

HALLIBURTON

PARADOX UPSTREAM LLC

600 TRAVIS ST STE 300
HOUSTON, TX, 77002
US

HAMILTON CREEK FEDERAL 31-31B-45-14
HAMILTON CREEK
SAN MIGUEL County, CO, US
API/UWI 05-113-06243-00
SEC: 31,TWP: 45,RNG: 14

5 Stage - 70Q Linear Gel Foam Frac

Proposal 313377 - Version 2.0
March 26, 2019

Submitted by:
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3199 D Rd
Grand Junction, CO - 81504-6185
USA

HALLIBURTON

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*Halliburton appreciates the opportunity to present
this cost estimate and looks forward to being of service to you.*

1 Foreword

Enclosed is our cost estimates and or recommended procedure for stimulation in the referenced well. The information in this proposal includes well data, calculations, materials requirements, and cost estimates. This proposal is based on information from our database, our valuable field personnel and previous stimulation services in the area.

Halliburton Energy Services recognizes the importance of supplying the **highest quality products and services** to our customers. Communication is a vital link in the completion process. Changes in well condition which differ considerably from those provided for this recommendation should be discussed for changes in procedure or design. Laboratory testing, running of computer programs for job optimization, and equipment for the execution of this recommendation can be coordinated with the service center listed below.

Halliburton maintains Health, Safety & Environment (HSE) as a **top priority** and provides support on HSE matters as they relate to our business activities. Helping to define, establish and incorporate HSE responsibility and accountability through every level creates value for our customers. Our vision is to create an incident-free environment and to conduct business with no adverse environmental impact. By integrating HSE into all of our business activities, Halliburton demonstrates industry leadership in HSE performance.

Technical information on products and services can be accessed easily at <http://www.myhalliburton.com>

The Real Time Data from this Fracturing job can be brought directly to **your** desktop.

2 Service Center Contacts

SERVICE CENTER:	Grand Junction, CO
PHONE NUMBER:	970-523-3600

3 Vertical Completion

3.1 Executive Summary

Job Summary

Number of Treatment Intervals	5	
Total Estimated Pumping Time	4.04	hr
Pad Percentage	18.22	%
BH Proppant Conc	2.50	lbm/gal

Total System Requirement

20# Water Frac G Foam	148150	Gal
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Total Customer Supplied

FRESH WATER	148150	Gal
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3.2 Well Details

3.2.1 Tubulars

Name	Measured Depth (ft)	Outer Diameter (in)	Inner Diameter (in)	Linear Weight (lbm/ft)	Grade
4 1/2" Production Casing	0 - 9163	4.500	4.000	11.60	N-80

3.2.2 Perforations

Name	Top MD (ft)	Bot MD (ft)
Stage 1	7116	7182
Stage 2	6950	7015
Stage 3	6800	6820
Stage 4	6650	6721
Stage 5	6480	6544

3.3 Procedure

3.3.1 Job Fluids

20# Water Frac G Foam

Job Volume: 148150.0 (Gal)

Base Fluid	FRESH WATER 1000.00 (gal/Mgal)	148150 (Gal)	Biocide	BE-7 0.25 (gal/Mgal)	38.00 (Gal)
Breaker	SP Breaker 1.00 (lbm/Mgal)	149.00 (lbm)	Scale Inhibitor	SCALECHEK LP-50, 330 GALLON TOTE 0.25 (gal/Mgal)	38.00 (Gal)
Breaker	GBW-30 1.00 (lbm/Mgal)	149.00 (lbm)	Foamer	HC-2 4.00 (gal/Mgal)	593.00 (Gal)
Gelling Agent	WG-35 20.00 (lbm/Mgal)	2963.00 (lbm)	Clay Control	CLA-Web 2.00 (gal/Mgal)	297.00 (Gal)

3.3.2 Job Totals

Fluids

Biocide	BE-7	38(Gal)	Breaker	SP Breaker	149.00(lbm)
Scale Inhibitor	SCALECHEK LP-50, 330 GALLON TOTE	38(Gal)	Breaker	GBW-30	149.00(lbm)
Foamer	HC-2	593(Gal)	Gelling Agent	WG-35	2963.00(lbm)
Clay Control	CLA-Web	297(Gal)			

Proppants

	Designed Qty	Requested
Premium White-20/40	757000 (lbm)	757000(lbm)

Customer Supplied Items

	Designed Qty	Tank Bottom	Requested with Tank Bottom
FRESH WATER	148150 (Gal)	0 (Gal)	148150(Gal)

N2 Totals

N2 Volume	10457054 (scf)
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3.3.3 Treatment Interval 1

Well Name	HAMILTON CREEK FEDERAL/31-31B-45-14	20# Water Frac G Foam	38071(Gal)
Job Name	Vertical Completion	Premium White-20/40	200000(lbm)
Mid Perf MD	7149(ft)		
No. of Perfs/Jets	0		
Estimated Pump Time	55.32(min)		
Frac Gradient	0.000 (psi/ft)		

