

Submit 1 Copy To Appropriate District Office  
District I – (575) 393-6161  
1625 N. French Dr., Hobbs, NM 88240  
District II – (575) 748-1283  
811 S. First St., Artesia, NM 88210  
District III – (505) 334-6178  
1000 Rio Brazos Rd., Aztec, NM 87410  
District IV – (505) 476-3460  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy, Minerals and Natural Resources

Form C-103  
Revised July 18, 2013

OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

WELL API NO.	30-025-42628
5. Indicate Type of Lease STATE <input type="checkbox"/> FEE <input type="checkbox"/> FEDERAL <input checked="" type="checkbox"/>	
6. State Oil & Gas Lease No.	NMLC029509A
7. Lease Name or Unit Agreement Name	Maljamar AGI
8. Well Number	#2
9. OGRID Number	221115
10. Pool name or Wildcat AGI: Wolfcamp	
11. Elevation (Show whether DR, RKB, RT, GR, etc.) 4,019 (GR)	

SUNDRY NOTICES AND REPORTS ON WELLS  
(DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well ☐ Gas Well ☐ Other: Acid Gas Injection Well ☒

2. Name of Operator  
Frontier Field Services LLC

3. Address of Operator  
65 Mercado Street, Suite 250, Durango, CO 81301

4. Well Location  
Unit Letter O : 400 feet from the SOUTH line and 2,100 feet from the EAST line  
Section 21 Township 17S Range 32E NMPM County Lea

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:

PERFORM REMEDIAL WORK ☐ PLUG AND ABANDON ☐  
TEMPORARILY ABANDON ☐ CHANGE PLANS ☐  
PULL OR ALTER CASING ☐ MULTIPLE COMPL ☐  
DOWNHOLE COMMINGLE ☐  
CLOSED-LOOP SYSTEM ☐  
OTHER: ☐

SUBSEQUENT REPORT OF:

REMEDIAL WORK ☐ ALTERING CASING ☐  
COMMENCE DRILLING OPNS. ☐ P AND A ☐  
CASING/CEMENT JOB ☐  
OTHER: Step-Rate Test Results to support Admin Press Increase Request ☒

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

**SRT No. 1:** An 8-hour notice was sent via email to the NMOCD Hobbs Office on April 14, 2016. Later in the afternoon a step-rate test was performed by Halliburton on Zone 4 through perforations from 10,739 feet (9,968 TVD) to 10,900 feet (10,100 TVD). The surface pressures and bottom hole pressures from each rate step are provided on the attached BLM Step Rate Data Form. The surface pressures over the first three steps (shown in red) were corrected to reflect the difference in fluid weight between the fresh water in the tubing and the 10.0 lbs per gallon injection brine. The test was done in 11 steps, and each step was not completed until the last two 5-minute intervals had corrected bottom hole pressures with less than 15 psig difference.

As shown in the graph of pressure vs injection rates for all steps, there is no indication from the Zone 4 step-rate test that the formation parting pressure was reached even through the maximum pumping rate of 5 bbls per minute. Note that on the blue line showing bottom hole pressure there is no break in the slope. In summary, even at the maximum surface pressure reached in Zone 4 (2,160 psig) there is no indication of fracturing of this highly permeable formation which additionally has evidence of secondary porosity.

**SRT No. 2:** On April 24, 2016 a step-rate test was performed by Halliburton on Zone 1 through perforations from 10,268 feet (9,609 TVD) to 10,302 feet (9,635 TVD), Zone 2 through perforations from 10,538 feet (9,812 TVD) to 10,552 feet (9,822 TVD), and Zone 3 through perforations from 10,648 feet (9,896 TVD) to 10,678 feet (9,920 TVD). Zone 4 was isolated from this test by a temporary packer. The surface pressures and bottom hole pressures from each rate step are provided on the attached BLM Step Rate Data Form.

It was apparent during the initial pumping rates that the permeability of the upper three zones was much less than what was observed from the step-rate test performed on Zone 4. As a result, the test included only 4 complete steps and was terminated prematurely due to a previously unknown Schlumberger pressure limitation policy concerning its wellhead to lubricator adaptor.

Although incomplete, the graph of pressure vs injection rates indicates that the formation parting pressure was likely reached at the second stage pumping rate of approximately 0.5 bbls per minute and surface pressure of 2,163 psig using 10.2 lbs per gallon brine. The bottom hole pressure at that stage was 7,346 psig which is consistent with a calculated parting pressure of approximately 7,112 psig based on initial formation pressure. When the difference in the TAG gradient and the test brine gradient (0.372 psig/ft and 0.530 psig/ft) is

taken into account, a surface pressure 3,641 psig using the anticipated TAG injection fluid would be required to reach the formation parting pressure. For this reason, Frontier requests that OCD approve an MAOP for this well of 3,200 psig consistent with the Maljamar AGI#1. This is especially conservative when considering that the lower zone (Zone 4) is even more permeable and would require much higher pressures to cause it to part.

In addition to the BLM Step Rate Data Forms for each test, the Halliburton Summary Reports for each test are also attached.

Spud Date:

January 25, 2016

Rig Release Date:

March 12, 2016

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE Dale T. Littlejohn TITLE Consultant to Frontier Energy LLC DATE 4-29-16

Type or print name Dale T Littlejohn E-mail address: dale@geolex.com PHONE: 505-842-8000

**For State Use Only**

APPROVED BY: [Signature] TITLE Petroleum Engineer DATE 05/06/16  
Conditions of Approval (if any):



# STEP RATE TEST DATA for BLM, CFO

Operator: Frontier Energy Services

Well: Maljamar AGI #2

API#: 3002542628

Lease: LC029509a

Data Collection Date: 4/14/16

Sfc Loc: Sec. 21, T-17-S, R-32-E, Lea Co., NM

Tbg O.D.: 2.875 Tbg Wt.: 6.50 Grade: L-80 Pipe I.D.: 7.0" TVD Packer: 9949  
 Top Inj. Depth (TVD): 9,968 X 0.20 psig/ft = Generic Surface Injection psig: 1994  
 Beginning Wellhead psig: 987 Msrd No Flow Formation psig: 5398 BHP TVD: 10084  
 Testing Wtr measured with Mud Wt Scale - lbs/gal: 10.0 Calc Production Water - lbs/gal: 8.9  
 Target Maximum Rate bpd (barrels per day): 5760  
 Minimum Bbls of Disposal Production Water to be on Location for S. R. T.: 443

1. Take a charted record of shut in psig for no less than 48 hours. If the wellhead shut in psig is not less than the approved injection pressure, bled the wellhead pressure below 0.2psig/ft x depth at top of injection before beginning the Step Rate Test.

