

DATE IN <u>8.17.10</u>	SUSPENSE	ENGINEER <u>TW.</u>	LOGGED IN <u>8.17.10</u>	TYPE <u>IPI</u>	APP NO <u>1022939843</u>
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*PTGW*

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION  
 - Engineering Bureau -  
 1220 South St. Francis Drive, Santa Fe, NM 87505



*Noble Energy*

*Rio Bravo 27-05*  
*30-045-33583*

**ADMINISTRATIVE APPLICATION CHECKLIST**

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

**Application Acronyms:**

- [NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
- [DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
- [PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
- [WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
- [SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
- [EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] TYPE OF APPLICATION - Check Those Which Apply for [A]

- [A] Location - Spacing Unit - Simultaneous Dedication  
 NSL  NSP  SD

Check One Only for [B] or [C]

- [B] Commingling - Storage - Measurement  
 DHC  CTB  PLC  PC  OLS  OLM

- [C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery  
 WFX  PMX  SWD  IPI  EOR  PPR

[D] Other: Specify IPI *TW.*

*SWD 1207*  
*700 PSI*

*8-20-10*  
*Will Van*  
*New SRT*

*IPI 302*

[2] NOTIFICATION REQUIRED TO: - Check Those Which Apply, or Does Not Apply

- [A]  Working, Royalty or Overriding Royalty Interest Owners
- [B]  Offset Operators, Leaseholders or Surface Owner
- [C]  Application is One Which Requires Published Legal Notice
- [D]  Notification and/or Concurrent Approval by BLM or SLO  
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
- [E]  For all of the above, Proof of Notification or Publication is Attached, and/or,
- [F]  Waivers are Attached

*3487' - 3561'*

[3] SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.

[4] CERTIFICATION: I hereby certify that the information submitted with this application for administrative approval is accurate and complete to the best of my knowledge. I also understand that no action will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Melanie D Peterson Melanie D Peterson San Juan Geologist 8/16/10  
 Print or Type Name Signature Title Date

mdpeterson@nobkenergyinc.com  
 e-mail Address

## Warnell, Terry G, EMNRD

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**From:** Warnell, Terry G, EMNRD  
**Sent:** Tuesday, August 17, 2010 10:49 AM  
**To:** 'MDPeterson@nobleenergyinc.com'  
**Subject:** RE: Rio Bravo 27 Well No. 5  
**Attachments:** Step-Rate Test.ppt

Hi Melanie,

On your checklist you marked SWD  
I assume you met to mark IPI?

Would also like for your Engineers to do a Bottomhole Pressure & Surface Pressure vs. Rate  
Similar to the one attached

Thanks,  
Terry

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**From:** MDPeterson@nobleenergyinc.com [mailto:MDPeterson@nobleenergyinc.com]  
**Sent:** Monday, August 16, 2010 3:55 PM  
**To:** Warnell, Terry G, EMNRD  
**Cc:** JRim@nobleenergyinc.com; jmuse@nobleenergyinc.com; SRobbins@nobleenergyinc.com  
**Subject:** Re: Rio Bravo 27 Well No. 5

Hello Terry,  
Thank you for the help on this. Below is the application for an increase in injection pressure. Jean will also be sending it to you as a hard copy. Please e-mail me if you need anything else to go with this.  
Thank you,  
Melanie

Melanie Peterson  
San Juan Geologist  
Noble Energy Inc.

Direct: 303-228-4207  
Cell: 307-262-4706

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**From:** "Warnell, Terry G, EMNRD" <TerryG.Warnell@state.nm.us>  
**To:** <jmuse@nobleenergyinc.com>, <MDPeterson@nobleenergyinc.com>  
**Cc:** "Jones, William V., EMNRD" <William.V.Jones@state.nm.us>  
**Date:** 08/13/2010 02:58 PM  
**Subject:** Rio Bravo 27 Well No. 5

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Hi Jean,

I just received three pieces of paper from you, a C-103 and two pages of a BJ stimulation treatment report

If you are wanting to administratively apply for a pressure increase, IPI, this is what OCD needs to see as part of the application:

- 1) Administrative order checklist form <http://www.emnrd.state.nm.us/ocd/documents/admnapp.pdf>
- 2) Cover letter explaining everything, including your conclusions from the Step Rate Test, the permit number allowing injection into this well and the latest maximum injection pressure limit and date it was approved.
- 3) Surface and bottomhole pressure vs Rate plots (sometimes surface pressures only will suffice, but if it is inconclusive, you will have to re-do the test, so most operators run the memory gauge in the hole prior to starting the pumps).
- 4) Raw data: summary of raw data in hardcopy and detailed data on a diskette.
- 5) Wellbore diagram showing tubing size and setting depth and perforations and cement tops of casings.

