



# Production Log Interpretation Report

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Company:	OG&G McClain Facility
Field:	Newcastle
County:	McClain, Oklahoma
Well:	Waste Disposal well #1
Survey Date:	2 May 2011

Interpretation Date:	5 May 2011
Analyst:	J. Camacho

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## **Purpose of Survey**

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To determine the injection profile in the well at two injection rates, 250 GPM (8571 bwpd) and 475 GPM (16286 bwpd)

## **Discussion / Conclusions**

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Several perforated intervals have been grouped together for the purpose of the analysis because the flowmeter readings were fairly inconsistent due to the plugging material in the well.

Overall the injection profile is heterogeneous. The injection profiles indicate that the zones 4670'-4737' and 4915'-4950' are taking most of the injected water (about 58% of total water injected). The zones 4800'-4865' and 6120'-6130' are also taking a fairly significant water rate (about 30 % of total water injected).

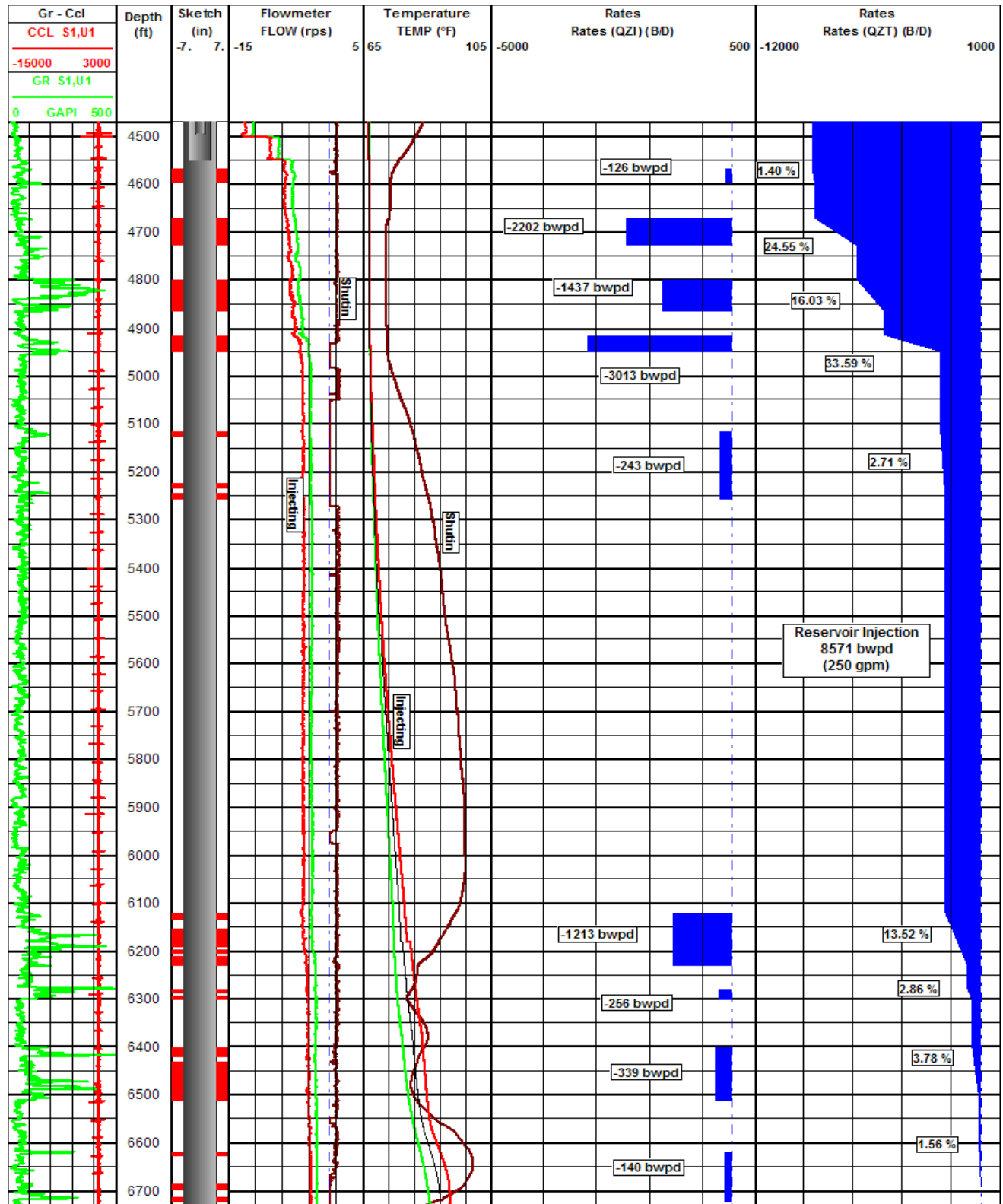
The flowmeter and temperature logs suggest that the lowest point of injection is 6626 ft.

