

NGL

**C10**

*Interval*

DJINJ Formation

Weld County, CO

API: 05-123-40772

*Prepared for: Heidi Reger*

*July 21, 2018*

Stimulation Treatment  
**Post Job Report**

**Prepared By:**

Zackery Roberson

Patrick Stirewalt

Bravo Crew

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## Engineering Executive Summary

On July 21, 2018 a stimulation treatment was performed in the DJINJ formation on the C10 well in Weld County, CO. The proposed treatment consists of:

10,000 gallons of 15% HCl Acid

The actual treatment consisted of:

12,008 gallons of 15% HCl Acid

A more detailed description of the actual treatment can be found in the attached reports. The following comments were provided to summarize events and changes to the proposed treatment:

Halliburton is strongly committed to quality control on location. Before and after each job all chemicals, proppants, and fluid volumes are measured to assure the highest level of quality control. Tank fluid analysis, crosslink time, and break tests are performed before each job in order to optimize the performance of the treatment fluids.

Halliburton maintains a continuous quality improvement process and appreciates any comments or suggestions that you may have. Halliburton again thanks you for the opportunity to perform service work on this well. We hope to be your solutions provider for future projects.

Thank you,

Zackery Roberson  
Feid Technology  
Halliburton Energy Services

**Customer** NGL  
**Formation** DJINJ  
**Lease** C10  
**API** 05-123-40772  
**Date** July 21, 2018

**Stage Summaries**

Interval	Fluids											
	Average		Max		ISIP		Treated Recycled Water		15% HCl Acid		Total Fluid	
	Pressure	Rate	Pressure	Rate	psi	psi/ft	gal	bbbl	gal	bbbl	gal	bbbl
1	3908	30.3	4344	36.3	1497	0.576	21,609	514.5	12,008	285.9	33,617	800

	Fluids											
	Average		Max		ISIP		Treated Recycled Water		15% HCl Acid		Total Fluid	
	Pressure	Rate	Pressure	Rate	psi	psi/ft	gal	bbbl	gal	bbbl	gal	bbbl
Planned	/ / / / / /						6,946	165	10,000	238	16,946	403
Recorded	3908	30	4344	36	1497	0.576	21,609	514.5	12,008	285.9	33,617	800

**Customer** NGL  
**Lease** C10  
**Formation** Niobrara  
**API** 05-123-40772  
**Date** July 21, 2018



Directional Data
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KOP  
Avg. TVD 10,487 ft  
Total MD 10,482 ft

Zone #	Displacement to Top Perf (gal)	Displacement to Top Perf (bbl)
1	6,843	163

Customer  
Lease  
Formation

NGL  
C10  
Niobrara

05-123-40772  
Sec 35 T7N R65W

API  
Legals

Treatment Interval	Stage Number	Fluid Description	Stage Description	Slurry Rate <i>(bpm)</i>	Design Clean Volume <i>(gal)</i>	Actual Clean Volume <i>(gal)</i>
Interval	1-1	Treated Water	Injection	40.0	100	10,775
	1-2	15% HCl Acid	Acid	40.0	10,000	12,008
	1-3	Treated Water	Flush	40.0	6,846	10,834
<i>Job Totals</i>					16,946	33,617

NGL

**C10**

*Interval*

Niobrara Formation

Weld County, CO

API: 05-123-40772

Stimulation Treatment  
**Appendix**

Stage Comments  
Chemical Summary  
Plan Design

**Customer** NGL  
**Formation** Niobrara  
**Lease** C10  
**API** 05-123-40772  
**Date** 7/21/2018

***Interval 1***

Start	8:34:00 AM	Date	7/21/2018
End	9:05:00 AM	Engineer	Zackery Roberson

Technical Comments

8:34am Online. Dispaced 12008gal of 15% acid. Came offline at 9:05am ISIP: 1497 PSI. 5 min ISIP:1194PSI 10 min ISIP:1090PSI 15 min ISIP: 1001 PSI. Per customer requested monitored the pressure for an hour after coming offline.

Customer  
Formation  
Lease  
API  
Date

**Chemical Summary - Chemicals used per physical strap**

Interval	Acid Additives	
	HAI-404M	LoSurf-300D
	<i>(lbs)</i>	<i>(lbs)</i>
1	72	24
<b>Total</b>	<b>72</b>	<b>24</b>
<b>BBLs</b>	<b>1.7</b>	<b>0.6</b>

