IPI-387

DATE IN 12.21.10	SUSPENSE	ENGINEER TW	LOGGED IN 12.21.10	TYPE IPI	APP NO 1035544307

PTGW

ABOVE THIS LINE FOR DIVISION USE ONLY

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

WGR Asset Holding
273264

Pat Finder AGI #002

ADMINISTRATIVE APPLICATION CHECKLIST 30-045-35178

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 _____

[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

[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.

David Lescinsky, Ph.D., C.P.G.	David Lescinsky	Consultant to WGR	12/21/2010
Print or Type Name	Signature	Title	Date

dtl@geolex.com
e-mail Address

GEOLEX®
INCORPORATED

December 16, 2010

Alberto A. Gutiérrez, C.P.G.

Mr. Mark E. Fesmire
Oil Conservation Division
New Mexico Department of Energy,
Minerals and Natural Resources
1220 South Saint Francis Drive
Santa Fe, New Mexico 87505

VIA EMAIL AND FIRST CLASS MAIL

Re: Request to Increase Maximum Allowable Operating Pressure (MAOP) to 2,160 psi for Anadarko Pathfinder AGI #1 (API # 30-045-35172).

Dear Mr. Fesmire:

Anadarko Petroleum Corporation ("Anadarko") requests a modification of Order No. R-13201 which was issued in Case No. 14329 granting Anadarko's application to inject acid gas into the Entrada Formation through its Pathfinder AGI Well No. 1 (Pathfinder AGI #1 – API # 30-045-35172) located in Section 1, Township 29 North, Range 15 West, NMPM, San Juan County, New Mexico. Ordering Paragraph 13 of Order No. R-13201 allows the Division Director to administratively authorize an increase of the maximum allowable operating pressure (MAOP) following a valid step-rate test. Anadarko requests an increase in the MAOP for the Pathfinder AGI #1 from 1,985 psig to 2,160 psig based on the results of the OCD-witnessed step-rate test (SRT) conducted on November 16, 2010 described below.

An SRT was conducted to determine whether the Entrada injection zone was suitable for injection of treated acid gas (TAG) at pressures greater than 1,985 psig. Due to the density difference between compressed TAG and saltwater (approximately 12 lb/ft^3), greater pressures are required during injection; the saltwater pressure equivalent of 1,985 psig TAG is approximately 1,452 psig. Salty Dog #5 (API # 30-045-32900), an SWD well injecting into the Entrada Formation five miles away from Pathfinder AGI #1, was granted a pressure increase by OCD of its MAOP to 2,000 psig (roughly equivalent to 2,533 psig TAG) in 2005 based on the results of an OCD-witnessed SRT with results very similar to ours.

NMOCD-REQUIRED STEP-RATE TEST – DESCRIPTION OF METHOD

The step rate test for the Pathfinder AGI #1 was conducted on November 16, 2010 and witnessed by Monica Kuehling of the NM Oil Conservation Division. The test was performed following completion of the well, injecting KCl water through the corrosion-resistant 2 7/8" production tubing and the packer set at 6,287 feet. The 5 ½" production casing is perforated in the Entrada Formation from 6,352 to 6,490 feet. Injection rates during the SRT ranged from 1.0 to 5.0 bpm, with 0.5 bpm steps, each lasting 20 minutes. The surface injection pressure and bottom hole pressures down the tubing were recorded, the latter by Tefteller bottom hole gauges set in the middle of the injection interval at 6,425 feet. A maximum bottom hole pressure of 4,274 psig was recorded during the SRT at an injection rate of 5.0 bpm (Figure 1). Since the SRT was performed following completion of the well, it was not necessary to correct the results for

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changes in tubing diameter or packer placement. The data are included in Attachment 1 and a summary graph is included as Figure 1.

INTERPRETATION OF STEP-RATE TEST

A notable increase in injectivity was observed during the SRT at about 4,150 psi bottom hole pressure. The observed reservoir behavior is consistent with injection into friable, well-sorted, and high-porosity sandstone like the Entrada Formation exhibits at this location. At the scale of the core samples, the Entrada consists of friable, well-sorted sands with measured porosities of up to 22% and permeabilities of up to 1,000 millidarcies (Attachment 2). An examination of thin sections taken from the core reveals coarse sandstone exhibiting high porosity and permeability interbedded with thin layers of fine, well sorted fine sandstone exhibiting lower porosity and permeability (Attachment 2). Given the near-shore beach dune depositional environment, the sands are cross-bedded and laminated. Fluid migrates easily through the coarse sand layers, but is inhibited by truncations associated with the cross-bedding, resulting in temporary pressure buildups until these barriers are overcome. When sufficient pressure has accumulated, the resistance to flow in the friable, fine-grained sands from the lower permeability cross-cutting layers is overcome allowing flow into adjacent packages of coarse, high permeability sand.

As additional cross-bedded packages of coarse sand are accessed, the Entrada becomes capable of accepting large volumes of fluid without a significant pressure increase. This interpretation is supported by the relatively flat bottom hole pressure and surface pressure corrected for friction curves (Figure 1). The very large matrix leak-off of the Entrada Formation is consistent with the interpretations of the Salty Dog #5 SRT by Lance Oil & Gas Company in their January 25, 2006 letter to NMOCD (Attachment 3).

CALCULATION OF ENTRADA FORMATION PARTING PRESSURE

Parting pressures (P_P) are estimated using the equation: $P_P = P_{RES} + (v/(1-v)) * (P_{OB} - P_{RES})$, where P_{RES} is the reservoir pressure, P_{OB} is the overburden pressure, and v is the Poisson's ratio for the reservoir rock. At the Pathfinder AGI #1, the reservoir pressure was determined to be 3,121 psig during a November 5, 2010 injection test and the overburden pressure was calculated to be 6,408 psig at the test gauge depth. The Poisson's ratio for the Entrada sandstone is estimated to be 0.3; values of 0.3 to 0.33 are typical for the friable, unconsolidated sandstone that characterized the core samples which we collected in the Entrada during the drilling of the well. Using these values and the equation described above, we calculate the parting pressure for the Entrada injection zone to be 4,530 psig, more than 250 psi above the maximum recorded bottom hole pressure of 4,274 psig. This is also consistent with the results of the 2005 test of the Salty Dog #5 where the parting pressure of the formation was not reached during the test.

ANALYSIS OF RESULTS, CONCLUSIONS AND SUMMARY OF ANADARKO'S REQUEST

The high porosity and permeability coarse sand layers of the Entrada are truncated by cross-beds, which temporarily inhibit fluid flow across these boundaries. At about 4,150 psig, well below the parting pressure of the formation, these inhibitions are overcome and the Entrada becomes capable of accepting large volumes of fluid without a significant pressure increase.

The maximum recorded surface injection pressure during the SRT was 2,377 psig, the equivalent of 2,910 psig for Anadarko's compressed TAG. Since the SRT was performed following completion of the well, it was not necessary to correct for changes in tubing diameter or packer placement. Anadarko hereby requests that OCD amend this order administratively, pursuant to paragraph 13 of the order to increase in the MAOP for compressed TAG from 1,985 psig (currently included in Order R-13201) to 2,160 psig, the current pressure limitation of the AGI surface equipment. The saltwater equivalent pressure of 2,160 psig compressed TAG, 1,627 psig, is considerably less than the maximum injection pressure measured (2,377 psig) and the MAOP at Salty Dog #5 (2,000 psig). This pressure is also well below the parting pressure of the formation. If you have any questions regarding this request, please contact me or Alberto Gutierrez of our office at 505-842-8000.

Sincerely,

Geolex, Inc.

David Lescinsky CPG# 11,370
Amer. Inst. Prof. Geologists

Dr. David Lescinsky, CPG

cc: Kent McEvers – WGR Asset Holding Company, LLC
Linda Kuhn, Esq. – Anadarko Petroleum Corporation
Vic Estes – Anadarko Petroleum Corporation
Tom Berkman – Anadarko Petroleum Corporation
Alberto Gutiérrez, RG – Geolex, Inc.
Richard Ezeanyim – NM Oil Conservation Division, Santa Fe
Charlie Perrin – NM Oil Conservation Division, Aztec

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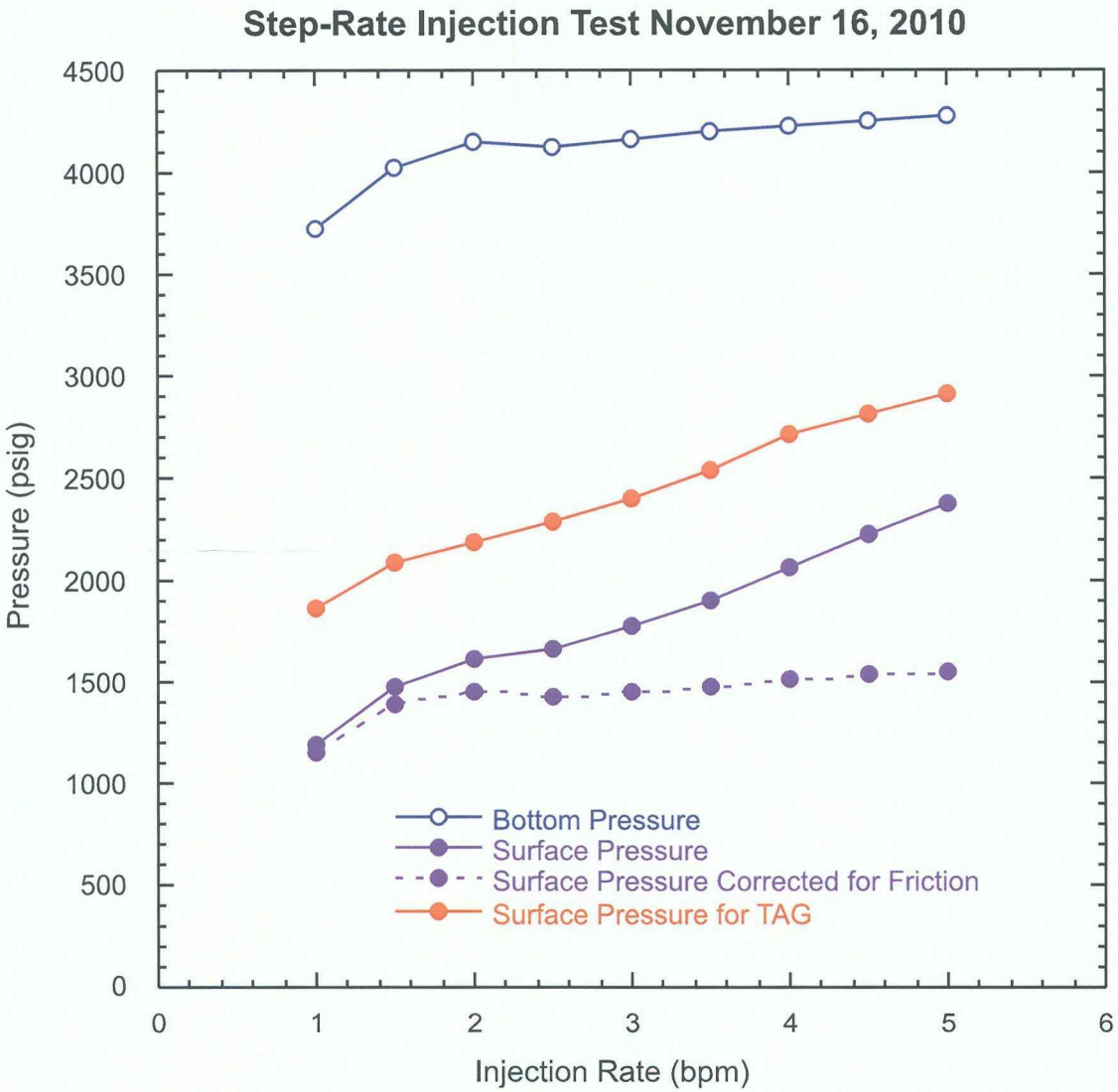


Figure 1: Results for the November 16, 2010 Step-Rate Test of the Pathfinder AGI #1. Hollow symbols correspond to bottom pressures and solid symbols correspond to surface injection pressures. The surface pressures have been corrected to remove friction (dashed line) and corrected to simulate TAG injection (red).

Attachment 1

Results of November 16, 2010 Step-Rate Test,

Pathfinder AGI #1

STIMULATION TREATMENT REPORT

Date 16-NOV-10 District Farmington F.Receipt 1001719635 Customer Anadarko Petroleum Corp (Comp
Lease PATHFINDER AGI #1 Well Name PATHFINDER AGI #1
Field SWD Location 1-29N-15W
County San Juan State New Mexico Stage No 1 Well API - API 30045351720000

WELL DATA Well Type: NEW Well Class: DISPOSAL Depth TD/PB: 6490 Formation:

Geometry Type	Tubular Type	OD	Weight	ID	Grade	Top	Bottom
TUBULAR	TBG	2.875	6.5	2.441	L-80	0	6287
TUBULAR	CSG	5.5	17	4.892	L-80	0	6620
COMPLETION						6352	6490

Perf Intervals

Top	Bottom	SPF	Diameter
6352	6490	3	.34

Packer Type Packer Depth FT

TREATMENT DATA

Fluid Type	Fluid Desc	Pumped Volume(Gals)
TREATMENT FLUID	2%KCl	229,194

Prop. Description: NO PROPPANT Volume Pumped(Lbs):

Total Prop Qty:

Previous Treatment N/A Previous Production N/A
Hole Loaded With 2%KCl Treat Via: Tubing [X] Casing [ ] Anul. [ ] Tubing & Anul. [ ]
Ball Sealers: In Stages Type
Auxiliary Materials

LIQUID PUMPED AND CAPACITIES IN BBLS.

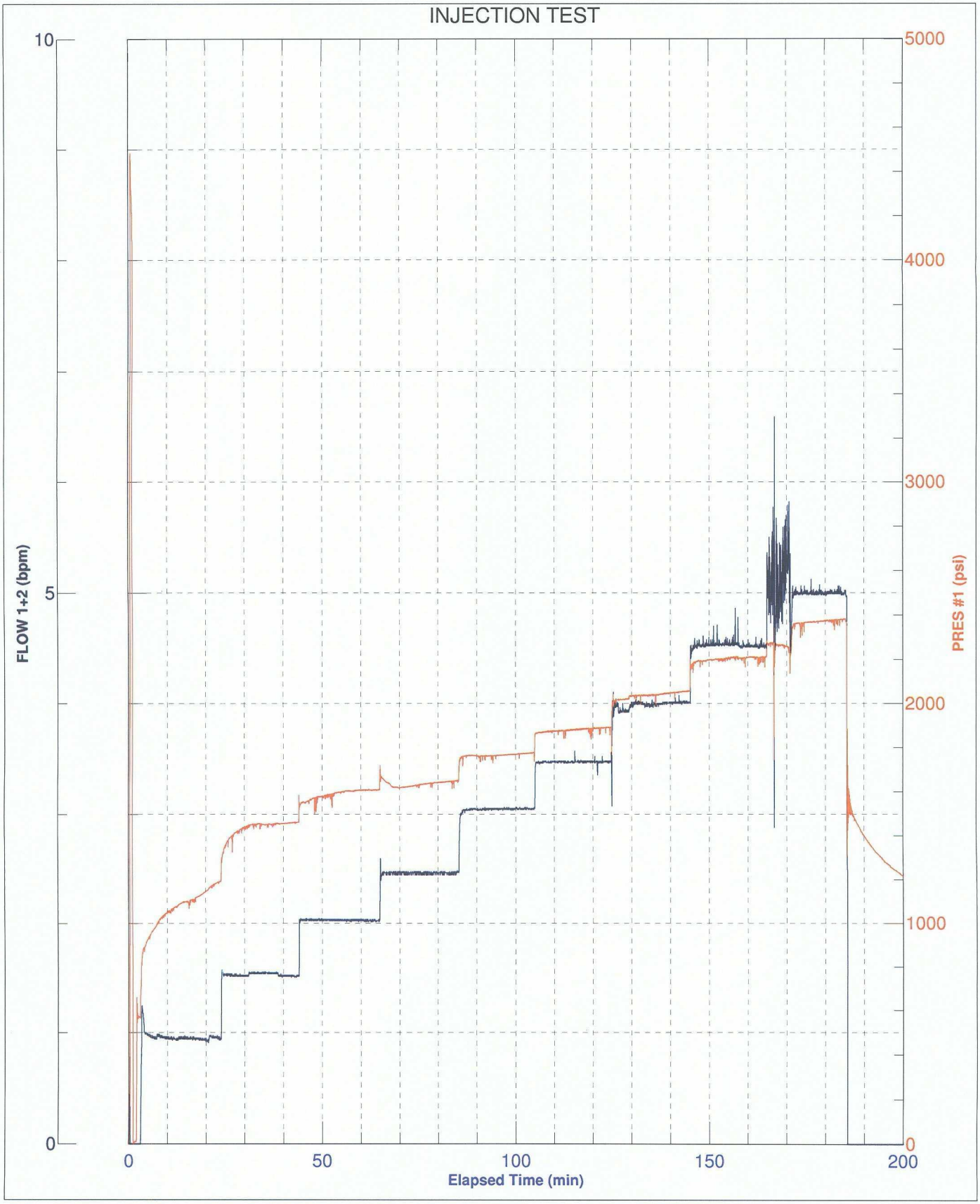
Tubing Cap.	0
Casing Cap.	153.8
Annular Cap.	0
Open Hole Cap.	0
Fluid to Load	0
Pad Volume	0
Treating Fluid	545.7
Flush	0
Overflush	0
Fluid to Recover	545.7

