

Drickey Queen Sand Unit
Summary of Recent Step Rate Tests

Well No.	Completion Depth (ft)	Type	Rate (BWPd)	Surface Pressure (psig)	Bottom Hole Pressure (psig)	Tool Depth (ft)	Fracture Gradient (psi/ft @ tool)	Date of test (mm/dd/yy)
DQSU #8	2918-2946	Open Hole	3744	1250	2284	2910	0.785	11/14/2014
DQSU #9	3045-3060	Perforated	4608	2012	2012	3035	No Fracture	11/14/2014
DQSU #17	3047-3061	Perforated	3024	1600	2787	3020	0.922	11/12/2014
DQSU #25	3045-3060	Perforated	2880	750	1956	3042	0.643	11/12/2014
DQSU #26	3040-3048	Open Hole	3600	1425	2558	3030	0.844	11/13/2014
DQSU #27	3042-3072	Open Hole	720	1350	2628	3035	0.865	11/11/2014
DQSU #32	2935-2960	Open Hole	2880	1450	2509	2920	0.859	11/11/2014
DQSU #33	3044-3061	Perforated	3600	1300	2347	3035	0.773	11/12/2014

DQSU #27 and #32 were run using freshwater; remaining wells run using produced water.

Propose a unit-wide wellhead injection pressure of 800 psig while injecting produced water.

Correction for carbon dioxide:

The assumptions, calculations, and resulting correction for CO₂ that were presented at hearing as Exhibit #33, Case #14505, Order #R-1541-B, Rock Queen Unit, would be the same for the Drickey Queen Sand Unit under anticipated operating conditions.

Consequently, a maximum surface injection pressure of 1200 psig while injecting CO₂ is proposed.

Oil Conservation Division
Case No. 15255
Exhibit No. 15-B

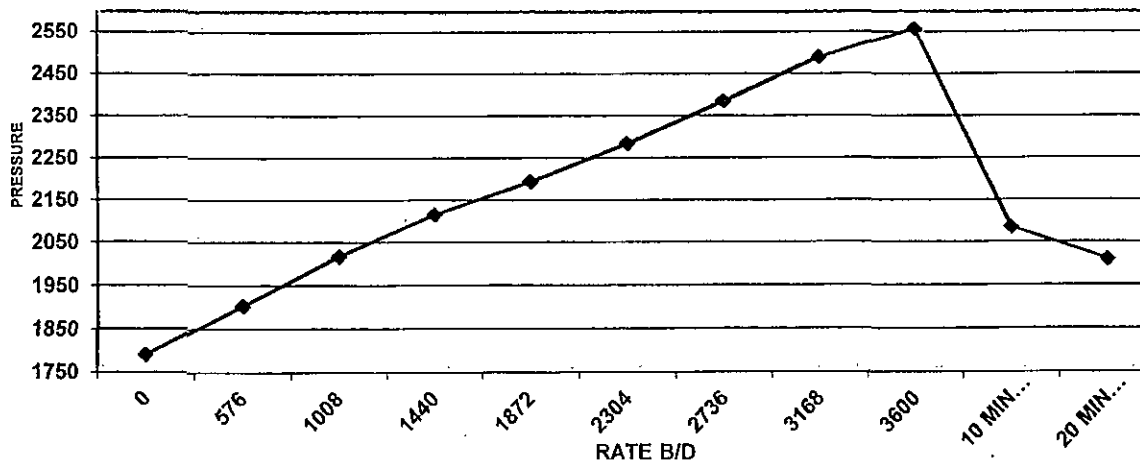
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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/13/2014	11:55 AM	1789	225	
576	11/13/2014	12:15 PM	1903	350	
1008	11/13/2014	12:35 PM	2017	500	NORMAL RATE & PSI
1440	11/13/2014	12:55 PM	2115	650	
1872	11/13/2014	1:15 PM	2193	775	
2304	11/13/2014	1:35 PM	2284	925	
2736	11/13/2014	1:55 PM	2385	1100	
3168	11/13/2014	2:15 PM	2490	1300	
3600	11/13/2014	2:35 PM	2558	1425	SOFT FRAC
10 MIN FALL OFF	11/13/2014	2:45 PM	2085	550	
20 MIN FALL OFF	11/13/2014	2:55 PM	2010	450	

