

KANSAS CORPORATION COMMISSION OIL & GAS CONSERVATION DIVISION

1097673

Form ACO-4 Form must be typed March 2009

APPLICATION FOR COMMINGLING OF Commingling ID # _ PRODUCTION (K.A.R. 82-3-123) OR FLUIDS (K.A.R. 82-3-123a)

| OPERATOR: License # | | API No. 15 | | | | |
|-------------------------------------|--|---------------------------|------------------------|-------------------------|--|--|
| Name: | | Spot Description: | | | | |
| Address | 1: | ; | Sec Twp S. R. | East West | | |
| Address | 2: | | Feet from North / _ | South Line of Section | | |
| City: | | | Feet from East / _ | West Line of Section | | |
| Contact F | Person: | County: | | | | |
| Phone: | () | Lease Name: | Well #: | | | |
| 1. | Name and upper and lower limit of each production interval to be con | nmingled: | | | | |
| | Formation: | (Perfs): | | | | |
| | Formation: | (Perfs): | | | | |
| | Formation: | (Perfs): | | | | |
| | Formation: | (Perfs): | | | | |
| | Formation: | (Perfs): | | | | |
| | | | | | | |
| 2. | Estimated amount of fluid production to be commingled from each int | | | | | |
| | Formation: | | MCFPD: | | | |
| | Formation: | BOPD: | MCFPD: | BWPD: | | |
| | Formation: | BOPD: | MCFPD: | BWPD: | | |
| | Formation: | BOPD: | MCFPD: | BWPD: | | |
| | Formation: | BOPD: | MCFPD: | BWPD: | | |
| □ 3.□ 4. | Plat map showing the location of the subject well, all other wells on the subject well, and for each well the names and addresses of the less signed certificate showing service of the application and affidavit of process | essee of record or opera | ator. | in a 1/2 mile radius of | | |
| For Com | mingling of PRODUCTION ONLY, include the following: | | | | | |
| <u> </u> | Wireline log of subject well. Previously Filed with ACO-1: Yes [| No | | | | |
| ☐ 6. | Complete Form ACO-1 (Well Completion form) for the subject well. | | | | | |
| For Com | mingling of FLUIDS ONLY, include the following: | | | | | |
| | Well construction diagram of subject well. | | | | | |
| 8. | Any available water chemistry data demonstrating the compatibility o | f the fluids to be commir | ngled. | | | |
| current in mingling i | IT: I am the affiant and hereby certify that to the best of my formation, knowledge and personal belief, this request for comstrue and proper and I have no information or knowledge, which stent with the information supplied in this application. | Sub | omitted Electronically | , | | |

KCC Office Use Only

Denied Approved

15-Day Periods Ends:

Approved By:

Date:

Protests may be filed by any party having a valid interest in the application. Protests must be in writing and comply with K.A.R. 82-3-135b and must be filed wihin 15 days of publication of the notice of application.

| - | Α | В | С | D | Е | F | G | Н | 1 | | K |
|--|--|--|---|--|--|--|--|--|---|---|-----------------|
| 1 | Produced Fluids # | В | 1 | 2 | 3 | 4 | 5 | 11 | • | <u> </u> | |
| | Parameters | Units | Input | Input | Input | Input | Input | | Click he | re | Click |
| 3 | Select the brines | Select fluid | | Ī | | V | Ī | Mixed brine: | to run SS | - | |
| 4 | Sample ID | by checking | | | | | | Cell H28 is | to ruii oc | • | Click |
| 5 | Date | the box(es), | 3/19/2012 | 3/4/2012 | 3/14/2012 | 1/20/2012 | 1/20/2012 | STP calc. pH. | ———— | | |
| 6 | Operator | Row 3 | PostRock | PostRock | PostRock | PostRock | PostRock | Cells H35-38 | | | Click |
| 7 | Well Name | | Ward Feed | Ward Feed | Clinesmith | Clinesmith | Clinesmith | are used in | Goal Seek | SSP | |
| 8 | Location | | #34-1 | #4-1 | #5-4 | #1 | #2 | mixed brines | 0.00 | | Click |
| 9 | Field | | CBM | CBM | Bartles | Bartles | Bartles | calculations. | | | |
| 10 | Na ⁺ | (mg/l)* | 19,433.00 | 27,381.00 | 26,534.00 | 25689.00 | 24220.00 | 24654.20 | Initial(BH) | Final(WH) | SI/SR |
| 11 | K ⁺ (if not known =0) | (mg/l) | | | | | | 0.00 | Saturation Index | values | (Final-Initial) |
| | Mg ²⁺ | (mg/l) | 1,096.00 | 872.00 | 1,200.00 | 953.00 | 858.00 | 995.91 | | lcite | |
| | Ca ²⁺ | (mg/l) | 1,836.00 | 2,452.00 | 2,044.00 | 1920.00 | 1948.00 | 2040.23 | -0.73 | -0.60 | 0.13 |
| | Sr ²⁺ | | 1,050.00 | 2,432.00 | 2,044.00 | 1720.00 | 1740.00 | | | | 0.13 |
| | Ba ²⁺ | (mg/l) | | | | | | 0.00 | Da | rite | |
| ., | | (mg/l) | | | | | | 0.00 | | | |
| | Fe ²⁺ | (mg/l) | 40.00 | 21.00 | 18.00 | 82.00 | 90.00 | 50.21 | | lite | |
| | Zn ²⁺ | (mg/l) | | | | | | 0.00 | -1.77 | -1.80 | -0.03 |
| 18 | Pb ²⁺ | (mg/l) | | | | | | 0.00 | Gyp | sum | |
| 19 | Cl | (mg/l) | 36,299.00 | 48,965.00 | 47,874.00 | 45632.00 | 43147.00 | 44388.44 | -3.19 | -3.18 | 0.00 |
| 20 | SO ₄ ²⁻ | (mg/l) | 1.00 | 1.00 | 8.00 | 1.00 | 1.00 | 2.40 | Hemil | ıydrate | |
| 21 | F. | (mg/l) | | | | | | 0.00 | -3.96 | -3.90 | 0.06 |
| | Br' | (mg/l) | | | | | | 0.00 | | ydrite | |
| | SiO2 | (mg/l) SiO2 | | | | | | 0.00 | -3.47 | -3.36 | 0.12 |
| _ | HCO3 Alkalinity** | (mg/l as HCO3) | 190.00 | 234.00 | 259.00 | 268.00 | 254.00 | 241.03 | | estite | 0,12 |
| | CO3 Alkalinity | (mg/l as CO3) | 170.00 | 434.00 | 237,00 | 200.00 | 234.00 | 241.03 | Cen | | |
| | Carboxylic acids** | (mg/l) | | | | | | 0.00 | Inor 6 | Sulfide | |
| 27 | Ammonia | (mg/L) NH3 | | | | | | 0.00 | -0.16 | -0.22 | -0.06 |
| _ | | | | | | | | | | | -0.00 |
| | Borate | (mg/L) H3BO3 | | | | | | 0.00 | Zinc | Sulfide | |
| | TDS (Measured) | (mg/l) | 4.040 | 4.0=4 | | | | 72781 | ~ | | |
| | Calc. Density (STP) CO ₂ Gas Analysis | (g/ml) | 1.038 19.97 | 1.051 18.76 | 1.050 22.41 | 1.048 35.53 | 1.045 | 1.047 | Calcium | fluoride | |
| | - , | (%) | | 0.0292 | | | 33.79 | 26.16 | I C. | -l | |
| | H ₂ S Gas Analysis*** Total H2Saq | (%) | 0.0289 | 1.00 | 0.0296 | 0.0306 | 0.0151 0.50 | 0.0269 | -0.74 | rbonate -0.51 | 0.23 |
| _ | _ | (mgH2S/l) | 1.00 5.67 | 5.76 | 1.00 5.72 | 1.00 5.54 | 5.55 | 5.63 | | eeded (mg/L) | 0.23 |
| 34 | pH, measured (STP) | pH 0-CO2%+Alk, | 5.07 | 5./0 | 5.72 | 5.54 | 5.55 | 5.03 | Calcite | NTMP | |
| | Choose one option | | | | | | | | Calcite | NIMI | |
| 35 | to calculate SI? | 2-CO2%+pH | 0 | 0 | 0 | 0 | 0 | | | | |
| 36 | Gas/day(thousand cf/day) | (Mcf/D) | | | | | | 0 | 0.00 | 0.00 | |
| | Oil/Day | (B/D) | 0 | 0 | 1 | 1 | 1 | 4 | Barite | BHPMP | |
| | Water/Day | (B/D) | 100 | 100 | 100 | 100 | 100 | 500 | 0.00 | 0.00 | |
| | For mixed brines, enter val | | | mag in Calle (H | (40 H42) | | | | | | |
| - | Initial T | | | ` . | | 44.0 | 40.0 | (Enter H40-H43) | | Н | |
| | | (F) | 66.0 | 71.0 | 70.0 | 41.0 | 49.0 | 60.0 | 5.69 | 5.60 | 1 |
| | Final T | (F) (F) | 66.0 66.0 | 71.0 71.0 | 70.0 70.0 | 41.0 | 49.0 | 60.0 89.0 | 5.69 Viscosity (| 5.60 CentiPoise) | |
| 42 | Final T Initial P | (F) (F) (psia) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 | 5.69 Viscosity (1.196 | 5.60 CentiPoise) 0.826 | |
| 42 43 | Final T Initial P Final P | (F) (F) (psia) (psia) | 66.0 66.0 | 71.0 71.0 | 70.0 70.0 | 41.0 | 49.0 | 60.0 89.0 | 5.69 Viscosity (1.196 Heat Capaci | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) | |
| 42 43 44 | Final T Initial P Final P Use TP on Calcite sheet? | (F) (F) (psia) (psia) I-Yes;0-No | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) 0.959 | |
| 42 43 44 45 | Final T Initial P Final P | (F) (F) (psia) (psia) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) | |
| 42 43 44 45 46 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. | (F) (F) (psia) (psia) I-Yes;0-No API grav. | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor no | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) 0.959 eeded (mg/L) | |
| 42 43 44 45 46 47 48 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 | |
| 42 43 44 45 46 47 48 49 50 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG//Day Conc. Multiplier H* (Strong acid) * | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at H ₂ S Gas | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH' (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/l) (pH) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH (Strong base) * Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated SCations= EAnions= | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/l) as HCO3 (equiv./I) (equiv./I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= ECations= Calc TDS= | (F) (F) (Psia) (psia) (1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) | 66.0 66.0 25.0 25.0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textit{\Sigma}\$ (STP) Exhions= \$\textit{\Sigma}\$ (STD)= Inhibitor Selection | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time | (F) (F) (Psia) (psia) (1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) | 66.0 66.0 25.0 25.0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 Unit Converter | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 60 61 62 63 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textstyle \text{Calcite}\$ acid \$\text{Lacite}\$ acid \$\text | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 4 1 1 2 | 70.0 70.0 25.0 25.0 25.0 Inhibitor NTMP BHPMP | 41.0 25.0 25.0 Unit Converter From Unit | 49.0 25.0 25.0 25.0 (From metric Value 80 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated 2Cations= £Anions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 0 | # 1 2 3 | Inhibitor NTMP BHPMP PAA | Unit Converter From Unit C m³ | 49.0 25.0 25.0 25.0 (From metric Value 80 100 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textstyle \text{Calcite}\$ acid \$\text{Lacite}\$ acid \$\text | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 4 1 1 2 | 70.0 70.0 25.0 25.0 25.0 Inhibitor NTMP BHPMP | 41.0 25.0 25.0 Unit Converter From Unit | 49.0 25.0 25.0 25.0 (From metric Value 80 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\mathbb{\text{Catluated}}\$ Alkalinity Caclulated \$\mathbb{\text{Catluated}}\$ Eanions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 0 | 71.0 71.0 25.0 25.0 1 1 1 2 3 4 | Inhibitor NTMP BHPMP PAA DTPMP | Unit Converter From Unit °C m³ m³ MPa | 49.0 25.0 25.0 25.0 (From metric Value 80 100 1,000 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit °F ft³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated Alkalinity Caclulated Alkalinity Caclulated ECations= ZAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, 1st inhibitor # is: | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 1 4 | 0 0 0 Unit min 1-Yes;0-No # | ## 1 2 3 4 5 6 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA | Unit Converter From Unit C m MPa Bar | 49.0 25.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit "F ft ³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 44 45 46 47 48 49 50 51 52 53 54 55 56 60 61 62 63 64 65 66 67 68 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/l) as HCO3 (equiv./I) (equiv./I) (mg/l) Input 120 1 4 1 50 | 0 0 0 Unit min 1-Yes;0-No # | ## 1 2 3 4 4 5 6 6 7 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA HEDP | Unit Converte From Unit C m³ m³ MPa Bar Torr | 49.0 25.0 25.0 25.0 25.0 Value 80 100 1,000 496 10,000 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit °F ft³ bbl(42 US gal) psia psia psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 193 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 44 45 46 47 48 49 50 51 52 53 54 55 56 60 61 62 63 64 65 66 67 68 69 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * OH* (Strong base) * Ouality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, 1st inhibitor is: % of 1st inhibitor is: | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 1 4 | 0 0 0 0 Unit min 1-Yes;0-No # # % | ## 1 2 3 4 5 6 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA | Unit Converter From Unit C m MPa Bar | 49.0 25.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit "F ft ³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |

