

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary Designate

Matthias Sayer
Deputy Cabinet Secretary

David R. Catanach, Division Director
Oil Conservation Division



January 9, 2017

TO: Daniel Sanchez, UIC Program Manager, OCD

FROM: Phillip Goetze, Engineering Bureau, OCD

RE: SUMMARY OF SECOND INJECTION SURVEY ACTIVITIES FOR THE MARALO SHOLES B WELL NO. 2 (API 30-025-09806; SWD-1127); OWL SWD OPERATING LLC

This document is a summary of recent activities related to the subsequent testing performed by the operator, OWL SWD Operating LLC (OWL), following the meeting in Santa Fe with representatives from OWL on October 24, 2016. The result of the meeting was to have a new survey with an injection profile over the entire open-hole interval along with an additional effort to be conducted by OWL to demonstrate that the injection interval is not hydrologically connected with the Capitan Reef aquifer system. OWL designated Mr. Chad Kronkosky, P.E., CEK Engineering LLC (CEK) of Lubbock, TX as the principal investigator for the effort.

General Notes: The well was initially tested in September 2016 without any modifications or maintenance of the injection interval. Results of this first survey activity were inconclusive with regards to the distribution for the entire permitted interval due to debris in the borehole. However, the pre-survey testing of the well did not demonstrate upward migration of fluids between the production casing and the intermediate casing or any issues with the existing tubing and packer system.

Recent Activities: Consultant for OWL provided a Sundry NOI to the District Supervisor for the second injection survey on November 15, 2016, following discussions on possible deepening of the existing open-hole interval to provide additional borehole depth to accommodate survey logging tools. This proposal was withdrawn by the consultant and the final proposed plan included only a cleaning of the borehole to the original depth of 3055 feet BGS.

Prior to testing of the injection interval, the contactor reconfigured and replaced the valve recently installed in the 8⁵/₈-inch casing.

OWL activities at the well were initiated on November 28, 2016, and completed on December 9, 2016. A detailed summary of daily reports by OWL's contractors is attached. Most notable items of the activities upon cursory review were:

1. the original plan to run the coil tubing and clean out the borehole with the injection tubing in place was not successful requiring the removal of the injection tubing for the complete cleaning of the injection interval;

2. injection survey was only conducted with only one rate of 5 BPM;
3. spinner (Indepth Injection) survey found no indications of leakage in the vicinity of the squeezed perforations; and
4. both surveys (Pump-In Tracer and Indepth Injection Profile) were able to record information over the deepest open-hole interval not tested in the first test activities. Copies of the test results as submitted by OWL are attached.

The tubing and packer was replaced in the well on December 9. A mandatory mechanical integrity test was conducted on the well and witnesses by Division, allowing the well to return to injection operation.

Division personnel were present at the wellhead to witness the actual testing activities. No issues or unusual circumstances occurred at the wellhead during the cleanout and testing activities.

Future Activities:

1. Review of final report to be submitted by OWL within the next two weeks;
2. Continued compilation and verification of hydrology data offered by the USGS and NMOSE for this area of the Capitan Reef aquifer system;
3. Complete effort to compile and correlate available geophysical logs in area to confirm Hiss's interpretation (as summarized in NMBGMR Resource Map 6) and compare with preliminary cross-sections provided by CEK;
4. Continued discussions with BLM and NMBGMR personnel for technical input and assistance in review of available data; and
5. Prepare and submit final report of findings with recommendations to Director.

Attachments:

Maralo Sholes B No. 2 Well Diagram
OWL SWD Operating LLC: Daily Summaries for Second Injection Surveys
OWL SWD Operating LLC: Results of Indepth Injection Profile
OWL SWD Operating LLC: Results of Pump-In Tracer

Cc: D. Catanach, Director, OCD



Maralo Sholes B Well No. 2 (SWD-1127)

API 30-025-09806

OWL SWD Operating, LLC

UL P, Sec 25, T25S, R36E, NMPM; Lea County

Footage: 660' FSL & 660' FEL

Spud Date: 5/25/1947

Status: Former Yates Producer

Author: PRG

GL:3021

BORE HOLE & CASING SIZES

CEMENTING HISTORY

[NR: not reported]

150 sxs; calculated to surface

410

NR & 10-3/4"

Santa Rosa fm at 450

[Potential UDWS]

Only "mudded in" reported.

Rustler fm at 990

Rustler (10' water) at 1050

Top of salt at 1120

NR & 8-5/8"

1225

TOC 7" Calculated

150 sxs; 1st calculated TOC: 2000'

1455

**Perforation History
 (Based on C-103s in Well File):**

1961: Operator plugs back well from oil zone (2950-2955); perfs added from 2871' to 2910' to develop gas cap.

1981: Operator squeezed perfs from 2871' to 2910' (2000 lbs with 150 sxs); new PBT 2832'; new perfs from 2733' to 2824'.

2003: Operator TA well; set CIBP at 3055' and cap with 35' of cement; passed pressure test.

2008: Operator reports Yates perfs 2733' to 2824' already squeezed off; tagged fill and cement at 2822'; drill 40' of cement and CIBP and deepen to current TD of 3055'.

Bottom of salt at 2552

2733

Squeezed Perfs (2733-2824)

2849

Packer & 4-1/2" tubing

2871

Plugged Perfs (2871-2910)

2935

NR & 7"

2950

Open Hole TD (1947)

Open-hole PB with perfs at 2871

3055

Open Hole TD (2008)

Injection Survey 9/2/2016

10 Min. Packer Check at 2830'
 [No leakage at packer indicated]
 20 Min. Upward Channel Checks at 2865'
 [No upward migration indicated]
 Fill from 3005' to 3055'
 Tracer survey indicates 20% of fluid volume exiting borehole from 2935' to 2955'; results inconclusive.