CASING Surface Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Rate-Liq+Prop (bbl/min)	Clean Vol. (Gal)	Proppant	Proppant Conc. (lbm/gal)	Prop. Mass (lbm)
1-1	Pad	20# Water Frac G Foam	15.00	7500		0.00	0
1-2	Proppant Laden Fluid	20# Water Frac G Foam	17.17	3136	Premium White-20/40	3.19	10000
1-3	Proppant Laden Fluid	20# Water Frac G Foam	19.16	7362	Premium White-20/40	6.11	45000
1-4	Proppant Laden Fluid	20# Water Frac G Foam	20.99	11929	Premium White-20/40	8.80	105000
1-5	Proppant Laden Fluid	20# Water Frac G Foam	22.68	3544	Premium White-20/40	11.29	40000
1-6	Flush	20# Water Frac G Foam	50.00	4600		0.00	0
Totals				38071			200000

CASING N2 Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Proppant	BH Prop Conc. (lbm/gal)	BH Clean Vol. (Gal)	BH Rate (bbl/min)	N2 Rate (scfm)	N2 Vol (scf)	Quality Const. IPF
1-1	Pad	20# Water Frac G Foam		0.00	25000	50.0	59145.32	704111	70
1-2	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	1.00	10000	50.0	55479.44	276170	70
1-3	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	2.00	22500	50.0	52118.43	609065	70
1-4	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	3.00	35000	50.0	49025.78	928273	70
1-5	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	4.00	10000	50.0	46170.59	259746	70
1-6	Flush	20# Water Frac G Foam		0.00	4600	50.0	0.00	0	0
Totals					107100			2777365	

3.3.4 Treatment Interval 2

Well Name	HAMILTON CREEK FEDERAL/31-31B-45-14	20# Water Frac G Foam	37971(Gal)
Job Name	Vertical Completion	Premium White-20/40	200000(lbm)
Mid Perf MD	6983(ft)		
No. of Perfs/Jets	0		
Estimated Pump Time	61.41(min)		
Frac Gradient	0.000 (psi/ft)		

CASING Surface Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Rate-Liq+Prop (bbl/min)	Clean Vol. (Gal)	Proppant	Proppant Conc. (lbm/gal)	Prop. Mass (lbm)
2-1	Pad	20# Water Frac G Foam	13.50	7500		0.00	0
2-2	Proppant Laden Fluid	20# Water Frac G Foam	15.45	3136	Premium White-20/40	3.19	10000
2-3	Proppant Laden Fluid	20# Water Frac G Foam	17.24	7362	Premium White-20/40	6.11	45000
2-4	Proppant Laden Fluid	20# Water Frac G Foam	18.89	11929	Premium White-20/40	8.80	105000
2-5	Proppant Laden Fluid	20# Water Frac G Foam	20.41	3544	Premium White-20/40	11.29	40000
2-6	Flush	20# Water Frac G Foam	45.00	4500		0.00	0
Totals				37971			200000

CASING N2 Pumping Schedule

Trt- Stage	Stage Desc.	Fluid Desc.	Proppant	BH Prop Conc. (lbm/gal)	BH Clean Vol. (Gal)	BH Rate (bbl/min)	N2 Rate (scfm)	N2 Vol (scf)	Quality Const. IPF
2-1	Pad	20# Water Frac G Foam		0.00	25000	45.0	53230.79	704111	70
2-2	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	1.00	10000	45.0	49931.50	276170	70
2-3	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	2.00	22500	45.0	46906.59	609065	70
2-4	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	3.00	35000	45.0	44123.20	928273	70
2-5	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	4.00	10000	45.0	41553.53	259746	70
2-6	Flush	20# Water Frac G Foam		0.00	4500	45.0	0.00	0	0
Totals					107000			2777365	

3.3.5 Treatment Interval 3

Well Name	HAMILTON CREEK FEDERAL/31-31B-45-14	20# Water Frac G Foam	19452(Gal)
Job Name	Vertical Completion	Premium White-20/40	92000(lbm)
Mid Perf MD	6810(ft)		
No. of Perfs/Jets	0		
Estimated Pump Time	43.31(min)		
Frac Gradient	0.000 (psi/ft)		

CASING Surface Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Rate-Liq+Prop (bbl/min)	Clean Vol. (Gal)	Proppant	Proppant Conc. (lbm/gal)	Prop. Mass (lbm)
3-1	Pad	20# Water Frac G Foam	9.00	3000		0.00	0
3-2	Proppant Laden Fluid	20# Water Frac G Foam	10.30	2509	Premium White-20/40	3.19	8000
3-3	Proppant Laden Fluid	20# Water Frac G Foam	11.49	2618	Premium White-20/40	6.11	16000
3-4	Proppant Laden Fluid	20# Water Frac G Foam	12.59	4090	Premium White-20/40	8.80	36000
3-5	Proppant Laden Fluid	20# Water Frac G Foam	13.61	2835	Premium White-20/40	11.29	32000
3-6	Flush	20# Water Frac G Foam	30.00	4400		0.00	0
Totals				19452			92000

