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

Other Services

Elevation
K.B. ?
D.F. ?
G.L. 3021'

Company	OWL		
Well	Maralo Sholes B #2		
Field	Yates & Seven Rivers		
County	Lea	State	NewMexico
Permanent Datum	Ground Level	Elevation	3021'
Log Measured From	Kelly Bushing		
Drilling Measured From	Kelly Bushing		

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

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String	10 3/4"	36.0#	surface	410'
Prot. String	8 5/8"	22.0#	surface	1223'
Production String	7"	20.0#	surface	2935
Liner				

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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

EXHIBIT
tabbies
A

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%

RENEGADE SERVICES

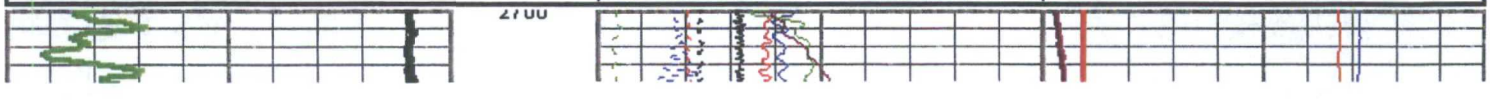
Merged Spinner Passes

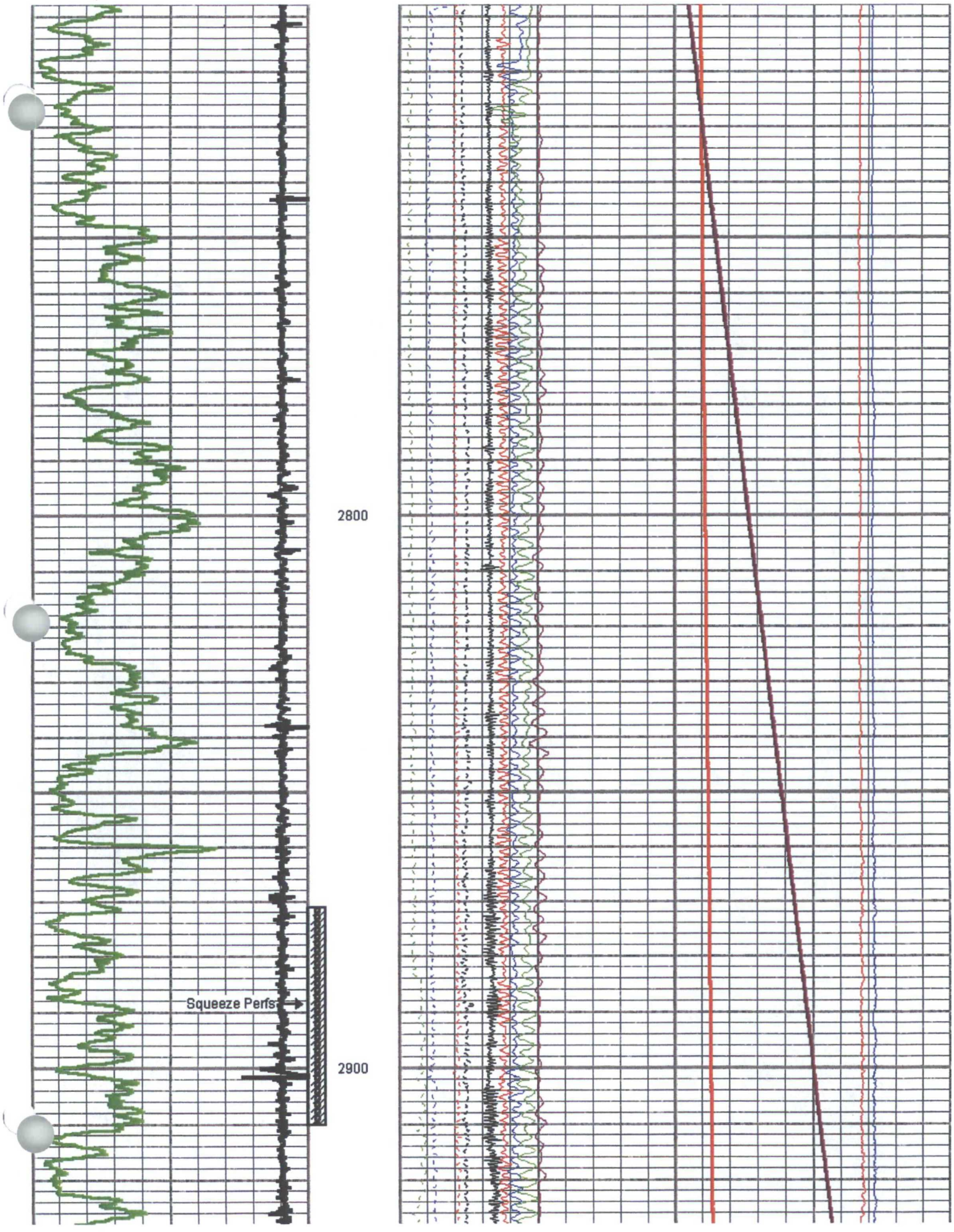
Database File: marales sholes b002.db
Dataset Pathname: merge1
Presentation Format: sparall2
Dataset Creation: Fri Dec 02 21:50:29 2016
Charted by: Depth in Feet scaled 1:240

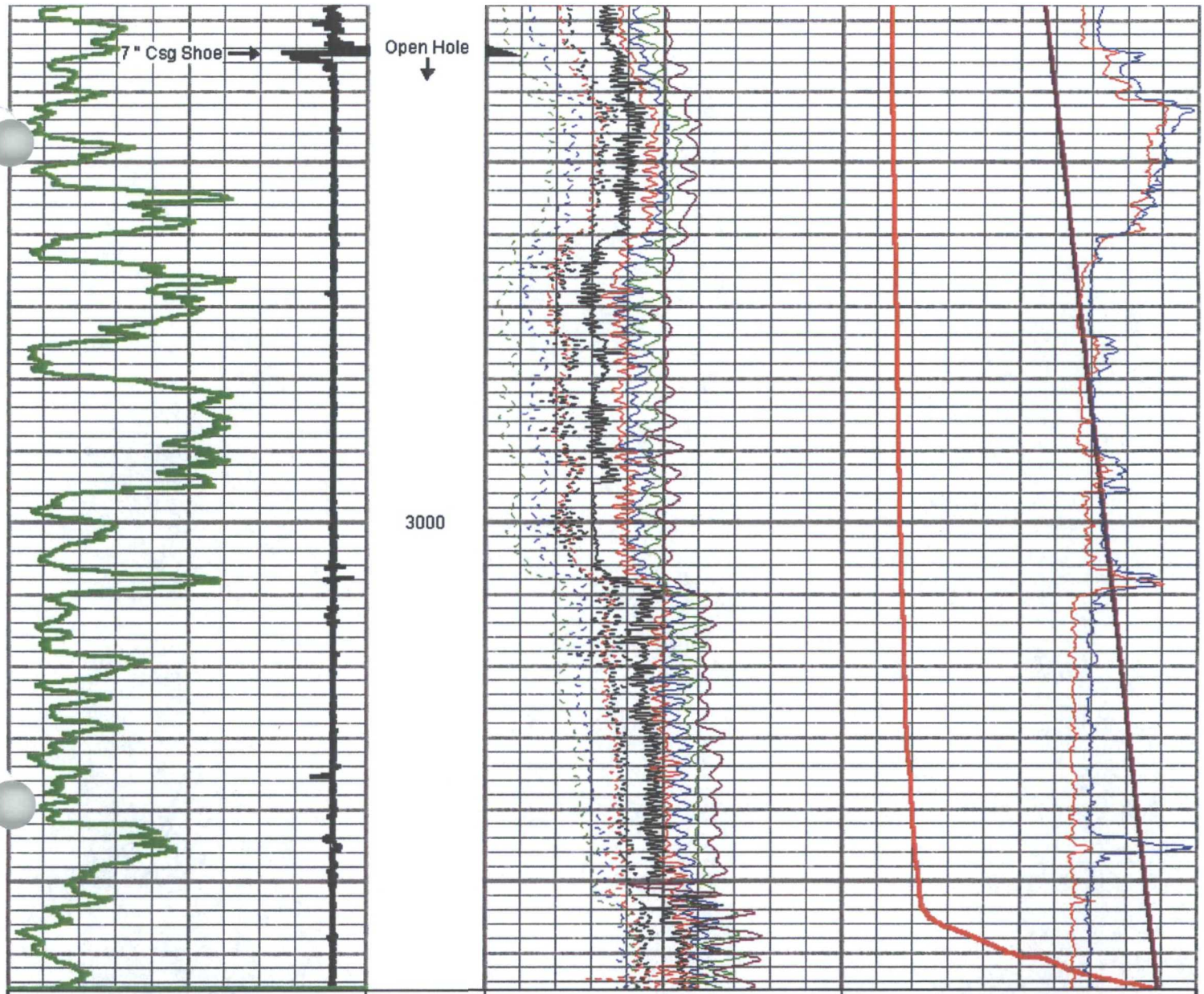
-10	CCL (mV)	1
0	Gamma Ray (GAPI)	50

-16	Spinner Dn 30 FPM (rps)	16
-16	Spinner Dn 60 FPM (rps)	16
-16	Spinner Dn 90 FPM (rps)	16
-16	Spinner Dn 120 FPM (rps)	16
-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