Capitan Reef at 3320 (Hiss, 1975)

OWL SWD Operating

Maralo Sholes B #2

11/28/16

08:15 arrived location Baker Hughes Coil tubing (Alex Prado, Corey Denzy, Jace Huddle, Rogelio Sosa) rigging up Reservoir Services (Richard Valencia, Abraham Rodriguez) for water transfer, Thru-Tubing Solutions (Darel) thru tubing motor and bit WTX (Robert Pringle) OWL (Tyler Richardson)

09:00 Shut down rig up due to high winds

10:15 Resume rig up

11:00 Renegade wireline (Munny Flores, Zack Ortis) Jim Smith (spinner and temp tools) arrives

11:15 Safety meeting with Baker Hughes and personnel on location

11:30 pressure test wellhead

11:45 RIH with coil and wash out nozzle

13:00 Tagged at 3008' by coil tubing measurements using Nitrogen to lift returns back to surface Reservoir Services monitoring flow back tank for returns Getting back returns equal to amount pumped well not taking fluids

14:30 Leave location coil not making any new hole as of yet

11/29/16

08:30 Arrived location Baker Hughes has been released made no progress on drilling out Will rig up pulling unit this evening to drill out WTX (Robert Pringle) OWL (Tyler Richardson) ESC (Energy Service Company) pulling unit crew (Francisco Silva, Michael Sanchez, Juan Terrazas, Jesse Hernandez)

10:30 Leave location

11/30/16

0830 Arrive location ESC unit laying down 4.5 csg and pkr

09:30 Out of the hole with 4.5 csg and pkr changing tongs and BOP rams from 4.5 to 3.5 for workover string waiting for work string to arrive

10:15 Work string arrives Well-Foam equipment arrives

12:15 RIH with tubing and scraper

12:45 Tongs broke waiting on new set

14:00 Leave location

12/1/16

10:00 Arrive location crew TOOH with tubing and scraper WFR (Wellbore Fishing and Rental tools)(Drew) Ran scraper to 2930'

10:30 RIH with tubing and 6.25 bit (WFR)

11:00 Renegade Wireline arrives

11:30 Rig up Well-Foam continue RIH with tubing and 6.25 bit

12:45 Pickup next joint of tubing and RIH

13:30 Start clean out

14:00 FTH vacuum truck arrives to empty half tank

14:30 Leave location

12/2/16

09:30 Arrive location Renegade Wireline RIH with Temp tool and Spinner wireline td 3072' correlated to casing bottom. Tubing tally td 3057' not using KB on either measurement.

12:00 Leave location

Initial readings on the spinner log show fluids going into the formation at 3005-3010' computed logs should be sent to Santa Fe by @ 12/6/16.

They will run tracer scan after Spinner runs are complete no data on that log yet.

12/3/16

Robert Pringles called said finished running RA Tracerscan (Renegade Wireline Mike Salas) on 12/2/16, 12/3/16 RIH with 3.5 work string to lay down then RIH with 4.5" casing and packer Made it most of the way in will wait til morning to nipple down BOP and circulate packer fluid. Said Tracer showed fluid going into permitted zone. Computed logs will be sent to Santa Fe around 12/6/16 POOH w/4.5" casing and packer lay down 4.5" casing, pick up and RIH w/3.5" work string

12/4/16

Received call from Robert Pringles, said that they had nipped down the BOP and was circulating packer fluid. Tried to test and got communication between 7" and 8 5/8" casings, will trip out of hole and pick 3.5" work string up to find leak

12/5/16

12:40 Arrived location to check on progress, POOH with 3.5" work string, Using plugs and packer to isolate where communication between the 7" and 8 5/8" is coming in at, 13:30 RIH w/work string and packer RIH 8 stands and pressure tested below packer held 500# POOH w/4 stands and pressure check below packer.

12/6/16

09:30 POOH W/3.5 work string and RPB found leak at 30' laying work string down Will dig out cellar to top of 8 5/8 @ 20' below surface and check on where leak is.

11:30 out of the hole laid down work string and pkr

12:15 start rigging pulling unit

13:30 finish rigging down unit

14:00 start digging out cellar

12/7/16

12:00 arrive location, Backhoe is back filling hole so rig can back in and rig back up. A culvert has been put inside the cellar. Will put fence around after finish with the well.

12:30 spotting unit to rig up

13:00 rigging up unit

12/8/16

12:30 arrive location 4.5" csg already in the hole, BOP still on well circulating packer fluid. Will run MIT on 12/9/16 at 09:00

12/9/16

09:00 MIT/BHT-OK Ran with 540# ended with 525# 32 minute test
Energy Services Company (Cleve) Ser#6973 Cal date 12/8/16 1000# spring

Left chart with Robert (OWL) Energy Services Company Pulling unit crew will back fill cellar and connect lines back up after rigging down unit.

11:00 leave location Crew rigging down pump truck from well to connect and pump out plug in packer

13:00 Robert called said unit is rigged down and well is hooked back up.



**INDEPTH
INJECTION
PROFILE**

Company OWL
 Well Maralo Sholes B #2
 Field Yates & Seven Rivers
 County Lea State New Mexico

Location: API #: 30-025-09806
 660' FSL & FEL
 SEC TWP 25S RGE 36E
 Permanent Datum Ground Level Elevation 3021'
 Log Measured From Kelly Bushing
 Drilling Measured From Kelly Bushing
 Other Services
 Elevation
 K.B. ?
 D.F. ?
 G.L. 3021'

Date	12/2/2016
Run Number	run #1
Depth Driller	3055
Depth Logger	3070
Bottom Logged Interval	3070
Top Log Interval	2700
Open Hole Size	6.25"
Type Fluid	water
Density / Viscosity	n/a
Max. Recorded Temp.	89 F
Estimated Cement Top	n/a
Time Well Ready	upon Arrival
Time Logger on Bottom	11:20
Equipment Number	Renegade #95
Location	Levelland, Tx.
Recorded By	Jim Smith
Witnessed By	

Borehole Record		Tubing Record					
Run Number	Bit	From	To	Size	Weight	From	To
				n/a	n/a	n/a	n/a
				n/a	n/a		
				n/a	n/a		

Casing Record		Wdgt/Ft		Top		Bottom	
Surface String	Size	36.0#		surface	410'		
Prof. String	10.3/4"	22.0#		surface	1223'		
Production String	8.5/8"	20.0#		surface	2935'		
Liner	7"						

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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 we 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 interpretation made by any of our officers, agents or employees. These interpretations are also subject to our general terms and conditions set out in our current Price Schedule.