You might also look at the EPA step rate test procedures

<http://www.epa.gov/region8/water/uic/INFO-StepRateTest.pdf>

Be sure to give the OCD District (Hobbs) a 24-48 hour notice on when you will run the SRT

Might also want to look at the OCD web site

<http://www.emnrd.state.nm.us/OCD/index.htm>

to see what other operators are submitting for IPI's

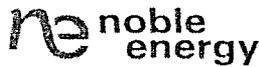
Sincerely

Terry G. Warnell  
New Mexico Oil Conservation Division  
1220 South St. Francis  
Santa Fe, NM 87505  
505-476-3466

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www.nobleenergyinc.com



RECEIVED OFFICE  
2010 AUG 17 A 11:25

Application for Authorization to Inject

Rio Bravo 27-05 API# 30-045-33583

8/16/2010

General Information:

Noble Energy Inc. respectfully requests to increase the maximum surface injection pressure of the Rio Bravo 25-05. As of March 29, 2010 the surface injection pressure was limited to no more than 700 psi into the Cliffhouse Member of the Mesa Verde with perforations from 3487'-3517' and 3536'-3561'. Current limitations of the surface injection pressure do not allow for a sufficient volume of water injection.

A step rate test was performed on 6/16/2010 on the well in question and based on the results of the test, maximum bottomhole pressure was determined to be 2795 psi. The maximum surface pressure determined by the step rate test was 1458 psi. Noble Energy would like to request higher surface injection pressure of 1450 psi.

This higher requested surface pressure will not result in any migration of the injected fluid to surrounding lithofacies.

The step rate test performed by BJ Services is attached for your review as well as the bottomhole pressures measured from pressure bombs from Phoenix Services.

Thank you for your consideration,

A handwritten signature in cursive script that reads "Melanie Peterson".

Melanie Peterson  
San Juan Geologist  
Rockies-Midcon Unit  
Direct:303-228-4207  
Cell:307-262-4706

# STIMULATION TREATMENT REPORT



Date 06-JUL-10 District Farmington F.Receipt 1001646039 Customer Noble Energy - Farmington  
 Lease RIO BRAVO 27-05 Well Name RIO BRAVO 27-05  
 Field BASIN Location Sec 27, T31N, R 13W  
 County San Juan State New Mexico Stage No 1 Well API - API 30045335830000

WELL DATA		Well Type: <u>OLD</u>	Well Class: <u>INJECTION</u>			Depth TD/PB: <u>4313</u>	Formation: <u>MESA VERDE</u>						
Geometry Type	Tubular Type	OD	Weight	ID	Grade	Top	Bottom	Perf Intervals					
TUBULAR	CSG	7	23	6.366		0	4313	Top	Bottom	SPF	Diameter		
TUBULAR	TBG	2.875	6.5	2.441		0	3414	3487	3517	4	.34		
								3536	3561	4	.34		
								4200	4286	4	.34		

Packer Type \_\_\_\_\_ Packer Depth \_\_\_\_\_ FT

TREATMENT DATA					LIQUID PUMPED AND CAPACITIES IN BBLs	
Fluid Type	Fluid Desc	Pumped Volume(Gals)	Prop. Description	Volume Pumped(Lbs)		
TREATMENT FLUID	2% KCL				Tubing Cap.	19.76
				Total Prop Qty: _____	Casing Cap.	_____
					Annular Cap.	107
					Open Hole Cap.	0
					Fluid to Load	.3
					Pad Volume	0
					Treating Fluid	_____
					Flush	20.143
					Overflush	_____
					Fluid to Recover	_____

Previous Treatment \_\_\_\_\_ Previous Production \_\_\_\_\_  
 Hole Loaded With 2% KCL Treat Via: Tubing  Casing  Anul.  Tubing & Anul.   
 Ball Sealers: \_\_\_\_\_ In \_\_\_\_\_ Stages Type \_\_\_\_\_  
 Auxiliary Materials \_\_\_\_\_