62	Temp Injecting (degF)	75
1150	Pressure (psi)	1350
0	Caliper X Arm (in)	10
0	Caliper Y Arm (in)	10




2800
Squeeze Perfs
2900



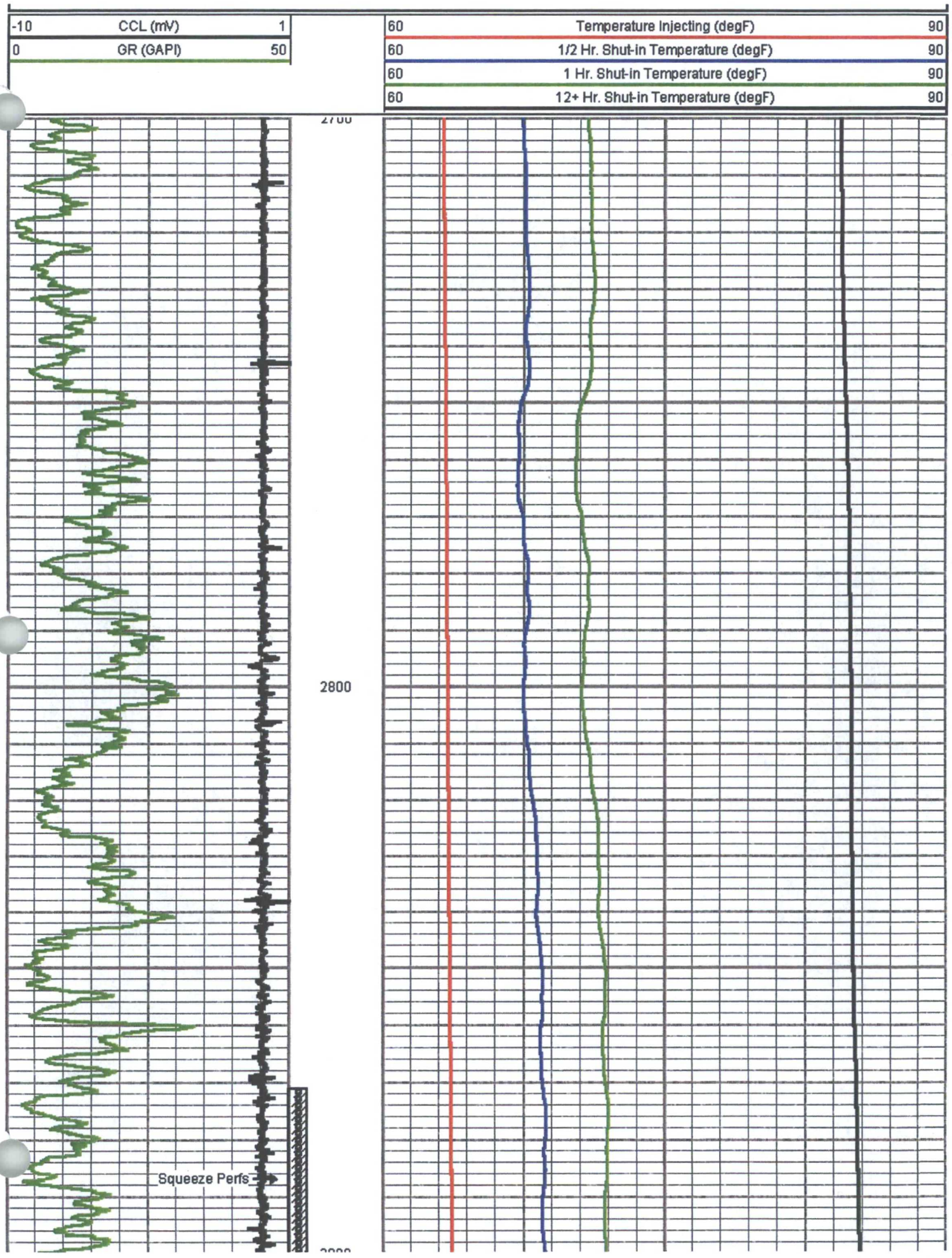
-10	CCL (mV)	1
0	Gamma Ray (GAPI)	50

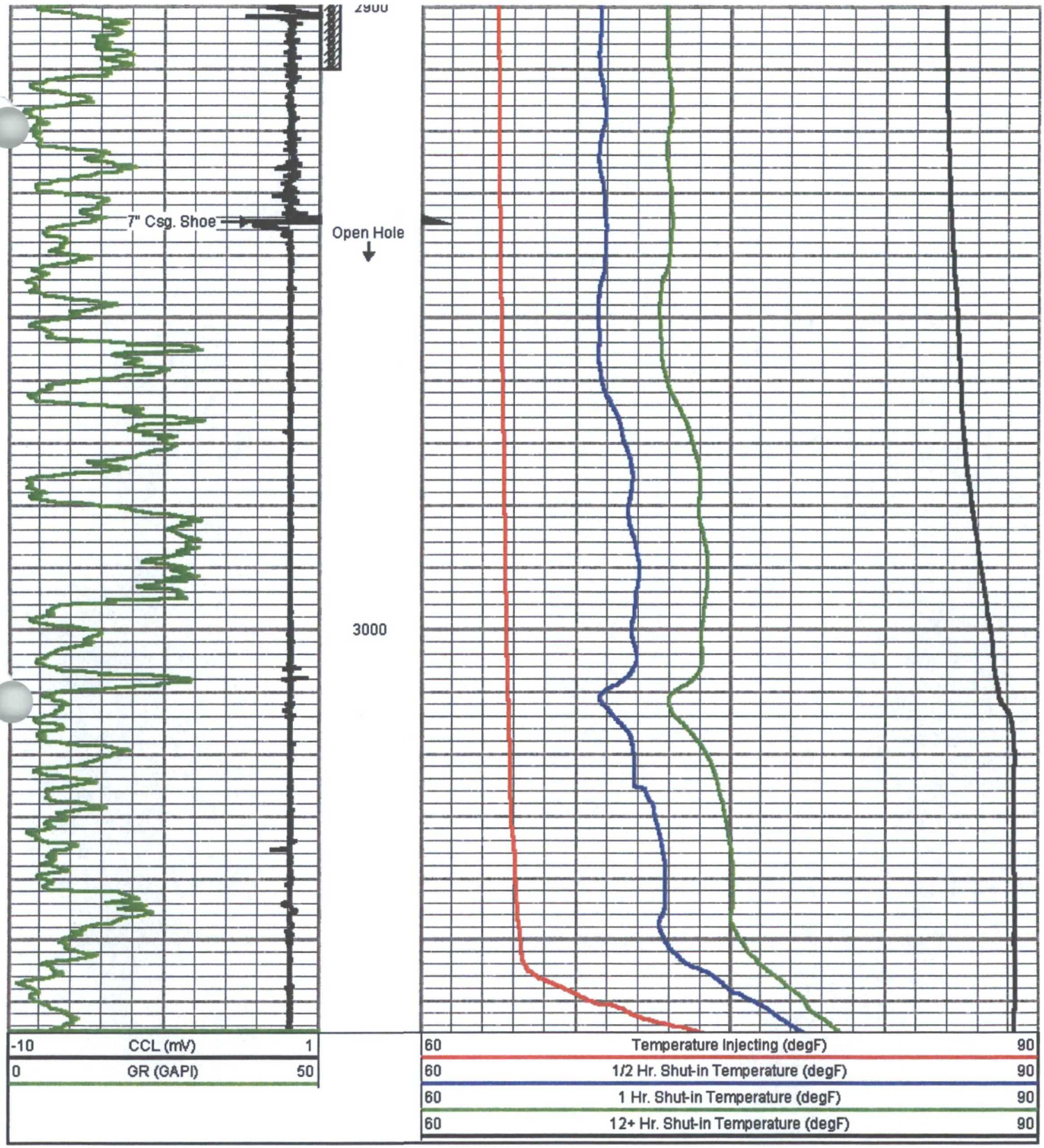
-16	Spinner Dn 30 FPM (rps)	16
-16	Spinner Dn 60 FPM (rps)	16
-16	Spinner Dn 90 FPM (rps)	16
-16	Spinner Dn 120 FPM (rps)	16
-16	Spinner Dn 150 FPM (rps)	16
-16	Spinner Up 30 FPM (rps)	16
-16	Spinner Up 60 FPM (rps)	16
-16	Spinner Up 90 FPM (rps)	16
-16	Spinner Up 120 FPM (rps)	16

62	Temp Injecting (degF)	75
1150	Pressure (psi)	1350
0	Caliper X Arm (in)	10
0	Caliper Y Arm (in)	10

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

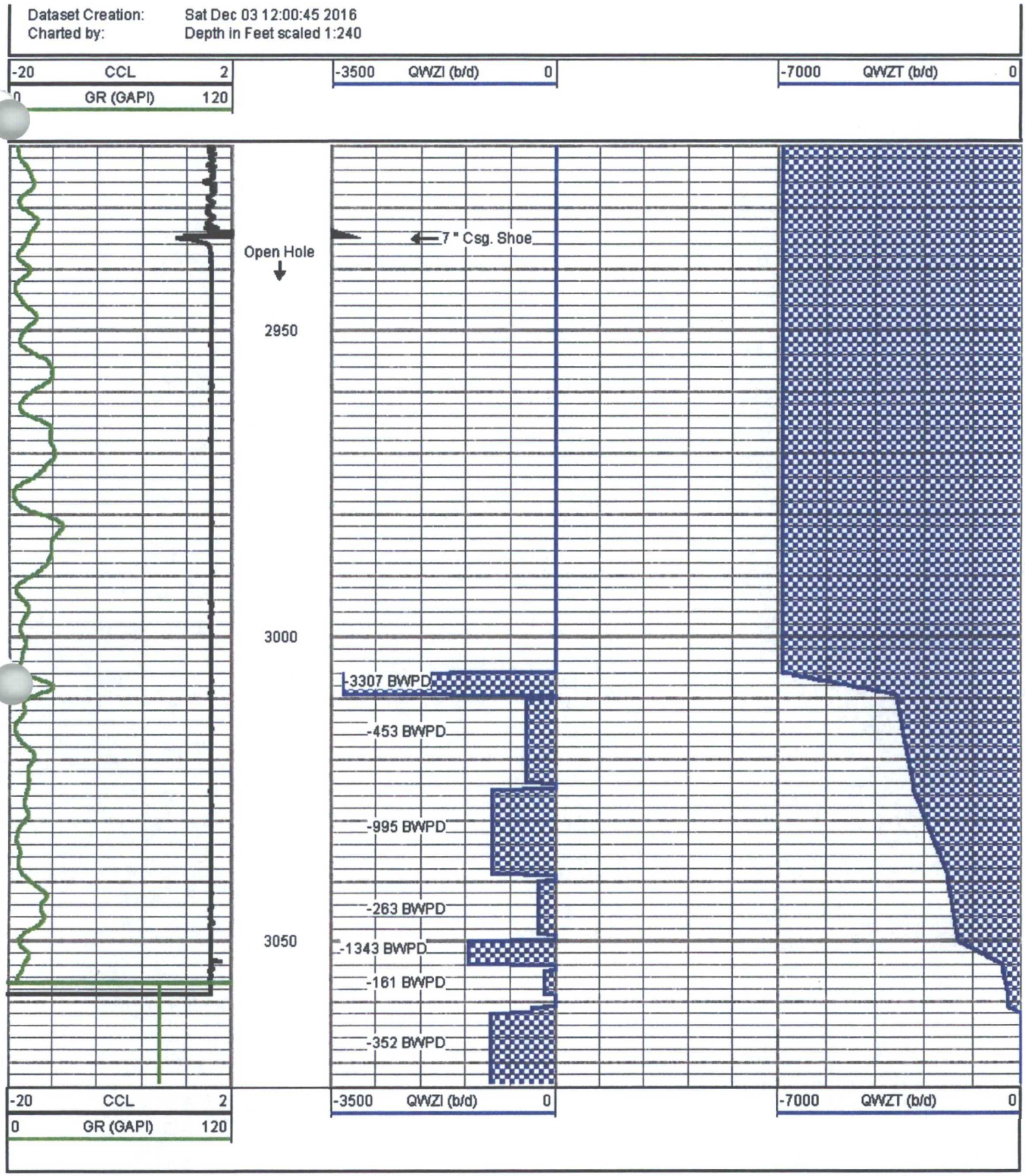

-10
CCL (mV)
1
0
GR (GAPI)
50
60
Temperature Injecting (degF)
90
60
1/2 Hr. Shut-in Temperature (degF)
90
60
1 Hr. Shut-in Temperature (degF)
90
60
12+ Hr. Shut-in Temperature (degF)
90
2800
Squeeze Perfs



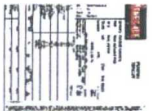
RENEGADE SERVICES

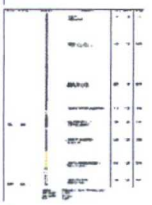
Q Interval & Q Total

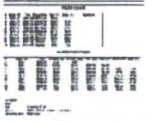
Database File: marales sholes b002.db
Dataset Pathname: f1
Presentation Format: pl_qint

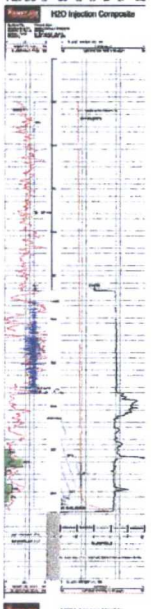


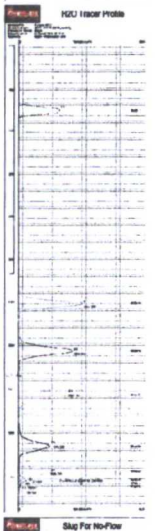
Company	OWL
Well	Maralo Sholes B #2
Field	Yates & Seven Rivers
County	Lea








H2O Injection Composite


H2U Tracer Profile


Slug For No-Flow

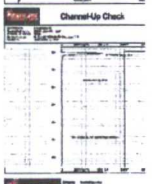

Channel-Up Check

EXHIBIT B

RENEGADE SERVICES

PUMP-IN TRACER

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

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

Location: API # :

660 FSL & 660' FEL

SEC N/A TWP N/A RGE N/A

Other Services: 3-Arm Caliper

Permanent Datum	Ground Level	Elevation	2749'
Log Measured From	K.B. 13" Above Perm. Datum		
Drilling Measured From	Kelly Bushing		

Elevation: K.B. 2762', D.F. 2761', G.L. 2749'

Date	December 2, 2016		
Run Number	ONE		1.375" Tools
Depth Driller	2935'		
Depth Logger	3072'		
Bottom Logged Interval	3072'		
Top Log Interval	2600'		
Open Hole Size	N/A		
Type Fluid	Water		
Density / Viscosity	N/A		
Max. Recorded Temp.	122.1 F		
Estimated Cement Top	N/A		
Time Well Ready	R.O.A		
Time Logger on Bottom	9:00 AM		
Equipment Number	Truck #48		
Location	Levelland		
Recorded By	M.Salas		
Witnessed By			

Borehole Record				Tubing Record			
Run Number	Bit	From	To	Size	Weight	From	To
				3.5"	N/A	Surface	2817'

Casing Record	Size	Wgt/Ft	Top	Bottom
Surface String				
Prot. String				
Production String	7"	20#	Surface	2935'
Liner				
EXP. LINER				

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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

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 DEG. 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 BARRLES 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' 1.375" 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
			DUMEJCT-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:
Well:
File: F:\maralo-#2.db
Dataset: MARALO/2/TRACER/_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	2363	18:05:20	0.00	0.00				
12	2852	18:05:55	225.00	33.31	6537.78	100.00		
13	2906	18:06:24	54.00	29.00	6536.99	100.00	0.79	0.00
14	2956	18:06:56	50.00	29.07	6542.69	100.00	-5.70	0.00
15	3015	18:07:40	59.00	37.60	5400.26	82.61	1142.43	17.39
16	3044	18:08:16	29.00	42.94	2206.73	33.76	3193.53	48.85
17	3053	18:08:56	9.00	36.06	815.47	12.47	1391.25	21.28
18	3056	18:09:49	3.90	53.72	230.27	3.52	585.20	8.95
19	3060	18:11:13	4.00	69.32	180.42	2.76	49.85	0.76