The shut in pass ran in this well (see log on page 14 of this report) does not show any clear evidence of cross flow above the perforated interval. The log is a bit noisy below 2500 ft but the response does not have the pattern of a cross flow condition.

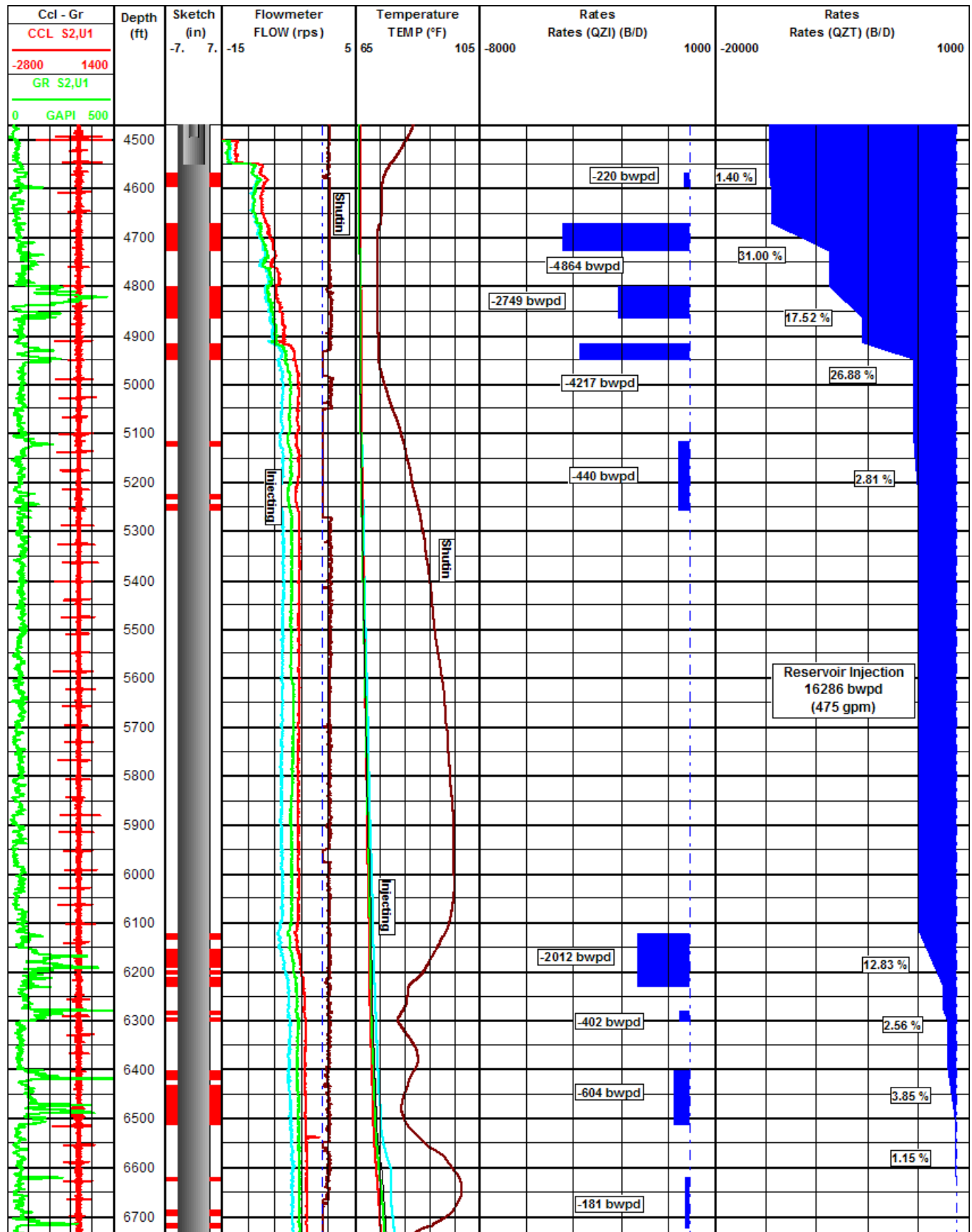
Refer to page 4 and 5 for a graphical representation of the injection profiles at the two injection conditions.

