
TOP OPERATING

Treatment Summary

TANAKA 1-2

BOULDER COUNTY, COLORADO

**SECTION 2
TOWNSHIP 1N
RANGE 69W**

J SAND FORMATION

**Treatment Date:
SEPTEMBER 28, 1999**



**Top Operating
7500 W. Mississippi Ste. B-3
Lakewood, Co 8026-4541**

**Tanaka 1-2
J Sand Fracture**

**Sec. 2 T1N R69W
Weld County, CO**

J Sand Fracturing Recommendation

Prepared for: Mr. Andy Peterson

7/30/99

**Version
1**

**Prepared by:
Lance J. Perez
Halliburton Energy Services
P.O.BOX 659
BRIGHTON COLO. 80601**

(303) 825-4346

Well Information

Formation	J Sand
Perforations	8057 - 8068 ft.
Casing Size	4 1/2 in.
Casing Weight	11.6 lb/ft
Tubing Size	2 7/8 in.
Tubing Weight	6.5 lb/ft
Packer @	7,400 ft.

Job Recommendation

LINEAR PAD DETAILS: (18,000 gal)

Base Fluid	27 lb FRACGEL
Mixing Fluid	Clay Fix II Water*
Gelling Agent	6.75 gal/M LGC-8
Surfactant	0.50 gal/M LOSURF-300
Surfactant	0.50 gal/M SSO-21M
Breaker	0.25 lbs/M GBW-3
Breaker	0.25 lbs/M OPTIFLO-III
Gel Stabilizer	5.0 lbs/M GEL-STA
Clay Control	2.0 gal/M CLAYFIX II

CROSSLINKED PAD & SLF DETAILS: (15,000 gal)

Base Fluid	27 lb FRACGEL
Mixing Fluid	Clay Fix II Water*
Gelling Agent	6.75 gal/M LGC-8
Crosslinker	0.28 gal/M CL-23
Crosslinker	0.12 gal/M CL-29
Surfactant	0.50 gal/M LOSURF-300
Surfactant	0.50 gal/M SSO-21M
Breaker	0.25 lbs/M GBW-3
Breaker	0.25 lbs/M OPTIFLO-III
Gel Stabilizer	5.0 lbs/M GEL-STA
Clay Control	2.0 gal/M CLAYFIX II

SLF 27# DETAILS: (91,500 gal)

Base Fluid	27 lb FRACGEL
Mixing Fluid	Clay Fix II Water*
Gelling Agent	6.75 gal/M LGC-8
Crosslinker	0.28 gal/M CL-23
Crosslinker	0.12 gal/M CL-29
Surfactant	0.50 gal/M LOSURF-300
Surfactant	0.50 gal/M SSO-21M
Breaker	0.25 lbs/M GBW-3
Breaker	0.25 lbs/M OPTIFLO-III
Gel Stabilizer	3.0 lbs/M GEL-STA (First 70,000 gal)
Clay Control	2.0 gal/M CLAYFIX II

Job Recommendation (Cont')

SLF 25# DETAILS: (35,000 gal)

Base Fluid	25 lb FRACGEL
Mixing Fluid	Clay Fix II Water*
Gelling Agent	6.25 gal/M LGC-8
Crosslinker	0.28 gal/M CL-23
Crosslinker	0.12 gal/M CL-29
Surfactant	0.50 gal/M LOSURF-300
Surfactant	0.50 gal/M SSO-21M
Breaker	0.25 lbs/M GBW-3
Breaker	0.5 lbs/M OPTIFLO-III (Next 26,000 gal)
Breaker	0.75 lbs/M OPTIFLO-III (Next to Last 4,500 gal)
Breaker	0.25 lbs/M SP Breaker (Last 4,500 gal)
Clay Control	2.0 gal/M CLAYFIX II

DISPLACEMENT DETAILS: (2,070 gal)

Mixing Fluid	Clay Fix II Water*
Breaker	2.0 lbs/M SP Breaker
Clay Control	2.0 gal/M CLAYFIX II

*Halliburton Supplied KCl Substitute

FRACGEL***Job Procedure***

STAGE	FLUID	CONC	PROPPANT
1 - Pre-Pad	1,000 gal 2% KCl		
2 - Pad	18,000 gal Linear Gel 27		
3 - SLF	15,000 gal FracGel 27		
4 - SLF	17,000 gal FracGel 27	1 lb/gal	20/40 White Sand (17,000 lb)
5 - SLF	18,000 gal FracGel 27	2 lb/gal	20/40 White Sand (36,000 lb)
6 - SLF	35,000 gal FracGel 27	3 lb/gal	20/40 White Sand (105,000 lb)
7 - SLF	40,500 gal FracGel 25	4 lb/gal	20/40 White Sand (162,000 lb)
8 - SLF	16,000 gal FracGel 25	5 lb/gal	20/40 White Sand (80,000 lb)
9 - Flush	2,070 gal Displacement		

FRACGEL

Cost Estimate

<u>Price Ref</u>	<u>Description</u>	<u>Qty</u>	<u>U/M</u>	<u>Unit Price</u>	<u>Total</u>
Equipment Charges					
300-111	MILEAGE FOR STIMULATION EQUIP	20	MI	\$ 3.65	\$ 459.90
		14	UNT		
300-112	MILEAGE FOR STIMULATION CREW	20	MI	2.15	38.70
		2	UNT		
307-780	TECHCOMMAND W/O ARC SYSTEM	2	HR	3,675.00	1,653.75
301-201	SLURRY PROCESSOR SYSTEM	25	BPM	3,931.20	1,769.04
301-085	MINIMUM PUMP CHG HT-400 V-12	2	HR	2,940.00	5,292.00
	(PER 2 HR)	4	PMP		
307-041	TANK 500BBL FRAC FLUID STORAGE	1	JOB	700.00	315.00
307-660	FLOWMETER- PER TREATMENT	1	JOB	290.85	130.88
307-629	PORTABLE SUCTION MANIFOLD	1	JOB	700.00	315.00
390-740	GROUND MANIF OR FRAC MANIFTRL	1	JOB	1,020.75	459.34
307-621	CASING CONTROL VALVE	1	DAY	905.05	407.27
307-962	MOBILE LAB VAN W/TECH	1	DAY	2,546.25	1,145.81
307-220	MOUNTAIN MOVER SAND SYSTEM	1	DAY	1,236.25	1,112.63
		2	UNT		
307-802	RADIOACTIVE DENSOMETER	1	JOB	615.30	276.88
Gel System & Additives Charges					
310-280	FRACGEL	27	LB	9.95	12,935.50
	(PER 1000 GAL)	107000	GAL		
310-280	FRACGEL	25	LB	9.95	3,917.81
	(PER 1000 GAL)	35000	GAL		
310-632	LGC-8	122	GAL	41.55	2,281.10
310-367	GEL-STA	400	LB	2.30	414.00
310-377	CL-23	40	GAL	103.40	N/C
310-384	CL-29	17	GAL	125.40	N/C
218-703	LOSURF 300	80	GAL	37.50	1,350.00
218-517	SSO-21M	80	GAL	35.50	1,278.00
310-364	GBW-3	40	LB	12.15	218.70
311-081	OPTIFLO-III	48	LB	31.00	669.60
311-050	SP BREAKER	6	LB	6.55	17.69
314-163	CLAYFIX II	325	GAL	34.20	5,001.75
313-394	BE-5	54	LB	48.45	1,177.34
Bulk Charges					
510-198	SAND 20/40 WHITE BULK	400000	LB	8.13	14,634.00
	(PER 100 LB)				
301-197	PROPPANT PUMP CHARGE	2.0	PPG	0.05	2,486.25
		110500	GAL		
301-197	PROPPANT PUMP CHARGE	5.0	PPG	0.13	936.00
		16000	GAL		
500-340	MILEAGE FOR BULK FRAC.MATERIAL	4000	TMI	1.25	2,250.00

TOTAL AMOUNT
DISCOUNT AMOUNT

\$ 139,875.40
76,931.46

DISCOUNTED TOTAL

\$ 62,943.94

Conditions

NOTE

The cost in this analysis is good for the materials and/or services outlined within. These prices are based on Halliburton being awarded the work on a first call basis. Prices will be reviewed for adjustments if awarded on 2nd or 3rd call basis and/or after 30 days of this written analysis. This is in an effort to schedule our work and maintain a high quality of performance for our customers.

The unit prices stated in the proposal are based on our current published prices. The projected equipment, personnel, and material needs are only estimates based on information about the work presently available to us. At the time the work is actually performed, conditions then existing may require an increase or decrease in the equipment, personnel, and/or material needs. Charges will be based upon unit prices in effect at the time the work is performed and the amount of equipment, personnel, and/or material actually utilized in the work. Taxes, if any, are not included. Applicable taxes, if any, will be added to the actual invoice.

It is understood and agreed between the parties that with the exception of the subject discounts, all services performed and equipment and materials sold are provided subject to Halliburton's General Terms and Conditions contained in our current price list, (which include LIMITATION OF LIABILITY and WARRANTY provisions), and pursuant to the applicable Halliburton Work Order Contract (whether or not executed by you), unless a Master Service and/or Sales Contract applicable to the services, equipment, or materials supplied exists between your company and Halliburton, in which case the negotiated Master Contract shall govern the relationship between the parties. We enclose a copy of the General Terms and Conditions, for your convenient review, and we would appreciate receiving any questions you may have about them. Should your company be interested in negotiating a Master Contract with Halliburton, our Law Department would be pleased to work with you to finalize a mutually agreeable contract. In this connection, it is also understood and agreed that Customer will continue to execute Halliburton usual field work orders and/or tickets customarily required by Halliburton in connection with the furnishing of said services, equipment, and materials.

Any terms and conditions contained in purchase orders or other documents issued by the customer shall be of no effect except to confirm the type and quantity of services, equipment, and materials to be supplied to the customer.

If customer does not have an approved open account with Halliburton or a mutually executed written contract with Halliburton, which dictates payment terms different than those set forth in this clause, all sums due are payable in cash at the time of performance of services or delivery of equipment, products, or materials. If customer has an approved open account, invoices are payable on the twentieth day after date of invoice. Customer agrees to pay interest on any unpaid balance from the date payable until paid at the highest lawful contract rate applicable, but never to exceed 18% per annum. In the event Halliburton employs an attorney for collection of any account, customer agrees to pay attorney fees of 20% of the unpaid account, plus all collection and court costs.

Company:

Top Operating

Lease:

Tanaka 1-2

27# FracGel

Formaton:

J Sand

260 °F

Location: Sec. 2 T1N R69W

Stage	Fluid Schedule	Volume (gal)	Proppant Type	Prop Conc. (ppg)	Prop Total (lbs)	Slurry Vol. (gals)	Rate (bpm)	Stage Time (h:min:sec)	Exposure Time (h:min:sec)	LGC-8 (7:3)	LoSurf-300 (gpt)	SSO-21 (gpt)	GBW-3 (gpt)	Optiflo III (ppt)	SP (ppt)	GelSta (ppt)
1	Load & Break	1000				1000	5	0:04:46	2:55:53							
2	Closure							0:00:00								
3	Linear Gel	18000				18000	25	0:17:09	2:51:07	6.75	0.50	0.50	0.25	0.25		
4	Pad 30# Fracgel	15000				15000	25	0:14:17	2:33:58	6.75	0.50	0.50	0.25	0.25		5.00
5	FracGel 27# HT	17000	Ottawa 20/40	1	17000	17769	25	0:16:55	2:19:41	6.75	0.50	0.50	0.25	0.25		5.00
6	FracGel 27# HT	18000	Ottawa 20/40	2	36000	19629	25	0:18:42	2:02:46	6.75	0.50	0.50	0.25	0.25		3.00
7	FracGel 27# HT	35000	Ottawa 20/40	3	105000	39751	25	0:37:51	1:44:04	6.75	0.50	0.50	0.25	0.25		3.00
8	FracGel 27#	21500	Ottawa 20/40	4	86000	25391	25	0:24:11	1:06:13	6.75	0.50	0.50	0.25	0.25		3.00
9	FracGel 25#	19000	Ottawa 20/40	4	76000	22439	25	0:21:22	0:42:02	6.25	0.50	0.50	0.25	0.50		
10	FracGel 25#	7000	Ottawa 20/40	5	35000	8584	25	0:08:10	0:20:39	6.25	0.50	0.50	0.25	0.50		
11	FracGel 25#	4500	Ottawa 20/40	5	22500	5518	25	0:05:15	0:12:29	6.25	0.50	0.50	0.25	0.75		
12	FracGel 25#	4500	Ottawa 20/40	5	22500	5518	25	0:05:15	0:07:14	6.25	0.50	0.50	0.25	0.25	0.25	
13	Flush	2070				2070	25	0:01:58	0:01:58						2.00	
14								0:00:00								
15								0:00:00								

Total Pump Time: 2:55 (hr:min)

Average Rate: 24.2 bpm

Treatment Down: Tubing / Packer

Abs. Min. HHP: 4,290 HHP

CallSheet Totals for Materials. On Loc. 15 % Excess

LGC-8 1320 CL 23/29 90 LoSurf-300 100 SSO-21 100 GBW-3 50 Optiflo III 69 SP 10 GelSta 440

MAX PRESSURE: 7000 psi

Anticipated Surface Pres Perforations: 11

Dia. in: 0.38

Calc. Perf Fric (psi): 726

Est. Well Bore Fric (psi): 1,200

WELL-BORE PATH

2 7/8" 6.5#

4 1/2" 11.6#

7400 ft

657 ft

Top Operating I Sand 20.7% 27# FracGel 159500 gals 159500#

Calc. BHP: 5241 psi

Average Gel Wt. 26.56 #

Average Prop Conc. 2.51 ppg

MAXIMUM CHEMICAL ADDITIVE

Pump Rates (gal/min)

25.0 bpm

Bucket Test Time for 1 gal (min:sec)

0.08 1.54 1.54 1.54 3.48

CL 23/29 90 LoSurf-300 100 SSO-21 100 GBW-3 50

LGC-8 1320 CL 23/29 90 LoSurf-300 100 SSO-21 100 GBW-3 50 Optiflo III 69 SP 10 GelSta 440