Saturation Index Calculations

Champion Technologies, Inc. (Based on the Tomson-Oddo Model)

Brine 1: Ward Feed Yard 34-1
Brine 2: Ward Feed Yard 4-1
Brine 3: Clinesmith 5-4
Brine 4: Clinesmith 1
Brine 5: Clinesmith 2

| | | Ratio | | | | | | |
|--------------------------|---------|---------|---------|---------|---------|-------------|--|--|
| | 20% | 20% | 20% | 20% | 20 | | | |
| Component (mg/L) | Brine 1 | Brine 2 | Brine 3 | Brine 4 | Brine 5 | Mixed Brine | | |
| Calcium | 1836 | 2452 | 2044 | 1920 | 1948 | 1952 | | |
| Magnesium | 1096 | 872 | 1200 | 953 | 858 | 865 | | |
| Barium | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Strontium | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Bicarbonate | 190 | 234 | 259 | 268 | 254 | 253 | | |
| Sulfate | 1 | 1 | 8 | 1 | 1 | 1 | | |
| Chloride | 36299 | 48965 | 47874 | 45632 | 43147 | 43206 | | |
| CO ₂ in Brine | 246 | 220 | 264 | 422 | 405 | 401 | | |
| Ionic Strength | 1.12 | 1.48 | 1.46 | 1.38 | 1.31 | 1.31 | | |
| Temperature (°F) | 89 | 89 | 89 | 89 | 89 | 89 | | |
| Pressure (psia) | 50 | 50 | 120 | 120 | 120 | 119 | | |

Saturation Index

| Calcite | -1.71 | -1.41 | -1.48 | -1.68 | -1.69 | -1.69 |
|-------------|-------|-------|-------|-------|-------|-------|
| Gypsum | -3.71 | -3.64 | -2.82 | -3.73 | -3.72 | -3.69 |
| Hemihydrate | -3.70 | -3.65 | -2.83 | -3.74 | -3.71 | -3.69 |
| Anhydrite | -3.89 | -3.79 | -2.97 | -3.89 | -3.88 | -3.85 |
| Barite | N/A | N/A | N/A | N/A | N/A | N/A |
| Celestite | N/A | N/A | N/A | N/A | N/A | N/A |