Company:
Well:
File: F:\maralo-#2.db
Dataset: MARALO/2/VEL./_tracer_/_shottabl_/1
Reference Rate: 6548.2 b/d

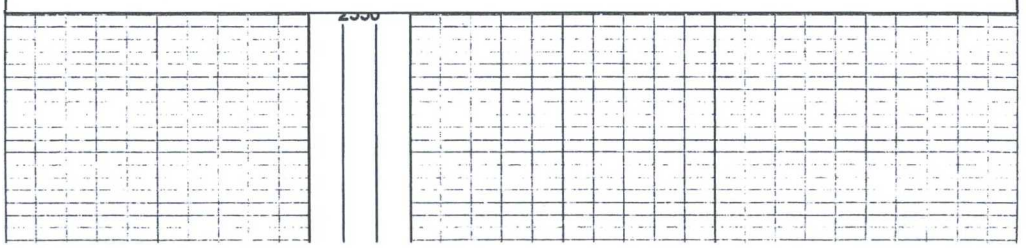
VELOCITY RESULTS

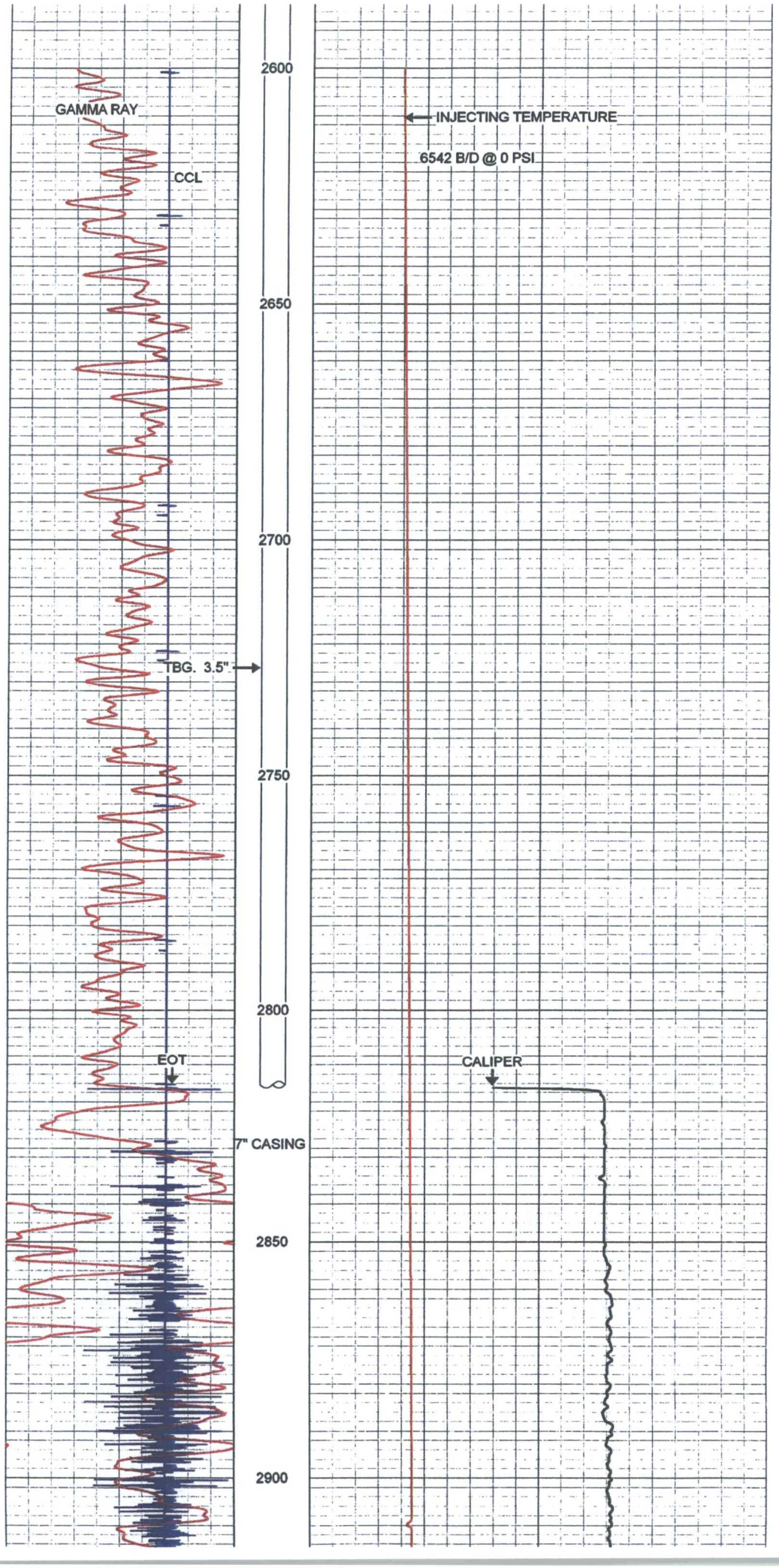
#	Depth (ft)	Time	D Space (ft)	D Time (sec)	Csg ID (in)	Flow (b/d)	Flow (%)	Delta (%)	Commer
1	2920.00	18:31:15	5.28	5.00	8.35				Channel C
9	3000.00	18:37:11	5.28	2.26	6.81	6548.22	100.00		
8	3010.00	18:36:37	5.28	2.60	6.80	5669.71	86.58	13.42	
7	3020.00	18:35:21	5.28	6.40	6.39	2697.26	41.19	45.39	
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	18:32:02	5.28	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

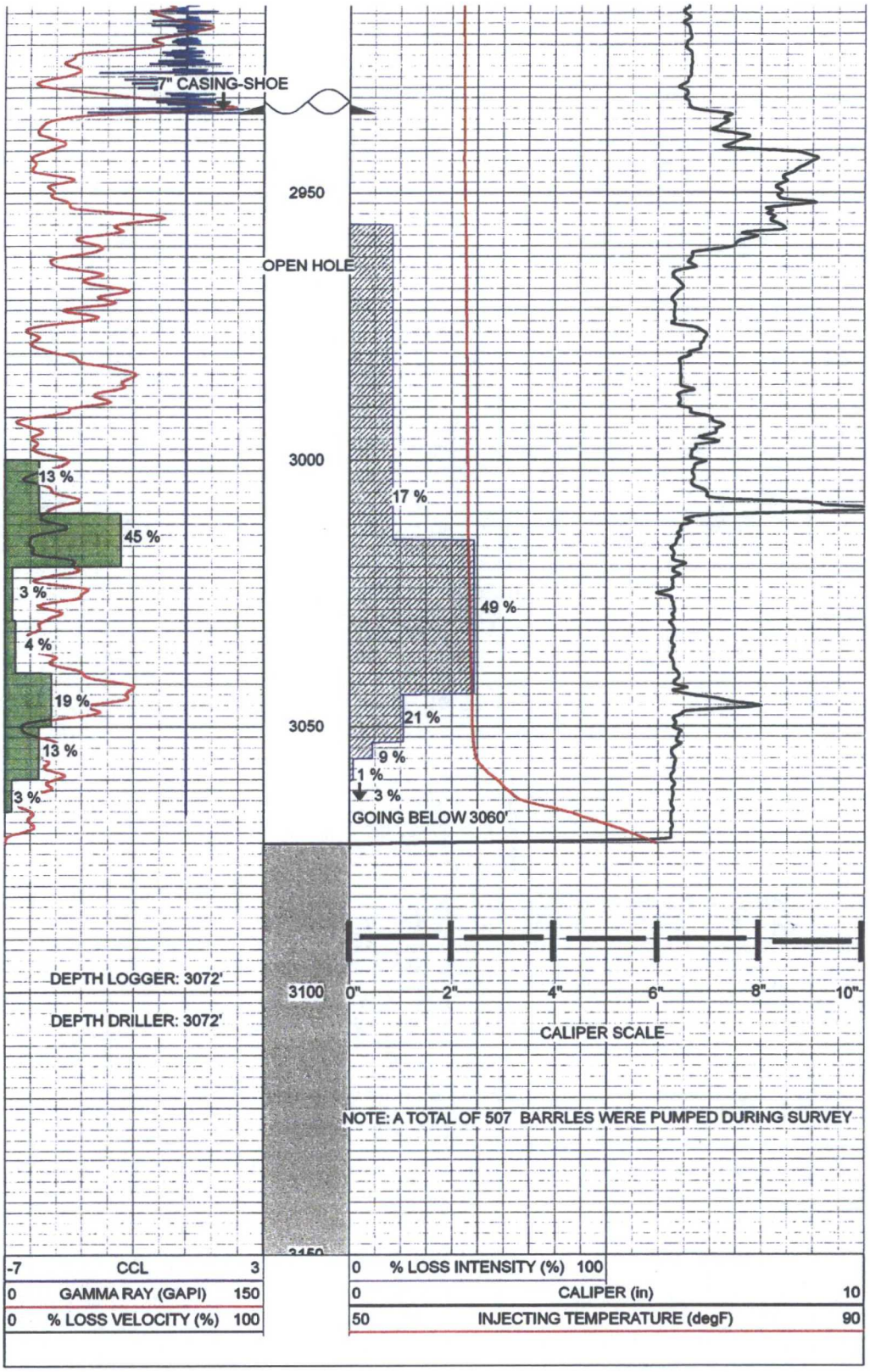
H2O Injection Composite

Database File: f:\maralo-#2.db
Dataset Pathname: MARALO/2/VEL./_composFIN
Presentation Format: trccomp
Dataset Creation: Fri Dec 02 20:21:38 2016
Charted by: Depth in Feet scaled 1:240

-7	CCL	3	0	% LOSS INTENSITY (%)	100
0	GAMMA RAY (GAPI)	150	0	CALIPER (in)	10
0	% LOSS VELOCITY (%)	100	50	INJECTING TEMPERATURE (degF)	90