Company:	LEGACY RESERVES	Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 26	Witnessed By:	D. ROSA
Field:	CAPROCK	Truck Number:	104
County:	CHAVES	District:	LEVELLAND
State:	NEW MEXICO	Tool Number:	
Injection:	WATER	Test Type:	STEP RATE TESTS
Shut'in Time:	2:35 PM	SOFT FRAC @ 3600 B/D 1425 SURFACE PRESSURE 2558 BOTTOM HOLE PRESSURE	
Total Shut In Time:	20 MIN.		
Tubing Size:	2 3/8		
Open Hole:	3040'-3048'		
Perforations:	N/A		
Plug Back Depth:	N/A		

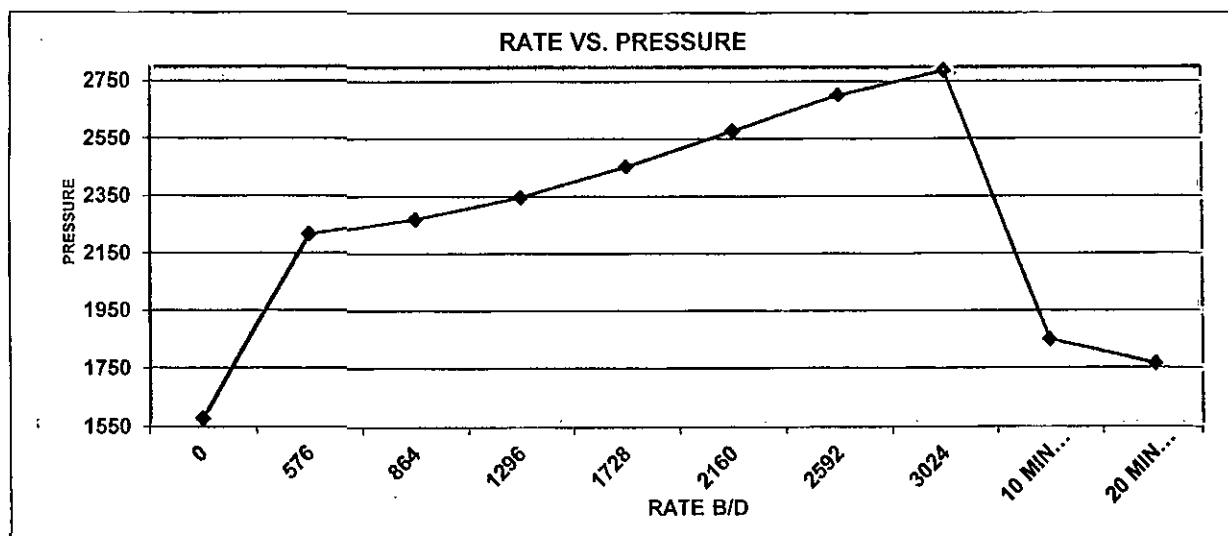
RATE VS. PRESSURE



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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/12/2014	8:10 AM	1576	15	
576	11/12/2014	8:30 AM	2216	700	
864	11/12/2014	8:50 AM	2270	750	
1296	11/12/2014	9:10 AM	2347	875	
1728	11/12/2014	9:30 AM	2454	1050	
2160	11/12/2014	9:50 AM	2578	1250	
2592	11/12/2014	10:10 AM	2704	1450	
3024	11/12/2014	10:30 AM	2787	1600	SOFT FRAC
10 MIN FALL OFF	11/12/2014	10:40 AM	1848	300	
20 MIN FALL OFF	11/12/2014	10:50 AM	1764	200	
Company: LEGACY RESERVES			Recorded By: T. STANCZAK		
Well: DRICKEY QUEEN SAND UNIT # 17			Witnessed By: D. ROSA		
Field: CAPROCK			Truck Number: 104		
County: CHAVES			District: LEVELLAND		
State: NEW MEXICO			Tool Number:		
Injection: WATER			Test Type: STEP RATE TESTS		
Shut In Time: 10:30 AM			SOFT FRAC @ 3024 B/D		
Total Shut In Time: 20 MIN.			1600 SURFACE PRESSURE		
Tubing Size: 2 3/8			2787 BOTTOM HOLE PRESSURE		
Open Hole: N/A					
Perforations: 3047'-3061'					
Plug Back Depth: N/A					