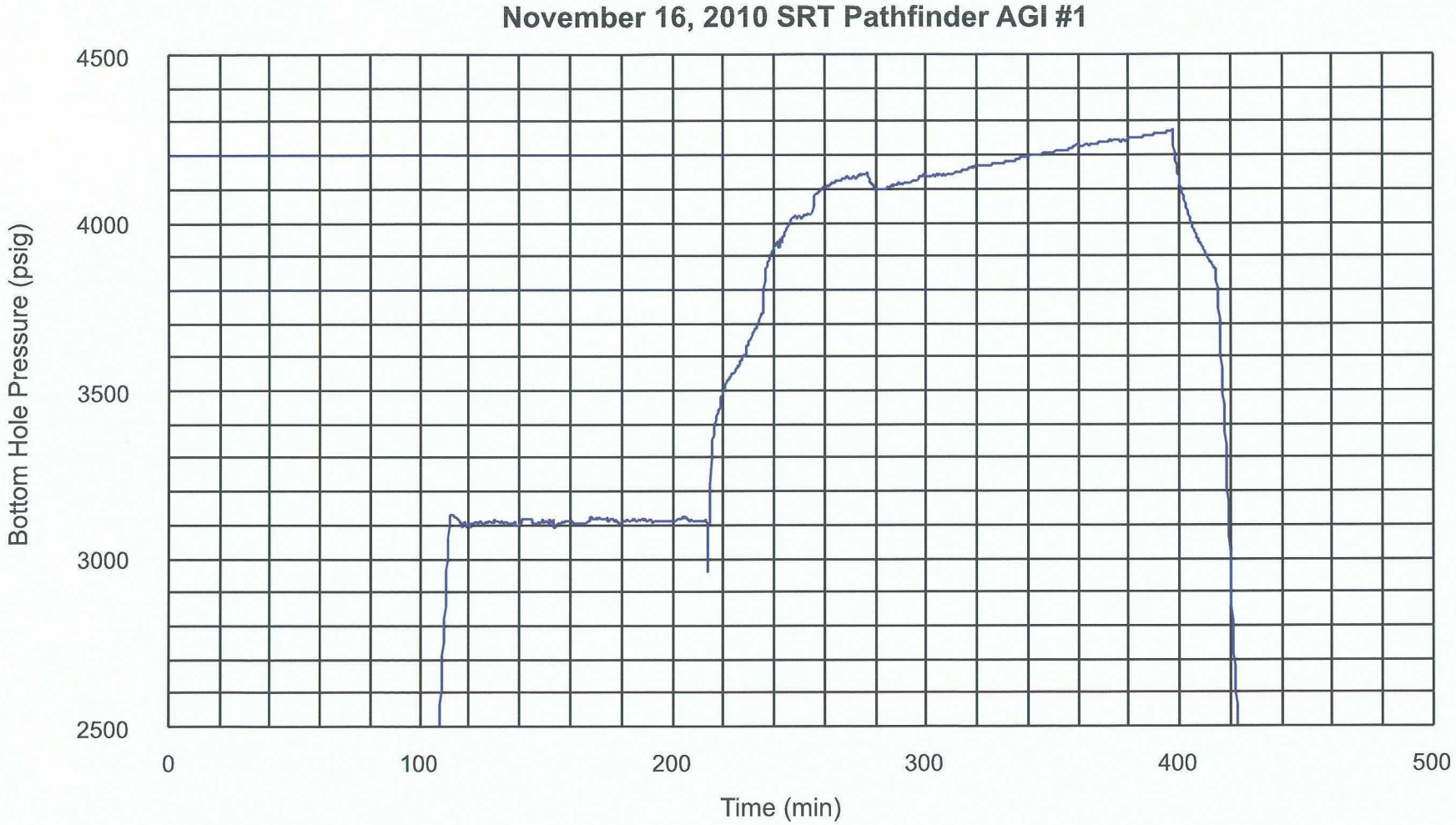
PROCEDURE SUMMARY

Time AM/PM	Treating Pressure-Psi		Surface Slurry BBLS. Pumped		Slurry Rate BPM	Comments
	STP	Annulus	Stage	Total		
12:30						Safteymeeting
12:40	4658					Press.Test Line
12:43	863		0	20.4	1	Open W/H St. 1 bpm
13:04	1332		30	20.4	1.5	St. 1.5 bpm
13:24	1554		44.4	50.4	2	St. 2.bpm
13:46	1650		49.5	94.4	2.5	St. 2.5 bpm
14:06	1755		59.9	143.9	3	St. 3 bpm
14:26	1866		68.7	203.8	3.5	St. 3.5 bpm
14:46	2006		80.2	272.5	4	St. 4 bpm
15:06	2178		90.2	352.7	4.5	St. 4.5 bpm
15:26	2275		102.8	442.9	5	St. 5 bpm
15:46	2376			545.7		Shutdown

Treating Pressure		Injection Rates		Shut In Pressures		Customer Rep.	Mr. Russell E. Bentle
Minimum	922	Treating Fluid	3	ISDP	1567	BJ Rep.	MARIO O PEREZ, JR
Maximum	2383	Flush	5	5 Min.	1384	Job Number	1001719635
Average	1727	Average	3	10 Min.	1278	Rec. ID No.	
Operators Max. Pressure				15 Min.	1211	Distribution	
3500				Final 1211 In 15 Min.			
				Flush Dens. lb./gal.	8.43		

BJ Services JobMaster Program Version 3.50
Job Number: 1001719635
Customer: Anadarko
Well Name: PathfinderAgi #1




November 16, 2010 SRT Pathfinder AGI #1
Bottom Hole Pressure (psig)
4500
4000
3500
3000
2500
0
100
200
300
400
500
Time (min)

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
0.00	0.010	50.935	19.75	0.010	50.732	36.00	0.010	52.738	80.00	0.010	60.772
2.25	0.010	50.935	20.00	0.010	50.756	37.00	0.010	52.876	81.00	0.010	60.897
2.50	0.010	50.876	20.25	0.010	50.780	38.00	0.010	53.033	82.00	0.010	61.046
2.75	0.010	50.816	20.50	0.010	50.804	39.00	0.010	53.183	83.00	0.010	61.170
3.00	0.010	50.756	20.75	0.010	50.828	40.00	0.010	53.334	84.00	0.010	61.295
3.25	0.010	50.697	21.00	0.010	50.852	41.00	0.010	53.485	85.00	0.010	61.419
3.50	0.010	50.637	21.25	0.010	50.882	42.00	0.010	53.594	86.00	0.010	61.594
3.75	0.010	50.584	21.50	0.010	50.905	43.00	0.010	53.811	87.00	0.010	61.757
4.00	0.010	50.524	21.75	0.010	50.929	44.00	0.010	53.974	88.00	264.419	62.086
4.25	0.010	50.464	22.00	0.010	50.953	45.00	0.010	54.137	88.25	263.765	62.130
4.50	0.010	50.405	22.25	0.010	50.983	46.00	0.010	54.301	88.50	263.509	62.155
4.75	0.010	50.345	22.50	0.010	51.007	47.00	0.010	54.482	88.75	480.694	62.174
5.00	0.010	50.286	22.75	0.010	51.031	48.00	0.010	54.664	89.00	480.428	62.199
5.25	0.010	50.244	23.00	0.010	51.055	49.00	0.010	54.786	89.25	480.436	62.217
5.50	0.010	50.227	23.25	0.010	51.084	50.00	0.010	55.022	89.50	481.418	62.242
5.75	0.010	50.209	23.50	0.010	51.114	51.00	0.010	55.223	89.75	481.621	62.261
6.00	0.010	50.185	23.75	0.010	51.144	52.00	0.010	55.417	90.00	481.813	62.286
6.25	0.010	50.167	24.00	0.010	51.164	53.00	0.010	55.618	90.25	481.978	62.305
6.50	0.010	50.149	24.25	0.010	51.198	54.00	0.010	55.813	90.50	482.819	62.330
6.75	0.010	50.126	24.50	0.010	51.228	55.00	0.010	56.039	90.75	483.038	62.349
7.00	0.010	50.108	24.75	0.010	51.258	56.00	0.010	56.258	91.00	483.053	62.374
7.25	0.010	50.090	25.00	0.010	51.287	57.00	0.010	56.410	91.25	483.081	62.374
7.50	0.010	50.074	25.25	0.010	51.311	58.00	0.010	56.642	91.50	483.105	62.403
7.75	0.010	50.048	25.50	0.010	51.341	59.00	0.010	56.937	91.75	490.019	62.461
8.00	0.010	50.036	25.75	0.010	51.361	60.00	0.010	57.163	92.00	507.256	62.505
9.00	0.010	50.019	26.00	0.010	51.401	61.00	0.010	57.390	92.25	530.414	62.549
10.00	0.010	50.046	26.25	0.010	51.425	62.00	0.010	57.617	92.50	557.062	62.592
11.00	0.010	50.102	26.50	0.010	51.467	63.00	0.010	57.826	92.75	588.287	62.636
12.00	0.010	50.143	26.75	0.010	51.487	64.00	0.010	58.035	93.00	616.816	62.680
13.00	0.010	50.203	27.00	0.010	51.511	65.00	0.010	58.244	93.25	647.766	62.724
14.00	0.010	50.268	27.25	0.010	51.562	66.00	0.010	58.441	93.50	679.259	62.767
15.00	0.010	50.312	27.50	0.010	51.598	67.00	0.010	58.632	93.75	709.401	62.811
16.00	0.010	50.379	27.75	0.010	51.618	68.00	0.010	58.817	94.00	736.859	62.855
17.00	0.010	50.482	28.00	0.010	51.642	69.00	0.010	59.008	94.25	765.216	63.068
17.25	0.010	50.500	28.25	0.010	51.674	70.00	0.010	59.187	94.50	793.447	63.526
17.50	0.010	50.524	28.50	0.010	51.730	71.00	0.010	59.354	94.75	822.206	63.984
17.75	0.010	50.540	28.75	0.010	51.750	72.00	0.010	59.466	95.00	850.972	64.449
18.00	0.010	50.572	29.00	0.010	51.770	73.00	0.010	59.688	95.25	881.072	64.909
18.25	0.010	50.595	30.00	0.010	51.922	74.00	0.010	59.842	95.50	911.168	65.369
18.50	0.010	50.619	31.00	0.010	52.053	75.00	0.010	60.010	95.75	944.221	65.837
18.75	0.010	50.637	32.00	0.010	52.185	76.00	0.010	60.183	96.00	975.921	66.299
19.00	0.010	50.661	33.00	0.010	52.317	77.00	0.010	60.350	96.25	1007.078	66.761
19.25	0.010	50.685	34.00	0.010	52.461	78.00	0.010	60.518	96.50	1040.117	67.231
19.50	0.010	50.709	35.00	0.010	52.600	79.00	0.010	60.642	96.75	1072.071	67.695

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
97.00	1102.682	68.160	108.00	2563.571	118.861	119.00	3099.143	153.358	131.50	3113.846	153.437
97.25	1134.489	68.868	108.25	2605.989	120.325	119.25	3107.868	153.372	131.75	3114.499	153.437
97.50	1167.705	69.718	108.50	2641.200	121.784	119.50	3106.890	153.387	132.00	3108.403	153.444
97.75	1198.759	70.564	108.75	2674.528	123.252	119.75	3103.111	153.394	132.25	3108.123	153.437
98.00	1233.031	71.412	109.00	2711.288	124.715	120.00	3096.767	153.408	132.50	3112.104	153.437
98.25	1267.026	72.262	109.25	2747.528	126.336	120.25	3093.860	153.423	132.75	3111.544	153.437
98.50	1298.865	73.114	109.50	2783.993	127.903	120.50	3104.965	153.430	133.00	3105.230	153.437
98.75	1334.457	73.969	109.75	2820.170	129.479	120.75	3104.126	153.444	133.25	3104.670	153.437
99.00	1369.502	74.825	110.00	2856.054	131.057	121.00	3108.140	153.459	133.50	3107.345	153.437
99.25	1406.411	75.684	110.25	2894.831	132.630	121.25	3105.760	153.452	133.75	3106.646	153.437
99.50	1439.290	76.544	110.50	2929.334	134.213	121.50	3106.740	153.459	134.00	3110.253	153.437
99.75	1474.847	77.406	110.75	2965.140	135.798	121.75	3106.746	153.459	134.25	3109.554	153.437
100.00	1511.734	78.277	111.00	2998.265	137.384	122.00	3103.646	153.459	134.50	3106.288	153.437
100.25	1548.388	79.255	111.25	3031.101	138.965	122.25	3110.520	153.459	134.75	3108.932	153.437
100.50	1585.382	80.400	111.50	3063.911	140.555	122.50	3111.359	153.459	135.00	3107.858	153.437
100.75	1621.289	81.548	111.75	3099.080	142.147	122.75	3106.289	153.459	136.00	3107.562	153.430
101.00	1656.642	82.693	112.00	3127.333	143.734	123.00	3111.577	153.459	137.00	3107.064	153.423
101.25	1692.793	83.847	112.25	3131.968	145.020	123.25	3105.232	153.459	138.00	3111.309	153.423
101.50	1725.444	85.005	112.50	3131.704	145.646	123.50	3105.963	153.459	138.25	3108.402	153.430
101.75	1760.764	86.158	112.75	3131.547	146.271	123.75	3106.305	153.459	138.50	3099.677	153.430
102.00	1794.731	87.322	113.00	3130.938	146.897	124.00	3113.428	153.466	138.75	3099.397	153.430
102.25	1824.941	88.488	113.25	3129.954	147.524	124.25	3111.048	153.459	139.00	3101.528	153.430
102.50	1854.331	89.650	113.50	3129.749	148.150	124.50	3112.027	153.452	139.25	3100.828	153.430
102.75	1886.121	90.822	113.75	3122.273	148.784	124.75	3113.318	153.452	139.50	3101.357	153.430
103.00	1912.819	91.996	114.00	3121.491	149.411	125.00	3108.139	153.452	139.75	3101.652	153.430
103.25	1941.661	93.220	114.25	3121.782	150.038	125.25	3107.735	153.452	140.00	3107.609	153.430
103.50	1971.316	94.495	114.50	3126.942	150.665	125.50	3107.714	153.452	140.25	3103.114	153.430
103.75	2000.686	95.773	114.75	3121.706	151.293	125.75	3104.438	153.452	140.50	3102.974	153.430
104.00	2032.450	97.054	115.00	3116.470	151.921	126.00	3107.611	153.452	140.75	3116.598	153.430
104.25	2068.210	98.337	115.25	3117.020	152.159	126.25	3107.470	153.452	141.00	3117.002	153.430
104.50	2098.873	99.623	115.50	3117.310	152.267	126.50	3112.898	153.452	141.25	3117.018	153.430
104.75	2124.184	100.906	115.75	3117.007	152.368	126.75	3106.817	153.452	141.50	3117.044	153.430
105.00	2149.749	102.197	116.00	3111.229	152.469	127.00	3111.311	153.444	141.75	3117.060	153.430
105.25	2181.974	103.492	116.25	3107.272	152.578	128.00	3111.311	153.444	142.00	3117.087	153.430
105.50	2208.581	104.788	116.50	3107.421	152.679	129.00	3107.081	153.437	142.25	3117.122	153.430
105.75	2244.511	106.088	116.75	3103.323	152.780	129.25	3110.253	153.430	142.50	3117.162	153.430
106.00	2271.621	107.389	117.00	3093.549	152.881	129.50	3104.437	153.437	142.75	3118.231	153.430
106.25	2312.322	108.714	117.25	3107.572	152.989	129.75	3115.277	153.437	143.00	3118.557	153.430
106.50	2338.643	110.153	117.50	3103.878	153.090	130.00	3117.656	153.437	143.25	3117.702	153.430
106.75	2380.141	111.601	117.75	3104.292	153.192	130.25	3112.368	153.437	143.50	3117.710	153.430
107.00	2416.286	113.045	118.00	3104.314	153.300	130.50	3113.348	153.437	143.75	3117.734	153.430
107.25	2448.680	114.499	118.25	3108.921	153.322	130.75	3114.639	153.437	144.00	3117.760	153.430
107.50	2494.367	115.948	118.50	3098.612	153.336	131.00	3114.631	153.437	144.25	3117.779	153.430
107.75	2526.985	117.407	118.75	3093.061	153.350	131.25	3113.099	153.437	144.50	3117.805	153.430