9/23/99 6:40 PM

Comment	Clean Volume (gals)	Clean Volume (bbls)	Prop Conc (lbs)	Slurry Volume (bbls)	LGC-8 CL 23/29	LoSurf-300	SSO-21	GBW-3	Optiflo II	SP	GelSta	Propan Total
	1000	24		24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
End Stage												0
End Stage												
4000	95		95	20.3	0.0	1.5	1.5	0.8	0.0	0.0	0.8	0
7000	167		167	40.5	0.0	3.0	3.0	1.5	0.0	0.0	1.5	0
10000	238		238	60.8	0.0	4.5	4.5	2.3	0.0	0.0	2.3	0
13000	310		310	81.0	0.0	6.0	6.0	3.0	0.0	0.0	3.0	0
16000	381		381	101.3	0.0	7.5	7.5	3.8	0.0	0.0	3.8	0
19000	452		452	121.5	0.0	9.0	9.0	4.5	0.0	0.0	4.5	0
End Stage												
22000	524		524	141.8	1.5	10.5	10.5	5.3	0.0	0.0	5.3	0
25000	595		595	162.0	3.0	12.0	12.0	6.0	0.0	0.0	6.0	0
28000	667		667	182.3	4.5	13.5	13.5	6.8	0.0	0.0	6.8	0
31000	738		738	202.5	6.0	15.0	15.0	7.5	0.0	0.0	7.5	0
34000	810		810	222.8	7.5	16.5	16.5	8.3	0.0	0.0	8.3	0
End Stage												
37000	881	1.00	884	243.0	9.0	18.0	18.0	9.0	0.0	0.0	9.0	0
40000	952	1.00	959	263.3	10.5	19.5	19.5	9.8	0.0	0.0	9.8	0
43000	1024	1.00	1034	283.5	12.0	21.0	21.0	10.5	0.0	0.0	10.5	0
46000	1095	1.00	1108	303.8	13.5	22.5	22.5	11.3	0.0	0.0	11.3	0
49000	1167	1.00	1183	324.0	15.0	24.0	24.0	12.0	0.0	0.0	12.0	0
51000	1214	1.00	1233	337.5	16.0	25.0	25.0	12.5	0.0	0.0	12.5	0
End Stage												
54000	1286	2.00	1310	357.8	17.5	26.5	26.5	13.3	0.0	0.0	13.3	0
57000	1357	2.00	1388	378.0	19.0	28.0	28.0	14.0	0.0	0.0	14.0	0
60000	1429	2.00	1466	398.3	20.5	29.5	29.5	14.8	0.0	0.0	14.8	0
63000	1500	2.00	1544	418.5	22.0	31.0	31.0	15.5	0.0	0.0	15.5	0
66000	1571	2.00	1622	438.8	23.5	32.5	32.5	16.3	0.0	0.0	16.3	0
69000	1643	2.00	1700	459.0	25.0	34.0	34.0	17.0	0.0	0.0	17.0	0
End Stage												
72000	1714	3.00	1781	479.3	26.5	35.5	35.5	17.8	0.0	0.0	17.8	0
75000	1786	3.00	1862	499.5	28.0	37.0	37.0	18.5	0.0	0.0	18.5	0
78000	1857	3.00	1943	519.8	29.5	38.5	38.5	19.3	0.0	0.0	19.3	0
81000	1929	3.00	2024	540.0	31.0	40.0	40.0	20.0	0.0	0.0	20.0	0
84000	2000	3.00	2106	560.3	32.5	41.5	41.5	20.8	0.0	0.0	20.8	0
87000	2071	3.00	2187	580.5	34.0	43.0	43.0	21.5	0.0	0.0	21.5	0
90000	2143	3.00	2268	600.8	35.5	44.5	44.5	22.3	0.0	0.0	22.3	0
93000	2214	3.00	2349	621.0	37.0	46.0	46.0	23.0	0.0	0.0	23.0	0
96000	2286	3.00	2430	641.3	38.5	47.5	47.5	23.8	0.0	0.0	23.8	0
99000	2357	3.00	2511	661.5	40.0	49.0	49.0	24.5	0.0	0.0	24.5	0
102000	2429	3.00	2592	681.8	41.5	50.5	50.5	25.3	0.0	0.0	25.3	0
104000	2476	3.00	2646	695.3	42.5	51.5	51.5	25.8	0.0	0.0	25.8	0
End Stage												
107000	2548	4.00	2731	715.5	44.0	53.0	53.0	26.5	0.0	0.0	26.5	0
110000	2619	4.00	2815	735.8	45.5	54.5	54.5	27.3	0.0	0.0	27.3	0
113000	2690	4.00	2899	756.0	47.0	56.0	56.0	28.0	0.0	0.0	28.0	0
116000	2762	4.00	2984	776.3	48.5	57.5	57.5	28.8	0.0	0.0	28.8	0
119000	2833	4.00	3068	796.5	50.0	59.0	59.0	29.5	0.0	0.0	29.5	0
122000	2905	4.00	3153	816.8	51.5	60.5	60.5	30.3	0.0	0.0	30.3	0
125000	2976	4.00	3237	837.0	53.0	62.0	62.0	31.0	0.0	0.0	31.0	0
125500	2988	4.00	3251	840.4	53.3	62.3	62.3	31.1	0.0	0.0	31.1	0
End Stage												
128500	3060	4.00	3335	859.1	54.8	63.8	63.8	31.9	0.0	0.0	31.9	0
131500	3131	4.00	3420	877.9	56.3	65.3	65.3	32.6	0.0	0.0	32.6	0
134500	3202	4.00	3504	896.6	57.8	66.8	66.8	33.4	0.0	0.0	33.4	0
137500	3274	4.00	3588	915.4	59.3	68.3	68.3	34.1	0.0	0.0	34.1	0
140500	3345	4.00	3673	934.1	60.8	69.8	69.8	34.9	0.0	0.0	34.9	0
143500	3417	4.00	3757	952.9	62.3	71.3	71.3	35.6	0.0	0.0	35.6	0
144500	3440	4.00	3785	959.1	62.8	71.8	71.8	35.9	0.0	0.0	35.9	0
End Stage												
147500	3512	5.00	3873	977.9	64.3	73.3	73.3	36.6	0.0	0.0	36.6	0
150500	3583	5.00	3960	996.6	65.8	74.8	74.8	37.4	0.0	0.0	37.4	0
151500	3607	5.00	3990	1002.9	66.3	75.3	75.3	37.6	0.0	0.0	37.6	0
End Stage												
154500	3679	5.00	4077	1021.6	67.8	76.8	76.8	38.4	0.0	0.0	38.4	0
156000	3714	5.00	4121	1031.0	68.5	77.5	77.5	38.8	0.0	0.0	38.8	0
End Stage												
159000	3786	5.00	4209	1049.8	70.0	79.0	79.0	39.5	0.0	0.0	39.5	0
160500	3821	5.00	4252	1059.1	70.8	79.8	79.8	39.9	0.0	0.0	39.9	0
End Stage												
162570	3871		4302	1059.1	70.8	79.8	79.8	39.9	0.0	0.0	39.9	0
End Stage												
End Stage												
End Stage												

Top Operating J Sand 20.7% 27# FracGel 159500gals 400000#s

0/22/00 6:40 PM



**Sand Sieve Work
Sheet**
RMNWA Laboratory

Customer: Top Operating
Interval: J Sand
Lease: Tanaka 1-2
Date: September 28, 1999

Average Retained 92.6%

Truck Unit:										
Compartment	1		2		3		4		5	
Sieve Size	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
16	T	0.0%	T	0.0%	T	0.0%	T	0.0%	T	0.0%
20	3.0	2.6%	7.6	6.5%	5.6	4.4%	5.0	5.0%	3.0	2.4%
30	38.9	33.3%	34.8	29.7%	51.6	40.1%	39.4	39.4%	41.6	33.2%
35	51.6	44.1%	56.5	48.2%	51.8	40.2%	41.5	41.5%	50.2	40.2%
40	18.1	15.5%	14.6	12.5%	15.0	11.7%	10.7	10.7%	22.9	18.3%
50	5.3	4.5%	3.6	3.1%	4.7	3.7%	3.1	3.1%	7.3	5.9%
Pan	T	0.0%	T	0.0%	T	0.0%	0.3	0.3%	T	0.0%
Total	116.9	100.0%	117.1	100.0%	128.7	100.0%	100.0	100.0%	125.0	100.0%
Retained	92.9%		90.4%		92.0%		91.6%		91.7%	

Truck Unit:										
Compartment	1		2		3		4		5	
Sieve Size	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
16	T	0.0%	T	0.0%	T	0.0%				
20	4.4	3.4%	2.9	2.3%	2.3	1.7%				
30	55.2	44.4%	45.4	36.0%	49.9	37.9%				
35	51.7	41.6%	52.1	41.3%	56.1	42.6%				
40	10.9	8.8%	19.9	15.8%	17.3	13.1%				
50	2.2	1.8%	5.7	4.6%	6.2	4.7%				
Pan	T	0.0%	T	0.0%	T	0.0%				
Total	124.4	100.0%	126.0	100.0%	131.8	100.0%	0.0	0.0%	0.0	0.0%
Retained	94.8%		92.6%		93.6%		0.0%		0.0%	



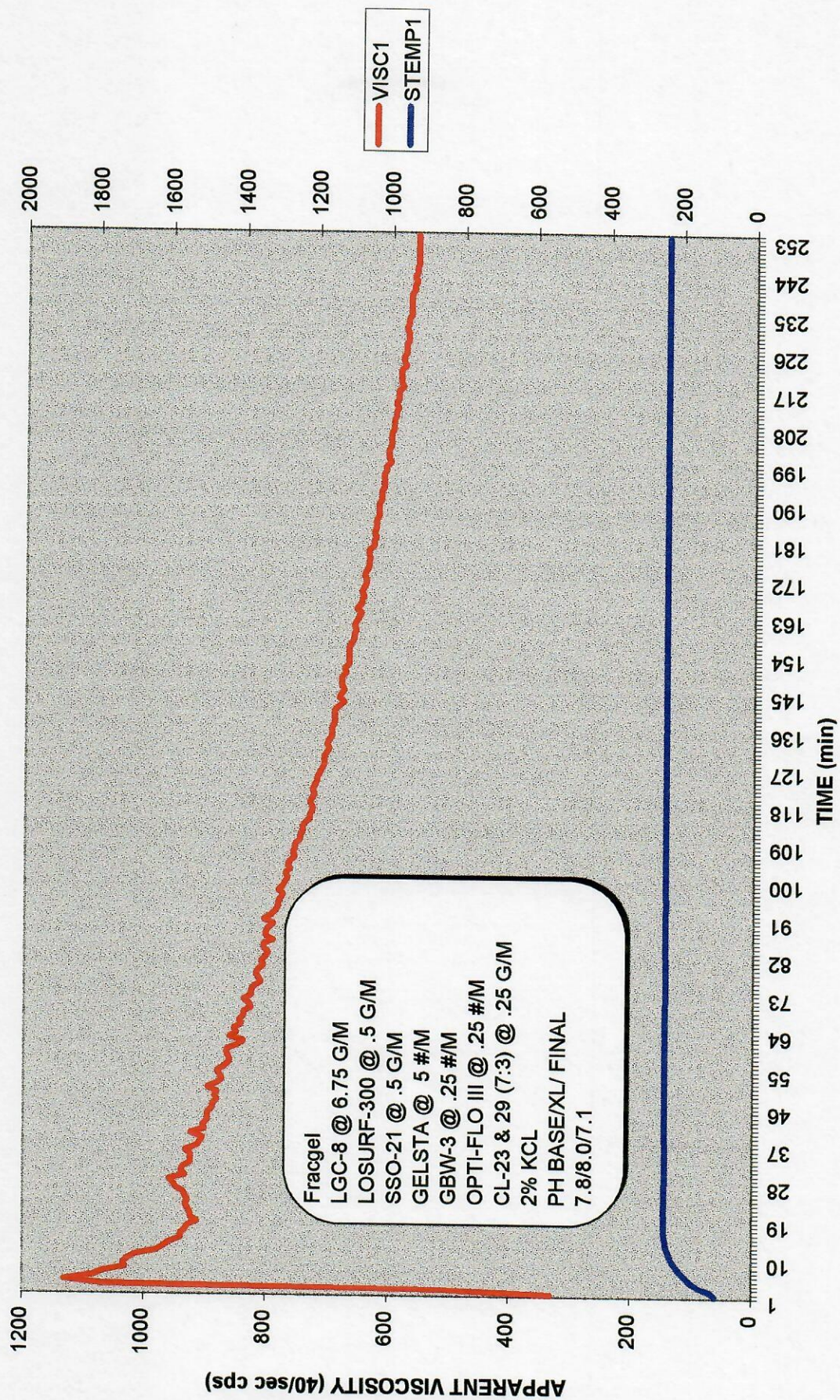
**RMNWA Laboratory
Brighton Co.**

Customer:	Top Operating
Formation:	J Sand
Lease:	Tanaka 1-2
Date:	September 28, 1999

	Tanks									
	1	2	3	4	5	6	7	8	9	10
Temperature - °F										
pH	8.00	7.57	7.42	8.16	8.18	8.27	8.18	8.15	8.10	
Chlorides (Cl) - mg/L	7587				8792	7232	9005			
Sulfates (SO ₄) - mg/L	90	200	250	75	90	70	80	90	200	
Iron (Fe) - mg/L	0	0	0	0	0	0	0	0	0	
Bicarbonates (HCO ₃) - mg/L	92	201	275	92	104	98	85	201	98	
Carbonates (CO ₃) - mg/L	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
Reducing Agents - mg/L	0	0	0	0	0	0	0	0	0	
Calcium (Ca) - mg/L	60	60	60	60	60	60	60	60	60	
Magnesium (Mg) - mg/L	0	0	0	0	0	0	0	0	0	
Phosphates (PO ₄) - mg/L	10	10	10+	10	10	10	10	10	10	
Specific Gravity	1.008	1.010	1.009	1.008	1.010	1.008	1.010	1.010	1.009	

[illegible]

TOP OPERATING-TANAKA 1-2



TREATMENT FLUID SUMMARY

Ticket / OST #:	147093
Company Name:	TOP OPERATING
Lease Name & Number:	TANAKA 1-2
State or Province:	CO
County:	WELD
Legal Description:	SEC 2, 1N, 69W
API or ERCB Number:	
Formation:	J SAND
Treatment Date:	9/28/99

		Frac Tank Number						
		1	2	3	4	5	6	
<u>Water</u>	Initial Strap	118.0	117.0	116.0	118.0	118.0	118.0	INCHES
	Final Strap	1.0	2.0	3.0	2.0	2.0	2.0	INCHES
	Initial Fluid	20320.0	20215.0	20110.0	20320.0	20320.0	20320.0	GALONS
	Final Fluid	50.5	101.0	151.5	101.0	101.0	101.0	GALONS
	Fluid Used	20269.5	20114.0	19958.5	20219.0	20219.0	20219.0	GALONS

TREATMENT FLUID SUMMARY

		Frac Tank Number						
		7	8	9				
<u>Water</u>	Initial Strap	118.0	117.0	117.0				INCHES
	Final Strap	21.0	24.0	20.0				INCHES
	Initial Fluid	20320.0	20215.0	20215.0				GALONS
	Final Fluid	2293.5	2764.0	2134.0				GALONS
	Fluid Used	18026.5	17451.0	18081.0				GALONS
	Temperature			60.0				F.
	pH			7.3				
<u>Base Gel</u>	Viscosity			20.0				cp
	pH			6.1				
	X-Link Time			1:45				Min:Sec
	Break Time			0:35				Hr: Min
<u>Oil</u>	Initial Strap							INCHES
	Final Strap							INCHES
	Initial Fluid							GALONS
	Final Fluid							GALONS
	Fluid Used							GALONS
	Temperature							F.
	API Gravity							API

		Fluid Totals	
<u>Water</u>	Initial Fluid	182355.0	GALONS
	Final Fluid	7797.5	GALONS
	Fluid Used	174557.5	GALONS
<u>Oil</u>	Initial Fluid	0.0	GALONS
	Final Fluid	0.0	GALONS
	Fluid Used	0.0	GALONS

		Composite Gel	
Viscosity	22.0	cp	
pH	0.0		
Temperature	60.0	F.	
X-Link Time	1:40	Min:Sec	
Break Time	0:35	Hr:Min	

Residue in Tanks: None

Valves and Connections Function Properly? - Yes

ADDITIVE VOLUME SUMMARY

Ticket / OST #: 147093
Company Name: TOP OPERATING
Lease Name & Number: TANAKA 1-2
State or Province: CO
County: WELD
Legal Description: SEC 2, 1N, 69W
API or ERCB Number:
Formation: J SAND
Treatment Date: 9/28/99

Description	Additive	Beginning	Ending	Used	Designed	Units
Breakers	GBW-3	89.0	49.0	40.0	50.0	lbs
Breakers	OPTIFLO-III	85.0	37.0	48.0	60.0	lb
Breakers	SP BREAKER	52.0	45.0	7.0	10.0	lb
Buffers	BA-40L	73.0	52.0	21.0	.0	gal
Cross-Linking Agents	CL23-29 -70-30	100.0	28.0	72.0	90.0	gal
Gelling Agents - Liquid	LGC-VIII	1365.0	245.0	1120.0	1320.0	gal
Miscellaneous Chemicals	GEL-STA	450.0	50.0	400.0	440.0	lb
Surfactants	LOSURF-300	195.0	113.0	82.0	100.0	gals
Surfactants	SSO-21M	150.0	69.0	81.0	100.0	gals

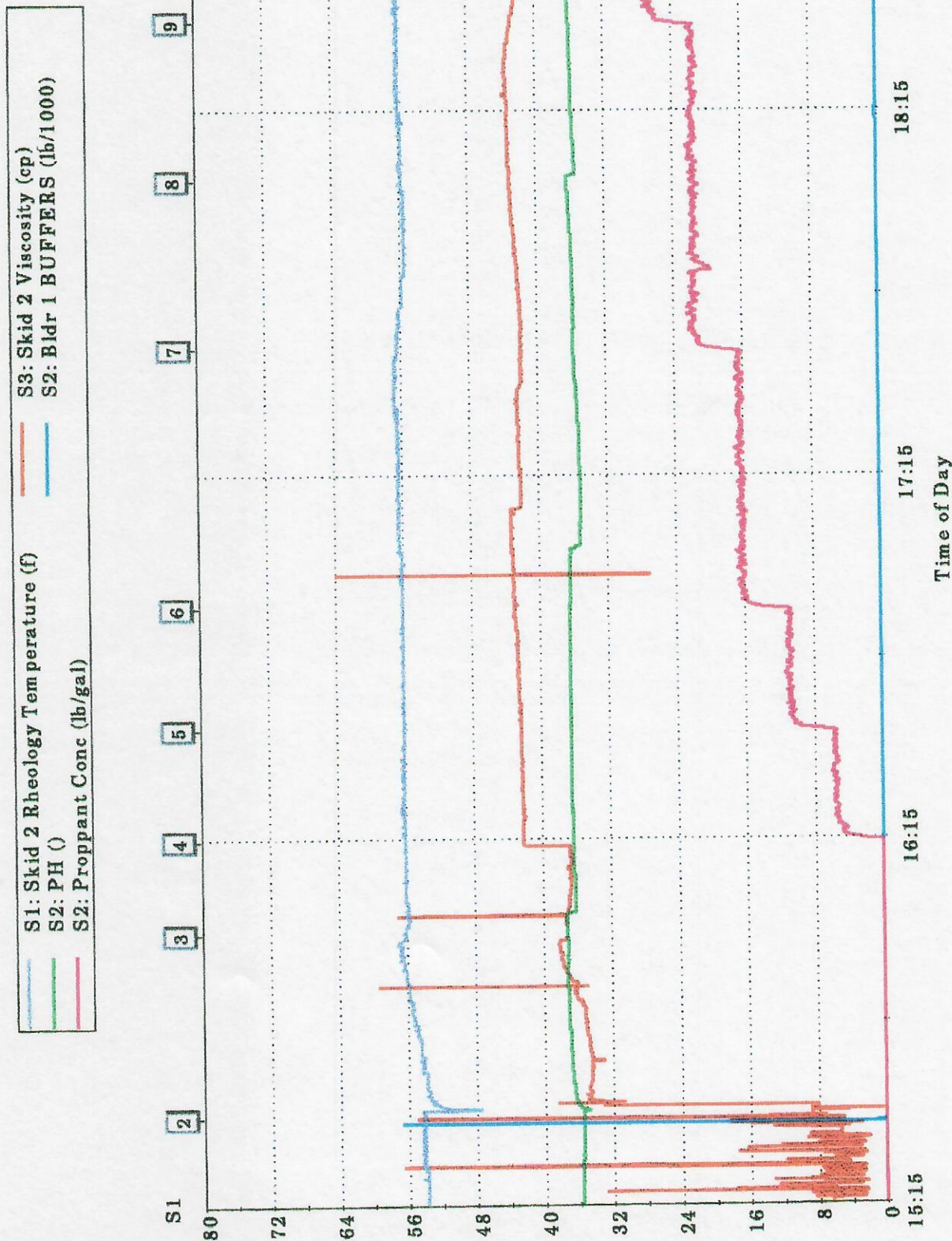
Beginning - Total volume of additive on location prior to starting the treatment.

