KOLAR Document ID: 1765189

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

Form U3C
June 2015
**Form must be Typed**
**Form must be completed on a per well basis**

# ANNUAL REPORT OF PRESSURE MONITORING, FLUID INJECTION AND ENHANCED RECOVERY

***Complete all blanks - add pages if needed. Copy to be retained for five (5) years after filing date.***

OPERATOR: License # 7311
Name: Shakespeare Oil Co., Inc.
Address 1: 202 W MAIN ST
Address 2:
City: SALEM State: IL Zip: 62881 + 1519
Contact Person: Joseph McDanel
Phone: ( 618 ) 548-1585
Lease Name: CALE
Well Number: 3-27

API No.: 15-063-22412-00-00
Permit No: D34243.0
Reporting Year: 2023
*(January 1 to December 31)*

SW - NE - SW - NE (Q/Q/Q/Q) Sec. 27 Twp. 11 S. R. 31 ☐ E ☑ W
1940 feet from ☑ N / ☐ S Line of Section
1965 feet from ☑ E / ☐ W Line of Section
County: Gove

**I. Injection Fluid:**

Type *(Pick one)*: ☐ Fresh Water ☐ Treated Brine ☐ Untreated Brine ☑ Water/Brine
Source: ☑ Produced Water ☐ Other *(Attach list)*
Quality: Total Dissolved Solids: 132883 mg/l Specific Gravity: 1.0815 Additives:
*(Attach water analysis, if available)*

**II. Well Data:**

Maximum Authorized Injection Pressure: 0 psi Injection Zone: CEDAR HILLS
Maximum Authorized Injection Rate: 500 barrels per day
Total Number of Enhanced Recovery Injection Wells Covered by this Permit: _____ *(Include TA's)*

**III.**

| Month: | Total Fluid Injected BBL | Maximum Fluid Pressure | Total Gas Injected MCF | Maximum Gas Pressure | # Days of Injection |
|---|---|---|---|---|---|
| January | 6816 | 0 | 0 | 0 | 31 |
| February | 6531 | 0 | 0 | 0 | 28 |
| March | 6958 | 0 | 0 | 0 | 31 |
| April | 6826 | 0 | 0 | 0 | 30 |
| May | 6838 | 0 | 0 | 0 | 31 |
| June | 6803 | 0 | 0 | 0 | 30 |
| July | 6774 | 0 | 0 | 0 | 31 |
| August | 6906 | 0 | 0 | 0 | 31 |
| September | 6608 | 0 | 0 | 0 | 30 |
| October | 6786 | 0 | 0 | 0 | 31 |
| November | 6847 | 0 | 0 | 0 | 30 |
| December | 6814 | 0 | 0 | 0 | 31 |
| ***TOTAL*** | 81507 | | 0 | | |

Submitted Electronically

Baker Hughes

**Central Area Laboratory**
12701 N. Santa Fe Ave, Suite 151
Oklahoma City, Oklahoma 73114

Upstream Chemicals

**REPORT DATE:** 2/28/2024

# COMPLETE WATER ANALYSIS REPORT SSP v.2010

| | | | |
|---|---|---|---|
| **CUSTOMER:** | SHAKESPEARE OIL | **ACCOUNT REP:** | BRETT J SUTER |
| **DISTRICT:** | KANSAS | **SAMPLE ID:** | 202410001359 |
| **AREA/LEASE:** | CALE | **SAMPLE DATE:** | 2/9/2024 |
| **SAMPLE POINT NAME** | CALE 3 | **ANALYSIS DATE:** | 2/23/2024 |
| **SITE TYPE:** | WELL SITES | **ANALYST:** | BS |
| **SAMPLE POINT DESCRIPTION:** | TANK | | |
| **CUSTOMER SAMPLE POINT ID:** | | | |

## SHAKESPEARE OIL, CALE, CALE 3

### FIELD DATA

| | |
|---|---|
| **Initial Temperature (°F):** | 150 |
| **Final Temperature (°F):** | 50 |
| **Initial Pressure (psi):** | 100 |
| **Final Pressure (psi):** | 15 |
| **pH:** | |
| **pH at time of sampling:** | 7.0 |

| **ALKALINITY BY TITRATION:** | **mg/L** | **meq/L** |
|---|---|---|
| **Bicarbonate ($HCO_3^-$):** | 440.0 | 7.2 |
| **Carbonate ($CO_3^{2-}$):** | ND | |
| **Hydroxide ($OH^-$):** | ND | |

| | |
|---|---|
| **aqueous $CO_2$ (ppm):** | 120.0 |
| **aqueous $H_2S$ (ppm):** | 20.0 |
| **aqueous O2 (ppb):** | ND |
| **Calculated TDS (mg/L):** | 132883 |
| **Density/Specific Gravity (g/cm³):** | 1.0815 |
| **Measured Specific Gravity** | ND |
| **Conductivity (mmhos):** | ND |
| **Resistivity:** | ND |
| **MCF/D:** | No Data |
| **BOPD:** | No Data |
| **BWPD:** | No Data |

