Appendix K:
Reservoir Stimulation, Tests and Analysis
(Logs on CD-ROM)

- Schlumberger Reservoir Stimulation Report
- CUDD Energy Services Pump Test Results
- Geolex Step-Rate Test Results
- Schlumberger Report on Distributed Temperature Profiles during Injection Well Testing and Bottomhole Pressure Measurements and Analysis
- Cardinal Surveys Tracer and Temperature Survey Logs

Service Contract Receipt

SCHLUMBERGER TECHNOLOGY CORPORATION

Schlumberger

Service Contract Number
BIZG-00393

Invoice Mailing Address: AMBRIAN MANAGEMENT LTD P.O. Box 272 MIDLAND TX 79702 USA	Left District	Date: 30-Jun-2011	Time: 5:00 AM
	Arrive Location	Date: 30-Jun-2011	Time: 6:00 AM
	Start Job	Date: 30-Jun-2011	Time: 9:00 AM
	Complete Job	Date: 30-Jun-2011	Time: 10:35 AM
	Leave Location	Date: 30-Jun-2011	Time: 11:35 AM
	Arrived District	Date: 30-Jun-2011	Time: 12:35 PM
	Service Description	Stimulation Matrix, Matrix Acid	

Customer PO	Contract	Well Name & Number Eunice Gas Plant #1 SWD	Field Targa
AFE	Cust Ref	County/Parish/Block/Borough Lea	State/Province NM
Customer or Authorized Representative David Rodriguez		SLB Location Hobbs, NM	Legal Location
API/UWI		Pricebook WSV_GEOREF_USL_2009_USD_v1	Rig

Service Instructions:

Acidize in 1 stg5000 gal 15% HCl1000 lbs Rocksalt (take 2000 extra just in case!)

Estimated Discounted Total (USD): 19,125.44

THE ESTIMATED CHARGES AND DATA SHOWN ABOVE ARE SUBJECT TO CORRECTION BY SCHLUMBERGER.

THE SERVICES, EQUIPMENT, MATERIALS AND/OR PRODUCTS PROVIDED BY THIS SERVICE CONTRACT RECEIPT HAVE BEEN PERFORMED OR RECEIVED AS SET FORTH ABOVE.

...ture of Customer or Authorized Representative:	**Signature of Schlumberger Representative:**
unknown ...y David Rodriguez ...011 10:45:40	Validity unknown Signed by Peter Lewis 6/30/2011 10:45:48
David Rodriguez — Date	Peter Lewis — Date

Date Printed: 30-Jun-2011 10:45 AM

Service Contract Receipt
SCHLUMBERGER TECHNOLOGY CORPORATION

Schlumberger

Service Contract Number: BIZG-00393

Invoice Mailing Address:
AMBRIAN MANAGEMENT LTD

P.O. Box 272

MIDLAND TX
79702 USA

Left District	Date: 30-Jun-2011	Time: 5:00 AM
Arrive Location	Date: 30-Jun-2011	Time: 6:00 AM
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Leave Location	Date: 30-Jun-2011	Time: 11:35 AM
Arrived District	Date: 30-Jun-2011	Time: 12:35 PM
Service Description	Stimulation Matrix, Matrix Acid	

Customer PO	Contract	Well Name & Number: Eunice Gas Plant #1 SWD	Field: Targa
AFE	Cust Ref	County/Parish/Block/Borough: Lea	State/Province: NM
Customer or Authorized Representative: David Rodriguez		SLB Location: Hobbs, NM	Legal Location
API/UWI		Pricebook: WSV_GEOREF_USL_2009_USD_v1	Rig

Service Instructions:
Acidize in 1 stg5000 gal 15% HCl1000 lbs Rocksalt (take 2000 extra just in case!)

THE ESTIMATED CHARGES AND DATA SHOWN BELOW ARE SUBJECT TO CORRECTION BY SCHLUMBERGER

Item	Description	Qty	UOM	Price	Disc	Amount
Products						
A262	Inhibitor, Corrosion	10	GA	76.00	20.00%	608.00
H015	Acid, Hydrochloric 15pct	5000	GA	2.04	20.00%	8,160.00
J066S	FIXAFRAC Diverting Agent	3000	LB	0.33	20.00%	792.00
J218	Breaker	2	LB	5.50	20.00%	8.80
J876	Slurry, HPG Polymer	7	GA	35.50	20.00%	198.80
[illegible]	Gypban	15	GA	54.38	20.00%	652.56
[illegible]	Iron Stabilizer	50	LB	12.95	20.00%	518.00
U042	Iron Chelating Agent	25	GA	25.25	20.00%	505.00
W054	Non-Emulsifying Agent	10	GA	43.84	20.00%	350.72
					Products Subtotal:	**14,742.35**
					Discount:	**2,948.47**
					Products Total:	**11,793.88**
Services						
28021000	Pump, Frac Rated 251-650 hhp Minimum	1	EA	2,000.00	20.00%	1,600.00
28082000	Chemical Float	1	JOB	308.20	20.00%	246.56
28179000	Pump, Frac Non-Pumping Time	2	HR	320.00	20.00%	512.00
58041009	Transport, Acid	8	HR	172.50	20.00%	1,104.00
59200002	Transportation, Mileage Heavy Vehicles	150	MI	5.52	20.00%	662.40
59200005	Transportation, Mileage Light Vehicles	50	MI	3.24	20.00%	129.60
59697004	CemCAT Monitoring System	1	JOB	880.00	20.00%	704.00
102946000	Fuel Surcharge (non-discounted)	3	EA	450.00		1,350.00
107264001	Regulatory Conformance Charge	3	EA	341.00		1,023.00
					Services Subtotal:	**8,571.20**
					Discount:	**1,239.64**
					Services Total:	**7,331.56**

Total (Before Discount):	**23,313.55**		
Discount:	**4,188.11**		
Special Discount:	**0.00**	**Estimated Discounted Total (USD):**	**19,125.44**

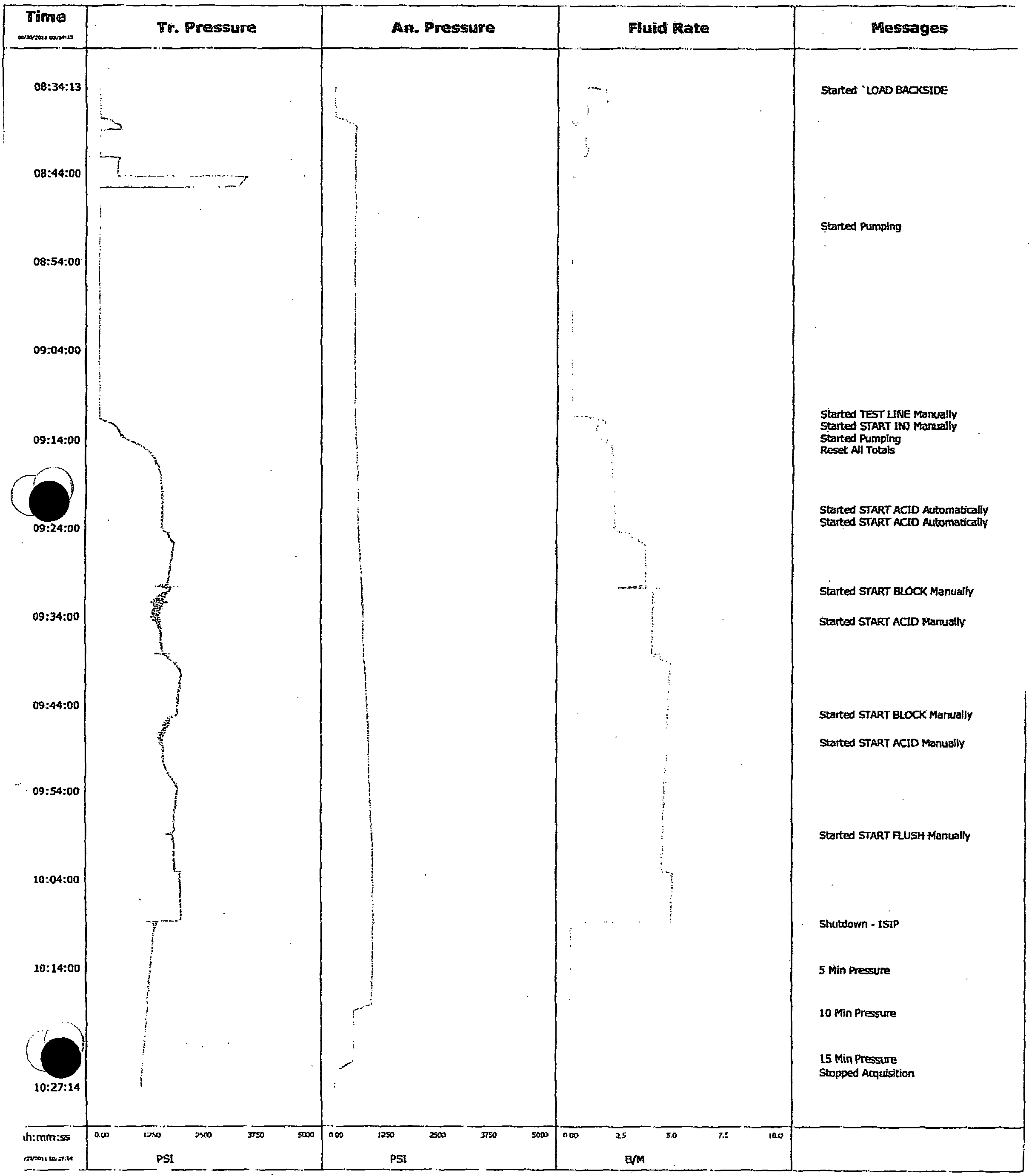
Date Printed: 30-Jun-2011 10:45 AM

Schlumberger

Matrix Job Report

MatCAT v1

Well	EUNICE GAS PLANT 1	**Client**	CAMBRIAN MANAGEMENT
	TARGA	**SIR No.**	591103
Engineer	PETER LEWIS	**Job Type**	ACID ROCK SALT
Country	United States	**Job Date**	06-30-2011



Schlumberger

Job Date: 06-30-2011

Customer: CAMBRIAN MANAGEMENT
District: HOBBS
Representative: DAVID ROGRIGUEZ
DS Supervisor: PETER LEWIS
Well: EUNICE GAS PLANT 1

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure psi	Fluid Rate bbl/min	Total Fluid Volum bbl	MC AN PRES psi
06:30:2011:08:34:13	0	0.7	0.0	-0
06:30:2011:08:34:32	Started LOAD BACKSIDE			
06:30:2011:08:34:32	0	1.7	0.0	0
06:30:2011:08:35:02	1	1.7	0.9	0
06:30:2011:08:35:51	0	1.7	2.3	0
06:30:2011:08:36:40	1	0.7	3.0	0
06:30:2011:08:37:29	0	0.7	3.7	1
06:30:2011:08:38:18	389	0.0	4.0	391
06:30:2011:08:39:07	5	0.0	4.0	515
06:30:2011:08:39:56	-1	0.7	4.5	510
06:30:2011:08:40:45	-1	0.6	5.0	507
06:30:2011:08:41:34	0	0.7	5.7	505
06:30:2011:08:42:23	469	0.0	6.1	507
06:30:2011:08:43:12	453	0.0	6.1	506
06:30:2011:08:44:01	445	0.0	6.1	505
06:30:2011:08:44:50	3442	0.0	6.1	503
06:30:2011:08:45:39	-1	0.0	6.1	502
06:30:2011:08:46:28	-7	0.0	6.1	501
06:30:2011:08:47:17	0	0.0	6.1	501
06:30:2011:08:48:06	13	0.0	6.1	500
06:30:2011:08:48:55	11	0.0	6.1	499
06:30:2011:08:49:44	10	0.0	6.1	498
06:30:2011:08:49:59	Started Pumping			
06:30:2011:08:49:59	10	0.0	6.1	498
06:30:2011:08:50:35	10	0.0	6.1	498
06:30:2011:08:51:24	9	0.0	6.1	497
06:30:2011:08:52:13	9	0.0	6.1	496
06:30:2011:08:53:02	8	0.0	6.1	495
06:30:2011:08:53:51	8	0.0	6.1	495
06:30:2011:08:54:40	8	0.0	6.1	494
06:30:2011:08:55:29	7	0.0	6.1	494
06:30:2011:08:56:18	7	0.0	6.1	493
06:30:2011:08:57:07	7	0.0	6.1	493
06:30:2011:08:57:56	7	0.0	6.1	492
06:30:2011:08:58:45	7	0.0	6.1	492
06:30:2011:08:59:34	7	0.0	6.1	492
06:30:2011:09:00:23	7	0.0	6.1	491
06:30:2011:09:01:12	7	0.0	6.1	491
06:30:2011:09:02:01	7	0.0	6.1	491
06:30:2011:09:02:50	7	0.0	6.1	490
06:30:2011:09:03:39	6	0.0	6.1	490
06:30:2011:09:04:28	6	0.0	6.1	490
06:30:2011:09:05:17	7	0.0	6.1	490
06:30:2011:09:06:06	6	0.0	6.1	489
06:30:2011:09:06:55	6	0.0	6.1	489
06:30:2011:09:07:44	6	0.0	6.1	489
06:30:2011:09:08:33	5	0.0	6.1	489
06:30:2011:09:09:22	6	0.0	6.1	489
06:30:2011:09:10:11	5	0.0	6.1	489
06:30:2011:09:11:00	Started TEST LINE Manually			
06:30:2011:09:11:00	6	0.0	6.1	489
06:30:2011:09:11:03	Started START INJ Manually			
06:30:2011:09:11:03	5	0.0	6.1	488
06:30:2011:09:11:20	Started Pumping			
06:30:2011:09:11:20	Reset All Totals			
06:30:2011:09:11:20	7	0.9	6.1	488
06:30:2011:09:11:52	164	1.5	0.7	498
06:30:2011:09:12:41	449	1.2	1.9	510
06:30:2011:09:13:30	585	1.2	2.9	515