PTB

| Calcite | N/A | N/A | N/A | N/A | N/A | N/A |
|-------------|-----|-----|-----|-----|-----|-----|
| Gypsum | N/A | N/A | N/A | N/A | N/A | N/A |
| Hemihydrate | N/A | N/A | N/A | N/A | N/A | N/A |
| Anhydrite | N/A | N/A | N/A | N/A | N/A | N/A |
| Barite | N/A | N/A | N/A | N/A | N/A | N/A |
| Celestite | N/A | N/A | N/A | N/A | N/A | N/A |

| - | Α | В | С | D | Е | F | G | Н | 1 | | K |
|--|--|--|---|--|--|--|--|--|---|---|-----------------|
| 1 | Produced Fluids # | В | 1 | 2 | 3 | 4 | 5 | 11 | • | <u> </u> | |
| | Parameters | Units | Input | Input | Input | Input | Input | | Click he | re | Click |
| 3 | Select the brines | Select fluid | | Ī | | V | Ī | Mixed brine: | to run SS | - | |
| 4 | Sample ID | by checking | | | | | | Cell H28 is | to ruii oc | • | Click |
| 5 | Date | the box(es), | 3/19/2012 | 3/4/2012 | 3/14/2012 | 1/20/2012 | 1/20/2012 | STP calc. pH. | ———— | | |
| 6 | Operator | Row 3 | PostRock | PostRock | PostRock | PostRock | PostRock | Cells H35-38 | | | Click |
| 7 | Well Name | | Ward Feed | Ward Feed | Clinesmith | Clinesmith | Clinesmith | are used in | Goal Seek | SSP | |
| 8 | Location | | #34-1 | #4-1 | #5-4 | #1 | #2 | mixed brines | 0.00 | | Click |
| 9 | Field | | CBM | CBM | Bartles | Bartles | Bartles | calculations. | | | |
| 10 | Na ⁺ | (mg/l)* | 19,433.00 | 27,381.00 | 26,534.00 | 25689.00 | 24220.00 | 24654.20 | Initial(BH) | Final(WH) | SI/SR |
| 11 | K ⁺ (if not known =0) | (mg/l) | | | | | | 0.00 | Saturation Index | values | (Final-Initial) |
| | Mg ²⁺ | (mg/l) | 1,096.00 | 872.00 | 1,200.00 | 953.00 | 858.00 | 995.91 | | lcite | |
| | Ca ²⁺ | (mg/l) | 1,836.00 | 2,452.00 | 2,044.00 | 1920.00 | 1948.00 | 2040.23 | -0.73 | -0.60 | 0.13 |
| | Sr ²⁺ | | 1,050.00 | 2,432.00 | 2,044.00 | 1720.00 | 1740.00 | | | | 0.13 |
| | Ba ²⁺ | (mg/l) | | | | | | 0.00 | Da | rite | |
| ., | | (mg/l) | | | | | | 0.00 | | | |
| | Fe ²⁺ | (mg/l) | 40.00 | 21.00 | 18.00 | 82.00 | 90.00 | 50.21 | | lite | |
| | Zn ²⁺ | (mg/l) | | | | | | 0.00 | -1.77 | -1.80 | -0.03 |
| 18 | Pb ²⁺ | (mg/l) | | | | | | 0.00 | Gyp | sum | |
| 19 | Cl | (mg/l) | 36,299.00 | 48,965.00 | 47,874.00 | 45632.00 | 43147.00 | 44388.44 | -3.19 | -3.18 | 0.00 |
| 20 | SO ₄ ²⁻ | (mg/l) | 1.00 | 1.00 | 8.00 | 1.00 | 1.00 | 2.40 | Hemil | ıydrate | |
| 21 | F. | (mg/l) | | | | | | 0.00 | -3.96 | -3.90 | 0.06 |
| | Br' | (mg/l) | | | | | | 0.00 | | ydrite | |
| | SiO2 | (mg/l) SiO2 | | | | | | 0.00 | -3.47 | -3.36 | 0.12 |
| _ | HCO3 Alkalinity** | (mg/l as HCO3) | 190.00 | 234.00 | 259.00 | 268.00 | 254.00 | 241.03 | | estite | 0,12 |
| | CO3 Alkalinity | (mg/l as CO3) | 170.00 | 434.00 | 237,00 | 200.00 | 234.00 | 241.03 | Cen | | |
| | Carboxylic acids** | (mg/l) | | | | | | 0.00 | Inor 6 | Sulfide | |
| 27 | Ammonia | (mg/L) NH3 | | | | | | 0.00 | -0.16 | -0.22 | -0.06 |
| _ | | | | | | | | | | | -0.00 |
| | Borate | (mg/L) H3BO3 | | | | | | 0.00 | Zinc | Sulfide | |
| | TDS (Measured) | (mg/l) | 4.040 | 4.0=4 | | | | 72781 | ~ | | |
| | Calc. Density (STP) CO ₂ Gas Analysis | (g/ml) | 1.038 19.97 | 1.051 18.76 | 1.050 22.41 | 1.048 35.53 | 1.045 | 1.047 | Calcium | fluoride | |
| | - , | (%) | | 0.0292 | | | 33.79 | 26.16 | I C. | -l | |
| | H ₂ S Gas Analysis*** Total H2Saq | (%) | 0.0289 | 1.00 | 0.0296 | 0.0306 | 0.0151 0.50 | 0.0269 | -0.74 | rbonate -0.51 | 0.23 |
| _ | _ | (mgH2S/l) | 1.00 5.67 | 5.76 | 1.00 5.72 | 1.00 5.54 | 5.55 | 5.63 | | eeded (mg/L) | 0.23 |
| 34 | pH, measured (STP) | pH 0-CO2%+Alk, | 5.07 | 5./6 | 5.72 | 5.54 | 5.55 | 5.03 | Calcite | NTMP | |
| | Choose one option | | | | | | | | Calcite | NIMI | |
| 35 | to calculate SI? | 2-CO2%+pH | 0 | 0 | 0 | 0 | 0 | | | | |
| 36 | Gas/day(thousand cf/day) | (Mcf/D) | | | | | | 0 | 0.00 | 0.00 | |
| | Oil/Day | (B/D) | 0 | 0 | 1 | 1 | 1 | 4 | Barite | BHPMP | |
| | Water/Day | (B/D) | 100 | 100 | 100 | 100 | 100 | 500 | 0.00 | 0.00 | |
| | For mixed brines, enter val | | | mag in Calle (H | (40 H42) | | | | | | |
| - | Initial T | | | ` . | | 44.0 | 40.0 | (Enter H40-H43) | | Н | |
| | | (F) | 66.0 | 71.0 | 70.0 | 41.0 | 49.0 | 60.0 | 5.69 | 5.60 | 1 |
| | Final T | (F) (F) | 66.0 66.0 | 71.0 71.0 | 70.0 70.0 | 41.0 | 49.0 | 60.0 89.0 | 5.69 Viscosity (| 5.60 CentiPoise) | |
| 42 | Final T Initial P | (F) (F) (psia) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 | 5.69 Viscosity (1.196 | 5.60 CentiPoise) 0.826 | |
| 42 43 | Final T Initial P Final P | (F) (F) (psia) (psia) | 66.0 66.0 | 71.0 71.0 | 70.0 70.0 | 41.0 | 49.0 | 60.0 89.0 | 5.69 Viscosity (1.196 Heat Capaci | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) | |
| 42 43 44 | Final T Initial P Final P Use TP on Calcite sheet? | (F) (F) (psia) (psia) I-Yes;0-No | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) 0.959 | |
| 42 43 44 45 | Final T Initial P Final P | (F) (F) (psia) (psia) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) | |
| 42 43 44 45 46 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. | (F) (F) (psia) (psia) I-Yes;0-No API grav. | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor no | 5.60 CentiPoise) 0.826 ty (cal/ml/ ⁰ C) 0.959 eeded (mg/L) | |
| 42 43 44 45 46 47 48 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 | |
| 42 43 44 45 46 47 48 49 50 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG//Day Conc. Multiplier H* (Strong acid) * | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at H ₂ S Gas | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH' (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/l) (pH) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH (Strong base) * Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated SCations= EAnions= | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/l) as HCO3 (equiv./I) (equiv./I) | 66.0 66.0 25.0 | 71.0 71.0 25.0 | 70.0 70.0 25.0 | 41.0 25.0 | 49.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= ECations= Calc TDS= | (F) (F) (Psia) (psia) (1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) | 66.0 66.0 25.0 25.0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH* (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textit{\Sigma}\$ (STP) Exhions= \$\textit{\Sigma}\$ (STD)= Inhibitor Selection | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time | (F) (F) (Psia) (psia) (1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) | 66.0 66.0 25.0 25.0 | 71.0 71.0 25.0 25.0 | 70.0 70.0 25.0 25.0 | 41.0 25.0 25.0 Unit Converter | 49.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 60 61 62 63 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textstyle \text{Calcite}\$ acid \$\text{Lacite}\$ acid \$\text | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 4 1 1 2 | 70.0 70.0 25.0 25.0 25.0 Inhibitor NTMP BHPMP | 41.0 25.0 25.0 Unit Converter From Unit | 49.0 25.0 25.0 25.0 (From metric Value 80 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated 2Cations= £Anions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 0 | # 1 2 3 | Inhibitor NTMP BHPMP PAA | Unit Converter From Unit C m³ | 49.0 25.0 25.0 25.0 (From metric Value 80 100 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\textstyle \text{Calcite}\$ acid \$\text{Lacite}\$ acid \$\text | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 | 71.0 71.0 25.0 25.0 4 1 1 2 | 70.0 70.0 25.0 25.0 25.0 Inhibitor NTMP BHPMP | 41.0 25.0 25.0 Unit Converter From Unit | 49.0 25.0 25.0 25.0 (From metric Value 80 | 60.0 89.0 25.0 120.0 30.00 0.60 0 | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated \$\mathbb{\text{Catluated}}\$ Alkalinity Caclulated \$\mathbb{\text{Catluated}}\$ Eanions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: | (F) (F) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 | 66.0 66.0 25.0 25.0 0 0 0 | 71.0 71.0 25.0 25.0 1 1 1 2 3 4 | Inhibitor NTMP BHPMP PAA DTPMP | Unit Converter From Unit °C m³ m³ MPa | 49.0 25.0 25.0 25.0 (From metric Value 80 100 1,000 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit °F ft³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH (Strong base) * Quality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated Alkalinity Caclulated Alkalinity Caclulated ECations= ZAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, 1st inhibitor # is: | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 1 4 | 0 0 0 Unit min 1-Yes;0-No # | ## 1 2 3 4 5 6 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA | Unit Converter From Unit °C m³ m³ MPa Bar | 49.0 25.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit "F ft ³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 44 45 46 47 48 49 50 51 52 53 54 55 56 60 61 62 63 64 65 66 67 68 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) † OH (Strong base) † Quality Control Checks at H ₂ S Gas Total H ₂ Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/l) as HCO3 (equiv./I) (equiv./I) (mg/l) Input 120 1 4 1 50 | 0 0 0 Unit min 1-Yes;0-No # | ## 1 2 3 4 4 5 6 6 7 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA HEDP | Unit Converte From Unit C m³ m³ MPa Bar Torr | 49.0 25.0 25.0 25.0 25.0 Value 80 100 1,000 496 10,000 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit °F ft³ bbl(42 US gal) psia psia psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 193 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |
| 42 44 45 46 47 48 49 50 51 52 53 54 55 56 60 61 62 63 64 65 66 67 68 69 | Final T Initial P Final P Use TP on Calcite sheet? API Oil Grav. Gas Sp.Grav. MeOH/Day MEG/Day Conc. Multiplier H* (Strong acid) * OH* (Strong base) * OH* (Strong base) * Ouality Control Checks at H ₂ S Gas Total H2Saq (STP) pH Calculated PCO2 Calculated Alkalinity Caclulated ECations= EAnions= Calc TDS= Inhibitor Selection Protection Time Have ScaleSoftPitzer pick inhibitor for you? If No, inhibitor # is: If you select Mixed, 1st inhibitor is: % of 1st inhibitor is: | (F) (F) (Psia) (psia) (psia) 1-Yes;0-No API grav. Sp.Grav. (B/D) (N) (N) STP: (%) (mgH2S/I) (pH) (%) (mg/I) as HCO3 (equiv./I) (equiv./I) (mg/I) Input 120 1 4 | 0 0 0 0 Unit min 1-Yes;0-No # # % | ## 1 2 3 4 5 6 | Inhibitor NTMP BHPMP PAA DTPMP PPCA SPA | Unit Converter From Unit °C m³ m³ MPa Bar | 49.0 25.0 25.0 25.0 | 60.0 89.0 25.0 120.0 30.00 0.60 0 0 To Unit "F ft ³ bbl(42 US gal) psia | 5.69 Viscosity (1.196 Heat Capaci 0.955 Inhibitor ne Gypsum 0.00 Anhydrite 0.00 Value 176 3,531 629 145,074 7,194 | 5.60 CentiPoise) 0.826 ty (cal/ml/°C) 0.959 ceded (mg/L) HDTMP 0.00 HDTMP | |