Comments

GAMMA RAY, CCL, X - Y CALIPER, PRESSURE, TEMPERATURE, 7" FULLBORE SPINNER
 DATA ACQUIRED BY " INDEPTH PRODUCTION SOLUTIONS "
 LOG TIED IN WITH CSG SHOE @ 2935'
 INJECTION RATE WAS 5 BPM DURING INJECTION PASSES

INTERVAL SUMMARY TABLE

ZONES (FT)			WATER		
			STB/D		
INT.	Top	Bot	QWZT	QWZI	%QWI
1	2900	3005	-6874	0	0%
2	3005	3010	-6874	-3307	48%
3	3010	3025	-3566	-453	7%
4	3025	3040	-3113	-995	14%
5	3040	3050	-2118	-263	4%
6	3050	3055	-1856	-1343	20%
7	3055	3060	-513	-161	2%
8	3060	3062	-352	-352	5%
9	3062	3065	0	0	0%
TOTALS				-6874	100%

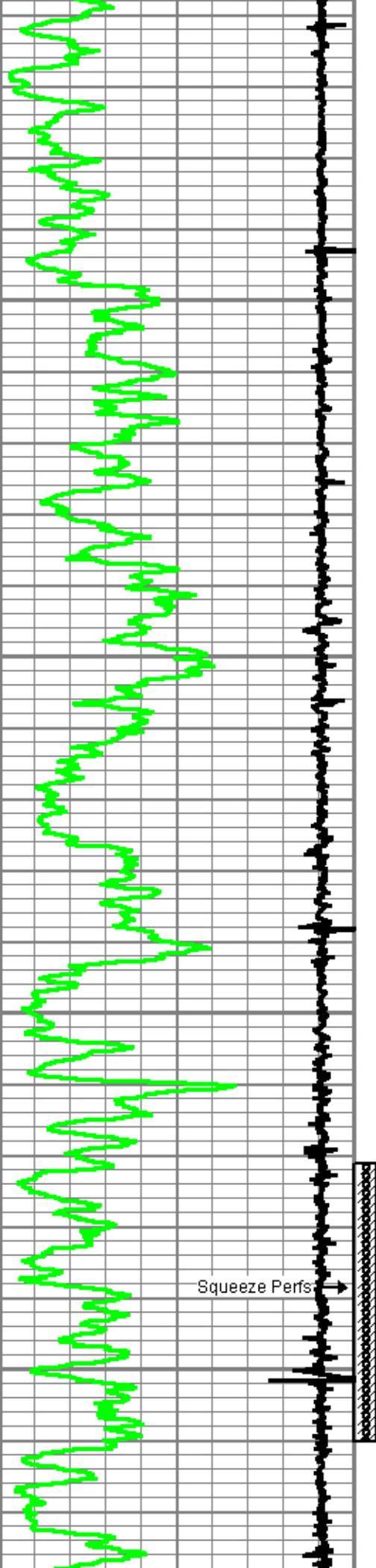


Merged Spinner Passes

Database File: marales sholes b002.db
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 Presentation Format: sparall2
 Dataset Creation: Fri Dec 02 21:50:29 2016
 Charted by: Depth in Feet scaled 1:240

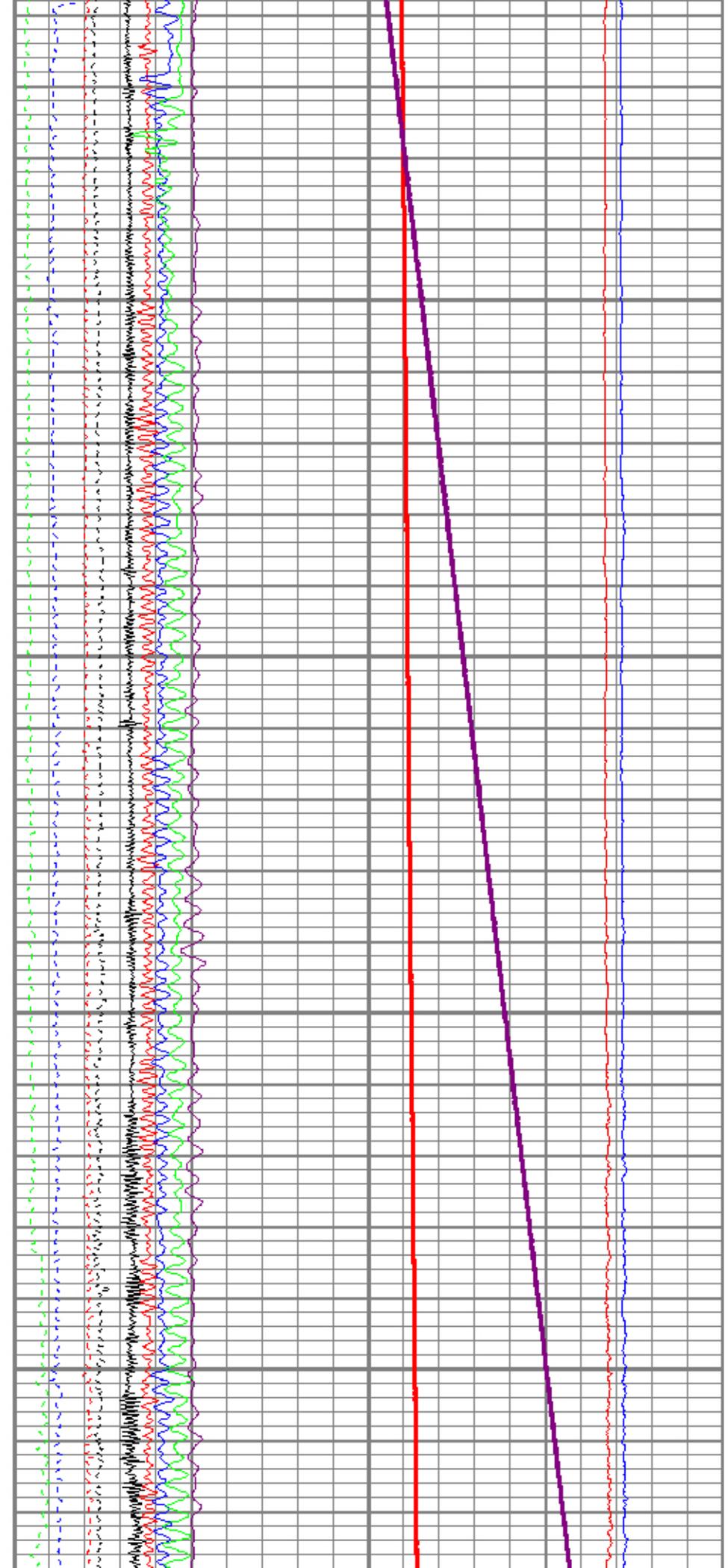
-10	CCL (mV)	1	-16	Spinner Dn 30 FPM (rps)	16	62	Temp Injecting (degF)	75
0	Gamma Ray (GAPI)	50	-16	Spinner Dn 60 FPM (rps)	16	1150	Pressure (psi)	1350
			-16	Spinner Dn 90 FPM (rps)	16	0	Caliper X Arm (in)	10
			-16	Spinner Dn 120 FPM (rps)	16	0	Caliper Y Arm (in)	10
			-16	Spinner Dn 150 FPM (rps)	16			
			-16	Spinner Up 30 FPM (rps)	16			
			-16	Spinner Up 60 FPM (rps)	16			
			-16	Spinner Up 90 FPM (rps)	16			
			-16	Spinner Up 120 FPM (rps)	16			