### PROCEDURE SUMMARY

Time AM/PM	Treating Pressure-Psi		Surface Slurry BBLs. Pumped		Slurry Rate BPM	Comments
	STP	Annulus	Stage	Total		
06:40						arrived at location
06:50						spotted equip and rigged up
09:00						safety meeting
09:13	7127	0	0	0	.2	ST: 4000psi Pressure test ( 7127psi)
09:16	1043	0	1	1	.5	ST: .5 BPM stage
09:31	1108	0	2	2	.7	St: .7 BPM stage
09:41	572	0	0	0	0	Shut Down; broaden head pressure @ 422psi; reset packer
10:35	5445	0	0	0	.2	Re-Test lines @4000psi (5445)
10:37	1083	0	1	1	.5	St: .5 bpm Stage
10:51	1117	0	2	2	.7	St: .7 bpm Stage
11:06	1168	0	3	3	1	St: 1 bpm Stage
11:21	1195	0	4	4	1.2	St: 1.2 bpm Stage
11:37	1234	0	5	5	1.5	St: 1.5 bpm Stage
11:52	1260	0	6	6	1.7	St: 1.7 bpm Stage
12:07	1282	0	7	7	2	St: 2 bpm Stage
12:22	1309	0	8	8	2.2	St: 2.2 bpm Stage
12:37	1358	0	9	9	2.5	St: 2.5 bpm Stage
12:56	1351	0	10	10	2.7	St: 2.7 bpm Stage
13:11	1442	0	11	11	3	St: 3 bpm Stage
13:26	1458	0	12	12	3.2	St: 3.2 bpm Stage
13:41	1443	0	13	13	3.5	St: 3.5 bpm Stage
13:56	1465	0	14	14	3.7	St: 3.7 bpm Stage
14:11	1514	0	15	15	4	St: 4 bpm Stage
14:22	1564	0	16	16	4.2	St: 4.2 bpm Stage
14:24	1564	454	17	17	4.2	Shut down; max pressure on broaden head reached

## Treatment Report-Supplement



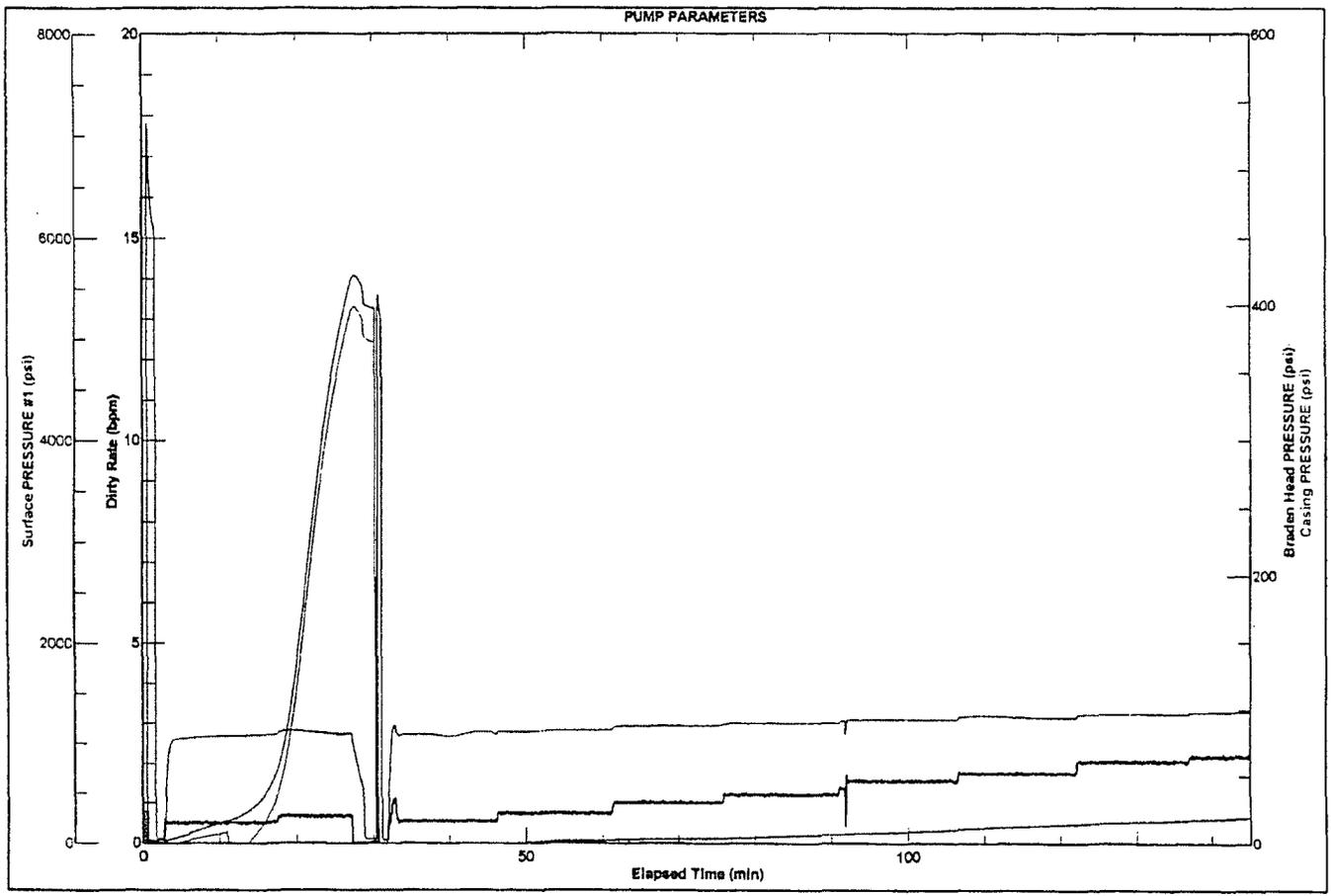
Date 06-JUL-10 District Farmington F.Receipt 1001646039 Customer Noble Energy - Farmington  
 Lease RIO BRAVO 27-05 Well Name RIO BRAVO 27-05  
 Field BASIN Location Farmington  
 County San Juan State New Mexico Stage No 1 Well API - API 30045335830000

