

Injection Profile Analysis

Company: Utah FORGE
Well: FORGE 16A(78)-32-STIM1
Field: Forge
County: Beaver
State: Utah

Geoscience & Production Center of Excellence, North America

Analyst: Fanny Haroun
Email: fanny.haroun@halliburton.com
Phone: 907-342-5550
Logging Date: 04/27/2024
Report Date: 04/28/2024

HALLIBURTON DOES NOT GUARANTEE THE ACCURACY OF ANY INTERPRETATION OF THE LOG DATA, CONVERSION OF LOG DATA TO PHYSICAL ROCK PARAMETERS OR RECOMMENDATIONS WHICH MAY BE GIVEN BY HALLIBURTON PERSONNEL OF WHICH APPEAR ON THE LOG OR IN ANY OTHER FORM. ANY USER OF SUCH DATA, INTERPRETATIONS, CONVERSIONS OF RECOMMENDATIONS AGREES THAT HALLIBURTON IS NOT RESPONSIBLE EXCEPT WHERE DUE TO GROSS NEGLIGENCE OR WILLFUL MISCONDUCT, FOR ANY LOSS, DAMAGES, OR EXPENSES RESULTING FROM THE USE THEREOF



TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY..... 3

2.0 TABULATED RESULTS..... 5

3.0 PRODUCTION LOGGING SURVEY..... 6

4.0 SPINNER CALIBRATION 8

5.0 PVT PARAMETER 9

6.0 PRODUCTION LOG ANALYSIS10

7.0 TOOL DIAGRAM12

1.0 EXECUTIVE SUMMARY

Well: FORGE 16A(78)-32-STIM1

Injection Profile

Survey date: 27-APR-2024

Well History and Logging Objective

The objective of the PLT is to determine the injected fluid distribution profile into the various perforated intervals. The injection fluid for the circulation test is water from well 58B-32. The perforated intervals correspond with the frac stages that were pumped on Well 16A(78)-32 in April 3-6, 2024. The frac stage intervals in well 16A(78)-32 are as follows:

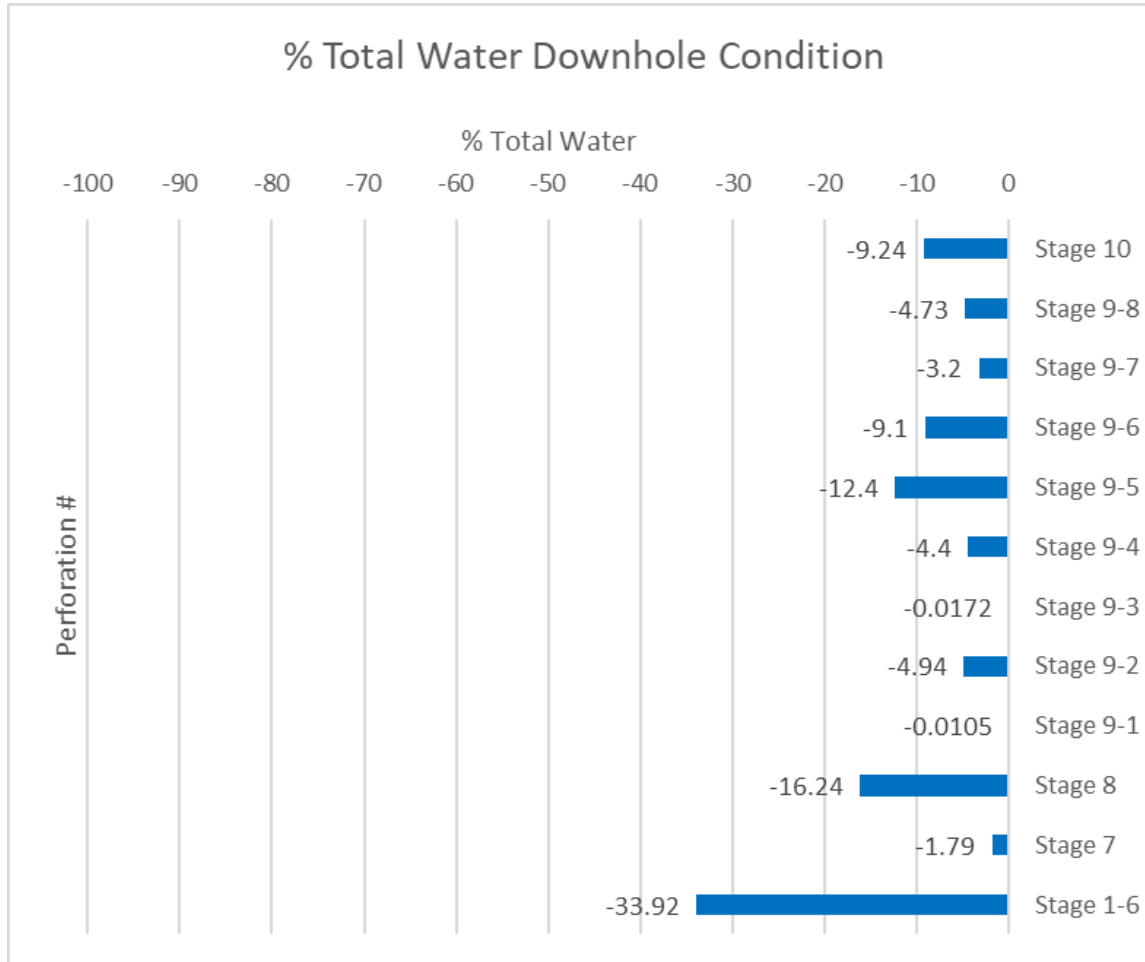
- Stage 1: 10,787 – 10,987 ft MD (Open-hole)
- Stage 2: 10,560 – 10,580 ft MD (Perforation interval)
- Stage 3: 10,120 – 10,140 ft MD (Perforation interval)
- Stage 4: 10,070 – 10,076 ft MD (Perforation interval)
- Stage 5: 10,020 – 10,026 ft MD (Perforation interval)
- Stage 6: 9,959 – 9,976 ft MD (2 Perforation clusters)
- Stage 7: 9,798 – 9,901 ft MD (3 Perforation clusters)
- Stage 8: 9,545 – 9,723 ft MD (8 Perforation clusters)
- Stage 9: 9,320 – 9,493 ft MD (8 Perforation clusters)
- Stage 10: 9,270 – 9,276 ft MD (Perforation interval)