Ending - Total volume of additive on location at the end of treatment.

Used - Difference between beginning and ending volumes.

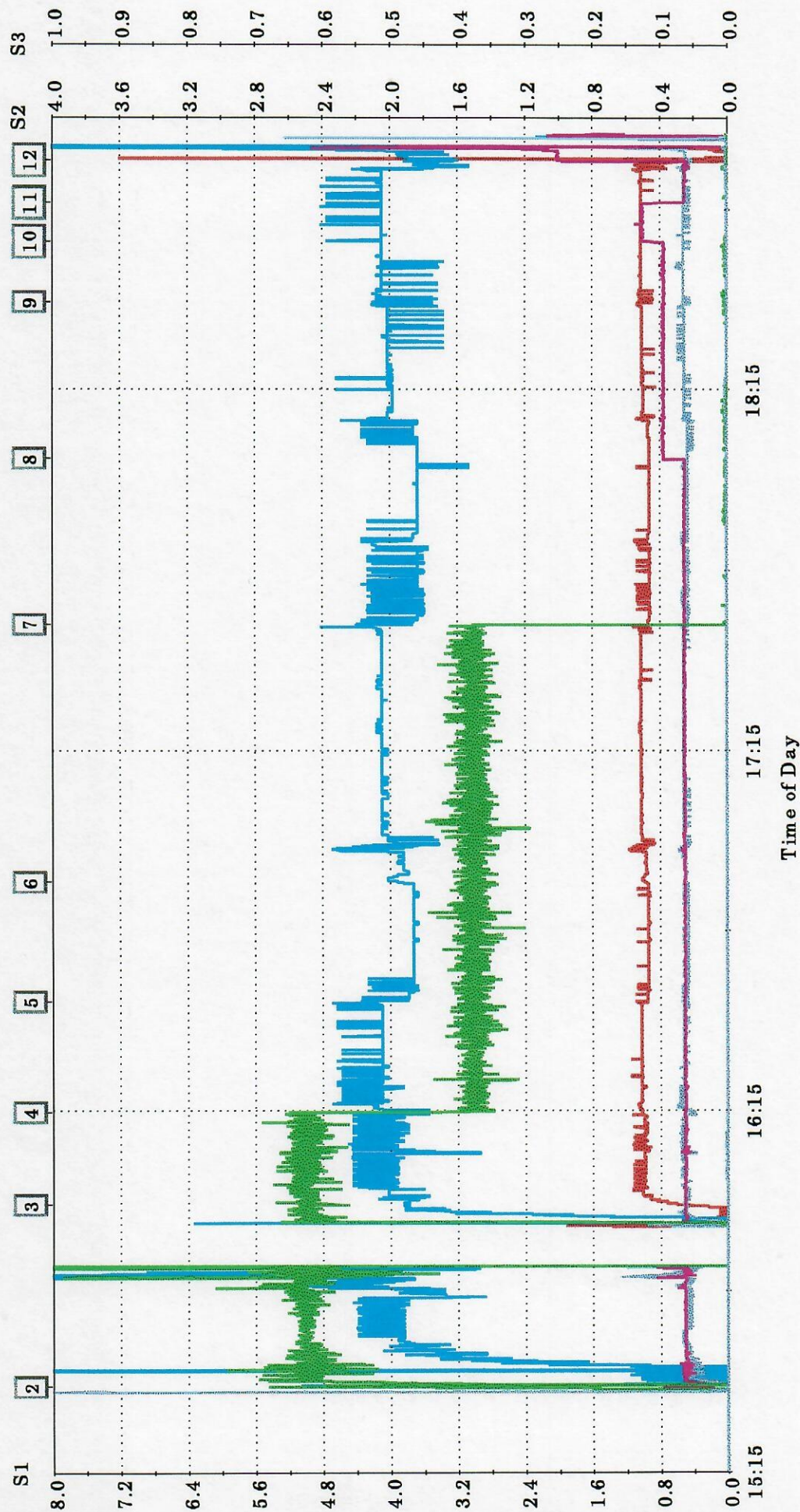
Designed - Total volume of additive based on the treatment design.

RHEOLOGY PLOT



CUSTOMER: TOP OPERATING TICKET: 174093 DATE: Tue 28-Sep-99
 WELL DESC: TANAKA 1-2 FORMATION: J-SAND

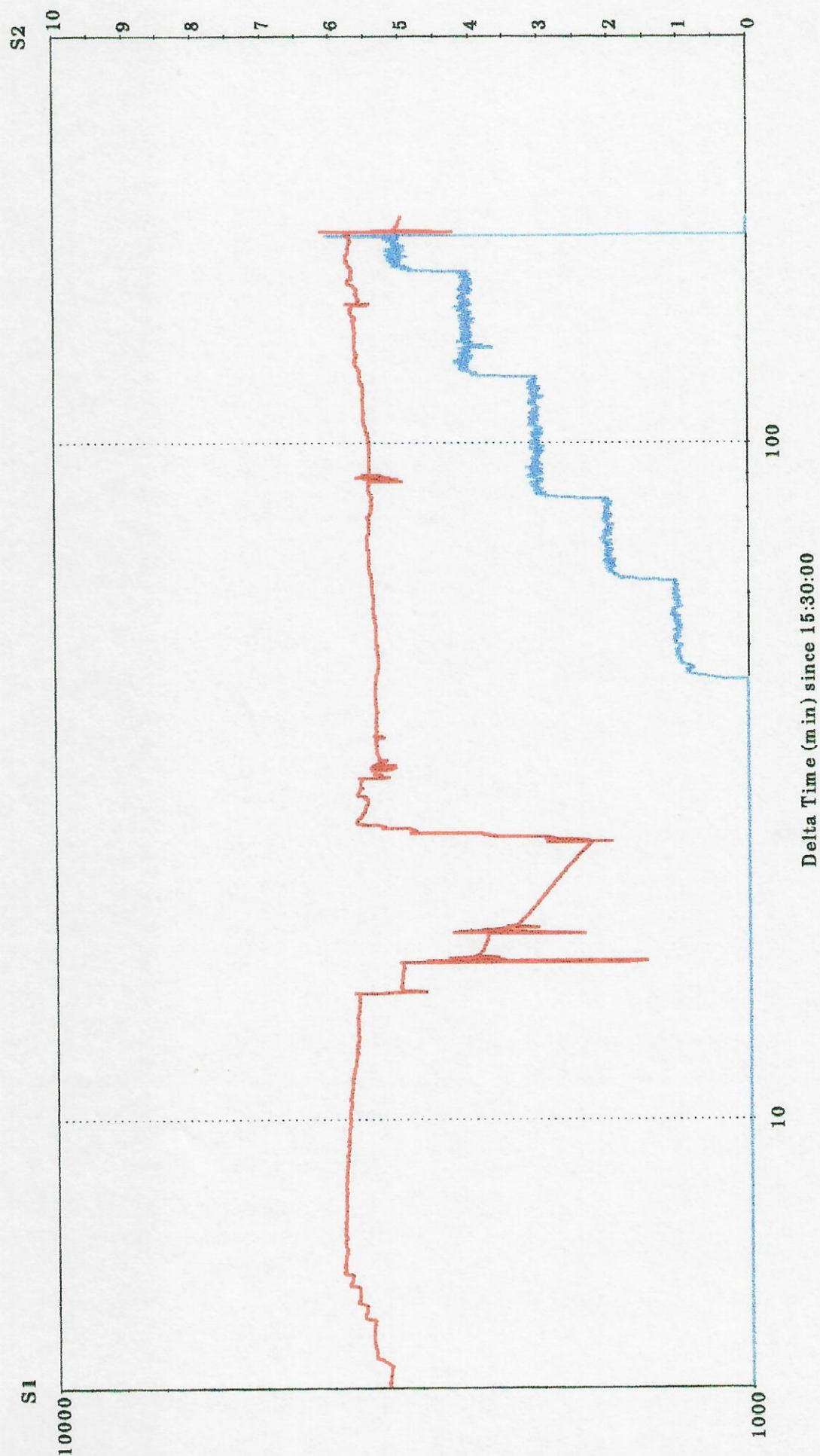
CHEMICAL PLOT



CUSTOMER: TOP OPERATING TICKET: 174093 DATE: Tue 28-Sep-99
 WELL DESC: TANAKA 1-2 FORMATION: J-SAND

NET PLOT

— S1: Calc'd BH Pressure - 3500 (psi) — S2: Proppant Conc (lb/gal)



CUSTOMER: TOP OPERATING TICKET: 174093 DATE: Tue 28-Sep-99
 WELL DESC: TANAKA 1-2 FORMATION: J-SAND

Call for Customer Service

Company Top Operating Date 9/27/99

Contractor _____ County Weld Town _____ Field Wattenburg

Lease Tanaka Well # #1-2 API # _____ Sec. 2 Twp. 1N Rng. 69W

Directions Hwy 52 West to Boulter Cty Rd 1, On West to 115th Street, South 1 mile, East & North to location.



Job Type <u>Fracgel</u>	PBTD	HHP 4000	BLENDER 2	ANNULUS TRK Yes
Formation Name <u>J-Sand</u> BHST <u>250</u>	Packer <u>7400?</u>	BALL INJECTOR	ISOLATION TOOL	CSG POP OFF Yes
Tubing <u>2 7/8</u> Casing _____	RBP	N2 OR CO2	TOT. TONS-SCF	MT. MOVER 2
Perforations <u>8057-8068</u>	Flange	BPM 24	PSI	MAX 7000
		TREATMENT COLUMN		
		TBG <u>2 7/8</u>	CSG	ANN

Treat. Fluid	<u>Fracgel</u>	Density	<u>27</u>	Lbs	
Displ. Fluid		Density		Lbs/Gal	
Prop. Type	<u>Sand Bulk</u>	Size	<u>20/40</u>	Lbs	<u>400,000</u>
Prop. Type		Size		Lbs	
Prop. Type		Size		Lbs	
Proppant				Lbs	
Surfactant	<u>LoSurf-300</u>	Gal	<u>100</u>	@	<u>0.5</u> /1000
Surfactant	<u>SSO-21</u>	Gal	<u>100</u>	@	<u>0.5</u> /1000
Gelling Agent	<u>LGC VIII</u>	Gal	<u>1320</u>	@	<u>6.75</u> /1000
Breaker Type	<u>SP</u>	Lbs	<u>10</u>	@	<u>1</u> /1000
Breaker Type	<u>Optiflo III</u>	Lbs	<u>60</u>	@	<u>1</u> /1000
Breaker Type	<u>Gbw-3</u>	Lbs	<u>50</u>	@	<u>1</u> /1000
Breaker Type		Lbs		@	<u>1</u> /1000
Crosslinker		Gal-Lbs		@	<u>1</u> /1000
Crosslinker	<u>CL-23 & CL-29</u>	Gal	<u>90</u>	@	<u>0.5</u> /1000
Buffer Type		Gal		@	<u>1</u> /1000
Buffer Type		Gal		@	<u>1</u> /1000
Bacteriacide	<u>Furnished By Customer</u>	Lbs		@	<u>1</u> /1000
Clay Control	<u>Furnished By Customer</u>	Gal		@	<u>1</u> /1000
Stabilizer	<u>Gel-Sta</u>	Lbs	<u>440</u>	@	<u>5</u> /1000
Activator		Gal-Lbs		@	<u>1</u> /1000

PROCEDURE

CL 23 & CL-29 Mixed (7:3)

BREAKER SCHEDULE

ACID DATA

Acid Type _____ % _____ Gal

Acid Type _____ % _____ Gal

Surfactant	Gal-Lbs	@	/1000
Ne Agent	Gal-Lbs	@	/1000
Clay Control	Gal-Lbs	@	/1000
Corrosion Inhibitor	Gal-Lbs	@	/1000
Corrosion Inhibitor	Gal-Lbs	@	/1000
Cracking Inhibitor	Gal-Lbs	@	/1000
Iron Sequester	Gal-Lbs	@	/1000
Friction Reducer	Gal-Lbs	@	/1000

ORDERED BY Andy Peterson

CALL TAKEN BY Lance Perez

CREW CALLED Alan Laubsch

DATE OF JOB 9/28/99

TIME READY 800

BULK SAND WEIGHTS

CUSTOMER: TOP OPERATING
LEASE

LEASE: TANAKA 1-2

DATE: 09/28/99

FORMATION: J SAND

JOB TOTAL: 400000

ON BIN

TRUCK NUMBER

B/L #

TRUCK LOADS

[illegible]

TOTAL: 401100 #

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SHIPPER'S NO. 0006209		AGENT'S NO.	CUSTOMER ORDER NO. PC4500105588	OUR ORDER NO. 052-0001018	SHIP DATE 9/23/99	SHIP VIA TK-PNT
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459				STATE CO 80601 COUNTY ADAMS		
DESTINATION BRIGHTON				ICC CONTRACT NO.		
CARRIER CUSTOMER TRUCK				VEHICLE OR CAR INITIAL & NO. BIN 3		
ROUTE				DELIVERING CARRIER		

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Chc Column
		1 TL UNIFRAC 20/40-BULK GR. 50379861					

SHIPPER'S SPECIAL INSTRUCTIONS:	GROSS	78740		
	TARE	31400		
	NET	47340		

HORTON FEEDLOTS, INC. 2602 WCR 27 Fort Lupton, Colorado 80601 Phone (303) 659-1000 Vehicle Unimac		NO. 77844 DATE 9-23-99	conditions of this shipment consignee without the consignor ent: make delivery yment of freight
PURCHASED FROM		DATE	
SOLD TO			
COMMODITY			
CARRIER Doty #38			

07:22 AM 09-23-99	78740 lb GR	% MOISTURE	
06:59 AM 09-23-99	31400 lb TA	BCFM	
TOTAL LBS. NET 47340		BUSHEL WT.	
		\$ PRICE PER	
		DRIVER ON OFF <input checked="" type="checkbox"/>	knowledges only
		WEIGHER IL	sd:

IMPORTANT READ HEALTH HAZARD WARNING BELOW RECEIVED Paul G...		SHIPPER UNIMIN CORPORATION PER AGENT PER	258 Elm Street New Canaan, CT 06840 (203) 966-8888
---	--	--	--

HEALTH HAZARD WARNING: CONTAINS FREE SILICA. DO NOT BREATHE DUST - Prolonged inhalation can cause delayed lung injury including SILICOSIS, a progressive, disabling and sometimes fatal lung disease. IARC has determined that crystalline and microcrystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure. Do not use as a dry abrasive blasting agent. Follow OSHA or other relevant safety and health standards for the form of crystalline silica called quartz. Current material safety data sheet containing safety information is available and should be consulted before opening. Since empty containers retain product residue, follow label warnings even after container is empty.