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure psi	Fluid Rate bbl/min	Total Fluid Volum bbl	MC AN PRES psi
06:30:2011:09:15:08	1162	2.0	5.9	538
06:30:2011:09:15:57	1327	2.1	7.6	549
06:30:2011:09:16:46	1418	2.0	9.2	554
06:30:2011:09:17:35	1470	2.0	10.9	560
06:30:2011:09:18:24	1493	2.1	12.6	564
06:30:2011:09:19:13	1496	2.1	14.3	565
06:30:2011:09:20:02	1518	2.1	16.1	568
06:30:2011:09:20:51	1531	2.1	17.8	575
06:30:2011:09:21:40	1529	2.1	19.5	583
06:30:2011:09:21:54	Started START ACID Automatically			
06:30:2011:09:21:54	1516	2.1	20.0	581
06:30:2011:09:22:29	1531	2.1	21.3	584
06:30:2011:09:22:42	Started START ACID Automatically			
06:30:2011:09:22:42	1539	2.1	21.8	582
06:30:2011:09:23:18	1544	2.2	23.1	584
06:30:2011:09:24:07	1551	2.2	24.9	594
06:30:2011:09:24:56	1710	3.0	27.0	602
06:30:2011:09:25:45	1837	3.6	29.7	611
06:30:2011:09:26:34	1777	3.6	32.7	623
06:30:2011:09:27:23	1765	3.6	35.7	625
06:30:2011:09:28:12	1708	3.6	38.7	640
06:30:2011:09:29:01	1706	3.6	41.7	645
06:30:2011:09:29:50	1683	3.6	44.7	659
06:30:2011:09:30:39	1366	2.3	47.5	664
06:30:2011:09:31:02	Started START BLOCK Manually			
06:30:2011:09:31:02	1716	4.0	49.0	673
06:30:2011:09:31:28	1527	4.0	50.7	664
06:30:2011:09:32:17	1574	4.2	54.0	697
06:30:2011:09:33:06	1340	4.0	57.3	715
06:30:2011:09:33:55	1347	4.0	60.6	714
06:30:2011:09:34:26	Started START ACID Manually			
06:30:2011:09:34:26	1306	4.0	62.7	703
06:30:2011:09:34:44	1484	4.0	63.9	710
06:30:2011:09:35:33	1517	4.0	67.1	708
06:30:2011:09:36:22	1494	4.0	70.4	709
06:30:2011:09:37:11	1485	4.0	73.7	713
06:30:2011:09:38:00	1537	4.0	76.9	722
06:30:2011:09:38:49	1675	4.4	80.4	730
06:30:2011:09:39:38	1879	4.8	84.3	748
06:30:2011:09:40:27	1976	4.9	88.3	760
06:30:2011:09:41:16	1952	4.8	92.2	771
06:30:2011:09:42:05	1937	4.8	96.2	782
06:30:2011:09:42:54	1927	4.8	100.2	794
06:30:2011:09:43:43	1907	4.8	104.1	805
06:30:2011:09:44:32	1895	4.8	108.0	813
06:30:2011:09:45:05	Started START BLOCK Manually			
06:30:2011:09:45:05	1875	4.7	110.7	823
06:30:2011:09:45:21	1636	4.8	111.9	817
06:30:2011:09:46:10	1621	4.7	115.8	837
06:30:2011:09:46:59	1558	4.7	119.7	839
06:30:2011:09:47:48	1469	4.7	123.6	847
06:30:2011:09:48:18	Started START ACID Manually			
06:30:2011:09:48:18	1501	4.7	126.0	833
06:30:2011:09:48:37	1497	4.7	127.5	847
06:30:2011:09:49:26	1572	4.7	131.3	838
06:30:2011:09:50:15	1543	4.7	135.2	843
06:30:2011:09:51:04	1598	4.7	139.0	845
06:30:2011:09:51:53	1679	4.6	142.8	854
06:30:2011:09:52:42	1793	4.6	146.7	863
06:30:2011:09:53:31	1906	4.6	150.4	872
06:30:2011:09:54:20	1884	4.6	154.2	884
06:30:2011:09:55:09	1855	4.6	158.0	896
06:30:2011:09:55:58	1852	4.6	161.7	897
06:30:2011:09:56:47	1818	4.6	165.5	911
06:30:2011:09:57:36	1815	4.6	169.2	917

Well: EUNICE GAS PLANT 1

Schlumberger

Job Date: 06-30-2011

Time mm:dd:yyyy:hh:mm:ss	Treating Pressure psi	Fluid Rate bbl/min	Total Fluid Volum bbl	MC AN PRES psi
06:30:2011:09:58:25	1813	4.5	172.9	925
06:30:2011:09:58:55	Started START FLUSH Manually			
06:30:2011:09:58:55	1748	4.5	175.2	935
06:30:2011:09:59:14	1809	4.5	176.6	932
06:30:2011:10:00:03	1822	4.5	180.3	942
06:30:2011:10:00:52	1800	4.5	184.0	944
06:30:2011:10:01:41	1816	4.5	187.7	952
06:30:2011:10:02:30	1836	4.5	191.4	954
06:30:2011:10:03:19	1944	5.0	195.1	954
06:30:2011:10:04:08	1953	5.0	199.2	960
06:30:2011:10:04:57	1957	5.0	203.3	960
06:30:2011:10:05:46	1966	5.0	207.4	958
06:30:2011:10:06:35	1972	5.0	211.4	959
06:30:2011:10:07:24	1992	4.9	215.5	962
06:30:2011:10:08:13	1998	5.0	219.6	964
06:30:2011:10:08:57	Shutdown - ISIP			
06:30:2011:10:08:57	1392	0.0	222.3	954
06:30:2011:10:09:02	1342	0.0	222.3	953
06:30:2011:10:09:51	1314	0.0	222.3	951
06:30:2011:10:10:40	1300	0.0	222.3	950
06:30:2011:10:11:29	1286	0.0	222.3	948
06:30:2011:10:12:18	1271	0.0	222.3	946
06:30:2011:10:13:07	1258	0.0	222.3	945
06:30:2011:10:13:56	1245	0.0	222.3	943
06:30:2011:10:14:07	5 Min Pressure			
06:30:2011:10:14:07	1241	0.0	222.3	943
06:30:2011:10:14:45	1231	0.0	222.3	942
06:30:2011:10:15:34	1219	0.0	222.3	940
06:30:2011:10:16:23	1206	0.0	222.3	938
06:30:2011:10:17:12	1194	0.0	222.3	937
06:30:2011:10:18:01	1181	0.0	222.3	912
06:30:2011:10:18:50	1170	0.0	222.3	477
06:30:2011:10:19:04	10 Min Pressure			
06:30:2011:10:19:04	1166	0.0	222.3	472
06:30:2011:10:19:39	1158	0.0	222.3	472
06:30:2011:10:20:28	1145	0.0	222.3	471
06:30:2011:10:21:17	1132	0.0	222.3	471
06:30:2011:10:22:06	1120	0.0	222.3	471
06:30:2011:10:22:55	1107	0.0	222.3	471
06:30:2011:10:23:44	1094	0.0	222.3	470
06:30:2011:10:24:05	15 Min Pressure			
06:30:2011:10:24:05	1089	0.0	222.3	469
06:30:2011:10:24:33	1082	0.0	222.3	458
06:30:2011:10:25:22	1070	0.0	222.3	122
06:30:2011:10:26:11	1057	0.0	222.3	3
06:30:2011:10:27:00	1045	0.0	222.3	4

CPS Treatment Report

Customer:	TARGA	ESO#:	BBJS8JHHPN
Well Name & No.:	EUNICE GAS PLANT SWD # 1	Formation:	SAN ANDRES
County:	LEA	Date:	July 6, 2011
State:	NM	Well type:	Injection / New / Stim.

Customer Information

Address:	1000 LOUSIANA STREET SUITE 4300
City, State:	HOUSTAN TX
Zip Code:	77002-5050
Customer Representative:	DAVID RODRIQUEZ

ENERGY SERVICES

Remarks

STEP RATE TEST

Arrive on Location:	6:00 AM
Depart Location:	7:00 PM
Total Hours:	13.00

	Depth	O.D	Weight	I.D		Volume	Bbls/linear ft.
Tubing 1 length ft.:	4,201	2 7/8	6.5	0.000		0.00 BBLS.	0.00000
Tubing 2 length ft.:						0.00 BBLS.	0.00000
Casing 1 length ft.:	4,250	5 1/2	17.00	4.950		1.17 BBLS.	0.02380
Casing 2 length ft.:						0.00 BBLS.	0.00000
Open Hole length ft.:		N/A	N/A			0.00 BBLS.	0.00000
Combined Depth ft.:	4,250				Annular Vol.:	BBLS.	0.01577

	Depth	Vol.				
Top Perf/Open Hole:	4,250	1.17	Maximum Pressure:	2500	ISIP:	1672
Bottom Perf/Open Hole:	4,850	115.44	Average Pressure:	1060	5 min:	
Number of Perfs:	0		Maximum Rate:	5.0	10 min:	
Perf Size:	0.31	in.	Average Rate:	4.1	15 min:	
Packer Depth:	4,201	ft.	Fluid to Recover:	1124	Proppant Total:	0

Time	STP	CASING	Rate	Stage	Total	Comments
8:13:00 AM	0	0	0.0		0.0	SAFETY MEETING
8:28:00 AM	46	500.0	0.0		0.7	LOAD CASEING
8:55:00 AM	163	458.0	1.2		6.0	START WATER
9:00:00 AM	255	481.0	1.2		11.0	PSI & RATE CHECK
9:05:00 AM	302	481.0	1.2		17.0	PSI & RATE CHECK
9:10:00 AM	372	504.0	1.2		23.0	PSI & RATE CHECK
9:15:00 AM	441	504.0	1.2		29.0	PSI & RATE CHECK
9:15:00 AM	511	527.0	1.5		29.5	INCREASED RATE
9:20:00 AM	604	527.0	1.5		36.6	PSI & RATE CHECK
9:25:00 AM	650	550.0	1.5		44.4	PSI & RATE CHECK
9:30:00 AM	789	573.0	1.5		51.9	PSI & RATE CHECK
9:35:00 AM	789	595.0	1.5		59.7	PSI & RATE CHECK
9:35:00 AM	929	595.0	1.5		67.0	PSI & RATE CHECK
9:40:00 AM	1022	641.0	2.0		70.0	INCREASED RATE
9:50:00 AM	1068	664.0	2.0		81.4	PSI & RATE CHECK
9:55:00 AM	1184	687.0	2.0		90.0	PSI & RATE CHECK
9:55:00 AM	1184	481.0	2.0		100.0	PSI & RATE CHECK
10:00:00 AM	1324	481.0	2.5		100.0	INCREASED RATE
10:05:00 AM	1370	504.0	2.5		112.0	PSI & RATE CHECK
10:10:00 AM	1416	550.0	2.5		125.0	PSI & RATE CHECK
10:15:00 AM	1440	573.0	2.5		137.6	PSI & RATE CHECK
10:15:00 AM	1509	595.0	2.5		150.8	INCREASED RATE CHANGED GEAF
10:20:00 AM	1533	595.0	2.5		150.8	PSI & RATE CHECK
10:25:00 AM	1556	618.0	2.5		165.0	PSI & RATE CHECK
10:30:00 AM	1556	481.0	3.0		175.5	PSI & RATE CHECK
10:35:00 AM	1579	527.0	3.0		194.5	PSI & RATE CHECK
10:35:00 AM	1579	550.0	3.0		194.5	INCREASE RATE
10:40:00 AM	1718	550.0	3.0		194.5	PSI & RATE CHECK
10:45:00 AM	1718	573.0	3.0		226.0	PSI & RATE CHECK
10:50:00 AM	1718	458.0	3.5		243.5	INCREASE RATE
10:50:00 AM	1718	504.0	3.5		261.0	PSI & RATE CHECK
10:55:00 AM	1881	527.0	3.5		279.0	PSI & RATE CHECK

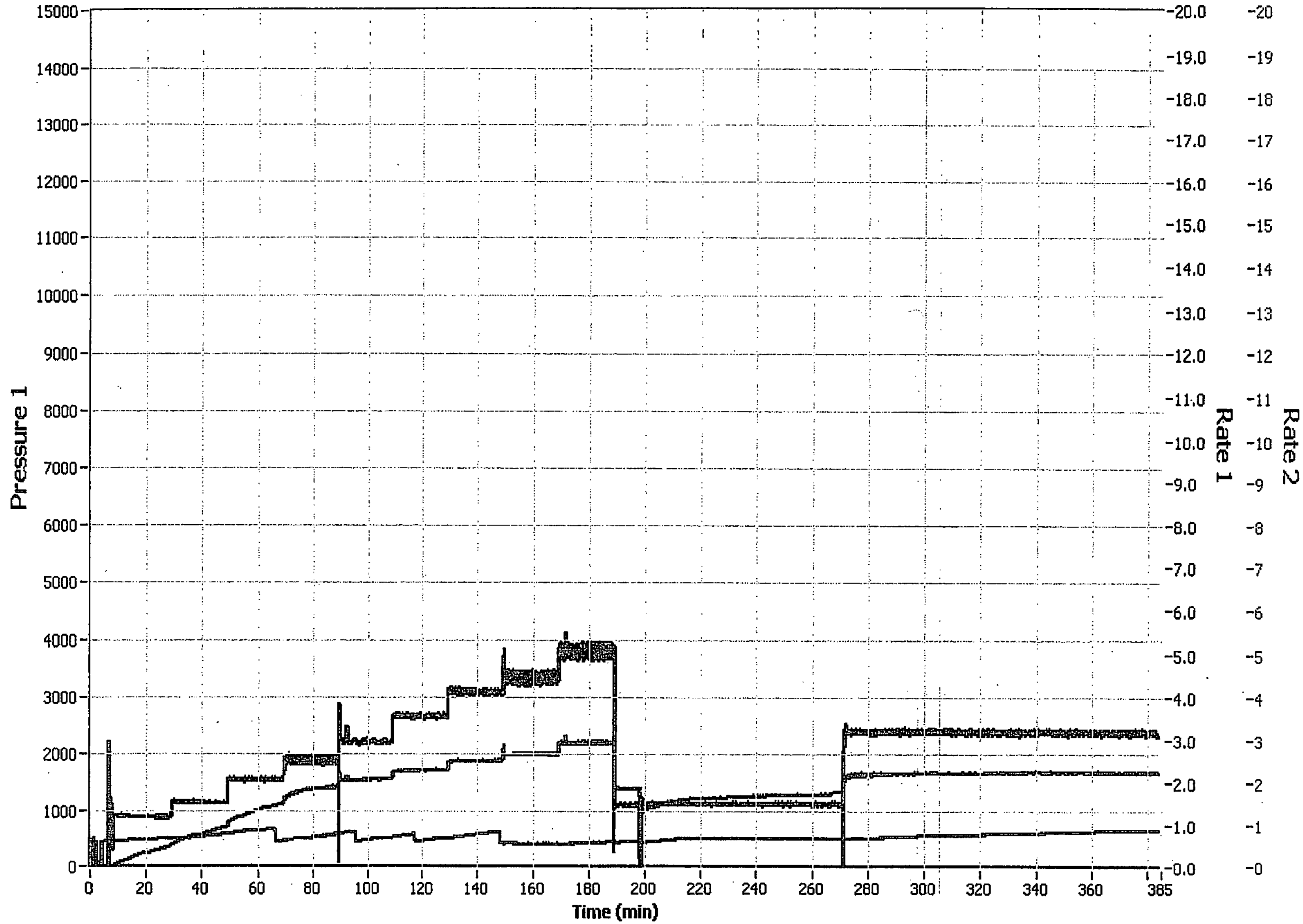
Treatment Report Continuation

ESO #

Page 2

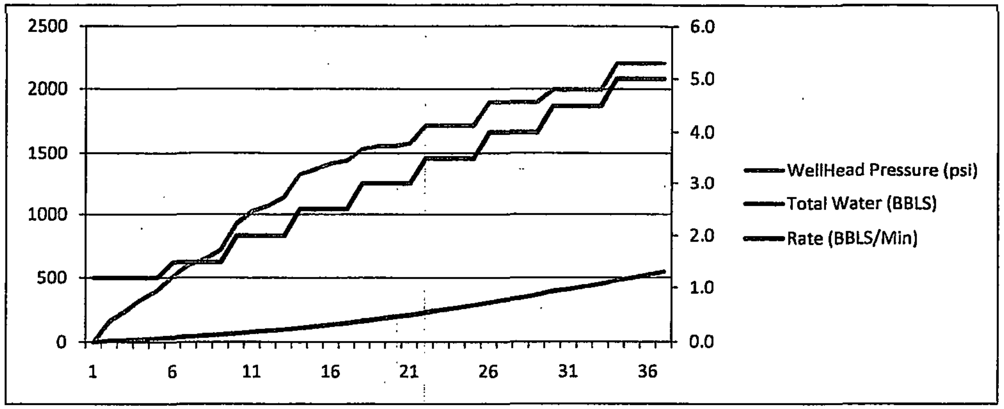
Time	STP	CASING	Rate	Stage	Total	Comments
10:55:00 AM	1904	527	3.5		279.0	PSI & RATE CHECK
11:00:00 AM	1904	550	3.5		302.0	PSI & RATE CHECK
11:05:00 AM	1904	595	4		325.0	PSI & RATE CHECK
11:10:00 AM	1904	618	4		340.0	PSI & RATE CHECK
11:15:00 AM	1904	435	4		361.0	PSI & RATE CHECK
11:15:00 AM	1997	435	4		361.0	PSI & RATE CHECK
11:20:00 AM	1997	435	4		382.0	PSI & RATE CHECK
12:00:00 AM	1997	435	4.5		406.5	INCREASED RATE
11:30:00 AM	1997	435	4.5		427.5	PSI & RATE CHECK
11:35:00 AM	2159	435	4.5		449.0	PSI & RATE CHECK
11:35:00 AM	2206	435	4.5		449.0	PSI & RATE CHECK
11:40:00 AM	2206	435	5		476.0	INCREASED RATE
11:45:00 AM	2206	435	5		501.0	PSI & RATE CHECK
11:50:00 AM	2206	458	5		424.0	PSI & RATE CHECK
11:55:00 AM	1416	458	5		424.0	PSI & RATE CHECK
11:55:00 AM	1207	458	5		550.0	PSI & RATE CHECK
12:13:00 PM	1022	458	1.5		563.0	DECREASED RATE
1:00:00 AM	1161	435	0		563.0	RAN OUT OF WATER
1:11:00 AM	1207	481	1.5		580.0	START WATER
1:20:00 AM	1254	504	1.5		591.0	PSI & RATE CHECK
1:40:00 AM	1254	504	1.5		610.0	PSI & RATE CHECK
1:50:00 AM	1277	504	1.5		623.0	PSI & RATE CHECK
2:00:00 AM	1277	504	1.5		939.0	PSI & RATE CHECK
2:10:00 AM	1277	504	1.5		654.0	PSI & RATE CHECK
2:20:00 AM	1300	527	1.5		670.0	PSI & RATE CHECK
2:30:00 AM	1300	527	1.5		685.0	PSI & RATE CHECK
2:40:00 AM	1324	527	1.5		700.0	PSI & RATE CHECK
2:50:00 AM	1324	527	1.5		714.0	PSI & RATE CHECK
3:00:00 AM	1324	527	1.5		727.0	PSI & RATE CHECK
3:00:00 AM	1625	527	1.5		742.0	PSI & RATE CHECK
3:10:00 AM	1600	527	3		746.0	INCREASED RATE
3:30:00 AM	1672	527	3		774.0	PSI & RATE CHECK
3:40:00 AM	1672	550	3		805.0	PSI & RATE CHECK
3:50:00 AM	1672	595	3		835.0	PSI & RATE CHECK
4:03:35 PM	1672	595	3		865.0	PSI & RATE CHECK
3:55:00 AM	1672	595	3		895.0	PSI & RATE CHECK
4:00:00 AM	1695	618	3		925.0	PSI & RATE CHECK
4:10:00 AM	1672	618	3		955.0	PSI & RATE CHECK
4:20:00 AM	1695	618	3		1005.0	PSI & RATE CHECK
4:32:01 PM	1672	641	3		1033.0	PSI & RATE CHECK