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## Injection Profile – Low Rate



## Injection Profile – Hi Rate



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## Survey Summary

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Injection rates:

Water	250 GPM
Water	475 GPM

### Tools Summary

String OD	1.375 in
Capacitance	(Calib. Type )
100% Water	N/A
100% HC	N/A
Density	None
Spinner blade OD	1.44 in

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## Interpretation Summary

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Interpretation Name: Interpretation # 1

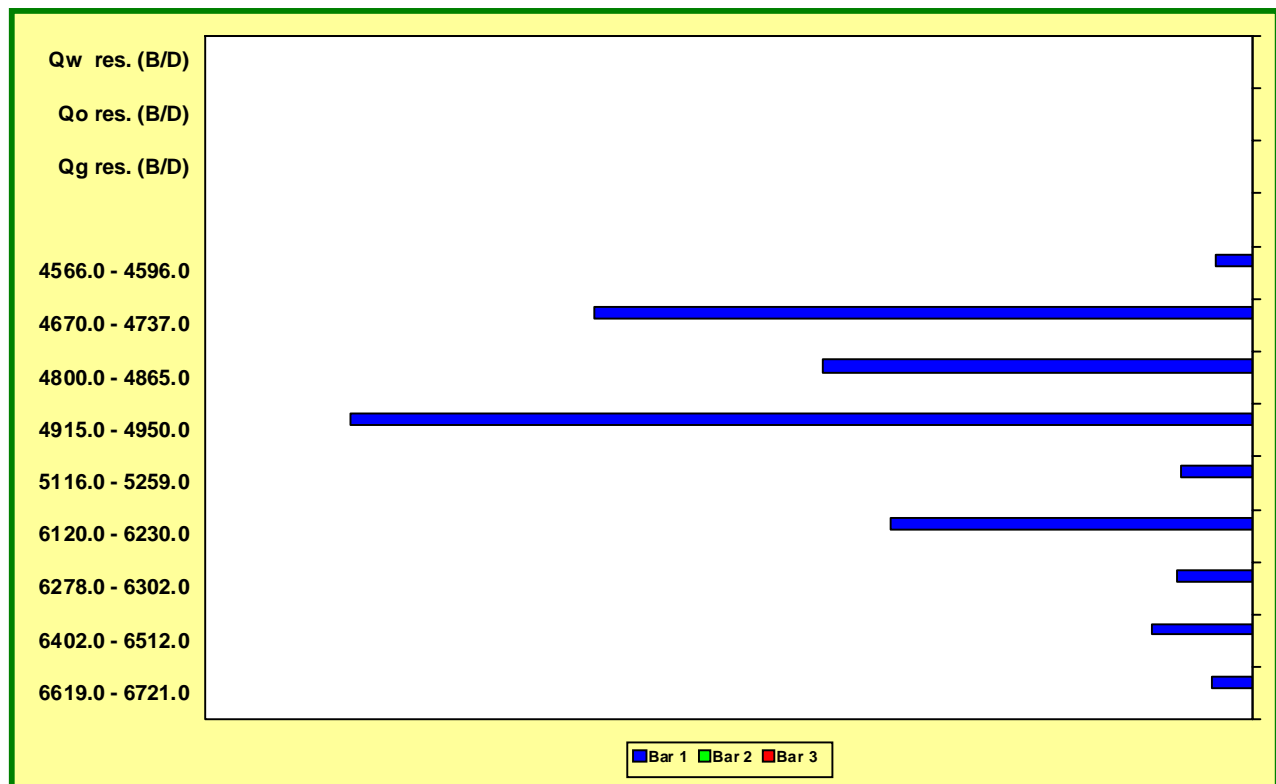
Flow type	Single-phase
Flow model	
Flow model	L-G
Flow model	W-O
Vpcf multiplier	1
Vslip multiplier	N/A
Vslip mult.W-O	N/A

### General Interpretation Comments:

- 1) The flowing conditions of this well were stable but the flowmeter measurements were erratic due to plugging with residue from well.
- 2) A single-phase water model was used for the analysis.
- 3) All flowmeter up passes were used in the apparent fluid velocity calculation.
- 4) No pressure measurements were available for rate calculations at surface conditions.