Saturation Index Calculations

Champion Technologies, Inc. (Based on the Tomson-Oddo Model)

Brine 1: Ward Feed Yard 34-1
Brine 2: Ward Feed Yard 4-1
Brine 3: Clinesmith 5-4
Brine 4: Clinesmith 1
Brine 5: Clinesmith 2

| | | Ratio | | | | | | |
|--------------------------|---------|---------|---------|---------|---------|-------------|--|--|
| | 20% | 20% | 20% | 20% | 20 | | | |
| Component (mg/L) | Brine 1 | Brine 2 | Brine 3 | Brine 4 | Brine 5 | Mixed Brine | | |
| Calcium | 1836 | 2452 | 2044 | 1920 | 1948 | 1952 | | |
| Magnesium | 1096 | 872 | 1200 | 953 | 858 | 865 | | |
| Barium | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Strontium | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Bicarbonate | 190 | 234 | 259 | 268 | 254 | 253 | | |
| Sulfate | 1 | 1 | 8 | 1 | 1 | 1 | | |
| Chloride | 36299 | 48965 | 47874 | 45632 | 43147 | 43206 | | |
| CO ₂ in Brine | 246 | 220 | 264 | 422 | 405 | 401 | | |
| Ionic Strength | 1.12 | 1.48 | 1.46 | 1.38 | 1.31 | 1.31 | | |
| Temperature (°F) | 89 | 89 | 89 | 89 | 89 | 89 | | |
| Pressure (psia) | 50 | 50 | 120 | 120 | 120 | 119 | | |

Saturation Index

| Calcite | -1.71 | -1.41 | -1.48 | -1.68 | -1.69 | -1.69 |
|-------------|-------|-------|-------|-------|-------|-------|
| Gypsum | -3.71 | -3.64 | -2.82 | -3.73 | -3.72 | -3.69 |
| Hemihydrate | -3.70 | -3.65 | -2.83 | -3.74 | -3.71 | -3.69 |
| Anhydrite | -3.89 | -3.79 | -2.97 | -3.89 | -3.88 | -3.85 |
| Barite | N/A | N/A | N/A | N/A | N/A | N/A |
| Celestite | N/A | N/A | N/A | N/A | N/A | N/A |

PTB

| Calcite | N/A | N/A | N/A | N/A | N/A | N/A |
|-------------|-----|-----|-----|-----|-----|-----|
| Gypsum | N/A | N/A | N/A | N/A | N/A | N/A |
| Hemihydrate | N/A | N/A | N/A | N/A | N/A | N/A |
| Anhydrite | N/A | N/A | N/A | N/A | N/A | N/A |
| Barite | N/A | N/A | N/A | N/A | N/A | N/A |
| Celestite | N/A | N/A | N/A | N/A | N/A | N/A |

ORIGINAL

KANSAS CORPORATION COMMISSION OIL & GAS CONSERVATION DIVISION

RECEIVED KANSAS CORPORATION COMMISSION

Form ACO-1 September 1999

MAY 3 0 2007 Form Must Be Typed

WELL COMPLETION FORM

WELL HISTORY - DESCRIPTION OF WELL & LEASE CONSERVATION DIVISION

WICHITA, KS

| Operator: License # 33344 | API No. 15 - 133-26763 - 00 - 60 |
|--|--|
| Name: Quest Cherokee, LLC | County: Neosho |
| Address: 211 W. 14th Street | |
| City/State/Zip: Chanute, KS 66720 | 660 feet from S /(N) circle one) Line of Section |
| Purchaser: Bluestem Pipeline, LLC | 1980 feet from E W-Dircle one) Line of Section |
| Operator Contact Person: Jennifer R. Ammann | Footages Calculated from Nearest Outside Section Corner: |
| Phone: (620) 431-9500 | (circle one) NE SE (NW) SW |
| Contractor: Name: Michael Drilling, LLC | Lease Name: McMinimy Family Trust Well #: 35-1 |
| License: 33783 | Field Name: Cherokee Basin CBM |
| Wellsite Geologist: Ken Recoy | Producing Formation: multiple |
| Designate Type of Completion: | Elevation: Ground: 985 Kelly Bushing: n/a |
| ✓ New Well Re-Entry Workover | Total Depth: 1183 Plug Back Total Depth: 1138.76 |
| OilSWDSIOWTemp. Abd. | Amount of Surface Pipe Set and Cemented at 23 Feet |
| ✓ Gas ENHR SIGW | Multiple Stage Cementing Collar Used? |
| Dry Other (Core, WSW, Expl., Cathodic, etc) | If yes, show depth setFeet |
| | If Alternate II completion, cement circulated from 1138.76 |
| If Workover/Re-entry: Old Well Info as follows: | feet depth to surface w/ 150 sx cmt. |
| Operator: | |
| Well Name: | Drilling Fluid Management Plan AI+ II Ntt 7-08 08 |
| Original Comp. Date: Original Total Depth: | (Data must be collected from the Reserve Pit) |
| Deepening Re-perf Conv. to Enhr./SWD | Chloride content ppm Fluid volume bbls |
| Plug Back Plug Back Total Depth | Dewatering method used |
| Commingled Docket No | Location of fluid disposal if hauled offsite: |
| Dual Completion Docket No | Operator Name: |
| Other (SWD or Enhr.?) Docket No | Lease Name: License No.: |
| 1/26/07 1/27/07 2/1/07 | Quarter Sec Twp S. R |
| Spud Date or Recompletion Date Date Reached TD Completion Date or Recompletion Date | County: Docket No.: |
| Kansas 67202, within 120 days of the spud date, recompletion, workov Information of side two of this form will be held confidential for a period of 107 for confidentiality in excess of 12 months). One copy of all wireline logs TICKETS MUST BE ATTACHED. Submit CP-4 form with all plugged wells | n the Kansas Corporation Commission, 130 S. Market - Room 2078, Wichita, the reference or conversion of a well. Rule 82-3-130, 82-3-106 and 82-3-107 apply. 12 months if requested in writing and submitted with the form (see rule 82-3-3 and geologist well report shall be attached with this form. ALL CEMENTING s. Submit CP-111 form with all temporarily abandoned wells. |
| Signature: Symmetry & Ammany | KCC Office Use ONLY |
| Title: New Well Development Coordinator Date: 5/29/07 | Letter of Confidentiality Received |
| Subscribed and sworn to before me this add day of May | If Denied, Yes Date: |
| | Wireline Log Received |
| 20 07 . | Geologist Report Received |
| Notary Public: Device Klauman | UIC Distribution |
| Notary | RRA KLAUMAN Public - State of Kansas es & - リーシャル |