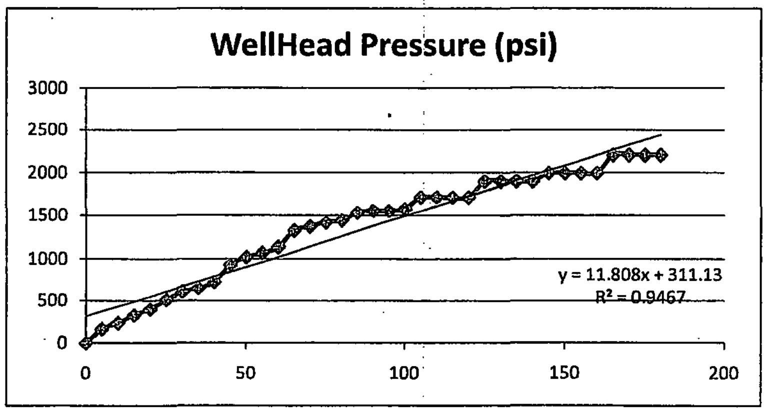
Surface Conditions



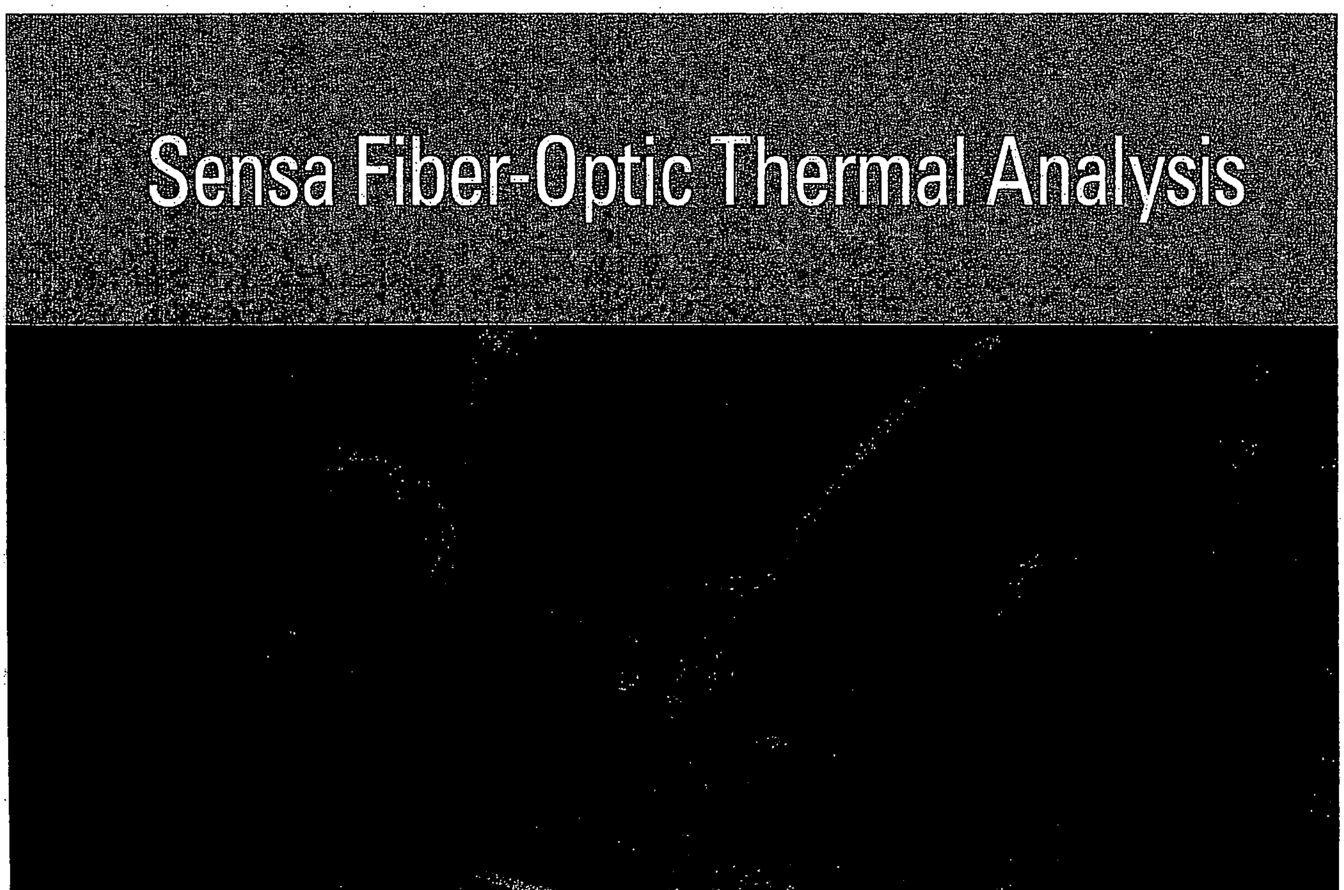
July 6 2011 Step Rate Test Data Recorded by Geolex, Inc. (JC Hunter)

Time (min)	Rate (BBLS/Min)	WellHead Pressure (psi)	Total Water (BBLS)
0	1.2	0	0
5	1.2	163	11
10	1.2	235	17.6
15	1.2	325	23.2
20	1.2	395	29
25	1.5	511	37
30	1.5	604	44.4
35	1.5	650	52
40	1.5	720	59.6
45	2.0	929	70.5
50	2.0	1022	81.5
55	2.0	1068	90.5
60	2.0	1138	100.3
65	2.5	1324	112.5
70	2.5	1370	125.2
75	2.5	1416	137.6
80	2.5	1440	150.6
85	3.0	1533	165
90	3.0	1556	179
95	3.0	1556	195
100	3.0	1579	208
105	3.5	1718	226.5
110	3.5	1718	244
115	3.5	1718	262
120	3.5	1718	279
125	4.0	1904	301
130	4.0	1904	323
135	4.0	1904	340
140	4.0	1904	361
145	4.5	1997	392
150	4.5	1997	406
155	4.5	1997	427
160	4.5	1997	449
165	5.0	2206	478
170	5.0	2206	500
175	5.0	2206	525
180	5.0	2206	549





TARGA
Eunice Gas Plant SWD#1
Distributed Temperature Profiles during Injection Well Testing



All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretation, and shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretations made by any of our officers, agents or employees. These interpretations are also subject to Clause 4 of our General Terms and Conditions as set out in our current Price Schedule

Project:	Distributed Temperature Sensors during Injection Well Testing
Prepared By:	Yosmar Gonzalez – Reservoir Engineer
Thermal Analysis by:	George Brown (Temperature Interpretation Advisor) and Yosmar Gonzalez
Date:	July, 2011
Company	Cambrian Management LTD
Field	SWD
Well Number:	Eunice Gas Plant #1
County	Lea
State & Country:	New Mexico, USA

Contents

1 Distributed Temperature Survey and Injection Logging Objectives

Monitor water injection perfomance and locate injection zones along the open hole interval located from 4258ft-4850ft.

For the Slick-Line DTS survey, the distributed temperature traces were taken before, during and after the Injection Well Test (warm back period). The shut-in temperature profiles will aid in analyzing conformance by injected water.

The DTS String was run along with memory pressure gauges to conducted pressure fall off tests, it will allows to provide information on the reservoir (effective permeability, *k*) and on the well (near-wellbore skin, *S*).

2 DTS in Water Injectors

2.1 The DTS Measurement

The fiber optic distributed temperature measurement uses an industrial laser to launch 10 nanosecond bursts of light down the optic fiber. During the passage of each packet of light a small amount is back-scattered from molecules in the fiber. This back-scattered light can be analyzed to measure the temperature along the fiber. Because the speed of light is constant a spectrum of the back-scattered light can be generated for each meter of the fiber using time sampling, allowing a continuous log of spectra along the fiber to be generated (Fig.1).

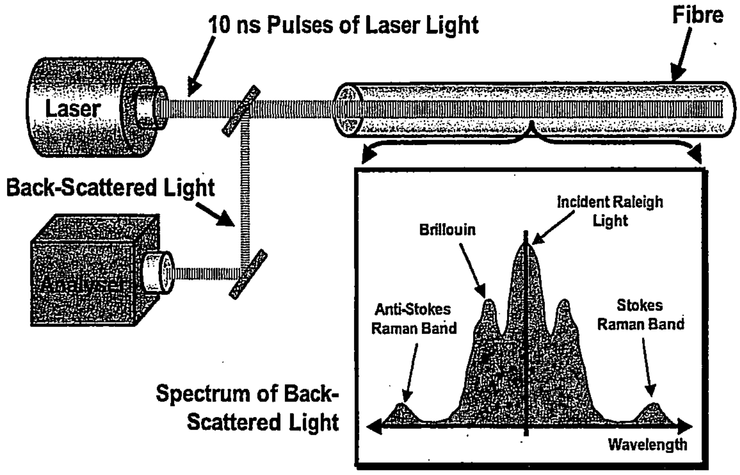


Fig.1 DTS Physics

A physical property of each spectrum of back-scattered light is that the ratio of the Stokes Raman to the Anti-Stokes Raman Bands is directly proportional to the temperature of the length of fiber from which it is generated. Consequently a log of temperature can be calculated every meter along the whole length of the fiber using only the laser source, analyzer and a reference temperature in the surface system, there is no need for any calibration points along the fiber or to calibrate the fiber before installation. Spectrum acquisition times can be varied from as little as 7 seconds to hours, and this defines the accuracy and resolution of the measured temperature log. Typically a resolution of 0.1 Degrees Centigrade is required for reservoir surveillance.

2.2 Temperature profiles in water injectors

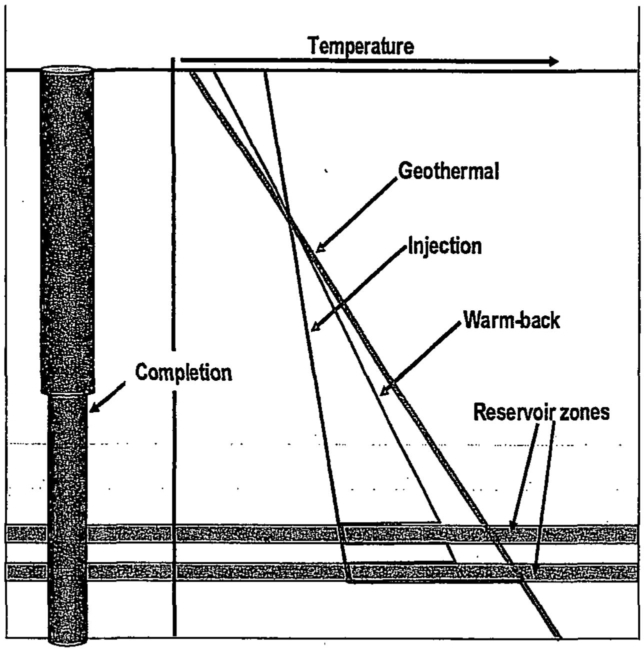


Figure 2: Temperature response to water injection

When injection is taking place the well/tubing is cooled to the temperature of the injected water. In low rate injection the injection profile may trend towards the geothermal line with depth, but usually the injection temperature at the reservoir is below the reservoir geothermal temperature. When the well is shut-in everything warms back towards the geothermal temperature. In zones which have not been flooded this can happen over a period of hours to days. However for flooded zones, where the water has cooled the rock deep into the formation, this can take may take days, or even years, depending on the length and amount of injection.

During the injection period, if the water injection rate is high, the injected fluid would have little time to exchange heat with the formation while moving down the wellbore. Thus the resultant temperature profile would be essentially a straight vertical line. For injection at lower rates, the water does have time to gain heat as moves downhole. At normal surface temperatures of the injection water, it follows that every injection rate between zero and infinity would produce an injection temperature profile with a gradient somewhere between these two extreme temperature curves.

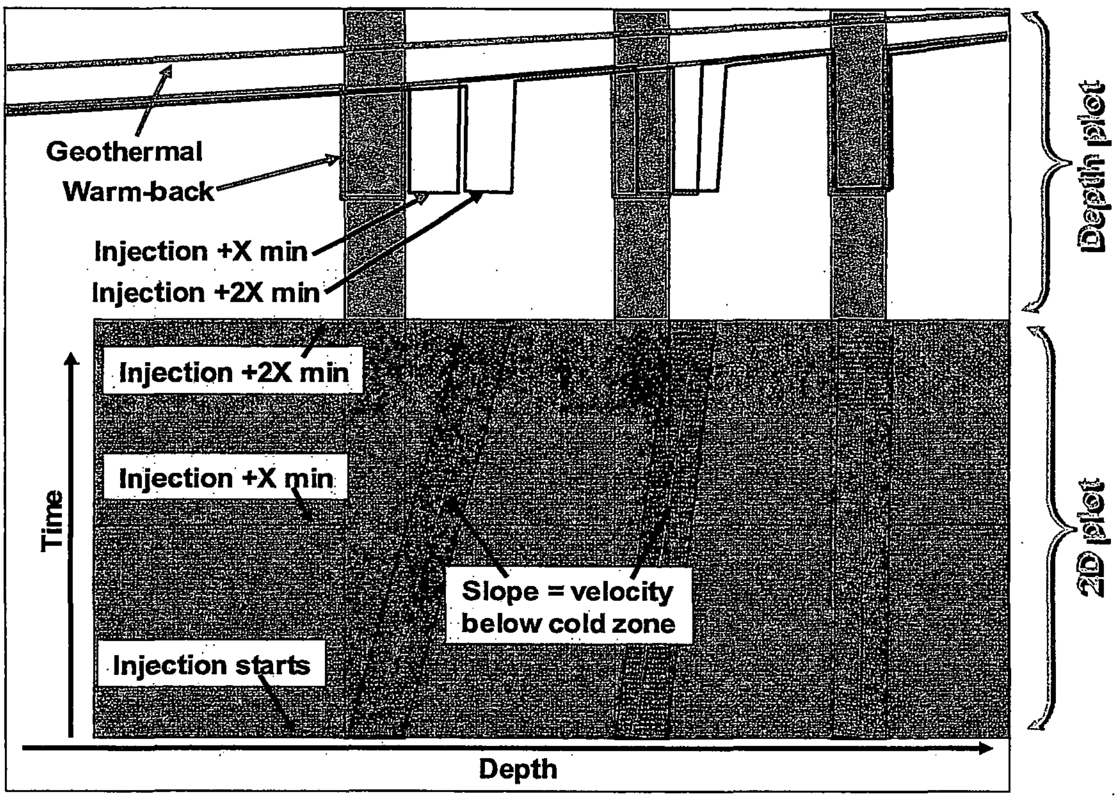
Also, the surface temperature of the water influences the injection curves, when cold water is injected; as the water moves down hole and contacts the warmer region, its temperature increases. For warmer or hot water injection, the temperature drops as the water moves downhole until water temperature reaches the geothermal temperature profile. At this elevation, where the water temperature equals the formation temperature, there is no heat transfer between water and formation, and the temperature curve becomes vertical. Gradually, with increasing depth, the curve again slopes as the water moves into warmer regions. Given sufficient depth, all three curves would converge to a common asymptote for that particular rate. The asymptote would be parallel, but would be cooler than, the geothermal profile.