### ANALYSIS OF SAMPLE

| **ANIONS:** | **mg/L** | **meq/L** |
|---|---|---|
| **Chloride ($Cl^-$):** | 81793.0 | 2307.3 |
| **Sulfate ($SO_4^{2-}$):** | 4514.0 | 94.0 |
| **Borate ($H_3BO_3$):** | 131.4 | 2.1 |
| **Fluoride ($F^-$):** | ND | |
| **Bromide ($Br^-$):** | ND | |
| **Nitrite ($NO_2^-$):** | ND | |
| **Nitrate ($NO_3^-$):** | ND | |
| **Phosphate ($PO_4^{3-}$):** | 0.1 | 0.0 |
| **Silica ($SiO_2$):** | ND | |

| **ORGANIC ACIDS:** | **mg/L** | **meq/L** |
|---|---|---|
| **Formic Acid:** | ND | |
| **Acetic Acid:** | ND | |
| **Propionic Acid:** | ND | |
| **Butyric Acid:** | ND | |
| **Valeric Acid:** | ND | |

| | |
|---|---|
| **Anion/Cation Ratio:** | 1.19 |

| **CATIONS:** | **mg/L** | **meq/L** |
|---|---|---|
| **Sodium ($Na^+$):** | 43575.4 | 1896.2 |
| **Potassium ($K^+$):** | 476.9 | 12.2 |
| **Magnesium ($Mg^{2+}$):** | 462.2 | 38.0 |
| **Calcium ($Ca^{2+}$):** | 1547.3 | 77.2 |
| **Strontium ($Sr^{2+}$):** | 65.7 | 1.5 |
| **Barium ($Ba^{2+}$):** | 0.1 | 0.0 |
| **Iron ($Fe^{2+}$):** | 7.9 | 0.3 |
| **Manganese ($Mn^{2+}$):** | 0.1 | 0.0 |
| **Lead ($Pb^{2+}$):** | ND | |
| **Zinc ($Zn^{2+}$):** | 0.4 | 0.0 |
| **Aluminum ($Al^{3+}$):** | ND | |
| **Chromium ($Cr^{3+}$):** | ND | |
| **Cobalt ($Co^{2+}$):** | ND | |
| **Copper ($Cu^{2+}$):** | ND | |
| **Molybdenum ($Mo^{2+}$):** | ND | |
| **Nickel ($Ni^{2+}$):** | ND | |
| **Tin ($Sn^{2+}$):** | ND | |
| **Titanium ($Ti^{2+}$):** | ND | |
| **Vanadium ($V^{2+}$):** | ND | |
| **Zirconium ($Zr^{2+}$):** | ND | |
| **Lithium (Li):** | ND | |
| **Total Hardness:** | 5848 | N/A |

**ND = Not Determined**

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

| **Conditions** | | **Barite ($BaSO_4$)** | | **Calcite ($CaCO_3$)** | | **Gypsum ($CaSO_4 \cdot 2H_2O$)** | | **Anhydrite ($CaSO_4$)** | |
|---|---|---|---|---|---|---|---|---|---|
| **Temp** | **Press.** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** |
| 50°F | 15 psi | 0.65 | 0.065 | 0.75 | 56.215 | -0.14 | 0.000 | -0.43 | 0.000 |
| 61°F | 24 psi | 0.55 | 0.061 | 0.79 | 58.276 | -0.12 | 0.000 | -0.37 | 0.000 |
| 72°F | 34 psi | 0.46 | 0.055 | 0.83 | 61.358 | -0.11 | 0.000 | -0.32 | 0.000 |
| 83°F | 43 psi | 0.38 | 0.049 | 0.88 | 64.623 | -0.10 | 0.000 | -0.27 | 0.000 |
| 94°F | 53 psi | 0.29 | 0.042 | 0.94 | 67.839 | -0.10 | 0.000 | -0.21 | 0.000 |
| 106°F | 62 psi | 0.22 | 0.033 | 1.00 | 71.337 | -0.09 | 0.000 | -0.16 | 0.000 |
| 117°F | 72 psi | 0.15 | 0.024 | 1.06 | 74.694 | -0.09 | 0.000 | -0.11 | 0.000 |
| 128°F | 81 psi | 0.08 | 0.014 | 1.12 | 77.774 | -0.09 | 0.000 | -0.06 | 0.000 |
| 139°F | 91 psi | 0.02 | 0.004 | 1.18 | 80.614 | -0.09 | 0.000 | 0.00 | 0.000 |
| 150°F | 100 psi | -0.04 | 0.000 | 1.24 | 83.245 | -0.08 | 0.000 | 0.06 | 124.706 |