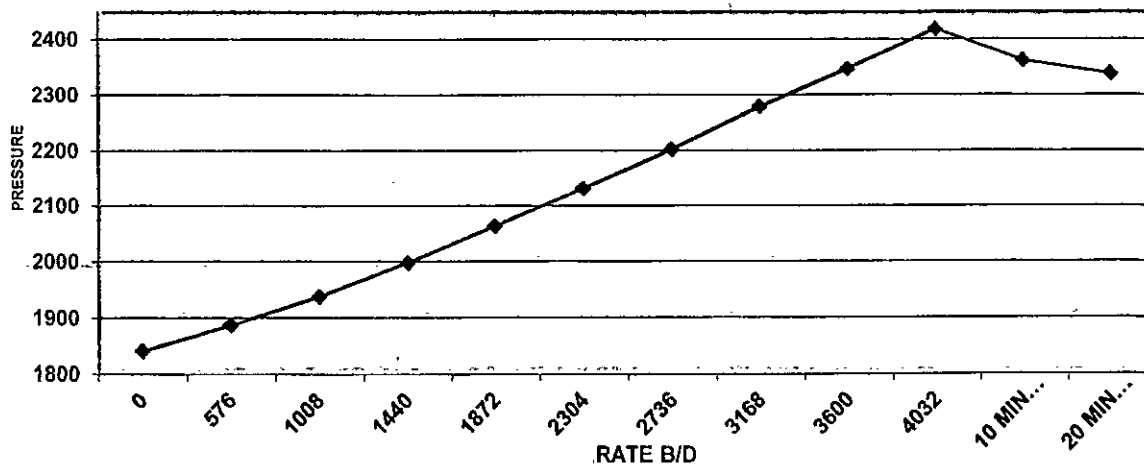


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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/12/2014	12:05 PM	1840	280	
576	11/12/2014	12:25 PM	1886	400	
1008	11/12/2014	12:45 PM	1937	525	
1440	11/12/2014	1:05 PM	1997	600	
1872	11/12/2014	1:25 PM	2063	700	
2304	11/12/2014	1:45 PM	2131	825	
2736	11/12/2014	2:05 PM	2202	975	
3168	11/12/2014	2:25 PM	2279	1150	
3600	11/12/2014	2:45 PM	2347	1300	SOFT FRAC
4032	11/12/2014	3:05 PM	2419	1475	
10 MIN FALL OFF	11/12/2014	3:15 PM	2362	800	
20 MIN FALL OFF	11/12/2014	3:25 PM	2338	775	
Company:	LEGACY RESERVES			Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 33			Witnessed By:	D. ROSA
Field:	CAPROCK			Truck Number:	104
County:	CHAVES			District:	LEVELLAND
State:	NEW MEXICO			Tool Number:	
Injection:	WATER			Test Type:	STEP RATE TESTS
Shut In Time:	3:05 PM			SOFT FRAC @ 3600 B/D 1300 SURFACE PRESSURE 2347 BOTTOM HOLE PRESSURE	
Total Shut In Time:	20 MIN.				
Tubing Size:	2 3/8				
Open Hole:	N/A				
Perforations:	3044'-3061				
Plug Back Depth	N/A				