Customer  
Lease  
Formation

NGL  
C10  
Niobrara

05-123-40772  
Sec 35 T7N R65W

Treatment Interval	Stage Number	Fluid Description	Stage Description	Slurry Rate <i>(bpm)</i>	Design Clean Volume <i>(gal)</i>	Design Clean Volume <i>(bbl)</i>	Design Slurry Volume <i>(bbl)</i>	Stage Time <i>(hh:mm:ss)</i>
Interv	1-1	Treated Water	Injection	40.0	100	2	2	00:00:04
	1-2	15% HCl Acid	Acid	40.0	10,000	238	238	00:05:57
	1-3	Treated Water	Flush	40.0	6,846	163	163	00:04:05
<i>Job Totals</i>					16,946	403	403	00:10:05

# HALLIBURTON

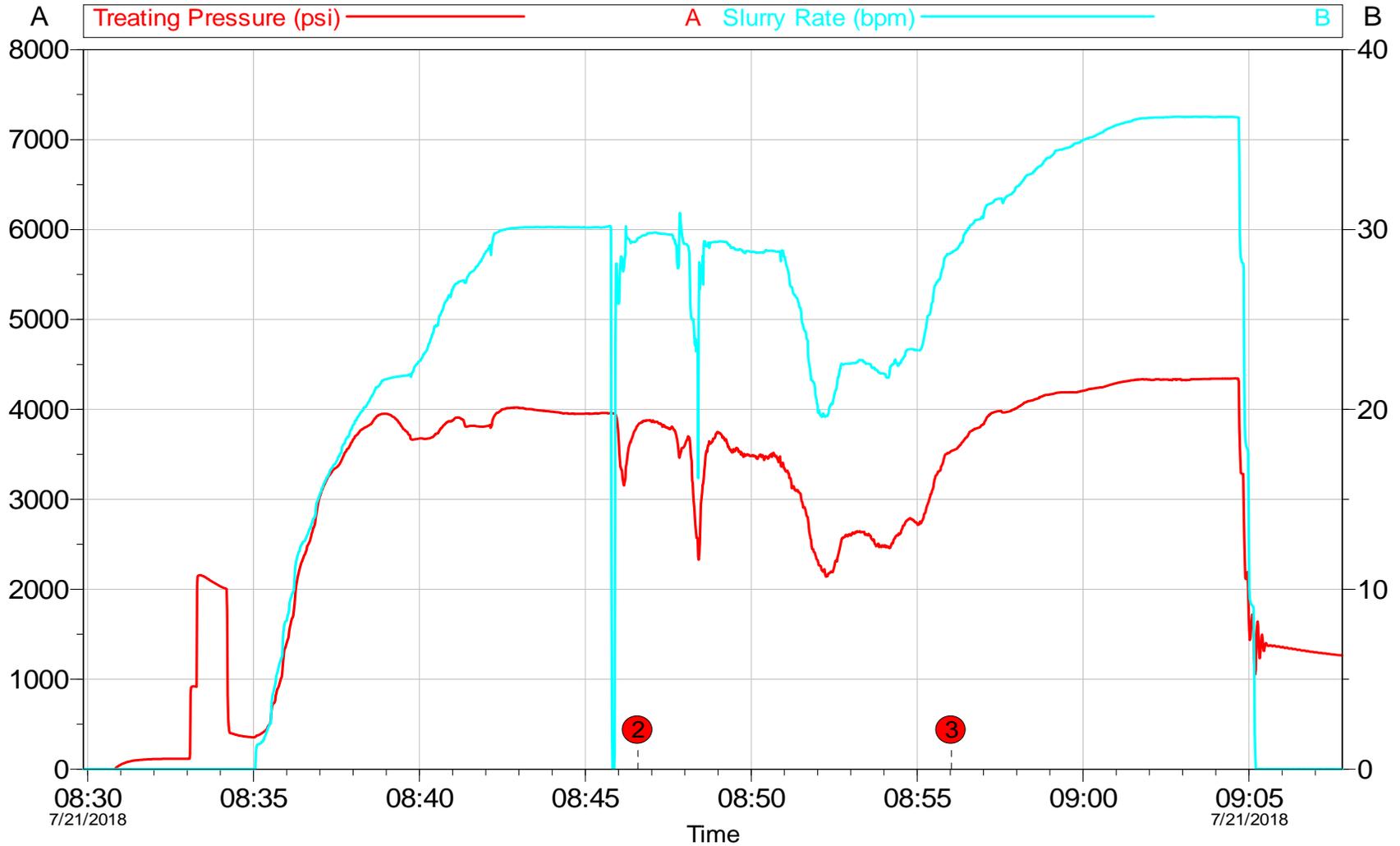
## EXECUTIVE SUMMARY

Company:	NGL		
Well:	C10		
Date:	7/21/2018		
Zone:	<b>DJINJ</b>		
Fluid System:	Hybor G		
Avg. Slurry Rate:	30.3 BPM	Start:	8:34:00
Avg. Pressure:	3908 psi	End:	9:05:00
Max. Slurry Rate:	36.3 BPM	Pump Time:	0:31
Max. Pressure:	4344 psi		
Zone Opening Pressure:	355 psi		
Total Fluid:	800 bbls		
Flush/Displacement Volume:	514 bbls		
ISIP:	1497 psi		
Frac. Gradient:	0.58 psi/ft		
Average Horsepower:	2903.22 hhp		

5min =  
10min =  
15min =

8:34am Online. Dispaced 12008gal of 15% acid. Came offline at 9:05am ISIP: 1497 PSI. 5 min ISIP:1194PSI 10 min ISIP:1090PSI 15 min ISIP: 1001 PSI. Per customer requested monitored the pressure for an hour after comnig offline.