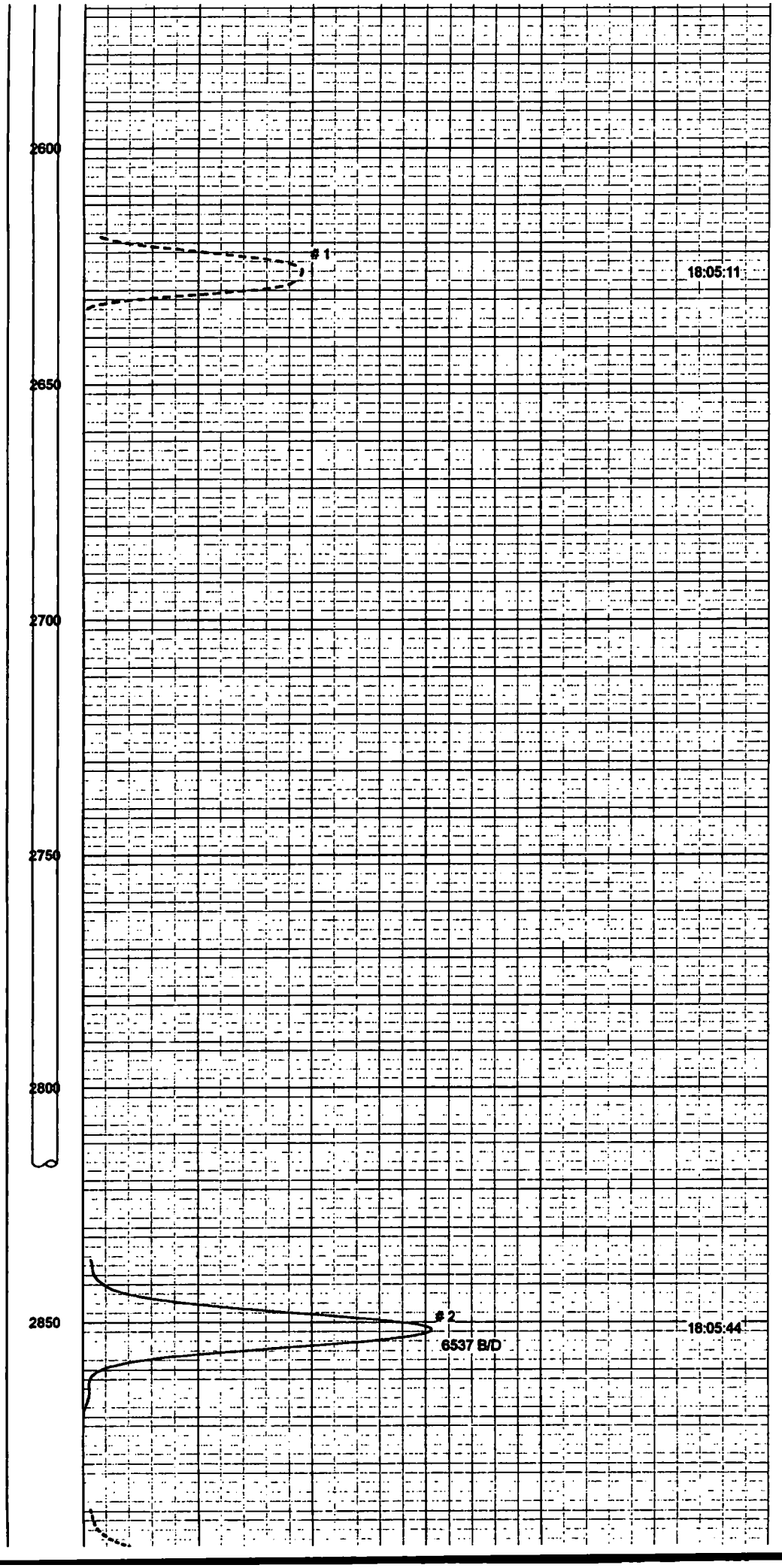

GAMMA RAY
CCL
2600
2650
2700
TBG. 3.5"
2750
2800
EOT
7" CASING
2850
2900
INJECTING TEMPERATURE
6542 B/D @ 0 PSI
CALIPER

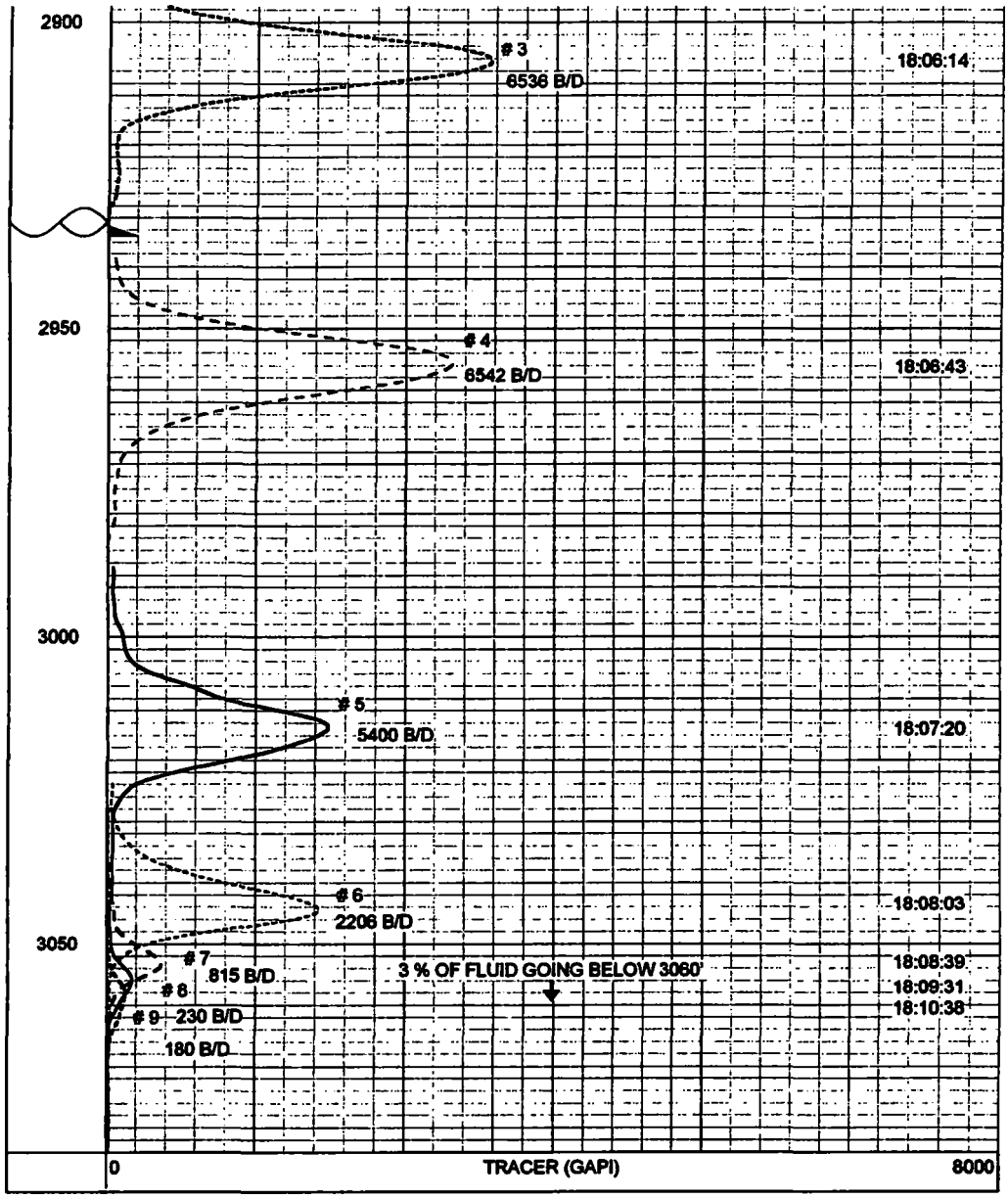


H2O Tracer Profile

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

0 TRACER (GAPI) 8000

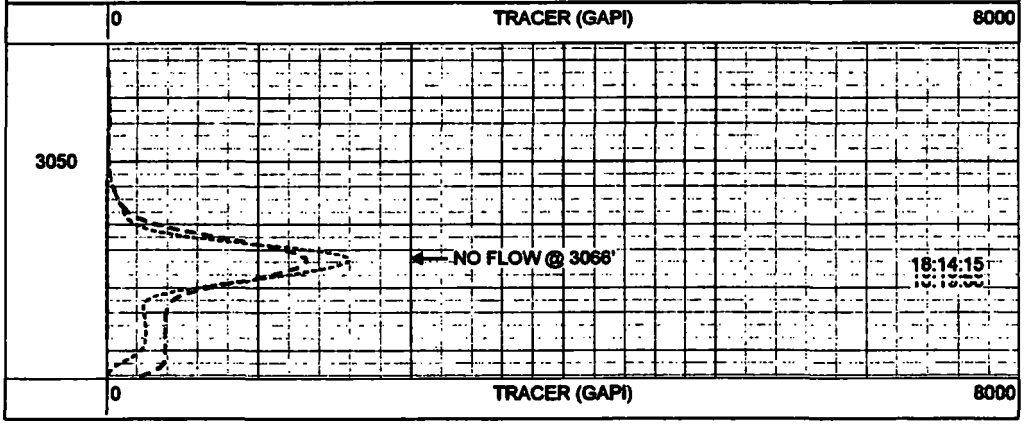

2600
2650
2700
2750
2800
2850
1
18:05:11
2
18:05:44
6537 B/D



KENEGADE

Slug For No-Flow

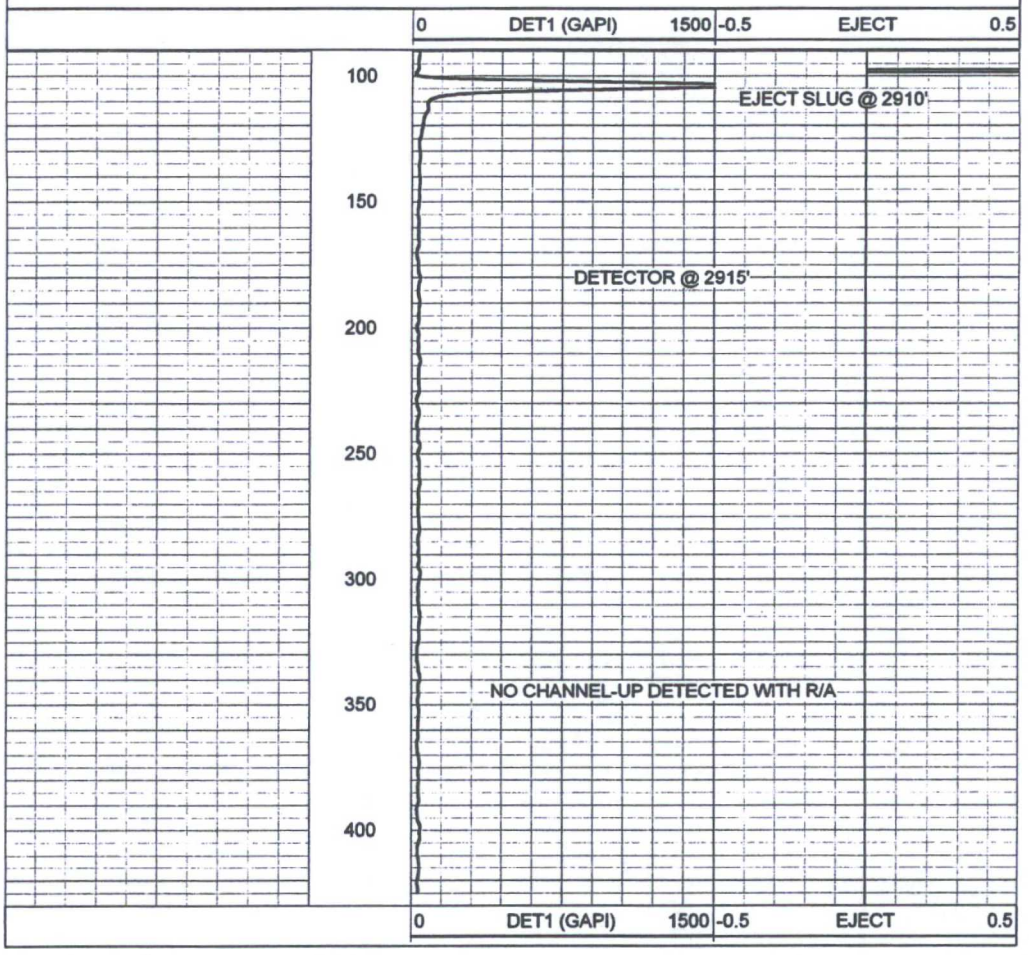
Database File:	f:\maralo-#2.db
Dataset Pathname:	MARALO/2/SLUG/_profile1_
Presentation Format:	trcprof
Dataset Creation:	Fri Dec 02 18:19:46 2016
Charted by:	Depth in Feet scaled 1:240



KENEGADE

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



RENEGADE SERVICES

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

CEK ENGINEERING LLC

PETROLEUM ENGINEERING CONSULTANTS

5301 69th Street
Lubbock, TX 79424
(806) 702-8954
www.cekengineering.com

January 12, 2017

Mr. Nevin Bannister
Chief Operating Officer
OWL SWD Operating, LLC
8214 Westchester Drive, Suite 850
Dallas, TX 75225

RE: Final UIC Geological Assessment Concerning:
NOTICE TO OPERATOR: Requirement to Conduct Injection Survey, Dated July 28, 2016 (EMNRD)
Maralo Sholes B Well No. 2 (API 30-25-09806)
660' FSL & 660' FEL, Sec. 25 T25S R36E
Lea County, New Mexico
Injection Authority: Administrative Order SWD-1127
Order Date: June 1, 2008
Permitted Interval: Yates and Seven Rivers (2938'-3055')

Mr. Bannister:

Per your request, CEK Engineering LLC has performed an Underground Injection Control (UIC) Geological Assessment for the Maralo Sholes B Well No. #2 (API 30-25-09806), herein WELL. The following is our final assessment, completed on or about January 12, 2017, we have incorporated the following:

i.) Discussions from our October 24, 2016 meeting with David Catanach, Phillip Goetze and Michael McMillan (EMNRD) in Santa Fe, New Mexico.
ii.) Results from the cleanout and injection survey re-run, performed December 2, 2016.

We specifically note, to the best of our understanding, the above "NOTICE TO OPERATOR" was sent in response to that certain letter dated April 28, 2016 from the City of Jal, New Mexico to Mr. Matthew Earthman (Souder, Miller & Assoc.) XC: David Martin, Sec. EMNRD; David Catanach, Director OCD; and Tom Blaine, State Engineer, enclosed herein (LETTER).

The LETTER was prepared due to concerns raised by several individuals and companies to the City of Jal, as well as, the City of Jal's pending application of 900 ac-ft of water per annum and nine well locations proposed in the same section (Sec. 25 T25S R36E) as the WELL. The City of Jal's specific concerns were related to the WELL's wellbore integrity, and potential contamination of shallow (< 600' MD) fresh water aquifer in the immediate area.

Additionally, Renegade Services performed an Injection Survey (Temperature, Tracer) on the WELL, September 2, 2016 (SURVEY1); the results of the SURVEY1 were inconclusive, tool set down 50' (3005' MD) above base of injection interval. Because the SURVEY1 results were inconclusive, Maxey G. Brown (OCD District 1 Supervisor) sent Ben Stone (SOS Consulting – OWL Regulatory Consultant) that certain email dated September 6, 2016, enclosed herein (EMAIL).