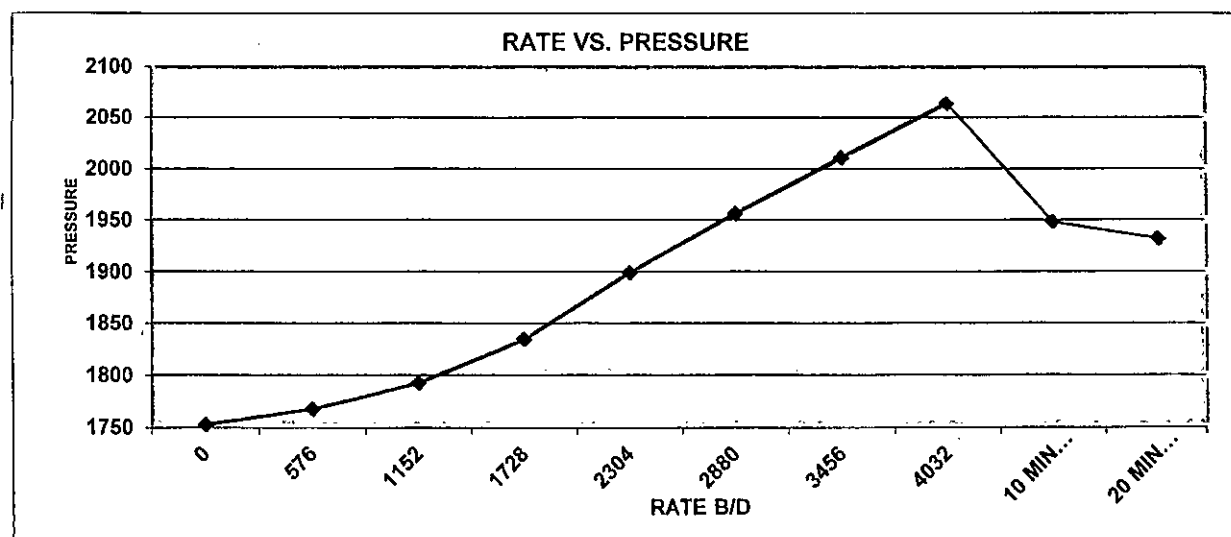
RATE VS. PRESSURE



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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/13/2014	8:10 AM	1752	185	
576	11/13/2014	8:30 AM	1767	220	
1152	11/13/2014	8:50 AM	1792	275	
1728	11/13/2014	9:10 AM	1834	400	
2304	11/13/2014	9:30 AM	1899	575	
2880	11/13/2014	9:50 AM	1956	750	SOFT FRAC
3456	11/13/2014	10:10 AM	2011	960	
4032	11/13/2014	10:30 AM	2064	1175	
10 MIN FALL OFF	11/13/2014	10:40 AM	1948	390	
20 MIN FALL OFF	11/13/2014	10:50 AM	1932	375	
Company:	LEGACY RESERVES			Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 25			Witnessed By:	D. ROSA
Field:	CAPROCK			Truck Number:	104
County:	CHAVES			District:	LEVELLAND
State:	NEW MEXICO			Tool Number:	
Injection:	WATER			Test Type:	STEP RATE TESTS
Shut In Time:	10:30 AM			SOFT FRAC @ 2880 B/D 750 SURFACE PRESSURE 1956 BOTTOM HOLE PRESSURE	
Total Shut In Time:	20 MIN.				
Tubing Size:	2 3/8				
Open Hole:	N/A				
Perforations:	3045'-3060'				
Plug Back Depth	N/A				