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
144.75	3117.832	153.430	155.75	3105.913	153.415	166.75	3109.006	153.401	177.75	3117.776	153.379
145.00	3117.857	153.430	156.00	3107.420	153.408	167.00	3109.255	153.401	178.00	3114.743	153.379
145.25	3107.609	153.430	156.25	3107.888	153.415	167.25	3109.737	153.401	178.25	3114.043	153.379
145.50	3107.889	153.430	156.50	3109.288	153.415	167.50	3110.825	153.401	178.50	3112.301	153.379
145.75	3107.391	153.430	156.75	3109.583	153.415	167.75	3121.619	153.401	178.75	3108.662	153.379
146.00	3107.381	153.430	157.00	3110.298	153.415	168.00	3124.262	153.394	179.00	3108.652	153.379
146.25	3107.377	153.430	157.25	3108.666	153.415	168.25	3124.275	153.401	179.25	3108.625	153.379
146.50	3107.385	153.430	157.50	3109.210	153.415	168.50	3124.270	153.394	179.50	3108.258	153.379
146.75	3107.375	153.430	157.75	3109.218	153.415	168.75	3117.123	153.394	179.75	3108.600	153.379
147.00	3106.925	153.430	158.00	3109.229	153.415	169.00	3118.741	153.394	180.00	3109.346	153.372
147.25	3111.309	153.423	158.25	3109.225	153.415	169.25	3118.990	153.394	180.25	3110.730	153.379
147.50	3112.429	153.423	158.50	3109.210	153.415	169.50	3119.238	153.394	180.50	3111.042	153.379
147.75	3107.608	153.423	158.75	3111.838	153.415	169.75	3119.938	153.394	180.75	3112.192	153.379
148.00	3106.908	153.423	159.00	3111.434	153.415	170.00	3121.509	153.394	181.00	3112.210	153.379
148.25	3105.415	153.423	159.25	3111.413	153.408	170.25	3121.742	153.394	181.25	3112.236	153.379
148.50	3105.089	153.423	159.50	3110.826	153.408	170.50	3121.198	153.394	181.50	3112.783	153.379
148.75	3115.275	153.415	159.75	3110.839	153.408	170.75	3120.405	153.394	181.75	3117.123	153.379
149.00	3115.275	153.415	160.00	3110.868	153.408	171.00	3121.182	153.387	182.00	3118.335	153.379
149.25	3108.137	153.415	160.25	3110.882	153.408	171.25	3121.478	153.394	182.25	3118.709	153.379
149.50	3113.424	153.415	160.50	3109.815	153.408	171.50	3120.234	153.394	182.50	3113.421	153.379
149.75	3113.844	153.415	160.75	3105.492	153.408	171.75	3119.658	153.394	182.75	3113.408	153.379
150.00	3108.666	153.415	161.00	3105.959	153.408	172.00	3119.472	153.394	183.00	3113.413	153.379
150.25	3112.631	153.423	161.25	3106.161	153.408	172.25	3119.674	153.394	183.25	3113.203	153.379
150.50	3109.723	153.415	161.50	3105.554	153.408	172.50	3119.456	153.394	183.50	3113.214	153.372
150.75	3109.443	153.415	161.75	3105.352	153.408	172.75	3119.129	153.387	183.75	3110.248	153.372
151.00	3112.367	153.415	162.00	3105.331	153.408	173.00	3118.943	153.387	184.00	3117.386	153.372
151.25	3098.883	153.415	162.25	3105.088	153.408	173.25	3119.285	153.387	184.25	3117.386	153.372
151.50	3115.275	153.415	162.50	3103.984	153.408	173.50	3119.425	153.387	184.50	3115.007	153.372
151.75	3116.115	153.415	162.75	3103.673	153.408	173.75	3119.404	153.387	184.75	3117.386	153.372
152.00	3113.689	153.415	163.00	3103.686	153.408	174.00	3119.098	153.387	185.00	3117.386	153.372
152.25	3113.269	153.415	163.25	3103.937	153.408	174.25	3122.146	153.394	185.25	3111.305	153.372
152.50	3104.964	153.415	163.50	3107.343	153.408	174.50	3112.100	153.387	185.50	3111.445	153.372
152.75	3109.987	153.415	163.75	3106.503	153.408	174.75	3111.540	153.387	185.75	3111.429	153.372
153.00	3109.567	153.408	164.00	3106.524	153.408	175.00	3111.527	153.387	186.00	3112.424	153.365
153.25	3115.275	153.423	164.25	3106.954	153.408	175.25	3117.388	153.387	187.00	3119.236	153.365
153.50	3095.711	153.415	164.50	3107.561	153.408	175.50	3117.377	153.387	187.25	3114.213	153.365
153.75	3095.698	153.415	164.75	3107.566	153.408	175.75	3117.186	153.387	187.50	3117.650	153.365
154.00	3095.804	153.415	165.00	3108.042	153.408	176.00	3117.014	153.387	187.75	3117.370	153.365
154.25	3096.053	153.415	165.25	3107.452	153.408	176.25	3117.022	153.387	188.00	3119.765	153.365
154.50	3096.364	153.415	165.50	3107.264	153.401	176.50	3116.423	153.387	188.25	3118.474	153.365
154.75	3105.229	153.415	165.75	3107.078	153.401	176.75	3111.042	153.387	188.50	3118.194	153.365
155.00	3105.368	153.415	166.00	3107.777	153.401	177.00	3115.007	153.379	188.75	3113.948	153.365
155.25	3104.373	153.415	166.25	3107.788	153.401	177.25	3115.007	153.385	189.00	3117.914	153.365
155.50	3104.394	153.415	166.50	3108.757	153.401	177.50	3117.916	153.379	189.25	3117.774	153.365

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
189.50	3113.419	153.365	206.50	3111.753	153.329	217.50	3426.998	153.943	228.50	3603.092	163.380
189.75	3114.508	153.365	206.75	3113.604	153.329	217.75	3433.610	154.058	228.75	3600.189	163.365
190.00	3114.726	153.365	207.00	3115.593	153.322	218.00	3440.485	154.167	229.00	3617.871	163.351
190.25	3115.021	153.365	207.25	3114.210	153.329	218.25	3441.606	154.275	229.25	3631.330	163.336
190.50	3115.039	153.358	207.50	3117.383	153.329	218.50	3449.476	154.384	229.50	3635.553	163.322
190.75	3116.499	153.358	207.75	3112.095	153.329	218.75	3459.523	154.492	229.75	3638.457	163.314
191.00	3116.639	153.358	208.00	3113.215	153.329	219.00	3462.696	154.601	230.00	3644.263	163.300
191.25	3116.646	153.358	208.25	3113.075	153.329	219.25	3482.787	154.781	230.25	3649.541	163.285
191.50	3116.658	153.358	208.50	3112.608	153.329	219.50	3490.719	155.070	230.50	3654.029	163.271
191.75	3112.626	153.358	208.75	3111.069	153.329	219.75	3498.121	155.367	230.75	3655.364	163.256
192.00	3112.626	153.358	209.00	3110.789	153.329	220.00	3502.350	155.656	231.00	3655.893	163.242
192.25	3107.074	153.358	209.25	3113.681	153.329	220.25	3504.993	155.953	231.25	3668.548	163.184
192.50	3110.247	153.358	209.50	3110.773	153.329	220.50	3511.600	156.242	231.50	3671.982	163.104
192.75	3110.667	153.358	209.75	3109.886	153.329	220.75	3512.718	156.539	231.75	3675.153	163.031
193.00	3114.740	153.350	210.00	3109.731	153.329	221.00	3517.411	156.828	232.00	3681.227	162.951
194.00	3114.538	153.343	210.25	3113.153	153.329	221.25	3523.487	157.125	232.25	3681.371	162.879
195.00	3114.475	153.343	210.50	3112.452	153.322	221.50	3527.448	157.414	232.50	3678.860	162.799
196.00	3114.895	153.336	210.75	3111.270	153.322	221.75	3530.352	157.711	232.75	3682.294	162.726
197.00	3114.708	153.336	211.00	3113.680	153.322	222.00	3531.328	158.001	233.00	3682.294	162.667
198.00	3114.771	153.336	211.25	3113.680	153.322	222.25	3535.892	158.348	233.25	3700.514	162.574
199.00	3114.568	153.329	211.50	3111.037	153.322	222.50	3540.643	158.645	233.50	3699.680	162.494
200.00	3114.646	153.329	211.75	3111.907	153.322	222.75	3544.865	158.935	233.75	3706.857	162.422
201.00	3111.037	153.322	212.00	3112.234	153.322	223.00	3545.140	159.225	234.00	3709.501	162.342
201.25	3111.597	153.329	212.25	3109.715	153.322	223.25	3546.502	159.522	234.25	3712.937	162.262
201.50	3114.474	153.329	212.50	3115.002	153.322	223.50	3551.189	159.811	234.50	3723.237	162.168
201.75	3121.348	153.329	212.75	3114.862	153.322	223.75	3553.560	160.101	234.75	3720.866	162.074
202.00	3118.440	153.329	213.00	3115.297	153.314	224.00	3554.035	160.391	235.00	3728.000	161.972
202.25	3117.694	153.329	213.25	3108.921	153.322	224.25	3554.040	160.688	235.25	3728.284	161.878
202.50	3117.523	153.329	213.50	3108.082	153.322	224.50	3560.934	160.978	235.50	3731.178	161.783
202.75	3118.207	153.329	213.75	2957.958	153.329	224.75	3560.088	161.268	235.75	3743.063	161.682
203.00	3119.684	153.329	214.00	3093.060	153.336	225.00	3565.407	161.566	236.00	3800.620	161.588
203.25	3119.674	153.329	214.25	3100.198	153.336	225.25	3571.209	161.791	236.25	3822.803	161.493
203.50	3119.218	153.329	214.50	3102.842	153.343	225.50	3572.183	161.928	236.50	3834.163	161.392
203.75	3122.406	153.329	214.75	3110.775	153.350	225.75	3575.424	162.066	236.75	3848.426	161.297
204.00	3122.427	153.329	215.00	3210.978	153.358	226.00	3570.669	162.211	237.00	3862.163	161.203
204.25	3122.687	153.336	215.25	3299.284	153.358	226.25	3579.639	162.349	237.25	3870.360	161.058
204.50	3119.762	153.329	215.50	3338.942	153.365	226.50	3580.333	162.487	237.50	3879.352	160.877
204.75	3120.322	153.329	215.75	3350.840	153.372	226.75	3588.076	162.632	237.75	3881.744	160.696
205.00	3121.520	153.329	216.00	3367.761	153.372	227.00	3590.974	162.770	238.00	3890.209	160.514
205.25	3121.499	153.329	216.25	3377.016	153.401	227.25	3595.456	162.908	238.25	3900.260	160.333
205.50	3121.224	153.329	216.50	3389.446	153.509	227.50	3598.882	163.053	238.50	3903.972	160.152
205.75	3116.854	153.329	216.75	3401.346	153.618	227.75	3601.516	163.191	238.75	3909.799	159.964
206.00	3120.027	153.329	217.00	3411.924	153.726	228.00	3602.628	163.329	239.00	3912.191	159.782
206.25	3110.773	153.329	217.25	3412.626	153.834	228.25	3606.786	163.394	239.25	3915.112	159.601

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
239.50	3916.247	159.420	250.50	4012.161	146.394	261.50	4107.814	133.985	272.50	4134.086	116.159
239.75	3922.540	159.239	250.75	4019.057	146.221	261.75	4107.542	133.550	272.75	4137.387	115.815
240.00	3926.781	159.058	251.00	4018.866	146.056	262.00	4109.036	133.115	273.00	4140.061	115.465
240.25	3926.244	158.812	251.25	4018.858	145.883	262.25	4110.232	132.680	273.25	4137.407	115.157
240.50	3931.583	158.529	251.50	4019.514	145.717	262.50	4111.193	132.246	273.50	4138.121	114.863
240.75	3932.448	158.240	251.75	4019.532	145.545	262.75	4114.904	131.811	273.75	4139.884	114.576
241.00	3937.446	157.957	252.00	4020.364	145.380	263.00	4115.490	131.377	274.00	4141.319	114.289
241.25	3938.031	157.668	252.25	4021.668	145.221	263.25	4116.577	130.943	274.25	4141.313	113.996
241.50	3943.573	157.385	252.50	4024.704	145.027	263.50	4117.662	130.509	274.50	4138.514	113.709
241.75	3942.898	157.096	252.75	4023.907	144.826	263.75	4117.655	130.076	274.75	4141.454	113.423
242.00	3927.240	156.814	253.00	4023.889	144.625	264.00	4117.848	129.649	275.00	4144.926	113.136
242.25	3927.124	156.524	253.25	4023.855	144.424	264.25	4121.152	129.209	275.25	4145.545	112.843
242.50	3929.665	156.242	253.50	4024.542	144.222	264.50	4122.457	128.768	275.50	4145.742	112.557
242.75	3955.854	155.953	253.75	4028.747	144.021	264.75	4122.931	128.335	275.75	4143.351	112.271
243.00	3939.226	155.671	254.00	4024.522	143.820	265.00	4122.093	127.903	276.00	4143.076	111.978
243.25	3952.736	155.323	254.25	4025.377	143.619	265.25	4122.318	127.463	276.25	4141.264	111.720
243.50	3960.168	154.955	254.50	4025.577	143.418	265.50	4122.729	127.030	276.50	4140.848	111.455
243.75	3961.038	154.586	254.75	4027.476	143.217	265.75	4126.064	126.598	276.75	4152.176	111.197
244.00	3968.955	154.210	255.00	4026.928	143.023	266.00	4125.380	126.166	277.00	4144.186	110.940
244.25	3971.894	153.842	255.25	4027.257	142.757	266.25	4125.713	125.727	277.25	4136.994	110.675
244.50	3974.833	153.473	255.50	4027.526	142.456	266.50	4126.140	125.295	277.50	4134.067	110.417
244.75	3978.566	153.098	255.75	4047.951	142.147	266.75	4127.488	124.863	277.75	4129.007	110.160
245.00	3983.357	152.729	256.00	4072.884	141.839	267.00	4127.898	124.425	278.00	4123.146	109.903
245.25	3985.768	152.361	256.25	4078.736	141.538	267.25	4131.232	124.015	278.25	4117.818	109.638
245.50	3989.501	151.986	256.50	4083.530	141.229	267.50	4131.672	123.612	278.50	4116.834	109.381
245.75	3996.408	151.618	256.75	4084.020	140.921	267.75	4131.219	123.216	278.75	4115.538	109.124
246.00	3997.559	151.250	257.00	4084.244	140.613	268.00	4131.047	122.821	279.00	4114.036	108.860
246.25	3999.566	150.875	257.25	4085.934	140.312	268.25	4132.785	122.418	279.25	4109.569	108.589
246.50	4004.431	150.572	257.50	4086.548	140.004	268.50	4133.177	122.023	279.50	4104.773	108.291
246.75	4010.541	150.262	257.75	4087.801	139.696	268.75	4134.319	121.628	279.75	4101.043	108.000
247.00	4010.541	150.033	258.00	4091.347	139.395	269.00	4134.491	121.234	280.00	4099.917	107.708
247.25	4014.561	149.641	258.25	4091.932	139.051	269.25	4132.863	120.832	280.25	4099.529	107.417
247.50	4015.426	149.332	258.50	4093.440	138.665	269.50	4132.721	120.437	280.50	4099.550	107.126
247.75	4018.844	149.022	258.75	4097.522	138.278	269.75	4134.113	120.043	280.75	4099.866	106.835
248.00	4018.309	148.712	259.00	4096.845	137.899	270.00	4134.095	119.642	281.00	4099.305	106.544
248.25	4018.300	148.402	259.25	4099.165	137.513	270.25	4134.077	119.381	281.25	4099.290	106.254
248.50	4018.092	148.092	259.50	4103.699	137.127	270.50	4134.071	118.925	281.50	4098.763	105.963
248.75	4020.265	147.783	259.75	4103.443	136.748	270.75	4134.084	118.580	281.75	4097.573	105.673
249.00	4019.307	147.480	260.00	4106.137	136.362	271.00	4135.617	118.236	282.00	4097.584	105.376
249.25	4009.981	147.236	260.25	4106.723	135.976	271.25	4133.593	117.885	282.25	4101.081	105.078
249.50	4017.671	147.070	260.50	4105.951	135.598	271.50	4134.309	117.541	282.50	4100.660	104.795
249.75	4024.038	146.897	260.75	4105.694	135.212	271.75	4134.524	117.197	282.75	4100.899	104.512
250.00	4020.344	146.732	261.00	4108.887	134.827	272.00	4133.407	116.853	283.00	4101.090	104.229
250.25	4020.637	146.559	261.25	4108.887	134.526	272.25	4133.246	116.502	283.25	4102.224	103.947