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FROM		UNIMIN CORPORATION		A T BRIGHTON	
SHIP	NO.	AGENT'S NO.	CUSTOMER ORDER NO.	OUR ORDER NO.	SHIP DATE
	0006210		pc4500165588	052-000101A	9/23/99
CONSIGNEE TO		HALLIBURTON ENERGY SERVICES, BOX 459			
DESTINATION		BRIGHTON		STATE	CO 80601
CARRIER		CUSTOMER TRUCK		COUNTY	ADAMS
ROUTE		ICC CONTRACT NO.			
DELIVERING CARRIER		VEHICLE OR CAR INITIAL & NO. Bin 3			

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Chec Color
1	TL	UNIFRAC 20/40-BULK GR50379862					

SHIPPER'S SPECIAL INSTRUCTIONS:					GROSS	83,660		
					TARE	30,320		
					NET	53,340		

HORTON FEEDLOTS, INC.

2602 WCR 27
Fort Lupton, Colorado 80601
Phone (303) 659-1000

Vehi PURCHASED FROM Unimin DATE 9-23-99

SOLD TO

COMMODITY

CARRIER # 410 Rety

07:16 AM 09-23-99

83660 lb GR

06:58 AM 09-23-99

30320 lb TA

% MOISTURE

BCFM

BUSHEL WT.

\$ PRICE PER

DRIVER ON OFF X

WEIGHER R

†This is applicable
†If the shipper
†Shipper's NOTE
The agree

TOTAL LBS. NET 53340

IMPORT/		READ HEALTH HAZARD WARNING BELOW		SHIPPER UNIMIN CORPORATION PER		258 Elm Street New Canaan, CT 06840 (203) 966-8990	
TIME AND DATE OF DELIVERY		AGENT PER					

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UNIMIN CORPORATION		BRIGHTON	
SHIPPER'S NO.	AGENT'S NO.	CUSTOMER ORDER NO.	OUR ORDER NO.
0006211		PC4500165588	052-0001018
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459		SHIP DATE	SHIP VIA
DESTINATION BRIGHTON		9/23/99	TK-PNT
CARRIER CUSTOMER TRUCK		STATE CO 80601	COUNTY ADAMS
ROUTE		ICC CONTRACT NO.	
DELIVERING CARRIER		VEHICLE OR CAR INITIAL & NO. B103	

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Chc Color
1	TL	UNIFRAC 20/40-BULK GR50379863					

SHIPPER'S SPECIAL INSTRUCTIONS:

GROSS	80.700
TARE	31.100
NET	49.600

HORTON FEEDLOTS, INC.

2602 WCR 27

Fort Lupton, Colorado 80601

Phone (303) 659-1000

CW chg 500

24.80
NO. 77873

conditions of
this shipment
insignee without
the consignor
make delivery
ment of freight

Vehicle PURCHASED FROM Unimin

DATE 9-23-99

SOLD TO

COMMODITY

CARRIER #38 Doty

% MOISTURE

10:18 AM 09-23-99

60700 lb GR

BCFM

09:56 AM 09-23-99

31100 lb TA

BUSHEL WT.

\$ PRICE PER

TOTAL LBS. NET

49.600

DRIVER ON OFF X

WEIGHER R

IMPORTANT:

READ HEALTH HAZARD WARNING BELOW

SHIPPER UNIMIN CORPORATION PER

AGENT PER

250 Elm Street
New Canaan, CT 06840
(203) 966-8888

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FROM		UNIMIN CORPORATION		TO		BRIGHTON	
SHIPPER'S NO.	AGENT'S NO.	CUSTOMER ORDER NO.		OUR ORDER NO.	SHIP DATE	SHIP VIA	
0006212		PC4500165888		052-000101A	9/23/99	TK-PNT	
CONSIGNEE TO				HALLIBURTON ENERGY SERVICES, BOX 459			
DESTINATION				BRIGHTON			
CARRIER				CUSTOMER TRUCK			
ROUTE				STATE CO 80601 COUNTY ADAMS			
DELIVERING CARRIER				ICC CONTRACT NO.			
				VEHICLE OR CAR INITIAL & NO. BJ 3			

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Check Column
1	TL	UNIFRAC 20/40-BULK CR 30379864					

SHIPPER'S SPECIAL INSTRUCTIONS:

GROSS	82,380		
TARE	30,820		
NET	51,560		

HORTON FEEDLOTS, INC.

2602 WCR 27
Fort Lupton, Colorado 80601
Phone: (303) 659-1000

Vehi

PURCHASED FROM Uniman

DATE

9-23-99

SOLD TO

COMMODITY

CARRIER Doty, 40

% MOISTURE

BCFM

BUSHEL WT.

\$ PRICE PER

DRIVER ON OFF X

WEIGHER

10:26 AM 09-23-99

82380 lb GR

10:06 AM 09-23-99

30820 lb TA

†This is
applicat
*If the si
†Ship
NOTE
The agn

TOTAL LBS. NET

51560

IMPORT

READ HEALTH HAZARD WARNING BELOW

RECEI

TIME AND DATE
OF DELIVERY

SHIPPER UNIMIN CORPORATION

PER

AGENT

PER

250 Elm Street
New Canaan, CT 06840
(203) 966-8888

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FROM UNIMIN CORPORATION		TO BRIGHTON	
SHIPPER'S NO. 0006213	AGENT'S NO.	CUSTOMER ORDER NO. 004500165588	OUR ORDER NO. 052-0001018
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459		SHIP DATE 9/23/99	SHIP VIA TK-PNT
DESTINATION BRIGHTON		STATE CO 80601	COUNTY ADAMS
CARRIER CUSTOMER TRUCK		ICC CONTRACT NO.	
ROUTE		VEHICLE OR CAR INITIAL & NO. BIN 3	
DELIVERING CARRIER			

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Chg Cot.
		1 TL UNIFRAC 20/40-BULK GR 50379865					

SHIPPER'S SPECIAL INSTRUCTIONS:

GROSS	52,100 80,000
TARE	2,200 30,000
NET	50,000 49,920

HORTON FEEDLOTS, INC.
2602 WCR 27
Fort Lupton, Colorado 80601
Phone (303) 659-1000

2
CU chg 500

24.96
NO. **77902**

Vehicle

PURCHASED FROM **Unimin**

DATE **9-23-99**

SOLD TO

COMMODITY

CARRIER **Doty #40**

% MOISTURE

BCFM

BUSHEL WT.

\$ PRICE PER

DRIVER ON OFF

WEIGHER

12:35 PM 09-23-99

30080 lb

12:55 PM 09-23-99

80000 lb

†This is to o
applicable reg
*If the shipme
† Shipper's in
NOTE---When
The agreed or

TOTAL LBS. NET **49 920**

IMPORTANT

READ HEALTH HAZARD WARNING BELOW

SHIPPER **UNIMIN CORPORATION** PER

AGENT PER

258 Elm Street
New Canaan, CT 06840
(203) 966-8888

HEALTH HAZARD WARNING: CONTAINS FREE SILICA. DO NOT BREATHE DUST - Prolonged inhalation can cause delayed lung injury including SILICOSIS, a progressive, disabling and sometimes fatal lung disease. IARC has determined that crystalline and microcrystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure. Do not use as a dry abrasive blasting agent. Follow OSHA or other relevant safety and health standards for the form of crystalline silica called quartz. Current material safety data sheet containing safety information is available and should be consulted before opening. Since empty containers retain product residue, follow label warning even after container is empty.

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FROM		UNIMIN CORPORATION		A T		BRIGHTON	
SHIPPER'S NO.	AGENT'S NO.	CUSTOMER ORDER NO.		OUR ORDER NO.	SHIP DATE	SHIP VIA	
0006214		PC4500165588		052-0001018	9/23/99	TK-PNT	
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459				STATE CO 80601 COUNTY ADAMS			
DESTINATION BRIGHTON				ICC CONTRACT NO.			
CARRIER CUSTOMER TRUCK				VEHICLE OR CAR INITIAL & NO. BIN 3			
ROUTE				DELIVERING CARRIER			

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Ches Column
1	TL	UNIFRAC 20/40-BULK GR 50379866					

SHIPPER'S SPECIAL INSTRUCTIONS:					GROSS	86,520		
					TARE	31,000		
					NET	55,520		

Arthur's BRIGHTON GRAIN CO. 404 N. Main St. • Brighton, CO 80601 • (303) 659-3247		27.76 DATE <u>Sept 23 1999</u>	of conditions of if this shipment consignee without or, the consignor must make delivery payment of freight
Vehicle	Customer Name <u>UNIMIN</u>	MATERIAL	
	Address <u>Sand</u>		
	Special Instructions <u>Sand</u>		
Truck Number <u>38</u>	Driver <u>off</u>	86520 1b Gross 55520 1b Net 31000 1b Tare 86520 1b Gross 55520 1b Net 31000 1b Tare	
Weigher <u>WRA</u>			

IMPORTANT READ INSTRUCTIONS BELOW RECEIVED <u>Karl G. L...</u>	SHIPPER <u>UNIMIN CORPORATION</u> PER _____ AGENT _____ PER _____	254 Elm Street New Canaan, CT 06840 (203) 966-8888
--	--	--

HEALTH HAZARD WARNING: CONTAINS FREE SILICA. DO NOT BREATHE DUST - Prolonged inhalation can cause delayed lung injury including SILICOSIS, a progressive, disabling and sometimes fatal lung disease. IARC has determined that crystalline and microcrystalline silica inhaled from occupational sources can cause cancer in humans. Risk of injury is dependent on the duration and level of exposure. Do not use as a dry abrasive blasting agent. Follow OSHA or other relevant safety and health standards for the form of crystalline silica called quartz. Current material safety data sheet containing safety information is available and should be consulted before opening. Since empty containers retain product residue, follow label warnings even after container is empty.

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FROM		UNIMIN CORPORATION		A T BRIGHTON	
SHIPPER	AGENT'S NO.	CUSTOMER ORDER NO.	OUR ORDER NO.	SHIP DATE	SHIP VIA
0006215		pc4500165588	052-0001018	9/23/99	TK-PNT
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459			STATE CO 80601 COUNTY ADAMS		
DESTINATION BRIGHTON			ICC CONTRACT NO.		
CARRIER CUSTOMER TRUCK			VEHICLE OR CAR INITIAL & NO. BIN 3		
ROUTE					
DELIVERING CARRIER					

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Check Column
1	TL	UNIFRAC 20/40-BULK GR50379867					

SHIPPER'S SPECIAL INSTRUCTIONS:

GROSS	78,540
TARE	30,960
NET	47,580

Arthur's
BRIGHTON GRAIN CO.

404 N. Main St. • Brighton, CO 80601 • (303) 659-3247

Customer Name Unimin

Address _____

Special Instructions _____

MATERIAL SAND

78540 lb Gross
47580 lb Net
30960 lb Tare

Truck Number 38

Driver [Signature]

Weigher [Signature]

258 Elm Street
New Canaan, CT 06840
(203) 966-8800

IMPORTANT

READ HEALTH HAZARD WARNING BELOW

RECEIVED
TIME AND DATE OF DELIVERY

SHIPPER UNIMIN CORPORATION PER _____
AGENT _____ PER _____

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FROM	UNIMIN CORPORATION		BRIGHTON		
SHIP	AGENT'S NO.	CUSTOMER ORDER NO.	OUR ORDER NO.	SHIP DATE	SHIP VIA
0006216		PC4500165588	052-000101A	9/23/99	TK-PNT
CONSIGNEE TO HALLIBURTON ENERGY SERVICES, BOX 459					
DESTINATION BRIGHTON					
CARRIER CUSTOMER TRUCK					
ROUTE					
DELIVERING CARRIER					
VEHICLE OR CAR INITIAL & NO. BIN 3					

Qty. Ordered	UOM	Kind of Package, Description of Articles, Special Marks and Exceptions	No. of Packages	HM	*Weight (Subject to Correction)	Class or Rate	Chet Color
1	TL	UNIFRAC 20/40-BULK GR 503 79868					

SHIPPER'S SPECIAL INSTRUCTIONS:	GROSS	77,360
	TARE	31,120
	NET	46,240

HORTON FEEDLOTS, INC.

2602 WCR 27
Fort Lupton, Colorado 80601
Phone (303) 659-1000

2
CW chg 500

23.12
NO. 77929

Conditions of
shipment
free without
consignor
to delivery
of freight

Vehicle or	PURCHASED FROM Unimin	DATE 9-23-99
SOLD TO		
COMMODITY		
CARRIER Doty #10		
03:07 PM 09-23-99	31120 lb	BCFM
03:41 PM 09-23-99	77360 lb	BUSHEL WT.
\$ PRICE PER		
DRIVER ON OFF X		
WEIGHER Jk		
TOTAL LBS. NET 46240		

IMPORTANT	READ HEALTH HAZARD WARNING BELOW	SHIPPER UNIMIN CORPORATION	PER
RECI		AGENT	PER
TIME AND DATE OF DELIVERY		250 Elm Street New Canaan, CT 06840 (203) 966-8880	

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Customer: **TOP OPERATING**
Well Desc.: **1-2**
Formation: **J-SAND**

Date: **28-Sep-1999**
Ticket #: **174093**
Job Type: **FRAC GEL 27 #**

Time of Day	Skid 2 Viscosity	Stage Clean Vol	Stage Slurry Vol	Job Clean Vol	Job Slurry Vol	Stage Proppant	Job Proppant
	cp	gal	gal	gal	gal	Pumped sack	Pumped sack
14:49:23	4.61	0.0	0.0	0.0	0.0	0.0	0.0
14:50:23	2.91	0.0	0.0	0.0	0.0	0.0	0.0
14:51:23	3.07	0.0	0.0	0.0	0.0	0.0	0.0
14:52:23	2.77	0.0	0.0	0.0	0.0	0.0	0.0
14:53:03	Stage Change 1 - LOAD & BREAK						
14:53:23	2.76	0.0	0.0	0.0	0.0	0.0	0.0
14:54:23	3.04	0.0	0.0	0.0	0.0	0.0	0.0
14:55:23	6.34	0.0	0.0	0.0	0.0	0.0	0.0
14:56:23	19.78	0.0	0.0	0.0	0.0	0.0	0.0
14:57:23	3.93	399.1	343.0	399.1	343.0	0.0	0.0
14:58:23	3.76	1102.0	765.1	1102.0	765.1	0.0	0.0
14:59:23	3.37	1559.2	1174.0	1559.2	1174.0	0.0	0.0
15:00:23	2.76	1940.5	1452.6	1940.5	1452.6	0.0	0.0
15:01:23	3.13	2089.3	1668.1	2089.3	1668.1	0.0	0.0
15:02:23	3.69	2320.2	1897.4	2320.2	1897.4	0.0	0.0
15:03:23	2.87	2663.6	2250.6	2663.6	2250.6	0.0	0.0
15:04:23	2.28	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:05:23	2.66	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:05:26	ISDP @ 2040 PSI						
15:06:23	3.21	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:07:23	2.77	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:08:23	3.00	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:09:23	5.54	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:10:23	4.05	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:11:23	1.23	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:12:23	2.45	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:13:23	0.86	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:14:23	8.35	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:15:23	3.13	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:16:23	1.28	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:17:23	3.07	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:18:23	2.65	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:19:23	1.46	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:20:23	1.27	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:21:23	2.25	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:22:23	1.82	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:23:23	8.69	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:24:23	6.20	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:25:23	4.73	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:26:23	2.62	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:27:23	6.67	2966.2	2522.7	2966.2	2522.7	0.0	0.0
15:28:23	9.17	3139.2	2704.6	3139.2	2704.6	0.0	0.0
15:29:10	Stage Change 2 - LINEAR GEL						
15:29:23	4.35	35.4	66.0	3471.0	2914.8	0.0	0.0
15:30:23	4.36	442.1	464.7	3877.6	3313.4	0.0	0.0
15:31:23	16.24	873.9	881.2	4309.4	3729.9	0.0	0.0
15:32:23	17.27	1289.5	1299.9	4725.1	4148.7	0.0	0.0
15:33:23	17.23	1788.2	1819.3	5223.8	4668.1	0.0	0.0
15:34:23	17.30	2492.8	2512.3	5928.3	5361.0	0.0	0.0
15:35:23	17.24	3317.0	3341.9	6752.5	6190.7	0.0	0.0
15:36:23	17.22	4269.0	4292.8	7704.5	7141.6	0.0	0.0
15:37:23	17.16	5257.3	5278.0	8692.8	8126.7	0.0	0.0
15:38:23	17.19	6241.6	6263.4	9677.1	9112.2	0.0	0.0
15:39:23	17.22	7224.7	7250.5	10660.3	10099.3	0.0	0.0
15:40:23	17.27	8207.9	8239.1	11643.4	11087.9	0.0	0.0