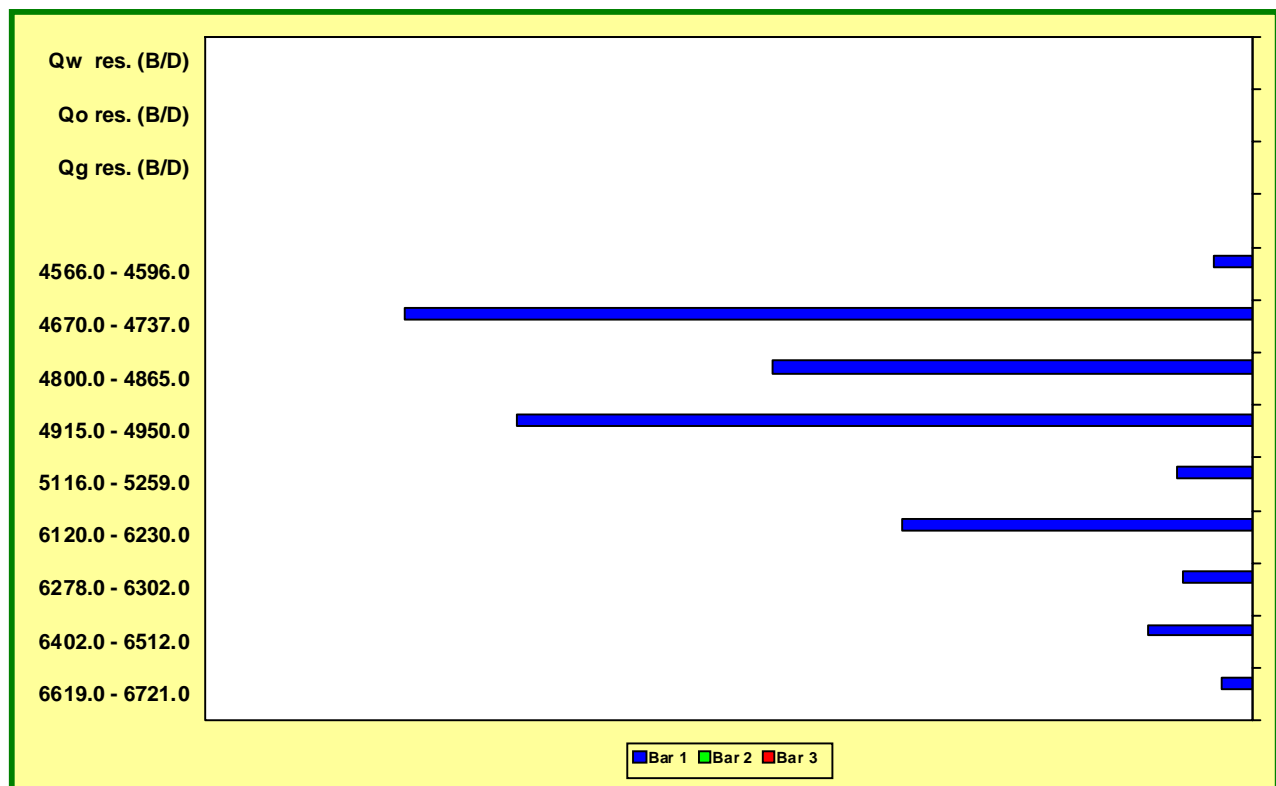
## Estimated Injection by Zone (Low Rate)

Zones (ft)	Qw res. (B/D)	Qo res. (B/D)	Qg res. (B/D)
4566.0 - 4596.0	-126.03	0.00	0.00
4670.0 - 4737.0	-2202.45	0.00	0.00
4800.0 - 4865.0	-1437.68	0.00	0.00
4915.0 - 4950.0	-3013.61	0.00	0.00
5116.0 - 5259.0	-242.82	0.00	0.00
6120.0 - 6230.0	-1213.29	0.00	0.00
6278.0 - 6302.0	-256.22	0.00	0.00
6402.0 - 6512.0	-339.30	0.00	0.00
6619.0 - 6721.0	-139.81	0.00	0.00



## Estimated Injection by Zone (Hi Rate)

Zones (ft)	Qw res. (B/D)	Qo res. (B/D)	Qg res. (B/D)
4566.0 - 4596.0	-220.00	0.00	0.00
4670.0 - 4737.0	-4864.40	0.00	0.00
4800.0 - 4865.0	-2748.73	0.00	0.00
4915.0 - 4950.0	-4217.38	0.00	0.00
5116.0 - 5259.0	-440.37	0.00	0.00
6120.0 - 6230.0	-2012.41	0.00	0.00
6278.0 - 6302.0	-401.66	0.00	0.00
6402.0 - 6512.0	-604.10	0.00	0.00
6619.0 - 6721.0	-180.57	0.00	0.00