| **Conditions** | | **Celestite ($SrSO_4$)** | | **Halite (NaCl)** | | **Iron Sulfide (FeS)** | | **Iron Carbonate ($FeCO_3$)** | |
|---|---|---|---|---|---|---|---|---|---|
| **Temp** | **Press.** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** | **Index** | **Amt (ptb)** |
| 50°F | 15 psi | 0.24 | 20.089 | -1.22 | 0.000 | 2.69 | 4.355 | 0.02 | 0.247 |
| 61°F | 24 psi | 0.24 | 20.487 | -1.22 | 0.000 | 2.58 | 4.351 | 0.08 | 0.876 |
| 72°F | 34 psi | 0.25 | 20.729 | -1.23 | 0.000 | 2.51 | 4.348 | 0.16 | 1.617 |
| 83°F | 43 psi | 0.25 | 20.862 | -1.24 | 0.000 | 2.46 | 4.346 | 0.24 | 2.285 |
| 94°F | 53 psi | 0.25 | 20.929 | -1.24 | 0.000 | 2.42 | 4.345 | 0.32 | 2.846 |
| 106°F | 62 psi | 0.25 | 20.965 | -1.25 | 0.000 | 2.40 | 4.344 | 0.41 | 3.346 |
| 117°F | 72 psi | 0.25 | 21.002 | -1.26 | 0.000 | 2.39 | 4.343 | 0.49 | 3.748 |
| 128°F | 81 psi | 0.25 | 21.067 | -1.26 | 0.000 | 2.38 | 4.343 | 0.57 | 4.063 |
| 139°F | 91 psi | 0.25 | 21.181 | -1.26 | 0.000 | 2.38 | 4.343 | 0.64 | 4.312 |
| 150°F | 100 psi | 0.26 | 21.360 | -1.27 | 0.000 | 2.37 | 4.343 | 0.71 | 4.511 |

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

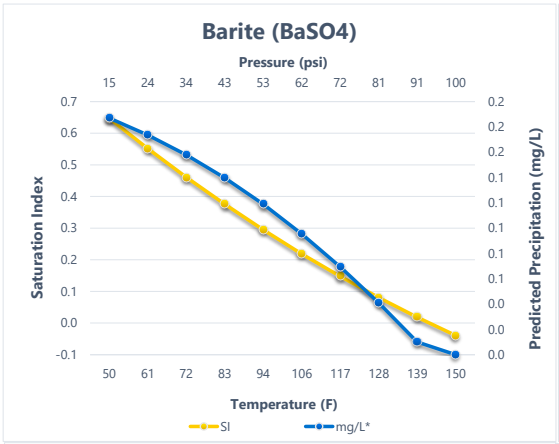
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.

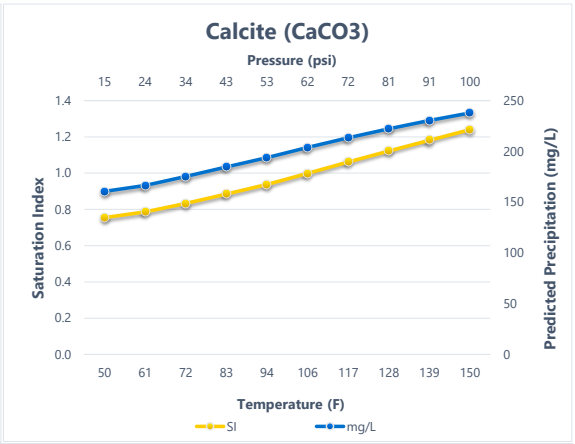
Note 3: Saturation Index predictions on this sheet use pH and alkalinity; $\%CO_2$ is not included in the calculations.