TIME	Treating Pressure-Psi		Surface Slurry BBLS. Pumped		Slurry Rate BPM	Comments
	STP	Annulus	Stage	Total		
06:40						arrived at location
06:50						spotted equip. and rigged up
09:00						safety meeting
09:13	7127	0	0		2	ST: 4000psi Pressure test ( 7127psi)
09:16	1043	0	1		5	ST: 5 BPM stage
09:31	1108	0	2		7	ST: 7 BPM stage
09:41	572	0	0		0	Shut Down: broaden head pressure @ 422psi; reset packer
10:35	5445	0	0		2	Re-Test lines @4000psi (5445)
10:37	1083	0	1		5	St: 5 bpm Stage
10:51	1117	0	2		7	St: 7 bpm Stage
11:06	1168	0	3		1	St: 1 bpm Stage
11:21	1195	0	4		1.2	St: 1.2 bpm Stage
11:37	1234	0	5		1.5	St: 1.5 bpm Stage
11:52	1260	0	6		1.7	St: 1.7 bpm Stage
12:07	1282	0	7		2	St: 2 bpm Stage
12:22	1309	0	8		2.2	St: 2.2 bpm Stage
12:37	1358	0	9		2.5	St: 2.5 bpm Stage
12:56	1351	0	10		2.7	St: 2.7 bpm Stage
13:11	1442	0	11		3	St: 3 bpm Stage
13:26	1458	0	12		3.2	St: 3.2 bpm Stage
13:41	1443	0	13		3.5	St: 3.5 bpm Stage
13:56	1465	0	14		3.7	St: 3.7 bpm Stage
14:11	1514	0	15		4	St: 4 bpm Stage
14:22	1564	0	16		4.2	St: 4.2 bpm Stage
14:24	1564	454	17		4.2	Shut down: max pressure on broaden head reached

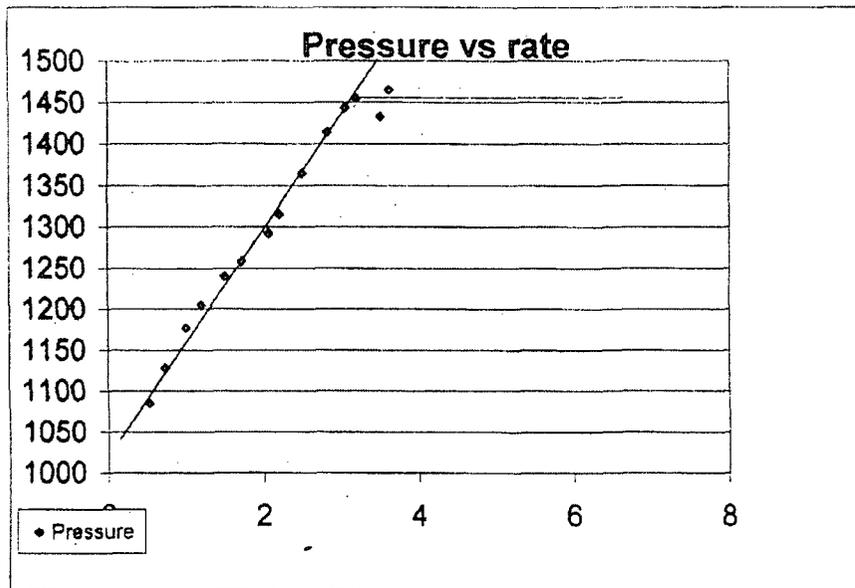
Treating Pressure		Injection Rates		Shut In Pressures		Customer Rep. Genarno Maez	
Minimum	1068	Treating Fluid		ISDP		BJ Rep.	DUANE D ADDISON
Maximum	1564	Flush		5 Min.		Job Number	1001646039
Average	1316	Average		10 Min.		Rec. ID No.	422151042 C
Operators Max. Pressure				15 Min.		Distribution	
3000				Final	In	Min.	
				Flush Dens. lb./gal.			