2.3 Thermal tracking of cold events in water injectors

The reservoir zones that have remained cold as a result of injection have caused the water in the wellbore to be cold too, from conduction, so when injection is started the wellbore water moves down the well and into the perforations and so do these cold events in the wellbore. Thus some of the wellbore water is hot (that which has been opposite non reservoir intervals during shut-in) and some of this water is cold (that which has been opposite reservoir intervals during shut-in) and the movement of the hot and cold water down the well can be tracked by the DTS system acquiring temperature traces at 30 second intervals.

If the DTS traces are plotted in 2D, time and depth, the movement of the cold water intervals in the casing/tubing can be tracked and shows up as cold sloping events where the slope of the event represents the velocity of the fluid below the point where the event intersects zero time. Thus in the example above the velocity derived from the first reservoir zone cold event represents the velocity of the fluid between the first and second reservoir zones.

Because the DTS must be run at a very high acquisition rate (30 seconds) the temperature data is very noisy due to the statistical nature of the measurement. Consequently noise reduction algorithms were applied to the raw data after acquisition in order to enhance the measurements and improve the interpretation.



3 The Slick-Line Ultra DTS Logging System

A standard mobile slick line unit and drum with the fiber-optic installed inside a 1/8 inch diameter cable was utilized for these surveys. This combined the ease of using the slick-line as the conveyance, reliable pressure control and the physical properties of the Ultra DTS measurement.

After the surface equipment were rigged up, the depth correction was done using the Kelly Bushing as a reference datum so the log was shifted from a 0 reading at ground level at start of log. The tool acquired distributed temperature profiles with 1-meter of spatial resolution at acquisition times of 2 minutes, enabling the operator to monitor simultaneously all the temperature changes along the entire depth of the well.

The DTS survey lends itself to an initial wellsite diagnostic analysis. The acquired well data will be presented as 2D depth-temperature plots or 3D depth-temperature-time plots. For the 3D plots, the magnitude of temperature changes is represented by the color printed along the time axis.

4 Well Completion and Data Acquisition

The following procedure was conducted in the well to capture the thermal responses before, during the injection well test and after the injection stopped to analyze the warm back period:

1. On the 29th June, at 10:00 am the slick-line optic fiber was run in the well to record the baseline temperature profile (geothermal temperature) temperature for approximately 1hr.
2. On the 30th June, at 14:00:00, the DTS SL was deployed back to the wellbore after an matrix acidizing treatment to monitor the warm back temperature profiles overnight.
3. On the 1st July, at 12:300 the first injection well test initiated, after two hours of pumping time it was decided to stop the step rate test. The DTS SL tool was left into the wellbore.
4. On July 6th, the injection well testing test was conducted (step rate test) the details of the injected flow rates are describe below:

STEP RATE TEST		
	Arrive on Location:	6:00 AM
	Depart Location:	7:00 PM
	Total Hours:	13:00

	Depth	O.D	Weight	I.D		Volume	Bbls/linear ft.
Tubing 1 length ft.:	4,201	2 7/8	6.5	0.000		0.00 BBLS.	0.00000
Tubing 2 length ft.:						0.00 BBLS.	0.00000
Casing 1 length ft.:	4,250	5 1/2	17.00	4.950		1.17 BBLS.	0.02380
Casing 2 length ft.:						0.00 BBLS.	0.00000
Open Hole length ft.:		N/A	N/A			0.00 BBLS.	0.00000
Combined Depth ft.:	4,250				Annuler Vol.:	BBLS.	0.01577

	Depth	Vol.				
Top Perf/Open Hole:	4,250	1.17	Maximum Pressure:	2600	ISIP:	1672
Bottom Perf/Open Hole:	4,850	115.44	Average Pressure:	1060	5 min:	
Number of Perfs:	0		Maximum Rate:	5.0	10 min:	
Perf Size:	0.31	in.	Average Rate:	4.1	15 min:	
Packer Depth:	4,201	ft.	Fluid to Recover:	1124	Proppant Total:	0

Time	STP	CASING	Rate	Stage	Total	Comments
8:13:00 AM	0	0	0.0		0.0	SAFETY MEETING
8:28:00 AM	46	500.0	0.0		0.7	LOAD CASEING
8:55:00 AM	163	458.0	1.2		8.0	START WATER
9:00:00 AM	255	481.0	1.2		11.0	PSI & RATE CHECK
9:05:00 AM	302	481.0	1.2		17.0	PSI & RATE CHECK
9:10:00 AM	372	504.0	1.2		23.0	PSI & RATE CHECK
9:15:00 AM	441	504.0	1.2		29.0	PSI & RATE CHECK
9:15:00 AM	511	527.0	1.5		29.5	INCREASED RATE
9:20:00 AM	604	527.0	1.5		36.6	PSI & RATE CHECK
9:25:00 AM	650	550.0	1.5		44.4	PSI & RATE CHECK
9:30:00 AM	789	573.0	1.5		51.9	PSI & RATE CHECK
9:35:00 AM	789	595.0	1.5		59.7	PSI & RATE CHECK
9:35:00 AM	929	595.0	1.5		67.0	PSI & RATE CHECK
9:40:00 AM	1022	641.0	2.0		70.0	INCREASED RATE
9:50:00 AM	1068	664.0	2.0		81.4	PSI & RATE CHECK
9:55:00 AM	1184	687.0	2.0		90.0	PSI & RATE CHECK
9:55:00 AM	1184	481.0	2.0		100.0	PSI & RATE CHECK
10:00:00 AM	1324	481.0	2.5		100.0	INCREASED RATE
10:05:00 AM	1370	504.0	2.5		112.0	PSI & RATE CHECK
10:10:00 AM	1416	550.0	2.5		125.0	PSI & RATE CHECK
10:15:00 AM	1440	573.0	2.5		137.6	PSI & RATE CHECK
10:15:00 AM	1509	595.0	2.5		150.8	INCREASED RATE CHANGED GEAI
10:20:00 AM	1533	595.0	2.5		150.8	PSI & RATE CHECK
10:25:00 AM	1556	618.0	2.5		165.0	PSI & RATE CHECK
10:30:00 AM	1556	481.0	3.0		175.5	PSI & RATE CHECK
10:35:00 AM	1579	527.0	3.0		194.5	PSI & RATE CHECK
10:35:00 AM	1579	550.0	3.0		194.5	INCREASE RATE
10:40:00 AM	1718	550.0	3.0		194.5	PSI & RATE CHECK
10:45:00 AM	1718	573.0	3.0		226.0	PSI & RATE CHECK
10:50:00 AM	1718	458.0	3.5		243.5	INCREASE RATE
10:50:00 AM	1718	504.0	3.5		261.0	PSI & RATE CHECK
10:55:00 AM	1891	527.0	3.5		279.0	PSI & RATE CHECK

Treatment Report Continuation

ESO #

Page 2

Time	STP	CASING	Rate	Stage	Total	Comments
10:55:00 AM	1904	527	3.5		279.0	PSI & RATE CHECK
11:00:00 AM	1904	550	3.5		302.0	PSI & RATE CHECK
11:05:00 AM	1904	595	4		325.0	PSI & RATE CHECK
11:10:00 AM	1904	618	4		340.0	PSI & RATE CHECK
11:15:00 AM	1904	435	4		361.0	PSI & RATE CHECK
11:15:00 AM	1997	435	4		361.0	PSI & RATE CHECK
11:20:00 AM	1997	435	4		382.0	PSI & RATE CHECK
12:00:00 AM	1997	435	4.5		406.5	INCREASED RATE
11:30:00 AM	1997	435	4.5		427.5	PSI & RATE CHECK
11:35:00 AM	2159	435	4.5		449.0	PSI & RATE CHECK
11:35:00 AM	2206	435	4.5		449.0	PSI & RATE CHECK
11:40:00 AM	2206	435	5		476.0	INCREASED RATE
11:45:00 AM	2206	435	5		501.0	PSI & RATE CHECK
11:50:00 AM	2206	458	5		424.0	PSI & RATE CHECK
11:55:00 AM	1410	450	5		424.0	PSI & RATE CHECK
11:55:00 AM	1207	458	5		550.0	PSI & RATE CHECK
12:13:00 PM	1022	458	1.5		563.0	DECREASED RATE
1:00:00 AM	1161	435	0		563.0	RAN OUT OF WATER
1:11:00 AM	1207	481	1.5		580.0	START WATER
1:20:00 AM	1254	504	1.5		591.0	PSI & RATE CHECK
1:40:00 AM	1254	504	1.5		610.0	PSI & RATE CHECK
1:50:00 AM	1277	504	1.5		623.0	PSI & RATE CHECK
2:00:00 AM	1277	504	1.5		939.0	PSI & RATE CHECK
2:10:00 AM	1277	504	1.5		654.0	PSI & RATE CHECK
2:20:00 AM	1300	527	1.5		670.0	PSI & RATE CHECK
2:30:00 AM	1300	527	1.5		685.0	PSI & RATE CHECK
2:40:00 AM	1324	527	1.5		700.0	PSI & RATE CHECK
2:50:00 AM	1324	527	1.5		714.0	PSI & RATE CHECK
3:00:00 AM	1324	527	1.0		727.0	PSI & RATE CHECK
3:00:00 AM	1625	527	1.5		742.0	PSI & RATE CHECK
3:10:00 AM	1600	527	3		746.0	INCREASED RATE
3:30:00 AM	1672	527	3		774.0	PSI & RATE CHECK
3:40:00 AM	1672	550	3		805.0	PSI & RATE CHECK
3:50:00 AM	1672	695	3		835.0	PSI & RATE CHECK
4:03:35 PM	1672	595	3		865.0	PSI & RATE CHECK
3:55:00 AM	1672	595	3		895.0	PSI & RATE CHECK
4:00:00 AM	1695	618	3		925.0	PSI & RATE CHECK
4:10:00 AM	1872	618	3		955.0	PSI & RATE CHECK
4:20:00 AM	1695	618	3		1005.0	PSI & RATE CHECK
4:32:01 PM	1672	641	3		1033.0	PSI & RATE CHECK

4. On the 6th July, at 4:32:00 pm the SL DTS was left into the wellbore. The recorded warm back time for this period was approximately 168 hours .Also, the main objective for the well to remain shut-in was to monitor the pressure fall off test.

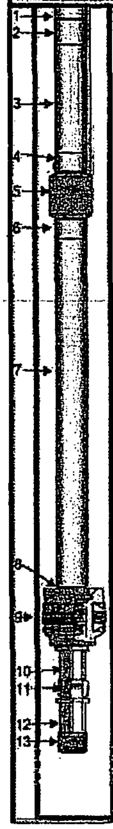
Well Completion

TARGA MIDSTREAM

EUNICE GAS PLANT #1
LEA COUNTY, NM
6/10/11

INJECTION STRING

Installation



	Length	Depth	Description	OD	ID
	13.00		KELLY BUSHING CORRECTION		
1	0.25	13.00	3.5 X 2.875 X-OVER PIN X BOX	2.875	2.000
2	3.63	13.25	2.875" 6.5# J55 8RD DUO-LINED TUBING SUB	2.875	2.000
3	254.10	16.88	8 JOINTS 2.875" 6.5# J55 8RD DUO-LINED TUBING	2.875	2.000
4	5.95	270.98	X-OVER SUB 2.875 8RD BOX X 2.875 VAM PIN	3.690	2.190
5	4.09	276.93	HALLIBURTON TUBING RETRIEVABLE SAFETY VALVE 101916658 781HXE23704-U SN-C2294020-1	4.630	2.313
6	6.00	281.02	X-OVER SUB 2.875 VAM BOX X 2.875 8RD PIN	3.230	2.190
7	3,914.02	287.02	124 JOINTS 2.875" 6.5# J55 8RD DUO-LINED TUBING	2.875	2.000
8	0.63	4,201.04	HALLIBURTON J LATCH SEAL ASSEMBLY TOTAL LENGTH IS 2.90'. .63' IS ABOVE PACKER	3.400	2.340
9	2.94	4,201.67	HALLIBURTON PERMINANT PACKER 212TWB70712-Z 5.5" 13-17# PACKER WAS SET ON WIRELINE WITH ELEMENTS @ 4203' TOP OF PACKER @ 4201.67 TUBING LANDED WITH 10,000# COMPRESSION	4.530	3.000
10	6.26	4,204.61	2.875" 6.5# J55 8RD DUO-LINED TUBING SUB	2.875	2.000
11	1.14	4,210.87	HALLIBURTON 2.875 X 1.875 'X' NIPPLE 711X2332-B SN# 2272562-1	3.680	1.875
12	6.28	4,212.01	2.875" 6.5# J55 8RD DUO-LINED TUBING SUB	2.875	2.000
13	0.60	4,218.29	2.875" PUMP OUT PLUG WITH 2 SHEAR PINS WITH A SHEAR VALUE OF 770# EACH 1540# TOTAL	3.000	2.600
		4,218.89	BOTTOM OF ASSEMBLY		
			TUBING WEIGHT IS # 31000#		

Filename:

5 DTS Analysis

5.1 Baseline Temperature Profile.

Figure 1, shows the original temperature condition before the acid and water injection (the geothermal temperature profile).The thermal behavior indicates no linear profile with depth. The temperature profile slopes vary according the rock thermal diffusivity and lithology, also will vary according to the completion thermal conductivity.

The bellow shut-in temperature profile reflects the distribution of temperature from zero to bottom of the well. Note the temperature behavior changed below the casing shoe at 4,258ft because the wellbore is at Open Hole conditions, and/or the thermal conductivity for the top reservoir zones are significantly different from the bottom reservoir zones (changes in reservoir permeability).

