 |
| Analysis Date: 01/18/12          | Bicarbonate:                     | 488.0   | 8.      | Magnesium: | 560.0   | 46.07   |
| Analyst: STACEY SMITH            | Carbonate:                       | 0.0     | 0.      | Calcium:   | 3079.0  | 153.64  |
| TDS (mg/l or g/m3): 155048.2     | Sulfate:                         | 4425.0  | 92.13   | Strontium: | 58.0    | 1.32    |
| Density (g/cm3, tonne/m3): 1.106 | Phosphate:                       |         |         | Barium:    | 0.1     | 0.      |
| Anion/Cation Ratio: 1            | Borate:                          |         |         | Iron:      | 8.0     | 0.29    |
| Carbon Dioxide: 460 PPM          | Silicate:                        |         |         | Potassium: | 403.0   | 10.31   |
| Oxygen:                          | Hydrogen Sulfide:                |         | 85 PPM  | Aluminum:  |         |         |
| Comments:                        | pH at time of sampling:          |         | 6.1     | Chromium:  |         |         |
| RESISTIVITY: .054 OHM-M @ 75°F   | pH at time of analysis:          |         |         | Copper:    |         |         |
|                                  | pH used in Calculation:          |         | 6.1     | Lead:      |         |         |
|                                  |                                  |         |         | Manganese: | 0.200   | 0.01    |
|                                  |                                  |         |         | Nickel:    |         |         |

| Conditions |              | Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl |        |   |        |                             |        |                             |        |                          |        |                       |
|------------|--------------|---|--------|---|--------|-----------------------------|--------|-----------------------------|--------|--------------------------|--------|-----------------------|
| Temp       | Gauge Press. | Calcite CaCO <sub>3</sub>   |        | Gypsum CaSO <sub>4</sub> ·2H <sub>2</sub> O |        | Anhydrite CaSO <sub>4</sub> |        | Celestite SrSO <sub>4</sub> |        | Barite BaSO <sub>4</sub> |        | CO <sub>2</sub> Press |
|            |              | Index   | Amount | Index                                       | Amount | Index                       | Amount | Index                       | Amount | Index                    | Amount |                       |
| 80         | 0            | -0.01   | 0.00   | 0.10  | 345.97 | 0.10                        | 285.70 | 0.08                        | 6.63   | 0.44                     | 0.00   | 2.91                  |
| 100        | 0            | 0.08  | 8.14   | 0.03  | 108.19 | 0.10                        | 280.27 | 0.06                        | 4.82   | 0.24                     | 0.00   | 3.6                   |
| 120        | 0            | 0.19  | 17.48  | -0.03                                       | 0.00   | 0.12                        | 340.85 | 0.04                        | 3.62   | 0.06                     | 0.00   | 4.29                  |
| 140        | 0            | 0.29  | 27.12  | -0.07                                       | 0.00   | 0.17                        | 452.36 | 0.04                        | 3.32   | -0.09                    | 0.00   | 4.97                  |

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO<sub>2</sub> pressure is actually the calculated CO<sub>2</sub> fugacity. It is usually nearly the same as the CO<sub>2</sub> partial pressure.

# Scale Predictions from Baker Petrolite

Analysis of Sample 559222 @ 75 °F for CIMAREX ENERGY, 01/18/12