BJ Services JobMaster Program Version 3.20  
Job Number: 1001648039  
Customer: Noble Energy Inc.  
Well Name: Rio Bravo 27-05



rate	surface
0.53	1085
0.73	1128
1	1177
1.2	1205
1.5	1240
1.72	1258
2.06	1292
2.2	1315
2.5	1365
2.82	1414
3.05	1443
3.2	1455
3.5	1433
3.62	1465
4	1518
4.25	1565





## PRESSURE GAUGE DATA

**Company:** Noble Energy

**Well Name:** Rio Bravo #27-05 SWD

**Date:** July 6, 2010

**OIL COMPANY INFORMATION**

Oil Company: NOBLE ENERGY  
Address: FARMINGTON, NM

**WELL INFORMATION**

Well Name: RIO BRAVO 27-05 SWD  
Well Location: T31N, R13W, SEC. 27  
Field: BASIN DAKOTA/BLANCO MV  
Pool:  
Formation: MESAVERDE  
Well Licence Number: 3004533583  
Well Fluid Status: 02 Gas  
Well Mode Status: 07 Standing(Drilled & Cased)  
Well Type Status: 09 Industrial  
Well Type Indicator: Vertical  
Production Interval(KB) From: 3487 TO 4286  
KB Elevation: 5676                      CF Elevation:                      Ground Elevation:  
Pool Datum:                              Datum Depth: 5676  
Producing Through: Tubing  
O.H. Diameter:  
Casing Liner Diameter:  
PBTD: 4341  
Total Depth: 6675  
Tubing Depth: 3480  
Tubing OD.: 2 7/8                      Tubing ID.: J55 6.4#  
Casing OD.: 7                              Casing ID.:

**TEST INFORMATION**

Type Of Test: Static Gradient  
Initial Tubing Pressure:                      Final Tubing Pressure:  
Initial Casing Pressure:                      Final Casing Pressure:  
Shut in Time:

**GAUGE INFORMATION**

Serial Number: 9459  
Pressure Range: 315  
Calibration Date: JUL 20/09  
Gauge Started:                              Gauge Stopped:  
On Bottom Time: 7/6/10 @ 1030 HRS      Off Bottom Time: 7/6/10 @ 1445 HRS  
Run Depth Bottom (KB): 3492