| Operator Name: Qu | iest Cherokee, LL | <u>.C</u> | Lease Nan | ne: McMinimy Fan | nily Trust | Well #: | | |
|--|--|--|-------------------------------------|---|--------------------|---------------------|---------------------------|--|
| Sec. 35 Twp. 2 | 27 S. R. <u>17</u> | ✓ East ☐ West | County: N | | | | | |
| tested, time tool ope temperature, fluid re | en and closed, flowin covery, and flow rate | and base of formations p g and shut-in pressures, es if gas to surface test, a final geological well site | whether shut-ir along with final | pressure reached | static level, hyd | rostatic pressur | es, bottom hole | |
| Drill Stem Tests Take | | ☐ Yes 🗸 No | [| ✓ Log Formation (Top), Depth and Datum | | | Sample | |
| Samples Sent to Ge | ological Survey | ☐ Yes 🗸 No | | Name See attached | | Тор | Datum | |
| Cores Taken Yes No Electric Log Run Yes No (Submit Copy) | | | | | | | | |
| List All E. Logs Run: | : | | | | | | | |
| Dual Induction Compensated Gamma Ray N | Density Neutro | n Log | | | | | | |
| | | CASING Report all strings set- | RECORD | New Used | ction etc | | | |
| Purpose of String | Size Hole | Size Casing | Weight | Setting | Type of | # Sacks | Type and Percent | |
| Surface | 12-1/4 | Set (In O.D.) 8-5/8" | Lbs. / Ft. | Depth 23 | "A" | Used 5 | Additives | |
| Production | 6-3/4 | 4-1/2 | 10.5 | 1138.76 | "A" | 150 | | |
| | | | | | | | | |
| | | ADDITIONAL | CEMENTING / | SQUEEZE RECOR | D | | 1 | |
| Purpose: Perforate Protect Casing | Depth Top Bottom | Type of Cement | #Sacks Used | Used Type and Percent Additives | | | | |
| Plug Back TD Plug Off Zone | | | | | | | | |
| Shots Per Foot | | ION RECORD - Bridge Plug | | | acture, Shot, Ceme | | | |
| 4 | | Footage of Each Interval Per 333-835/817-819/782-78 | | (Amount and Kind of Material Used) Depth 300gal 15%HCLwl 24 bbls 2%kcl water, 429bbls water wl 2% KCL, Blockle, 10600# 30/70 sand 904-906/870-872 | | | | |
| | | | | _ | | 833-83 | 5/817-819 782-785/765-767 | |
| 4 | 685-689/675-679 | | | 300gal 15%HCLw/ 46 bbls 2%kcl water, 553bbls water w/ 2% KCL, Biocide, 10600# 30/70 sand 685-689/675-67 | | | | |
| | | | | | | | | |
| TUBING RECORD 2- | Size | Set At 934 I | Packer At n/a | Liner Run | Yes N | 0 | | |
| Date of First, Resumer 3/5/07 | rd Production, SWD or E | Enhr. Producing Met | | owing 📝 Pump | ing Gas L | ift Othe | er (Explain) | |
| Estimated Production Per 24 Hours | Oil n/a | Bbls. Gas 16.6mcf | İ | Water I | Bbls. | Gas-Oil Ratio | Gravity | |
| Disposition of Gas | METHOD OF (| | | Production Inte | erval | | | |
| Vented ✓ Sold (If vented, So | Used on Lease ubmit ACO-18.) | Open Hole Other (Spec | Perf. [| Dually Comp. | Commingled | | | |

012707



Michael Drilling, LLC RECEIVED KANSAS CORPORATION COMMISSION

P.O. Box 402 Iola, KS 66749 620-365-2755

MAY 3 0 2007 CONSERVATION DIVISION

WICHITA KS

Company: Quest Cherokee LLC

Address:

9520 North May Ave, Suite 300

Oklahoma City, Oklahoma 73120

Ordered By: Donnie Meyers

01/27/07 Date:

Lease: McMinimy Family Trust

County: Neosho

Well#: 35-1

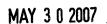
API#: 15-133-26763-00-00

Drilling Log

| | | IME LOE | |
|---------|---------------------------|-----------|---------------------------|
| FEET | DESCRIPTION | FEET | DESCRIPTION |
| 0-23 | Overburden | 679-682 | Lime |
| 23-67 | Lime | 682-684 | Black Shale |
| 67-91 | Wet Sand | 684 | Gas Test 20" at1/4" Choke |
| 91-120 | Lime | 684-708 | Sandy Shale |
| 120-125 | Sand | 708 | Gas Test 55" at1/2" Choke |
| 125-197 | Shale | 708-785 | Sand |
| 197-199 | Lime | 785-786 | Coal |
| 199-201 | Sandy Shale | 786-838 | Shale ~ |
| 201-262 | Lime | 838-840 | Coal |
| 262-270 | Shale | 840-883 | Sand |
| 270-280 | Lime | 883-884 | Coal |
| 280-312 | Sand | 884-910 | Shale |
| 312-400 | Lime | 910-1076 | Sand |
| 400-492 | Shale | 1076-1079 | Coal |
| 492-525 | Shale and Lime | 1079-1087 | Shale |
| 525-586 | Shale | 1081 | Gas Test 16" at3/4" Choke |
| 586-589 | Lime | 1087-1183 | Missippi Lime |
| 589-592 | Coal | 1108 | Gas Test 15" at3/4" Choke |
| 592-622 | Lime | 1183 | Gas Test 15" at3/4" Choke |
| 622-652 | Shale | 1183 | TD |
| 652-653 | Coal | | |
| 653-672 | Lime | | Surface 23' |
| 658 | Gas Test 20" at1/4" Choke | | |
| 672-679 | Black Shale | | |

