

**TERRA ENERGY PARTNERS**  
H&P 271  
Well# TR 522-23-597  
API# 05-045-23459-00  
PAD# TR 32-23-597  
RIG PHONE: 970-986-4861



**SURFACE HOLE: 14-3/4" TD 2968'**

**Surface Casing Details: 5/10/2017**

RUN 9-5/8" SURFACE CASING AS FOLLOWS: MADE UP 1 FLOAT SHOE, 1 JT. OF 9-5/8" 36# J-55 LT&C AS SHOE JOINT AND 1 FLOAT COLLAR, 3 JOINTS OF 9-5/8" 36 # WITH PARASITE SUB AND 67 JTS OF 36# J-55 ST&C, WITH 1 JOINT OF 36# J-55 ON TOP TO BE CUT OFF AND A WELD ON WELL HEAD AT GROUND LEVEL FOR A TOTAL OF 72 JOINTS OF SURFACE CASING. SHOE DEPTH 2968'. FLOAT COLLAR DEPTH 2942', PARASITE SUB @ 2818'. RUN CENTRALIZERS ON FIRST THREE JTS, THEN 1 CENTRALIZER EVERY 3RD JOINT THERE AFTER INCLUDING 2 CEMENT BASKETS FOR A TOTAL OF 15 CENTRALIZERS, BOTTOM CENTRALIZER AT 2956' AND TOP CENTRALIZER AT 672'. CASING SET DEPTH @ 2967'. (RUN 91 JOINTS OF 1.90" 2.76# IJ J-55 TUBING FOR A PARASITE FROM SURFACE TO 2860'.)

**Surface Cement Details: 5/10/17**

SURFACE CEMENT AS FOLLOWS: HELD SAFETY MEETING WITH HALLIBURTON CEMENTERS AND H&P 271 RIG CREW. TESTED LINES TO 3500 PSI, PUMPED ONE 5 BBL FRESH WATER SPACER, ONE 10 BBL SUPER FLUSH SPACER, PUMPED ONE 5 BBL FRESH WATER SPACER, PUMPED ONE 10 BBL CALCIUM CHI. H2O SPACER, PUMPED ONE 5 BBL FRESH WATER SPACER, PUMPED ONE 10 BBL SUPER FLUSH 100 SPACER, PUMPED ONE 5 BBL FRESH WATER SPACER, PUMPED ONE 10 BBL CALCIUM CHI. H2O SPACER, PUMPED ONE 10 BBL FRESH WATER SPACER. LEAD, PUMPED 498 BBLS (1175 SACKS) OF VARICEM 12.3 PPG, 2.38 YLD, 13.76 GAL/SK LEAD CEMENT W/ 70% EXCESS ON LEAD. TAIL, PUMPED 130 BBLS (345 SKS) OF 12.8 PPG, 2.11 YLD, 11.78 GAL/SK VARICEM TAIL CEMENT W/ 70% EXCESS. DROPPED PLUG, DISPLACED WITH 227.6 BBLS OF FRESH WATER W/ 512 PSI LIFT @ 10 BPM, SLOWED DOWN TO 2 BPM FOR LAST 10 BBLS OF DISPLACEMENT W/ 172 PSI PRIOR TO BUMPING PLUG. BUMPED PLUG T/ 605 PSI. BLEED 1 BBL BACK TO TRUCK AND FLOATS HELD. HAD NO RETURNS DURING CEMENT JOB. / HAD 0 BBLS CEMENT BACK T/ SURFACE / FLUSHED PARASITE STRING WITH 10 BBLS OF SUGAR WATER. TOPPED OUT W/ 80 SACKS, 17 BBLS OF 15.6 #, 1.19 FT3/SK 5.24 GAL/SK CEMENT. CEMENT TO SURFACE

Pressure Equilibrium Calculation

Assumptions:

Water in casing when flowing casing pressure is measured prior to bumping the plug.  
Friction loss in casing is negligible  
Loss of lead cement only - all tail cement remains in the annulus

|                               |               |                      |                   |
|-------------------------------|---------------|----------------------|-------------------|
| Flowing Casing Pressure (FCP) | 172 psi       | Annulus volumetrics: | 14.75 hole size   |
| Annular Fill Volume           | 1.46769 lf/cf |                      | 9.625 casing size |
| Surface Casing Setting Depth  | 2968 feet     |                      | 1.46769 lf/cf     |
| Annular Fluid Weight          | 0.0 ppg       |                      | 0.68134 cf/lf     |
| Sacks Lead Cement             | 1175 sx       |                      | 8.240488 lf/bbl   |
| Yield Lead Cement             | 2.38 cf/sk    |                      | 0.121352 bbl/lf   |
| Slurry Weight Lead Cement     | 12.3 ppg      |                      |                   |
| Sacks Tail Cement             | 345 sx        |                      |                   |
| Yield Tail Cement             | 2.11 cf/sk    |                      |                   |
| Slurry Weight Tail Cement     | 12.8 ppg      |                      |                   |

Calculations:

|                                    |           |
|------------------------------------|-----------|
| Height of Tail Cement              | 1068 feet |
| BHP (Hydrostatic + FCP)            | 1457 psi  |
| Pressure Exerted by Tail Cement    | 710 psi   |
| Difference                         | 747 psi   |
| Height of Mud (Top of Lead Cement) | 731 feet  |

Calculation Check:

|  |          |
|--|----------|
| Pressure Exerted by Annular Fluid Above Cement | 0 psi    |
| Pressure Exerted by Lead Cement                | 747 psi  |
| Pressure Exerted by Tail Cement                | 710 psi  |
|  | 1457 psi |

|                             |            |
|-----------------------------|------------|
| Top Job Cement Yield        | 2.38 cf/sk |
| Cement Required for Top Job | 209 sx     |
| Slurry Volume               | 498 cf     |
| Slurry Volume               | 89 bbl     |

|                      |        |
|----------------------|--------|
| Actual Cement        | 0 sx   |
| Actual Slurry Volume | 0.0 cf |
| Pea Gravel           | 0 cy   |
| Total Volume         | 0 cf   |

Simple Volumetric Calculation Comparison

Assumptions:

No loss to the formation

|                              |               |
|------------------------------|---------------|
| Annular Fill Volume          | 1.46769 lf/cf |
| Surface Casing Setting Depth | 2968 feet     |
| Sacks Lead Cement            | 1175 sx       |
| Yield Lead Cement            | 2.38 cf/sk    |
| Sacks Tail Cement            | 345 sx        |
| Yield Tail Cement            | 2.11 cf/sk    |
| Height of Fluid Column       | 5173 feet     |

Other Calculations

Convert Barrels to Cubic Feet/Sacks:

|               |      |
|---------------|------|
| Barrels       | 0    |
| Cubic Feet    | 0    |
| Yield (cf/sk) | 1.71 |
| Sacks         | 0    |

Stage Tool - First Stage Barrels Circulated:

|                                   |                |
|-----------------------------------|----------------|
| DV tool depth                     | 0              |
| Barrels per foot above DV tool    | 0.12 bbls/foot |
| Expected Returns from first stage | -89 bbls       |