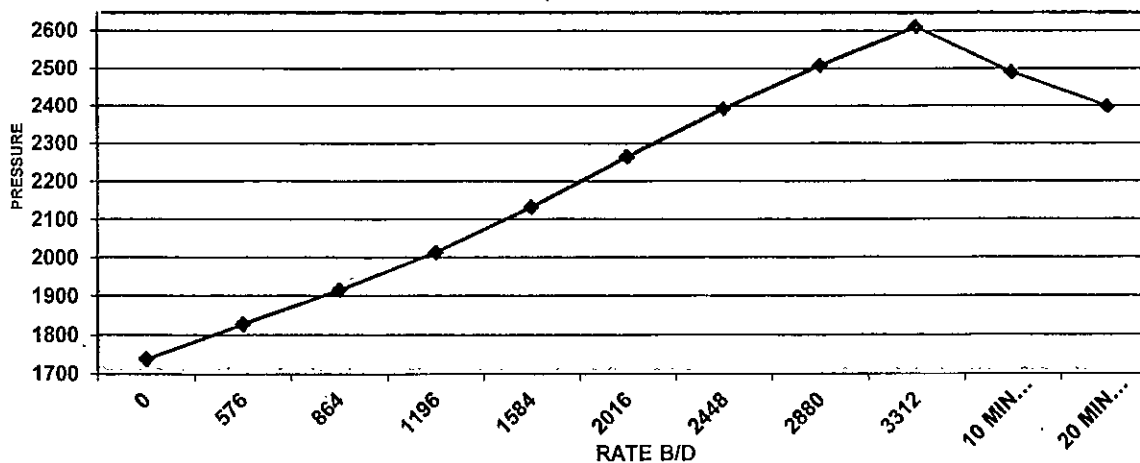


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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/11/2014	11:50 AM	1737	225	
576	11/11/2014	12:10 PM	1827	500	
864	11/11/2014	12:30 PM	1915	675	
1196	11/11/2014	12:50 PM	2013	800	
1584	11/11/2014	1:10 PM	2132	975	
2016	11/11/2014	1:30 PM	2265	1150	
2448	11/11/2014	1:50 PM	2393	1325	
2880	11/11/2014	2:10 PM	2509	1450	SOFT FRAC
3312	11/11/2014	2:30 PM	2611	1625	
10 MIN FALL OFF	11/11/2014	2:40 PM	2491	1350	
20 MIN FALL OFF	11/11/2014	2:50 PM	2399	1175	
Company:	LEGACY RESERVES			Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 32			Witnessed By:	D. ROSA
Field:	CAPROCK			Truck Number:	104
County:	CHAVES			District:	LEVELLAND
State:	NEW MEXICO			Tool Number:	
Injection:	WATER			Test Type:	STEP RATE TESTS
Shut In Time:	2:30 PM			SOFT FRAC @ 2880 B/D	
Total Shut In Time:	20 MIN.			1450 SURFACE PRESSURE	
Tubing Size:	2 3/8			2509 BOTTOM HOLE PRESSURE	
Open Hole:	2935'-2980'				
Perforations:	N/A				
Plug Back Depth	N/A				

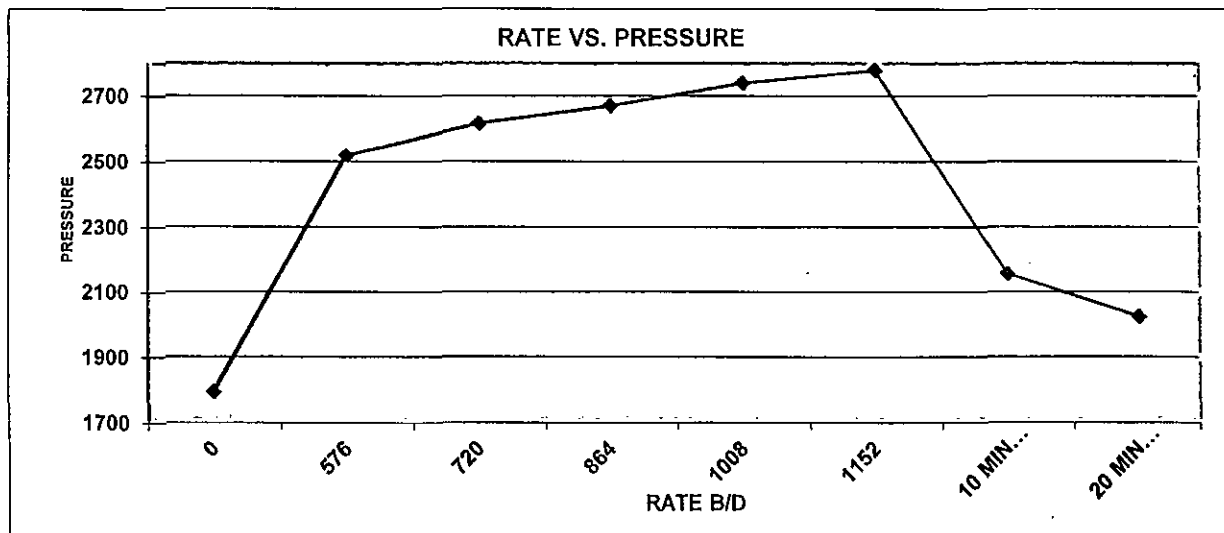
RATE VS. PRESSURE





STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/11/2014	8:40 AM	1792	210	
576	11/11/2014	9:00 AM	2520	1150	
720	11/11/2014	9:20 AM	2617	1375	HARD FRAC
864	11/11/2014	9:40 AM	2670	1425	
1008	11/11/2014	10:00 AM	2740	1475	
1152	11/11/2014	10:20 AM	2779	1525	
10 MIN FALLOFF	11/11/2014	10:30 AM	2155	850	
20 MIN FALLOFF	11/11/2014	10:40 AM	2023	725	
Company: LEGACY RESERVES			Recorded By: T. STANCZAK		
Well: DRICKEY QUEEN SAND UNIT # 27			Witnessed By: D. ROSA		
Field: CAPROCK			Truck Number: 104		
County: CHAVES			District: LEVELLAND		
State: NEW MEXICO			Tool Number:		
Injection: WATER			Test Type: STEP RATE TESTS		
Shut In Time: 10:20 AM			HARD FRAC @ 720 B/D		
Total Shut In Time: 20 MIN.			1350 SURFACE PRESSURE		
Tubing Size: 2 3/8			2628 BOTTOM HOLE PRESSURE		
Open Hole: 3042'-3072'					
Perforations: N/A					
Plug Back Depth: N/A					