The PLT will be conveyed into the deviated section of the wellbore, preferably on a roller bogie/taxi with added weight bars. It is desirable to measure the rate distribution of the injected water into the various frac stage intervals at constant surface injection rate.

Conclusions

22 stationary stops were recorded throughout the logging interval with average injection rate of 15 BPM (21600 BPD) of 8.36 PPG slick Water.

The injection survey shows the percentage of the water injection at downhole condition:



2.0 TABULATED RESULTS

Injection Survey

The metered rate for the analysis: -15 BPM (-21600 BWPD).

Surface Rate Summary			
		Log Date Test date	Qw (BWPD)
Calculated rates (S.C.)		27-Apr-2024	-21604
Metered Rates (S.C.)		27-Apr-2024	-21600

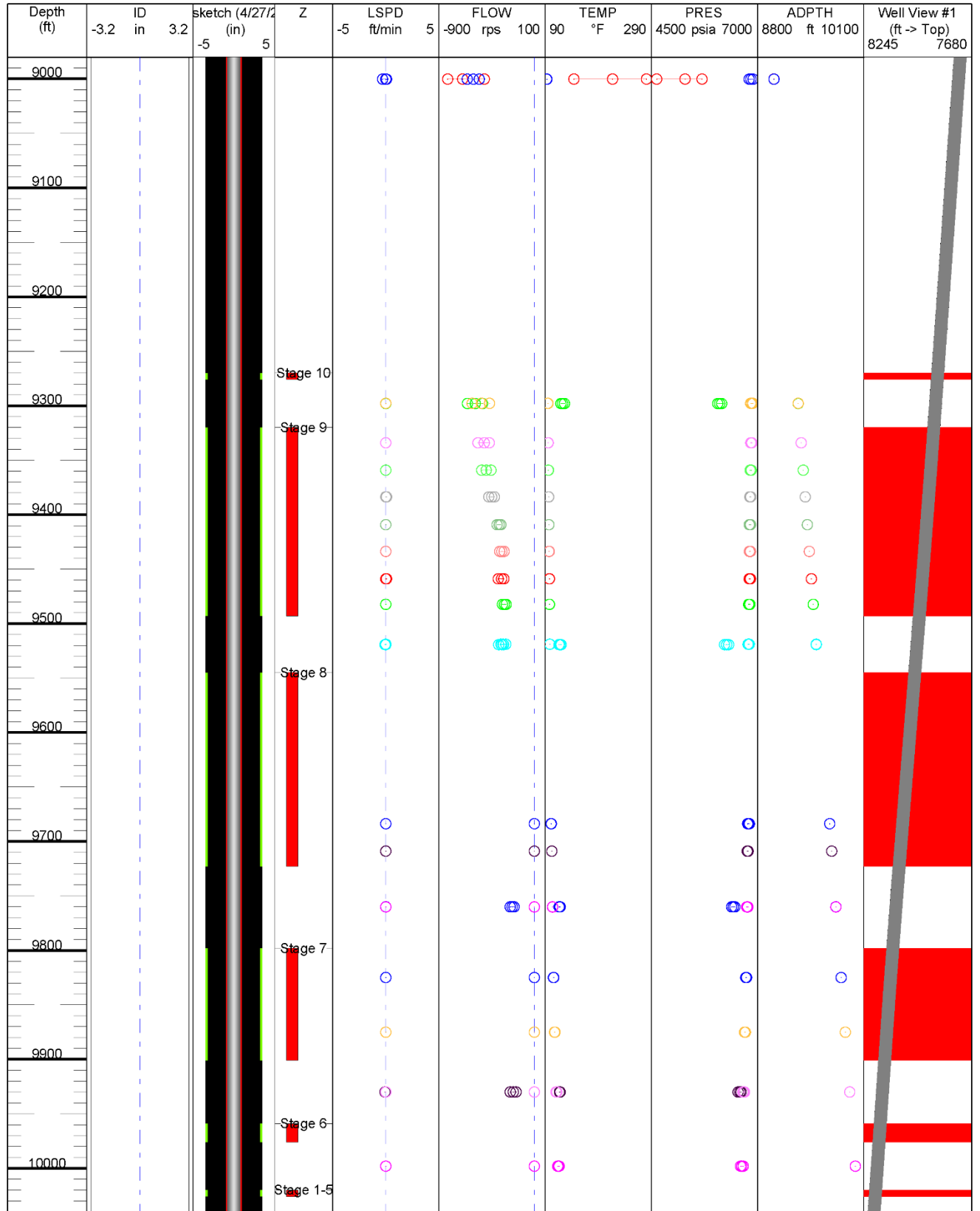
Injection at Downhole Conditions					
Layer	FRAC Status	Injection Intervals		Qw (BWPD)	% Total Rate
		Top	Bottom		
Stage 10	Open	9270.0	9276.0	-1983.3	-9.24
Stage 9-8	Open	9320.0	9329.9	-1015.9	-4.73
