



Razor 26J-2633L
Redtail
DFIT Procedure
AFE # TBD
API # 051233749500

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Well Data

Surface Location 2,251' FSL, 2,047' FEL (NWSE), Sec 26, T10N, R58W

Elevations: Ground Level: 4,728.3 ft Kelly Bushing: 4,727.2 ft (17.3' KB)
Depths: Total Depth: 9,422 ft KBMD

Surface Casing: 40 jnts 9-5/8", 36 ppf J-55 LTC set at 1,615' KB, cmt'd w/ 742 sks Type III, 14.5 ppg, 1.40 cf/sk, full returns, cmt to surface

<u>OD</u>	<u>Grade</u>	<u>Weight</u>	<u>ID</u>	<u>Drift</u>	<u>Capacity</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tensile</u>
9-5/8 in	J-55	36 ppf	8.921 in	8.765 in	0.0773 bbl/ft	2,020 psi	3,520 psi	453 kip

Production Casing: 214 jnts 5-1/2", 17 ppf L-80 LTC set at 9403' KB, cmt'd in two stages w/ 1,263 sks Class G 10.5 ppg, full returns, cmt to surface

<u>OD</u>	<u>Grade</u>	<u>Weight</u>	<u>ID</u>	<u>Drift</u>	<u>Capacity</u>	<u>Collapse</u>	<u>Burst</u>	<u>Tensile</u>
5-1/2 in	L-80	17 ppf	4.892 in	4.767 in	0.0232 bbl/ft	6,290 psi	7,740 psi	338 kip

Wellhead Details

Casing Head: 11" 5K

Tubing Head: 7-1/16" 10K

Adapter Flange: 4-1/16" 10K x 7-1/16" 10K

Frac Tree: 4-1/16" 10K x 7-1/16" 10K Adapter, 4-1/16" Manual Master Valve, Flow Cross with dual 3-1/16" 10K Double Valve Outlets, and 4-1/16" Crown (Manual) Valve

Discussion

The following is a procedure to run a Diagnostic Fracture Injection Test (DFIT) and a single stage frac including preparatory well work. A bridge plug will be set above the Entrada perforations and the Niobrara B Chalk perforations will be shot on wireline. The DFIT will be performed by a frac crew and data will be recorded for 96 hours using tandem surface gauges. Data will be sent to Whiting personnel. Frac will be performed according to attached frac procedure and data from after frac logs sent to Whiting personnel.

Safety and Environmental

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. While perforating, radio-safe detonating charges are required and all unnecessary personnel should minimize exposure to equipment. While pumping stimulations treatments, exposure to high-pressure lines should also be minimized. MSDS sheets and means to treat exposure should be readily available for all chemicals on location. 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	
Contacts	Phone Number & Description
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)	

Wellsite and Downhole Preparation

1. NU 7-1/16" 10K Manual Master Valve to tbg head.
2. MIRU WL crew, RT Gauge Ring/Junk Basket to 6950', MU 5-1/2" CIBP, NU 10K lubricator, RIH and set at 6,925' KB, POOH, PU dump bailer & load w/ Class G cmt, RIH and dump-bail 10' cmt on CIBP. Load csg and test plug to 2000 psi.
3. Load csg, pressure test manual master valve and csg to 7000 psi for 15 min
4. Move in one (1), 500 bbl water tank. Fill and heat tank to 70 °F. Ensure biocide and clay control are added to tanks or during the DFIT.
5. PU one (1) 3-1/8 scalloped gun 3' long, 6 spf, 60 deg phasing. NU 10K lubricator & WL BOP, RIH and perforate at 5661-5664 ft. POOH with spent gun. LD lubricator and spent gun. RDMO WL crew.