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## Fluid Parameters Summary

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### Fluid Type: Water

#### Gas: (NO)

Specific gravity	N/A
N2 %	N/A
CO2 %	N/A
H2S %	N/A
Z factor	
$\mu$ g	

#### Oil: (NO)

Gravity	N/A
GOR	N/A
WOR	
Rs, Pb	
Bo	
Co	
$\mu$ o	

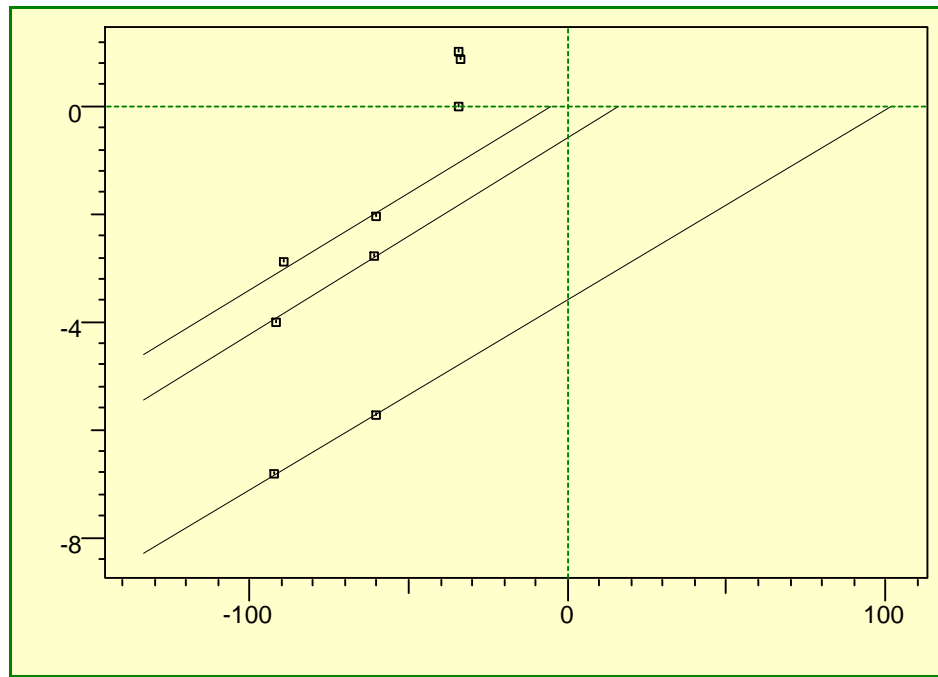
#### Condensate: (NO)

Tank GOR	N/A
Tank gas gravity	N/A
Separator GOR	N/A
Separator gas gravity	N/A
Separator P	N/A
Separator T	N/A
Dew point P	N/A
Dew point T	N/A
Liq. Gravity	N/A
N2 %	N/A
CO2 %	N/A
H2S %	N/A

#### Water: ( )

Salinity, ppm	10000
Rsw	Katz
Cw	Dodson and Standing
$\mu$ w	Van-Wingen+Frick
$\mu$ w	Van-Wingen+Frick

## Spinner Calibration Summary



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)
4553.4 - 4561.3	N/A	0.035	N/A	101.419	0.000
5514.1 - 6030.0	N/A	0.037	N/A	15.819	0.000
6727.3 - 6735.2	N/A	0.036	N/A	-5.325	0.000

### Estimated Percentage Total Injection (Low Rate)

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<b>Zones (ft)</b>	<b>Qt res. (B/D)</b>	<b>Production % (%)</b>
4566.0 - 4596.0	-126.03	1.40
4670.0 - 4737.0	-2202.45	24.55
4800.0 - 4865.0	-1437.68	16.03
4915.0 - 4950.0	-3013.61	33.59
5116.0 - 5259.0	-242.82	2.71
6120.0 - 6230.0	-1213.29	13.52
6278.0 - 6302.0	-256.22	2.86
6402.0 - 6512.0	-339.30	3.78
6619.0 - 6721.0	-139.81	1.56