Time of Day	Skid 2 Viscosity	Stage Clean Vol	Stage Slurry Vol	Job Clean Vol	Job Slurry Vol	Stage Proppant	Job Proppant
	cp	gal	gal	gal	gal	Pumped sack	Pumped sack
15:41:23	17.30	9193.6	9227.9	12629.2	12076.6	0.0	0.0
15:42:23	17.34	10177.9	10217.6	13613.4	13066.4	0.0	0.0
15:43:23	17.43	11163.7	11208.8	14599.2	14057.6	0.0	0.0
15:44:23	17.48	12152.8	12200.5	15588.4	15049.3	0.0	0.0
15:44:56	START REVERSE STEP RATE						
15:45:23	17.52	13141.2	13189.6	16576.7	16038.4	0.0	0.0
15:46:23	17.56	13915.0	13951.9	17350.5	16800.7	0.0	0.0
15:47:23	17.60	14554.3	14542.7	17989.9	17391.5	0.0	0.0
15:48:23	17.76	14807.9	14865.5	18243.5	17714.3	0.0	0.0
15:49:23	18.09	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:50:23	18.14	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:51:23	18.01	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:52:23	18.42	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:53:23	18.62	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:54:23	18.77	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:54:46	ISDP @ 2195 PSI,CLOSURE @ 5725 PSI						
15:55:23	18.90	14947.5	15002.5	18383.0	17851.4	0.0	0.0
15:56:23	18.85	15001.6	15150.0	18437.2	17998.8	0.0	0.0
15:57:23	18.98	15813.5	15905.1	19249.0	18753.9	0.0	0.0
15:57:47	RESUME LINEAR PAD						
15:58:23	18.99	16836.4	16898.3	20271.9	19747.1	0.0	0.0
15:59:23	18.56	17836.7	17896.7	21272.3	20745.5	0.0	0.0
15:59:31	Stage Change 3 - CROSSLINKED PAD						
16:00:23	18.57	896.5	908.5	22277.2	21762.3	0.0	0.0
16:01:23	18.62	1957.9	1969.8	23338.5	22823.6	0.0	0.0
16:02:23	18.54	3010.1	3003.1	24390.7	23856.9	0.0	0.0
16:03:23	18.51	3978.4	3984.1	25359.0	24837.9	0.0	0.0
16:04:23	18.45	4946.5	4954.6	26327.1	25808.4	0.0	0.0
16:05:23	18.42	5916.7	5928.3	27297.3	26782.1	0.0	0.0
16:06:23	18.36	6887.1	6902.3	28267.7	27756.2	0.0	0.0
16:07:23	18.30	7860.0	7873.8	29240.6	28727.7	0.0	0.0
16:08:23	18.30	8824.9	8848.8	30205.4	29702.7	0.0	0.0
16:09:23	18.33	9800.7	9823.8	31181.3	30677.7	0.0	0.0
16:10:23	18.48	10770.4	10798.6	32151.0	31652.4	0.0	0.0
16:11:23	18.31	11742.4	11773.6	33123.0	32627.4	0.0	0.0
16:12:23	18.31	12717.7	12748.8	34098.2	33602.7	0.0	0.0
16:13:23	18.35	13690.7	13724.1	35071.2	34577.9	0.0	0.0
16:14:23	21.07	14660.5	14699.3	36041.1	35553.1	0.0	0.0
16:14:47	Stage Change 4 - 1 PPG SAND STAGE						
16:15:23	21.07	581.7	608.9	36976.0	36527.3	2.8	2.8
16:16:23	21.07	1494.9	1584.6	37889.2	37503.0	10.7	10.7
16:17:23	21.08	2432.6	2565.0	38826.8	38483.5	18.8	18.8
16:18:23	21.02	3368.8	3545.7	39763.1	39464.2	27.9	27.9
16:19:23	21.07	4308.8	4526.6	40703.1	40445.1	37.3	37.3
16:19:48	1 PPG SAND ON FORMATION						
16:20:23	21.07	5238.8	5507.1	41633.1	41425.6	46.5	46.5
16:21:23	21.09	6175.9	6487.6	42570.2	42406.2	56.2	56.2
16:22:23	21.08	7110.3	7468.4	43504.6	43387.0	65.7	65.7
16:23:23	21.12	8043.9	8449.1	44438.2	44367.7	75.2	75.2
16:24:23	21.09	8978.4	9429.8	45372.7	45348.5	84.6	84.6
16:25:23	21.09	9911.3	10409.9	46305.6	46328.6	94.2	94.2
16:26:23	21.12	10844.1	11390.1	47238.5	47308.9	104.0	104.0
16:27:23	21.05	11776.1	12370.3	48170.5	48289.1	113.8	113.8
16:28:23	21.12	12711.7	13351.4	49106.1	49270.2	123.1	123.1
16:29:23	21.13	13643.2	14332.1	50037.5	50251.0	132.8	132.8

Time of Day	Skid 2 Viscosity	Stage Clean Vol	Stage Slurry Vol	Job Clean Vol	Job Slurry Vol	Stage Proppant	Job Proppant
	cp	gal	gal	gal	gal	Pumped sack	Pumped sack
16:30:23	21.16	14573.8	15312.3	50968.1	51231.2	142.4	142.4
16:31:23	21.17	15505.5	16292.5	51899.9	52211.4	152.1	152.1
16:32:23	21.14	16435.7	17272.6	52830.0	53191.5	161.8	161.8
16:33:01	Stage Change 5 - START 2 PPG 20/40 SLF STAGE						
16:33:23	21.14	331.3	367.8	53734.4	54172.3	5.4	173.5
16:34:23	21.17	1213.4	1349.8	54616.5	55154.4	22.3	190.4
16:35:23	21.17	2110.6	2334.2	55513.7	56138.7	40.1	208.2
16:36:23	21.14	3013.2	3319.0	56416.2	57123.5	57.8	226.0
16:37:23	21.17	3909.3	4304.4	57312.3	58108.9	75.7	243.8
16:38:23	21.20	4806.6	5289.3	58209.6	59093.8	93.8	261.9
16:39:23	21.21	5704.3	6274.5	59107.2	60078.9	111.9	280.0
16:40:23	21.22	6600.8	7259.1	60003.8	61063.6	129.9	298.0
16:41:23	21.20	7495.4	8243.8	60898.4	62048.2	148.1	316.3
16:42:23	21.27	8391.3	9228.2	61794.3	63032.7	166.5	334.6
16:43:23	21.25	9288.3	10213.3	62691.2	64017.7	184.9	353.1
16:44:23	21.25	10189.0	11199.9	63592.0	65004.3	203.2	371.3
16:45:23	21.30	11083.4	12185.3	64486.4	65989.7	221.2	389.3
16:46:23	21.31	11981.5	13170.9	65384.5	66975.3	239.1	407.2
16:47:23	21.33	12879.2	14157.0	66282.2	67961.4	257.6	425.7
16:48:23	21.28	13775.1	15141.9	67178.0	68946.3	275.8	443.9
16:49:23	21.30	14672.8	16128.2	68075.8	69932.6	294.0	462.1
16:50:23	21.34	15568.9	17114.7	68971.8	70919.2	312.2	480.3
16:51:23	21.37	16469.7	18100.5	69872.6	71904.9	330.3	498.4
16:52:23	21.41	17368.4	19087.4	70771.4	72891.8	348.5	516.6
16:53:08	Stage Change 6 - START 3 PPG 20/40 SAND STAGE						
16:53:23	21.42	228.8	263.8	71652.5	73879.4	6.0	536.2
16:54:23	21.44	1065.0	1252.7	72488.7	74868.4	31.1	561.3
16:55:23	21.50	1935.6	2242.3	73359.4	75857.9	57.1	587.3
16:56:10	3 PPG SLF ON PERFS.						
16:56:23	21.45	2802.5	3232.0	74226.3	76847.8	83.3	613.5
16:57:23	21.44	3664.2	4221.7	75088.0	77837.4	109.8	639.9
16:58:23	21.49	4524.1	5168.5	75947.8	78784.2	134.9	665.1
16:59:23	21.44	5274.0	6076.4	76697.8	79692.2	158.9	689.0
17:00:23	21.48	6108.4	7014.3	77532.2	80630.0	183.9	714.1
17:01:23	21.52	6930.9	7953.4	78354.8	81569.2	208.9	739.1
17:02:23	21.55	7750.7	8892.6	79174.5	82508.3	234.0	764.1
17:03:23	21.54	8571.5	9832.2	79995.2	83447.8	259.2	789.3
17:04:23	21.54	9390.6	10771.5	80814.4	84387.1	284.1	814.3
17:05:23	21.56	10209.7	11710.3	81633.5	85325.7	309.2	839.4
17:06:23	21.55	11025.1	12648.6	82448.9	86264.0	334.0	864.2
17:07:23	21.54	11843.0	13586.2	83266.8	87201.7	358.8	889.0
17:08:23	21.59	12665.9	14522.9	84089.7	88138.4	383.5	913.6
17:09:23	21.58	13484.4	15459.8	84908.3	89075.4	408.1	938.3
17:10:23	21.02	14303.6	16396.2	85727.3	90011.8	433.1	963.3
17:11:23	20.98	15122.6	17332.9	86546.3	90948.6	458.2	988.4
17:12:23	21.05	15937.3	18269.6	87361.1	91885.4	483.1	1013.2
17:13:23	21.01	16752.9	19205.6	88176.7	92821.3	508.0	1038.2
17:14:23	20.99	17570.2	20139.7	88994.1	93755.5	532.9	1063.0
17:15:23	21.00	18392.0	21073.6	89815.9	94689.3	557.5	1087.7
17:16:23	21.04	19207.5	22006.5	90631.3	95622.1	582.3	1112.4
17:17:23	21.04	20021.4	22937.6	91445.3	96553.3	607.4	1137.6
17:18:23	21.10	20833.2	23868.7	92257.1	97484.4	632.6	1162.7
17:19:23	21.10	21642.9	24799.9	93066.8	98415.6	657.7	1187.8
17:20:23	21.10	22454.6	25730.6	93878.5	99346.4	682.6	1212.7
17:21:23	21.12	23271.1	26661.5	94694.9	100277.2	707.6	1237.7

Time of Day	Skid 2 Viscosity	Stage Clean Vol	Stage Slurry Vol	Job Clean Vol	Job Slurry Vol	Stage Proppant Pumped sack	Job Proppant Pumped sack
	cp	gal	gal	gal	gal		
17:22:23	21.09	24087.2	27594.4	95511.0	101210.2	732.5	1262.7
17:23:23	21.12	24902.7	28525.3	96326.7	102141.2	757.2	1287.4
17:24:23	21.13	25718.4	29455.7	97142.4	103071.6	782.1	1312.3
17:25:23	21.17	26532.5	30386.5	97956.6	104002.4	807.3	1337.4
17:26:23	21.16	27341.2	31316.7	98765.4	104932.7	832.4	1362.5
17:27:23	21.16	28152.7	32246.6	99576.8	105862.6	857.1	1387.3
17:28:23	21.17	28966.5	33176.7	100390.6	106792.8	881.8	1412.0
17:29:23	21.07	29781.3	34107.3	101205.5	107723.5	906.9	1437.0
17:30:23	20.90	30596.5	35037.9	102020.7	108654.1	931.8	1461.9
17:31:23	20.90	31410.4	35968.3	102834.6	109584.6	956.8	1486.9
17:32:23	20.91	32225.8	36898.1	103650.0	110514.5	981.6	1511.8
17:33:23	20.95	33040.2	37827.7	104464.4	111444.2	1006.8	1536.9
17:34:23	20.92	33853.5	38754.9	105277.8	112371.3	1031.8	1561.9
17:35:23	20.88	34663.1	39681.6	106087.4	113297.9	1056.7	1586.8
17:35:51	Stage Change 7 - START 4 PPG 20/40 SAND STAGE, TAIL END BREAKER PACKAGE						
17:36:23	20.90	427.1	517.9	106852.4	114225.0	16.5	1614.9
17:37:23	20.91	1203.7	1447.7	107628.9	115155.0	47.5	1645.9
17:38:23	20.91	1989.3	2381.5	108414.6	116088.7	78.9	1677.3
17:39:03	4 PPG SLF ON PERFS.						
17:39:23	20.86	2775.9	3316.1	109201.1	117023.3	111.0	1709.3
17:40:23	20.88	3566.1	4249.2	109991.4	117956.4	143.1	1741.5
17:41:23	20.91	4355.2	5180.4	110780.5	118887.6	174.9	1773.3
17:42:23	20.93	5140.5	6111.3	111565.8	119818.6	206.9	1805.3
17:43:23	20.95	5918.1	7042.6	112343.3	120750.0	239.3	1837.6
17:44:23	20.97	6698.3	7974.3	113123.5	121681.7	270.9	1869.3
17:45:23	20.99	7483.4	8907.9	113908.7	122615.2	302.8	1901.1
17:46:23	21.02	8268.3	9839.9	114693.6	123547.2	334.7	1933.1
17:47:23	21.07	9052.3	10770.8	115477.5	124478.2	366.5	1964.8
17:48:23	21.09	9837.4	11701.3	116262.6	125408.7	398.3	1996.6
17:49:23	21.09	10639.9	12631.1	117065.2	126338.5	428.4	2026.8
17:50:23	21.12	11416.9	13558.7	117842.2	127266.2	459.1	2057.5
17:51:23	21.18	12189.4	14486.5	118614.6	128193.9	490.6	2089.0
17:52:23	21.18	12970.8	15415.1	119396.0	129122.5	522.5	2120.9
17:53:23	21.25	13753.2	16343.9	120178.4	130051.4	554.2	2152.6
17:54:23	21.20	14535.4	17272.4	120960.6	130979.9	585.7	2184.1
17:55:23	21.26	15316.8	18201.1	121742.1	131908.4	617.2	2215.6
17:56:23	21.33	16098.3	19129.5	122523.7	132836.7	648.9	2247.3
17:57:23	21.33	16878.5	20056.3	123303.9	133763.4	680.4	2278.8
17:58:23	21.41	17657.2	20982.5	124082.5	134689.5	712.1	2310.5
17:59:23	21.38	18435.2	21908.3	124860.5	135615.3	743.6	2342.0
18:00:23	21.41	19210.9	22832.1	125636.2	136539.2	775.1	2373.5
18:01:23	21.46	19987.0	23755.9	126412.2	137463.1	806.4	2404.8
18:02:23	21.47	20763.7	24681.2	127189.0	138388.3	838.1	2436.5
18:03:22	Stage Change 8 - CONTINUE 4 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:03:23	21.49	32.5	38.6	127966.8	139315.2	1.3	2467.9
18:04:23	21.48	812.9	962.5	128747.2	140239.1	32.8	2499.3
18:05:23	21.49	1579.8	1868.4	129514.0	141145.0	63.7	2530.3
18:06:23	21.56	2369.6	2803.9	130303.9	142080.6	95.5	2562.1
18:07:23	21.55	3143.9	3723.4	131078.2	143000.1	127.0	2593.6
18:08:23	21.59	3913.1	4643.6	131847.5	143920.2	158.7	2625.3
18:09:23	21.58	4685.4	5565.2	132619.8	144841.8	190.7	2657.2
18:10:23	21.56	5418.7	6426.2	133353.1	145702.8	220.0	2686.6
18:11:23	21.59	6131.5	7276.4	134065.9	146553.0	249.0	2715.6
18:12:23	21.60	6850.0	8126.8	134784.5	147403.4	278.0	2744.6
18:13:23	21.62	7569.5	8977.0	135504.0	148253.7	307.0	2773.6