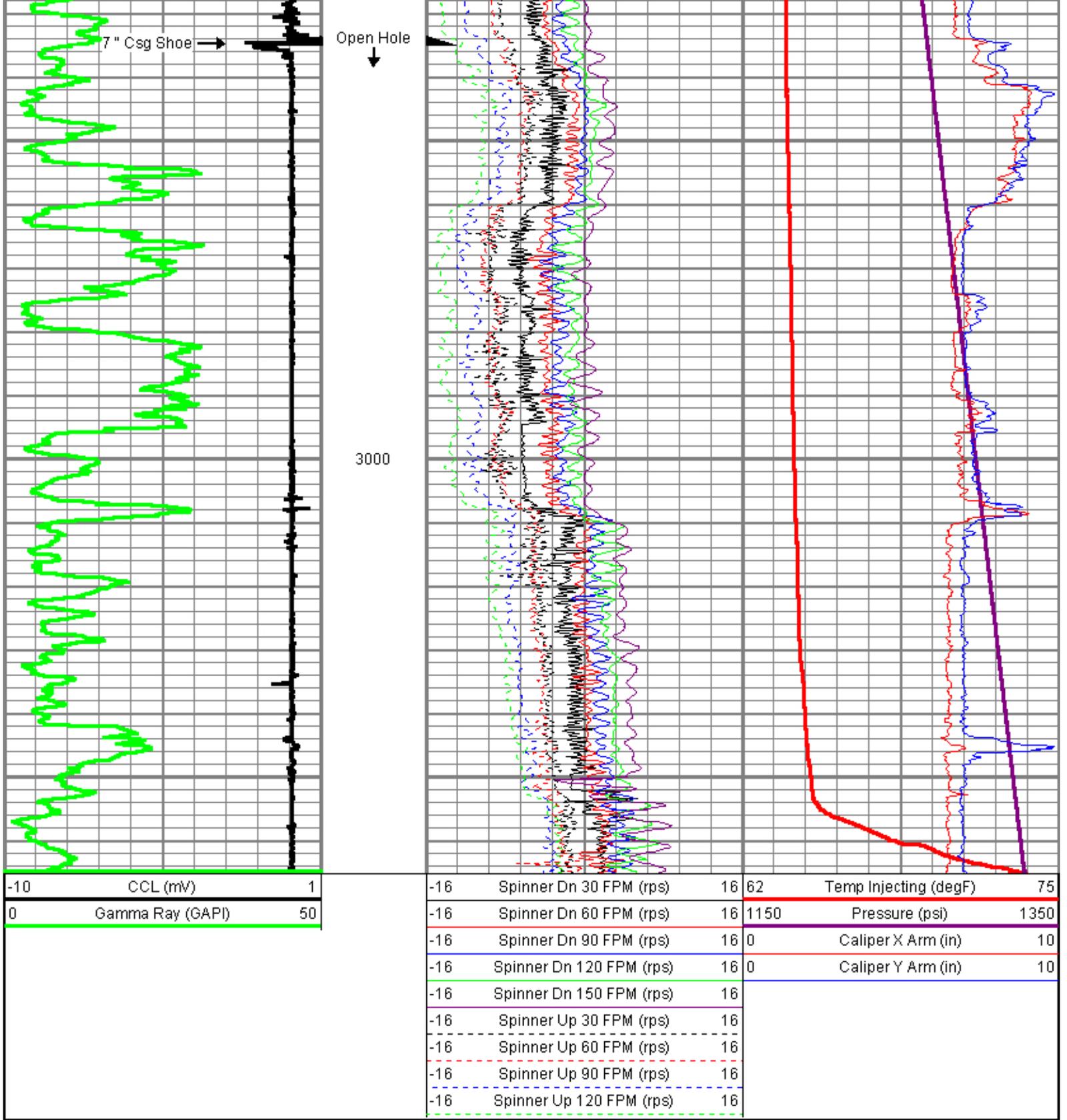




2800

2900



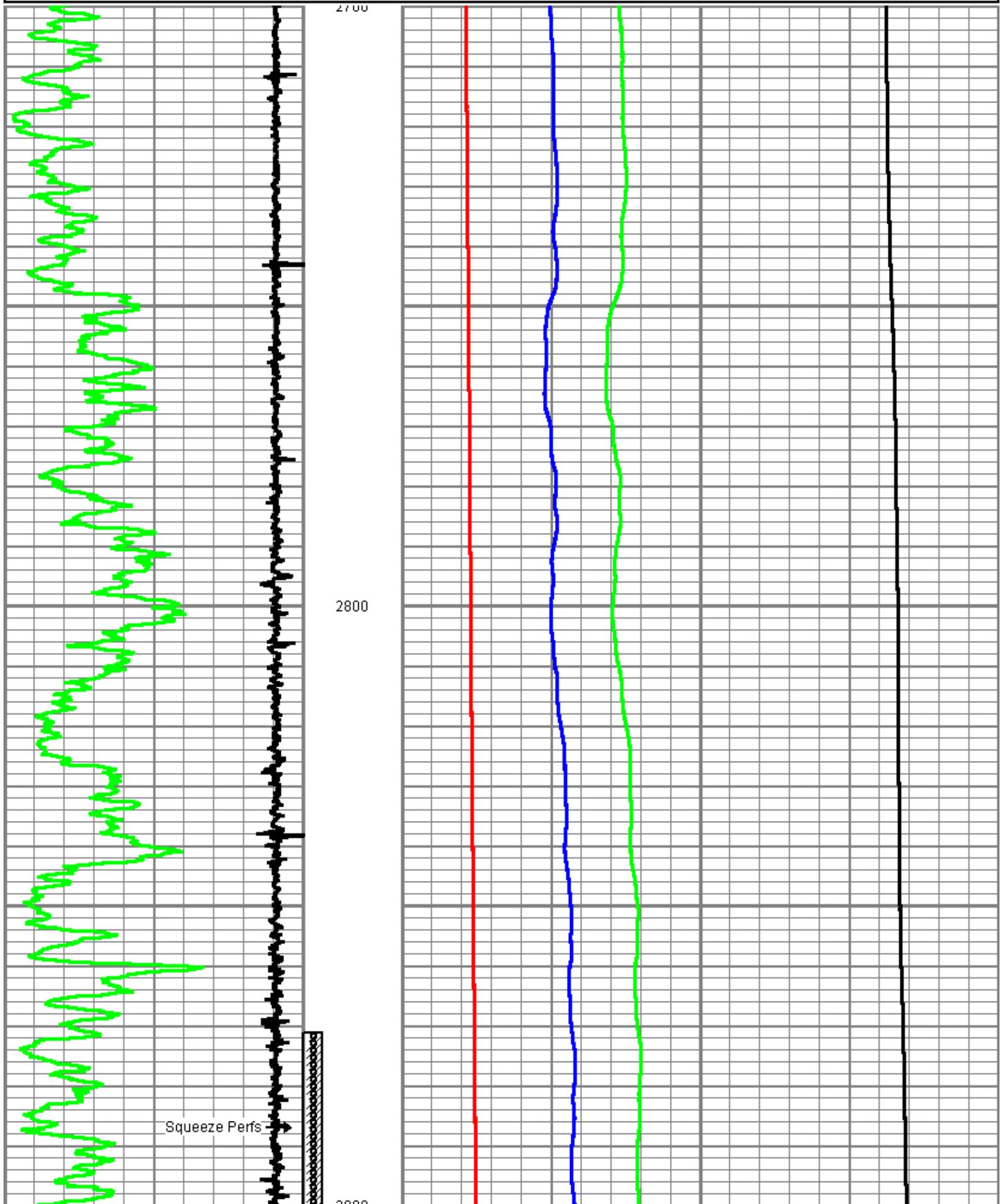


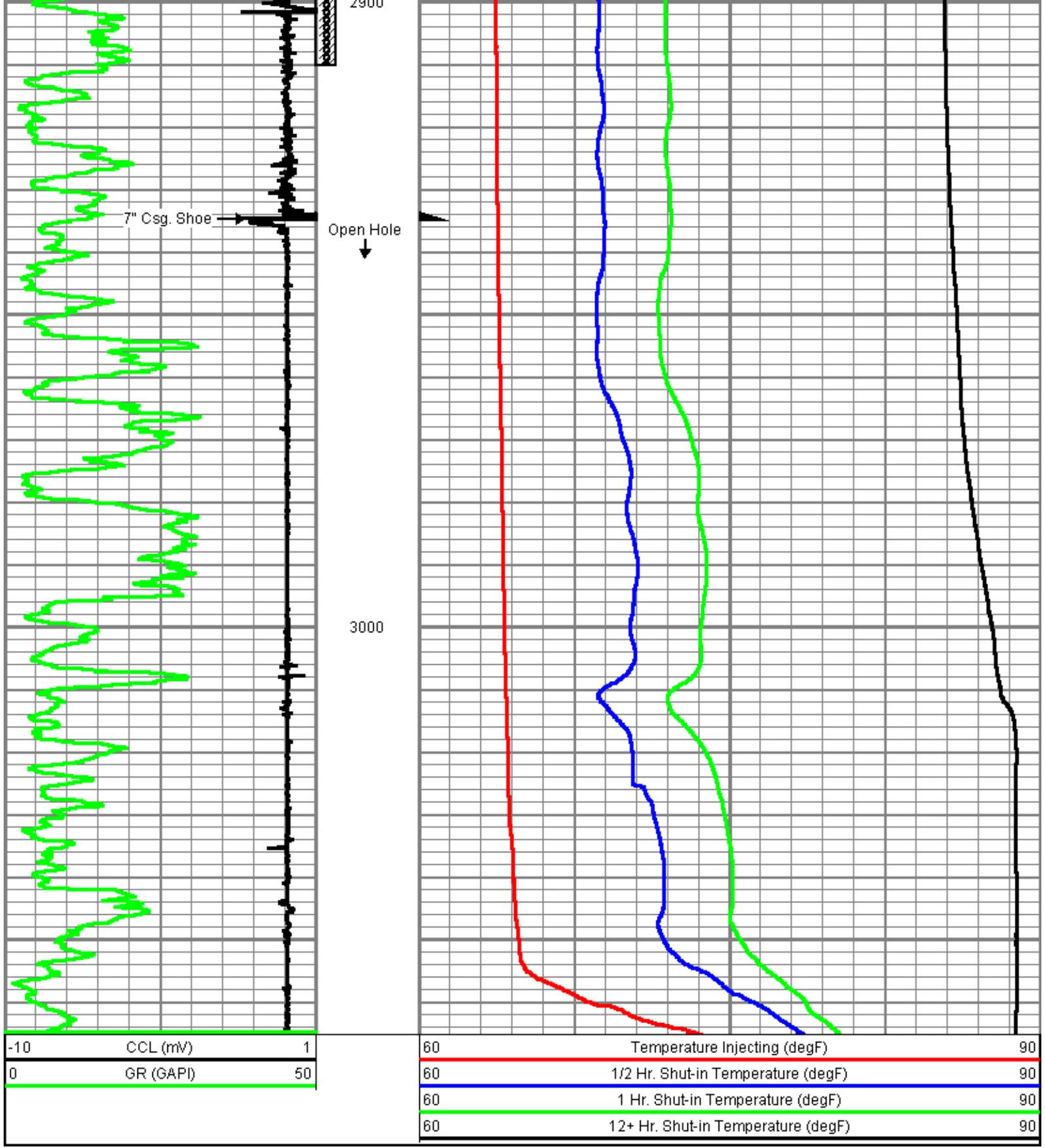
Flowing Vs. Shut-in Temperatures

Database File: marales sholes b002.db
 Dataset Pathname: merge2
