



Horsetail 19N-1924M-R
REDTAIL
Perf SWD Zones & Test
API No. 051234063000
AFE #14-2010

WELL DATA

Surface Location: 660' FSL & 2616' FEL of Sec 19, T10N, R57W, Weld County, CO

Elevations: Ground Level: 4749 ft Kelly Bushing: 4760 ft (11' KB)

Depths: Total Depth: 8317 ft KBMD

Surface Casing: *Planned to be run from surface to 1550'*

<u>OD</u>	<u>Grade</u>	<u>Weight</u>	<u>ID</u>	<u>Drift</u>	<u>Cap</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tensile</u>
9-5/8"	J-55	36 lb/ft	8.921 in	8.765 in	0.0773 bbl/ft	2020 psi	3520 psi	394,000 lbs

Production Casing: *Planned to be run from surface to 8317', w/ DV tool at 6200'*

<u>OD</u>	<u>Grade</u>	<u>Weight</u>	<u>ID</u>	<u>Drift</u>	<u>Cap</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tensile</u>
7"	L-80	29 lb/ft	6.184 in	6.059 in	0.0371 bbl/ft	7020 psi	8160 psi	587,000 lbs

OBJECTIVE

Horsetail 19N-1924M-R is a re-drill of the original well. The information listed above is planned, the wellbore has not yet been drilled. The well's intended purpose is two-fold: (1) to initially be used as a seismic monitoring well for offset hydraulic stimulation work, and (2) to be used as a SWD well. This procedure proposes to test the intended SWD zones by perforating (depths approximate), swabbing native fluids, performing a matrix acid stimulation, and performing a step rate test. After the SWD zones are tested, this procedure proposes to prepare the well for use as a seismic monitoring well by setting a Retrieval Bridge Plug above the perforated zones and installing seismic arrays. A procedure to equip this well with injection tubulars will be submitted along with the UIC paperwork once the formation testing covered in this procedure is complete and results have been received.

Re-Plug and Abandon Procedure

1. Provide the COGCC with 48-hour notice of MIRU via electronic form.
2. MIRU WO rig. Mob-in pump, tank, and all other necessary equipment. NU 7-1/16" 5K BOP w/ 3-1/2" pipe rams on top and blind rams on bottom, pressure test high and low, function test BOP. Deliver 8300' of 3-1/2" 9.3 lb/ft EUE workstring. Have delivered two (2) clean 500-bbl upright tanks and fill with fresh water. Heat as necessary, add biocide, corrosion and scale inhibitor. Inhibited water will be used for all wellbore operations.
3. PU bit & scraper TIH on workstring, tag DV collar at +/- 6200', Drill-out DV, make several passes to ensure DV tool 'smooth'. TIH & tag PBTD, ensure wellbore depth of at least 8100'. C/O if necessary, circulate well clean, TOOH standing back tag LD tools.
4. MIRU wireline. PU Isolation Scanner with VDL, NU pack-off, RIH & log from PBTD to surface. ND pack-off, LD tools.
5. PU perforating guns loaded w/ 6 spf, 60 degree phasing (0.42" EHD min) and pack off, NU pack off to BOP. RIH w/ guns and perforate Amazon at approx. 7860' - 7915' KB. POOH spent guns, ND pack off, LD gun, and ensure all shots fired.
6. PU PKR & TIH. Set PKR at 7810'. Swab wellbore volume plus minimum of 100 bbls native formation fluid. Sample fluid, label (Amazon formation) and send in for analysis. Release PKR & TOOH standing back, LD tools.
7. PU perforating guns loaded w/ 6 spf, 60 degree phasing (0.42" EHD min) and pack off, NU pack off to BOP. RIH w/ guns and perforate Lyons at approx. 7535' - 7610', 7500' - 7520' & 7455' - 7490' KB. POOH spent guns, ND pack off, LD gun, and ensure all shots fired.

8. PU RBP & PKR & TIH. Set RBP at 7650', pull up hole & set PKR at 7410'. Swab wellbore volume plus minimum of 100 bbls native formation fluid. Sample fluid, label (Lyons formation) and send in for analysis. Release PKR, TIH & release RBP & TOOH standing back, LD tools.
9. PU perforating guns loaded w/ 6 spf, 60 degree phasing (0.42" EHD min) and pack off, NU pack off to BOP. RIH w/ gun and perforate Entrada @ 7060'-7080' KB. POOH spent guns, ND pack off, LD gun, and ensure all shots fired.
10. PU RBP & PKR & TIH. Set RBP at 7150', pull up hole & set PKR at 7010'. Swab wellbore volume plus minimum of 100 bbls native formation fluid. Sample fluid, label (Entrada formation) and send in for analysis. Release PKR, TIH & release RBP & TOOH standing back tbg, LD tools.
11. PU PKR & TIH on 3-1/2" tbg. Set PKR at 7010'. Perform 7560 gal acid job with 15 % HCl & standard additives as shown below, using bio-ball diversion. Flush and monitor ISIP and 15 min of pressure fall-off. Perform step-rate injection test with 660 bbl wtr as shown below. Record pressures & rates. Record ISIP and 15 min of pressure fall-off.

MATRIX ACID STIMULATION

<u>Stage</u>	<u>Rate (bpm)</u>	<u>Vol (bbl)</u>	<u>Time (min)</u>
Pad (wtr)	5	10	2
15% HCl	5	60	12
Diversion	5	10	2
15% HCl	5	60	12
Diversion	5	10	2
15% HCl	5	60	12
Flush	5	200	40
TOTAL		410	

STEP RATE TEST

<u>Rate (bpm)</u>	<u>Vol (bbl)</u>	<u>Time (min)</u>
1	10	10
2	20	10
3	30	10
4	40	10
5	50	10
6	60	10
7	70	10
8	80	10
9	90	10
10	100	10
11	110	10
TOTAL	660	

12. Release PKR, TOOH w/ 3-1/2" tbg, LD tbg & tools.
13. MIRU WL, PU RBP, NU pack-off, RIH & set RBPs at 7700', 7200', & 7000'. POOH w/ setting tool. Fill csg and pressure test to 1500 psi. PU seismic array for monitoring project. RIH w/ array, hang-off in well. RDMO WL. ND BOP, NU WH.
14. RDMO WO Rig and ancillary equipment.

SAFETY & ENVIRONMENTAL

****EMERGENCY CONTACTS BELOW****

Whiting Operating stresses safety and environmental stewardship in all operations. Safety tailgate meetings are encouraged prior to commencing with any major wellsite task. Spills of notable size should be reported and recorded. The proper personal protective equipment (PPE) should be worn at all times while on location. Should there be any questions regarding Whiting's safety/environmental policies, the Wellsite Supervisor will provide instruction.

EMERGENCY CONTACT INFORMATION

<u>Contacts</u>	<u>Phone Number & Description</u>
EMERGENCY	911 or (800) 472-2121
Sheriff's Department (Sterling, CO)	(970) 522-3512 (Logan County)
New Raymer Fire Dept	(970) 437-5713
After Hours Emergency (WOG)	
Engineer: Charles Ohlson	Cell: (303) 489-6268, Office: (303) 390-4905
Rig Supervisor: Brent Brown	Cell: (701) 290-0123
Operations Supervisor: Mike Staab	Cell: (307) 299-0095, Office: (970) 493-2900