The EMAIL was prepared, after consultation with David Catanach, to serve as formal notice for OWL to proceed with the cleanout of the 50' of fill and to re-run the injection survey.

Final Report for Maralo Sholes B Well No. 2
Attachment 7

Texas Registered En

EXHIBIT
tabbies
C

The following UIC Geological Assessment was prepared to specifically address concerns mention in the LETTER and EMAIL, in addition to informal discussions (email, phone conversations) raised by OWL's Staff/Consultants regarding potential out of zone injection into the Capitan Reef. Additionally, as an attachment to this report, we specifically address comments posed by Mr. Goetze, during our October 24, 2016 meeting, concerning the spatial location of the injected fluids with respect to the Capitan Reef (Seven Rivers Shelf Margin).

UIC Geological Assessment

The WELL is injecting into the very top of the Seven Rivers Formation and basal Yates Formation. The WELL is situated (completed) in the back reef lagoonal environment (comprised of shelf carbonates, siliciclastics and evaporites) of the Guadalupian Artesia Group. Neutron/Gamma Ray Well Log signatures identify several highly porous and permeable, regionally extensive, eolian sand/dolomitic grainstone reservoirs. These reservoirs are the, updip, productive members of the Jalmat, Rhodes, and Scharbrough oil and gas fields (combined production to date is ~ 100 MMBO & 1.9 TCF).

The WELL's equivalent (injection interval) in the Capitan Reef (Late/Upper Seven Rivers) Margin is located 3.5+ miles to the west and approximately 200-300' down dip structurally. *Additionally, in our opinion, there is sufficient evidence (HISS 1975, NMOCD Case No. 8405 testimony/Water Sample Analysis, IC Potash Corp Feasibility Study) that the interstitial waters of the Capitan Reef and back reef Artesia Group members near the WELL are mineralized above 10,000 mg/L (TDS), digital copies provided on FTP site.*

Several injection wells (examples in the cross-section) have injected into the same reservoirs at high rates since the late 1960's and possibly earlier. Additionally we have identified 460+ injection wells in the immediate area injecting into the same/similar reservoirs as the WELL. These wellbores have been utilized for secondary recovery operations and salt water disposal since the early 1960's.

Additionally, we observed in the literature core analysis reports indicating that Seven Rivers (in the back reef lagoonal environment) eolian siliciclastics reservoirs have permeability's in excess of 350 millidarcies. These core analysis reports support our Pressure Transient Analysis stochastic modeling.

Current (12-02-2016) Injection Profile Survey Assessment

Based on our review of that certain Injection Profile Survey performed by Renegade Services on December 2, 2016 (SURVEY2); we observe that ALL fluid is being injected into the approved permitted interval (Lower Yates / Upper Seven Rivers, 2938'-3055'). We specifically call your attention to the comparison exhibit of SURVEY1 and SURVEY2, enclosed herein; and note that the spinner, temperature, and tracers logs all indicated a no-flow vertical boundary at ~ 3055' (MD). Additionally, both SURVEY 1 and SURVEY 2 indicated a no-flow (no channeling of fluids behind the 7" production casing) vertical boundary at ~ 2935' (top of open-hole section).

Summary / Professional Opinion

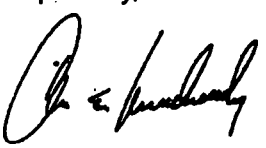
Based on SURVEY1 and SURVEY2 results for the WELL, and our regional geological/injection well study; it is our professional opinion that the injected fluids into the WELL are remaining within the permitted interval (Lower Yates / Upper Seven Rivers, 2938'-3055'). This opinion is based on regional/local scale geological interpretation, wellbore configuration and surface operations (injection pressures between Vacuum and 575 psi).

Additionally, the WELL **is not** injecting into the Capitan Reef (limestone); the WELL is injecting into the Upper Seven Rivers Sands (minor amounts into dolomitized shelf carbonate grainstones). These same reservoirs are hydrocarbon productive in the updip members in the Jalmat, Rhodes, and Scharbrough oil and gas fields located in the immediate area.

Based on the results of SURVEY1 and SURVEY2, at this time our opinion is, the WELL does not pose a threat to public health or safety (this opinion does not encompass an environment site assessment, which we have not performed nor reviewed). *We reserve the right to revise this statement, based on additional data collected subsequent to the date of this report.*

If you have additional questions, please do not hesitate to contact me at you convenience.

Respectfully,



Chad E. Kronkosky, P.E.
President

Enclosures (4):

Letter dated April 28, 2016 from the City of Jal, New Mexico to Mr. Matthew Earthman (Souder, Miller & Assoc.) XC: David Martin, Sec. EMNRD; David Catanach, Director OCD; and Tom Blaine, State Engineer

Email dated September 6, 2016 from Maxey G. Brown (OCD District 1 Supervisor) to Ben Stone (SOS Consulting – OWL Regulatory Consultant).

Jal, New Mexico (Middle Seven Rivers) Lithology Map

Jal, New Mexico (Artesia Group) Injection Wells Map

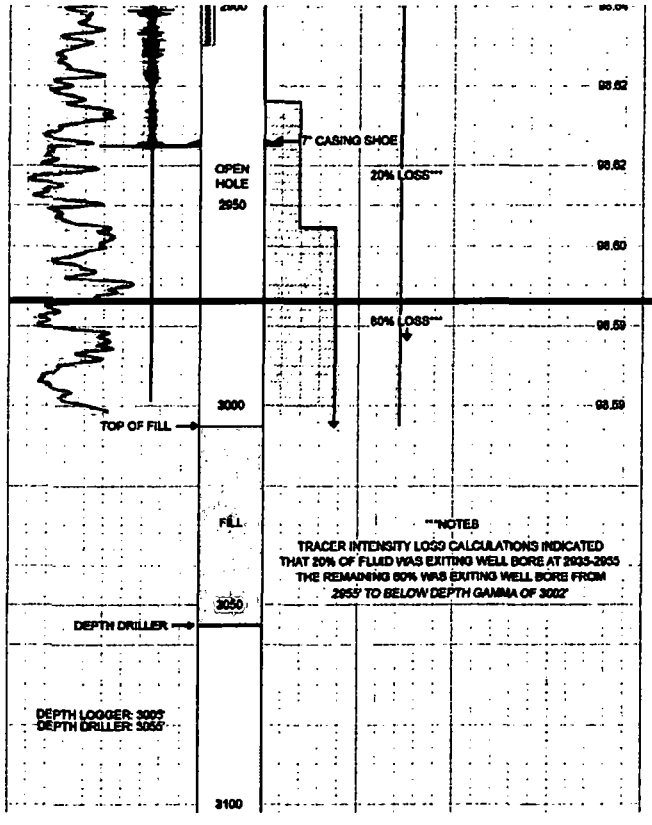
FTP Website (contact CEK Engineering for instructions to website):

Hiss, William, "Stratigraphy and Ground-Water Hydrology of the Capitan Aquifer, Southeastern New Mexico and Western Texas", University of Colorado, PhD Dissertation, 1975

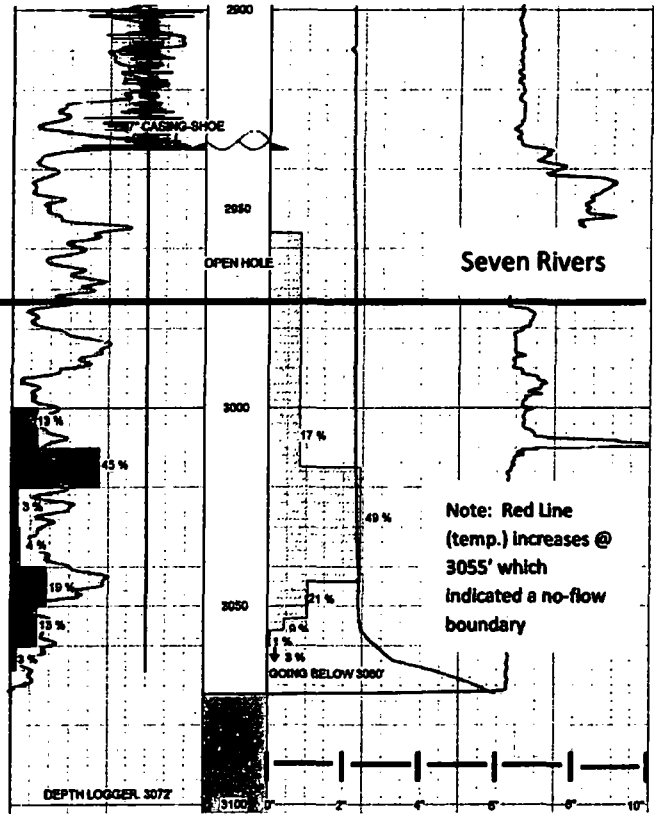
National Instrument 43-101 Technical Report "Ochoa Project Feasibility Study Lea County, New Mexico USA" IC Potash Corp.

NMOCD Case No. 8405, West Jal Disposal #1, Currently Operated by Mesquite SWD.

Injection Profile Comparison



Initial Injection Profile (09-02-2016)



Current Injection Profile (12-02-2016)

Maralo Sholes B No. 2 (30-025-09806; SWD 1127) Pressure Transient Analysis Uncertainty Modeling

Chad E. Kronkosky, P.E.

January 10, 2017

Introduction

The following document and technical calculations were prepared in accordance of generally accepted hydrogeological principles. The following calculations utilize stochastic (monte carlo) simulation methods coupled with the line source solution to the single phase radial flow diffusivity equation, presented as follows:

For an infinite-acting reservoir, Mathews and Russell (1967) propose the following solution to the diffusivity equation.

$$p(r,t) = p_i + \left[\frac{70.6 Q_w \mu}{kh}\right] Ei\left[\frac{-948\phi\mu c_t r^2}{kt}\right]$$

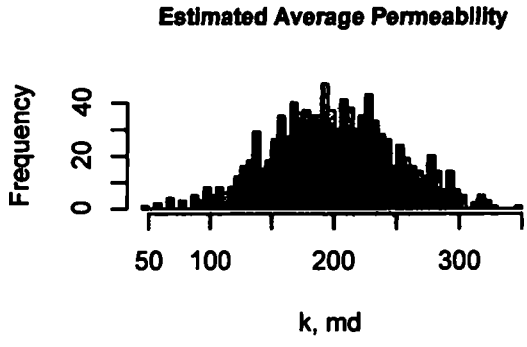
The following Pressure Transient Analysis (with uncertainty) was performed in the "R" programming environment (most off-the-shelf commercial PTA software do not handle uncertainty models well).

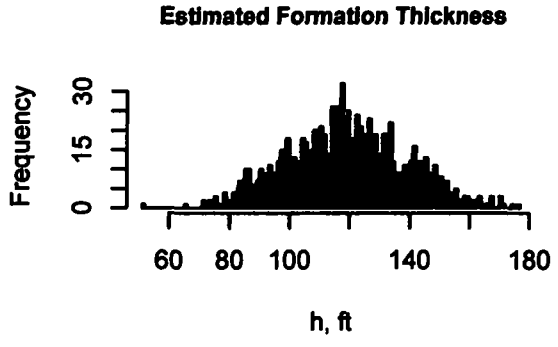
Uncertainty Analysis

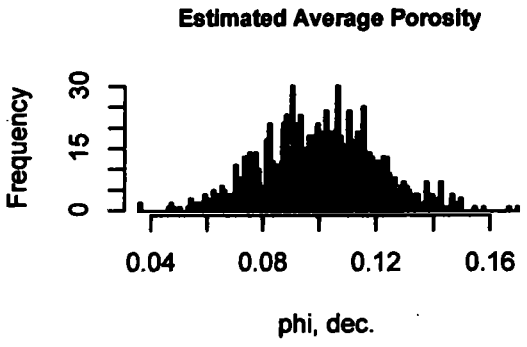
Parameter estimates (e.g. k, h, phi, ct) always exhibit varying degrees of uncertainty. Based on a detailed review of literature/offset publicly available information and sound professional judgement; we estimates the following parameters with normal distributions (1000 samples) with means and standard deviations as follows:

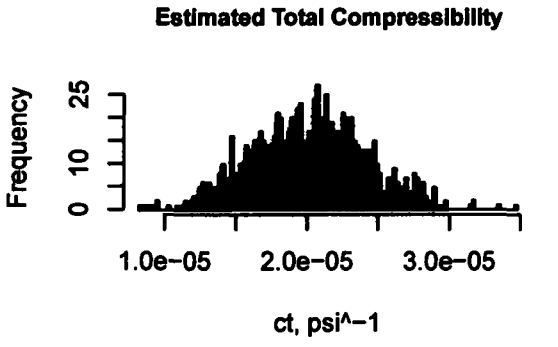
```
library(pracma)

n   <- 1000
k   <- rnorm(n = n, mean = 200, sd = 50)                # md
h   <- rnorm(n = n, mean = 120, sd = 20)                # ft
phi <- rnorm(n = n, mean = .10, sd = 0.02)              # dec.
ct  <- rnorm(n = n, mean = 2*10^(-5), sd =  4*10^(-6))  # psi^-1
```









Near Wellbore Reservoir Pressure Estimates

An estimate of the near wellbore (static) reservoir pressure (top of openhole section) as of 12-02-2016; was made utilizing the injection survey results obtained from that certain welllog prepared by Renegade Services on 12-02-2016 "Indepth Injection Profile" pressure log.

```
Pwf <- 1285  # psi (from Renegade Service 12-02-2016 Indepth Injection Profile)
q   <- 7200  # bwpd ~ 5 BPM (from Renegade Service 12-02-2016 Indepth Injection Profile)
B   <- 1     # bbl/bbl
u   <- 1     # cp
r   <- 0.33  # ft
t   <- 1     # hr (from Renegade Service 12-02-2016 Indepth Injection Profile)

Pi <- Pwf - ((70.6*q*B*u)/(k*h))*expint((948*phi*u*ct*r^2)/(k*t))
```

We estimate that the near wellbore static reservoir pressure is **995 psi** which means the reservoir is **0.115 psi/ft** underpressured. This explains why most if not all injection wells (within the vacuum/artesia trend) inject on vacuum pressure (i.e. hydrostatic head in the injection tubing is greater than static reservoir head).