Resource Corporation





CONSERVATION DIVISION WICHITA, KS

TICKET NUMBER 1983

RANGE

-COUNTY

FIELD TICKET REF #

FOREMAN _____

TOWNSHIP

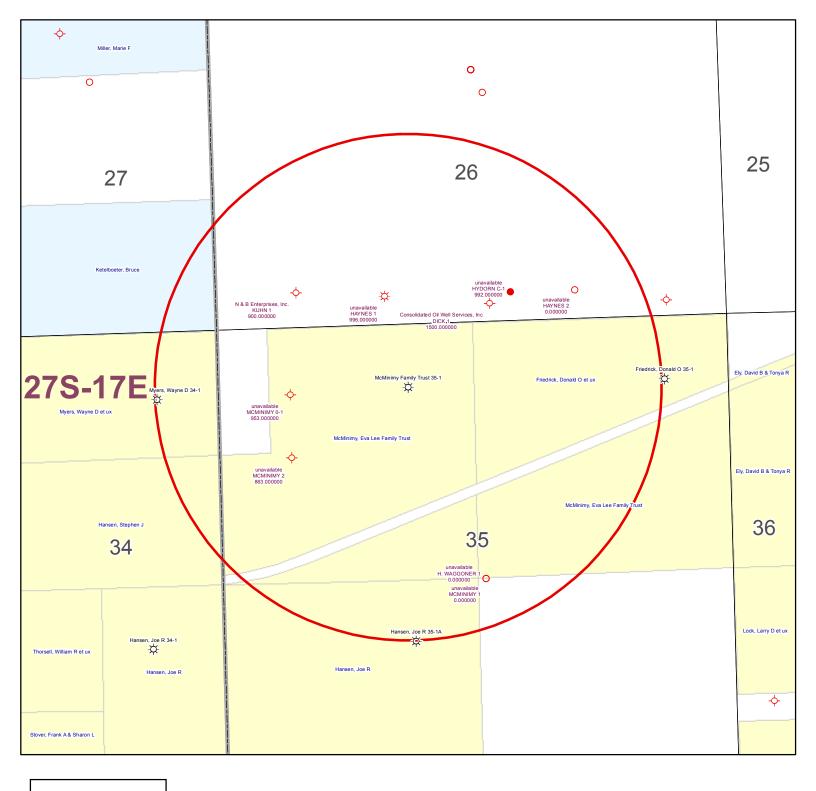
SECTION



TREATMENT REPORT 619690 & FIELD TICKET CEMENT

WELL NAME & NUMBER

| 2-1-07 | Mcmin | imy + | iamily to | rust 35-1 | 35 | 27 / | / / / / / | |
|-----------------------|--------------|-------------|------------------------------------|----------------|---------------|------------------|--|--|
| FOREMAN / | TIME | TIME | LESS | TRUCK | TRAILER | TRUCK | EMPLOYEE SIGNATURE | |
| OPERATOR | IN | OUT | LUNCH | # | # | , | _ | |
| Jue P | 6:45 | 12:15 | | 9034127 | | 6 | You Blocker | |
| Tim. A | 6:45 | | | 908,255 | | 6 | In the second | |
| Russell A | 7:15 | | | 90=206 | | 5.5 | 100 | |
| TROY. W | 6:215 | 1 | | 931500 | | 6 | They also | |
| MAC. M | 7:00 | 1'00 | | 93/3/0 | 607240 | 6 | Macarall | |
| | | <u> </u> | | `4, | 1 | <u> I </u> | | |
| JOB TYPE Louget | رنسم_ HOLE ا | SIZE 6 | <u>3/4</u> + | OLE DEPTH// | 5/ CASI | NG SIZE & WEIGH | T 41/2 10.5 | |
| CASING DEPTH 115 | 38.76 DRILL | PIPE | TUBING OTHER | | =R | | | |
| SLUBBY WEIGHT | 14.5 SLURF | RY VOL | v | VATER gal/sk | CEMI | ENT LEFT in CASI | NG | |
| DISPLACEMENT 18 | R.//a DISPLA | ACEMENT F | rsı N | MIX PSI | RATE | Hbpm | | |
| DEMARKS | | | | | | | <i>.</i> # | |
| Wash 55 (1 | RAND S | <5 sc.1 | Swept to | Surface. INS | stalled come | nthead DAI | 3 1 SK Sel | |
| d 13 bbl e | lur of 150 | 5K5 | of Cencest | To get due | to STAGO. | flustpung | 1 Proportion | |
| Plus to hat | tor de so | 1-(1001 | shar | | | | | |
| | | | | <u> </u> | | • | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | 1 | | | | | |
| | 1138 | . 76 | ft 41/2 | Casing | | | | |
| | | 6 | Centraliz | | | | | |
| 93/3/0 | 2.25 | ·hv | Cosing tractor | | | | | |
| 60724/0 | 2.25 | | Casina | | | | | |
| ACCOUNT | | | | | TOTAL | | | |
| CODE | QUANTITY or | UNIIS | DESCRIPTION OF SERVICES OR PRODUCT | | AMOUNT | | | |
| 903427 | 6 | hr | Foreman Pickup | | | | | |
| 903255 | 6 | | | | | | | |
| 903206 | 5.5 | | | | | | | |
| 1104 | 14, | 10 5K | Portland Cement | Samuel B (() a | 21/2 | | | |
| 1124 | <u> </u> | | OWC - Blend Com | | 31/2 | | | |
| 1126 | | | Gilsonite | nent 11/2 wipe | pr β105 | | | |
| 1110 | · | 15 3K | Flo-Seal | | | | | |
| 1107 | | 3 SK | Premium Gel | | <u> </u> | | | |
| 1118 | | <u>3 SK</u> | KCL | | | | ···· | |
| 1215A | <u>مما</u> | 3 / 1 | | Colchloride | | | S. P. N. | |
| 1111B 1123 | | 3 SK | City Water | C- CVIOITI | | | | |
| | 7000 | 5 hr | Transport Truck | | | | | |
| 903142 | | 5 hr | Transport Trailer | | | | | |
| 932452 | | 6 hr 80 Vac | | | | | | |
| 7373 30 Ravin 4513 | 1 | 1 | 1 411/0 (| lact stree | | | negardit. | |



KGS STATUS

- → DA/PA
- EOR
- **⇔** GAS
- △ INJ/SWD
- OIL
- OIL/GAS
- OTHER

McMinimy Family Trust 35-1 35-27S-17E 1" = 1,000'

POSTROCK



Current Completion

SPUD DATE: 1/26/2007

COMP. Date: 2/1/2007 API: 15-133-26763-00-00

WELL : McMinimy Family Trust 35-1

FIELD : Cherokee Basin

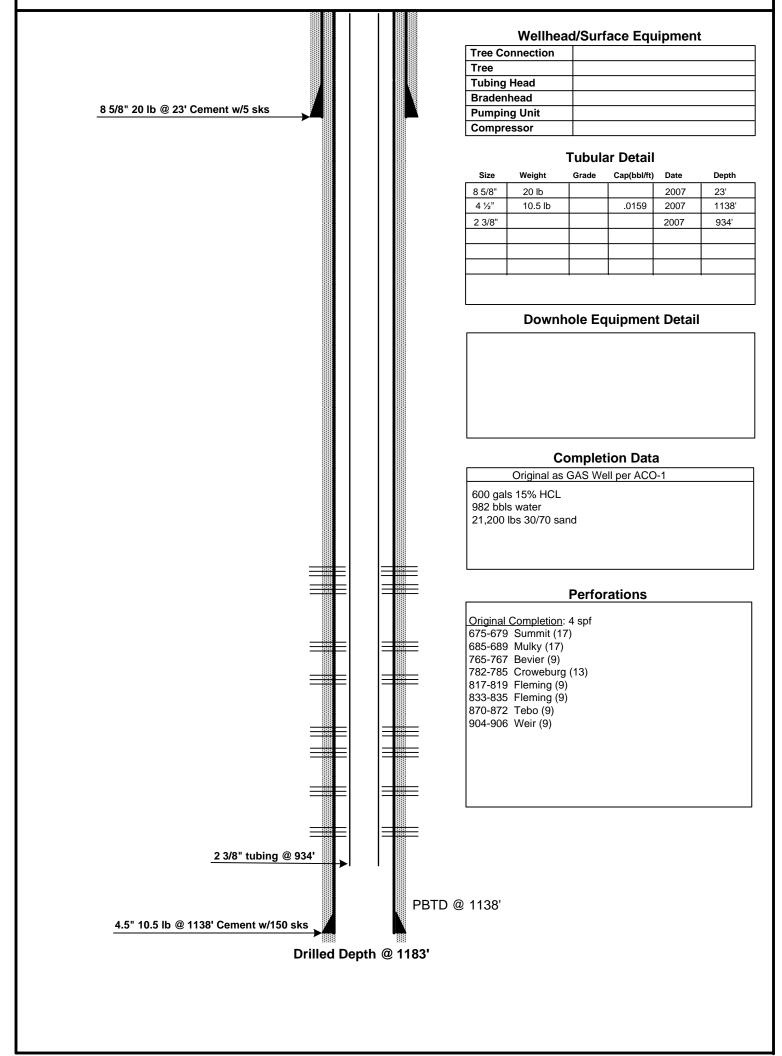
STATE : Kansas COUNTY : Neosho

PREPARED BY: POSTROCK

APPROVED BY: _

: Neosho LOCATION: 35-27S-17E (NE,NW)

ELEVATION: 985'