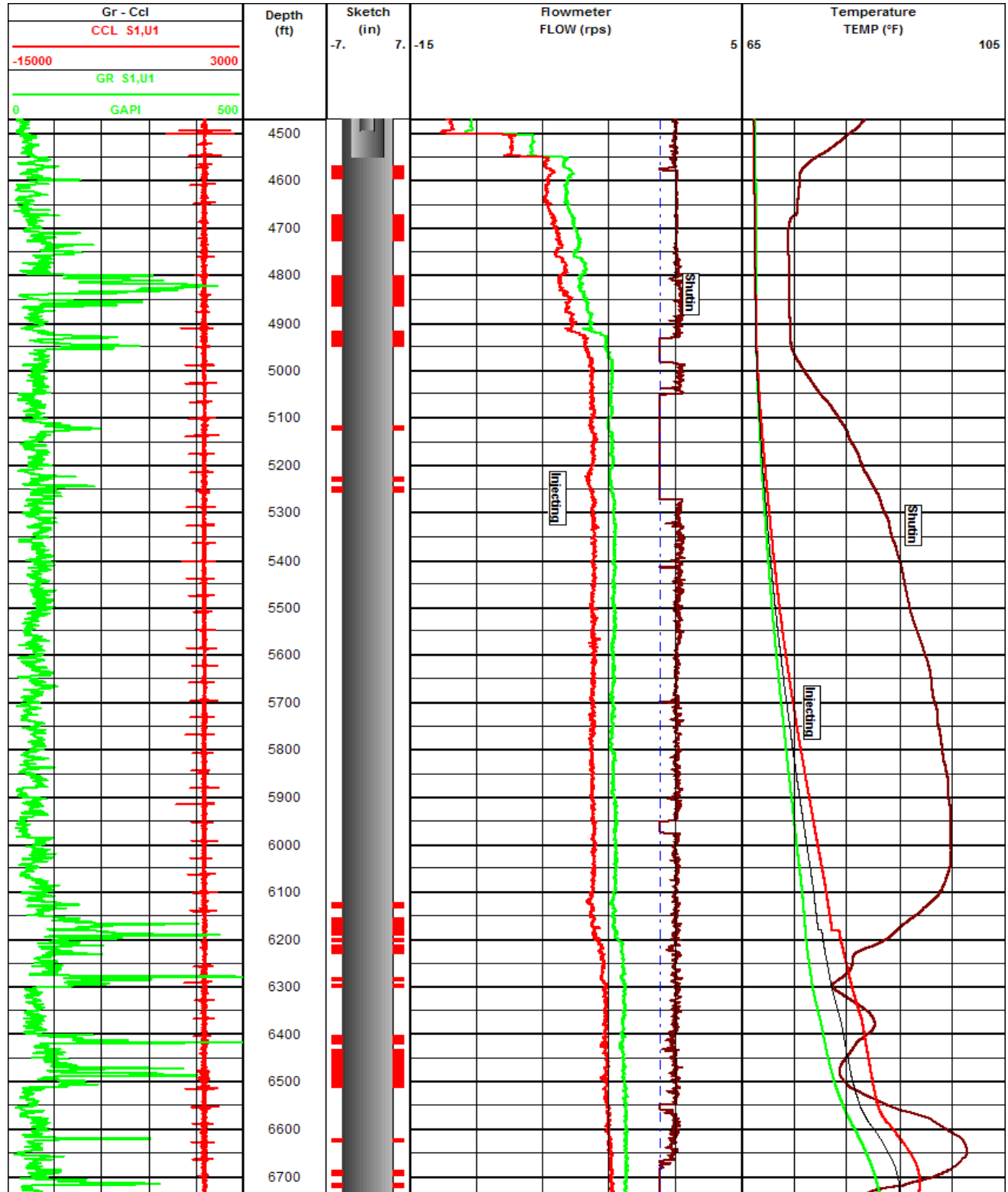
### Estimated Percentage Total Injection (High Rate)