Time of Day	Skid 2 Viscosity	Stage Clean Vol	Stage Slurry Vol	Job Clean Vol	Job Slurry Vol	Stage Proppant Pumped	Job Proppant Pumped
	cp	gal	gal	gal	gal	sack	sack
18:14:23	21.59	8289.1	9826.4	136223.6	149103.1	336.3	2802.9
18:15:23	21.60	9007.2	10675.6	136941.7	149952.2	365.6	2832.2
18:16:23	21.60	9722.1	11524.7	137656.7	150801.3	394.5	2861.1
18:17:23	21.88	10438.7	12374.0	138373.2	151650.5	423.3	2889.9
18:18:23	21.66	11154.2	13223.0	139088.7	152499.7	452.2	2918.8
18:19:23	21.67	11868.5	14071.4	139803.1	153348.1	481.2	2947.8
18:20:23	21.71	12581.0	14918.9	140515.5	154195.6	510.3	2976.8
18:21:23	21.72	13293.7	15764.4	141228.2	155041.1	539.1	3005.6
18:22:23	21.69	14003.1	16604.9	141937.5	155881.7	567.5	3034.1
18:23:23	21.69	14712.0	17444.8	142646.5	156721.5	596.0	3062.6
18:24:23	21.63	15419.7	18286.3	143354.1	157563.0	624.5	3091.1
18:25:23	21.63	16132.2	19130.2	144066.6	158406.8	653.2	3119.8
18:26:23	21.52	16845.2	19973.1	144779.6	159249.8	682.1	3148.7
18:27:23	21.47	17557.9	20817.4	145492.4	160093.9	710.9	3177.5
18:28:23	21.41	18269.8	21662.5	146204.2	160939.1	739.8	3206.3
18:29:23	21.34	18964.4	22507.3	146898.8	161783.9	769.2	3235.8
18:29:27	Stage Change 9 - START 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:30:23	21.33	647.8	797.3	147586.2	162630.5	31.4	3269.0
18:31:23	21.25	1338.7	1645.4	148277.1	163478.4	65.2	3302.8
18:32:23	21.17	2036.0	2501.9	148974.4	164334.9	99.9	3337.5
18:32:40	5 PPG SLF ON PERFS.						
18:33:23	21.08	2732.8	3358.4	149671.1	165191.4	134.9	3372.5
18:34:23	21.00	3429.5	4213.9	150367.8	166046.9	169.9	3407.5
18:35:23	20.97	4126.9	5070.1	151065.1	166903.2	205.0	3442.7
18:36:23	20.90	4824.9	5925.1	151763.2	167758.3	240.3	3477.9
18:37:23	20.92	5521.8	6780.5	152460.1	168613.7	275.6	3513.2
18:38:23	20.90	6220.7	7634.7	153159.0	169468.0	310.3	3547.9
18:39:23	20.96	6917.9	8488.3	153856.0	170321.6	345.7	3583.3
18:39:32	Stage Change 10 - CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:40:23	20.98	612.1	748.7	154555.6	171177.3	30.8	3618.5
18:41:23	21.02	1311.8	1604.8	155255.2	172033.4	66.0	3653.7
18:42:23	21.04	2009.2	2461.1	155952.6	172889.9	100.9	3688.6
18:43:23	20.84	2708.1	3317.4	156651.5	173746.2	136.2	3723.9
18:44:23	20.65	3405.4	4173.1	157348.8	174601.8	171.3	3759.0
18:45:23	20.41	4102.4	5028.2	158046.0	175457.0	206.1	3793.8
18:45:59	Stage Change 11 - CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:46:23	20.38	290.6	356.9	158743.1	176313.3	14.7	3829.0
18:47:23	20.40	988.6	1212.9	159440.9	177169.4	49.9	3864.2
18:48:23	20.35	1688.2	2068.4	160140.5	178024.9	85.2	3899.5
18:49:23	20.35	2384.1	2924.4	160836.3	178880.9	120.6	3934.9
18:50:23	20.40	3079.9	3780.7	161532.1	179737.3	156.1	3970.5
18:51:23	20.38	3779.9	4636.2	162232.1	180592.9	191.5	4005.8
18:52:23	20.42	4500.0	5488.7	162952.1	181445.3	228.6	4042.9
18:52:54	Stage Change 12 - FLUSH						
18:53:23	20.40	434.6	416.7	163786.4	182294.6	4.2	4063.0
18:54:23	20.36	1298.8	1256.5	164650.7	183134.4	4.2	4063.0
18:55:23	18.34	1920.0	1818.4	165272.0	183696.2	5.2	4064.0
18:56:23	13.25	1920.0	1818.4	165272.0	183696.2	5.2	4064.0
18:57:23	11.43	1920.0	1818.4	165272.0	183696.2	5.2	4064.0
18:58:23	11.35	1920.0	1818.4	165272.0	183696.2	5.2	4064.0
18:59:23	11.17	1920.0	1818.4	165272.0	183696.2	5.2	4064.0

Time of Day	Tubing Pressure	Annulus Pressure	Calc'd BH Pressure	Clean Rate	Slurry Rate	BH Proppant Conc	Job Slurry Vol
	psi	psi	psi	bbl/min	bbl/min	lb/gal	gal
14:49:23	2	128	0	0.0	0.0	0.00	0.0
14:50:23	0	145	3507	0.0	0.0	0.00	0.0
14:51:23	0	162	3507	0.0	0.0	0.00	0.0
14:52:23	0	175	3507	0.0	0.0	0.00	0.0
14:53:03	Stage Change 1 - LOAD & BREAK						
14:53:23	2	189	3507	0.0	0.0	0.00	0.0
14:54:23	0	204	3507	0.0	0.0	0.00	0.0
14:55:23	0	215	3507	0.0	0.0	0.00	0.0
14:56:23	0	225	3507	0.0	0.0	0.00	0.0
14:57:23	17	227	3473	10.6	9.7	0.00	343.0
14:58:23	53	218	3461	18.3	9.9	0.00	765.1
14:59:23	53	144	3451	12.1	9.7	0.00	1174.0
15:00:23	2088	96	4654	2.8	5.1	0.00	1452.6
15:01:23	2819	646	5278	4.6	5.2	0.00	1668.1
15:02:23	3933	506	5347	5.8	7.5	0.00	1897.4
15:03:23	5428	319	5699	10.4	9.6	0.00	2250.6
15:04:23	2125	0	5584	0.0	0.0	0.00	2522.7
15:05:23	1697	-1	5163	0.0	0.0	0.00	2522.7
15:05:26	ISDP @ 2040 PSI						
15:06:23	1364	0	4830	0.0	0.0	0.00	2522.7
15:07:23	1097	0	4563	0.0	0.0	0.00	2522.7
15:08:23	874	0	4340	0.0	0.0	0.00	2522.7
15:09:23	663	-1	4131	0.0	0.0	0.00	2522.7
15:10:23	468	-2	3934	0.0	0.0	0.00	2522.7
15:11:23	280	-3	3747	0.0	0.0	0.00	2522.7
15:12:23	106	-2	3572	0.0	0.0	0.00	2522.7
15:13:23	9	-2	3475	0.0	0.0	0.00	2522.7
15:14:23	-5	-2	3567	0.0	0.0	0.00	2522.7
15:15:23	-5	-1	3567	0.0	0.0	0.00	2522.7
15:16:23	-5	0	3567	0.0	0.0	0.00	2522.7
15:17:23	-6	-1	3567	0.0	0.0	0.00	2522.7
15:18:23	-6	-1	3567	0.0	0.0	0.00	2522.7
15:19:23	-6	0	3567	0.0	0.0	0.00	2522.7
15:20:23	-7	-1	3567	0.0	0.0	0.00	2522.7
15:21:23	-6	-3	3567	0.0	0.0	0.00	2522.7
15:22:23	-5	-1	3567	0.0	0.0	0.00	2522.7
15:23:23	-6	0	3567	0.0	0.0	0.00	2522.7
15:24:23	-5	0	3567	0.0	0.0	0.00	2522.7
15:25:23	-3	-2	3567	0.0	0.0	0.00	2522.7
15:26:23	-5	0	3567	0.0	0.0	0.00	2522.7
15:27:23	-4	0	3567	0.0	0.0	0.00	2522.7
15:28:23	18	0	3466	8.7	11.8	0.00	2704.6
15:29:10	Stage Change 2 - LINEAR GEL						
15:29:23	3439	1003	4942	5.9	7.5	0.00	2914.8
15:30:23	5132	900	5916	10.9	9.9	0.00	3313.4
15:31:23	4824	995	6168	9.9	9.9	0.00	3729.9
15:32:23	4357	908	6254	10.3	10.0	0.00	4148.7
15:33:23	5039	917	7093	14.3	14.7	0.00	4668.1
15:34:23	5326	931	6894	17.4	18.3	0.00	5361.0
15:35:23	6097	932	7190	20.8	21.4	0.00	6190.7
15:36:23	6589	933	7317	24.0	23.6	0.00	7141.6
15:37:23	6585	870	7339	23.5	23.4	0.00	8126.7
15:38:23	6580	966	7319	23.5	23.5	0.00	9112.2
15:39:23	6572	931	7300	23.7	23.5	0.00	10099.3
15:40:23	6556	904	7270	23.5	23.6	0.00	11087.9

Time of Day	Tubing Pressure	Annulus Pressure	Calc'd BH Pressure	Clean Rate	Slurry Rate	BH Proppant Conc	Job Slurry Vol
	psi	psi	psi	bbl/min	bbl/min	lb/gal	gal
15:41:23	6531	885	7244	23.3	23.6	0.00	12076.6
15:42:23	6484	864	7186	23.3	23.6	0.00	13066.4
15:43:23	6467	848	7170	23.5	23.6	0.00	14057.6
15:44:23	6460	836	7166	23.5	23.6	0.00	15049.3
15:44:56	START REVERSE STEP RATE						
15:45:23	5355	818	6903	23.5	18.9	0.00	16038.4
15:46:23	5063	756	6657	16.4	18.2	0.00	16800.7
15:47:23	3164	669	5989	5.5	7.7	0.00	17391.5
15:48:23	3075	667	5890	7.4	7.7	0.00	17714.3
15:49:23	2189	647	5652	0.0	0.0	0.00	17851.4
15:50:23	2098	684	5560	0.0	0.0	0.00	17851.4
15:51:23	2019	721	5481	0.0	0.0	0.00	17851.4
15:52:23	1948	756	5410	0.0	0.0	0.00	17851.4
15:53:23	1880	788	5343	0.0	0.0	0.00	17851.4
15:54:23	1814	817	5276	0.0	0.0	0.00	17851.4
15:54:46	ISDP @ 2195 PSI,CLOSURE @ 5725 PSI						
15:55:23	1750	844	5213	0.0	0.0	0.00	17851.4
15:56:23	3479	901	5843	1.9	12.2	0.00	17998.8
15:57:23	6244	983	7093	21.6	22.6	0.00	18753.9
15:57:47	RESUME LINEAR PAD						
15:58:23	6446	956	7106	24.0	23.8	0.00	19747.1
15:59:23	6378	924	7043	23.8	23.8	0.00	20745.5
15:59:31	Stage Change 3 - CROSSLINKED PAD						
16:00:23	6753	929	7165	24.7	25.2	0.00	21762.3
16:01:23	6725	926	7122	25.5	25.3	0.00	22823.6
16:02:23	6028	903	6878	23.8	22.8	0.00	23856.9
16:03:23	6032	893	6757	23.2	23.4	0.00	24837.9
16:04:23	6138	883	6907	23.0	23.2	0.00	25808.4
16:05:23	6158	875	6929	23.1	23.2	0.00	26782.1
16:06:23	6163	868	6936	23.1	23.2	0.00	27756.2
16:07:23	6164	860	6932	23.0	23.2	0.00	28727.7
16:08:23	6166	853	6933	23.3	23.2	0.00	29702.7
16:09:23	6169	846	6930	23.0	23.2	0.00	30677.7
16:10:23	6164	841	6928	23.1	23.2	0.00	31652.4
16:11:23	6179	837	6941	23.7	23.2	0.00	32627.4
16:12:23	6180	832	6947	23.1	23.2	0.00	33602.7
16:13:23	6182	827	6942	22.9	23.2	0.00	34577.9
16:14:23	6181	817	6943	22.6	23.2	0.00	35553.1
16:14:47	Stage Change 4 - 1 PPG SAND STAGE						
16:15:23	6128	814	6925	21.9	23.2	0.00	36527.3
16:16:23	6058	805	6915	22.0	23.3	0.00	37503.0
16:17:23	6026	799	6906	22.3	23.3	0.52	38483.5
16:18:23	6029	793	6912	22.3	23.3	0.86	39464.2
16:19:23	6031	787	6918	22.0	23.4	0.89	40445.1
16:19:48	1 PPG SAND ON FORMATION						
16:20:23	6036	780	6922	22.5	23.4	0.97	41425.6
16:21:23	6036	772	6929	22.2	23.3	0.98	42406.2
16:22:23	6035	765	6926	22.4	23.4	0.95	43387.0
16:23:23	6039	756	6933	22.3	23.3	1.04	44367.7
16:24:23	6051	759	6943	22.3	23.3	1.02	45348.5
16:25:23	6052	754	6945	22.2	23.3	1.00	46328.6
16:26:23	6057	747	6953	22.2	23.4	1.05	47308.9
16:27:23	6060	737	6961	22.2	23.3	1.05	48289.1
16:28:23	6063	729	6953	22.3	23.4	1.04	49270.2
16:29:23	6066	720	6961	22.1	23.3	0.97	50251.0

Time of Day	Tubing Pressure	Annulus Pressure	Calc'd BH Pressure	Clean Rate	Slurry Rate	BH Proppant Conc	Job Slurry Vol
	psi	psi	psi	bbl/min	bbl/min	lb/gal	gal
16:30:23	6071	708	6971	22.2	23.3	1.00	51231.2
16:31:23	6075	696	6971	22.2	23.3	1.03	52211.4
16:32:23	6078	686	6975	22.1	23.3	1.03	53191.5
16:33:01	Stage Change 5 - START 2 PPG 20/40 SLF STAGE						
16:33:23	6074	675	6984	21.0	23.4	1.02	54172.3
16:34:23	6033	666	6994	21.0	23.4	1.05	55154.4
16:35:23	5999	656	7006	21.6	23.4	1.45	56138.7
16:36:23	5998	647	7005	21.3	23.5	1.91	57123.5
16:37:23	5996	1317	7011	21.4	23.4	1.99	58108.9
16:38:23	5996	1332	7004	21.4	23.5	1.95	59093.8
16:39:23	5997	1331	7014	21.4	23.5	2.07	60078.9
16:40:23	6004	1328	7020	21.3	23.5	2.01	61063.6
16:41:23	6005	1327	7022	21.3	23.5	2.01	62048.2
16:42:23	6003	1327	7020	21.4	23.5	2.02	63032.7
16:43:23	5997	1324	7015	21.5	23.5	1.99	64017.7
16:44:23	5996	1324	7008	21.3	23.5	2.07	65004.3
16:45:23	5996	1323	7014	21.3	23.4	2.05	65989.7
16:46:23	5994	1321	6998	21.5	23.5	2.05	66975.3
16:47:23	5996	1320	7018	21.3	23.4	1.98	67961.4
16:48:23	5984	1322	6996	21.4	23.5	1.97	68946.3
16:49:23	5971	1319	6983	21.4	23.5	2.08	69932.6
16:50:23	5966	1317	6976	21.3	23.5	1.98	70919.2
16:51:23	5960	1316	6971	21.5	23.5	2.04	71904.9
16:52:23	5962	1316	6980	21.3	23.4	2.00	72891.8
16:53:08	Stage Change 6 - START 3 PPG 20/40 SAND STAGE						
16:53:23	5964	1313	6974	20.0	23.6	1.97	73879.4
16:54:23	5932	1311	6991	20.3	23.6	2.09	74868.4
16:55:23	5900	1309	7006	20.7	23.6	2.39	75857.9
16:56:10	3 PPG SLF ON PERFS.						
16:56:23	5893	1308	7008	20.5	23.6	2.91	76847.8
16:57:23	5887	1308	7003	20.5	23.6	2.99	77837.4
16:58:23	5380	1284	6931	19.2	21.3	3.00	78784.2
16:59:23	5638	1291	6957	18.6	22.5	3.07	79692.2
17:00:23	5646	1291	6991	19.7	22.4	3.01	80630.0
17:01:23	5644	1295	6992	19.5	22.4	3.02	81569.2
17:02:23	5651	1295	6995	19.6	22.4	3.02	82508.3
17:03:23	5652	1295	7002	19.5	22.4	3.04	83447.8
17:04:23	5649	1295	6999	19.6	22.4	3.04	84387.1
17:05:23	5646	1294	6995	19.4	22.4	3.09	85325.7
17:06:23	5643	1294	6999	19.4	22.3	2.97	86264.0
17:07:23	5636	1293	6989	19.6	22.3	3.07	87201.7
17:08:23	5647	1292	7002	19.5	22.3	3.00	88138.4
17:09:23	5648	1291	7000	19.5	22.3	3.01	89075.4
17:10:23	5644	1288	7001	19.5	22.3	2.98	90011.8
17:11:23	5643	1286	7005	19.4	22.3	2.94	90948.6
17:12:23	5644	1283	7004	19.4	22.3	3.03	91885.4
17:13:23	5653	1282	7014	19.4	22.3	3.01	92821.3
17:14:23	5659	1278	7029	19.6	22.2	3.02	93755.5
17:15:23	5666	1275	7036	19.5	22.2	3.06	94689.3
17:16:23	5663	1270	7047	19.4	22.2	3.02	95622.1
17:17:23	5665	1268	7047	19.4	22.2	3.05	96553.3
17:18:23	5666	1263	7057	19.2	22.2	2.98	97484.4
17:19:23	5668	1260	7060	19.3	22.2	3.06	98415.6
17:20:23	5669	1257	7056	19.4	22.2	3.09	99346.4
17:21:23	5673	1252	7059	19.4	22.2	3.10	100277.2