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   307.4   927.1   995.1   971.9  1047.0  1154.0
```

Reservoir Pressure Increase Due To Injection as of (12-2016)

We estimate the reservoir pressure increase due to injection as of (12-2016) using multi-rate (avg. Fulfer and avg. Owl injection rates) superposition principles as follows:

```
t  <- 24*365*((60+23)/12)   # hr (total time of inj 01/2009 to 11/2016 )
t1 <- 24*365*(60/12)        # hr (total time of Fulfer inj 01/2009  to 12/2014)
q1 <- 7250125/(t1/24)       # bwpd (avg rate of Fulfer inj - total inj / total time)
q2 <- 12856680/((t-t1)/24)  # bwpd (avg rate of OWL inj - total inj / total time)
r  <- c(5280/2, 5280, 2*5280, 4*5280)  # ft

Pr <- vector(mode = "list", length = 12)
for(i in 1:4){
 Pr[[i]] <- ((70.6*q1*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*t)) +
            ((70.6*(q2-q1)*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*(t-t1)))
}
```

The estimated reservoir pressure increase 1/2 mile from the wellbore (i.e. AOR boundary) due to injection is **295 psi**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   136.2   246.2   294.8   313.4   359.5   847.6
```

The estimated reservoir pressure increase 1 mile from the wellbore due to injection is **218 psi**.

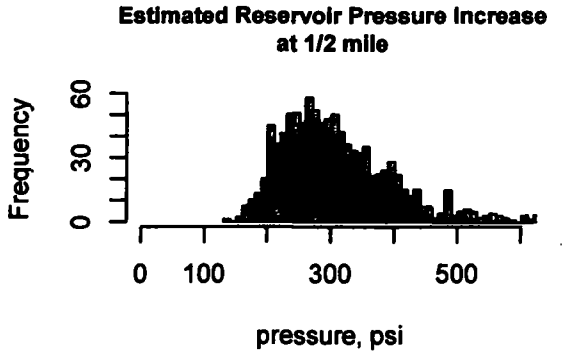
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   102.0   182.2   217.8   229.5   263.8   610.7
```

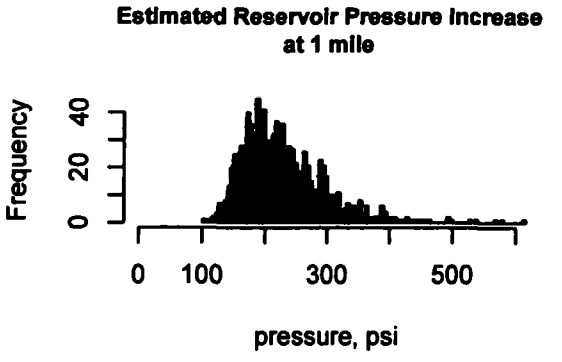
The estimated reservoir pressure increase 2 mile from the wellbore (i.e. Lease/Well identification boundary) due to injection is **141 psi**.

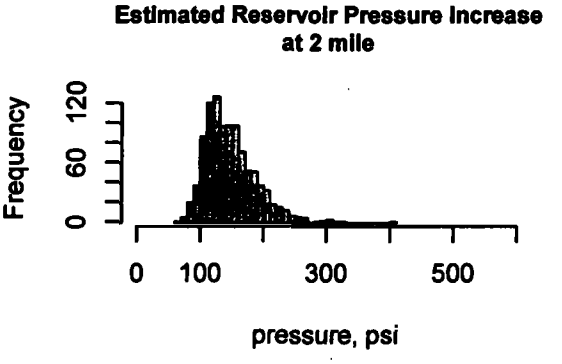
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   68.34  118.60  141.00  147.90  168.80  407.70
```

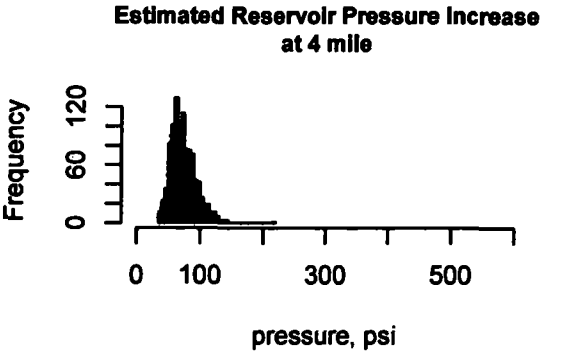
The estimated reservoir pressure increase 4 miles from the wellbore due to injection is **71 psi**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   35.38   59.95   71.17   73.98   85.36  218.20
```









Perturbed/Displaced Reservoir Volume Due To Injection as of (12-2016)

We estimated the perturbed/displaced volume due to injection as of (12-2016) using radial flow volumetrics as follows:

```
A1 <- (q1*(t1/24))/((7758*phi*h)/B)
A2 <- (q2*((t-t1)/24))/((7758*phi*h)/B)
A  <- A1 + A2
```

The estimated perturbed/displaced reservoir fluid due to Fulfer Oil & Cattle LLC injection (01/2009 to 12/2014, 7.25 MMbw at 4000 bwpd) is **80 acres**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   39.35   67.69   80.25   84.18   97.13  224.90
```

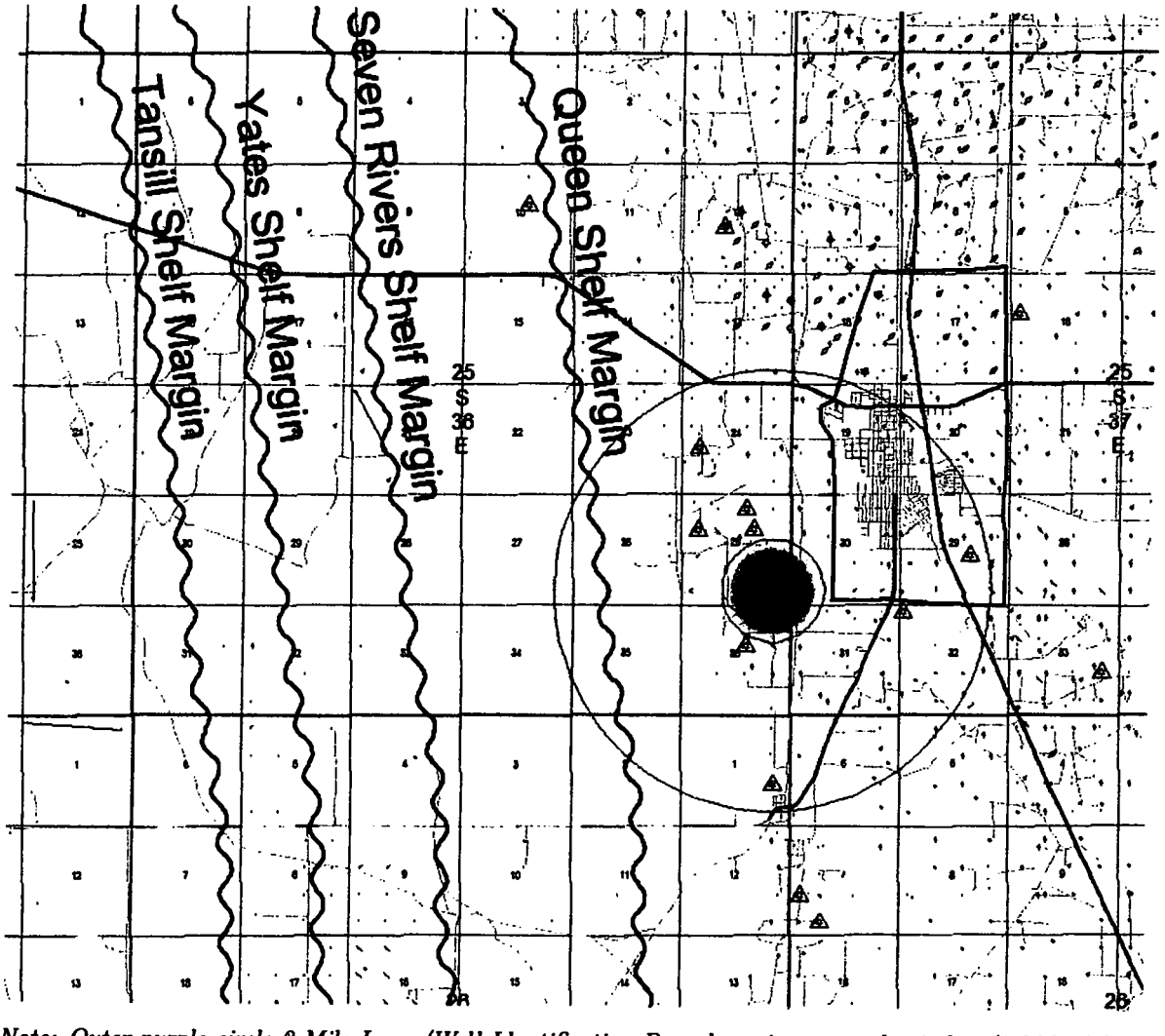
The estimated perturbed/displaced reservoir fluid due to Owl SWD Operating, LLC injection (01/2014 to 11/2016, 12.86 MMbw at 18400 bwpd) is **142 acres**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   69.77  120.00  142.30  149.30  172.20  398.80
```

The estimated perturbed/displaced reservoir fluid due to all injection (01/2009 to 11/2016, 20.11 MMbw) is **223 acres**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   109.1   187.7   222.5   233.5   269.4   623.7
```

The solid blue circle is our best estimate (based on statistics above) of the present situation (spatially) of the injected fluid. Based on our professional judgement, numerical simulation (e.g. ModFlow) is unwarranted at this time.



Note: Outer purple circle 2 Mile Lease/Well Identification Boundary; inner purple circle 1/2 Mile AOR.

Reservoir Pressure Increase Due To Future Injection (5-year Estimate)

We estimate the reservoir pressure increase due to injection as of (12-2016 + 5-Years) using multi-rate (avg. Fulfer and avg. Owl injection rates - assuming Owl rates remain constant) superposition principles as follows:

```
t  <- 24*365*((60+23+60)/12)  # hr (total time of inj 01/2009 to 11/2016 + 5 years)
t1 <- 24*365*((60)/12)        # hr (total time of fulfer inj 01/2009  to 12/2014)
t2 <- 24*365*((60+23)/12)     # hr (total time of fulfer inj 01/2009  to 11/2016)
q1 <- 7250125/(t1/24)         # bwpd (avg rate of fulfer inj - total inj / total time)
q2 <- 12856680/((t2-t1)/24)   # bwpd (avg rate of OWL inj - total inj / total time)
```

```
q3 <- q2                          # bwpd (avg rate of OWL inj stays constant)
r  <- c(5280/2, 5280, 2*5280, 4*5280)  # ft

for(i in 1:4){
 Pr[[i + 4]] <- ((70.6*q1*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*t)) +
                ((70.6*(q2-q1)*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*(t-t1))) +
                ((70.6*(q3-q2)*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*(t-t2)))
}
```

The estimated future reservoir pressure increase 1/2 mile from the wellbore (i.e. AOR boundary) due to 5-years of additional injection (at 18400 bwpd) is **63 psi** (from 295 psi to 357 psi).