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
283.50	4101.803	103.664	294.50	4124.446	94.210	307.75	4143.022	86.933	318.75	4165.015	82.474
283.75	4101.586	103.374	294.75	4124.652	94.068	308.00	4142.741	86.793	319.00	4165.473	82.408
284.00	4101.370	103.092	295.00	4124.647	93.932	308.25	4143.232	86.659	319.25	4166.185	82.335
284.25	4100.383	102.810	295.25	4124.628	93.790	308.50	4143.581	86.519	319.50	4166.471	82.269
284.50	4102.978	102.527	295.50	4124.617	93.647	308.75	4144.576	86.385	319.75	4166.993	82.196
284.75	4103.687	102.245	295.75	4124.628	93.512	309.00	4144.784	86.245	320.00	4166.538	82.130
285.00	4105.025	101.963	296.00	4125.385	93.369	309.25	4144.800	86.125	320.25	4166.792	82.057
285.25	4107.007	101.702	296.25	4125.922	93.227	309.50	4144.819	86.005	320.50	4167.125	81.991
285.50	4107.403	101.455	296.50	4126.474	93.092	309.75	4144.066	85.885	320.75	4167.931	81.918
285.75	4107.861	101.208	296.75	4127.735	92.950	310.00	4146.527	85.765	321.00	4168.201	81.852
286.00	4108.272	100.967	297.00	4128.177	92.807	310.25	4146.246	85.644	321.25	4167.840	81.773
286.25	4108.730	100.720	297.25	4136.504	92.692	310.50	4145.570	85.524	321.50	4167.849	81.694
286.50	4109.424	100.473	297.50	4137.796	92.564	310.75	4145.762	85.404	321.75	4167.869	81.614
286.75	4109.678	100.233	297.75	4138.254	92.442	311.00	4146.694	85.284	322.00	4167.902	81.535
287.00	4107.276	99.987	298.00	4139.956	92.320	311.25	4147.689	85.164	322.25	4168.401	81.456
287.25	4110.485	99.740	298.25	4139.975	92.199	311.50	4147.695	85.045	322.50	4168.410	81.376
287.50	4110.959	99.500	298.50	4139.975	92.077	311.75	4147.685	84.925	322.75	4168.433	81.290
287.75	4111.166	99.254	298.75	4139.300	91.955	312.00	4147.676	84.842	323.00	4168.471	81.211
288.00	4111.860	99.007	299.00	4140.483	91.834	312.25	4147.685	84.685	323.25	4169.452	81.132
288.25	4111.233	98.782	299.25	4141.083	91.712	312.50	4147.686	84.592	323.50	4169.441	81.053
288.50	4111.255	98.583	299.50	4140.628	91.591	312.75	4150.304	84.492	323.75	4168.179	80.974
288.75	4112.794	98.378	299.75	4139.009	91.469	313.00	4150.022	84.392	324.00	4168.168	80.894
289.00	4116.380	98.173	300.00	4137.374	91.341	313.25	4149.284	84.299	325.00	4172.119	80.565
289.25	4115.533	97.975	301.00	4137.256	90.822	313.50	4149.279	84.199	325.25	4171.837	80.466
289.50	4114.356	97.770	302.00	4137.060	90.242	313.75	4150.076	84.100	325.50	4172.076	80.393
289.75	4112.676	97.565	303.00	4140.833	89.670	314.00	4154.334	84.000	325.75	4172.082	80.314
290.00	4112.396	97.361	303.25	4140.410	89.529	314.25	4155.424	83.907	326.00	4173.027	80.235
290.25	4115.589	97.163	303.50	4138.900	89.374	314.50	4155.821	83.807	326.25	4173.330	80.156
290.50	4115.025	96.958	303.75	4140.304	89.226	314.75	4155.066	83.708	326.50	4174.026	80.077
290.75	4115.044	96.754	304.00	4141.299	89.079	315.00	4154.927	83.615	326.75	4174.218	79.998
291.00	4115.297	96.556	304.25	4141.758	88.931	315.25	4154.922	83.522	327.00	4174.426	79.919
291.25	4115.551	96.365	304.50	4140.769	88.783	315.50	4156.145	83.449	327.25	4174.681	79.840
291.50	4116.008	96.195	304.75	4140.582	88.635	315.75	4156.415	83.369	327.50	4175.314	79.761
291.75	4116.561	96.025	305.00	4141.671	88.488	316.00	4156.410	83.296	327.75	4175.328	79.682
292.00	4117.884	95.855	305.25	4142.067	88.340	316.25	4156.427	83.217	328.00	4175.353	79.610
292.25	4118.294	95.685	305.50	4142.621	88.193	316.50	4157.192	83.144	328.25	4175.637	79.531
292.50	4117.699	95.514	305.75	4142.614	88.045	316.75	4161.593	83.064	328.50	4176.207	79.465
292.75	4119.619	95.351	306.00	4142.626	87.891	317.00	4164.543	82.991	328.75	4176.020	79.400
293.00	4118.803	95.181	306.25	4138.723	87.757	317.25	4164.543	82.936	329.00	4176.005	79.327
293.25	4118.648	95.011	306.50	4139.292	87.616	317.50	4165.269	82.839	329.25	4176.940	79.262
293.50	4118.414	94.842	306.75	4140.933	87.482	317.75	4165.559	82.759	329.50	4176.948	79.196
293.75	4120.697	94.672	307.00	4143.078	87.342	318.00	4165.860	82.686	329.75	4176.961	79.124
294.00	4120.697	94.554	307.25	4141.678	87.208	318.25	4166.304	82.613	330.00	4177.167	79.058
294.25	4121.267	94.353	307.50	4138.466	87.067	318.50	4164.019	82.547	330.25	4177.181	78.992

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
330.50	4177.206	78.920	341.50	4199.314	76.818	352.50	4213.344	74.157	363.50	4230.751	72.475
330.75	4178.516	78.854	341.75	4199.601	76.753	352.75	4213.978	74.118	363.75	4231.111	72.423
331.00	4179.638	78.789	342.00	4200.030	76.694	353.00	4215.464	74.079	364.00	4231.809	72.365
331.25	4179.644	78.723	342.25	4200.300	76.635	353.25	4215.845	74.040	364.25	4229.631	72.320
331.50	4180.305	78.664	342.50	4201.108	76.577	353.50	4215.137	74.001	364.50	4230.314	72.262
331.75	4180.638	78.612	342.75	4201.300	76.518	353.75	4215.391	73.969	364.75	4230.506	72.210
332.00	4181.460	78.559	343.00	4201.507	76.459	354.00	4215.725	73.930	365.00	4230.857	72.159
332.25	4181.477	78.500	343.25	4201.529	76.381	354.25	4216.532	73.891	365.25	4230.496	72.107
332.50	4180.880	78.448	343.50	4201.547	76.336	354.50	4216.553	73.852	365.50	4230.510	72.056
332.75	4181.198	78.395	343.75	4202.054	76.244	354.75	4216.582	73.813	365.75	4230.535	72.004
333.00	4181.190	78.343	344.00	4202.419	76.172	355.00	4216.617	73.774	366.00	4231.295	71.953
333.25	4180.965	78.284	344.25	4202.707	76.107	355.25	4216.643	73.752	366.25	4232.357	71.901
333.50	4180.636	78.231	344.50	4203.025	76.035	355.50	4216.662	73.735	366.50	4233.640	71.850
333.75	4181.505	78.179	344.75	4203.376	75.964	355.75	4216.676	73.713	366.75	4233.656	71.798
334.00	4182.817	78.120	345.00	4203.695	75.892	356.00	4216.696	73.658	367.00	4233.659	71.740
334.25	4183.956	78.067	345.25	4203.887	75.827	356.25	4217.224	73.625	367.25	4233.854	71.701
334.50	4183.974	78.035	345.50	4203.895	75.755	356.50	4218.158	73.600	367.50	4233.002	71.656
334.75	4184.290	77.995	345.75	4204.320	75.684	356.75	4218.428	73.567	367.75	4232.625	71.618
335.00	4185.569	77.956	346.00	4204.701	75.618	357.00	4221.241	73.541	368.00	4235.315	71.573
335.25	4185.887	77.917	346.25	4205.068	75.553	357.25	4222.095	73.509	368.25	4236.139	71.534
335.50	4185.399	77.877	346.50	4205.386	75.488	357.50	4222.104	73.483	368.50	4236.331	71.489
335.75	4185.415	77.851	346.75	4205.689	75.423	357.75	4223.931	73.451	368.75	4236.681	71.450
336.00	4185.426	77.799	347.00	4205.929	75.358	358.00	4224.406	73.425	369.00	4237.363	71.405
336.25	4185.861	77.760	347.25	4205.940	75.293	358.25	4224.612	73.399	369.25	4238.424	71.367
336.50	4186.573	77.720	347.50	4206.424	75.228	358.50	4225.310	73.360	369.50	4238.585	71.322
336.75	4190.457	77.681	347.75	4206.837	75.170	358.75	4226.244	73.321	369.75	4238.604	71.283
337.00	4193.409	77.648	348.00	4207.220	75.105	359.00	4229.310	73.289	370.00	4238.635	71.238
337.25	4193.695	77.603	348.25	4207.744	75.040	359.25	4230.133	73.250	370.25	4238.667	71.212
337.50	4194.518	77.563	348.50	4208.631	74.975	359.50	4230.144	73.211	370.50	4238.708	71.180
337.75	4194.531	77.524	348.75	4208.886	74.910	359.75	4230.138	73.179	370.75	4238.760	71.155
338.00	4194.789	77.485	349.00	4209.189	74.845	360.00	4230.282	73.140	371.00	4239.403	71.122
338.25	4195.974	77.445	349.25	4209.476	74.799	360.25	4229.368	73.101	371.25	4239.414	71.097
338.50	4196.196	77.406	349.50	4209.920	74.747	360.50	4229.101	73.069	371.50	4240.339	71.065
338.75	4196.514	77.360	349.75	4209.480	74.695	360.75	4229.080	73.030	371.75	4237.496	71.039
339.00	4196.879	77.321	350.00	4209.465	74.643	361.00	4229.068	72.992	372.00	4238.493	71.007
339.25	4197.165	77.282	350.25	4210.402	74.591	361.25	4229.062	72.961	372.25	4243.141	70.981
339.50	4197.186	77.243	350.50	4210.578	74.539	361.50	4229.064	72.888	372.50	4243.411	70.949
339.75	4197.209	77.204	350.75	4211.196	74.494	361.75	4229.086	72.836	372.75	4243.556	70.923
340.00	4197.242	77.164	351.00	4211.546	74.442	362.00	4229.353	72.785	373.00	4243.257	70.891
340.25	4197.288	77.112	351.25	4212.291	74.390	362.25	4229.562	72.733	373.25	4242.310	70.865
340.50	4197.853	77.053	351.50	4212.306	74.355	362.50	4230.433	72.681	373.50	4242.548	70.846
340.75	4198.218	76.994	351.75	4212.453	74.286	362.75	4231.115	72.630	373.75	4242.818	70.827
341.00	4198.615	76.936	352.00	4212.740	74.234	363.00	4230.739	72.578	374.00	4243.293	70.808
341.25	4199.012	76.877	352.25	4213.010	74.196	363.25	4230.734	72.527	374.25	4242.663	70.788

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)	Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
374.50	4242.663	70.775	385.50	4255.133	70.044	396.50	4270.126	68.791	407.50	3948.165	73.800
374.75	4242.839	70.743	385.75	4255.609	70.019	396.75	4270.761	68.772	407.75	3942.259	73.995
375.00	4242.999	70.724	386.00	4256.243	69.993	397.00	4274.461	68.746	408.00	3938.501	74.196
375.25	4242.991	70.705	386.25	4256.988	69.961	397.25	4273.609	68.727	408.25	3934.476	74.397
375.50	4242.977	70.686	386.50	4257.179	69.935	397.50	4244.897	68.733	408.50	3933.624	74.591
375.75	4242.958	70.666	386.75	4258.066	69.910	397.75	4226.083	68.740	408.75	3928.841	74.793
376.00	4242.926	70.647	387.00	4258.226	69.884	398.00	4207.537	68.740	409.00	3924.548	74.994
376.25	4241.803	70.628	387.25	4258.386	69.852	398.25	4194.098	68.746	409.25	3920.523	75.163
376.50	4240.334	70.615	387.50	4259.162	69.827	398.50	4179.584	68.753	409.50	3917.841	75.319
376.75	4241.205	70.602	387.75	4259.170	69.801	398.75	4167.221	68.753	409.75	3914.084	75.469
377.00	4244.777	70.589	388.00	4259.183	69.769	399.00	4156.470	68.759	410.00	3910.866	75.625
377.25	4245.347	70.576	388.25	4259.209	69.737	399.25	4145.450	68.765	410.25	3906.842	75.775
377.50	4246.597	70.564	388.50	4260.341	69.705	399.50	4136.849	68.765	410.50	3904.429	75.931
377.75	4246.835	70.544	388.75	4260.341	69.683	399.75	4127.442	68.772	410.75	3900.406	76.081
378.00	4247.009	70.532	389.00	4260.013	69.641	400.00	4117.498	68.778	411.00	3896.651	76.237
378.25	4247.200	70.519	389.25	4260.505	69.609	400.25	4109.703	68.810	411.25	3893.970	76.387
378.50	4240.483	70.506	389.50	4260.526	69.577	400.50	4100.829	68.931	411.50	3890.752	76.544
378.75	4244.783	70.493	389.75	4260.842	69.539	400.75	4092.762	69.046	411.75	3886.730	76.694
379.00	4245.637	70.480	390.00	4261.998	69.507	401.00	4085.233	69.161	412.00	3884.050	76.851
379.25	4247.108	70.467	390.25	4262.316	69.475	401.25	4078.510	69.283	412.25	3881.638	76.981
379.50	4248.484	70.448	390.50	4263.062	69.443	401.50	4071.520	69.398	412.50	3881.072	77.106
379.75	4248.722	70.435	390.75	4263.364	69.411	401.75	4064.798	69.513	412.75	3876.814	77.230
380.00	4249.087	70.423	391.00	4263.682	69.379	402.00	4057.540	69.628	413.00	3871.451	77.360
380.25	4249.831	70.403	391.25	4264.064	69.347	402.25	4051.356	69.750	413.25	3870.743	77.485
380.50	4250.132	70.390	391.50	4264.620	69.315	402.50	4045.173	69.865	413.50	3867.164	77.609
380.75	4250.449	70.378	391.75	4264.891	69.283	402.75	4039.259	69.980	413.75	3864.753	77.740
381.00	4250.470	70.365	392.00	4265.698	69.257	403.00	4033.076	70.102	414.00	3861.536	77.864
381.25	4250.475	70.346	392.25	4265.890	69.225	403.25	4026.624	70.281	414.25	3850.541	77.989
381.50	4250.467	70.333	392.50	4266.241	69.193	403.50	4021.783	70.493	414.50	3828.012	78.120
381.75	4249.883	70.320	392.75	4267.365	69.168	403.75	4016.406	70.705	414.75	3805.215	78.244
382.00	4250.485	70.301	393.00	4265.564	69.136	404.00	4012.104	70.910	415.00	3780.006	78.369
382.25	4252.099	70.281	393.25	4265.979	69.104	404.25	4005.922	71.122	415.25	3743.808	78.631
382.50	4250.171	70.269	393.50	4265.989	69.078	404.50	4001.084	71.335	415.50	3707.895	79.110
382.75	4249.477	70.249	393.75	4266.004	69.046	404.75	3994.098	71.540	415.75	3672.525	79.597
383.00	4249.461	70.230	394.00	4266.011	69.014	405.00	3990.335	71.753	416.00	3639.576	80.077
383.25	4252.861	70.217	394.25	4266.025	68.995	405.25	3985.767	71.965	416.25	3600.199	80.565
383.50	4253.068	70.198	394.50	4266.051	68.970	405.50	3980.125	72.172	416.50	3564.048	81.046
383.75	4253.079	70.179	394.75	4266.090	68.951	405.75	3976.363	72.385	416.75	3527.635	81.535
384.00	4253.956	70.160	395.00	4267.920	68.925	406.00	3970.991	72.598	417.00	3490.695	82.018
384.25	4254.115	70.147	395.25	4268.094	68.906	406.25	3966.962	72.804	417.25	3452.958	82.507
384.50	4254.258	70.128	395.50	4268.318	68.880	406.50	3962.128	73.004	417.50	3414.692	82.991
384.75	4254.433	70.108	395.75	4270.375	68.861	406.75	3958.100	73.205	417.75	3372.684	83.482
385.00	4254.441	70.096	396.00	4270.597	68.836	407.00	3954.340	73.399	418.00	3331.756	83.967
385.25	4254.464	70.076	396.25	4270.820	68.816	407.25	3953.630	73.600	418.25	3290.831	84.426

Pathfinder AGI #1 Step-Rate Injection Test November 16, 2010 - Bottomhole Results

Time (min)	Reservoir Pressure (psig)	Reservoir Temp (°F)
418.50	3248.801	84.612
418.75	3207.846	84.792
419.00	3162.608	84.971
419.25	3112.017	85.151
419.50	3061.965	85.331
419.75	3010.311	85.511
420.00	2962.409	85.691
420.25	2911.299	85.871
420.50	2859.656	86.051
420.75	2810.159	86.232
421.00	2765.488	86.419
421.25	2719.669	86.292
421.50	2676.478	85.985
421.75	2643.726	85.671
422.00	2601.061	85.358
422.25	2561.603	85.045
422.50	2517.858	84.732
422.75	2474.643	84.419
423.00	2432.763	84.106
423.25	2391.411	83.794
423.50	2347.914	83.482
423.75	2308.163	83.170
424.00	2262.784	82.865
424.25	2220.313	82.474
424.50	2178.615	82.004
424.75	2138.250	81.528
425.00	2104.306	81.053
425.25	2060.979	80.578
425.50	2019.250	80.104
425.75	1975.640	79.630
426.00	1932.291	79.156
426.25	1885.177	78.684
426.50	1838.058	78.212
426.75	1795.759	77.740
427.00	1752.116	77.275
427.25	1705.463	76.701
427.50	1663.634	76.127
427.75	1616.430	75.560
428.00	1573.242	74.988
428.25	1528.434	74.423
428.50	1486.571	73.852
428.75	1446.045	73.289
429.00	1402.286	72.720
429.25	1355.033	72.159
429.50	1305.081	71.592
429.75	1258.346	71.032
430.00	1209.185	70.467
430.25	1156.529	69.916
430.50	1112.464	69.379
430.75	1068.659	68.842
431.00	1025.926	68.313
431.25	990.440	67.778
431.50	966.497	67.244
431.75	947.667	66.717
432.00	938.766	66.185
432.25	932.290	65.654
432.50	929.044	65.130
432.75	927.927	64.600
433.00	927.475	64.072
433.25	927.028	63.695
433.50	925.505	63.544
433.75	925.138	63.388
434.00	924.733	63.231
434.25	922.968	63.074
434.50	922.584	62.918
434.75	922.132	62.761
435.00	922.112	62.605
435.25	918.418	62.449
435.50	917.333	62.292
435.75	917.314	62.136
436.00	917.292	61.986
436.25	917.690	61.986
436.50	919.267	62.011
436.75	919.288	62.036
437.00	19.948	62.068
437.25	0.010	62.093
437.50	0.010	62.118
437.75	0.010	62.149
438.00	0.010	62.174
438.25	0.010	62.191
438.50	0.010	62.230
438.75	0.010	62.255
439.00	0.010	62.280
439.25	0.010	62.349
439.50	0.010	62.386
439.75	0.010	62.424
440.00	0.010	62.455
440.25	0.010	62.492
440.50	0.010	62.530
440.75	0.010	62.561
441.00	0.010	62.599
441.25	0.010	62.636
441.50	0.010	62.657
441.75	0.010	62.682
442.00	0.010	62.742
443.00	0.010	62.749
444.00	0.010	62.630
445.00	0.010	62.550
446.00	0.010	62.429