 Presentation Format: pl_ftvst
 Dataset Creation: Fri Dec 02 21:50:36 2016
 Charted by: Depth in Feet scaled 1:240

-10	CCL (mV)	1
0	GR (GAPI)	50

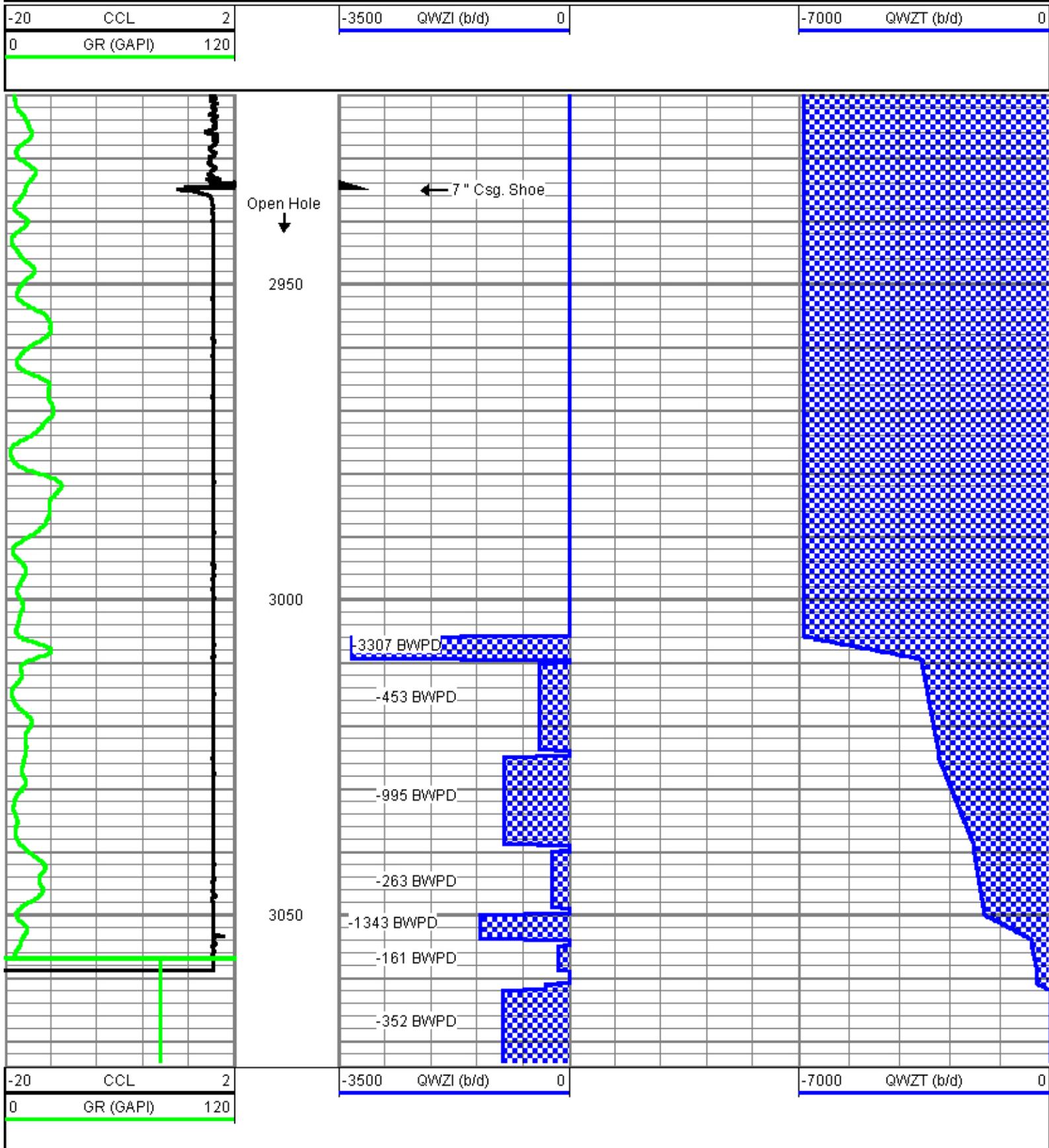
60	Temperature Injecting (degF)	90
60	1/2 Hr. Shut-in Temperature (degF)	90
60	1 Hr. Shut-in Temperature (degF)	90
60	12+ Hr. Shut-in Temperature (degF)	90





Q Interval & Q Total

Database File: marales sholes b002.db
 Dataset Pathname: f1
 Presentation Format: pl_qint