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   27.86   51.10   63.25   68.37   78.32  231.10
```

The estimated future reservoir pressure increase 1 mile from the wellbore due to 5-years of additional injection (at 18400 bwpd) is **63 psi** (from 218 psi to 280 psi).

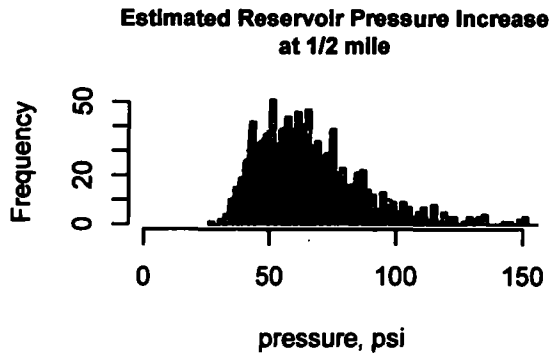
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   27.72   50.85   62.79   67.85   77.69  226.60
```

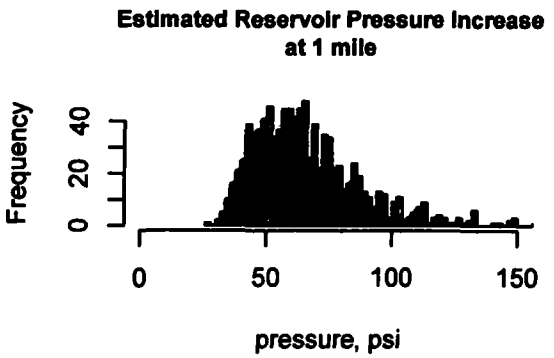
The estimated future reservoir pressure increase 2 mile from the wellbore (i.e. Lease/Well identification boundary) due to 5-years of additional injection is **61 psi** (from 141 psi to 203 psi).

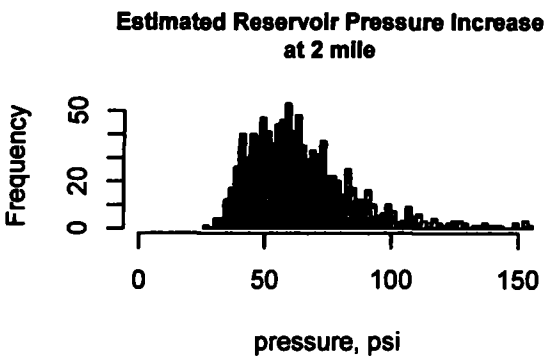
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   27.19   49.69   61.06   65.84   75.59  209.60
```

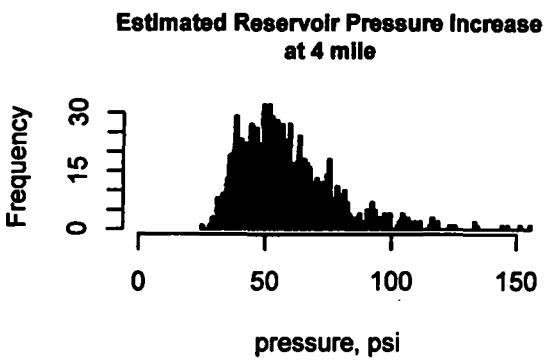
The estimated future reservoir pressure increase 4 miles from the wellbore due to 5-years of additional injection is **55 psi** (from 71 psi to 127 psi).

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   25.18   45.55   54.63   58.60   67.31  158.30
```









Purturbed/Displaced Reservoir Volume Due To Due To Future Injection (5-year Estimate)

We estimated the perturbed/displaced volume due to injection as of (12-2016 + 5-Years) using radial flow volumetrics as follows:

```
A1 <- (q1*(t1/24))/((7758*phi*h)/B)
A2 <- (q2*((t-t1)/24))/((7758*phi*h)/B)
A3 <- (q3*((t-t2)/24))/((7758*phi*h)/B)
A  <- A1 + A2 + A3
```

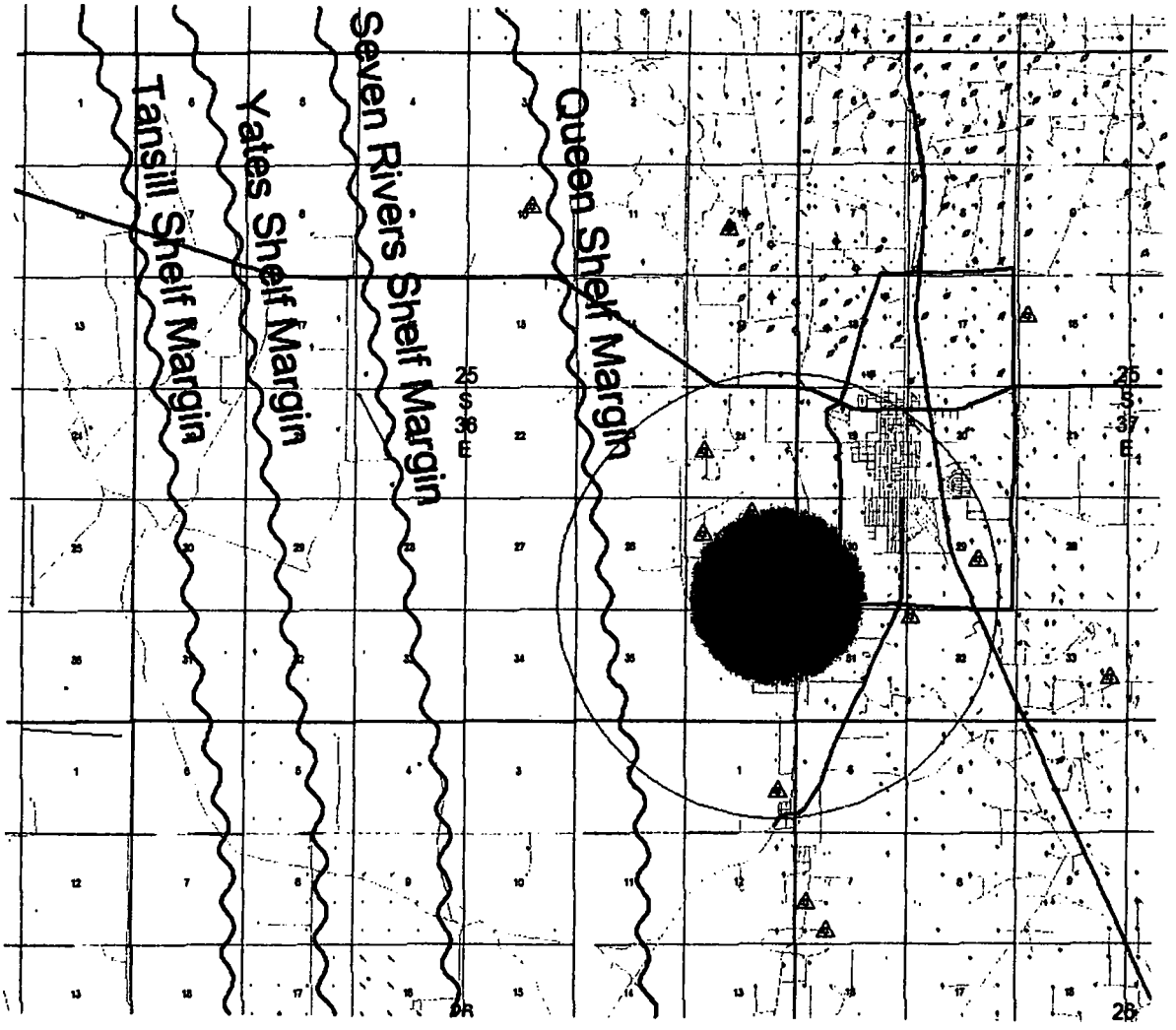
The estimated perturbed/displaced reservoir fluid due to Owl SWD Operating, LLC injection (12/2016 to 12/2021, 33.55 MMbw at 18400 bwpd) is **514 acres**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   182.0   313.1   371.2   389.4   449.3  1040.0
```

The estimated perturbed/displaced reservoir fluid due to all injection (01/2009 to 12/2021, 53.69 MMbw) is **965 acres**.

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##   473.1   814.0   965.0  1012.0  1168.0  2705.0
```

The solid blue circle is our best estimate (based on statistics above) of the future situation (spatially) of the injected fluid. Based on our professional judgement, numerical simulation (e.g. ModFlow) is unwarranted at this time.



Note: Outer purple circle 2 Mile Lease/Well Identification Boundary; inner purple circle 1/2 Mile AOR.

Reservoir Pressure Decrease (5-year Estimate) If Shut-in 12/2016.

We estimate the reservoir pressure decrease due to secession of injection as of (12-2016 + 5-Years) using multi-rate (avg. Fulfer and avg. Owl injection rates - and shut-in 12-2016 for 5-Years) superposition principles as follows:

```
t  <- 24*365*((60+23+60)/12)  # hr (total time of inj 01/2009 to 11/2016 + 5 years)
t1 <- 24*365*((60)/12)        # hr (total time of fulfer inj 01/2009  to 12/2014)
t2 <- 24*365*((60+23)/12)     # hr (total time of fulfer inj 01/2009  to 11/2016)
q1 <- 7250125/(t1/24)         # bwpd (avg rate of fulfer inj - total inj / total time)
q2 <- 12856680/((t2-t1)/24)   # bwpd (avg rate of OWL inj - total inj / total time)
q3 <- 0                       # bwpd (avg rate of OWL inj stays constant)
r  <- c(5280/2, 5280, 2*5280, 4*5280)  # ft
```

```
for(i in 1:4){
 Pr[[i + 8]] <- ((70.6*q1*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*t)) +
                ((70.6*(q2-q1)*B*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*(t-t1))) +
                ((70.6*(q3-q2)*u)/(k*h))*expint((948*phi*u*ct*r[i]^2)/(k*(t-t2)))
}
```

The estimated future reservoir pressure decrease 1/2 mile from the wellbore (i.e. AOR boundary) after 5-years from secession of injection is **-270 psi** (from 295 psi to 25 psi).

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##  -756.4  -329.3  -270.4  -286.4  -226.0  -125.3
```

The estimated future reservoir pressure decrease 1 mile from the wellbore after 5-years from secession of injection is **-192 psi** (from 218 psi to 25 psi).

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -544.70 -232.90 -192.10 -202.70 -160.60  -91.07
```

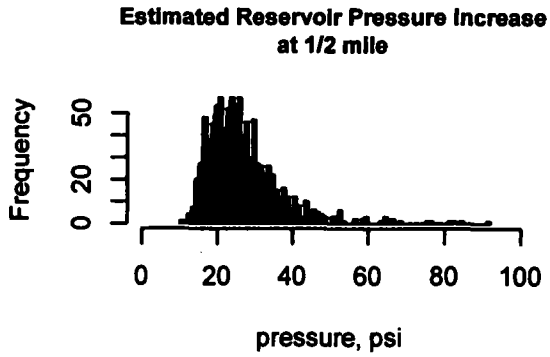
The estimated future reservoir pressure decrease 2 mile from the wellbore (i.e. Lease/Well identification boundary) after 5-years from secession of injection is **-117 psi** (from 141 psi to 24 psi).