Attachment 2

Core Descriptions and Analyses,

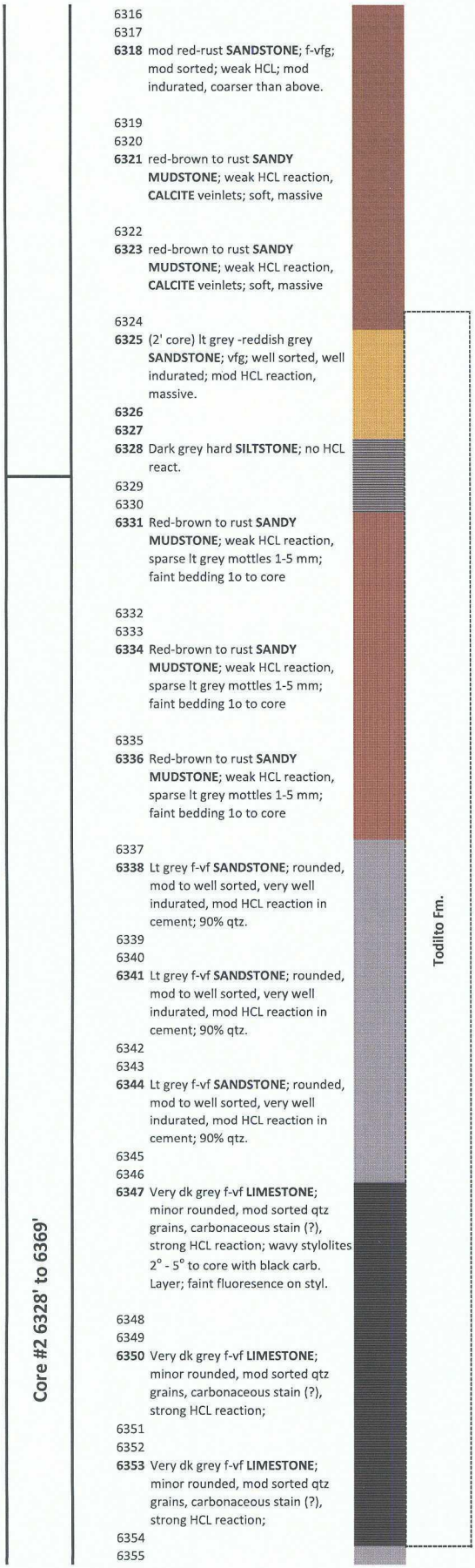
Pathfinder AGI #1

Anadarko Pathfinder #1 AGI Visual Core Log

Visual Core Log 6270' - 6429'

Depth (ft)	Description	Symbol	Fm
6260			
6261			
6262			
6263			
6264			
6265			
6266			
6267			
6268			
6269			
6270			
6271			
6272			
6273			
6274			
6275	very ,dark grey to bluish **CLAYSTONE**; v soft, lam bedding 10° - 15° to core		
6276			
6277			
6278	red-brown to rust **MUDSTONE**; no HCL reaction, soft, massive		
6279			
6280			
6281	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6282			
6283			
6284	red-brown to rust **MUDDY SANDSTONE**; vfg, mod sorted, HCL reaction, soft, massive		
6285			
6286			
6287	red-brown to rust **MUDDY SANDSTONE**; vfg, mod sorted, HCL reaction, soft, massive		
6288			
6289			
6290	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6291			
6292			
6293	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6294			
6295			
6296	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6297			
6298			
6299			
6300	(1'core) mottled lt & dk red - rust **MUDDY STANDSTONE**; irreg bedding perp to core; HCL reaction		
6301			
6302			
6303	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6304			
6305			
6306	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6307			
6308			
6309	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6310			
6311			
6312	red-brown to rust **SANDY MUDSTONE**; weak HCL reaction, soft, massive		
6313			
6314			
6315	mod red-rust **SANDSTONE**; f-vfg; mod sorted; weak HCL; mod indurated, coarser than above.		

Core #1 6270' to 6328'


Core #2 6328' to 6369'
6316
6317
6318 mod red-rust SANDSTONE; f-vfg; mod sorted; weak HCL; mod indurated, coarser than above.
6319
6320
6321 red-brown to rust SANDY MUDSTONE; weak HCL reaction, CALCITE veinlets; soft, massive
6322
6323 red-brown to rust SANDY MUDSTONE; weak HCL reaction, CALCITE veinlets; soft, massive
6324
6325 (2' core) lt grey -reddish grey SANDSTONE; vfg; well sorted, well indurated; mod HCL reaction, massive.
6326
6327
6328 Dark grey hard SILTSTONE; no HCL react.
6329
6330
6331 Red-brown to rust SANDY MUDSTONE; weak HCL reaction, sparse lt grey mottles 1-5 mm; faint bedding 1o to core
6332
6333
6334 Red-brown to rust SANDY MUDSTONE; weak HCL reaction, sparse lt grey mottles 1-5 mm; faint bedding 1o to core
6335
6336 Red-brown to rust SANDY MUDSTONE; weak HCL reaction, sparse lt grey mottles 1-5 mm; faint bedding 1o to core
6337
6338 Lt grey f-vf SANDSTONE; rounded, mod to well sorted, very well indurated, mod HCL reaction in cement; 90% qtz.
6339
6340
6341 Lt grey f-vf SANDSTONE; rounded, mod to well sorted, very well indurated, mod HCL reaction in cement; 90% qtz.
6342
6343
6344 Lt grey f-vf SANDSTONE; rounded, mod to well sorted, very well indurated, mod HCL reaction in cement; 90% qtz.
6345
6346
6347 Very dk grey f-vf LIMESTONE; minor rounded, mod sorted qtz grains, carbonaceous stain (?), strong HCL reaction; wavy stylolites 2° - 5° to core with black carb. Layer; faint fluoresence on styl.
6348
6349
6350 Very dk grey f-vf LIMESTONE; minor rounded, mod sorted qtz grains, carbonaceous stain (?), strong HCL reaction;
6351
6352
6353 Very dk grey f-vf LIMESTONE; minor rounded, mod sorted qtz grains, carbonaceous stain (?), strong HCL reaction;
6354
6355
Todilto Fm.

6356 Lt grey f-vf SANDSTONE; rounded, mod to well sorted, very indurated, mod HCL reaction in cement; >90% qtz.

6357

6358

6359 Lt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very indurated, mod HCL reaction in cement; >90% qtz.

6360

6361

6362

6363

6364

6365 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz. BREAK FROM UPPER (TIGHT) ENTRADA TO LOWER PERMEABLE ENTRADA

6366

6367

6368 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6369 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6370

6371

6372 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6373

6374

6375 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6376

6377

6378 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6379

6380

6381 VLt grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6382

6383

6384 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6385

6386

6387 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6388

6389

6390 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6391

6392

6393 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6394

6395

Core #3 6369' to 6429'

6396 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6397
6398
6399 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6400
6401
6402 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6403
6404
6405 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6406
6407
6408 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, moderably friable, mod HCL reaction in cement; >90% qtz.

6409
6410
6411 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6412
6413
6414 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6415
6416
6417 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6418
6419
6420 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6421
6422
6423 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6424
6425
6426 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6427
6428
6429 VLt grey to yellowish grey f-vf **SANDSTONE**; rounded, mod to well sorted, very friable, mod HCL reaction in cement; >90% qtz.

6430

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Western Gas Partners, LP
File No.: 23022

ROUTINE CORE ANALYSIS Preliminary Report

1850 psi Confining Stress

Well: Todilto / Entrada
Field: San Juan Basin
Location: San Juan Co., New Mexico

Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
1	6270.50	0.134	2.8				2.62	Fractured
2	6271.25							Failed plug
3	6272.20	0.002	1.1				2.66	
4	6273.90	0.008	4.1				2.65	Fractured
5	6274.20	0.008	4.2				2.65	
6	6275.20	0.003	4.1				2.66	Fractured
7	6276.55	0.002	4.3				2.64	
8	6277.20	0.008	4.4				2.65	
9	6278.20	0.006	4.9				2.65	
10	6279.20	0.007	3.2				2.65	
11	6280.20							Failed plug
12	6280.40	0.009	4.7				2.65	
13	6271.20	0.002	2.1				2.65	
14	6282.15	0.089	2.9				2.65	Fractured chipped
15	6283.20	0.005	3.5				2.63	
16	6284.30	0.009	3.3				2.55	
17	6285.35	5.49	4.1				2.64	Fractured chipped
18	6286.15	6.246	4.1				2.64	Fractured
19	6287.30	0.011	3.0				2.65	Fractured
20	6288.60	0.007	2.7				2.65	Fractured
21	6289.70	0.003	4.5				2.64	
22	6290.20	0.004	2.5				2.65	
23	6291.30	0.003	2.3				2.64	
24	6292.35	0.004	1.5				2.65	
25	6293.40	1.5	2.4				2.65	Fractured
26	6294.00							Failed plug
27	6295.00	0.029	3.1				2.76	Fractured

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ROUTINE CORE ANALYSIS Preliminary Report

1850 psi Confining Stress

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Location: San Juan Co., New Mexico

Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
28	6296.10	0.005	2.8				2.65	Fractured
29	6297.25	0.111	3.3				2.64	Fractured
30	6298.10	0.014	3.0				2.65	Fractured
31	6300.22	0.003	2.4				2.65	chipped
32	6301.25	0.062	3.9				2.66	Fractured
33	6302.60	1.58	3.2				2.65	Fractured
34	6303.10							Failed plug
35	6303.30	0.005	2.7				2.65	chipped
36	6304.15	0.018	3.4				2.65	
37	6305.20							Failed plug
38	6305.00	0.015	2.9				2.65	chipped
39	6306.20	0.015	2.7				2.65	Fractured chipped
40	6307.10	1600.	3.3				2.65	Fractured
41	6308.60	0.881	3.2				2.66	Fractured
42	6310.50							Failed plug
43	6310.05							Failed plug
44	6311.50							Failed plug
45	6311.70	0.204	3.3				2.65	Fractured chipped
46	6312.50	0.004	2.1				2.65	
47	6313.20	0.053	1.9				2.66	Fractured
48	6314.50	2.54	2.7				2.65	Fractured chipped
49	6315.30	0.805	3.2				2.66	Fractured
50	6316.50							Failed plug
51	6316.35	2.11	2.6				2.66	Fractured chipped
52	6317.25	0.007	2.9				2.65	Fractured
53	6318.70	1.4	3.6				2.65	Fractured
54	6319.20	0.002	1.9				2.65	

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Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
55	6320.25	1.53	2.4				2.65	Fractured
56	6321.45	2.553	2.5				2.66	Fractured
57	6322.80	0.008	2.2				2.66	chipped
58	6323.20	0.01	2.4				2.65	Fractured chipped
59	6324.25	0.004	2.4				2.64	chipped
60	6325.20	0.009	2.3				2.65	
61	6326.15	0.006	3.2				2.64	
62	6327.00	0.001	1.4				2.66	
63	6328.20	0.001	1.5				2.65	
64	6328.10	0.004	4.1				2.66	
65	6330.15	0.003	3.4				2.66	chipped
66	6331.35	0.005	3.4				2.67	
67	6332.20	0.004	3.1				2.67	chipped
68	6333.20	0.006	2.9				2.67	Fractured
69	6334.20	0.003	4.1				2.66	
70	6335.20	0.004	3.2				2.67	
71	6336.25	0.501	2.3				2.66	Fractured
72	6336.00	1.07	3.7				2.66	Fractured
73	6337.20	0.002	2.0				2.66	
74	6338.20	0.002	2.7				2.66	
75	6339.15	0.006	4.0				2.65	
76	6340.20	0.007	5.3				2.65	
77	6341.20	0.003	2.9				2.65	
78	6342.20	0.005	2.0				2.66	
79	6343.20	0.004	1.2				2.67	
80	6344.20	0.003	1.2				2.67	
81	6345.10	0.001	0.7				2.73	

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Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

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				Oil percent	Water percent	Gas percent		
82	6346.05	0.088	0.5				2.72	Fractured chipped
83	6347.10	0.006	0.4				2.71	chipped
84	6348.35	0.001	0.4				2.70	chipped
85	6349.40	0.001	0.3				2.68	Fractured
86	6350.20	0.006	1.2				2.65	
87	6351.10	0.005	1.7				2.65	
88	6352.20	0.005	3.9				2.65	
89	6353.20	0.033	4.6				2.65	
90	6354.20	0.008	2.1				2.65	
91	6355.20	373.6	18.4				2.64	
92	6356.20	463.9	19.0				2.65	
93	6357.40	619.5	19.8				2.64	
94	6359.20							Failed plug
95	6361.10	1265.8	22.1				2.64	Fractured
96	6362.10	670.9	20.7				2.64	
97	6362.40	401.3	19.7				2.64	
98	6363.20	330.8	19.4				2.64	chipped
99	6364.20	468.4	19.3				2.65	
100	6365.20	904.6	23.0				2.64	
101	6366.20	1064.3	22.2				2.63	
102	6367.20	1080.1	22.6				2.63	
102f	6369.45	781.5	20.9				2.64	Fractured
103	6370.20	233.1	18.7				2.64	
104	6371.20	841.1	20.4				2.63	Fractured
105	6372.20	951.2	21.0				2.65	
106	6373.20	1033.	21.5				2.64	
107	6374.20	293.5	17.9				2.65	

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Field: San Juan Basin
Location: San Juan Co., New Mexico

Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
108	6375.30	350.	17.8				2.65	
109	6376.20	660.6	19.7				2.64	
110	6377.20	568.	18.5				2.64	
111	6378.30	386.	9.6				2.65	
112	6379.20	379.	15.7				2.65	
113	6380.20	562.	20.5				2.65	
114	6381.20	402.77	19.4				2.64	
115	6382.20	187.	17.0				2.66	
116	6383.20	370.	18.5				2.65	
117	6384.20	383.3	19.1				2.64	
118	6385.20	417.	19.1				2.64	
119	6386.20	246.	17.8				2.64	
120	6387.20	238.	17.8				2.64	
121	6388.20	108.	14.2				2.65	
122	6389.20	332.	19.4				2.64	
123	6390.20	194.	18.2				2.64	
124	6391.10	96.25	15.7				2.64	
125	6392.40	116.	17.0				2.64	
126	6393.90	145.	16.3				2.64	
127	6394.65	164.	16.4				2.65	
128	6397.00	139.	17.5				2.64	
129	6398.40	648.	20.8				2.64	
130	6399.20	247.	17.0				2.64	
131	6400.40	67.4	12.4				2.65	
132	6401.20	40.2	10.2				2.65	
133	6402.30	454.	18.2				2.65	
134	6403.20	258.	16.6				2.65	

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Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
135	6404.20	16.45	11.5				2.65	
136	6405.50	14.98	15.7				2.64	
137	6406.20	8.58	15.7				2.65	
138	6407.60	33.75	17.5				2.64	
139	6408.20	26.83	17.0				2.65	
140	6409.00	80.65	18.5				2.64	
141	6410.20	5.14	16.1				2.65	
142	6411.20	29.3	17.2				2.65	
143	6412.20	20.31	17.0				2.65	
144	6413.60	589.	23.5				2.65	
145	6417.00	182.9	17.6				2.65	
146	6419.05	0.451	9.8				2.65	
147	6419.20	4.185	12.2				2.65	
148	6419.35	4.98	12.5				2.65	
149	6419.55	12.19	9.5				2.66	
150	6419.65	32.5	12.5				2.65	
151	6419.80	16.1	9.3				2.66	
152	6419.90	16.2	12.5				2.65	
153	6420.15	62.37	15.1				2.65	chipped
154	6420.30	113.03	15.9				2.65	
155	6420.45	115.72	16.3				2.64	
156	6420.55	46.22	14.6				2.65	
157	6420.70	92.72	15.4				2.64	
158	6420.80	105.9	15.8				2.64	chipped
159	6420.90	113.47	16.4				2.66	
160	6422.45	82.44	17.7				2.65	
1V	6274.90	0.001	4.9				2.67	

PTS Laboratories, Inc.