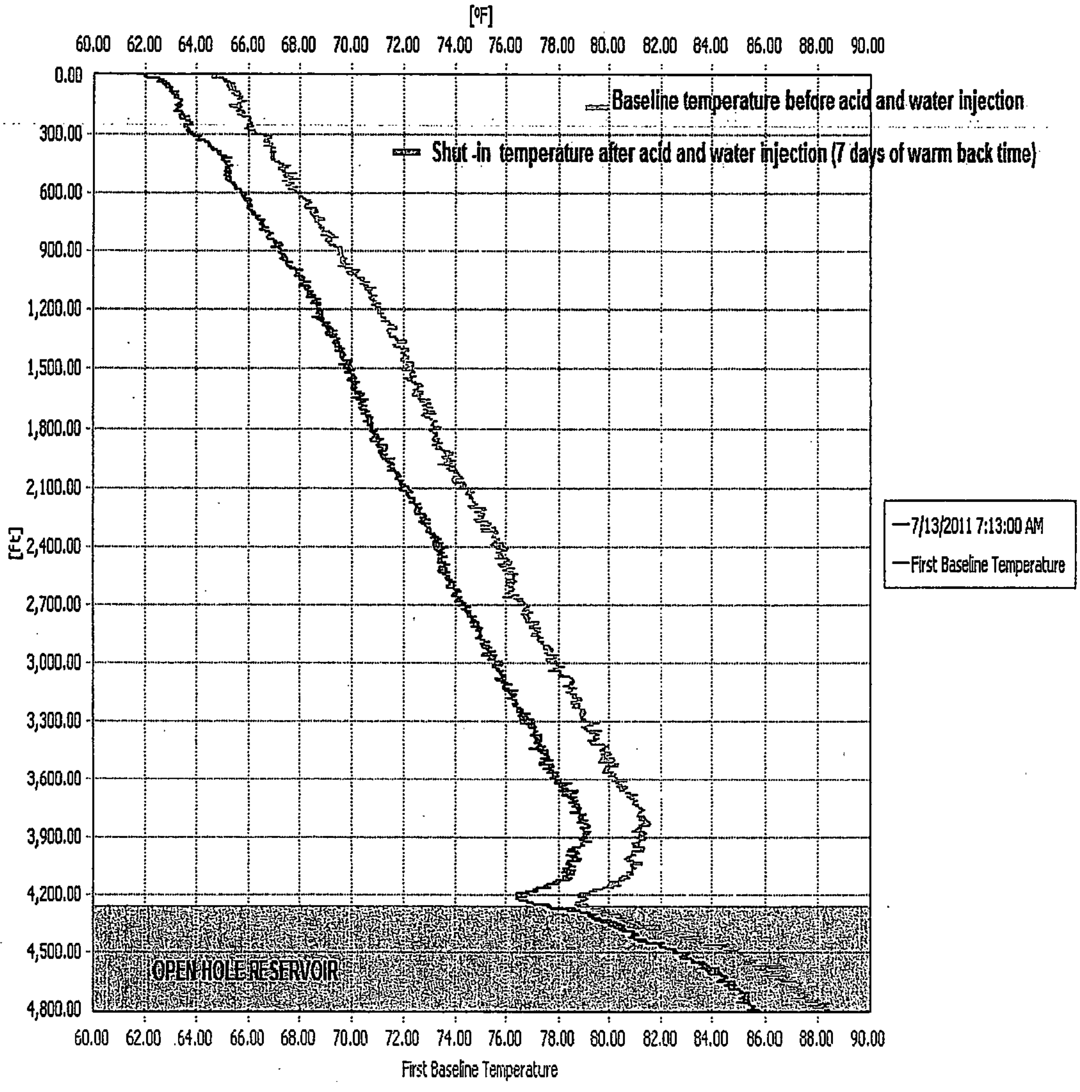


Figure 1: Selected Shut-In Temperature traces before and after water the injection periods.

5.2 Temperature profiles after matrix acidizing.

Figure 2 and Figure 3, shows the baseline temperature vs. the warm back temperature traces after the acid treatment. The warm effect technique consist in shut in the well for a certain period of time after its have been acidized, during this period is expected that the temperature profile moved towards the initial temperature at shut-in conditions. For the case of acid treatments, the acid will reacts with the reservoir exothermally causing a heating effect in the acidized reservoir zones, so the temperature will show a heating effect in those zones where the acid was effective placed. The DTS was deployed short time after the acid stops, please note warm back temperature over the reservoir interval shows a generalized heating event, being more notorious the heat events at the interval **4297ft-4368ft** and bellow **4503 ft**, this thermal response is attributable to the heating of the reservoir due to the exothermic reaction of the acid with the rock. Between **4368ft-4503ft**, the injected acid caused a slight heating effect at the formation zones, then after a short time temperature traces stopped to warm up, inferring the acid treatment possible had a good performance mainly at the upper zones **4297ft-4368tf and below 4503ft.** The green curve indicates the time the temperature started to returns towards the geothermal profile.

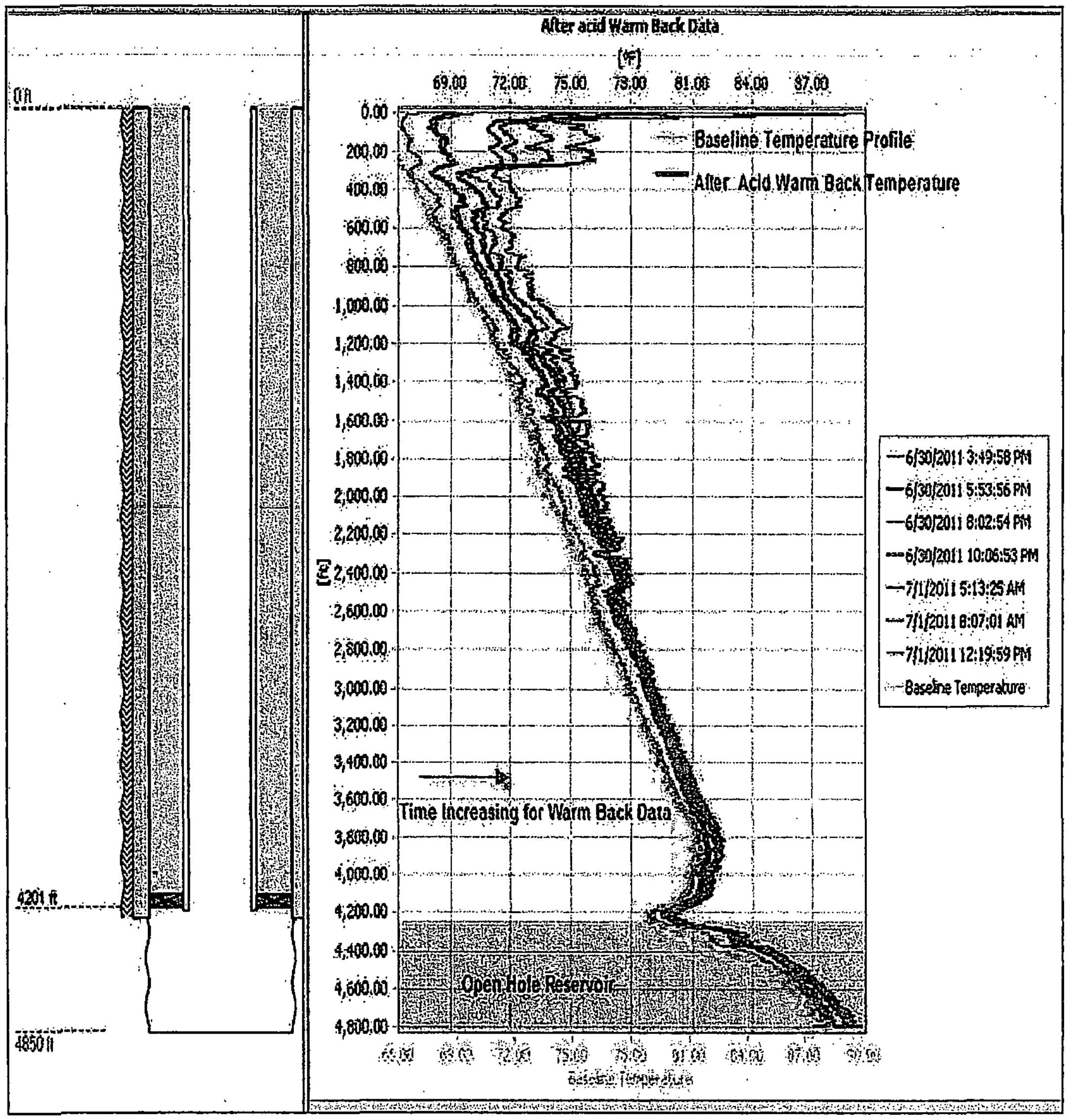


Figure 2: Selected Temperature traces after matrix acidizing.

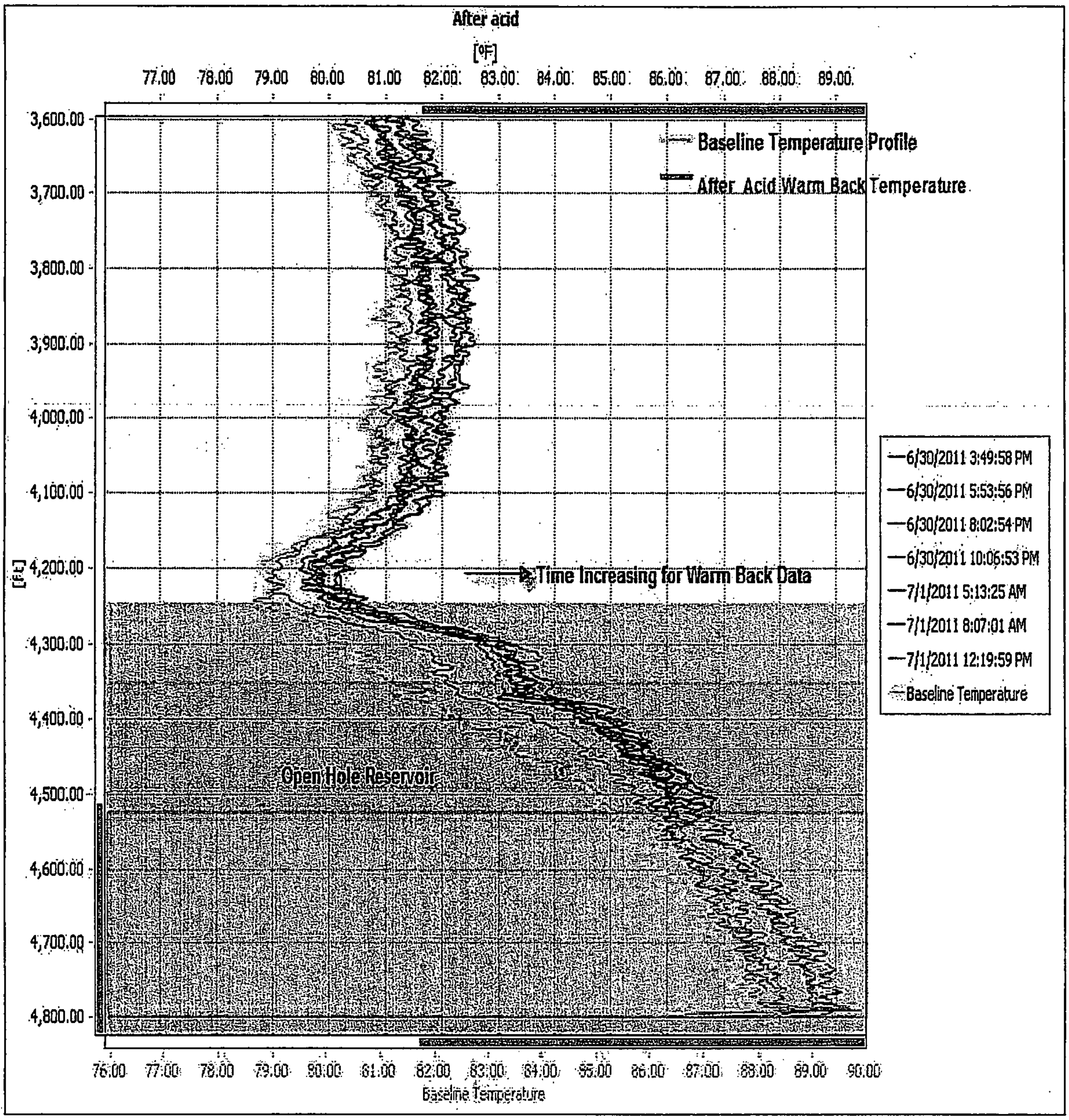


Figure 2: Selected Temperature traces after matrix acidizing over the reservoir interval.

5.3 Temperature profiles during step rate test.

Figure 3 and Figure 4, Shows the initial injection temperature profiles at different step rates of 1.5bbl/min, 2.5 bbl/min and 3 bbl/min. Please note as the injection rate increases the temperature inflection (cool anomaly) indicating the water is being injecting to the formation in moving down to 4,626ft.The injected volume was limited, but the DTS information suggests that mainly top reservoir zone 4,462ft and above is receiving the water injection.

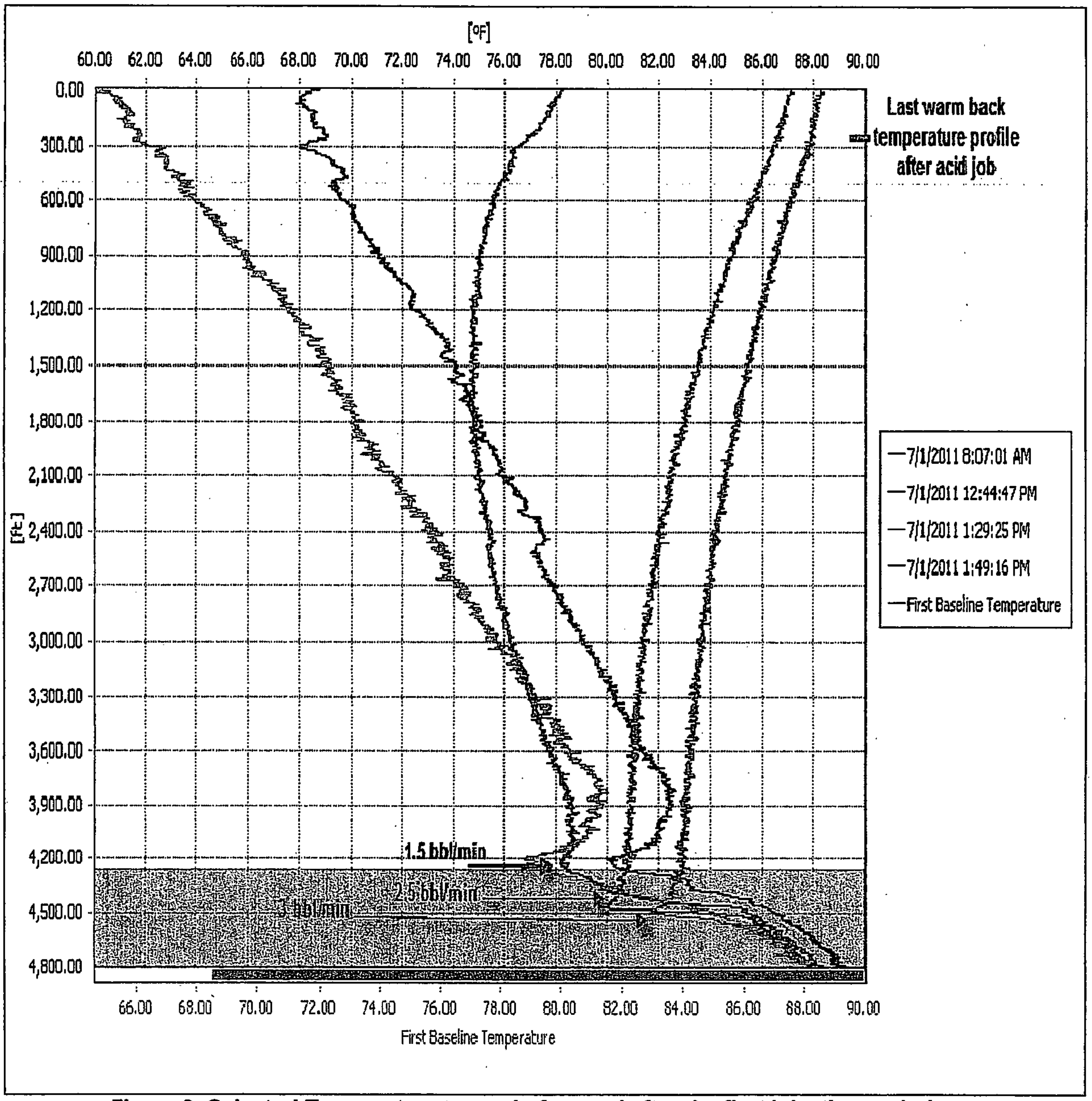


Figure 3: Selected Temperature traces before and after the first injection period.