2. Perform a minimum of seven steps, recording rate to  $\pm 1/10$  bpm, surface and down hole pressures to  $\pm 10$  psig in five minute intervals. The first two psig(s) must be below 0.2psig/ft x top injection depth.

3. The last two five minute surface pressure readings of each (minimum 30 minute) step are to be within 15psig of each other. And the last two five minute formation pressure readings of each (minimum 30 minute) step are to be within 15psig of each other. If either are not, continue 5 minute readings. Record the (surface pressure, formation pressure, & rate) of the last reading as the Data Point for that Step.

## Step 1

Target Test Rate (5% of maximum) = 0.25 bpm for Step 1

Step 1 data at:	5 min	10 min	15 min	20 min	25 min	30 min	Start Time: 14:47
Surface (psig):	204	180	157	123	100		Corr. For FW in Tubing
Formation (psig):	5427	5434	5439	5442	5448		target bpd: 360
bpm:	0.25	0.25	0.25	0.25	0.25		Data Point #1
Step 1 data at:	35 min	40 min	45 min	50 min	25 min	60 min	@ bpd: 360
Surface (psig):							Sfc psig: 153
Formation (psig):							F psig: 5438
bpm:							@ bpm: 0.25

## Step 2

Target Test Rate (10% of maximum) = 0.50 bpm for Step 2

Step 2 data at:	5 min	10 min	15 min	20 min	25 min	30 min	Corr. For FW in Tubing
Surface (psig):	88	76	49	45			target bpd: 720
Formation (psig):	5454	5458	5463	5465			Data Point #2
bpm:	0.5	0.5	0.5	0.5			@ bpd: 720
At bpm Rate:	35 min	40 min	45 min	50 min	25 min	60 min	Sfc psig: 65
Surface (psig):							F psig: 5460
Formation (psig):							bpm: 0.50
bpm:							

## Step 3

Target Test Rate (20% of maximum) = 1.00 bpm for Step 3

Step 3 data at:	5 min	10 min	15 min	20 min	25 min	30 min	Corr. For FW in Tubing
Surface (psig):	68	94	128	142			target bpd: 1440
Formation (psig):	5479	5485	5491	5496			Data Point #3
bpm:	1.0	1.0	1.0	1.0			@ bpd: 1440
Step 3 data at:	35 min	40 min	45 min	50 min	25 min	60 min	Sfc psig: 108
Surface (psig):							F psig: 5488
Formation (psig):							bpm: 1.00
bpm:							



## STEP RATE TEST DATA for BLM, CFO

Operator: Frontier Energy Services

Well: Maljamar AGI #2

API#: 3002542628

Lease: LC029509a

Data Collection Date: 4/14/16

Sfc Loc: Sec. 21, T-17-S, R-32-E, Lea Co., NM

### Step 8

Target Test Rate (87.5% of maximum) = 3.50 bpm for Step 8

Step 8 data at:	5 min	10 min	15 min	20 min	25 min	30 min	target bpd: 5040 Data Point #8 @ bpd: 5040
Surface (psig):	1300	1400	1400	1430	1440		
Formation (psig):	5755	5771	5782	5793	5800		
bpm:	3.50	3.50	3.50	3.50	3.50		
Step 8 data at:	35 min	40 min	45 min	50 min	25 min	60 min	Sfc psig: 1394 F psig: 5780 bpm: 3.5
Surface (psig):							
Formation (psig):							
bpm:							

### Step 9

Target Test Rate (100% of maximum) = 4.0 bpm for Step 9

Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	target bpd: 5760 Data Point #9 @ bpd: 5760
Surface (psig):	1500	1600	1590	1590			
Formation (psig):	5822	5830	5840	5848			
bpm:	4.00	4.00	4.00	4.00			
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	Sfc psig: 1570 F psig: 5835 bpm: 4.0
Surface (psig):							
Formation (psig):							
bpm:							

### Step 10

Target Test Rate (112.5% of maximum) = 4.5 bpm for Step 10

Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	target bpd: 5760 Data Point #10 @ bpd: 6480
Surface (psig):	1850	1850	1860	1860			
Formation (psig):	5880	5892	5903	5908			
bpm:	4.50	4.50	4.50	4.50			
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	Sfc psig: 1855 F psig: 5896 bpm: 4.5
Surface (psig):							
Formation (psig):							
bpm:							

### Step 11

Target Test Rate (125% of maximum) = 5.0 bpm for Step 11

Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	End Time: 18:39
Surface (psig):	2160	2160	2160				
Formation (psig):	5948	5960	5962	Ran out of Treatment Watrer			
bpm:	5.00	5.00	5.00				
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	target bpd: 5760
Surface (psig):							Data Point #11
Formation (psig):							@ bpd: 7200
bpm:							Sfc psig: 2160
							F psig: 5957
							bpm: 5.0