Company OWL
Well Maralo Sholes B #2
Field Yates & Seven Rivers
County Lea



PUMP-IN TRACER

Company	Owl SWD Operating	Well	Maralo Sholes B #002
Field	Maralo Sholes	County	Lea
State	New Mexico	Location	660 FSL & 860' FEL
AP#	660 FSL & 860' FEL	SEC	N/A TWP N/A RGE N/A
Permanent Station	Ground Level	Elevation	2749'
Log Measured From	K 1/8" Above Perm. Datum	K 1/8" Above Perm. Datum	2749'
Log Measured From	Kelly Bushing	Kelly Bushing	2749'
Log Measured From	December 2, 2016	December 2, 2016	2749'
Company	Owl SWD Operating	Well	Maralo Sholes B #002
Field	Maralo Sholes	County	Lea
State	New Mexico	Location	660 FSL & 860' FEL
AP#	660 FSL & 860' FEL	SEC	N/A TWP N/A RGE N/A
Permanent Station	Ground Level	Elevation	2749'
Log Measured From	K 1/8" Above Perm. Datum	K 1/8" Above Perm. Datum	2749'
Log Measured From	Kelly Bushing	Kelly Bushing	2749'
Log Measured From	December 2, 2016	December 2, 2016	2749'

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Comments

LOG WAS SET TO 7" CASING-SHOE SET @ 2935'

PERFORATIONS

OPEN HOLE: 2935' - 3072'

INJECTION WELL:
 SHUT-IN DATE: 12-02-2016 HOUR: 3:30 P.M. TOTAL S.I. TIME 1 HOUR S.I. PRESS 0-PSI
 METERED INJ. RATE: 6542 B/D PRESSURE: 0-PSI TEMP 122 DEGREE FLUID TYPE WATER
 TOTAL VOLUME TO DATE: FLUID LEVEL TUBING FULL

PRODUCER:
 FLOWING PUMPING CHOKE SETTING HOURS PROD.
 FLUID LEVEL CSG. TBG. RATE B/W B/O
 FLUID TYPE WATER

FRAC OR ACID WELLS:
 TIME FINISHED FRAC OR ACID ACID % FLUID - GALS SAND #
 RATE - BPM PRESSURE

CONCLUSIONS

THIS SURVEY WAS RUN TO DETERMINE THE ZONES OF INJECTION, THERE WAS NO INDICATION OF A CHANNEL-UP FROM CASING-SHOE

NOTE: A TOTAL OF 507 BARRILES WERE PUMPED DURING SURVEY
 100% CASING RATE -6542- B/D
 100% TUBING RATE -6542- B/D

Sensor	Offset (ft)	Schematic	Description	Len (ft)	OD (in)	WT (lb)
			1.38CHD 1.38 Cable Head	1.00	1.38	2.00
			SBAR-1.375" (000) 7 1/32" Tungsten Sinker Bar	7.00	1.38	61.00
			SBAR-169x5 (0001) Sinker Bar 1 3/8 by 5 foot	5.00	1.38	30.00
			DUMJECT-PROBE (DUMPROBE)	2.17	1.38	10.00
CCL	8.94		CCL-Probe (Probe_1) 1 3/8" Probe Logging CCL	1.89	1.38	5.00
			DUMDET-KC (KCPOS) KC SCINT G/R	3.46	1.38	10.00
			DUMCAL-PROBE (PROBE01) PROBE XY CALIPER	3.43	1.38	20.00
TEMP	0.00		TEMP-Probe (P01) Probe 1 3/8" Temp	1.55	1.38	4.00

Dataset: maralo-#2.db: MARALO/2/injtemp/pass1
 Total Length: 25.49 ft
 Total Weight: 142.00 lb
 O.D.: 1.38 in

Company: F:\maralo-#2.db
 Well: MARALO/2/TRACER/_tracer/_shottabl_1
 Dataset: MARALO/2/VEL/_tracer/_shottabl_1
 Reference Rate: 6537.0 b/d

TRACER RESULTS

#	Depth (ft)	Time	Integration	Flow (%)	Delta (%)	Comment
2	2626.00	18:05:20	156472.00	100.00		
3	2852.00	18:05:55	156472.00	100.00	0.00	
4	2906.00	18:06:24	156472.00	100.00	0.00	
5	2956.00	18:06:56	156472.00	100.00	0.00	
6	3015.00	18:07:40	129882.00	83.01	16.99	
7	3044.00	18:08:16	53749.30	34.35	48.66	
8	3053.00	18:08:56	20823.60	13.31	21.04	
9	3056.00	18:09:49	7049.81	4.51	8.80	
10	3060.00	18:11:13	5049.81	3.23	1.28	

VELOCITY FROM TRACER

#	Depth (ft)	Time	D Space (ft)	D Time (sec)	Flow (b/d)	Flow (%)	Delta (b/d)	Delta (%)
11	2920.00	18:31:15	5.28	5.00	8.35			
12	2852.00	18:37:11	5.28	2.26	6.81	6542.22	100.00	
13	2906.00	18:36:37	5.28	2.60	6.80	5669.71	86.58	13.42
14	3020.00	18:35:21	5.28	6.40	6.39	2697.26	41.19	45.39
6	3030.00	18:34:49	5.28	5.00	6.29	2502.73	38.22	2.97
5	3040.00	18:33:42	5.28	5.80	6.39	2230.05	34.06	4.16
4	3050.00	18:32:52	5.28	12.00	6.30	1047.91	16.00	18.05
3	3060.00	18:31:52	0.00	69.00	6.26	179.50	2.74	13.26
2	3066.00	18:31:52	0.00	300.00	6.28	0.01	0.00	2.74