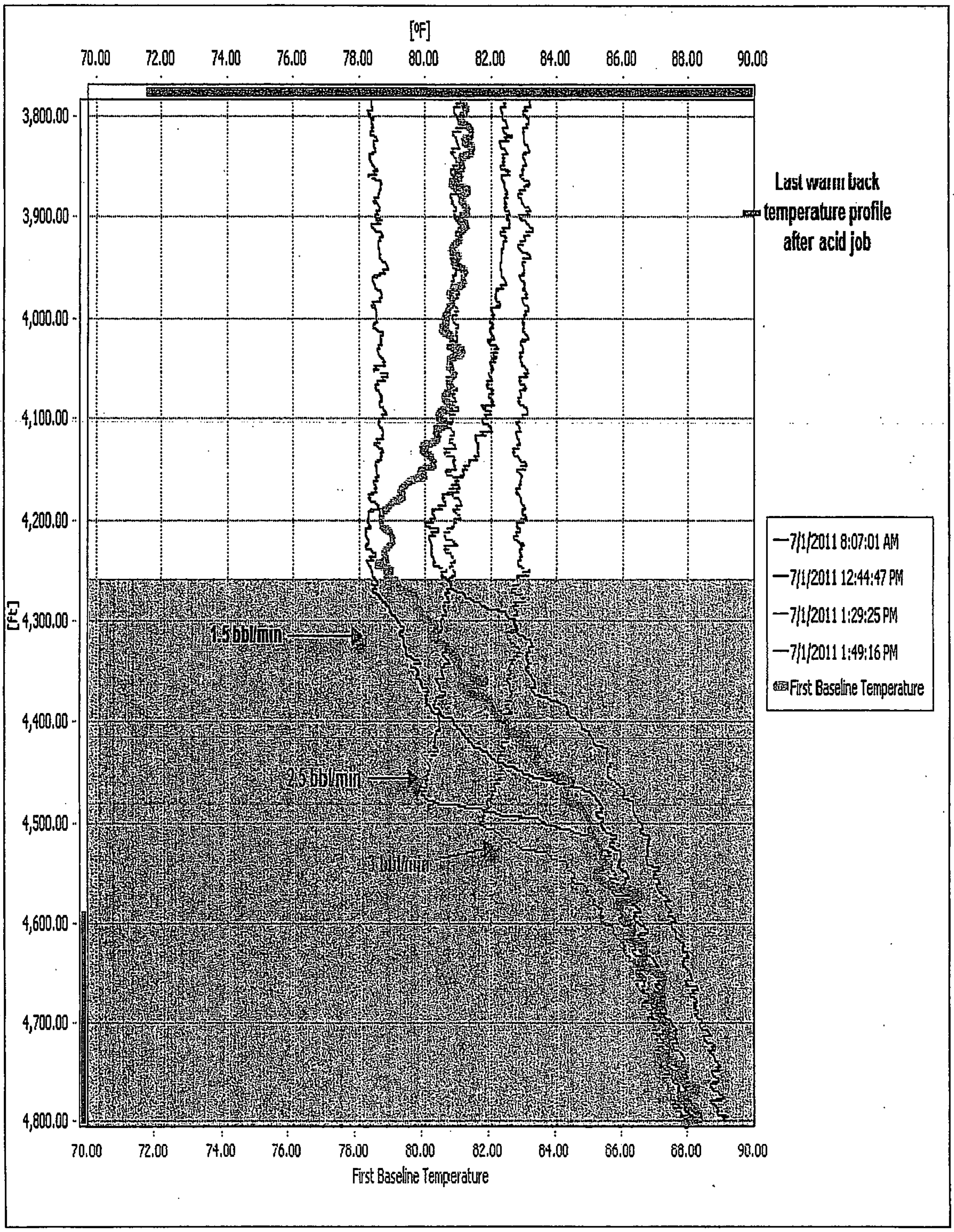


Figure 4: Selected Temperature traces before and after the first injection period over the reservoir interval.

Figure 5 and 6, shows the thermal behavior during the second injection period (main step rate test). Note the initial injection rates from 1.5 to 3 bbl/min showed the reservoir is receiving fluid until 4484ft. When the injection rate was increased to 3.5 bbl/min, the thermal behavior suggests the injected fluid started to move down the wellbore.

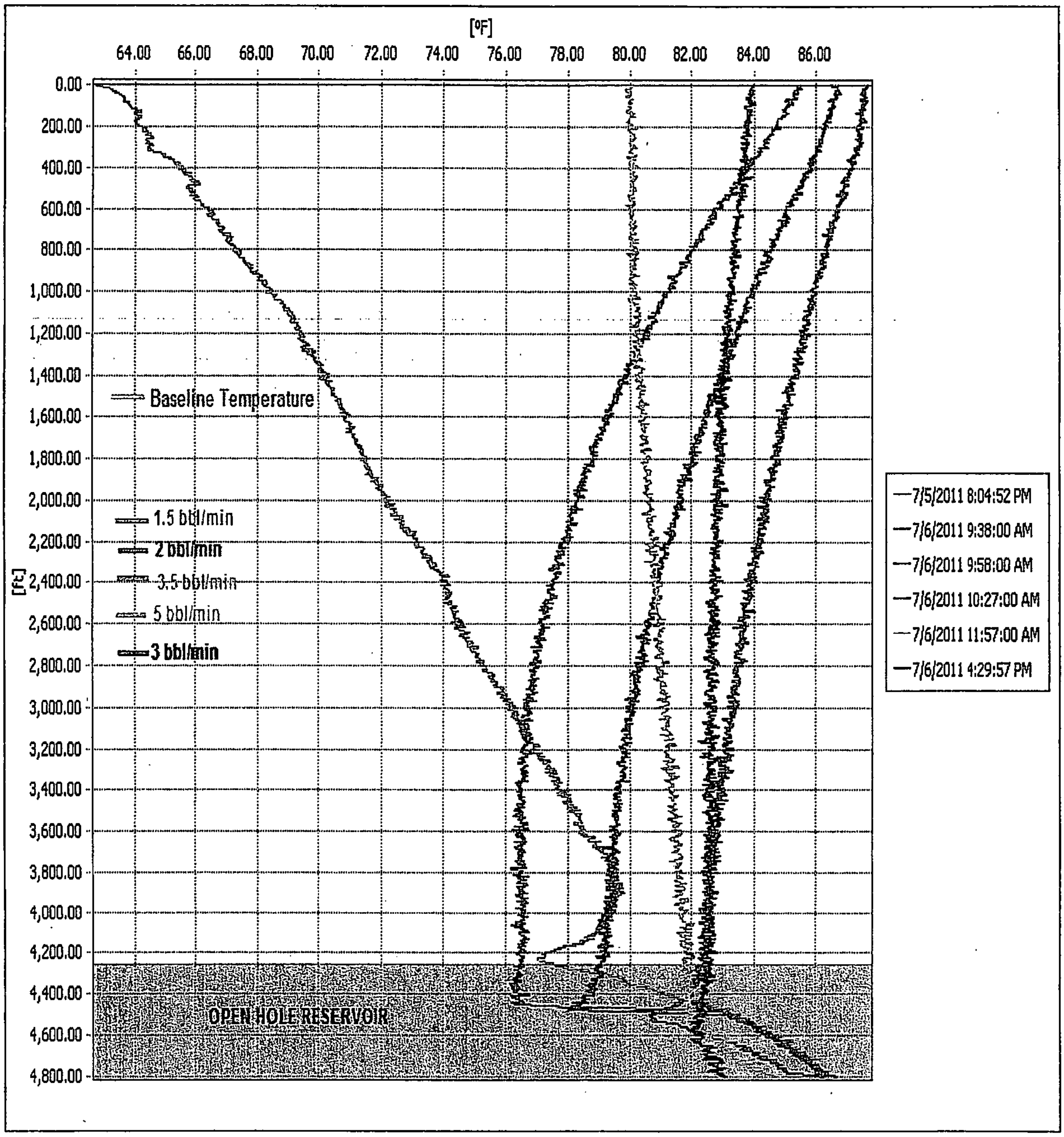


Figure 5: Selected Temperature traces during main injection period.

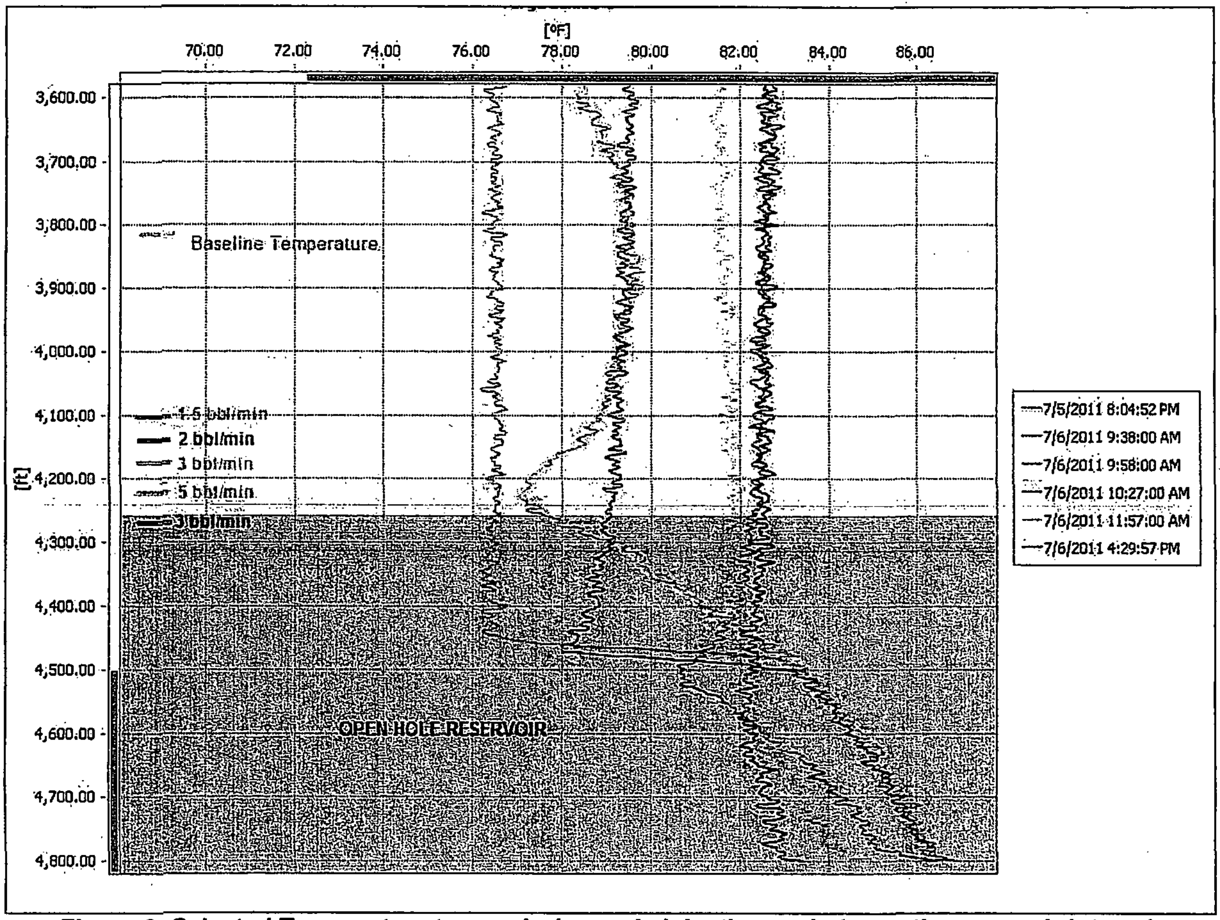


Figure 6: Selected Temperature traces during main injection period over the reservoir interval.

5.4 Temperature profiles after the injection period.

Figure 7, shows the thermal behavior after the fluid injection, the observed temperature of the injected fluid increased while being pumping down the wellbore. It is expected that the temperature of the reservoir zones that have been received fluid stayed closer to the injection temperatures. The DTS traces for the early shut-in curves revealed from 4600 ft and above the temperature keep closer to the injection temperature. Below 4750 ft the temperature tends to returns rapidly to the geothermal profile.

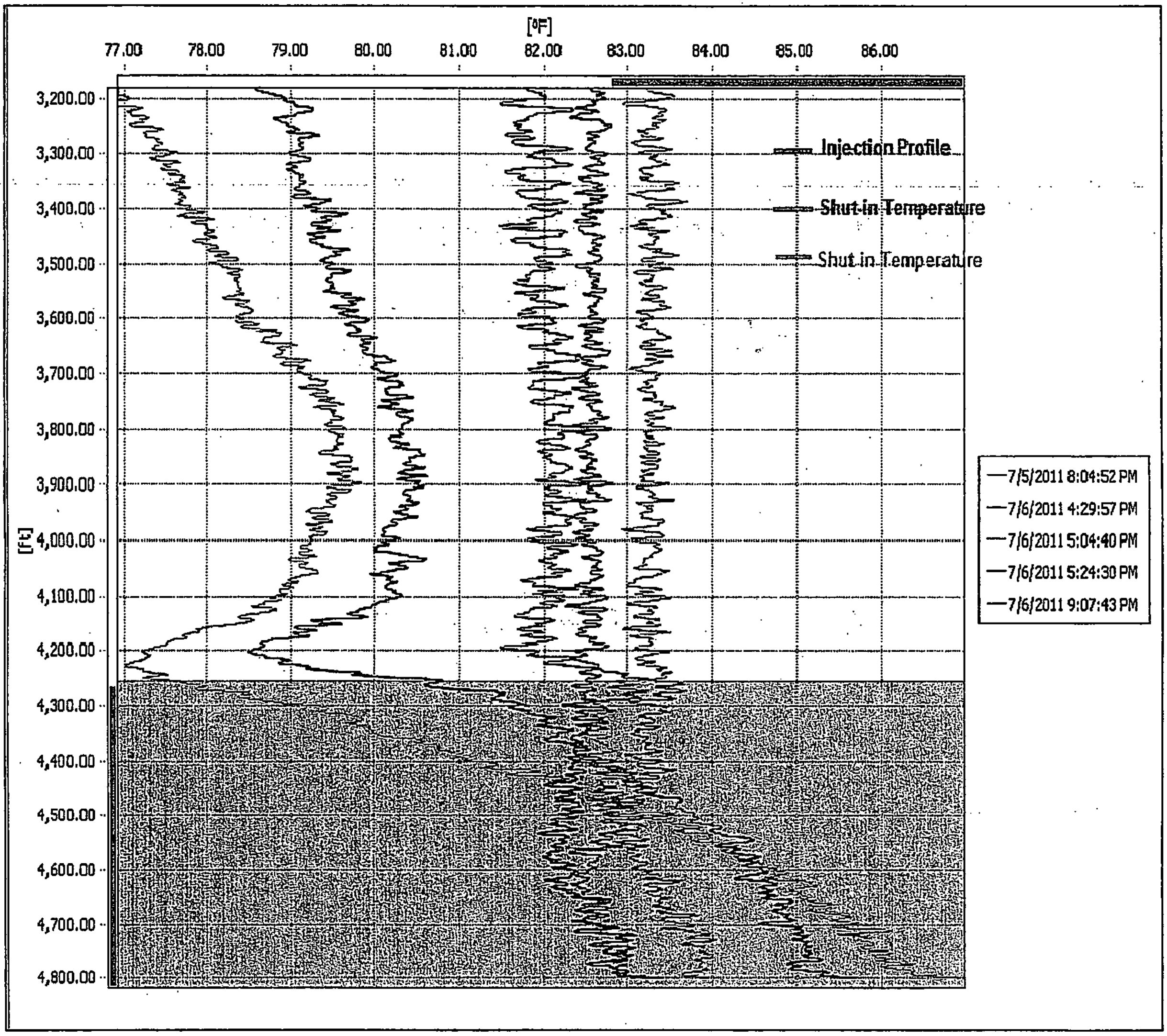


Figure 7: Selected Temperature traces during shut in periods.