DATE: Oct, 2012

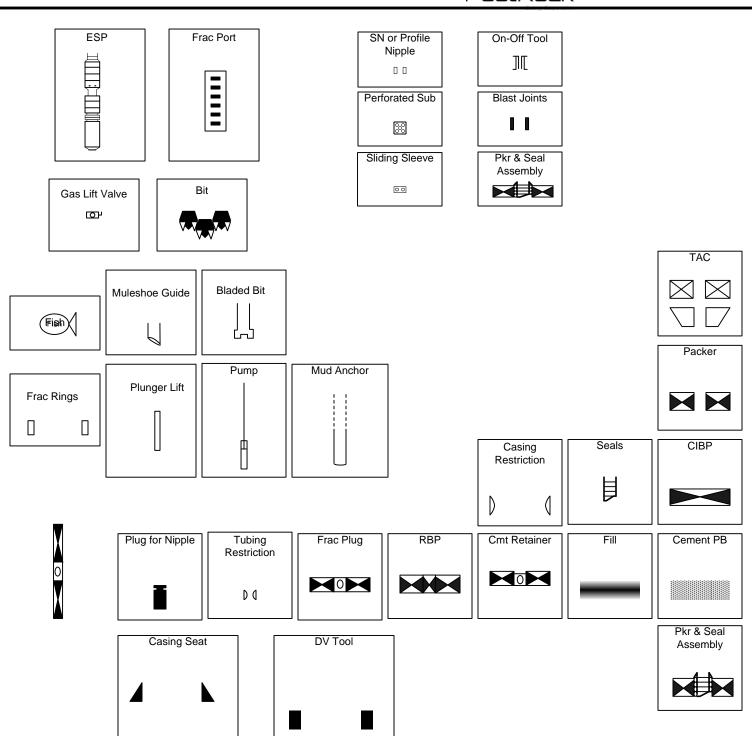
DATE:_

POSTROCK



LEGEND

PostRock[®]



| 1 | NAME & UPPER & LOWER LIMI | OF EACH PRODUCTION INTERVAL TO BE CO | MMINGLED |
|---|---------------------------|--------------------------------------|----------|
|---|---------------------------|--------------------------------------|----------|

| FORMATION: | FLEMING | (PERFS): | 833 - | 835 |
|------------|--------------|----------|-------|-----|
| FORMATION: | TEBO | (PERFS): | 870 - | 872 |
| FORMATION: | WEIR | (PERFS): | 804 - | 906 |
| FORMATION: | SQUIRREL | (PERFS): | 717 - | 723 |
| FORMATION: | BARTLESVILLE | (PERFS): | 921 - | 924 |
| FORMATION: | BARTLESVILLE | (PERFS): | 928 - | 932 |
| FORMATION: | BARTLESVILLE | (PERFS): | 946 - | 950 |
| FORMATION: | BARTLESVILLE | (PERFS): | 959 - | 964 |
| FORMATION: | | (PERFS): | - | |
| FORMATION: | | (PERFS): | | |
| FORMATION: | | (PERFS): | | |
| FORMATION: | | (PERFS): | | |
| | | | | |

2 ESTIMATED AMOUNT OF FLUID PRODUCTION TO BE COMMINGLED FROM EACH INTERVAL

| FORMATION: | FLEMING | BOPD: | 0 | MCFPD: | 7.75 | 0 BWPD: | 8.38 |
|------------|--------------|-------|-----|--------|------|---------|------|
| FORMATION: | TEBO | BOPD: | 0 | MCFPD: | 7.75 | BWPD: | 8.38 |
| FORMATION: | WEIR | BOPD: | 0 | MCFPD: | 7.75 | BWPD: | 8.38 |
| FORMATION: | SQUIRREL | BOPD: | 0.6 | MCFPD: | 0 | BWPD: | 4 |
| FORMATION: | BARTLESVILLE | BOPD: | 0.6 | MCFPD: | 0 | BWPD: | 4 |
| FORMATION: | BARTLESVILLE | BOPD: | 0.6 | MCFPD: | 0 | BWPD: | 4 |
| FORMATION: | BARTLESVILLE | BOPD: | 0.6 | MCFPD: | 0 | BWPD: | 4 |
| FORMATION: | BARTLESVILLE | BOPD: | 0.6 | MCFPD: | 0 | BWPD: | 4 |
| FORMATION: | 0 | BOPD: | | MCFPD: | | BWPD: | |
| FORMATION: | 0 | BOPD: | | MCFPD: | | BWPD: | |
| FORMATION: | 0 | BOPD: | | MCFPD: | | BWPD: | |
| FORMATION: | 0 | BOPD: | | MCFPD: | | BWPD: | |

MCMINIMY FAMILY TRUST 35-1-APPLICATION FOR COMMINGLING OF PRODUCTION OR FLUIDS Offset Operators, Unleased Mineral Owners and Landowners acreage (Attach additional sheets if necessary)

| Legal Description of Leasehold: | |
|---------------------------------|-----------------------|
| Legal Description of Leasehold: | |
| Legal Description of Leasehold: | |
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| nowledge and belief. | |
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| 1 1 / Norris | |
| Duly Authorized Agent | |
| NOVEMBER 2 | 2012 |
| this 101 day of NOVEINBER | .012 |
| | |
| Jenny K. Olal | |
| | |
| sion Expires: | |
| | |
| | |
| 100 | Duly Authorized Agent |

LEGAL LOCATION SPOT CURR_OPERA

S26-T27S-R17E SW SW SE Consolidated Oil Well Services, Inc

S26-T27S-R17E NE SW SE SE N & B Enterprises, Inc.

26-27S-17E

SW4 lessSWSW &

Ash Grove Cement Co.

W2SE less

PO Box 25900

Overland Park, KS 66225

SW4 SW4

Bruce & Jennifer Lee

1060 200th Rd Chanute, KS 66720

Tract in E2 SE4

Kevin & Julie Unrein 20255 Brown Rd Chanute, KS 66720

Tract in SE4 SE4

Larry & Marilyn Lock 1028 Windsor Dr Chanute, KS 66720

Tract in SW4 SE4

Hunter & Denise Hastings

1520 200th Rd Chanute, KS 66720

Tract in SW4 SE4

Linda Miller 1740 200th Rd Chanute, KS 66720

Tract in SW4 SE4

Kim & Shelly Kuhn 1630 200th Rd Chanute, KS 66720

35-27S-17E

tract in NW4

Chad & Jeana Anderes

1035 200th Rd Chanute, KS 66720

RR strip in NW4

Glenn & Lora Lee Wrestler

4680 S Santa Fe Chanute, KS 66720

RR strip in NE4

Donald Jr & Cheryl Friederich

19895 Brown Rd Chanute, KS 66720

NW4 SE4

Chris & Tara Bilby 19495 Brown Rd Chanute, KS 66720

| Affidavit of Notice Served | |
|---|-------------------------|
| Re: Application for: APPLICATION FOR COMMINGLING OF PRODUCTION OR FLUIDS ACO-4 | |
| Well Name: MCMINIMY FAMILY TRUST 35-1 Legal Location: NENW S35-T27S-R17E | |
| The undersigned hereby certificates that he / she is a duly authorized agent for the applicant, and that on the day of NOVEMBER | |
| 0040 | |
| , a true and correct copy of the application referenced above was delivered or mailed to the following parties: | |
| Note: A copy of this affidavit must be served as a part of the application. | |
| Name Address (Attach additional sheets if necessary) | |
| CONSOLIDATED OIL WELL SERVICE, INC PO BOX 884, CHANUTE, KS 6672 | 20 |
| N & B ENTERPRISES, INC PO BOX 812, CHANUTE, KS 6672 | 20 |
| SEE ATTACHED | |
| | |
| | |
| | |
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| | |
| | |
| I further attest that notice of the filing of this application was published in the THE CHANUTE TRIBUNE , the office | cial county publication |
| of NEOSHO county. A copy of the affidavit of this publication is attached. | 7. |
| ingle | |
| Signed this day of NOVEMBER , 2012 | |
| Less Mari | |
| Applicant or Duly Authorized Agent | |
| Subscribed and sworn to before methis day of day of | , 2012 |
| Quanity D. Real, | |
| JENNIFER R. BEAL MY COMMISSION EXPIRES My Commission Expires: 7-20-2016 | |
| 7-20-8010 My Commission Expires: Quely 20, 2016 | : |
| | |
| | |
| | |
| | |

26-27S-17E

SW4 lessSWSW & Ash Grove Cement Co.