Stage 9-7	Open	9336.8	9355.9	-692.3	-3.22
Stage 9-6	Open	9361.6	9380.3	-1960.1	-9.13
Stage 9-5	Open	9386.4	9405.6	-2653.7	-12.36
Stage 9-4	Open	9412.9	9430.0	-946.5	-4.41
Stage 9-3	Open	9438.2	9456.0	-3.7	-0.02
Stage 9-2	Open	9461.6	9480.1	-1061.9	-4.94
Stage 9-1	Open	9485.3	9493.0	-2.3	-0.01
Stage 8	Open	9545.1	9723.0	-3487.3	-16.24
Stage 7	Open	9798.0	9901.0	-383.4	-1.79
Stage 1-6	Open	9959.0	10987.0	-7285.4	-33.92

Cumulative Rates at Downhole Conditions					
Injection Intervals		Qt (BWPD)	Press (psia)	Temp (degF)	Dev (deg)
Top	Bottom				
9270.0	9276.0	-21441.2	6870.0	93.0	65.8
9320.0	9329.9	-19457.9	6865.5	94.9	65.6
9336.8	9355.9	-18444.7	6854.7	95.5	64.8
9361.6	9380.3	-17754.0	6842.1	95.9	64.1
9386.4	9405.6	-15796.0	6831.0	96.4	64.1
9412.9	9430.0	-13143.6	6821.3	96.8	64.1
9438.2	9456.0	-12197.9	6821.9	97.1	63.2
9461.6	9480.1	-12195.8	6821.0	97.7	63.2
9485.3	9493.0	-11134.4	6811.7	97.9	63.2
9545.1	9723.0	-11133.9	6798.4	98.5	63.0
9798.0	9901.0	-7655.7	6760.1	103.7	63.9
9959.0	10987.0	-7285.4	6679.2	111.1	66.6