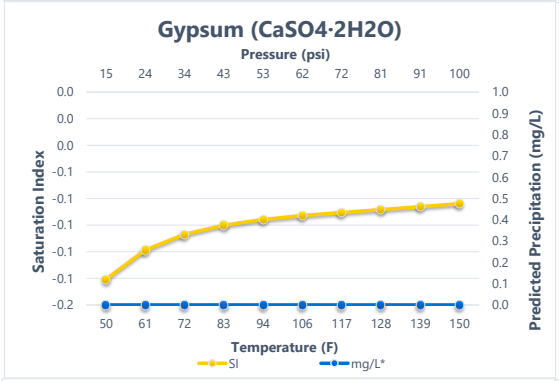
EESI ScaleSoftPitzer™ SSP2010

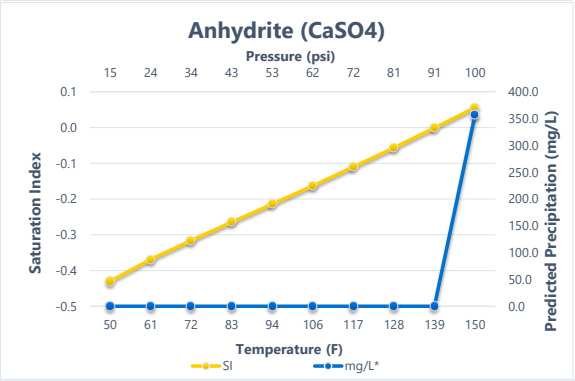
Comments:

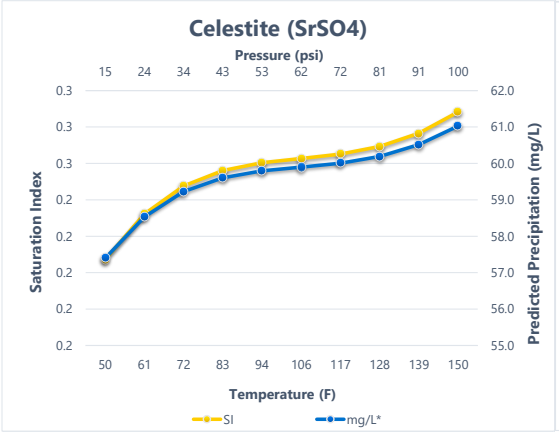
**SAMPLE ID: 202410001359 SHAKESPEARE OIL, CALE, CALE 3**

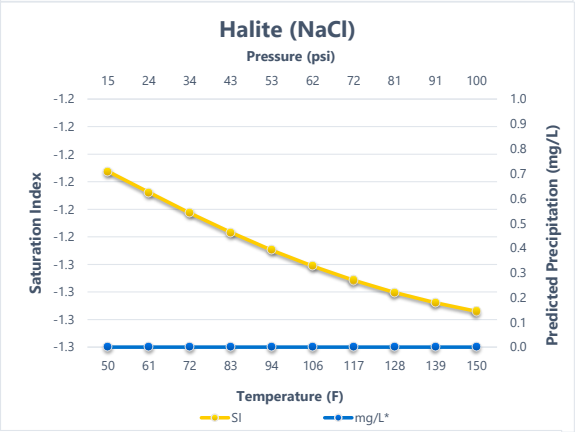


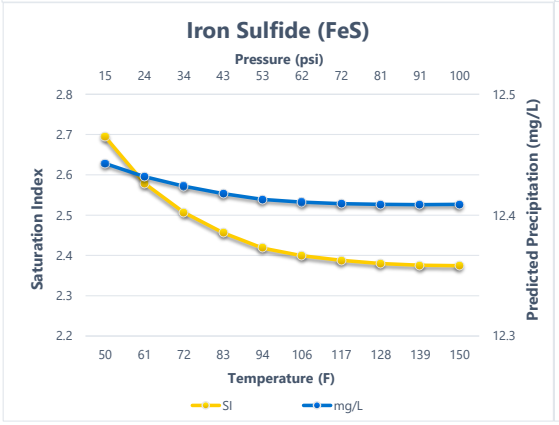



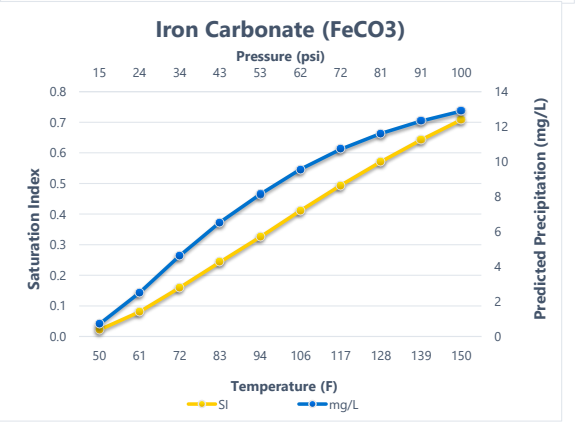

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