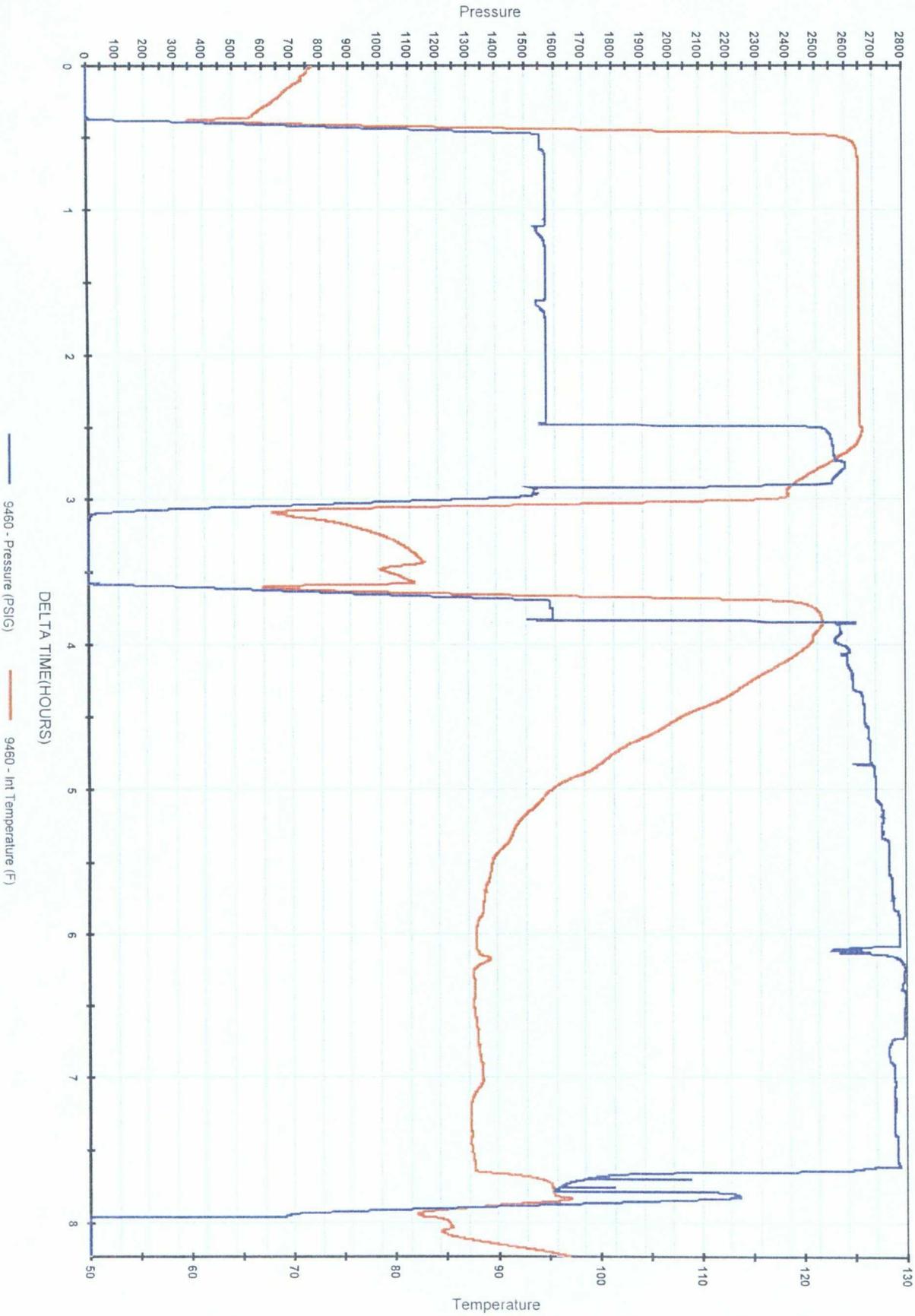
**REMARKS**

RU PRESSURE TRLR-RAN TANDEM BHP GAUGES (9459, 9460) TO 3492'-ON STANDBY-RAN STEP RATE TEST-POSSIBLE PACKER LEAK-POOH W/GAUGES-ON STANDBY TO RESET PACKER-RAN TANDEM BHP GAUGES TO 3492'-RAN STEP RATE TEST-POOH W/TANDEM BHP GAUGES.

PRESSURE AND TEMPERATURE VS DELTA TIME

Company: NOBLE ENERGY  
Location: RIO BRAVO #27-05 SWD  
Date: JULY 6, 2010  
Serial# 9460