CASING N2 Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Proppant	BH Prop Conc. (lbm/gal)	BH Clean Vol. (Gal)	BH Rate (bbl/min)	N2 Rate (scfm)	N2 Vol (scf)	Quality Const. IPF
3-1	Pad	20# Water Frac G Foam		0.00	10000	30.0	35487.19	281644	70
3-2	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	1.00	8000	30.0	33287.66	220936	70
3-3	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	2.00	8000	30.0	31271.06	216556	70
3-4	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	3.00	12000	30.0	29415.47	318265	70
3-5	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	4.00	8000	30.0	27702.35	207797	70
3-6	Flush	20# Water Frac G Foam		0.00	4400	30.0	0.00	0	0
Totals					50400			1245199	

3.3.6 Treatment Interval 4

Well Name	HAMILTON CREEK FEDERAL/31-31B-45-14	20# Water Frac G Foam	27205(Gal)
Job Name	Vertical Completion	Premium White-20/40	140000(lbm)
Mid Perf MD	6686(ft)		
No. of Perfs/Jets	0		
Estimated Pump Time	42.67(min)		
Frac Gradient	0.000 (psi/ft)		

CASING Surface Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Rate-Liq+Prop (bbl/min)	Clean Vol. (Gal)	Proppant	Proppant Conc. (lbm/gal)	Prop. Mass (lbm)
4-1	Pad	20# Water Frac G Foam	13.50	4500		0.00	0
4-2	Proppant Laden Fluid	20# Water Frac G Foam	15.45	3136	Premium White-20/40	3.19	10000
4-3	Proppant Laden Fluid	20# Water Frac G Foam	17.24	4908	Premium White-20/40	6.11	30000
4-4	Proppant Laden Fluid	20# Water Frac G Foam	18.89	6816	Premium White-20/40	8.80	60000
4-5	Proppant Laden Fluid	20# Water Frac G Foam	20.41	3544	Premium White-20/40	11.29	40000
4-6	Flush	20# Water Frac G Foam	45.00	4300		0.00	0
Totals				27205			140000

CASING N2 Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Proppant	BH Prop Conc. (lbm/gal)	BH Clean Vol. (Gal)	BH Rate (bbl/min)	N2 Rate (scfm)	N2 Vol (scf)	Quality Const. IPF
4-1	Pad	20# Water Frac G Foam		0.00	15000	45.0	53230.79	422467	70
4-2	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	1.00	10000	45.0	49931.50	276170	70
4-3	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	2.00	15000	45.0	46906.59	406043	70
4-4	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	3.00	20000	45.0	44123.20	530442	70
4-5	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	4.00	10000	45.0	41553.53	259746	70
4-6	Flush	20# Water Frac G Foam		0.00	4300	45.0	0.00	0	0
Totals					74300			1894868	

3.3.7 Treatment Interval 5

Well Name	HAMILTON CREEK FEDERAL/31-31B-45-14	20# Water Frac G Foam	25451(Gal)
Job Name	Vertical Completion	Premium White-20/40	125000(lbm)
Mid Perf MD	6512(ft)		
No. of Perfs/Jets	0		
Estimated Pump Time	39.64(min)		
Frac Gradient	0.000 (psi/ft)		

CASING Surface Pumping Schedule

Trt-Stage	Stage Desc.	Fluid Desc.	Rate-Liq+Prop (bbl/min)	Clean Vol. (Gal)	Proppant	Proppant Conc. (lbm/gal)	Prop. Mass (lbm)
5-1	Pad	20# Water Frac G Foam	13.50	4500		0.00	0
5-2	Proppant Laden Fluid	20# Water Frac G Foam	15.45	3136	Premium White-20/40	3.19	10000
5-3	Proppant Laden Fluid	20# Water Frac G Foam	17.24	4908	Premium White-20/40	6.11	30000
5-4	Proppant Laden Fluid	20# Water Frac G Foam	18.89	5112	Premium White-20/40	8.80	45000
5-5	Proppant Laden Fluid	20# Water Frac G Foam	20.41	3544	Premium White-20/40	11.29	40000
5-6	Flush	20# Water Frac G Foam	45.00	4250		0.00	0
Totals				25451			125000

CASING N2 Pumping Schedule

Trt- Stage	Stage Desc.	Fluid Desc.	Proppant	BH Prop Conc. (lbm/gal)	BH Clean Vol. (Gal)	BH Rate (bbl/min)	N2 Rate (scfm)	N2 Vol (scf)	Quality Const. IPF
5-1	Pad	20# Water Frac G Foam		0.00	15000	45.0	53230.79	422467	70
5-2	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	1.00	10000	45.0	49931.50	276170	70
5-3	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	2.00	15000	45.0	46906.59	406043	70
5-4	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	3.00	15000	45.0	44123.20	397831	70
5-5	Proppant Laden Fluid	20# Water Frac G Foam	Premium White-20/40	4.00	10000	45.0	41553.53	259746	70
5-6	Flush	20# Water Frac G Foam		0.00	4250	45.0	0.00	0	0
Totals					69250			1762257	