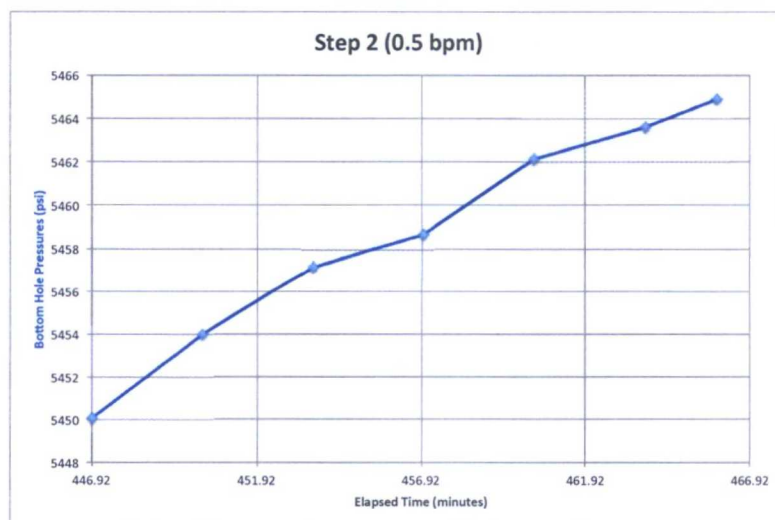
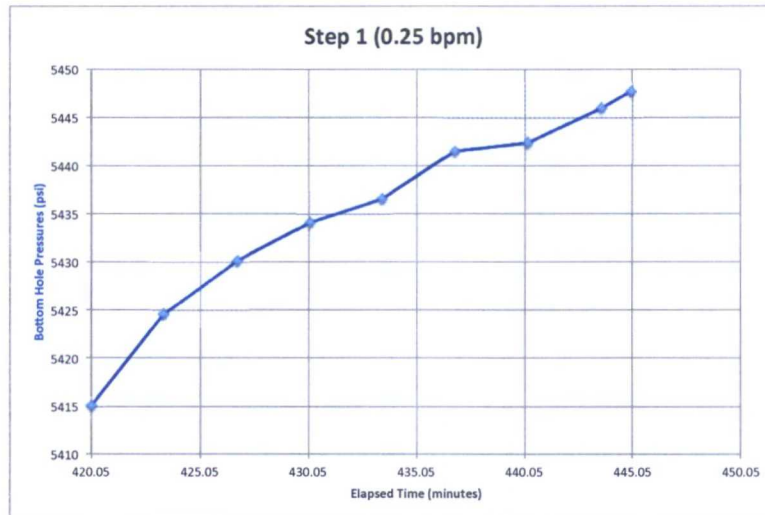
Instant Shut In Pressure:  
5 minute Shut In Pressure:  
10 minute Shut In Pressure:  
15 minute Shut In Pressure:

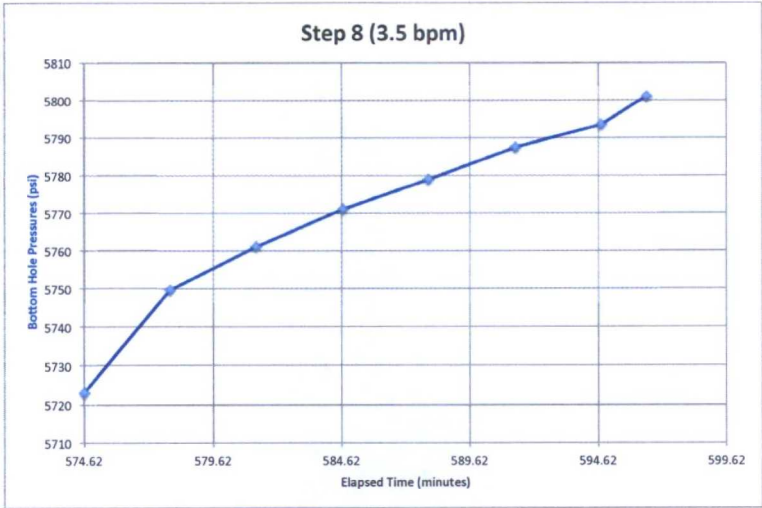
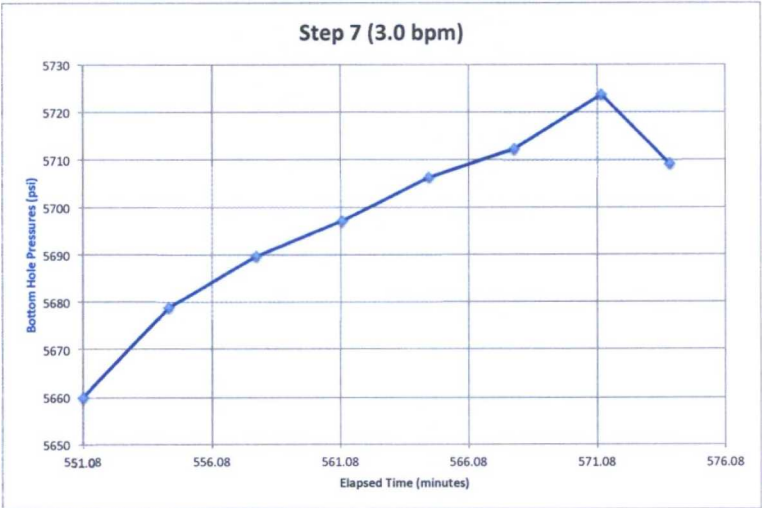
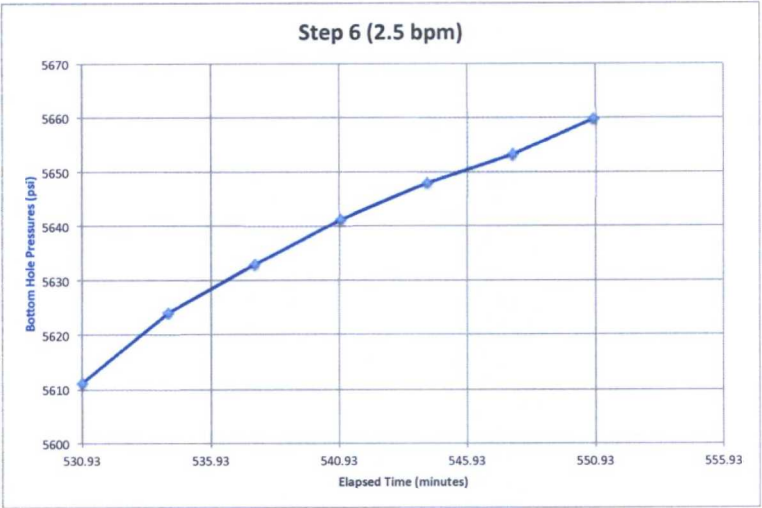
Surface	Formation	
725	5955	psig
510	5788	psig
460	5743	psig
427	5699	psig



### Maljamar AGI #2 Zone 4 Step-Rate Test Bottom-Hole Pressures

The BHP for each 5-minute interval during each step was determined using the following graphs. This was necessary for completing the BLM SRT form because the Schlumberger BHP data was provided at time intervals that did not correlate with the surface pressures provided by Halliburton and recorded on site.