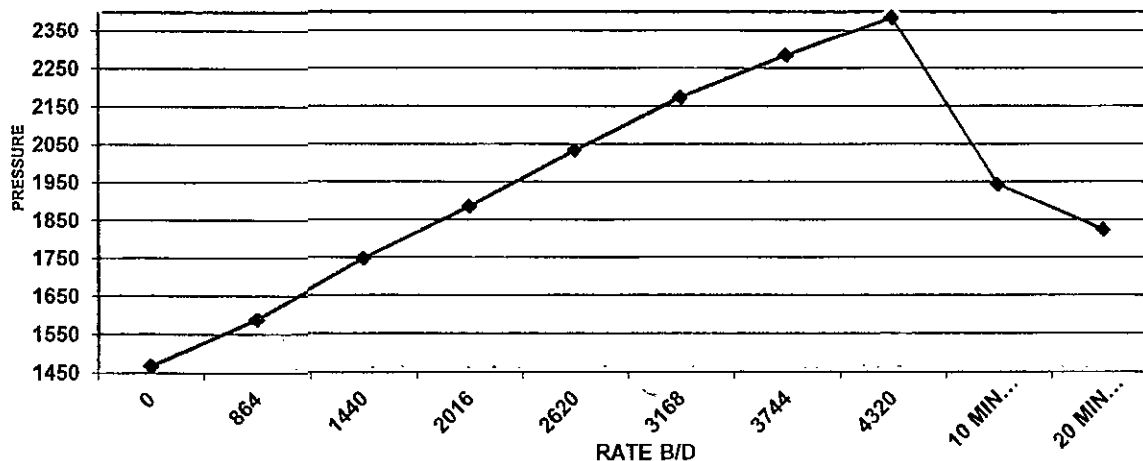


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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/14/2014	8:20 AM	1466	0	
864	11/14/2014	8:40 AM	1588	90	
1440	11/14/2014	9:00 AM	1747	325	
2016	11/14/2014	9:20 AM	1885	525	
2620	11/14/2014	9:40 AM	2034	790	
3168	11/14/2014	10:00 AM	2174	1025	
3744	11/14/2014	10:20 AM	2284	1250	SOFT FRAC
4320	11/14/2014	10:40 AM	2385	1475	
10 MIN FALL OFF	11/14/2014	10:50 AM	1943	450	
20 MIN FALL OFF	11/14/2014	11:00 AM	1824	325	
Company:	LEGACY RESERVES			Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 8			Witnessed By:	D. ROSA
Field:	CAPROCK			Truck Number:	104
County:	CHAVES			District:	LEVELLAND
State:	NEW MEXICO			Tool Number:	
Injection:	WATER			Test Type:	STEP RATE TESTS
Shut In Time:	10:40 AM			SOFT FRAC @ 3774 B/D 1250 SURFACE PRESSURE 2284 BOTTOM HOLE PRESSURE	
Total Shut In Time:	20 MIN.				
Tubing Size:	2 3/8				
Open Hole:	2928'-2946'				
Perforations:	N/A				
Plug Back Depth	N/A				