3.0 PRODUCTION LOGGING SURVEY

Curve scale:

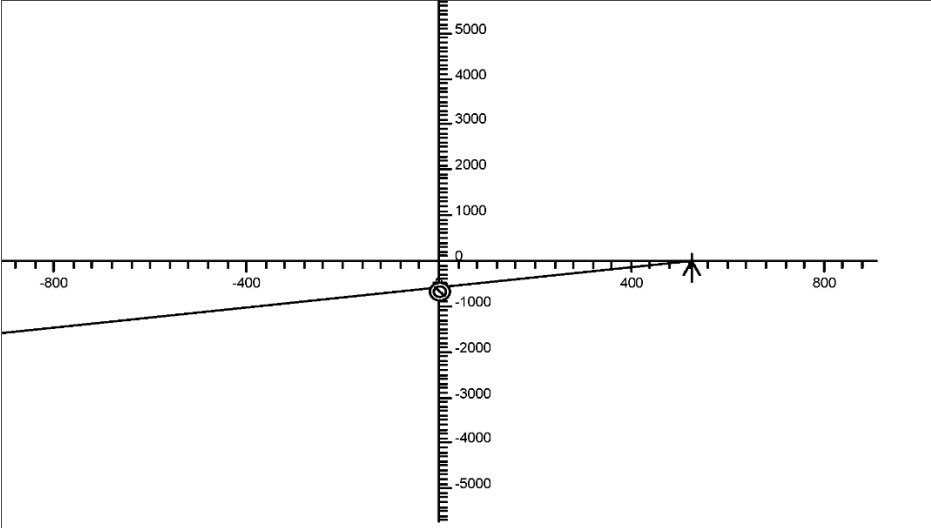
- ID: Internal Diameter, -3.2 to 3.2 inches.
- LSPD: Line Speed, 5 to 5 ft/min.
- FLOW: Flowmeter Spinner, -900 to 100 RPS.
- TEMP: Temperature, 90 - 290 degF.
- PRES: Pressure, 4500-7000 psia.
- ADPTH: Actual Stop Depth, ft
- Well View (TVD): 8245-7680 ft.



4.0 SPINNER CALIBRATION

The spinner calibration was done at depth 9000 ft MD, calibrated to match the surface injection rate of 21600 BPD.

HALLIBURTON		16A_IPROF_27APR24_V1
	Company: Utah FORGE Field: FORGE Well: FORGE 16A(78)-32-STIM1	Test: IPROF Date: 04/27/2024 Survey: Survey # 1



rps versus ft/min

Threshold (+) 0 ft/min
Threshold (-) 0 ft/min

	Calib. Zone ft	Slope (+)	Slope (-)	Int (+) ft/min	Int (-) ft/min	Int. Diff. ft/min
<input type="checkbox"/>	8988.3-9009.5	N/A	1.100	N/A	523.74	0.00