**Running Horse**

**Maljamar AGI 2**

Sales Order: 903243737

## **Post Job Report**

For: N/A

Date: Thursday, April 14, 2016

Notice: Although the information contained in this report is based on sound engineering practices, the copyright owner(s) does (do) not accept any responsibility whatsoever, in negligence or otherwise, for any loss or damage arising from the possession or use of the report whether in terms of correctness or otherwise. The application, therefore, by the user of this report or any part thereof, is solely at the user's own risk.

**HALLIBURTON**

## **1.0 EXECUTIVE SUMMARY**

Halliburton appreciates the opportunity to perform the stimulation treatment. A pre-job safety meeting was held where details of the job were discussed, potential safety hazards were reviewed, and environmental compliance procedures were outlined. Pump time was 230.00 min.

The proposed treatment for Running Horse AGI2 Step Rate Test consisted of:

- 33096 gal of TREATED WATER.

The treatment actually pumped consisted of:

- 24037 gal of TREATED WATER.

The average BH treating rate was 2.0 bpm and average WH pressure was 1058 psi.

The total liquid load to recover is 24036 gal.

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.

Respectfully,



**2.2 Perforation Intervals**

Top MD ft	Bottom MD ft
10820.0	10825.0

**2.3 Initial Fluid Position Pressures**

Expected Bottom Hole Pressure	-1	psi
Reservoir Pressure	-1	psi
Closed-In WHP	-1	psi
Fluid Free to Flow into Formation	No	
Surface Lines Full	No	
Top of Fluid Depth	-1.#]	ft

**3.2 Designed Pumping Schedule (continued)**

Stage Number	Description	Stage Time min
1	Step Rate Test	32.00
2	Step Rate Test	30.00
3	Step Rate Test	30.00
4	Step Rate Test	30.00
5	Step Rate Test	30.00
6	Step Rate Test	30.00
7	Step Rate Test	30.00
8	Step Rate Test	30.00
9	Step Rate Test	30.00
10	Step Rate Test	26.67
11	Step Rate Test	26.67
12	Shut-In	0.00
Total		325.33



# HALLIBURTON

N/A

N/A Stage 1

Running Horse AG12 Step Rate Test

Stage Number	Stage Time	Max Wellhead Rate bpm	Avg Treating Pressure psi	Avg Clean Rate bpm	Avg Slurry Rate bpm	Avg Wellhead Rate bpm	Avg Hydraulic Horsepower hp
1	14-Apr-16 16:12:25	49.0	824	0.3	0.3	0.3	7
2	14-Apr-16 16:32:43	1.0	622	0.5	0.5	0.5	8
3	14-Apr-16 16:52:19	1.5	436	1.1	1.1	1.1	12
4	14-Apr-16 17:12:07	2.2	423	1.5	1.5	1.5	16
5	14-Apr-16 17:32:16	2.5	593	2.0	2.0	2.0	29
6	14-Apr-16 17:57:18	3.0	862	2.5	2.5	2.5	54
7	14-Apr-16 18:17:08	3.5	1085	3.0	3.0	3.0	79
8	14-Apr-16 18:43:29	6.3	1403	3.3	3.3	3.3	113
9	14-Apr-16 19:02:24	4.5	1551	4.0	4.0	4.0	151
10	14-Apr-16 19:22:48	5.0	1842	4.5	4.5	4.5	203
11	14-Apr-16 20:21:53	5.5	2129	5.0	5.0	5.0	260
12	14-Apr-16 20:28:27	0.0	0	0.0	0.0	0.0	0

Stage Number	Stage Time	Clean Volume gal	Slurry Volume gal	Wellhead Volume gal
1	14-Apr-16 16:12:25	351	351	349
2	14-Apr-16 16:32:43	468	468	468
3	14-Apr-16 16:52:19	896	896	896
4	14-Apr-16 17:12:07	1263	1263	1263

## 5.0 PERFORMANCE HIGHLIGHTS

### 5.1 Job Summary

Start Time	14-Apr-16 10:28:30	
End Time	14-Apr-16 20:28:27	
Pump Time	230.00	min
Start Averaging Time	14-Apr-16 15:31:54	
End Averaging Time	14-Apr-16 20:28:27	
Max Treating Pressure	2926	psi
Max Slurry Rate	49.0	bpm
Max Wellhead Rate	49.0	bpm
Max Gel Rate	49.0	bpm
Avg Treating Pressure	1058	psi
Avg Clean Rate	2.5	bpm
Avg Slurry Rate	2.5	bpm
Avg Wellhead Rate	2.5	bpm
Avg Gel Rate	2.5	bpm
Avg Hydraulic Horsepower	64	hp
Clean Volume	24036	gal
Slurry Volume	24036	gal
Wellhead Volume	24034	gal
Gel Volume	24036	gal
BH Max Treating Pressure	6862	psi
BH Avg Treating Pressure	4388	psi
BH Max Rate	6.2	bpm
BH Avg Rate	2.0	bpm
Load to Recover	24036	gal
<b>Volumes Pumped</b>	<b>Total</b>	<b>Units</b>
TREATED WATER	24037	gal

**Disclaimer:** The average and maximum values (except volumes and bottom hole values) are based on the start and end averaging times.