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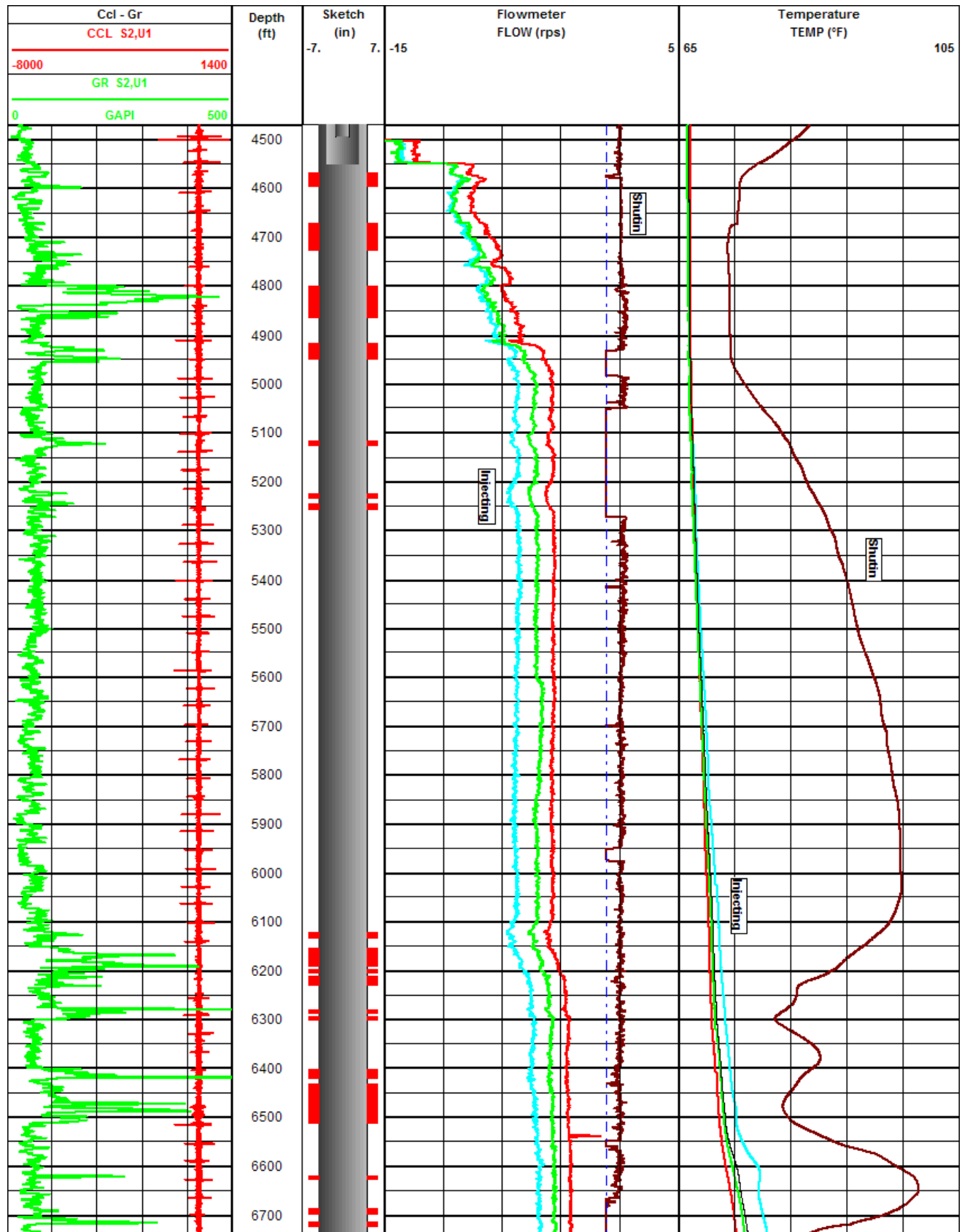
<b>Zones (ft)</b>	<b>Qt res. (B/D)</b>	<b>Production % (%)</b>
4566.0 - 4596.0	-220.00	1.40
4670.0 - 4737.0	-4864.40	31.00
4800.0 - 4865.0	-2748.73	17.52
4915.0 - 4950.0	-4217.38	26.88
5116.0 - 5259.0	-440.37	2.81
6120.0 - 6230.0	-2012.41	12.83
6278.0 - 6302.0	-401.66	2.56
6402.0 - 6512.0	-604.10	3.85
6619.0 - 6721.0	-180.57	1.15