Western Gas Partners, LP
File No.: 23022

ROUTINE CORE ANALYSIS Preliminary Report

1850 psi Confining Stress

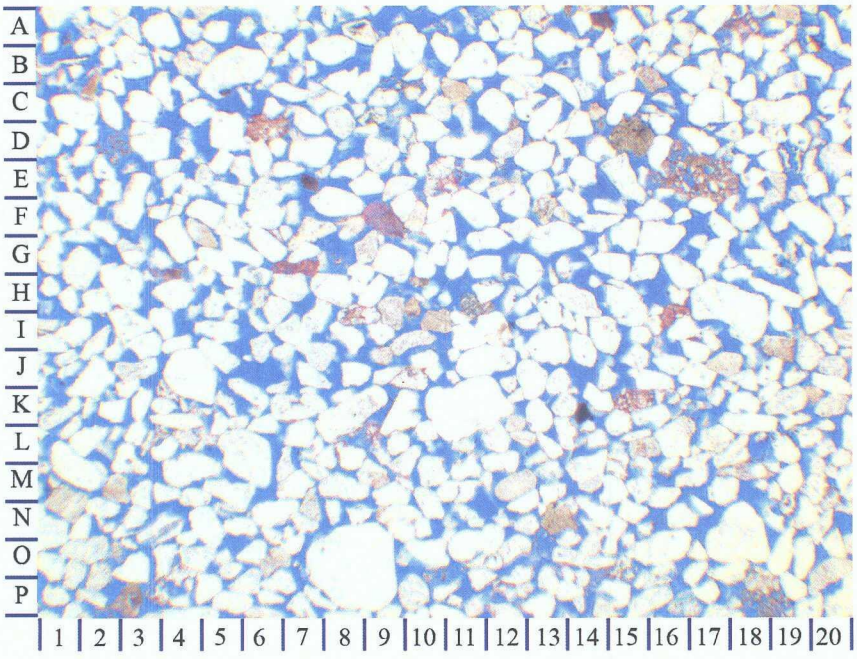
Well: Todilto / Entrada
Field: San Juan Basin
Location: San Juan Co., New Mexico

Date: 9-13-10
Mud Type: Water Base Mud
Core Type: Conventional

Sample ID	Depth, feet	Permeability to Air, millidarcies	Porosity, percent	Saturations			Grain Density g/cm^3	Lithological Descriptions
				Oil percent	Water percent	Gas percent		
2V	6313	0.00	2.6				2.66	
3V	6334	0.01	4.1				2.67	Fractured
4V	6337	0.00	2.2				2.69	
5V	6339	0.00	3.6				2.66	
6V	6340	0.00	5.1				2.65	
7V	6343	0.00	1.0				2.66	
8V	6352	0.31	4.8				2.65	

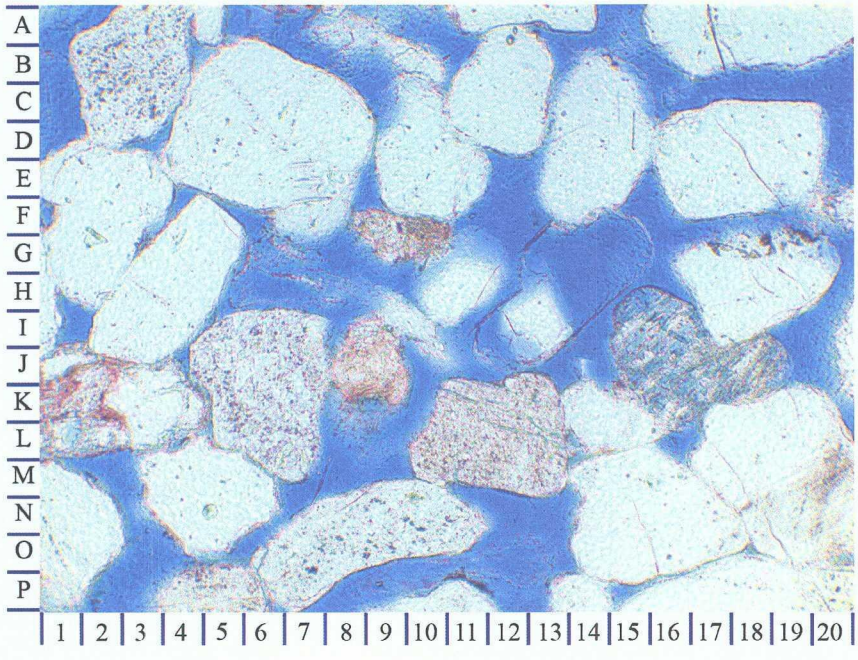
THIN SECTION ANALYSIS
(Before Acid)

A-25X



0.50 mm

B-125x



0.10 mm

File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6366.20

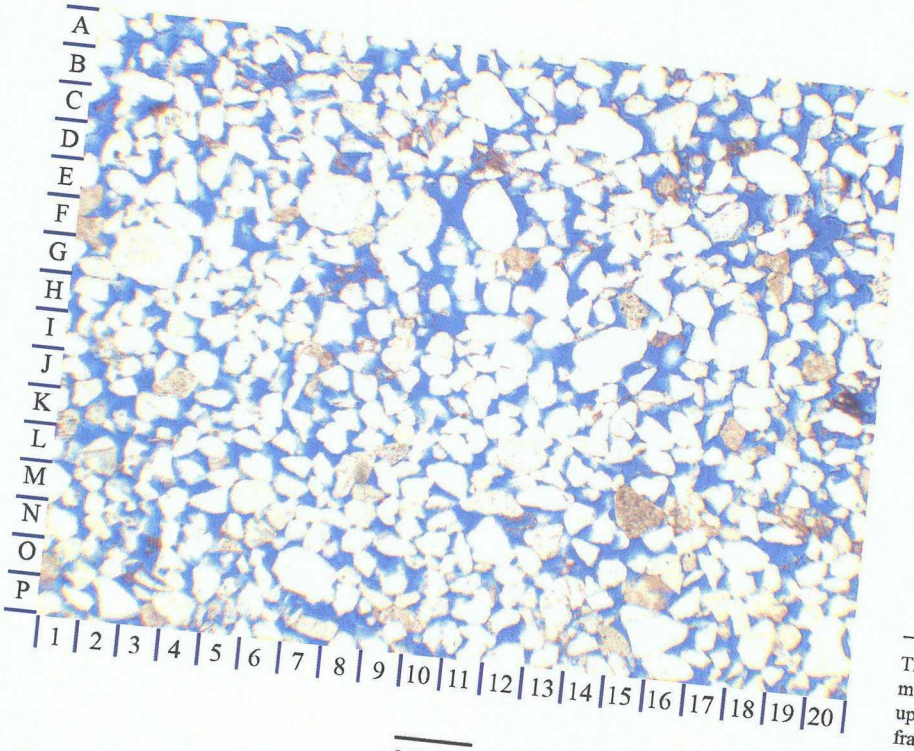
Thin Section Description

This sample is a fine grained sandstone that is well near moderately sorted, with maximum grain size in the upper medium to lower coarse sand range. The granular framework appears slightly to moderately compacted, with point to elongate grain to grain contacts. The grain composition is predominantly quartz. Feldspar, chert and sedimentary/argillaceous rock fragments are common grains, generally scattered throughout the rock. Dark grains visible in the low magnification Photomicrograph A are argillaceous rock fragments. These softer grains show minor plastic deformation. Porosity (blue) is evenly distributed, and is comprised of preserved primary intergranular pores and leached grain secondary pores.

Photomicrograph B shows the central portion of Photomicrograph A in more detail. The grains have a thin clay coating that remains after the grain has been leached. Note faint rims at H6, G14, O12. The clay rim at G14 outlines what had been a feldspar grain. A partially leached feldspar is present at J16 and a largely intact feldspar is located at L12. The grains around J4 and O18 are well compacted, resulting in much smaller intergranular pore size. There is minor quartz overgrowth development on the grain at E2 and surrounding the small remnant pore at O18.

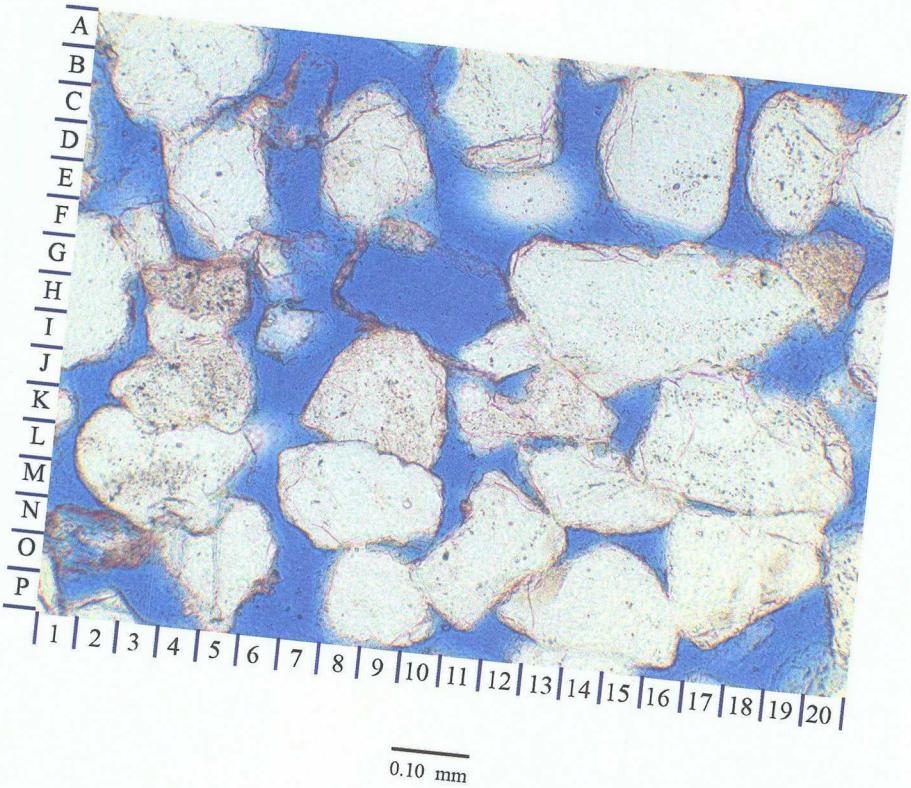
THIN SECTION ANALYSIS
(After Acid)

A-25X



File No.: 23022
Company: Western Gas Partners, LP
Well: Pathfinder AGE #1
Depth (Ft): 6366.20

B-125x



Thin Section Description

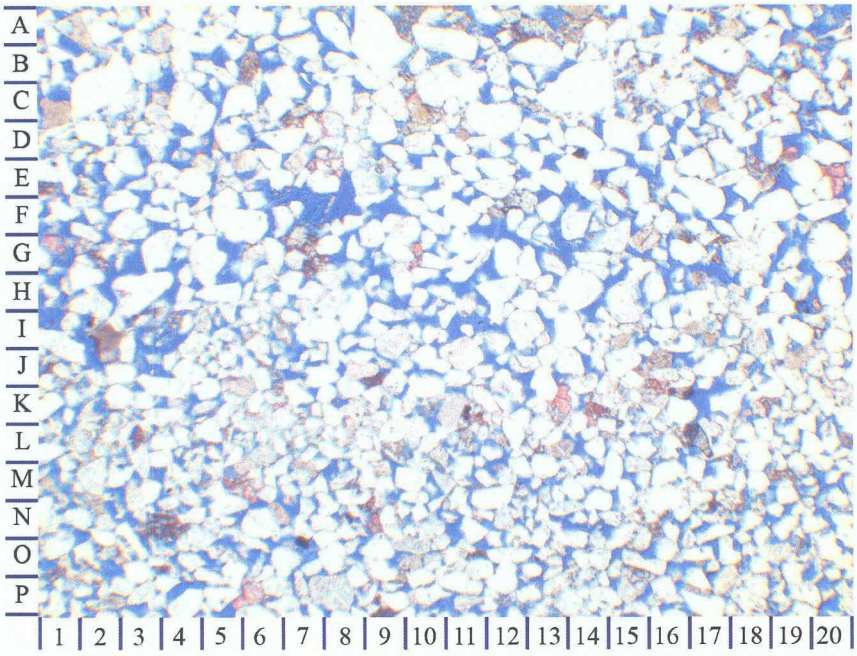
This sample is a fine grained sandstone that is well near moderately sorted, with maximum grain size in the upper medium to lower coarse sand range. The granular framework appears slightly to moderately compacted, with point to elongate grain to grain contacts. The grain composition is predominantly quartz. Feldspar, chert and sedimentary/argillaceous rock fragments are common grains, generally scattered throughout the rock. Dark grains visible in the low magnification Photomicrograph A are argillaceous rock fragments. These softer grains show minor plastic deformation. Porosity (blue) is evenly distributed, and is comprised of preserved primary intergranular pores and leached grain secondary pores.

Photomicrograph B shows the central portion of Photomicrograph A in more detail. The grains have a thin clay coating that remains after the grain has been leached. Note faint rims at H6, G14, O12. The clay rim at G14 outlines what had been a feldspar grain. A partially leached feldspar is present at J16 and a largely intact feldspar is located at L12. The grains around J4 and O18 are well compacted, resulting in much smaller intergranular pore size. There is minor quartz overgrowth development on the grain at E2 and surrounding the small remnant pore at O18.

PTS Laboratories, Inc. 4342 W. 12th Street Houston, Tx. 77055 Office: 713-316-1800 Fax: 713-316-1881 www.ptslabs.com

THIN SECTION ANALYSIS
(Before Acid)

A-25X



0.50 mm

B-125x

0.10 mm

File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6384.20

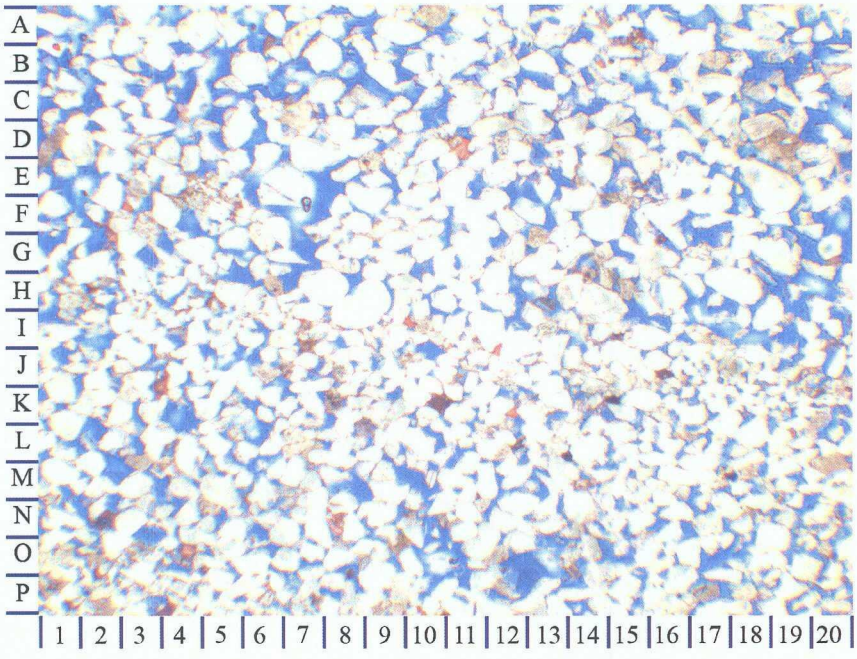
Thin Section Description

Photomicrograph A shows that this sandstone is characterized by the presence of size sorted laminations. Finer grained laminae, like that along rows J-L, contain very fine grained sand and have a more tightly compacted fabric. Coarser grained laminae contain upper medium sand size grains. Scattered darker grains are mostly argillaceous rock fragments, with some shaly chert. Minor calcite (stained red) is scattered throughout, as sand size particles and cement. Visible porosity (blue) includes large leached grain pores (F7) and increases in abundance with increasing grain size.

Photomicrograph B shows a porous area above a tightly packed, finer grained laminae. Faint clay rims outline leached grain secondary pores at L11, M14, M17. The level of compaction varies with the grains tightly packed in some areas. A small amount of calcite (red) cements the pores at B9 and D9.

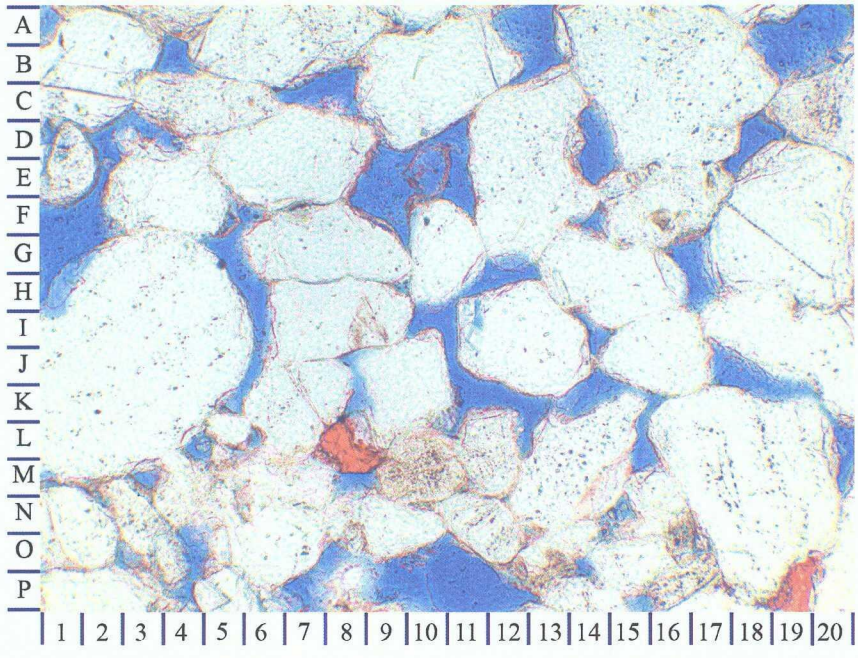
THIN SECTION ANALYSIS
(After Acid)

A-25X



0.50 mm

B-125x



0.10 mm

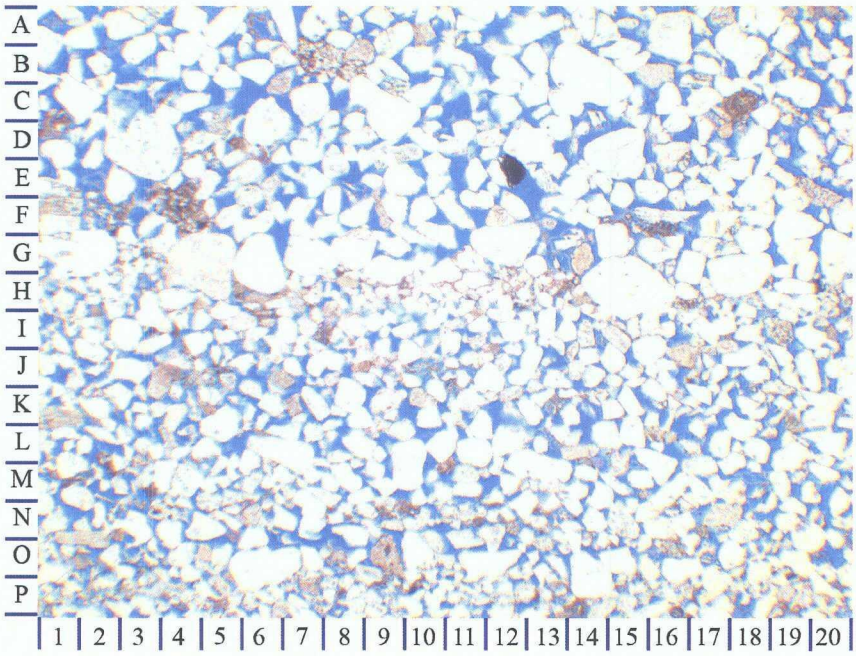
File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6384.20

Thin Section Description

Photomicrograph A shows that this sandstone is characterized by the presence of size sorted laminations. Finer grained laminae, like that along rows J-L, contain very fine grained sand and have a more tightly compacted fabric. Coarser grained laminae contain upper medium sand size grains. Scattered darker grains are mostly argillaceous rock fragments, with some shaly chert. Minor calcite (stained red) is scattered throughout, as sand size particles and cement. Visible porosity (blue) includes large leached grain pores (F7) and increases in abundance with increasing grain size.
Photomicrograph B shows a porous area above a tightly packed, finer grained laminae. Faint clay rims outline leached grain secondary pores at L11, M14, M17. The level of compaction varies with the grains tightly packed in some areas. A small amount of calcite (red) cements the pores at B9 and D9.