Time	Description	Comment	Job Slurry Vol gal	Job Proppant 100*lb	Hydraulic Power hp	Backside Pressure psi
		then stabilized				
17:32:17	Stage 6	Step Rate Test	4672	0.00	46	546
17:57:19	Stage 7	Step Rate Test	7345	0.00	80	638
18:17:08	Stage 8	Step Rate Test	9813	0.00	106	560
18:43:29	Stage 9	Step Rate Test	13447	0.00	157	614
19:02:25	Stage 10	Step Rate Test	16616	0.00	203	503
19:22:49	Stage 11	Step Rate Test	20471	0.00	267	613
20:21:54	Stage 12	Shut-In	24036	0.00	0	-3643

## 5.3 Job Event Log

Stage Number	Event Number	Time	Description	Comment	Treating Pressure psi	Calc'd BH Pres psi	Slurry Rate bpm	Job Clean Vol gal
	1	14-Apr-16 10:28:30	Start Job	Starting Job				
	2	10:41:44	Test Lines	4000 psi	4305	2385	0.0	1
	3	10:55:35	Other	Start Stage 1	987	2385	0.0	1
1		15:31:53	Stage 1	Step Rate Test	941	2385	0.0	1
		15:31:54	Start Averaging	Start Avg Trt 1	941	2385	0.0	0
2		16:12:26	Stage 2	Step Rate Test	730	2385	0.5	351
3		16:32:44	Stage 3	Step Rate Test	528	2385	1.0	819
4		16:52:20	Stage 4	Step Rate Test	392	3385	1.5	1715
5		17:12:08	Stage 5	Step Rate Test/Shifted transmission gear, rate drop then stabilized	551	5041	2.0	2978

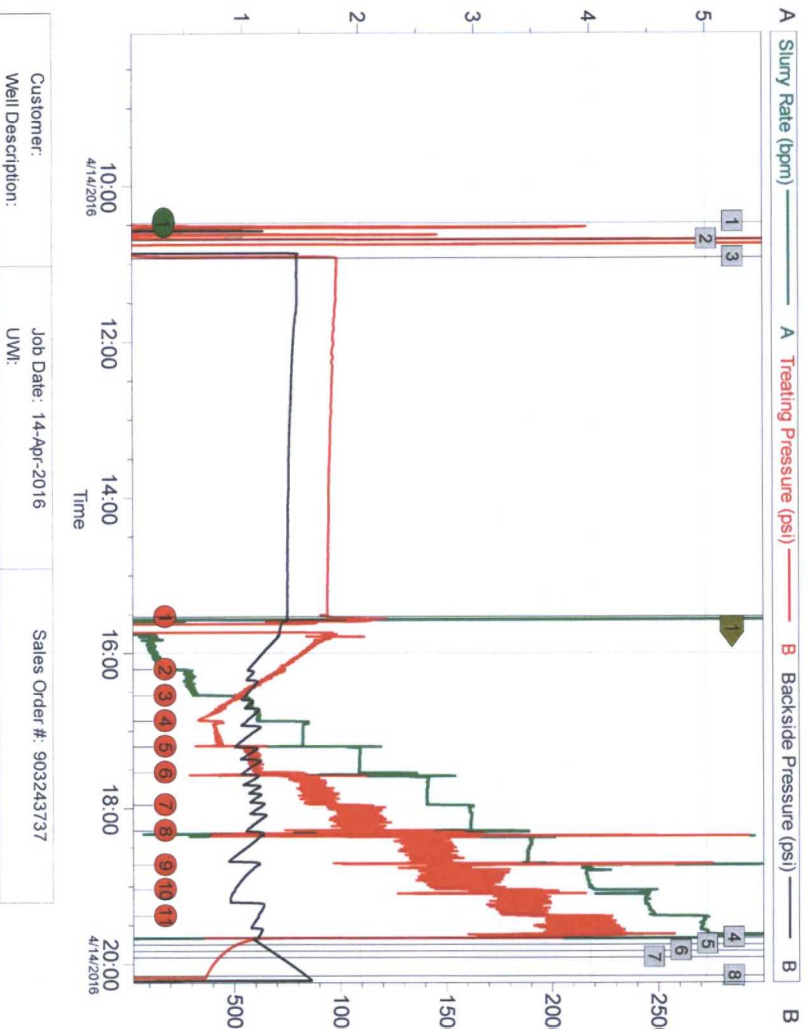
# HALLIBURTON

N/A  
N/A Stage 1  
Running Horse AG12 Step Rate Test

Stage Number	Event Number	Time	Description	Comment	Job Slurry Vol gal	Job Proppant 100-lb	Hydraulic Power hp	Backside Pressure psi
	3	10:55:35	Other	Start Stage 1	1	0.00	0	799
1		15:31:53	Stage 1	Step Rate Test	1	0.00	0	750
		15:31:54	Start Averaging	Start Avg Trt 1	0	0.00	0	750
2		16:12:26	Stage 2	Step Rate Test	351	0.00	8	570
3		16:32:44	Stage 3	Step Rate Test	819	0.00	13	556
4		16:52:20	Stage 4	Step Rate Test	1715	0.00	14	559
5		17:12:08	Stage 5	Step Rate Test/Shifted transmission gear.rate drop then stabilized	2978	0.00	27	508
6		17:32:17	Stage 6	Step Rate Test	4672	0.00	46	546
7		17:57:19	Stage 7	Step Rate Test	7345	0.00	80	638
8		18:17:08	Stage 8	Step Rate Test	9813	0.00	106	560
9		18:43:29	Stage 9	Step Rate Test	13447	0.00	157	614
10		19:02:25	Stage 10	Step Rate Test	16616	0.00	203	503
11		19:22:49	Stage 11	Step Rate Test	20471	0.00	267	613
	4	19:39:52	ISIP		24036	0.00	2	603
	5	19:44:54	Shut-In Pressure @ 5 Minutes		24036	0.00	0	627
	6	19:49:52	Shut-In Pressure @ 10 Minutes		24036	0.00	0	672
	7	19:54:52	Shut-In Pressure @ 15 Minutes		24036	0.00	0	717
	8	20:09:07	Shut-In Pressure @ 30 Minutes		24036	0.00	0	838
12		20:21:54	Stage 12	Shut-In	24036	0.00	0	-3643
		20:28:27	End Averaging	End Avg Trt 1	24036	0.00	0	-3643

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### 6.1 Step Rate Test









## STEP RATE TEST DATA for BLM, CFO

Operator: Frontier Energy Services

Well: Maljamar AGI #2

API#: 3002542628

Lease: LC029509a

Data Collection Date: 4/24/16

Sfc Loc: Sec. 21, T-17-S, R-32-E, Lea Co., NM

Step 8							
Target Test Rate (87.5% of maximum) = 3.50 bpm for Step 8							
Step 8 data at:	5 min	10 min	15 min	20 min	25 min	30 min	
Surface (psig):							
Formation (psig):							target bpd: 5040
bpm:							Data Point #8
Step 8 data at:	35 min	40 min	45 min	50 min	25 min	60 min	@ bpd: #DIV/0!
Surface (psig):							Sfc psig: #DIV/0!
Formation (psig):							F psig: #DIV/0!
bpm:							bpm: #DIV/0!

