Convert to SWD Procedure

Well: Gunderson 13-11

Dan Fouts

July 17, 2018

WELL INFORMATION:

Well:	Gunderson 13-11
API #:	05-077-09010-00
Pad:	Gunderson 13-11
County, State:	Mesa, Colorado
Surface Hole:	1706 FSL & 1790 FWL NESW S13 T096S R94W
Surface Coordinates:	39.274194, -107.834527
Bottom Hole:	1994 FSL & 2113 FWL S13 T09S R94W

Elevation:	RKB:	7292
	KB:	20
	GL:	7272

PBTD:	8138 MD / 8110 TVD
TD:	8190 MD / 8162 TVD

Casing:	Conductor: 16" @ 60
	Surface: 8-5/8" 32# J55 8rd STC @ 1340 (TOC @ surface)
	Production: 4-1/2" 11.6# I80 8rd LTC @ 8185 (TOC @ 1300 / Top Good Bond @ 1690)

Perforations:	Completion @ 5955-8031

Tubing:	2-3/8" 4.7# J55 EUE 8rd @ 7516

Geology:	Wasatch G	2102
	Ohio Creek	4407
	Williams Fork	4658
	Cameo	6930
	Rollins	7312
	Cozzette	7790
	Corcoran	7992

CONTACTS:			
	Health & Safety Coordinator	Laura Lancaster	970 644 1259
	Production Coordinator	TJ Cordova	970 250 9519
	Production Coordinator	Rory Mortensen	970 778 5161
	Wellsite Consultant	Dan Hacking	970 778 1063
	Wellsite Consultant	Troy Roehm	970 852 1806
	Production Engineer	Dan Fouts	970 852 1170
	Completions Manager	John Grubich	970 589 9496
	Production Manager	Milt Johnson	970 230 1011
	Senior Regulatory Manager	Wayne Bankert	970 985 5383
	Operations Manager	Chris Clark	970 462 8375

DIRECTIONS: Contact TJ Cordova or Rory Mortensen.

PRE-JOB PLANNING:

1. Arrange for delivery of injection tubing string from (TBD). Note 2-3/8" EUE 8rd tubing coming out of well, and injection string to be 2-7/8" non-upset flush joint.
2. Note master valve, cross, and swab valve to be replaced with 2-9/16" 3K/5K equipment.

PROCEDURE:

1. Hold pre-job safety meeting with all personnel involved in this operation.
2. MIRU service rig.
3. Kill well with lease water.
4. ND production tree.
5. NU and test Class III BOPE.
6. POOH laying down 2-3/8" tubing and send to Petros for inspection.

Abandon Williams Fork, Cameo, and Corcoran Perforations:

7. Move in DLD wireline unit.
8. Run gauge ring to 5900'.
9. Set 4-1/2" 5K CIBP @ 5900.
10. Fill hole with lease water to ensure CIBP holds.
11. Pressure test and chart 4-1/2" casing to 1500 psi for 15 minutes to verify integrity.
12. Dump bail 50 linear feet (4 sacks in 2 runs) neat Class G cement on CIBP.
13. RDMO DLD wireline unit.

Perforate Ohio Creek and Prepare for Injection Test:

14. MIRU Cutters wireline unit.
15. Log CBL/GR/CCL from 5000' to 4000'.
16. Correlate to Halliburton open hole logs dated 05/21/2006.
17. Perforate the following intervals with 3-1/8" HSC guns loaded 3 spf 120 deg with Owen 19g HERO SGH-3119-330 charges:
    a. 4636' - 4656' (20')
    b. 4582' - 4628' (46')
    c. 4547' - 4567' (20')
    d. 4406' - 4438' (32')
    NET (118')
18. RDMO Cutters.
19. RIH with the following 2-7/8" 6.5# N/L80 flush joint ID coated injection string:
    a. 2-3/8" wireline re-entry guide @ 4370' +/-
    b. 2-3/8" x 10' pup jt
    c. 2-3/8" XN No-Go nipple with 1.875" BX profile
    d. 2-3/8" x 10' pup jt
    e. 2-3/8" x 10' pup jt with center 8 feet perforated 3 x 1/2" hpf
    f. 4-1/2" x 2-3/8" Arrowset / Hornet packer
    g. 2-3/8" x 10' pup jt
    h. 2-3/8" On/Off Tool with 1.875" BX profile
    i. 2-3/8" x 2-7/8" cross over
    j. 2-7/8" tubing to surface
    k. Tubing hanger threaded for BPV
20. Set packer and land tubing as per tool hand recommendation.
21. Pressure test and chart 5-1/2" casing to 1500 psi for 15 minutes to verify well integrity.
22. ND BOPE.
23. Nipple up new or refurbished 2-9/16" 3K/5K injection tree.
24. RDMO rig.

Collect Injection Zone Water Samples for Analysis:

25. Move in portable tanks to store 4500 bbls of lease water.
26. Plumb tanks in (2) parallel trains with a central take-point.
27. MIRU swab unit.
28. Swab well until 40 bbls (2 hole volumes) have been recovered.
29. Collect (3) x 1 quart samples of formation water.
30. RDMO swab unit.
31. Send water samples to lab for analysis.

Pump Step Rate Test:

32. Fill portable tanks with lease water.
33. MIRU Northern Lights slickline.
34. Install memory pressure gauges on tubing and casing.
35. Program downhole gauges to collect data sample every (2) seconds and hang off in XN nipple.
36. RDMO Northern Lights.
37. MIRU Gonzo 500 hp triplex pump, charge pump, 2 parallel sets of 2 water filter housings, and flow meter.
38. Install 25 micron filters in first set of filter housings and 5 micron filters in second set of filter housings.
39. Pump Step Rate Test as follows:

Step Number	Notes	Step Time Duration (minutes)	Step Time Duration (hours)	Time Cumulative (minutes)	Time Cumulative (hours)	Pump Rate (GPM	Pump Rate (BPM)	Step Volume (BBLS)	Volume Cumulative (BBLS)
1	Zero Rate	60	1	60	1	0	0.00	0	0
2	Min Rate	60	1	120	2	21	0.50	30	30
3		60	1	180	3	31.5	0.75	45	75
4		60	1	240	4	42	1.00	60	135
5		60	1	300	5	56	1.33	80	215
6		60	1	360	6	70	1.67	100	315
7		60	1	420	7	84	2.00	120	435
8		60	1	480	8	105	2.50	150	585
9		60	1	540	9	126	3.00	180	765
10		60	1	600	10	168	4.00	240	1005
11		60	1	660	11	210	5.00	300	1305
12		60	1	720	12	252	6.00	360	1665
13		60	1	780	13	294	7.00	420	2085
14		60	1	840	14	336	8.00	480	2565
15		60	1	900	15	378	9.00	540	3105
16	Max Rate	60	1	960	16	420	10.00	600	3705
17	Fall Off	4320	72	5280	88		0.00	0	3705
TOTAL		5100	88	5280	88				3705

40. After pumping, shut in well upstream of the tubing pressure gauge.
41. RDMO Gonzo.
42. Continue collecting data for 7 days even if surface tubing gauge indicates no pressure.
43. MIRU Northern Lights slickline.
44. Recover surface pressure gauges.
45. Recover downhole pressure gauge.
46. RDMO slickline.
47. Send all pressure gauges to Northern Lights to download data and send to Laramie Engineering.
48. Shut in and secure well.