DFIT Procedure

1. NU tandem 10K pressure/temperature quartz gauges to tbg head. Ensure gauges are programed to record pressure data on one (1) second intervals. Gauge accuracy must be 0.01 psi.
2. MIRU frac pump & crew. Test frac iron to 7500 psi. Open well and pump DFIT per rate and volume schedule below:

Volume (gal)	Rate (bpm)	Time (h:mm:ss)
100	4	0:00:36
2500	12	0:04:58
250	10	0:00:36
200	8	0:00:36
<u>150</u>	<u>6</u>	<u>0:00:36</u>
3200		0:07:22

**All fluid used for DFIT should be fresh water with biocide and chemical clay control (equivalent to 3% KCL)*

***The max treating pressure is 7000 psi.*

3. After shutdown, record pressure fall-off data with frac-van for one (1) hour prior to SI the well & RDMO frac pump and crew.

****Do not isolate pressure/temperature gauges from treating pressure or fall-off pressure.*

4. Record pressure fall-off data for 96 hours.

****Do not bleed off pressure or pump into well during the pressure fall-off recording period.*

5. Send data to:

Charles Ohlson	charles.ohlson@whiting.com	303-390-4905
Don Koenig	don.koenig@whiting.com	303-876-7060
Sam Bentley	sam.bentley@whiting.com	303-876-7048

WELL PREP, Step 1: Fill Frac Tanks with **1500 bbls** of fresh water (or utilize nearby water source & limited onsite tanks). Frac service company to add biocide directly to water. Obtain water samples & perform QA/QC analysis as per Whiting Oil & Gas Guidelines & Specifications. **1500 bbls will be needed for frac work.**

WELL PREP, Step 2: NU Remainder of frac tree to existing Master Valve: 4-1/16" 10K x 7-1/16" 10K Adapter, 4-1/16" Manual Master Valve, Flow Cross with dual 3-1/16" 10K Double Valve Outlets, and 4-1/16" Crown (Manual) Valve. Pressure test Frac Tree to 7000 psi.

STAGE 1 - NIOBRARA 'B' INTERVAL 5661' TO 5664' Mid Perf: 5663 ft

FRAC, Step 1: MIRU Frac Company. Rig frac iron to Frac Tree. Hold Safety Meeting w/ all personnel on location. Review procedure, job, escape routes, safety hazards, MSDS, wireline safety, emergency contacts, PP&E, etc. Review critical job parameters (pressure, volume, rate, contingency plans, etc.). Set electronic kills at **6,500 psi**, test frac lines to **7,500 psi**. Check SICP, apply same pressure to frac iron prior to opening WH.

FRAC, Step 2: Frac the Niobrara 'B' down casing per the criteria & design in the table below (ensure design matches recommendation & procedure from Frac Company). Tag 40/70 proppant with Iridium 192, 1 & 2 ppg proppant stages with Scandium 46, and 3 & 4 ppg proppant stages with Antimony 124 (ProTechnics).

JOB AT A GLANCE

Pump Rate: 25 bpm	40/70 White: 2000 lbm	Estimated Pressure: 3090 psi
Fluid Volume: 1429 bbl	20/40 White: 73000 lbm	Maximum Pressure: 7000 psi
<i>*Does not include acid volume</i>		

FRAC DESIGN PARAMETERS - Wellbore, Hydraulics and Formation Information

Treating Rate:	25 bpm	Effective Holes:	18 perfs	Casing ID:	4.892 in
Anticipated FG:	0.75 psi/ft	Perf Diam:	0.41 inches	Capacity:	0.0232 bbl/ft
Fluid Density:	8.34 ppg	Perf Eff:	50%	BH Temp:	210 deg F
Absolute Vol:	0.0451 gal/lb	Coeff. Dchg:	0.55	Pfriction:	150.0 psi/1000ft
Overflush:	0 bbls	Pore Pressure:	2650 psi	Treating Press:	3087 psi