Step 9							
Target Test Rate (100% of maximum) = 4.0 bpm for Step 9							
Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	
Surface (psig):							
Formation (psig):							target bpd: 5760
bpm:	4.00	4.00	4.00	4.00			Data Point #9
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	@ bpd: 5760
Surface (psig):							Sfc psig: #DIV/0!
Formation (psig):							F psig: #DIV/0!
bpm:							bpm: 4.0

Step 10							
Target Test Rate (112.5% of maximum) = 4.5 bpm for Step 10							
Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	
Surface (psig):							
Formation (psig):							target bpd: 5760
bpm:							Data Point #10
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	@ bpd: #DIV/0!
Surface (psig):							Sfc psig: #DIV/0!
Formation (psig):							F psig: #DIV/0!
bpm:							bpm: #DIV/0!

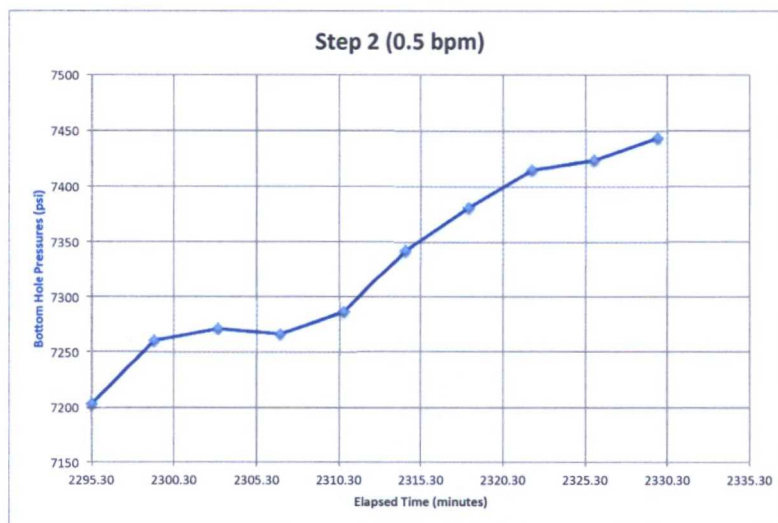
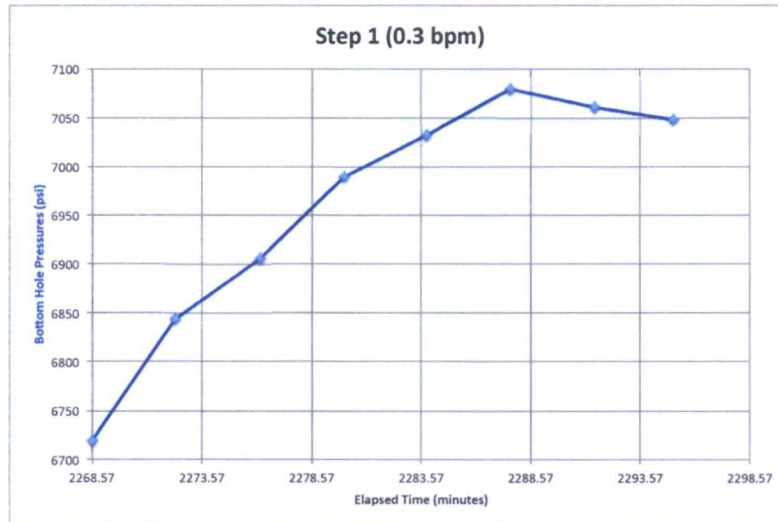
Step 11							
Target Test Rate (125% of maximum) = 5.0 bpm for Step 11							
Step 9 data at:	5 min	10 min	15 min	20 min	25 min	30 min	End Time: 18:39
Surface (psig):							
Formation (psig):							target bpd: 5760
bpm:							Data Point #11
Step 9 data at:	35 min	40 min	45 min	50 min	25 min	60 min	@ bpd: #DIV/0!
Surface (psig):							Sfc psig: #DIV/0!
Formation (psig):							F psig: #DIV/0!
bpm:							bpm: #DIV/0!

Instant Shut In Pressure:  
 5 minute Shut In Pressure:  
 10 minute Shut In Pressure:  
 15 minute Shut In Pressure:

Surface	Formation	
2767	8120	psig
2305	7500	psig
2068	7260	psig
1870	7080	psig

### Maljamar AGI #2 Zone 1-3 Step-Rate Test Bottom-Hole Pressures

The BHP for each 5-minute interval during each step and following shut down was determined using the following graphs. This was necessary for completing the BLM SRT form because the Schlumberger BHP data was provided at time intervals that did not correlate with the surface pressures provided by Halliburton and recorded on site.





RUNNING HORSE PRODUCTION CO LLC  
PO BOX 369  
IGNACIO, CO 81137

MALJAMAR AGI 2

Interval 1  
Lea County, New Mexico

Sales Order: 0903266369

## **Post Job Report**

For: JOHN TARPLEY  
Date: Sunday, April 24, 2016

Notice: Although the information contained in this report is based on sound engineering practices, the copyright owner(s) does (do) not accept any responsibility whatsoever, in negligence or otherwise, for any loss or damage arising from the possession or use of the report whether in terms of correctness or otherwise. The application, therefore, by the user of this report or any part thereof, is solely at the user's own risk.

**HALLIBURTON**

**1.0 EXECUTIVE SUMMARY**

JOHN TARPLEY  
RUNNING HORSE PRODUCTION CO LLC  
PO BOX 369  
IGNACIO , CO 81137

Dear JOHN TARPLEY ,

Halliburton appreciates the opportunity to perform the stimulation treatment on the MALJAMAR AGI 2. A pre-job safety meeting was held where details of the job were discussed, potential safety hazards were reviewed, and environmental compliance procedures were outlined. Pump time was 123.40 min.