## Appendix (Additional Tables - Log Plots)

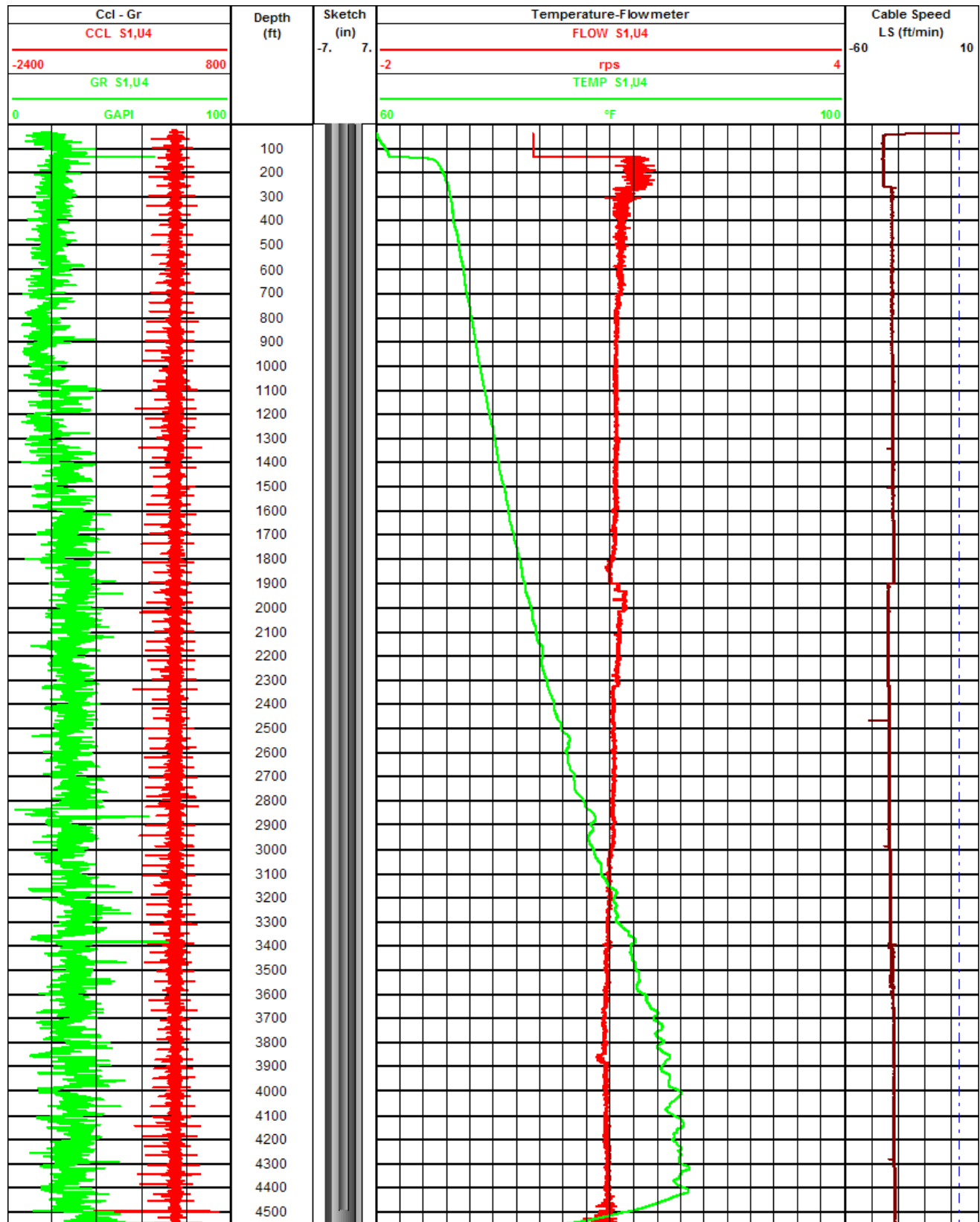
### Acquired Data – Low Rate vs Shutin



## Acquired Data – Hi Rate vs Shutin



## Acquired Data –Shutin above perforations



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### 1 7/16 Adapter Head

Weight 2 LB  
Length 14 IN  
Max. Diameter 1.44 IN  
Total Stack Weight 129 LB in air  
Total Stack Length 30.31 FT

### Sinker Bar

Weight 43 LB  
Length 84 IN  
Max. Diameter 1.44 IN

### Sinker Bar

Weight 43 LB  
Length 84 IN  
Max. Diameter 1.44 IN

### Telemetry/ Casing Collar Locator

Weight 10.8 lbs/4.9 kg  
Length 4.04 ft/1.23 m  
Max. Diameter 1.375 in/34.93 mm

### Bi-directional Centralizer

Weight 9.0 lbs/4.1 kg  
Length 2.88 ft/0.88 m  
Max. Diameter 1.375 in/34.93 mm

### Gamma Ray

Weight 7.1 lbs/3.22 kg  
Length 2.65 ft/0.81 m  
Max. Diameter 1.375 in/34.93 mm

### Bi-directional Centralizer

Weight 9.0 lbs/4.1 kg  
Length 2.88 ft/0.88 m  
Max. Diameter 1.375 in/34.93 mm

### Jewel Bearing Flowmeter/ Temperature

Weight 5.14 lbs/2.33 kg  
Length 2.23 ft/0.68 m  
Cage Max. Dia. \_\_\_\_\_