RATE VS. PRESSURE

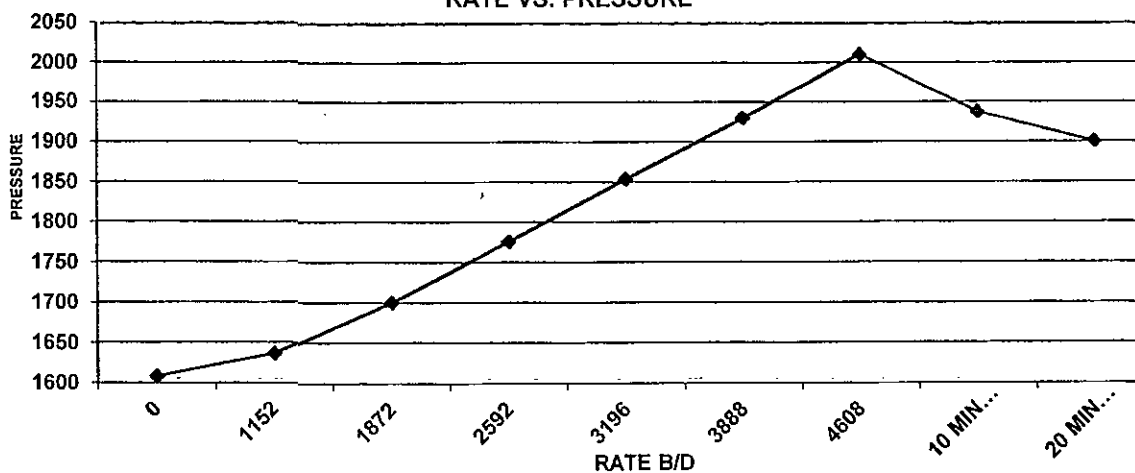


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STEP RATE TEST

RATE B/D	Date	Time	BH PRESS	SURF. PRESS	Comments
0	11/14/2014	1:20 PM	1608	50	
1152	11/14/2014	1:40 PM	1636	100	
1872	11/14/2014	2:00 PM	1700	260	
2592	11/14/2014	2:20 PM	1776	475	
3196	11/14/2014	2:40 PM	1854	650	
3888	11/14/2014	3:00 PM	1930	900	
4608	11/14/2014	3:20 PM	2011	1125	
10 MIN FALL OFF	11/14/2014	3:30 PM	1938	375	
20 MIN FALL OFF	11/14/2014	3:40 PM	1901	340	
Company:	LEGACY RESERVES			Recorded By:	T. STANCZAK
Well:	DRICKEY QUEEN SAND UNIT # 9			Witnessed By:	D. ROSA
Field:	CAPROCK			Truck Number:	104
County:	CHAVES			District:	LEVELLAND
State:	NEW MEXICO			Tool Number:	
Injection:	WATER			Test Type:	STEP RATE TESTS
Shut In Time:	3:20 PM			NO FRAC WAS ACHIEVED	
Total Shut In Time:	20 MIN.				
Tubing Size:	2 3/8				
Open Hole:	N/A				
Perforations:	3045'-3060'				
Plug Back Depth	N/A				

RATE VS. PRESSURE



**Rock Queen Unit
Step-Rate Tests Summary**

Well No.	Rate (BWPD)	Surface Pressure (psig)	Bottom Hole Pressure (psig)	Tool Depth (ft)	Fracture Gradient (psi/ft @ tool)	Date of test (mm/dd/yy)
RQU #6	3,200	450	1,435	3,050	No Fracture	08/18/08
RQU #42	4,000	1,700	2,500	2,900	No Fracture	03/29/08
RQU #44	1,530	1,720	3,000	3,030	0.990	04/02/08
RQU #48	2,000	810	1,936	2,900	No Fracture	08/20/08
RQU #62	440	1,055	2,395	3,040	0.788	04/01/08
RQU #64	2,800	900	1,918	2,900	No Fracture	08/19/08
RQU #66	400	1,140	2,474	3,050	0.811	03/29/08
RQU #70	2,800	1,530	2,574	3,040	0.847	04/01/08
RQU #85	4,200	1,020	1,932	3,040	No Fracture	08/24/08
RQU #87	400	1,145	2,382	2,900	0.821	08/25/08

Propose a unit-wide wellhead injection pressure of 1050 psig—corrected for the density of injected fluid.

Correction for produced water injection based on a SG = 1.2, gradient = 0.52 psi/ft at 3000 feet:

Corrected WHP = 1050 psig - 3000 ft (0.52-0.433) psi/ft = 789 psi, ignoring any friction pressure.

Recommend a maximum wellhead injection pressure of 800 psi on produced water.

Calculated BHP = 3000 ft (0.52 psi/ft) + 800 psi = 2360 psi

Correction for carbon dioxide:

Working equation: BHP = WHP + Fluid Gradient X Depth

WHP and fluid gradient are unknowns; gradient changes with pressure (depth)

Solution is to assume a WHP, calculate an average CO2 density, then calculate a BHP

CO2 densities calculated at a temperature of 70 degrees F.

At a BHP of 2360 psia, density of CO2 is 56.66 lbm/ft3

WHP(psia)	CO2 Density (lbm/ft3)	Average CO2 Density(lbm/ft3)	Calculated Gradient(psi/ft)	Calculated BHP(psia)
900	48.29	52.48	0.364	1992
1000	49.55	53.11	0.368	2104
1100	50.53	53.60	0.372	2216
1200	51.34	54.00	0.375	2325
1300	52.04	54.35	0.377	2431

Limit WHP to 1200 psi on CO2 injection.

CO2 density from NIST;

Gradient = CO2 density/62.43 X 0.433 psi/ft

Oil Conservation Division

Case No. 14505

Exhibit No. 33