The proposed treatment for RUNNING HORSE MALJAMAR AGI # 2 consisted of:

- 23016 gal of Treated Water.

The treatment actually pumped consisted of:

- 4286 gal of Treated Water.

The average BH treating rate was 0.7 bpm and average WH pressure was 2367 psi.

The total liquid load to recover is 4287 gal.

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.

Respectfully,

DAVID ZAMBRANO

## 2.2 Pipe Information

Equipment	Top MD ft	Bottom MD ft	OD in	ID in	Grade	Weight lb/ft
Surface Pipe	0.0	50.0	2.620	1.870		
Tubing	0.0	10473.0	2.875	2.441	J-55	6.50
Casing	0.0	11048.0	7.000	6.184		29.00
Formation	10474.0	11000.0				
Open Hole	11048.0	11248.0		6.500		

## 2.3 Initial Fluid Position Pressures

Expected Bottom Hole Pressure	7600	psi
Reservoir Pressure	4333	psi
Reservoir Pressure Gradient	0.440	psi/ft
Closed-In WHP	0	psi
Fluid Free to Flow into Formation	Yes	
Surface Lines Full	No	
Fluid in Tubing	Brine	
Top of Fluid Depth	0.00	ft

## 2.4 Temperature Profile Information

Ambient Temperature	60.0	°F
Injected Fluid	60.0	°F
Proppant	60.0	°F



## 3.0 PUMPING SCHEDULE

### 3.1 Designed Pumping Schedule

Stage Number	Description	Fluid System	Clean Volume gal	Slurry Volume gal	Rate Stage Start bpm	Rate Stage End bpm	Stage Time min
1	Step Rate Test	Treated Water	336	336	0.3	0.3	32.00
2	Step Rate Test	Treated Water	630	630	0.5	0.5	30.00
3	Step Rate Test	Treated Water	1260	1260	1.0	1.0	30.00
4	Step Rate Test	Treated Water	1890	1890	1.5	1.5	30.00
5	Step Rate Test	Treated Water	2520	2520	2.0	2.0	30.00
6	Step Rate Test	Treated Water	3150	3150	2.5	2.5	30.00
7	Step Rate Test	Treated Water	3780	3780	3.0	3.0	30.00
8	Step Rate Test	Treated Water	4410	4410	3.5	3.5	30.00
9	Step Rate Test	Treated Water	5040	5040	4.0	4.0	30.00
Total			23016	23016			272.00
Total							

Stage Number	Stage Time ucts	Clean Volume gal	Slurry Volume gal	Wellhead Volume gal
2	24-Apr-16 10:42:06	733	733	733
3	24-Apr-16 11:12:24	1271	1271	1271
4	24-Apr-16 14:22:01	1858	1858	1858
Total		4287	4287	4280

## 4.2 Bottom Hole Stage Summary

Stage Number	Start Time ucts	Max BH Pressure psi	Avg BH Pressure psi	Max BH Rate bpm	Avg BH Rate bpm
WB/SL	00:00:00	-15	-15	0.0	0.0
WB/SL	00:00:00	-15	-15	0.0	0.0
1	11:29:04	7961	7934	1.5	1.5
2	11:35:47	7995	6363	1.5	0.4

## 5.2 Job Stage Log

Time ucts	Description	Comment	Treating Pressure psi	Backside Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
24-Apr-16 09:37:40	Stage 1	Step Rate Test	87	0	0.0	0
10:07:06	Stage 2	Step Rate Test	1872	0	0.4	424
10:42:07	Stage 3	Step Rate Test	2283	493	0.7	1158
11:12:25	Stage 4	Step Rate Test	2670	487	1.1	2428

Time ucts	Description	Comment	Hydraulic Power hp	Hydrostatic Pressure psi	Slurry Left In Stage gal	Slurry Stage Size gal
09:37:40	Stage 1	Step Rate Test	0	4856	336	336
10:07:06	Stage 2	Step Rate Test	18	4884	-88	336
10:42:07	Stage 3	Step Rate Test	38	4892	1260	1260
11:12:25	Stage 4	Step Rate Test	69	4906	-11	1260

## 5.3 Job Event Log

Stage Number	Event Number	Time ucts	Description	Comment	Treating Pressure psi	Backside Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
	1	24-Apr-16 04:20:00	Safety Meeting - Service Center or other Site	JOURNEY MANAGEMENT				
	2	04:30:00	Depart from Service Center or Other Site					
	3	07:00:00	Arrive at Location					



# HALLIBURTON

RUNNING HORSE PRODUCTION CO LLC  
MALJAMAR AGI 2 Stage 1  
RUNNING HORSE MALJAMAR AGI # 2

Stage Number	Event Number	Time ucts	Description	Comment	Treating Pressure psi	Backside Pressure psi	Slurry Rate bpm	Job Slurry Vol gal
	15	11:42:09	ISIP		2767	500	0.1	4286
	16	11:47:09	Shut-In Pressure @ 5 Minutes		2305	488	0.0	4287
	17	11:52:09	Shut-In Pressure @ 10 Minutes		2068	494	0.0	4287
	18	11:57:09	Shut-In Pressure @ 15 Minutes		1870	503	0.0	4287
	19	12:12:09	Shut-In Pressure @ 30 Minutes		1413	532	0.0	4287
	20	12:42:09	Other	SHUT IN ONE HOUR	873	486	0.0	4287
	21	13:44:08	Wait on Customer or Contractor Equipment - End Tim	COMPANY REP SAID TO RIG IT DOWN	419	564	0.0	4287
	22	13:45:00	Safety Meeting - Pre Rig-Down		416	564	0.0	4287
	23	13:50:00	Rig-Down Equipment		-6	570	0.0	4287
		14:22:00	End Averaging	End Avg Trt 1	-3791	-3810	0.0	4287
	24	14:22:04	End Job	Ending Job	-3791	-3810	0.0	4287
	25	14:50:00	Rig-Down Completed		-3791	-3810	0.0	4287
	26	14:55:00	Safety Meeting - Departing Location		-3791	-3810	0.0	4287
	27	15:00:00	Depart Location for Service Center or Other Site		-3791	-3810	0.0	4287
	28	17:30:00	Return to Service Center from Job		-3791	-3810	0.0	4287