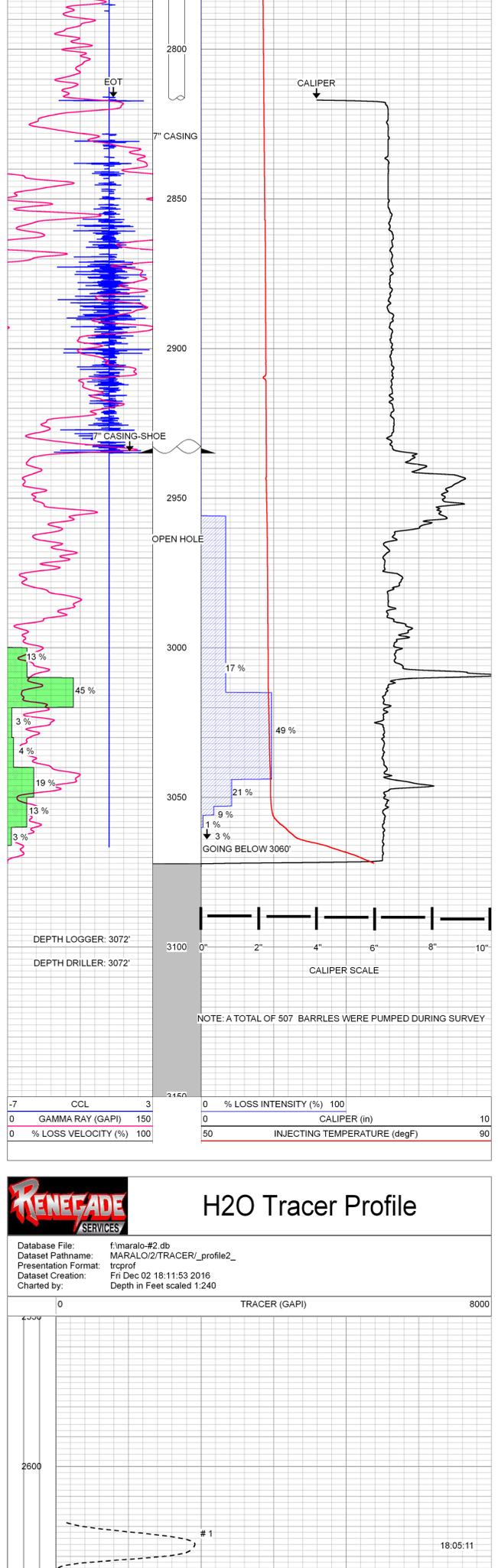
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 Well: MARALO/2/VEL/_tracer/_shottabl_1
 Dataset: MARALO/2/VEL/_tracer/_shottabl_1
 Reference Rate: 6548.2 b/d

VELOCITY RESULTS

#	Depth (ft)	Time	D Space (ft)	D Time (sec)	Csg ID (in)	Flow (b/d)	Flow (%)	Delta (%)	Channel C
1	2920.00	18:31:15	5.28	5.00	8.35				
9	3000.00	18:37:11	5.28	2.26	6.81	6548.22	100.00		
8	3010.00	18:36:37	5.28	2.60	6.80	5669.71	86.58	13.42	
7	3020.00	18:35:21	5.28	6.40	6.39	2697.26	41.19	45.39	
6	3030.00	18:34:49	5.28	5.00	6.29	2502.73	38.22	2.97	
5	3040.00	18:33:42	5.28	5.80	6.39	2230.05	34.06	4.16	
4	3050.00	18:32:52	5.28	12.00	6.30	1047.91	16.00	18.05	
3	3060.00	18:31:52	0.00	69.00	6.26	179.50	2.74	13.26	
2	3066.00	18:31:52	0.00	300.00	6.28	0.01	0.00	2.74	NO FLO

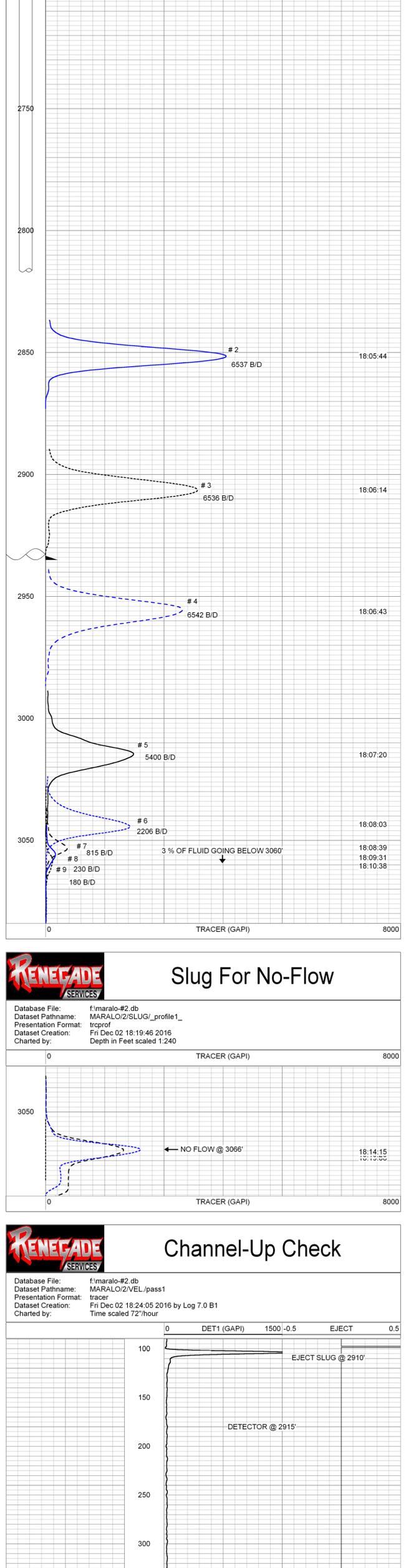
H2O Injection Composite

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 Charted by: Depth in Feet scaled 1.240



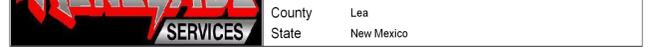
H2O Tracer Profile

Database File: f:\maralo-#2.db
 Dataset Pathname: MARALO/2/TRACER/_profile2_
 Presentation Format: trcprof
 Dataset Creation: Fri Dec 02 18:11:53 2016
 Charted by: Depth in Feet scaled 1.240



Slug For No-Flow

Database File: f:\maralo-#2.db
 Dataset Pathname: MARALO/2/VEL/_profile1_
 Presentation Format: trcprof
 Dataset Creation: Fri Dec 02 18:19:46 2016
 Charted by: Depth in Feet scaled 1.240



Channel-Up Check

Database File: f:\maralo-#2.db
 Dataset Pathname: MARALO/2/VEL/pass1
 Presentation Format: tracer
 Dataset Creation: Fri Dec 02 18:24:05 2016 by Log 7.0 B1
 Charted by: Time scaled 72/hour

Company

Company: Owl SWD Operating
 Well: Maralo Sholes B #002
 Field: Maralo Sholes
 County: Lea
 State: New Mexico