W2SE less

PO Box 25900

Overland Park, KS 66225

SW4 SW4

Bruce & Jennifer Lee

1060 200th Rd Chanute, KS 66720

Tract in E2 SE4

Kevin & Julie Unrein 20255 Brown Rd Chanute, KS 66720

Tract in SE4 SE4

Larry & Marilyn Lock 1028 Windsor Dr Chanute, KS 66720

Tract in SW4 SE4

Hunter & Denise Hastings

1520 200th Rd Chanute, KS 66720

Tract in SW4 SE4

Linda Miller 1740 200th Rd Chanute, KS 66720

Tract in SW4 SE4

Kim & Shelly Kuhn 1630 200th Rd Chanute, KS 66720

35-27S-17E

tract in NW4

Chad & Jeana Anderes

1035 200th Rd Chanute, KS 66720

RR strip in NW4

Glenn & Lora Lee Wrestler

4680 S Santa Fe Chanute, KS 66720

RR strip in NE4

Donald Jr & Cheryl Friederich

19895 Brown Rd Chanute, KS 66720

NW4 SE4

Chris & Tara Bilby 19495 Brown Rd Chanute, KS 66720

AFFIDAVIT

STATE OF KANSAS

SS.

County of Sedgwick

Mark Fletchall, of lawful age, being first duly sworn, deposeth and saith: That he is Record Clerk of The Wichita Eagle, a daily newspaper published in the City of Wichita, County of Sedgwick, State of Kansas, and having a general paid circulation on a daily basis in said County, which said newspaper has been continuously and uninterruptedly published in said County for more than one year prior to the first publication of the notice hereinafter mentioned, and which said newspaper has been entered as second class mail matter at the United States Post Office in Wichita, Kansas, and which said newspaper is not a trade, religious or fraternal publication and that a notice of a true copy is hereto attached was published in the regular and entire Morning issue of said The Wichita Eagle for _1_ issues, that the first publication of said notice was

made as aforesaid on the 9th of

November A.D. 2012, with

subsequent publications being made on the following dates:

And affiant further says that he has personal knowledge of the statements above set forth and that they are true.

Eletchall

Subscribed and sworn to before me this

9th day of November, 2012

PENNY L. CASE Notary Public - State of Kan My Appt. Expires

Notary Public Sedgwick County, Kansas

Printer's Fee: \$134.80

LEGAL PUBLICATION

PUBLISHED IN THE WICHITA EAGLE NOVEMBER 9, 2012 (3216889) BEFORE THE STATE CORPORATION COMMISSION OF THE STATE OF KANSAS

OF THE STATE OF KANSAS

NOTICE OF FILING APPLICATION

RE In the Matter of Postrock Midcontinent
Production, LLC Application for
Commingling of Production in the
McMinimy Family Trust 35-1 located in
Neosho County, Kansas.

TO: All Oil & Gas Producers, Unleased Mineral
Interest Owners, Landowners, and all
persons whomever concerned.
You, and each of you, are hereby notified
that Postrock Midconlinent Production, LLC
has filled an application to commingle the
Summit, Mulky, Bevier, Croweburg, Fleming,
Tebo, Weir, Squirrel and Barriesville producing
formalions at the McMinimy Family Trust
35-1, located in the New, S35-7275-R17E,
Approximately 660 FNL & 1980 FWL, Neosho Approximately 660 FNL & 1980 FWL, Neosho

County, Kansas.

Any persons who object to or protest this application shall be required to file their this application shall be required to file their objections or projest with the Conservation Division of the State Corporation Commission of the State of Kansas within fifteen (15) days from the date of this publication. These projests shall be filed pursuant to Commission regulations and must state specific reasons why granting the application may cause waste, violate correlative rights or pollute the natural resources of the State of Kansas.

All persons interested or concerned shall take notice of the forecoming and shall governor.

All persons interested or concerned shall lake notice of the foregoing and shall govern themselves accordingly. All person and/or companies wishing to protest this application are required to file a written protest with the Conservation Division of the Kansas Oil and Gas Commission.

Gas Commission.

Upon like receipt of any protest, the
Commission will convene a hearing and
protestants will be expected to enter an
appearance either through proper legal counsel or as individuals, appearing on their own behalf.
Postrock Midcontinent Production, LLC 210 Park Avenue, Suite 2750 Oktahoma City, Oklahoma 73102 (405) 660-7704

BEFORE THE STATE CORPORATION COMMISSION OF THE STATE OF KANSAS NOTICE OF FILING APPLICATION

RE: In the Matter of Postrock Midcontinent Production, LLC Application for Commingling of Production in the McMinimy Family Trust 35-1 located in Neosho County, Kansas.

TO: All Oil & Gas Producers, Unleased Mineral Interest Owners, Landowners, and all persons whomever concerned.

You, and each of you, are hereby notified that Postrock Midcontinent Production, LLC has filed an application to commingle the Summit, Mulky, Bevier, Croweburg, Fleming, Tebo, Weir, Squirrel and Bartlesville producing formations at the McMinimy Family Trust 35-1, located in the NE NW, S35-T27S-R17E, Approximately 660 FNL & 1980 FWL, Neosho County, Kansas.

Any persons who object to or protest this application shall be required to file their objections or protest with the Conservation Division of the State Corporation Commission of the State of Kansas within fifteen (15) days from the date of this publication. These protests shall be filed pursuant to Commission regulations and must state specific reasons why granting the application may cause waste, violate correlative rights or pollute the natural resources of the State of Kansas.

All persons interested or concerned shall take notice of the foregoing and shall govern themselves accordingly. All person and/or companies wishing to protest this application are required to file a written protest with the Conservation Division of the Kansas Oil and Gas Commission.

Upon the receipt of any protest, the Commission will convene a hearing and protestants will be expected to enter an appearance either through proper legal counsel or as individuals, appearing on their own behalf.

Postrock Midcontinent Production, LLC 210 Park Avenue, Suite 2750 Oklahoma City, Oklahoma 73102 (405) 660-7704

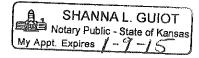
A COPY OF THE AFFIDAVIT OF PUBLICATION MUST ACCOM-PANY ALL APPLICATIONS

Affidavit of Publication &

STATE OF KANSAS, NEOSHO COUNTY, ss: Rhonda Howerter, being first duly sworn, deposes and says: That she is Classified Manager of THE CHANUTE TRIBUNE, a daily newspaper printed in the State of Kansas, and published in and of general circulation in Neosho County, Kansas, with a general paid circulation on a daily basis in Neosho County, Kansas, and that said newspaper is not a trade, religious or fraternal publication.

Said newspaper is a daily published at least weekly 50 times a year: has been so published continuously and uninterruptedly in said county and state for a period of more than five years prior to the first publication of said notice; and has been admitted at the post office of Chanute, in said county as second class matter.

| That the attached notice is a true copy thereof and was published in the regular and entire issue of said newspaper for consecutive time, the first publication thereof being made as aforesaid on the day of |
|---|
| , 2012, 2012 |
| , 2012, 2012 |
| Subscribed and sworn to and before me this |
| My commission expires: January 9, 2015 Printer's Fee |



Conservation Division Finney State Office Building 130 S. Market, Rm. 2078 Wichita, KS 67202-3802



Phone: 316-337-6200 Fax: 316-337-6211 http://kcc.ks.gov/

Sam Brownback, Governor

Mark Sievers, Chairman Thomas E. Wright, Commissioner Shari Feist Albrecht, Commissioner

November 27, 2012

Clark Edwards
PostRock Midcontinent Production LLC
Oklahoma Tower
210 Park Ave, Ste 2750
Oklahoma City, OK 73102

RE: Approved Commingling CO111210

McMinimy Family Trust 35-1, Sec. 35-T27S-R17E, Neosho County

API No. 15-133-26763-00-00

Dear Mr. Edwards:

Your Application for Commingling (ACO-4) for the above described well, received by the KCC on November 19, 2012, has been reviewed and approved by the Kansas Corporation Commission (KCC) per K.A.R. 82-3-123. Notice was examined and found to be proper per K.A.R. 82-3-135a. No protest had been filed within the 15-day protest period.

Based upon the depth of the Bartlesville formation perforations, total oil production shall not exceed 100 BOPD and total gas production shall not exceed 50% of the absolute open flow (AOF).

File form ACO-1 upon re-completion of the well to commingle.

Commingling ID number CO111210 has been assigned to this approved application. Use this number for well completion reports (ACO-1) and other correspondence that may concern this approved commingling.

Sincerely,

Rick Hestermann Production Department