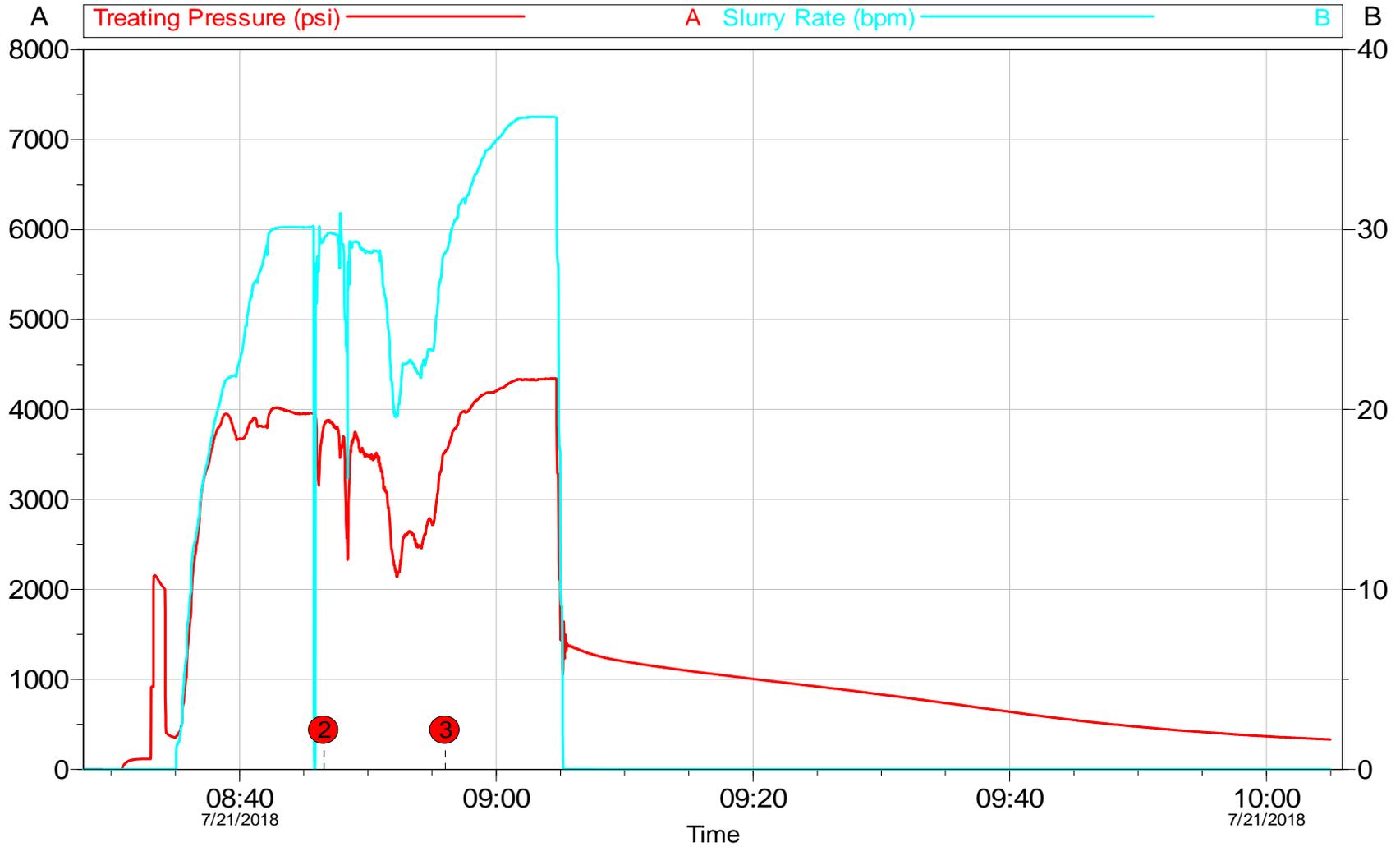
# C10 Interval 1 Treatment Plot NGL C10 - Acid