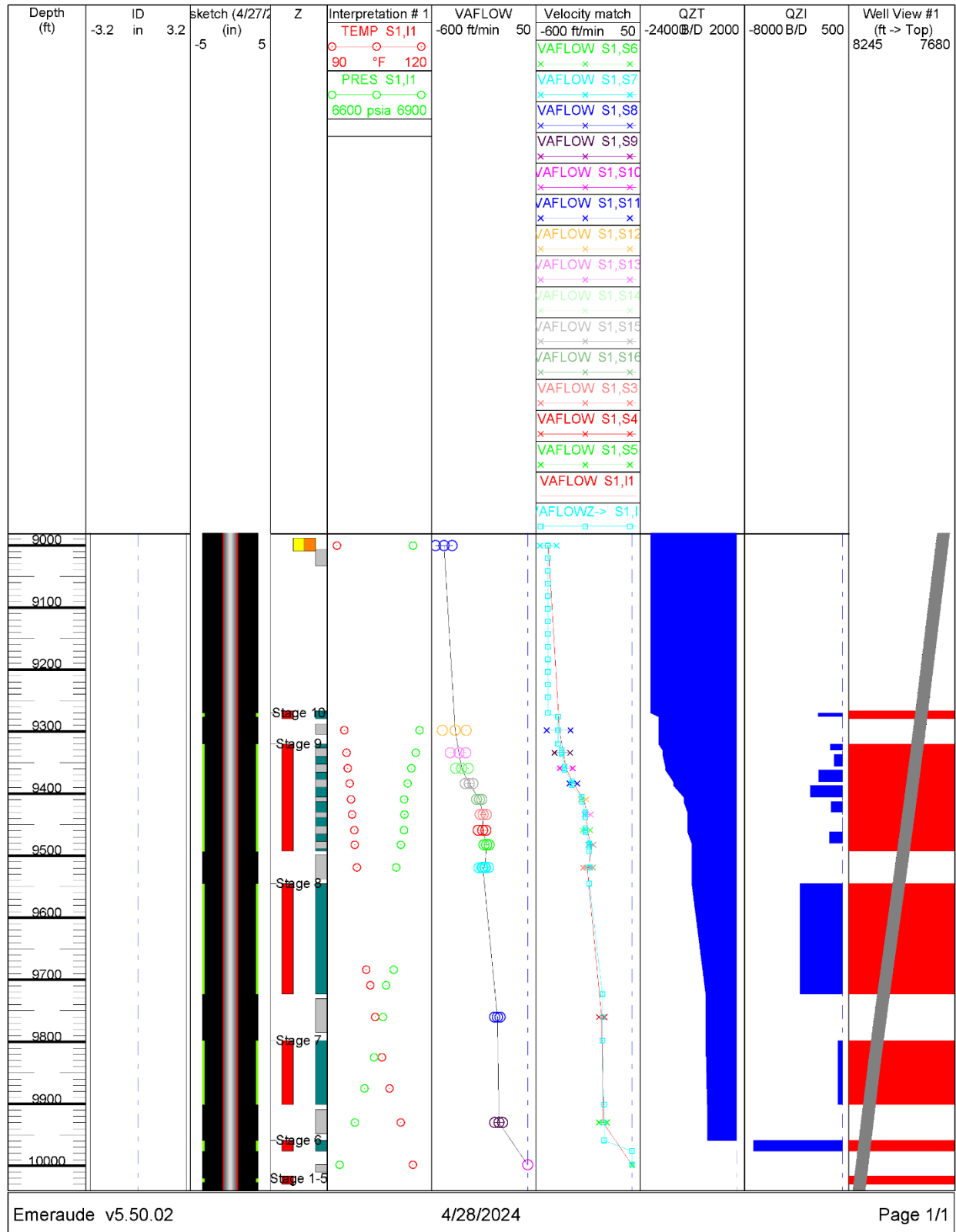
Emeraude v5.50.02
4/28/2024
Page 1/1



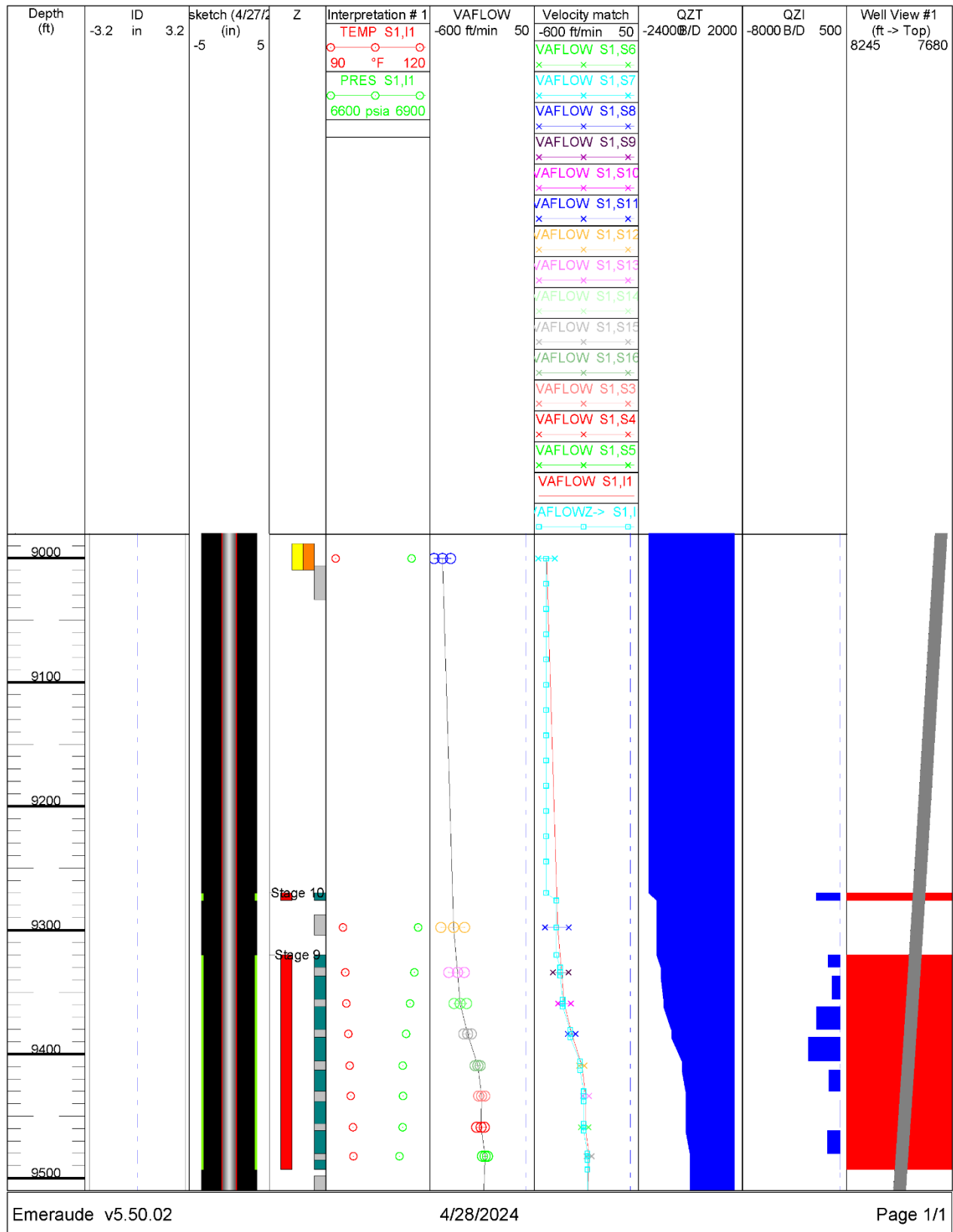
5.0 PVT PARAMETER

	PVT	16A_IPROF_27APR24_V1
HALLIBURTON	Company: Utah FORGE Field: FORGE Well: FORGE 16A(78)-32-STIM1	Test: IPROF Date: 04/27/2024 Survey: Survey # 1
<div><div>FLUID TYPE</div><div>Water</div></div> <div><div>Salinity, ppm</div><div>10000</div></div> <div><div>Rsw</div><div>Katz</div></div> <div><div>cw</div><div>Dodson and Standing</div></div> <div><div>Muw</div><div>Van-Wingen+Frick</div></div>		
Emeraude v5.50.02 <div>4/28/2024</div> Page 1/1		

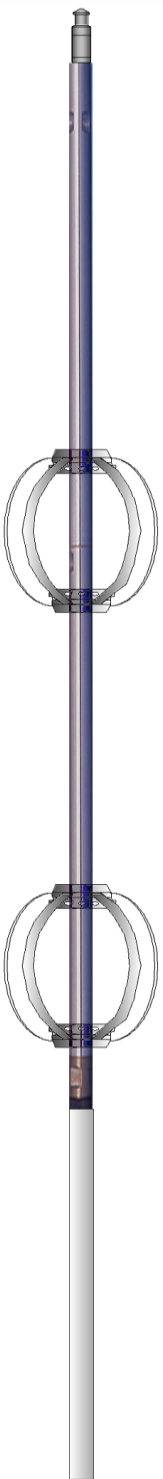
6.0 PRODUCTION LOG ANALYSIS



Detail Interpretation Plot for Stage 9 Perforation Clusters



7.0 TOOL DIAGRAM

Sensor	Offset (ft)	Schematic	Description	Length (ft)	O.D. (in)	Weight (lb)
			CHD-1_69 (1.69) 1.6875 CABLEHEAD	1.00	1.69	
			SLIP-OBC Slip On 3 .625 Dits Centralizer	3.00	3.63	5.00
			WT-1-11/16" 1.6875" WEIGHT BAR	19.00	1.69	84.00
			SLIP-OBC (001) Slip On 3 .625 Dits Centralizer	3.00	3.63	5.00
			KUSTER_PL-PTS (GS5219) Kuster PTSC	6.71	1.75	
PRES	2.58					
TEMP	1.33					
FLOW	0.38					
UTCTIM	0.00					
Dataset: 16a_plt.db: field/well/run1/pass1 Total length: 26.71 ft Total weight: 94.00 lb O.D.: 3.63 in						

End of Report