5.5 Thermal Analysis during Main Step Rate Test

Once the injection started at 1.2 bbl/min, the water being injected is of a different temperature from the warmed-back temperatures near the surface and in this case it is possible to detect and track the injection velocity down the tubing near the surface as shown in Figure 8 and 9. The velocity of the fluid is identified as the slope of the color change moving away from the initial injection time.

The thermal slopes analysis revealed the initial injection down the tubing is approximately 1.5 bpm, the calculated fluid velocity decreased to 1 bbl/min at the 5 ½ casing shoe, this thermal behavior suggest the loss of up to 0.5 bbl/min at the casing shoe (leak zone or high permeable zone right behind the casing shoe taking fluid).The calculated velocity **below** 4350ft was 0.27 bpm, indicating a fluid loss of **0.73 bpm** into a zone at **4350 ft.**

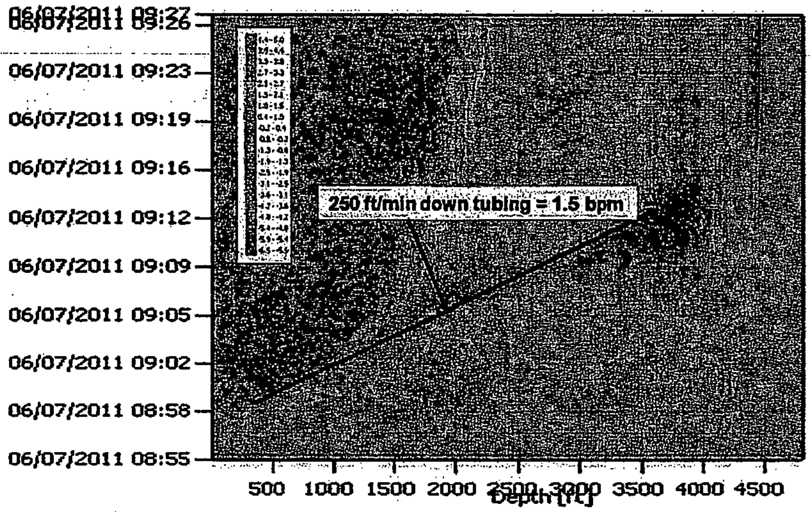


Figure 8: 2d plot of subtraction filter showing injection down the tubing(Water injection started at 1.2 bbl/min)

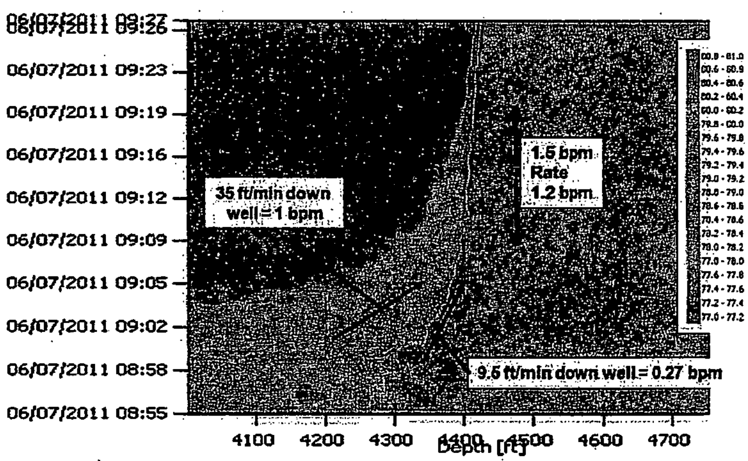


Figure 8: 2d plot of subtraction filter showing injection down the tubing(Water injection started at 1.2 bbl/min).

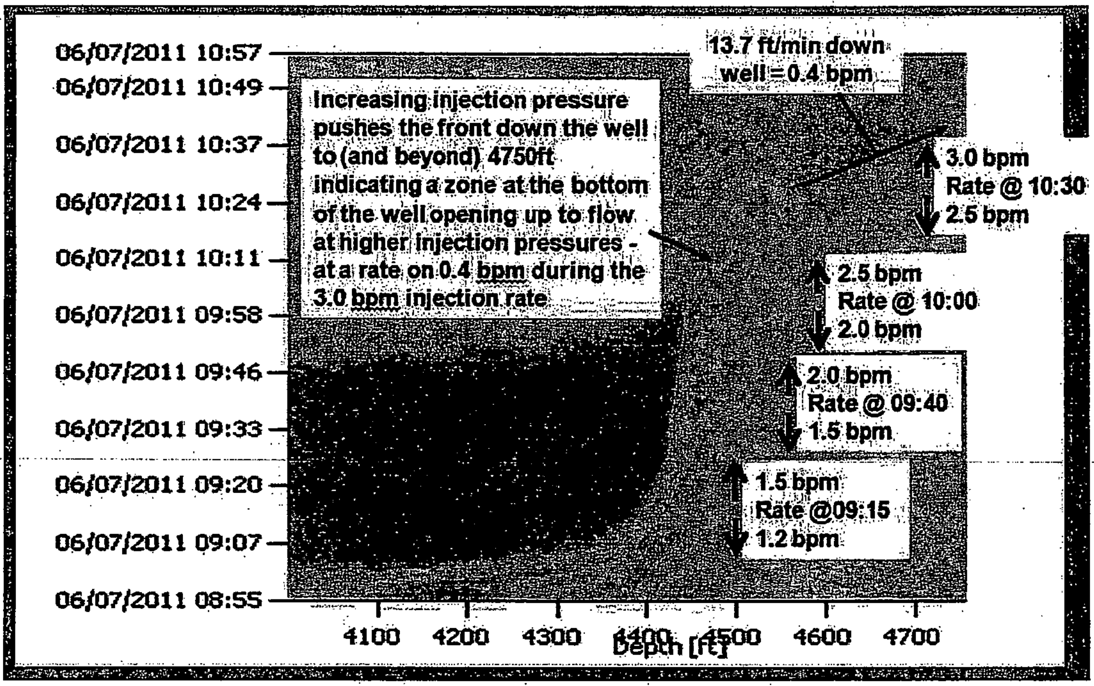


Figure 9: Increasing injection rate plot.

Increasing the injection rate, and pressure, pushes the injection front down from 4,420ft to 4,750ft (and beyond) indicating a reservoir zone at the bottom of the well opening up to flow at high injection pressures.

The injection rate to this lower zone during the 3.0 bpm injection period is 0.4 bpm

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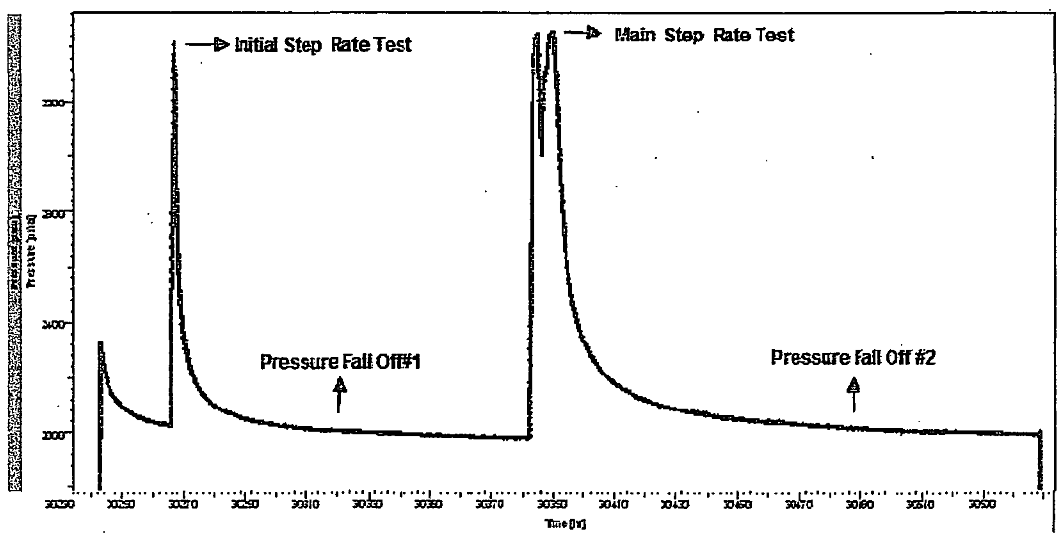
6 Bottomhole Pressure Plots and Step Rate Test Analysis

The primary objective for a step rate test is to determine the breakdown pressure (fracture opening pressure), the break down pressure provides an indication of the pressure necessary to star fracture propagation. The injection rate at which this occurs can also be of interest, but may vary significantly depending on viscosity, fluid-loss properties, and the flow rate history of the well.

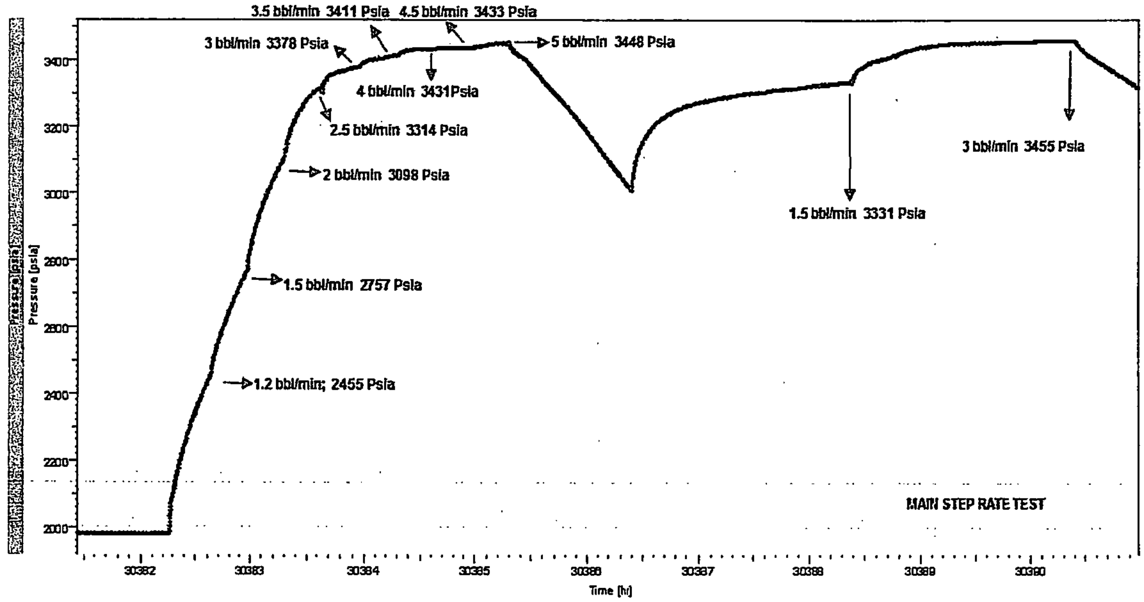
In a successful step-rate test, injection must be started at matrix rates and then increased in incremental steps until the fracture is created or reopened/ extended (already fractured wells). Rates should be kept constant during each increment until conditions have stabilized and should be maintained for a short time beyond this point.

The Cartesian plot of the bottomhole pressure vs. time during the injection and shut-in periods are show below. The plot is presented in cumulative time (initial injection period started in 2008). The maximum recorded injection pressure was 3348 psia, and the final recorded shut-in pressure was 1978 psia. The downhole quartz recorders were run along the DTS string and it was located at 4810 ft.

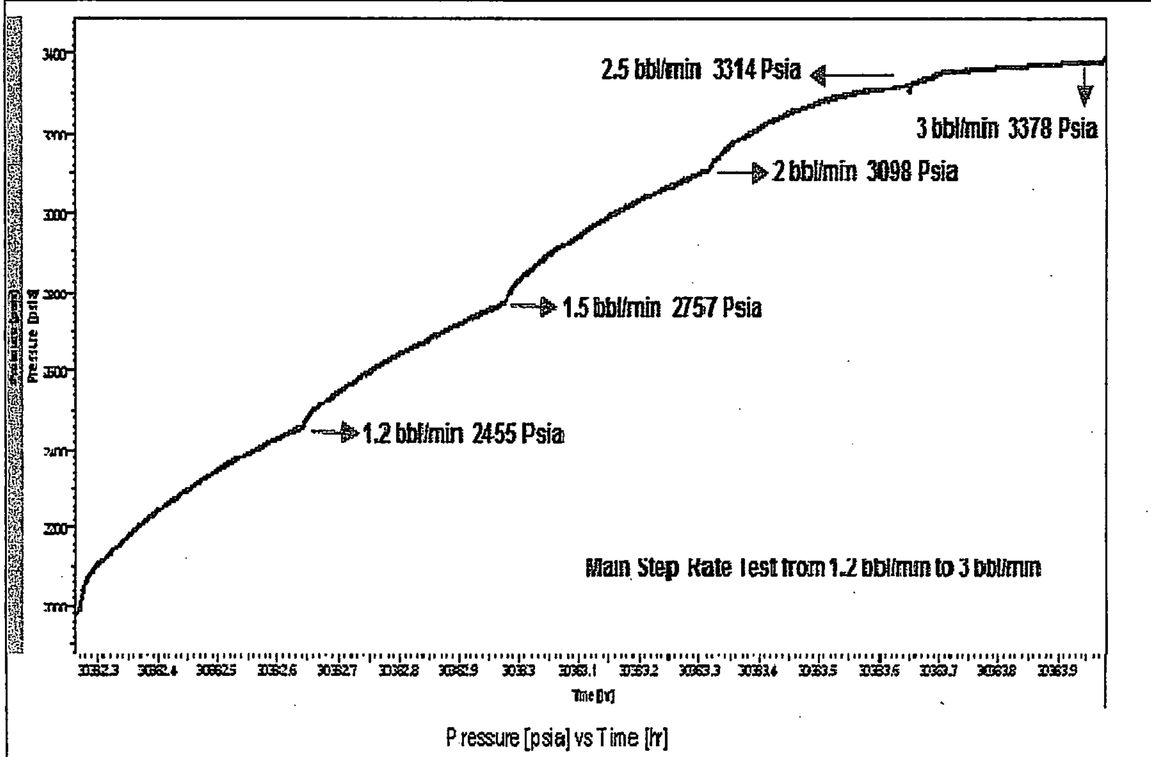


Fressure [psia] vs Time [hr]

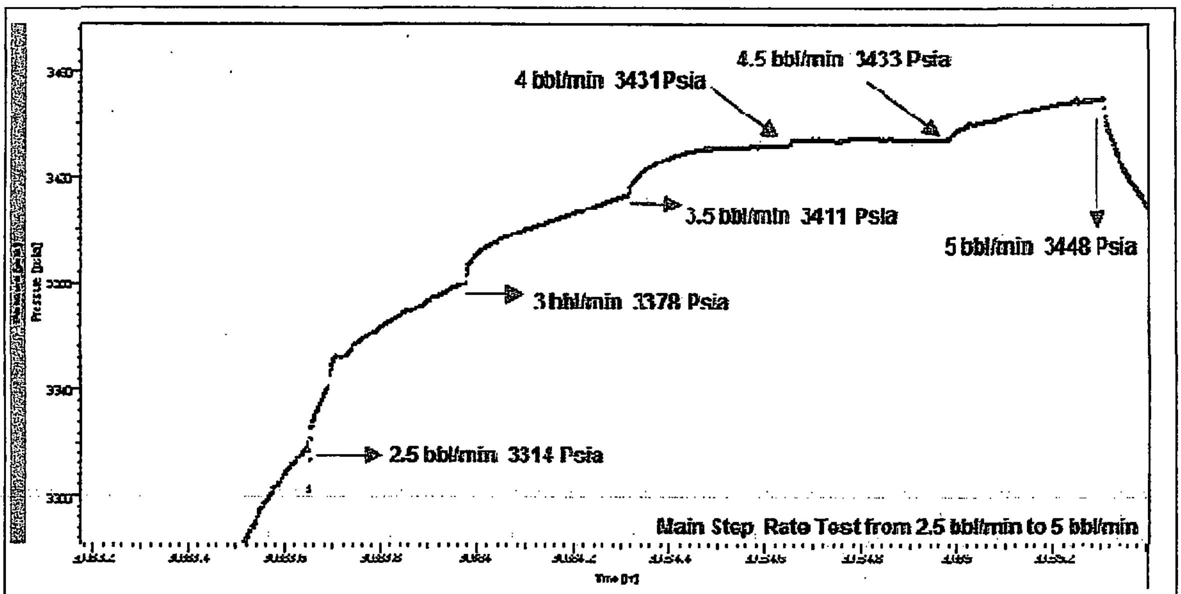
The flowing plots show the bottomhole pressure vs. time for the main step rate test analysis.