HYDRAULIC SAND FRACTURE STIMULATION DESIGN

Stage No.	Fluid Name	Proppant Type	Clean Volume (gal)	Prop Con (ppg)	Slurry Rate (bpm)	Prop Amount (lbm)	Clean Rate (bpm)	Sly Vol (bbl)	Cumulative Prop Amt (lbm)	Stage Time (m s)
1 Break	Slickwater		1000	0.0	10.0	0	10.0	24	0	2m 23s
2 Acid	15% HCl		2000	0.0	15.0	0	15.0	48	0	3m 10s
3 Pad	Slickwater		8000	0.0	25.0	0	25.0	190	0	7m 37s
4 Prop	Slickwater	40/70 White	8000	0.25	25.0	2000	24.7	193	2000	7m 42s
5 Pad	20# XL Gel		8000	0.0	25.0	0	25.0	190	2000	7m 37s
6 Prop	20# XL Gel	20/40 White	7000	1.0	25.0	7000	23.9	174	9000	6m 58s
7 Prop	20# XL Gel	20/40 White	8000	2.0	25.0	16000	22.9	208	25000	8m 19s
8 Prop	20# XL Gel	20/40 White	8000	3.0	25.0	24000	22.0	216	49000	8m 39s
9 Prop	20# XL Gel	20/40 White	6500	4.0	25.0	26000	21.2	183	75000	7m 19s
10 Flush	20# Linear		5529	0.0	25.0	0	25.0	132	75000	5m 16s
			62029			75000				1h 5m

FRAC, Step 3: Perform flush as per criteria above. Perform over-flush at reduced rate. Obtain ISIP, 5, 10 & 15 minute SI pressures. SI well and secure in preparation for Slickline work.

POST FRAC WORK, Step 1: Run After-Frac log to determine placement & geometry of frac jobs as follows: MIRU SL Unit w/ 10K lubricator & pressure test. Make dummy run to find PBTD. RIH w/ ProTechnics GR After Frac Memory Tool on SL. Log the vertical section of the well across the previously frac'd interval, from PBTD to 4,500'. POOH & RD SL Unit.

POST FRAC WORK, Step 2: Turn-over well to flow-testers. Open well through flowback manifold choke to flowback tank. Maintain a flowback rate of **80 - 100 bbls/hr** until desired clean-up is achieved. When burnable gas and/or condensate/oil is observed, turn well through flow-test separator. At least once per hour, document Fluid & Gas Rates & Volumes, FCP, Choke Size & Total Recovery. Sample flowback fluid every four (4) hrs for first forty-eight (48) hrs of flowback & send to Frac Company lab for analysis. Continue to flow well until notified otherwise.

POST FRAC WORK, Step 3: Unload and tally 5,600' of 2-7/8", 6.5 lb/ft L-80 tbg on pipe racks. MIRU WO Rig. ND frac tree all except 7-1/16" Manual Master Valve. NU 7-1/16" 10K BOP (upper pipe rams, lower blind rams) & test to 5,000 psi. Ensure well dead, killing with 10ppg brine as necessary. TIH w/ production tbg as follows:

PROPOSED TUBING TALLY

	<u>No.</u>	<u>Description</u>	<u>Length</u>	<u>Cumul.</u>
	----	Kelly Bushing Correction	20'	20'
(avg tbg jnt 31')	178	2-7/8", 6.5 lb/ft, L-80, 8rd Production tbg	5518'	5538'
	1	5-1/2" Tubing Anchor Catcher	3'	5541'
	2	2-7/8", 6.5 lb/ft, L-80, 8rd Production tbg	62'	5603'
	1	Seating Nipple (w/ bushing & dip-tube)	1'	5604'
	1	2-7/8" slotted sub	4'	5608'
	1	XO to Gas Anchor	1'	5609'
	1	Gas Anchor	20'	5629'
	1	Bull Plug	1'	5630'

Production BHA & AFL system subject to change based on observations during drill-out/flowback

POST FRAC WORK, Step 4: Set TAC, ND BOP & Manual Master Valve, land tbg in tension and NU Production Tree. Change over to rods and run 1-3/4" Insert Pump on rodstring (Size & Grade To Be Determined). Space-out and seat pump. Fill tbg and pressure test. Stroke pump and ensure good pump action. Hang well on and assemble flow tee. Turn over to production.