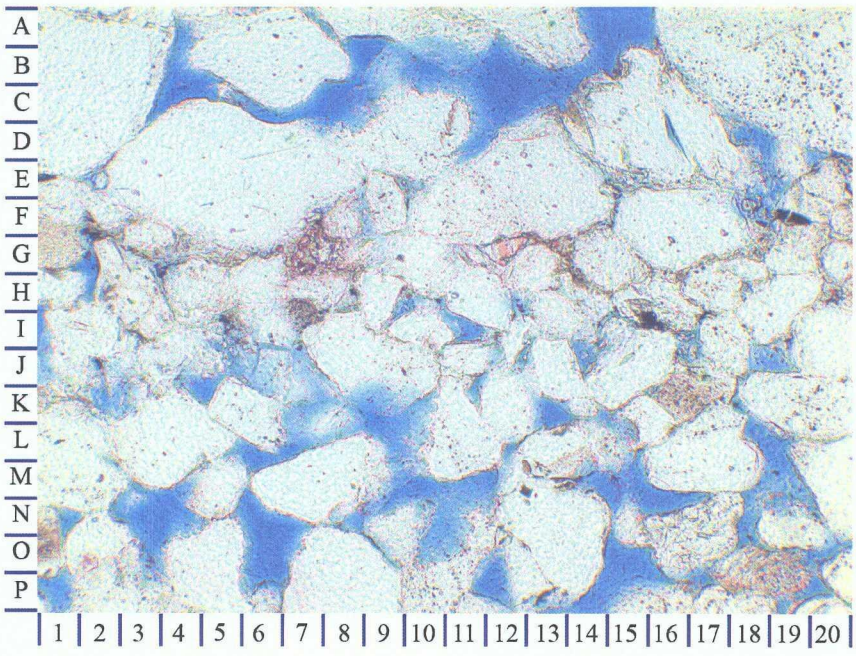
THIN SECTION ANALYSIS
(Before Acid)

A-25X



0.50 mm

B-125x



0.10 mm

File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6387.20

Thin Section Description

The low magnification view in Photomicrograph A shows the rock consists of size sorted laminae that range from silt-upper very fine sand up to upper fine-upper medium sand. The laminae commonly have sharp contacts. The finer grained laminae are generally thin and well compacted. Intergranular porosity shows better preservation as grain size increases. The rock in rows A-G is the coarsest grained and most porous. Quartz is the most common grain, followed by feldspar, chert and argillaceous/sedimentary rock fragments (darker grains). The black grain at E12 is an opaque heavy mineral.

Photomicrograph B shows the boundary between a very thin layer made up of very fine sand/silt size grains and much coarser rock. The grains at the contact with the overlying fine to medium grained sandstone are very tightly compacted with some grain to grain contacts slightly sutured. Clay (brown) and less common calcite (red) fill some intergranular areas. The grain in the upper left corner shows quartz overgrowth development.

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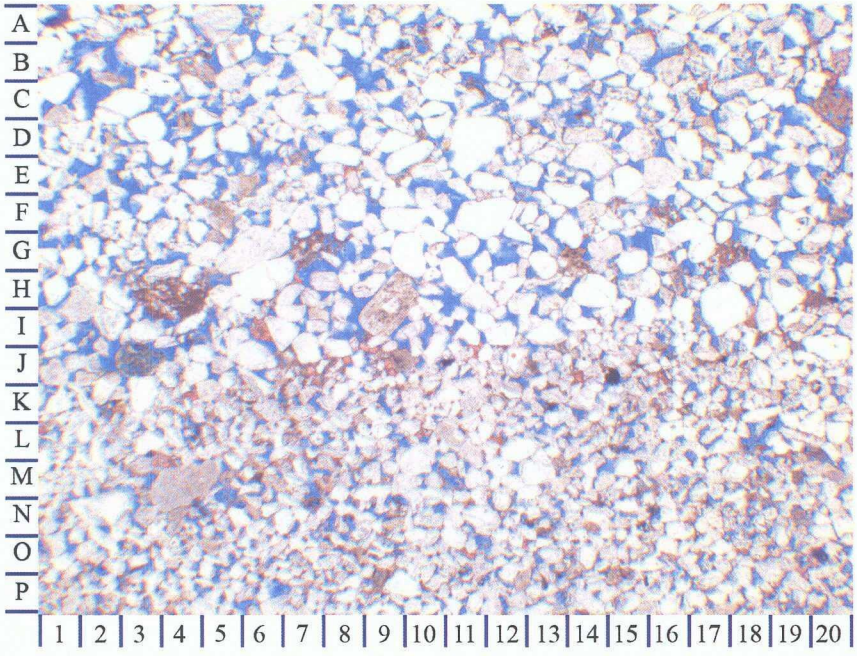
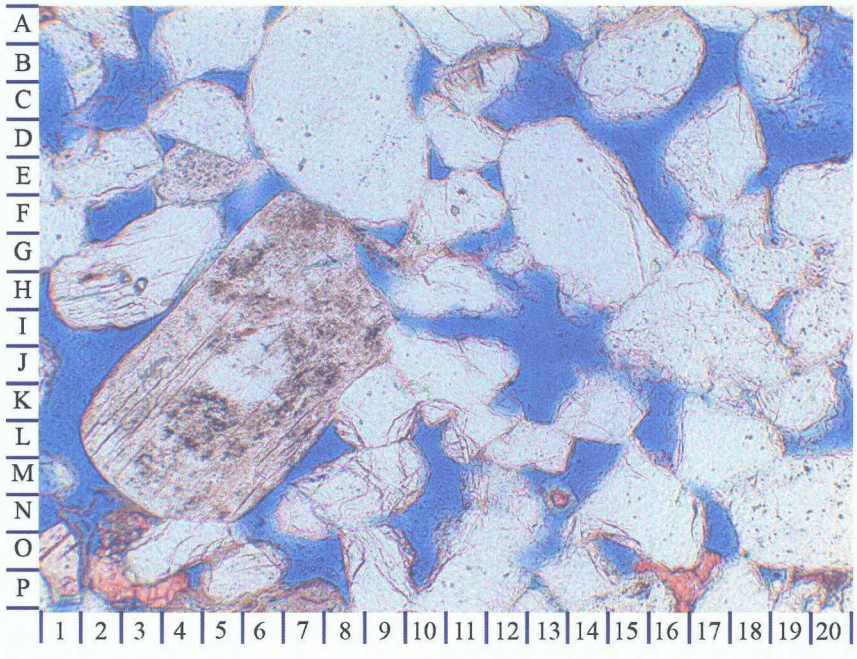
THIN SECTION ANALYSIS
(After Acid)

A-25X



0.50 mm

B-125x



0.10 mm

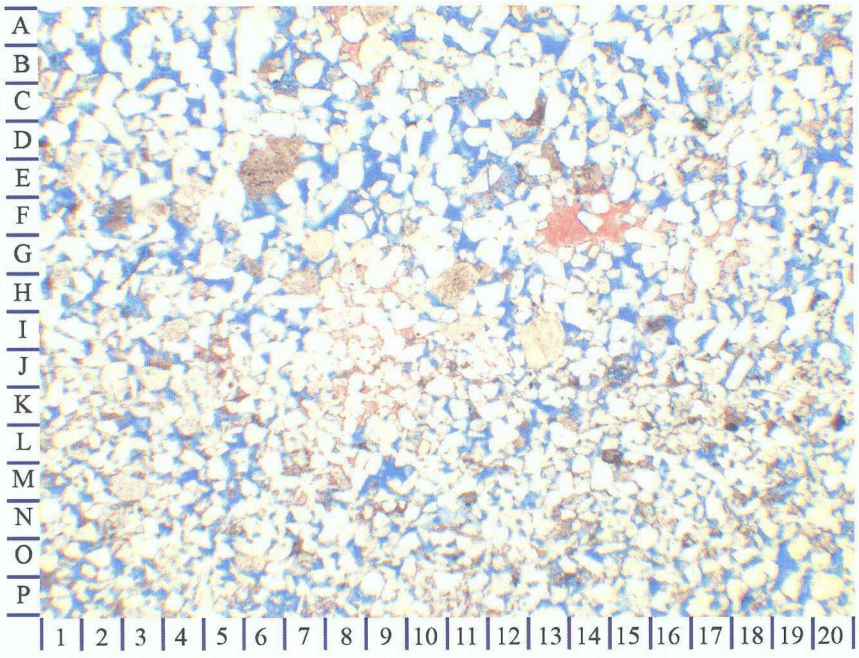
File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6387.20

Thin Section Description

These photomicrographs show the same size sorted laminations and variation in pore structure depending on the grain size in the laminae. The visible pore space is a combination of primary intergranular and larger, but scattered, leached grain secondary pores. Calcite cement (red) is still present. As in other samples, remnant clay rims mark the edges of secondary pores formed through diagenetically controlled grain dissolution (E10, P11 in Photomicrograph B).

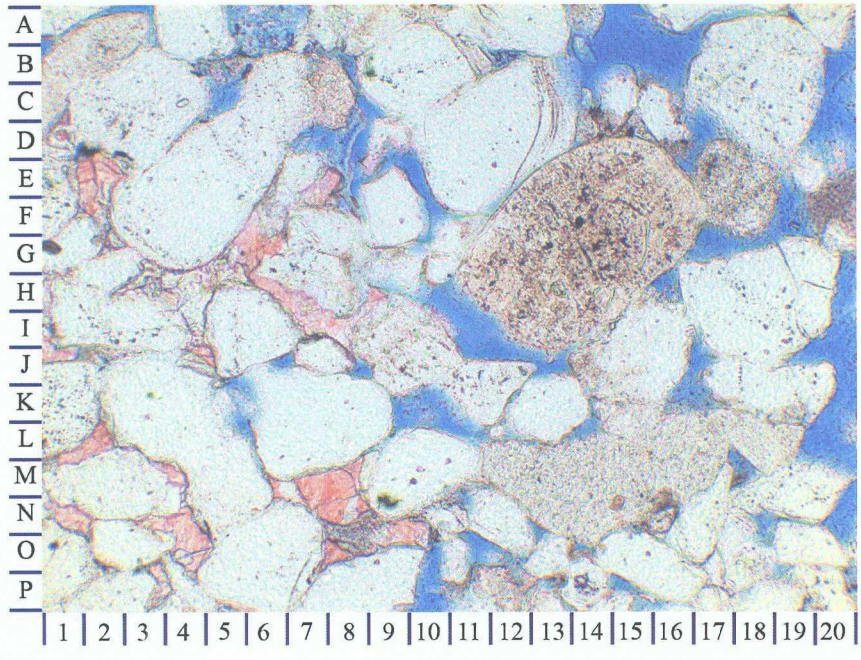
THIN SECTION ANALYSIS
(Before Acid)

A-25X



0.50 mm

B-125x



0.10 mm

File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6408.20

Thin Section Description

This sample has less well defined size sorting and fewer laminations. Most of the rock is very fine to fine grained and well sorted. The coarser grained rock in rows A-G is more porous. The dominant grain is quartz. Darker grains include argillaceous/sedimentary rock fragments (E6), sericitized feldspar, along with less common shaly chert and heavy minerals. Calcite cement (red) is more common and cements intergranular areas in relatively large patches (note area around I9 in Photomicrograph A) and fills larger secondary pores (F14). There are also smaller patches of anhydrite cement.

The area in Photomicrograph B contains a portion of the calcite cemented rock (red). There is some variation in grain size and grain packing that affects intergranular volume. The calcite cement appears to be a later stage of diagenesis. The grains in this area include a large, sericitized feldspar (F14) and clean chert (M14).

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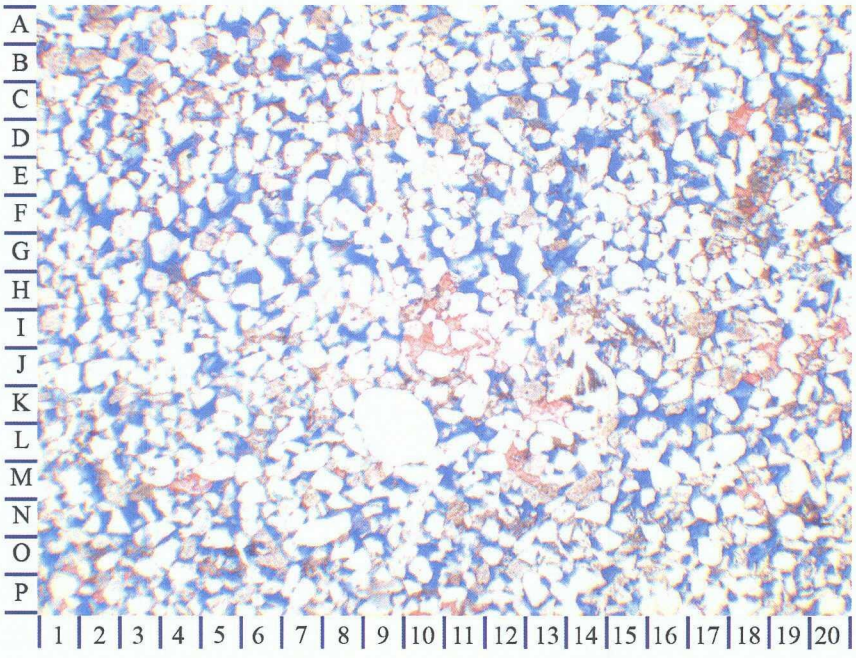
THIN SECTION ANALYSIS
(After Acid)

A-25X



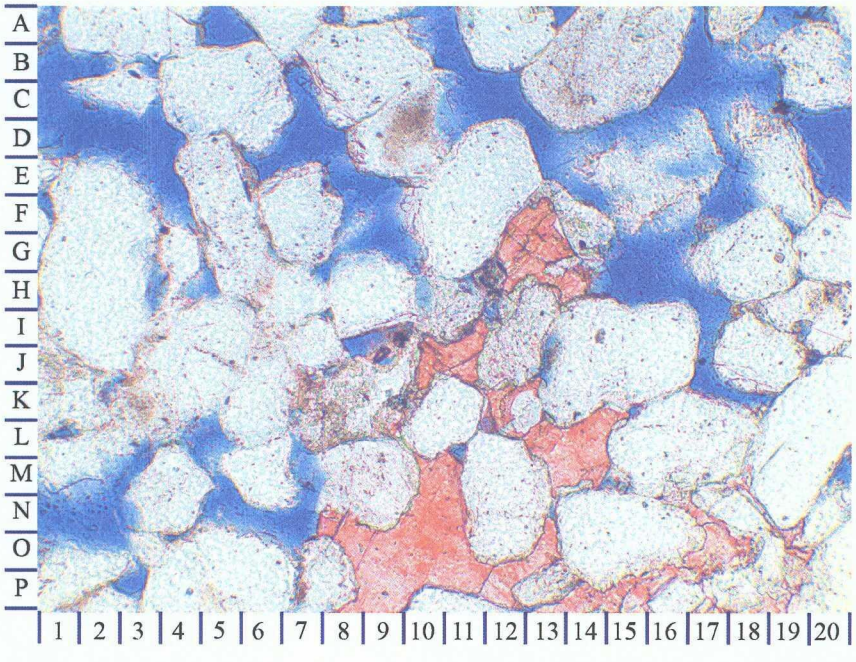
0.50 mm

File No.:	23022
Company:	Western Gas Partners, LP
Well:	Pathfinder AGE #1
Depth (Ft):	6408.20

Thin Section Description

This sample retains the large patches of calcite cemented rock (red) that are present before the acid flow. The rock fabric, grain content and pore structure also appear similar between the two samples.

B-125x



0.10 mm

Attachment 3

Request to NMOCD for an Increase in the Maximum Allowable Operating Pressure (MAOP) for the Salty Dog #5 SWD by Lance Oil & Gas Company, January 25, 2006

in 1/26/06 2/10/06

pwvjs0603854055

LANCE OIL & GAS COMPANY, INC.

P.O. Box 70 • Kirtland, New Mexico 87417
(505) 598-5601 Ext. 43 • Fax (505) 598-0064

SWD-971-A

January 25, 2006

New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St Francis Drive
Santa Fe, NM 87505

Attn: Mr. William Jones

RE: Salty Dog #5
NE/4 Section 16, T29N – R14W
San Juan County, New Mexico
Administrative Order SWD - 971

Dear Mr. Jones:

Lance Oil and Gas Company, Inc. respectively requests modifications to previously approved Administrative Order SWD – 971 dated March 4, 2005. The perforation intervals after drilling along with the Maximum Allowable Operating Pressure (MAOP) require modifications prior to first injection. The MAOP modification from 1,325 psig to 2,000 psig is well below the formation parting pressure as detailed below.