Max. Pressure: 2797.081 Max. Temperature: 125.938

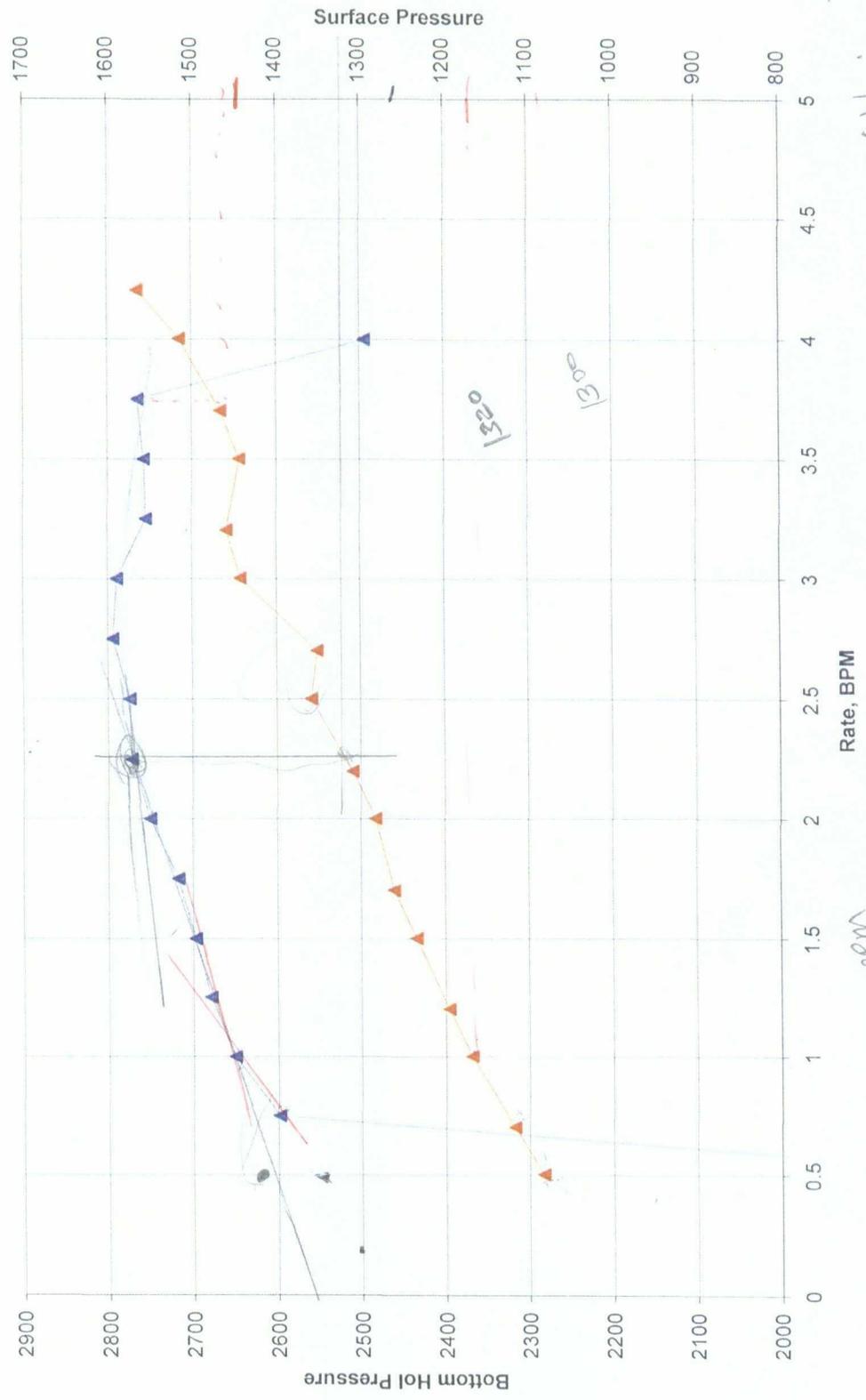


3 1/8" Top Vent

Perf.

303-228-4207

### Rio Bravo 27-5 Step Rate Test



$$\begin{array}{r} 1130 \text{ PSI} \\ - 50 \\ \hline 1180 \end{array}$$
  

$$\begin{array}{r} 1130 \text{ PSI} \\ - 50 \\ \hline 1180 \end{array}$$

Billie -  
 MAY 2 505-632-8056

Bottom Hole Pressure (PSI) —▲— Surface Pressure (PSI)