Time of Day	Tubing Pressure	Annulus Pressure	Calc'd BH Pressure	Clean Rate	Slurry Rate	BH Proppant Conc	Job Slurry Vol
	psi	psi	psi	bbl/min	bbl/min	lb/gal	gal
17:22:23	5675	1252	7063	19.4	22.2	3.03	101210.2
17:23:23	5672	1248	7059	19.4	22.2	3.14	102141.2
17:24:23	5674	1247	7058	19.4	22.2	3.05	103071.6
17:25:23	5676	1247	7062	19.2	22.2	3.06	104002.4
17:26:23	5681	1244	7077	19.3	22.1	3.06	104932.7
17:27:23	5677	1241	7069	19.3	22.1	3.08	105862.6
17:28:23	5674	1238	7064	19.4	22.1	3.08	106792.8
17:29:23	5684	1236	7074	19.4	22.1	3.03	107723.5
17:30:23	5679	1232	7064	19.4	22.2	3.06	108654.1
17:31:23	5681	1230	7070	19.4	22.2	3.09	109584.6
17:32:23	5689	1228	7081	19.4	22.1	3.02	110514.5
17:33:23	5691	1223	7095	19.4	22.1	3.12	111444.2
17:34:23	5697	1217	7107	19.3	22.1	3.06	112371.3
17:35:23	5701	1210	7108	19.0	22.1	3.10	113297.9
17:35:51	Stage Change 7 - START 4 PPG 20/40 SAND STAGE, TAIL END BREAKER PACKAGE						
17:36:23	5681	1206	7105	18.3	22.1	3.04	114225.0
17:37:23	5656	1200	7113	18.6	22.2	3.02	115155.0
17:38:23	5649	1196	7112	18.8	22.3	3.66	116088.7
17:39:03	4 PPG SLF ON PERFS.						
17:39:23	5651	1192	7117	18.8	22.3	3.97	117023.3
17:40:23	5659	1189	7153	18.8	22.2	4.02	117956.4
17:41:23	5661	1184	7157	18.8	22.2	4.15	118887.6
17:42:23	5663	1179	7151	18.6	22.2	4.12	119818.6
17:43:23	5660	1176	7153	18.6	22.2	4.01	120750.0
17:44:23	5653	1170	7134	18.6	22.2	4.07	121681.7
17:45:23	5657	1166	7134	18.7	22.2	4.16	122615.2
17:46:23	5659	1160	7150	18.7	22.2	4.04	123547.2
17:47:23	5660	1153	7157	18.6	22.1	4.09	124478.2
17:48:23	5671	1147	7167	18.9	22.1	4.10	125408.7
17:49:23	5673	1143	7163	18.9	22.1	4.07	126338.5
17:50:23	5673	1135	7163	18.3	22.1	4.01	127266.2
17:51:23	5671	1129	7163	18.5	22.1	3.72	128193.9
17:52:23	5661	1124	7162	18.6	22.1	3.93	129122.5
17:53:23	5659	1116	7161	18.6	22.1	3.96	130051.4
17:54:23	5660	1111	7162	18.6	22.1	4.04	130979.9
17:55:23	5656	1106	7157	18.6	22.1	4.08	131908.4
17:56:23	5650	1101	7155	18.6	22.1	4.06	132836.7
17:57:23	5651	1097	7160	18.6	22.1	4.04	133763.4
17:58:23	5662	1092	7176	18.6	22.1	4.06	134689.5
17:59:23	5656	1087	7181	18.4	22.0	4.02	135615.3
18:00:23	5657	1083	7173	18.4	22.0	4.02	136539.2
18:01:23	5657	1075	7179	18.5	22.0	3.99	137463.1
18:02:23	5644	1068	7151	18.5	22.1	4.02	138388.3
18:03:22	Stage Change 8 - CONTINUE 4 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:03:23	5646	1058	7155	18.6	22.1	4.02	139315.2
18:04:23	5664	1056	7195	18.6	21.9	4.04	140239.1
18:05:23	5670	1052	7212	18.5	21.9	3.99	141145.0
18:06:23	5666	1045	7208	18.6	21.9	4.04	142080.6
18:07:23	5662	1040	7210	18.2	21.9	4.00	143000.1
18:08:23	5655	1036	7195	18.3	21.9	4.02	143920.2
18:09:23	5645	1031	7187	18.4	21.9	4.14	144841.8
18:10:23	5268	1008	7118	16.8	20.3	4.07	145702.8
18:11:23	5264	1004	7114	17.2	20.3	4.10	146553.0
18:12:23	5261	996	7107	17.1	20.3	3.98	147403.4
18:13:23	5266	991	7115	17.1	20.2	4.05	148253.7

Time of Day	Tubing Pressure	Annulus Pressure	Calc'd BH Pressure	Clean Rate	Slurry Rate	BH Proppant Conc	Job Slurry Vol
	psi	psi	psi	bbl/min	bbl/min	lb/gal	gal
18:14:23	5277	985	7135	17.1	20.2	4.03	149103.1
18:15:23	5283	977	7144	17.1	20.2	4.00	149952.2
18:16:23	5284	968	7143	17.0	20.2	4.05	150801.3
18:17:23	5283	962	7138	17.1	20.2	4.12	151650.5
18:18:23	5288	956	7143	17.0	20.2	4.05	152499.7
18:19:23	5306	952	7167	16.9	20.2	4.01	153348.1
18:20:23	5314	948	7179	17.0	20.2	3.96	154195.6
18:21:23	5340	945	7226	17.0	20.1	4.04	155041.1
18:22:23	5361	940	7253	16.8	20.0	4.04	155881.7
18:23:23	5355	932	7247	16.8	20.0	4.06	156721.5
18:24:23	5329	924	7196	16.9	20.1	4.01	157563.0
18:25:23	5324	921	7205	17.0	20.1	4.01	158406.8
18:26:23	5324	918	7201	17.0	20.1	3.98	159249.8
18:27:23	5325	912	7193	16.9	20.1	4.02	160093.9
18:28:23	5327	905	7193	17.0	20.2	4.06	160939.1
18:29:23	5324	899	7210	16.2	20.1	4.07	161783.9
18:29:27	Stage Change 9 - START 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:30:23	5294	888	7195	16.3	20.2	3.99	162630.5
18:31:23	5265	879	7198	16.6	20.2	4.03	163478.4
18:32:23	5315	873	7226	16.7	20.4	4.87	164334.9
18:32:40	5 PPG SLF ON PERFS.						
18:33:23	5327	868	7241	16.6	20.4	4.95	165191.4
18:34:23	5339	862	7257	16.6	20.4	4.98	166046.9
18:35:23	5337	859	7254	16.4	20.4	5.02	166903.2
18:36:23	5331	852	7251	16.7	20.4	5.06	167758.3
18:37:23	5339	848	7266	16.6	20.4	5.02	168613.7
18:38:23	5340	839	7271	16.6	20.3	5.10	169468.0
18:39:23	5328	828	7256	16.6	20.3	5.14	170321.6
18:39:32	Stage Change 10 - CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:40:23	5320	822	7239	16.6	20.4	4.99	171177.3
18:41:23	5313	813	7230	16.6	20.4	5.13	172033.4
18:42:23	5317	804	7232	16.6	20.4	5.08	172889.9
18:43:23	5327	797	7240	16.6	20.4	5.06	173746.2
18:44:23	5312	790	7226	16.6	20.4	4.98	174601.8
18:45:23	5310	786	7226	16.6	20.4	5.08	175457.0
18:45:59	Stage Change 11 - CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS						
18:46:23	5303	781	7215	16.6	20.4	5.07	176313.3
18:47:23	5302	777	7224	16.7	20.3	5.01	177169.4
18:48:23	5300	770	7213	16.6	20.4	5.04	178024.9
18:49:23	5296	764	7210	16.4	20.4	5.04	178880.9
18:50:23	5297	755	7215	16.6	20.4	5.05	179737.3
18:51:23	5312	747	7240	16.4	20.3	5.09	180592.9
18:52:23	5311	741	7261	18.4	20.3	5.10	181445.3
18:52:54	Stage Change 12 - FLUSH						
18:53:23	5348	731	7255	21.0	20.2	5.07	182294.6
18:54:23	5480	723	7224	20.3	19.7	5.60	183134.4
18:55:23	2844	619	6567	0.0	0.0	4.77	183696.2
18:56:23	2986	620	6708	0.0	0.0	4.77	183696.2
18:57:23	2968	14	6691	0.0	0.0	4.77	183696.2
18:58:23	2951	7	6674	0.0	0.0	4.77	183696.2
18:59:23	2942	7	6665	0.0	0.0	4.77	183696.2
19:00:23	2934	8	6657	0.0	0.0	4.77	183696.2
19:01:23	2930	8	6652	0.0	0.0	4.77	183696.2
19:02:23	2924	7	6646	0.0	0.0	4.77	183696.2

STAGE 1	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	1000.0	3435.6	Treating Pressure Avg/Max (psi)	1879 / 5454	4210 / 5454
Slurry Volume (gal)	1000.0	2848.8	BHTP Avg/Max (psi)	4335 / 6381	5629 / 7132
Start Fluid Rate (bbl/min)	5.0	0.0	Total Avg. Rate (bbl/min)	7.6	9.9
End Fluid Rate (bbl/min)	5.0	5.6	Avg. HHP (hp)	311.9	
Friction Model	1% KCl				
Description : LOAD & BREAK					

STAGE 2	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	18000.0	17936.7	Treating Pressure Avg/Max (psi)	5536 / 6596	5839 / 6753
Slurry Volume (gal)	18000.0	17996.7	BHTP Avg/Max (psi)	6766 / 7367	6950 / 7367
Start Fluid Rate (bbl/min)	24.0	5.7	Total Avg. Rate (bbl/min)	18.3	20.7
End Fluid Rate (bbl/min)	24.0	23.8	Avg. HHP (hp)	2663.9	
Friction Model	Gel				
Description : LINEAR GEL					

STAGE 3	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	15000.0	15006.0	Treating Pressure Avg/Max (psi)	6246 / 6753	6169 / 6725
Slurry Volume (gal)	15000.0	15056.5	BHTP Avg/Max (psi)	6960 / 7168	6933 / 7143
Start Fluid Rate (bbl/min)	24.0	23.8	Total Avg. Rate (bbl/min)	23.5	23.3
End Fluid Rate (bbl/min)	24.0	23.2	Avg. HHP (hp)	3600.1	
Friction Model	Gel				
Description : CROSSLINKED PAD					

STAGE 4	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	17000.0	17001.4	Treating Pressure Avg/Max (psi)	6056 / 6156	6049 / 6083
Slurry Volume (gal)	17775.2	17877.4	BHTP Avg/Max (psi)	6940 / 6983	6949 / 7000
Start Fluid Rate (bbl/min)	24.0	23.2	Total Avg. Rate (bbl/min)	23.3	23.4
End Fluid Rate (bbl/min)	24.0	23.3	Avg. HHP (hp)	3463.3	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	2241.7	
Start Conc (lb/gal)	1.00	0.20	Avg. Prop Concentration (lb/gal)	0.98	0.98
End Conc (lb/gal)	1.00	1.29	Prop in Formation (lb)	14560.9	
Friction Model	Gel				
Description : 1 PPG SAND STAGE					

STAGE 5	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	18000.0	18020.8	Treating Pressure Avg/Max (psi)	5995 / 6083	5983 / 6007
Slurry Volume (gal)	19641.6	19811.3	BHTP Avg/Max (psi)	7003 / 7030	7003 / 7030
Start Fluid Rate (bbl/min)	24.0	23.3	Total Avg. Rate (bbl/min)	23.5	23.5
End Fluid Rate (bbl/min)	24.0	23.5	Avg. HHP (hp)	3447.0	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	4165.5	
Start Conc (lb/gal)	2.00	1.29	Avg. Prop Concentration (lb/gal)	1.99	1.99
End Conc (lb/gal)	2.00	2.36	Prop in Formation (lb)	48849.9	
Friction Model	Gel				
Description : START 2 PPG 20/40 SLF STAGE					

STAGE 6	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	35000.0	34994.6	Treating Pressure Avg/Max (psi)	5683 / 5967	5669 / 5900
Slurry Volume (gal)	39788.0	40083.2	BHTP Avg/Max (psi)	7030 / 7168	7036 / 7168
Start Fluid Rate (bbl/min)	24.0	23.5	Total Avg. Rate (bbl/min)	22.4	22.3
End Fluid Rate (bbl/min)	24.0	22.1	Avg. HHP (hp)	3114.3	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	6077.7	
Start Conc (lb/gal)	3.00	2.38	Avg. Prop Concentration (lb/gal)	3.03	3.03
End Conc (lb/gal)	3.00	3.48	Prop in Formation (lb)	153737.3	
Friction Model	Gel				
Description : START 3 PPG 20/40 SAND STAGE					

STAGE 7	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	21500.0	21502.5	Treating Pressure Avg/Max (psi)	5660 / 5689	5659 / 5676
Slurry Volume (gal)	25421.6	25561.8	BHTP Avg/Max (psi)	7153 / 7193	7160 / 7213
Start Fluid Rate (bbl/min)	24.0	22.1	Total Avg. Rate (bbl/min)	22.1	22.1
End Fluid Rate (bbl/min)	24.0	22.1	Avg. HHP (hp)	3069.0	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	7615.4	
Start Conc (lb/gal)	4.00	3.50	Avg. Prop Concentration (lb/gal)	4.02	4.02
End Conc (lb/gal)	4.00	4.02	Prop in Formation (lb)	239016.8	
Friction Model	Gel				
Description : START 4 PPG 20/40 SAND STAGE, TAIL END BREAKER PACKAGE					

STAGE 8	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	19000.0	18998.4	Treating Pressure Avg/Max (psi)	5389 / 5672	5354 / 5670
Slurry Volume (gal)	22465.6	22549.5	BHTP Avg/Max (psi)	7177 / 7278	7178 / 7278
Start Fluid Rate (bbl/min)	24.0	22.1	Total Avg. Rate (bbl/min)	20.6	20.4
End Fluid Rate (bbl/min)	24.0	20.1	Avg. HHP (hp)	2720.5	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	7727.9	
Start Conc (lb/gal)	4.00	4.04	Avg. Prop Concentration (lb/gal)	4.05	4.05
End Conc (lb/gal)	4.00	4.57	Prop in Formation (lb)	316008.3	
Friction Model	Gel				
Description : CONTINUE 4 PPG 20/40 SAND STAGE, INCREASE BREAKERS					

STAGE 9	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	7000.0	6999.4	Treating Pressure Avg/Max (psi)	5323 / 5342	5329 / 5342
Slurry Volume (gal)	8596.0	8588.1	BHTP Avg/Max (psi)	7240 / 7274	7250 / 7274
Start Fluid Rate (bbl/min)	24.0	20.1	Total Avg. Rate (bbl/min)	20.3	20.4
End Fluid Rate (bbl/min)	24.0	20.4	Avg. HHP (hp)	2652.4	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	9273.1	
Start Conc (lb/gal)	5.00	4.57	Avg. Prop Concentration (lb/gal)	5.00	5.00
End Conc (lb/gal)	5.00	5.08	Prop in Formation (lb)	349467.0	
Friction Model	Gel				
Description : START 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS					

STAGE 10	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	4500.0	4509.0	Treating Pressure Avg/Max (psi)	5318 / 5327	5312 / 5327
Slurry Volume (gal)	5526.0	5527.7	BHTP Avg/Max (psi)	7235 / 7248	7227 / 7242
Start Fluid Rate (bbl/min)	24.0	20.4	Total Avg. Rate (bbl/min)	20.4	20.4
End Fluid Rate (bbl/min)	24.0	20.4	Avg. HHP (hp)	2656.2	
Sand	20/40	0.04560 (gal/lb)	Prop in Wellbore (lb)	9243.2	
Start Conc (lb/gal)	5.00	5.12	Avg. Prop Concentration (lb/gal)	5.04	5.04
End Conc (lb/gal)	5.00	5.03	Prop in Formation (lb)	372190.4	
Friction Model	Gel				
Description : CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS					