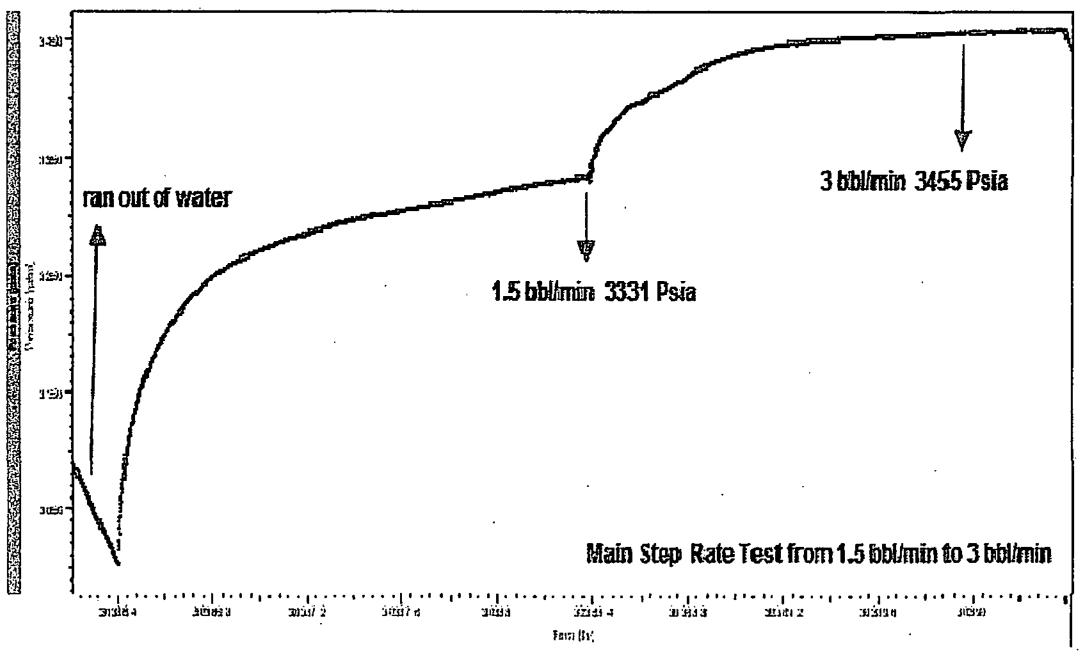
Pressure [psia] vs Time [hr]



Pressure [psia] vs Time [hr]



Pressure [psia] vs Time [hr]



Pressure [psia] vs Time [hr]

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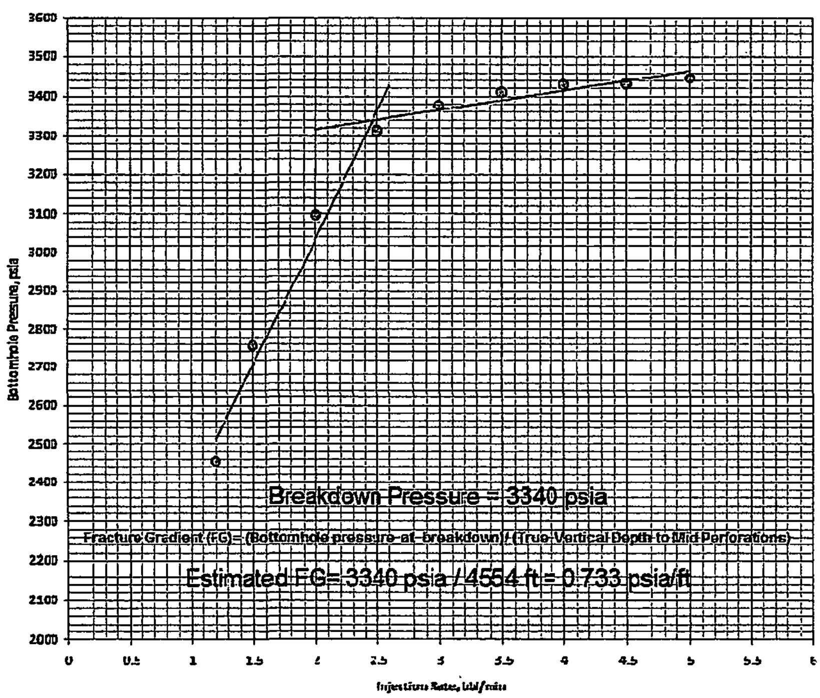
Step Rate Test Analysis

The input injection flow rate for the well subject to analysis is shown in **Table.1**

Date 7/6/2011	Time h:mm	Water Injection rate bbl/min	Bottomhole Pressure Psia
	08:55:00 to 09:15:00	1.2	2455
	09:15:00 to 09:35:00	1.5	2757
	09:35:00 to 09:55:00	2	3098
	10:00:00 to 10:25:00	2.5	3314
	10:25:00 to 10:45:00	3	3378
	10:45:00 to 11:00:00	3.5	3411
	11:00:00 to 11:20:00	4	3431
	11:20:00 to 11:35:00	4.5	3433
	11:35:00 to 11:55:00	5	3448
	13:11:00 to 15:00:00	1.5	3331
	15:10:00 to16:32:00	3	3455

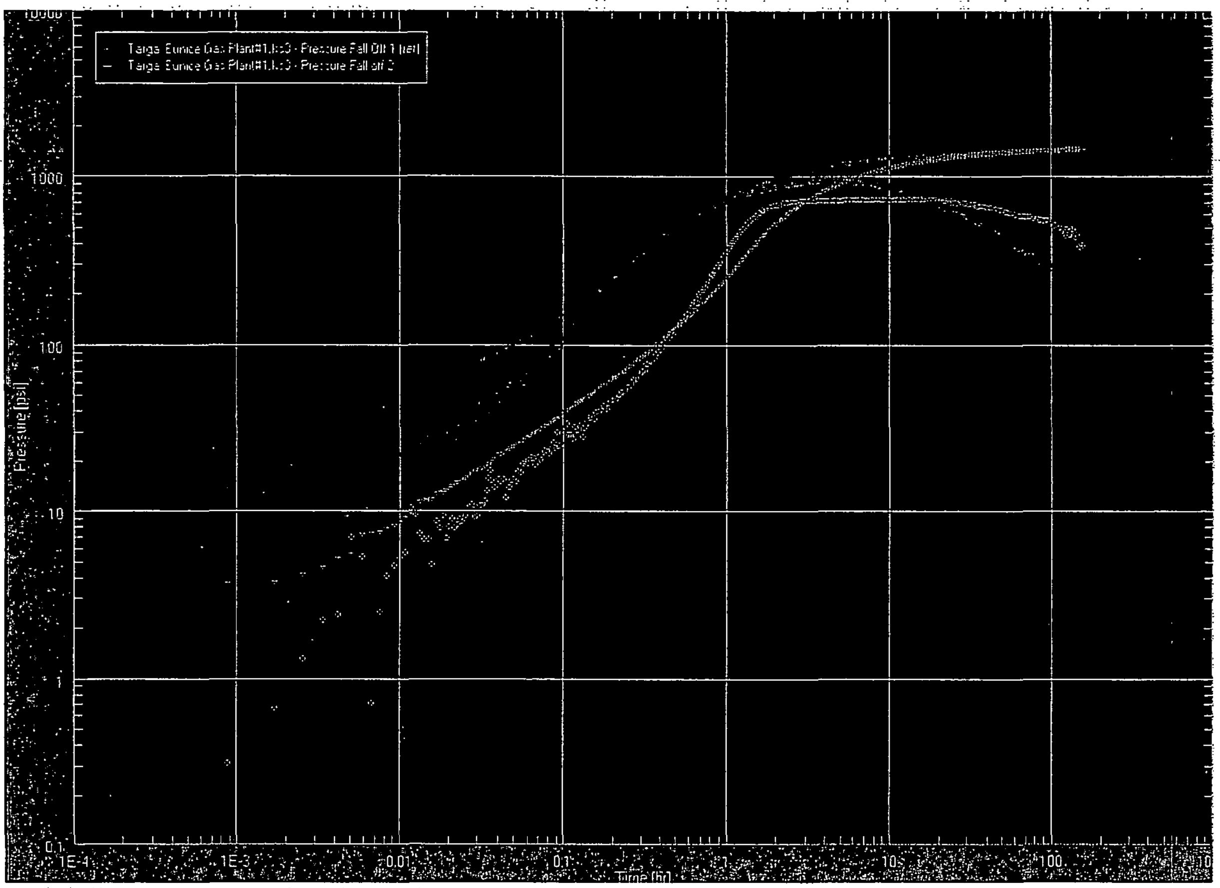
Table 1 – Injection flow rates for the step rate analysis

The plot below shows the analysis for the step-rate test where the maximum pressure at given injection rate is plotted vs. the injection rate. The general interpretation approach is the first straight line indicates the change in pressure before fracturing as a function of rate. The injection is into the matrix system, and the slope is directly depending on the formation permeability. The second line indicates the injection rates after the fracture is created or reopens. Because the fracture is open and extending, the surface area area exposed to the injection rate is much larger than in the case of matrix injection. Consequently, this straight line can be expected to be much flatter than the first straight line. The point at which the two lines intersect is the breakdown pressure (fracture reopening pressure).



Step Rate Test Analysis
Eunice Gas Plant#1

For the Pressure Fall Off test was **no possible** to conduct an adequate type curve Log- Log match to describe a reservoir analytic model. The pressure derivative plot exhibit at early times variable unloading effects and along the shut in time seems to be the pressure measurements are affected by wellbore dynamics (possible crossflow between layers or fluid movements after the well was shut it). However, the results described below shows the estimation of **kh** and **skin** by tracing a straight line where possible IARF are located (after 2 hours of shut-in, for the second pressure fall off test). The pressure derivative for both Fall Off periods shows constant pressure boundary behavior at late time region (after 10 hours of shut-in time).The Horner's approximation time was used to input the injection flow rate to generate the pressure derivatives.



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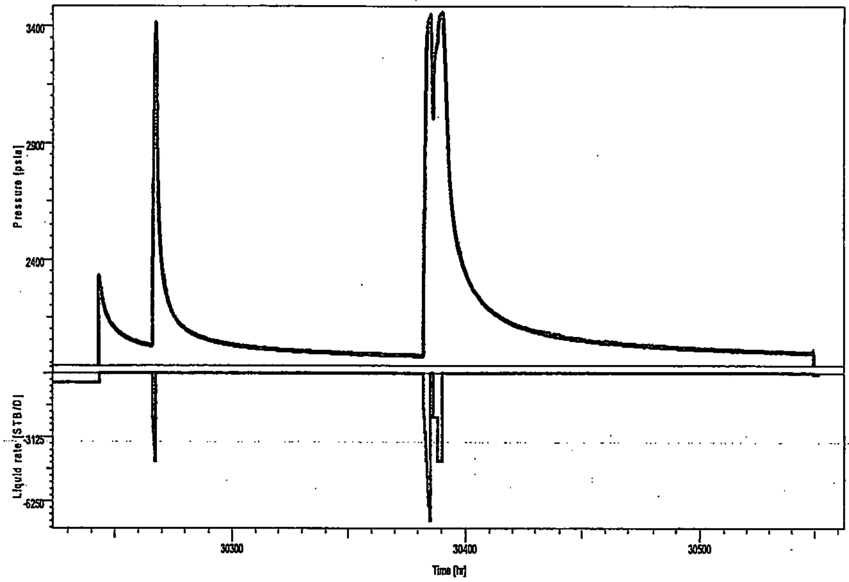
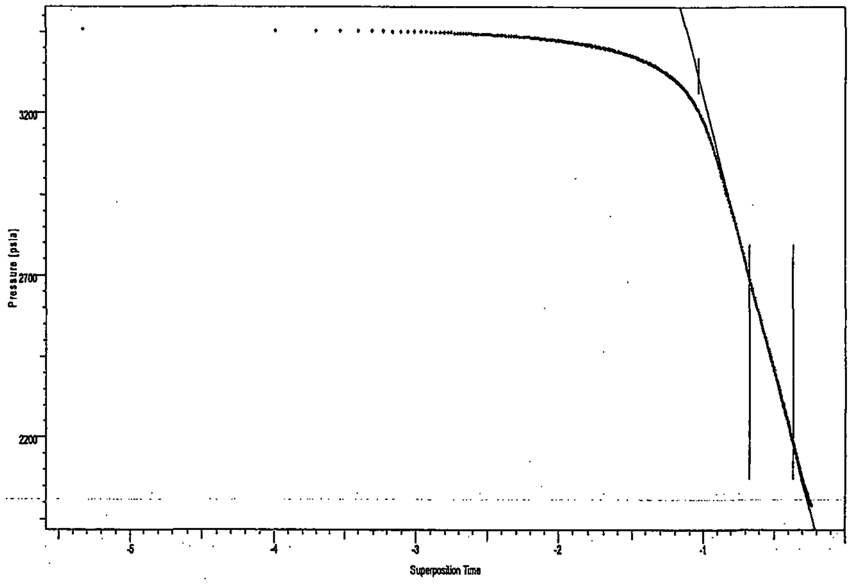


History plot (Pressure [psia], Liquid rate [STB/D] vs Time [hr])

Name	Value	Name	Value
Targa		Pi	1805.97 psia
Rate	0 STB/D		
Rate change	4320 STB/D	**Derived & Secondary Parameters**	
P@dt=0	3456.57 psia	Delta Q	4320 STB/D
Pi	1805.97 psia	P @ dt=0	3456.57 psia
Smoothing	0.1	PI	2.61724 [STB/D]/psia
PI	2.61724 [STB/D]/psia	Rinv	575 ft
		Test. Vol.	11.1069 MMB
Main Model Parameters		k / mu	0.745 md/cp
TMatch	0.25 [hr]-1		
PMatch	7.32E-4 [psia]-1	**Semilog Line**	
C	0.528 bbl/psi	Skin	-4.6
k.h, total	447 md.ft	k	0.691 md
k, average	0.745 md		



Semi-Log plot: p [psia] vs Superposition Time

Name	Value	Name	Value
Targa		Rinv	575 ft
Rate	0 STB/D	Test. Vol.	11.1069 MMB
Rate change	4320 STB/D	k / mu	0.745 md/cp
P@dt=0	3456.57 psia		
Pi	1805.97 psia	**Semilog Line**	
Smoothing	0.1	From	30393.8 hr
PI	2.61724 [STB/D]/psia	To	30410.3 hr
		Slope	1692.61 psi
Main Model Parameters		Intercept	1560.71 psia
TMatch	0.25 [hr]-1	P@1hr	3313.76 psia
PMatch	7.32E-4 [psia]-1	Delta Q	4320 STB/D
C	0.528 bbl/psi	P @ dt=0	3456.57 psia
k.h, total	447 md.ft	PMatch	6.8E-4 [psia]-1
k, average	0.745 md	k.h	415 md.ft
Pi	1805.97 psia	k	0.691 md
		k/mu	0.691 md/cp
Derived & Secondary Parameters		p*	1560.71 psia
Delta Q	4320 STB/D	Skin	-4.6
P @ dt=0	3456.57 psia	Delta P Skin	-6758.62 psi
PI	2.61724 [STB/D]/psia		