Rate, BPM

MAX anticipated injection rate = 4 BPM

10% .4  
 20% .8  
 40% 1.6 3.2  
 60% 4.0 8.0  
 80% 8.0 16.0  
 100% 16.0 32.0

Step rate should be held for 30 minutes

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## COMMENT SUMMARY

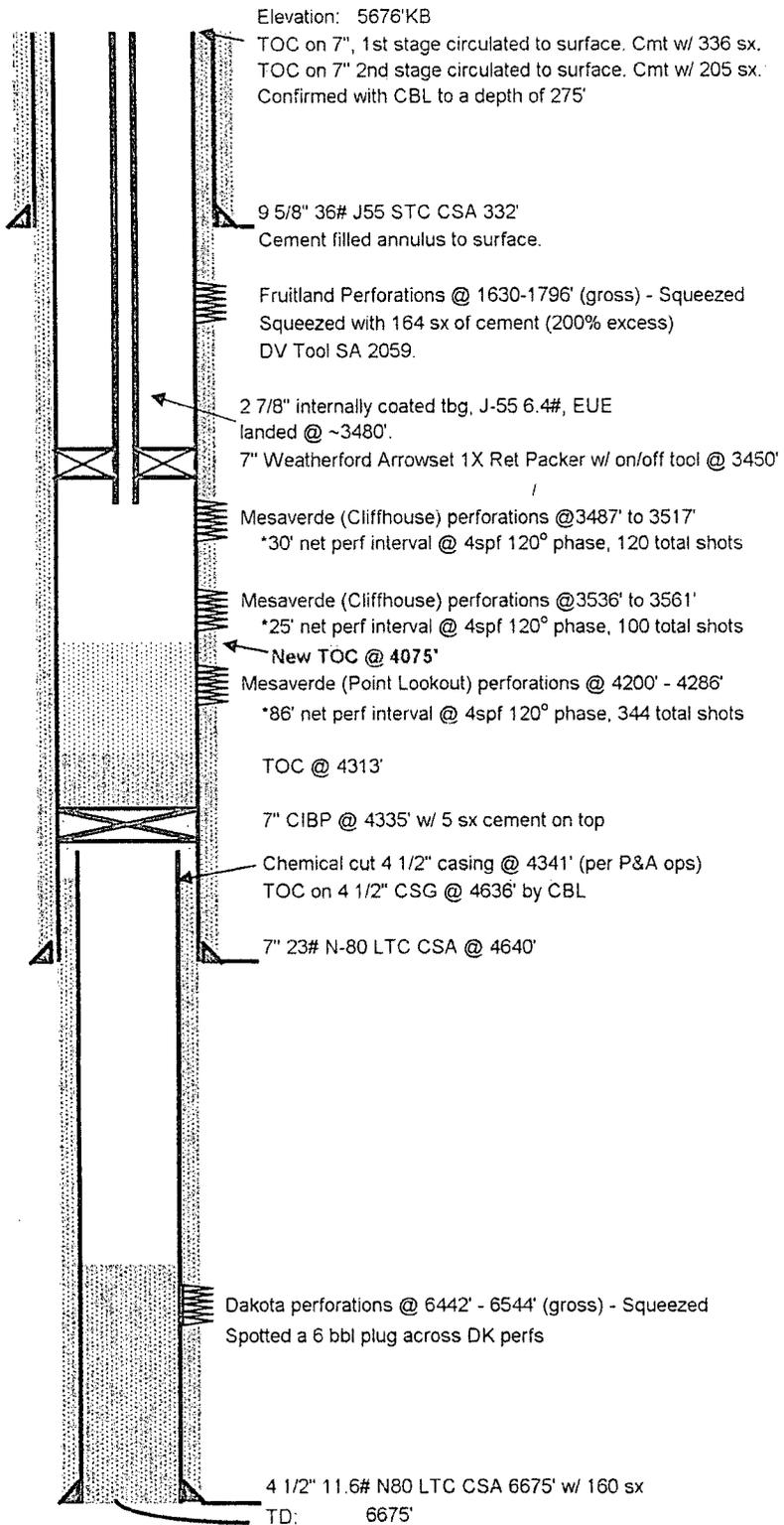
Oil Company: NOBLE ENERGY  
Date of Test: JULY 6, 2010

Well Location: RIO BRAVO #27-05 SWD  
Serial#: 9459

#	Real Time	Comment	Pres.(PSIG)	Temp.(DEG.F)
1	07/06/2010 10:36:02	0.5 BBL/MIN	1690.38	121.734
2	07/06/2010 10:52:00	.75 BPM	2597.65	118.414
3	07/06/2010 11:07:00	1.00 BPM	2649.83	112.548
4	07/06/2010 11:32:00	1.25 BPM	2678.48	100.931
5	07/06/2010 11:47:00	1.5 BPM	2696.63	94.937
6	07/06/2010 12:02:00	1.75 BPM	2717.33	91.641
7	07/06/2010 12:27:00	2.00 BPM	2750.38	88.766
8	07/06/2010 12:42:00	2.25 BPM	2772.21	87.902
9	07/06/2010 12:57:00	2.50 BPM	2774.48	89.047
10	07/06/2010 13:12:00	2.75 BPM	2794.15	87.656
11	07/06/2010 13:27:00	3.00 BPM	2789.16	87.916
12	07/06/2010 13:41:58	3.25 BPM	2754.34	88.345
13	07/06/2010 13:57:00	3.50 BPM	2757.01	87.263
14	07/06/2010 14:12:00	3.75 BPM	2764.46	87.291
15	07/06/2010 14:25:00	STOPPED PUMPING	2493.84	87.817



# Rio Bravo 27-05 SWD Schematic



Location: 1505' FNL, 1245' FWL,  
 Sec 27, T31N, R13W,  
 San Juan County, New Mexico

Field: La Plata  
 Basin Dakota/Blanco Mesa Verde

API #: 30-045-33583  
 Spud Date: October 2, 2006

Geoprognois:

- Fruitland Coal - 1226'
- Pictured Cliffs - 1805'
- Lewis - 1999'
- Cliffhouse - 3398'
- Menefee - 3517'
- Point Lookout - 4199'
- Gallup - 5771'
- Dakota - 6392'

### Surface Pressure and Rate vs Time