Customer: NGL	Job Date: 21-Jul-2018	Sales Order #: 0905008161
Well Description: NGL C10	UWI: 05-123-40772	

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# C10 Interval 1 Treatment Plot NGL C10 - Acid



Customer: NGL	Job Date: 21-Jul-2018	Sales Order #: 0905008161
Well Description: NGL C10 C10	UWI: 05-123-40772	

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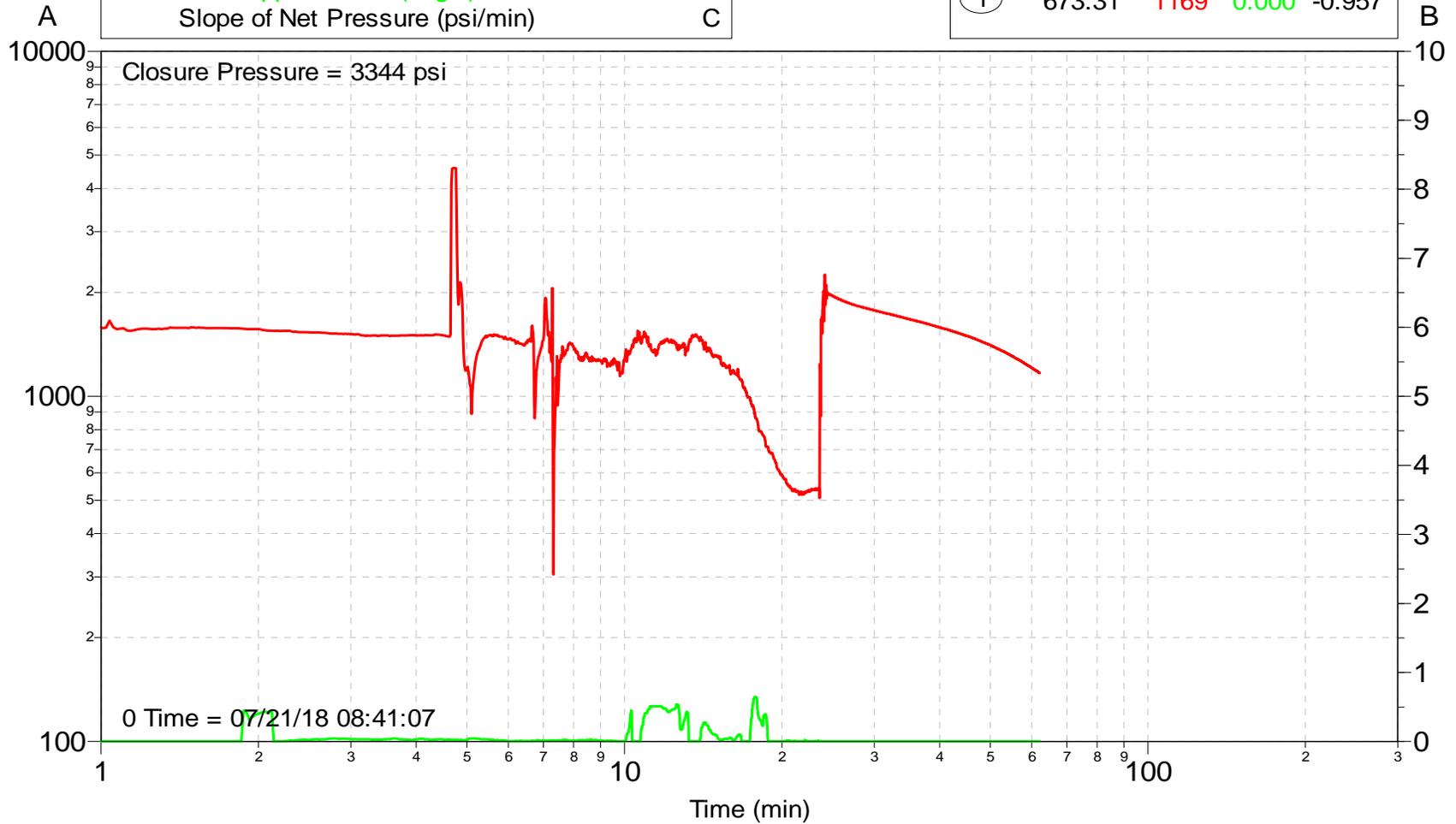
## C10 Interval 1

### Net Pressure Plot

NGL C10 - Acid

—	Net Calc'd BH Pres (psi)	A
—	BH Proppant Conc (lb/gal)	B
—	Slope of Net Pressure (psi/min)	C

	Time	NetPr	BPC	Slope
①	673.31	1169	0.000	-0.957



Customer: NGL	Job Date: 21-Jul-2018	Sales Order #: 0905008161
Well Description: NGL C10 C10	UWI: 05-123-40772	

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