STAGE 11	Planned	Actual	SUMMARY	@Surface	@Perfs
Clean Volume (gal)	4500.0	4892.7	Treating Pressure Avg/Max (psi)	5304 / 5320	5212 / 5596
Slurry Volume (gal)	5526.0	5914.2	BHTP Avg/Max (psi)	7226 / 7268	7194 / 7606
Start Fluid Rate (bbl/min)	24.0	20.4	Total Avg. Rate (bbl/min)	20.4	19.3
End Fluid Rate (bbl/min)	24.0	20.2	Avg. HHP (hp)	2646.8	
None	None	0.00000 (gal/lb)	Prop in Wellbore (lb)	9252.8	
Start Conc (lb/gal)	5.00	5.05	Avg. Prop Concentration (lb/gal)	5.09	5.14
End Conc (lb/gal)	5.00	3.89	Prop in Formation (lb)	396603.9	
Friction Model	Gel				
Description : CONTINUE 5 PPG 20/40 SAND STAGE, INCREASE BREAKERS					

STAGE 12	Planned	Actual	SUMMARY	@Surface	@Perfs
STAGE	SKIPPED!				
Description : FLUSH					

Initial Conditions

<i>Treatment Parameters</i>	Job Type	FRAC GEL 27 #
	Well Treated Down	Tubing
	Static Column Used	NO
	Earth Temperature	50.0 f
	Slurry Temperature	60.0 f
	BHTT	260.0 f
	Reservoir Pressure	0 psi
	Expected BHTP	0 psi
<i>Initial Wellbore Data</i>	Wellbore fluid	Gel
	Density	8.33 lb/gal
	n-prime	0.4585
	K-prime	0.021500 lb*sec^n/ft^2
<i>Perf Data</i>	Number of	0
	Diameter	0.000 in
	Disch. Coeff	0.000
<i>Inventories</i>	Fluid Volume	163000.0 gal
	Proppant	401100.0 lb

Wellbore Data

Wellbore Segment Number	Actual Length (ft)	TVD (ft)	Casing ID (in)	Casing OD (in)	Tubing ID (in)	Tubing OD (in)
1	7400	7400	4.000	4.500	2.441	2.875
2	8057	8057	4.000	4.500	0.000	0.000

Time	Description
13:58:39	Prime Pumps Tuesday September 28, 1999
13:58:48	Test Lines
14:04:37	Test Lines
14:10:18	SET POP OFF @ 7300 PSI
14:49:22	Start Job
14:53:03	Stage Change Stage 1 - LOAD & BREAK
15:05:26	ISDP @ 2040 PSI
15:29:10	Stage Change Stage 2 - LINEAR GEL
15:44:56	START REVERSE STEP RATE
15:54:46	ISDP @ 2195 PSI,CLOSURE @ 5725 PSI
15:57:47	RESUME LINEAR PAD
15:59:31	Stage Change Stage 3 - CROSSLINKED PAD
16:14:47	Stage Change Stage 4 - 1 PPG SAND STAGE
16:19:48	1 PPG SAND ON FORMATION
16:33:01	Stage Change Stage 5 - START 2 PPG 20/40 SLF STAGE
16:53:08	Stage Change Stage 6 - START 3 PPG 20/40 SAND STAGE
16:56:10	3 PPG SLF ON PERFS.
17:35:51	Stage Change Stage 7 - START 4 PPG 20/40 SAND STAGE,TAIL END BREAKER PACKAGE
17:39:03	4 PPG SLF ON PERFS.
18:03:22	Stage Change Stage 8 - CONTINUE 4 PPG 20/40 SAND STAGE,INCREASE BREAKERS
18:29:27	Stage Change Stage 9 - START 5 PPG 20/40 SAND STAGE,INCREASE BREAKERS
18:32:40	5 PPG SLF ON PERFS.
18:39:32	Stage Change Stage 10 - CONTINUE 5 PPG 20/40 SAND STAGE,INCREASE BREAKERS
18:45:59	Stage Change Stage 11 - CONTINUE 5 PPG 20/40 SAND STAGE,INCREASE BREAKERS
18:52:54	Stage Change Stage 12 - FLUSH

PRESSURE

Stage	Tubing Pressure psi (avg/max)	Annulus Pressure psi (avg/max)	Calc'd BH Pressure psi (avg/max)
1	1879 / 5454	265 / 985	4335 / 6381
2	5536 / 6596	883 / 1018	6766 / 7367
3	6246 / 6753	868 / 929	6960 / 7168
4	6056 / 6156	756 / 815	6940 / 6983
5	5995 / 6083	1184 / 1339	7003 / 7030
6	5683 / 5967	1270 / 1314	7030 / 7168
7	5660 / 5689	1139 / 1207	7153 / 7193
8	5389 / 5672	976 / 1058	7177 / 7278
9	5323 / 5342	863 / 898	7240 / 7274
10	5318 / 5327	804 / 829	7235 / 7248
11	5304 / 5320	761 / 783	7226 / 7268
12	5048 / 5596	713 / 735	7131 / 7606
Totals:	(5286/6753)	(873/1339)	(6850/7606)

RATE

Stage	Slurry Rate bbl/min (avg/max)	Clean Rate bbl/min (avg/max)
1	7.6 / 16.0	9.3 / 28.8
2	18.3 / 23.8	18.3 / 25.6
3	23.5 / 25.4	23.4 / 25.5
4	23.3 / 23.4	22.2 / 23.5
5	23.5 / 23.6	21.3 / 21.7
6	22.4 / 23.6	19.5 / 20.9
7	22.1 / 22.3	18.6 / 19.3
8	20.6 / 22.1	17.3 / 18.6
9	20.3 / 20.4	16.6 / 16.8
10	20.4 / 20.4	16.6 / 16.8
11	20.4 / 20.4	16.8 / 20.0
12	17.6 / 20.2	18.7 / 21.5
Totals:	(20.0/25.4)	(18.2/28.8)

SAND CONCENTRATION

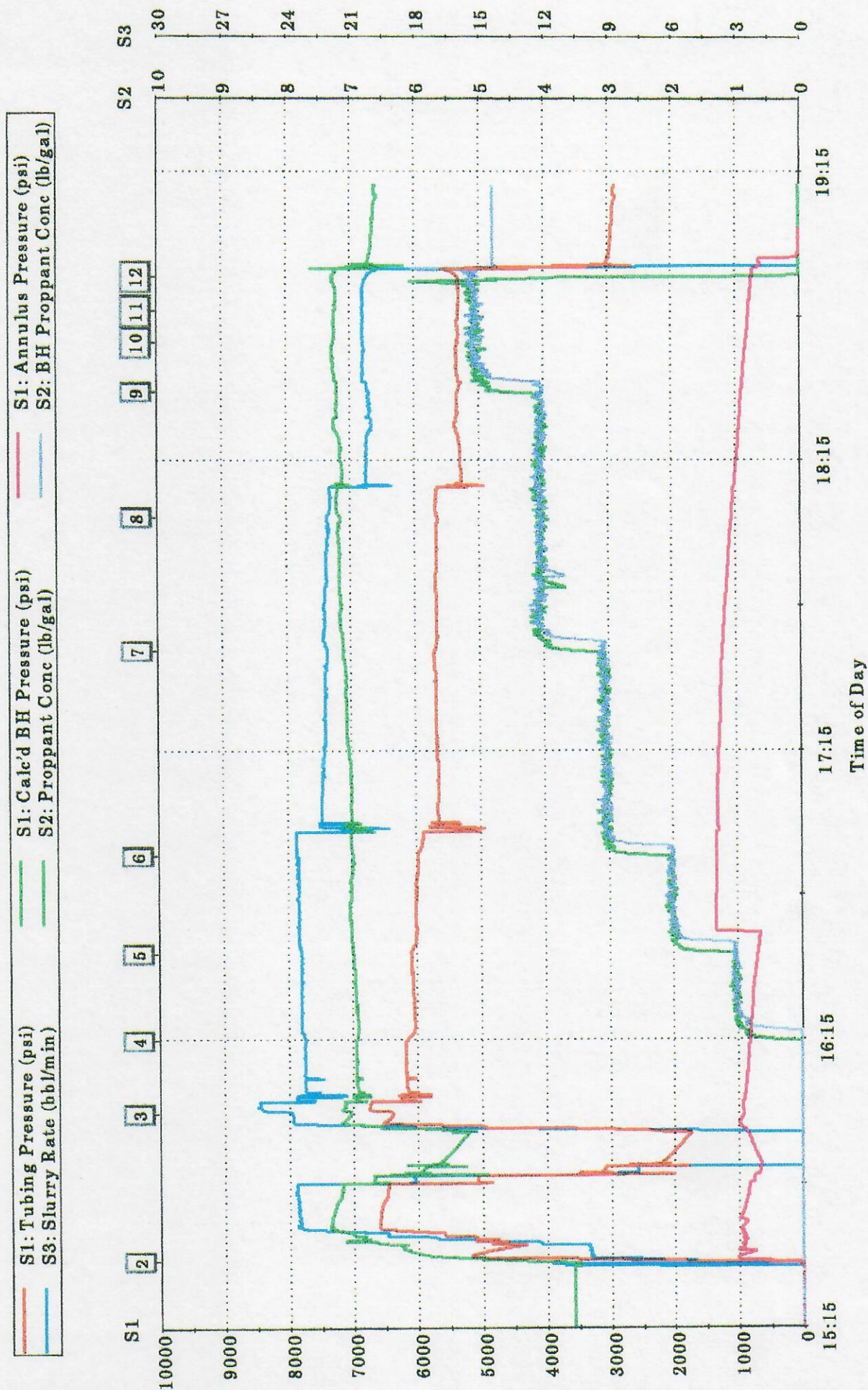
Stage	Proppant Conc lb/gal (avg/max)	BH Proppant Conc lb/gal (avg/max)
1	0.00 / 193.13	0.00 / 0.00
2	0.00 / 0.00	0.00 / 0.00
3	0.00 / 0.00	0.00 / 0.00
4	0.98 / 1.29	0.85 / 1.11
5	1.99 / 2.36	1.89 / 2.13
6	3.03 / 3.48	2.97 / 3.18
7	4.02 / 4.21	3.94 / 4.21
8	4.05 / 4.57	4.04 / 4.19
9	5.00 / 5.19	4.75 / 5.16
10	5.04 / 5.21	5.05 / 5.19
11	5.09 / 6.06	5.07 / 5.20
12	0.24 / 3.73	5.25 / 6.05
Totals:	(2.45/193.13)	(2.82/6.05)

VOLUMES

Stage	Job Clean Vol	Stage Clean Vol	Job Slurry Vol	Stage Slurry Vol	Stage Proppant Pumped sack	Job Proppant Pumped sack
	gal	gal	gal	gal		
1	3435.6	3435.6	2848.8	2848.8	0.0	0.0
2	21372.3	17936.7	20845.5	17996.7	0.0	0.0
3	36386.5	15006.0	35910.3	15056.5	0.0	0.0
4	53395.7	17001.4	53796.3	17877.4	168.0	168.0
5	71423.8	18020.8	73615.7	19811.3	362.0	530.2
6	106418.9	34994.6	113699.4	40083.2	1068.0	1598.1
7	127927.8	21502.5	139268.9	25561.8	867.9	2466.3
8	146932.8	18998.4	161826.1	22549.5	770.8	3237.4
9	153937.5	6999.4	170421.4	8588.1	349.8	3587.4
10	158452.5	4509.0	175956.5	5527.7	226.6	3814.3
11	163344.9	4892.7	181870.8	5914.2	244.2	4058.6
12	165272.0	1920.0	183696.2	1818.4	5.2	4064.0
Totals:	(165272.0)	(165217.1)	(183696.2)	(183633.3)	(4062.6)	(4064.0)

Stage
1
2
3
4
5
6
7
8
9
10
11
12
Totals:

TREATMENT PLOT



CUSTOMER: TOP OPERATING TICKET: 174093 DATE: Tue 28-Sep-99
 WELL DESC: TANAKA 1-2 FORMATION: J-SAND



HALLIBURTON

TOP OPERATING

7500 W. Mississippi, Suite B-3
Lakewood, CO 80260-4541

Well Type: 2
Well Cat.: 1
State: CO
County: Weld
Serv. Loc. 55410
Ref Loc. 1

Operator: James E. Brady
Engineer: Lance J. Perez

Tanaka 1-2
9/28/99

Continuation to Unified Ticket

TICKET # 174093

PRICE	Secondary	Loc. Cacti	Discount	Factor	Description	First Qty.	Unit of Measure	Second Qty.	Unit of Measure	Book Price	Discount Amount	Net Price	Note
REF	Part #												
Stimulation Equipment Charges													
3124	.550				Mileage for Stimulation Equip-One Way	20 MI			14 Units	3.65	1,022.00	(562.10)	459.90
3125	.550				Mileage for Stimulation Crew-One Way	20 MI			2 Units	2.15	86.00	(47.29)	38.71
3142	.550				Minimum Pump Charge HT-400	3 HR			4 Pump	2,940.00	11,760.00	(6,468.00)	5,292.00
3256	.550				Techcommand w/o Arc System	3 HR			1 Job	3,675.00	3,675.00	(2,021.25)	1,653.75
3153	.550				Slurry Processor System	25 BPM			1 EA	3,931.20	3,931.20	(2,162.16)	1,769.04
3213	.550				Tank 500 bbl Frac Fluid Storage	1 Day			1 Unit	700.00	700.00	(385.00)	315.00
3243	.550				Flowmeter-Per Treatment	1 Job			1 Unit	290.85	290.85	(159.97)	130.88
3239	.550				Portable Suction Manifold	1 Job			1 Unit	700.00	700.00	(385.00)	315.00
3620	.550				Ground Manif or Frac Manif Trl	1 Job			1 Unit	1,020.75	1,020.75	(561.41)	459.34
3238	.550				Casing Control Valve	1 Job			1 Unit	905.05	905.05	(497.78)	407.27
3324	.550				Mobile Lab Van W/Tech	1 Day			1 Unit	2,546.25	2,546.25	(1,400.44)	1,145.81
3261	.550				Radioactive Densometer	1 Job			1 Unit	615.30	615.30	(338.42)	276.88
										27,252.40	(14,988.82)		12,263.58
Chemical Additives													
14304	.550				FracGel	27 LB			107000 Gal	9.95	28,745.55	(15,810.05)	12,935.50
14304	.550				FracGel	25 LB			35000 Gal	9.95	8,706.25	(4,788.44)	3,917.81
10003757	.550				LGC-8	122 GAL				41.55	5,069.10	(2,788.01)	2,281.09
100003833	.550				CL-23	50 GAL				0.00	0.00	N/C	N/C
100012244	.550				CL-29	22 GAL				0.00	0.00	N/C	N/C
100003797	.550				BA-40L	21 GAL				0.00	0.00	N/C	N/C
100003844	.550				SSO-21M	81 GAL				35.50	2,875.50	(1,581.53)	1,293.97
100003651	.550				Losurf - 300	82 GAL				37.50	3,075.00	(1,691.25)	1,383.75
100012769	.550				Gel-Sta	400 LB				2.30	920.00	(506.00)	414.00
100003801	.550				Optiflo III	48 LB				31.00	1,488.00	(818.40)	669.60
100001577	.550				GBW-3	40 LB				12.15	486.00	(267.30)	218.70
100003624	.550				SP Breaker	7 LB				6.55	45.85	(25.22)	20.63
										51,411.25	(28,276.20)		23,135.05
Proppant and Bulk Handling Charges													
3220	.550				Mountain Mover Sand System	1 Day			2 Unt	1,236.25	2,472.50	(1,359.88)	1,112.62
100003678	.550				Sand 20/40 White Bulk	401100 LB				8.13	32,609.43	(17,935.19)	14,674.24
16122	.550				Mileage For Bulk Frac. Material	4011 TMI				1.25	5,013.75	(2,757.56)	2,256.19
3346	.550				Proppant Pump Charge	2 PPG			111000 GAL	0.05	5,550.00	(3,052.50)	2,497.50
3346	.550				Proppant Pump Charge	5 PPG			16000 GAL	0.13	2,080.00	(1,144.00)	936.00
										47,725.68	(26,249.13)		21,476.55

126,389.33 (69,514.15) 56,875.18

Customer Signature: _____