# HALLIBURTON

RUNNING HORSE PRODUCTION CO LLC  
MALJAMAR AGI 2 Stage 1  
RUNNING HORSE MALJAMAR AGI # 2

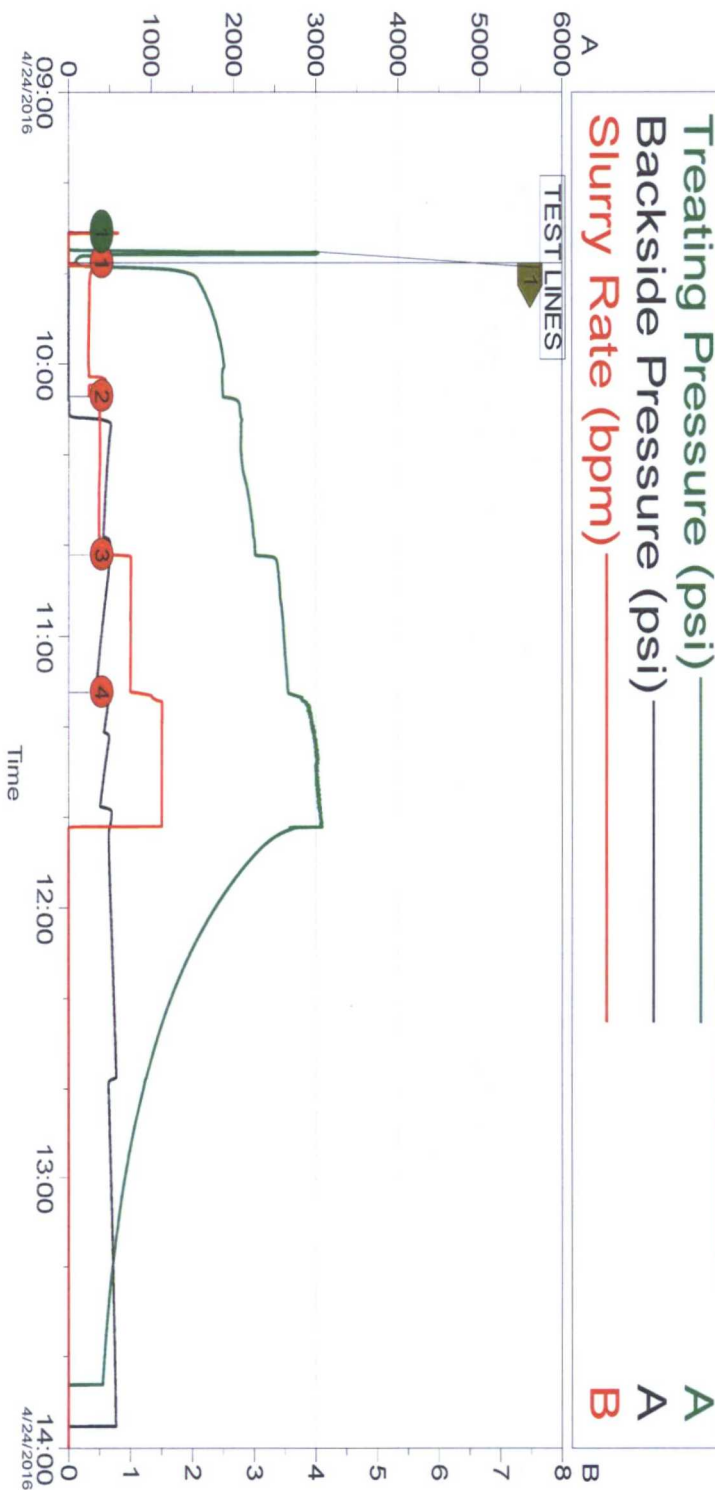
Stage Number	Event Number	Time ucts	Description	Comment	Hydraulic Power hp	Hydrostatic Pressure psi	Slurry Left In Stage gal	Slurry Stage Size gal
1		09:37:40	Stage 1	Step Rate Test	0	4856	336	336
		09:37:41	Start Averaging	Start Avg Trt 1	0	4856	336	336
2		10:07:06	Stage 2	Step Rate Test	18	4884	-88	336
3		10:42:07	Stage 3	Step Rate Test	38	4892	1260	1260
4		11:12:25	Stage 4	Step Rate Test	69	4906	-11	1260
13		11:42:07	Other	SHUTTING DOWN PRE MATURELY BECAUSE SCHLUMBERGER SWEDGE ONLY RATED TO 3,000 PSI	9	4912	32	1890
14		11:42:08	Wait on Customer or Customer Sub- Contractor Equip - Start Time	WAITING ON ORDERS FROM COMPANY REP	7	4913	32	1890
15		11:42:09	ISIP		4	4913	32	1890
16		11:47:09	Shut-In Pressure @ 5 Minutes		0	4904	32	1890
17		11:52:09	Shut-In Pressure @ 10 Minutes		0	4898	32	1890
18		11:57:09	Shut-In Pressure @ 15 Minutes		0	4893	32	1890
19		12:12:09	Shut-In Pressure @ 30 Minutes		0	4884	32	1890
20		12:42:09	Other	SHUT IN ONE HOUR	0	4873	32	1890
21		13:44:08	Wait on Customer or Customer Sub- Contractor Equipment - End Tim	COMPANY REP SAID TO RIG IT DOWN	0	4865	32	1890
22		13:45:00	Safety Meeting - Pre		0	4865	32	1890

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## 6.0 ATTACHMENTS

### 6.1 RUNNING HORSE MALJAMAR AGI # 2 MISCELLANEOUS PUMPING

### RUNNING HORSE MALJAMAR AGI # 2 MISCELLANEOUS PUMPING



Customer: RUNNING HORSE PRODUCTION CO LLC  
Well Description: MALJAMAR AGI 2  
Job Date: 24-Apr-2016  
LWI: 30-025-42628-00  
Sales Order #: 0903266369

HALLIBURTON