Perforation Intervals

The well was perforated in the Entrada Formation from 6,514' – 44' KB, 6,564' – 94' KB and 6,614' – 44' KB. The three 30 foot intervals were perforated with two 20 foot intervals in-between left unperforated to facilitate isolation if ever required. A copy of the composite log is attached with the perforated intervals noted. The Entrada formation looks like a very good water disposal interval with porosity averaging greater than 21%. Lance requests a modification to the previously approved Administrative Order SWD – 971 dated March 4, 2005. The original permit authorizes "*the injection of produced water for disposal purposes into the Entrada formation through perforations from 6,625 feet to 6,750' through plastic-lined tubing set with a packer located within 100 feet of the top of the injection interval*". Lance perceived the permit to be specific to the Entrada formation and not the perforation intervals. The NMOCD Aztec Division is aware of the error pursuant to conversation Erwin / Perrin / Hayden on 12/16/05. Notice of Intents are attached as appropriate including the Affidavit of Publication and the 15 day notice dated December 22, 2005.

Step-Rate Test

A Salty Dog #5 step-rate injection test (SRT) was conducted on December 17, 2005 to ascertain the formation breakdown pressure. The SRT was pumped down 2-3/8" tubing with a packer set at 6,461' KB and Tefteller bottomhole gauges set at 6,580' KB. The maximum injection rate achieved during the SRT was 5-3/4 bwpm with a corresponding surface injection pressure of 4,060 psig. Lance believes the matrix leak-off is very large and thus has not parted or fractured the Entrada formation at 5-3/4 bwpm and 4,060 psig. The 2-3/8" tubing exacerbates friction pressure with the friction pressure increasing rapidly during the higher injection rates. The surface injection pressure and bottomhole pressure down 2-3/8" tubing is presented in Attachment #1.

Attachment #1 also indicates the surface injection pressure versus rate without friction down 2-3/8" tubing. As you would expect the surface pressure without friction pressure and bottomhole pressures are parallel

with only the hydrostatic pressure gradient of water between the two curves. Both curves are very flat indicating to Lance that the formation is able to accept very large volumes of water without increasing the bottom hole pressures. It seems reasonable to expect that 150 foot Entrada sandstone could not be fractured with only 5-3/4 bwpm.

Attachment #1 also graphically represents the 2-7/8" plastic-lined tubing friction added into the surface pressure. Lance requests a MAOP of 2,000 psig with 2-7/8" internally coated tubing which Lance believes is well below the formation parting pressure. The original SRT digital data as recorded with Tefteller, Inc. bottom hole gauges is included as an attachment for your perusal. The digital data has been used to prepare Table 1 indicating the bottom hole pressures with and without friction pressures. Since the bottom hole pressure data was obtained down 2-3/8" tubing, Lance has corrected for friction down 2-7/8" plastic-lined tubing. A table is attached with the original bottomhole pressures down 2-3/8" tubing, corrected for no friction down 2-3/8" tubing and finally corrected back to friction down 2-7/8" internally coated tubing. Again, it appears that the formation has not reached the formation parting pressure.

Your timely approval would be appreciated. Pls feel free to call Tom Erwin (505-598-5601 Ext 63) if you have any questions.

Sincerely,
LANCE OIL AND GAS COMPANY, INC.

Thomas M. Erwin, P.E.
Senior Petroleum Engineer

Attachments

Cc: **Mr. Charlie Perrin - NMOCD**
Mr. Dave Gomendi – Lance Oil & Gas

Lance Salty Dog 5 Perforation Recommendations

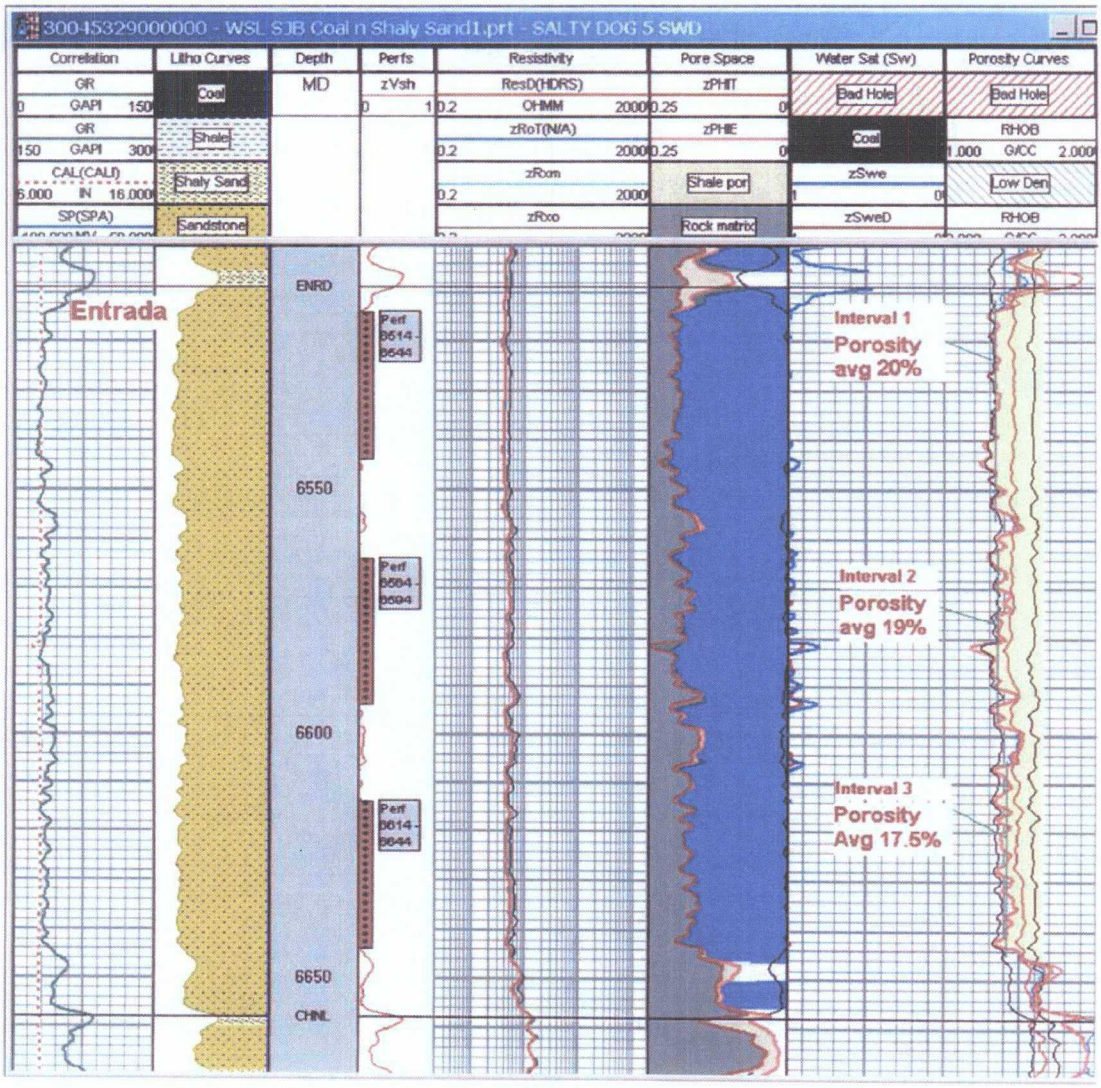
Complete the Entrada Sandstone for water disposal over 3 intervals.

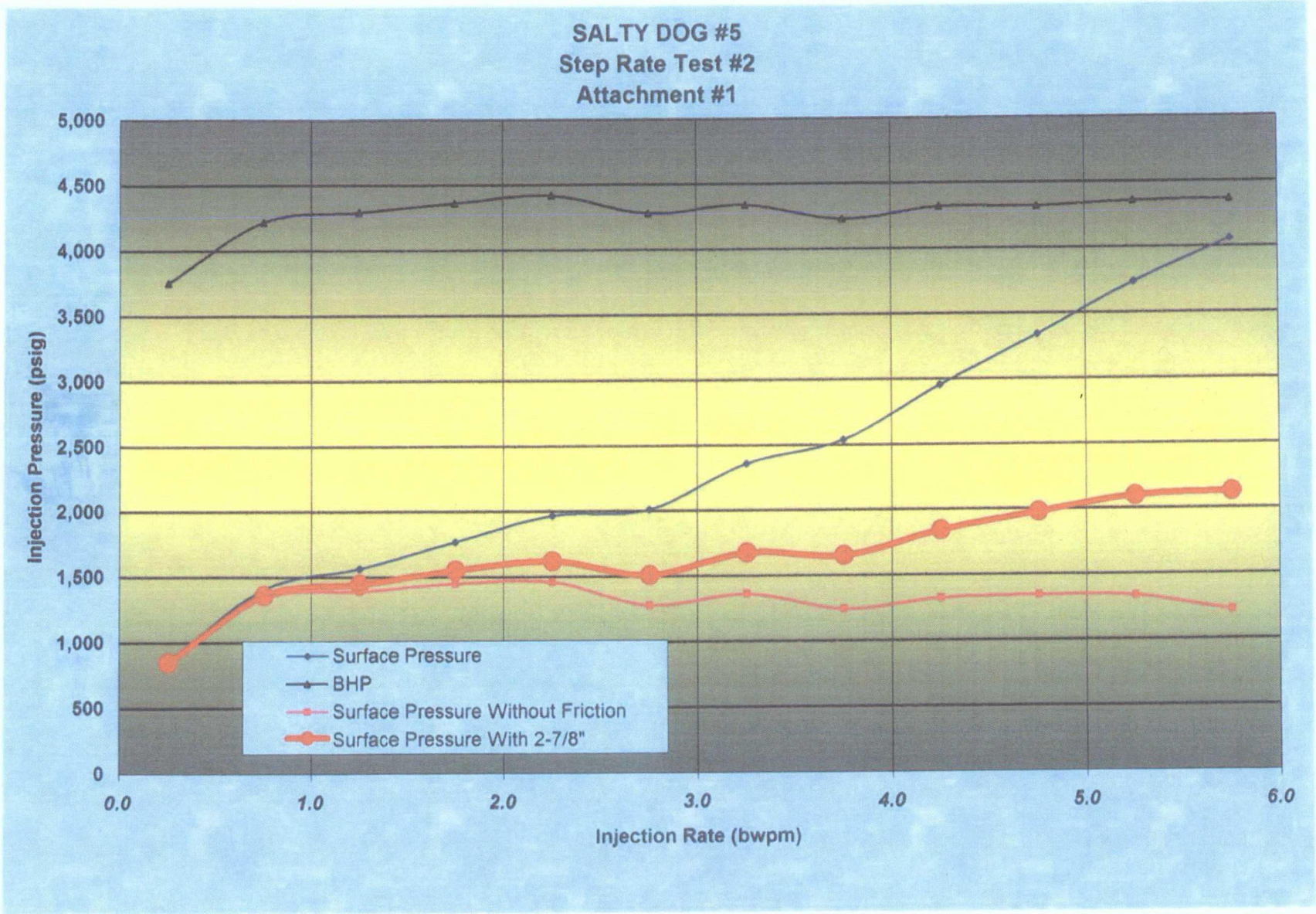
The Entrada has nearly 150 ft of continuous, high porosity from 6514 to 6656 that should make for an excellent water disposal zone. The interval will be perforated in three sections within this porosity as shown below. That arrangement will facilitate setting bridge plugs between perforation sets at later times should isolation testing of individual perforation intervals ever be necessary.

The perforations should receive an acid clean-up, however, stimulation of the zone by frac'ing is probably not going to be necessary.

Stage 1, Entrada Sandstone – 360 total shots

Perforation Interval 1	Total Ft	Density	# Shots	Shot Dia.	Phasing
6514 - 44	30 ft	4 SPF	120 Shots	.42	120 Deg
Perforation Interval 2	**Total Ft**	**Density**	**# Shots**	**Shot Dia.**	**Phasing**
6564 – 94	30 ft	4 SPF	120 Shots	.42	120 Deg
Perforation Interval 3	**Total Ft**	**Density**	**# Shots**	**Shot Dia.**	**Phasing**
6614 – 44	30 ft	4 SPF	120 Shots	.42	120 Deg




SALTY DOG #5
Step Rate Test #2
Attachment #1
Injection Pressure (psig)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
0.0
1.0
2.0
3.0
4.0
5.0
6.0
Injection Rate (bwpm)
Surface Pressure
BHP
Surface Pressure Without Friction
Surface Pressure With 2-7/8"

Lance Oil & Gas Company, Inc.

Salty Dog #5

Step Rate Test #2 - 12/17/05

Table #1

Fresh Water Injection Rate (bwpm)	Actual Down 2-3/8" Tubing		Calculated Down 2-3/8" Tubing Without Friction		Calculated Down 2-7/8" Internally Coated Tubing With Friction	
	Surface Injection Pressure (psig)	Tefteller, Inc. Bottom Hole Pressure (psig)	Total Friction Pressure ** (psig)	Calculated Surface Injection Pressure (psig)	Total Friction Pressure ** (psig)	Calculated Surface Injection Pressure (psig)
0.25	856.0	3,754.0	9.0	847.0	2.7	849.7
0.75	1,410.0	4,221.0	67.5	1,342.5	20.9	1,363.4
1.25	1,565.0	4,292.0	172.4	1,392.6	53.8	1,446.4
1.75	1,770.0	4,363.0	319.7	1,450.3	100.3	1,550.6
2.25	1,968.0	4,421.0	507.1	1,460.9	159.7	1,620.6
2.75	2,014.0	4,280.0	733.0	1,281.0	231.5	1,512.5
3.25	2,360.0	4,340.0	996.1	1,363.9	315.4	1,679.3
3.75	2,539.0	4,226.0	1,295.5	1,243.5	410.9	1,654.4
4.25	2,955.0	4,317.0	1,630.1	1,324.9	518.0	1,842.9
4.75	3,341.0	4,319.0	1,999.5	1,341.5	636.4	1,977.9
5.25	3,736.0	4,355.0	2,402.8	1,333.2	765.8	2,099.0
5.75	4,060.0	4,367.0	2,839.6	1,220.4	906.2	2,126.6

** See Attached Halliburton Friction Curve for 2-3/8" Tubing and Tuboscopes Friction Curve for 2-7/8" Internally Coated Tubing.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Mark E. Fesmire, P.E.
Director
Oil Conservation Division

ADMINISTRATIVE ORDER SWD-971-A

APPLICATION OF LANCE OIL & GAS COMPANY, INC. FOR PRODUCED WATER DISPOSAL, SAN JUAN COUNTY, NEW MEXICO.

ADMINISTRATIVE ORDER
OF THE OIL CONSERVATION DIVISION

Under the provisions of Rule 701(B), Lance Oil & Gas Company, Inc. made application to the New Mexico Oil Conservation Division on January 26, 2006, for permission to amend the existing permit to inject produced water into the Salty Dog SWD Well No. 5 (API No. 30-045-32900) located 1030 feet from the North line and 1365 feet from the East line of Section 16, Township 19 North, Range 14 West, NMPM, San Juan County, New Mexico.

THE DIVISION DIRECTOR FINDS THAT:

(1) The application has been duly filed under the provisions of Rule 701(B) of the Division Rules and Regulations;

(2) Satisfactory information has been provided that all offset operators and surface owners have been duly notified;

(3) A step-rate test has been run on the perforated interval and the surface fracture pressure determined to be greater than 2,000 psi.

(4) The applicant has presented satisfactory evidence that all requirements prescribed in Rule 701 will be met; and

(5) No objections have been received within the waiting period prescribed by said rule.

IT IS THEREFORE ORDERED THAT:

The applicant is hereby authorized to utilize its Salty Dog SWD Well No. 5 (API No. 30-045-32900) located 1030 feet from the North line and 1365 feet from the East line of Section 16, Township 19 North, Range 14 West, NMPM, San Juan County, New Mexico, in such manner as

to permit the injection of produced water for disposal purposes into the Entrada formation through perforations from **6,514 feet to 6,644 feet** and through plastic-lined tubing set with a packer located within 100 feet of the top of the injection interval.

IT IS FURTHER ORDERED THAT:

The operator shall take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

After perforating the injection interval, the estimated static reservoir pressure shall be reported to the Division on a sundry report.

After installing injection tubing, the casing shall be pressure tested from the surface to the packer setting depth to assure casing integrity.

The casing-tubing annulus shall be loaded with an inert fluid and equipped with a pressure gauge or an approved leak detection device in order to determine leakage in the casing, tubing, or packer.

The wellhead injection pressure on the well shall be limited to **no more than 2,000 psi as per the step-rate test run 12/17/2005.** In addition, the injection well or system shall be equipped with a pressure limiting device in workable condition which shall, at all times, limit surface injection pressure to the maximum allowable pressure for this well.

The Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the injection formation. Such proper showing shall consist of a valid step-rate test run in accordance with and acceptable to this office.

The operator shall notify the supervisor of the Aztec district office of the Division of the date and time of the installation of disposal equipment and of any mechanical integrity test so that the same may be inspected and witnessed.

The operator shall immediately notify the supervisor of the Aztec district office of the Division of the failure of the tubing, casing, or packer in said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

PROVIDED FURTHER THAT, jurisdiction is retained by the Division for the entry of such further orders as may be necessary for the prevention of waste and/or protection of correlative rights or upon failure of the operator to conduct operations (1) to protect fresh water or (2) consistent with the requirements in this order, whereupon the Division may, after notice and hearing, terminate the injection authority granted herein.

The operator shall provide written notice of the date of commencement of injection to the

Aztec district office of the Division.

The operator shall submit monthly reports of the disposal operations on Division Form C-115, in accordance with Rule Nos. 706 and 1120 of the Division Rules and Regulations.

The injection authority granted herein shall terminate one year after the effective date of this order if the operator has not commenced injection operations into the subject well, provided however, the Division, upon written request by the operator, may grant an extension thereof for good cause shown.

Approved at Santa Fe, New Mexico, on February 8, 2006.

MARK E. FESMIRE, P.E.
Director

MEF/wvjj

cc: Oil Conservation Division – Aztec
State Land Office – Oil, Gas, and Minerals Division