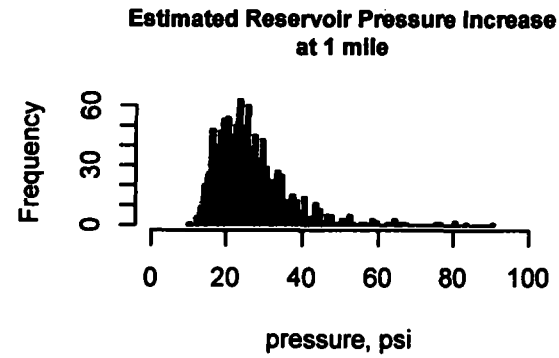
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## -342.50 -139.00 -116.80 -121.50  -98.57  -57.52
```

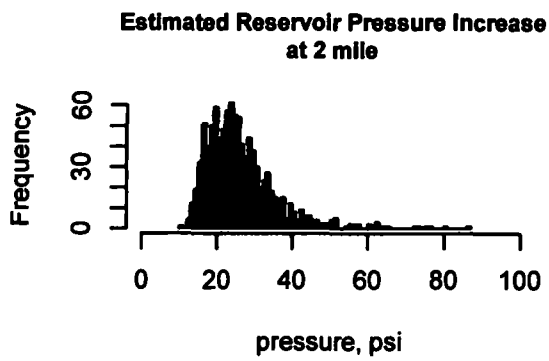
The estimated future reservoir pressure decrease 4 miles from the wellbore after 5-years from secession of injection is **-48 psi** (from 71 psi to 23 psi).

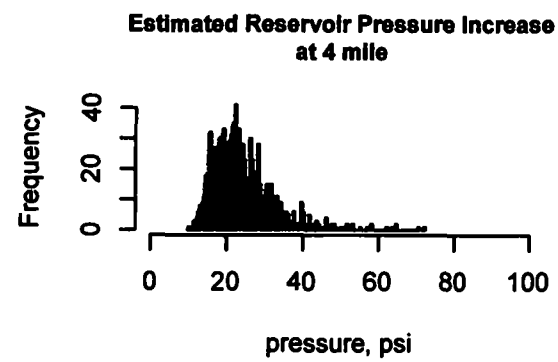
```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## -155.8000  -58.3100  -47.8100  -49.3400  -38.2600    0.5565
```

We Specificly Note That (5-Years) After The Secession of Injection The Reservoir Pressure Will Have Only Increased 25 psi From Initial (prior to injection) Conditions


Estimated Reservoir Pressure Increase
at 1/2 mile
Frequency
0 20 50
0 20 40 60 80 100
pressure, psi


Estimated Reservoir Pressure Increase
at 1 mile
Frequency
0 30 60
0 20 40 60 80 100
pressure, psi


Estimated Reservoir Pressure Increase
at 2 mile
Frequency
0 30 60
0 20 40 60 80 100
pressure, psi


Estimated Reservoir Pressure Increase
at 4 mile
Frequency
0 20 40
0 20 40 60 80 100
pressure, psi

KEVIN MICHAEL BURNS
4905 Los Alamitos Dr
Midland, TX 79705

Mobile: 432-425-9093
Email: kmburns96@gmail.com

SUMMARY

Petroleum Engineer who has been responsible for managing multi-million-dollar horizontal well drilling operations and million-dollar production lease operating expenses. Engineered new well designs, repairs and improvements of legacy wells as well as designed plug and abandonment procedures. Authored near-term and 5 year corporate forecasts for entire business units and asset teams.

WORK HISTORY

December 2016 – Present | OWL SWD Operating | Midland, TX

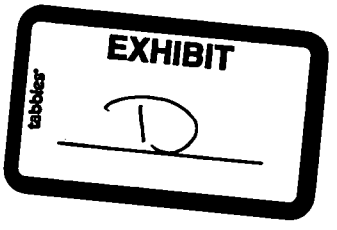
Area Engineer

- Develop capital budgets for various multi-million dollar SWD batteries and wells
- Improve pipeline efficiencies with proper design of booster stations, automation and valve placement
- Project manager for surface facility and downhole capital projects including drilling new Devonian SWDs
- Develop internal processes and designed new AFE template to improve efficiencies between Operations, Business Development and Accounting
- Establish interdepartmental checks and balances to make sure internal processes were monitored in order to mitigate issues associated data sharing and project status
- Work with Sales and Business Development staff to maintain client relationships
- Evaluate potential SWD locations for new disposals

August 2013 – December 2016 | BOPCO, L.P. | Midland, TX

Production Engineer | May 2015 – Present

- Oversee day to day operations for the Keystone Ellenburger reservoir pressure management (co-production) project
- Lead the installation of monitoring pump off controllers real time via Spirit Global Energy Solutions web-based program then transitioning to XSPOC.
- Increase production and reduce down time through optimization of artificial lift design of rod and beam lift systems
- Improve production through treating wells with skin and near wellbore damage through acid and chlorine dioxide treatments
- Develop production forecasting for reserves analysis, corporate planning and budgeting
- Reservoir and performance analysis of inactive Silurian and Colby waterflood projects and identify wells that have been shut-in as candidates to return to production
- Develop AFE's for all capital and well work projects



Facilities Engineer September 2014 – April 2015

- Manage day to day operations of 8 Devonian SWD's, facilities and pipeline infrastructure
- Reduce centrifugal transfer pump failures through optimizing size and re-placement of existing equipment
- Reduce SPS equipment failures through optimizing automation and reducing cycling
- Reduce interface and hauling costs through the installation of Nitrogen blanket system at SWD batteries
- Develop and monitor capital and LOE budgets and expenditures

Drilling Engineer August 2013 – August 2014

- Manage day to day operations for Poker Lake Unit horizontal program
- Initiate the transition from conventional motors to rotary steerable system
- Design casing strings and associated casing cement program
- Reduce cement costs through vendor management and evaluation
- Coordinate oil based mud program and recycling of drilling fluids to reduce mud costs
- Manage open hole completion liner installation
- Lead multi-disciplinary team in drafting AFE's for new DC&E AFEs

Engineering Tech Legacy Reserves April 2013 – July 2013

- Update wellbore diagrams using well files and web-based databases
- Research offset operator production and completion information using IHS Enerdeq and Texas RRC website data
- Identify recompletion candidates based on production declines and well history
- Coordinate regulatory paperwork between engineers and support staff
- Review daily reports

Engineering Tech Berry Petroleum April 2010 – March 2013

- Manage daily workover and drilling reports for engineers
- Develop spreadsheets to evaluate drilling rig performance and manage rig bonus program
- Solicit oil country tubular vendors for quarterly casing and tubing needs
- Develop corporate budget for asset team
- Write procedures for well maintenance work
- Utilize Rodstar for rod designs for newly drilled wells and for well work operations

Project Manager Hilliard Energy Services June 2006 – March 2010

- Lead multifaceted team in delivering projects on time and under budget
- Develop project budgets for services provided to clients
- Coordinate with client representatives to identify objectives and deliverables
- Solicit subcontractors and equipment providers on behalf of clients
- Monitor project costs and timing utilizing MS Project and Primavera

Wellness Coach/Rehab Technician Various Hospitals/Health Care Facilities May 2002 – May 2006

- Work for hospitals and other health care facilities provided fitness and cardiac rehab services to clients and patients

EDUCATION/PROFESSIONAL DEVELOPMENT

- Texas Tech University B.S. Exercise Science Graduated May 2002
- University Texas, Permian Basin B.S. Petroleum Engineering Graduated December 2013

COMPUTER SKILLS

Proficiency in Microsoft Office products, Wellview, Petra, PHDWin, Aries, Rodstar, and SROD , PipeFlo and PumpFlo

CEK ENGINEERING LLC

Chad E. Kronkosky, P.E.

5301 69th Street, Lubbock, TX 79424-1600

Phone: (806) 702-8954 x 101 Email: chad.kronkosky@cekengineering.com

EDUCATION

Ph.D. Petroleum Engineering
Texas Tech University
(ABD) Expected Graduation F2017

M.S. Petroleum Engineering
Texas Tech University, 2009

B.S. Petroleum Engineering
Texas Tech University, 2006

LICENSES / REGISTRATIONS

Professional Engineer
Texas (License #105054)

AREAS OF EXPERTISE

Oil and Gas Reserve Evaluations
- PRMS, SEC Definitions
- Acquisitions / Divestures

Reservoir Engineering
- Field Studies
- EOR / Unitizations
- Formation Evaluation

Unconventional Reservoirs
- Tight Oil
- Shale Gas
- Coal Bed Methane

Project Management

SOFTWARE PROFICIENCIES

Economic Modeling
- PHDwin, Powertools, Palisade Decision Suite

Reservoir Engineering
- Fekete Harmony Suite
- FastRTA, FastWelltest, FastCBM, FastDeclinePlus

Geological / Geophysical
- IHS PETRA

Petrophysical Analysis
- Hydrocarbon Data Systems
- HDS 2000, Internally Developed "Fortran" Code For IHS Petra Automation

GIS / Aerial Imagery
- BlueMarble
- GlobalEnergyMapper

U.S. Well Database Providers
- IHS Energy, Drillinginfo.com, MJSystems LogSleuth

Programming Languages
- VBA, VB.Net, Matlab, R "Statistics"
- SQL Server, Access

Objective and Qualification Summary

To provide my clients with exceptional Petroleum Engineering and Geological services. Mr. Kronkosky has over eight years of experience servicing Private Equity Management Teams and small independent E&P companies with engineering expertise in reservoir, production / completion, and drilling projects. His advanced technical focus is oil and gas reserve/resource analysis and reservoir engineering.

Professional Experience

CEK Engineering LLC
President — January 2012 to Present

Bold Operating LLC
Reservoir Engineer — February 2010 to December 2011

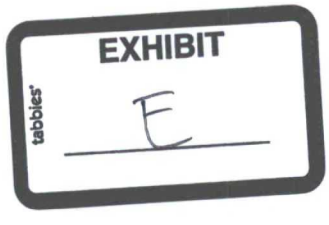
Ute Oil Company d.b.a. ACT Operating Company
Graduate Petroleum Engineer — May 2006 to February 2010

CEK Engineering LLC (CEK) was formed to provide Professional Engineering consulting services to the Oil and Gas Industry. As President of CEK, Mr. Kronkosky's, responsibilities have included: preparation of third party reserve reports, secondary recovery projects and unitizations, acquisition and divestment screening within the Permian Basin, coordination with lending institutions, on client's behalf, for their annual credit determinations, unconventional resource evaluations within the Permian Basin, engineering/geological support for operated and non-operated client properties, and preparation of regulatory permits.

Mr. Kronkosky manages a small staff of employees that provide technical and administrative support on client projects. Mr. Kronkosky's diverse computer skills allow him to develop custom software and databases as well as support CEK's IT System and Network.

Mr. Kronkosky's specific project experience includes:

Corporate Management Experience
Responsible for preparing annual corporate capital budgets and cash flow projections. Coordinating with lending institutions. Analyzing oil and gas acquisitions and divestments. Responsible for developing and maintaining corporate geodatabases (PETRA) for various exploration and development projects. Training/mentoring junior level engineers and technicians to aid their professional development.



PROFESSIONAL AFFILIATIONS

Society of Petroleum Evaluation Engineers
Membership Was Sponsored By Three SPEE Past Presidents

Society of Petroleum Engineers

American Association of Petroleum Geologist

HONORS / AWARDS

Best Presentation / Paper Horizontal Drilling Case Studies, 2011 Southwest Section AAPG Annual Convention

Co-author / Co-presenter - "Geology and Development of the Bone Springs Sandstone and Avalon Shale in Loving County and Adjacent Areas", John Worrall and Chad Kronkosky

Commercial Saltwater Disposal – Permian Basin

Project Type/Services *Engineering / Geological/Regulatory Support*
Depositional Environment *Various High Permeability/Fractured Reservoirs*

Provided Engineering / Geological Support to a Private Equity backed Management Team focused on providing Commercial Saltwater Disposal Services throughout the Permian Basin. Made recommendations as to which reservoirs were Commercial SWD targets, their anticipated injection rates / pressures, and anticipated economics. Provided regional scale fluid production exhibits depicting withdraw / injection migration pathways which were used to determine placement of SWD wellbores throughout the basin. Prepared regulatory exhibits / casing design plans for ultra-deep injection 18,000'+ wellbores; as well as detailed geologic mapping support for the recently adopted Disposal Well Rule Amendments (TRRC Rules 3.9 & 3.46).

Meadow Creek Field (Penn. Sd.) – Permian Basin (Eastern Shelf)

Project Type/Services *Field Study / Formation Evaluation & Petrophysical Analysis / (3P) Reserve Evaluation (Deterministic Method), Enhanced Oil Recovery Feasibility Study*
Depositional Environment *Siliciclastic Turbidites / Deltaic Front Sandstones*

Diagnosed production issues due to very low reservoir pressure and high Gas-Oil-Ratios which lead to the recommendation to form a Secondary Recovery Unit. Based on this recommendations, prepared an EOR Feasibility Study, the results of which allowed our client to book 2+ MMSTB (20+ MM$ of risked value) of resources they had not accounted for. This study salvaged a project that otherwise would have been abandoned by the client.

Vertical Wolfberry Play – Permian Basin (Midland Basin)

Project Type/Services *Tight Oil Reserve/Resource Evaluations (Deterministic and Probabilistic Methods)*
Depositional Environment *Clastic/Carbonate Debris Flows & Turbidites*

Prepared multiple third party reserve/resource reports (quarterly/annual) for various clients (80 – 500 MM$ project valuations). Provided detailed reservoir/geological analysis aiding clients in completion strategies/practices. Performed a detailed statistical (production/completion) study to determine optimal well spacing for future projects. This statistical study utilizes results from an analogous project with 300+ recent well completions using varying well spacing and completion practices (multiple frac types & mixture of completed reservoirs).

Levelland/Slaughter/Welch Fields – Permian Basin (NW Shelf)

Project Type/Services *Enhanced Oil Recovery / Unitizations / (2P) Reserve Evaluations (Deterministic Method)*
Depositional Environment *Tidal Flat Carbonates*

Prepared several secondary recovery reserve studies (San Andres Formation) utilizing Analogous and Material Balance analytical procedures. Provided engineering/geological services to "Unitize" approximately 8,000+ ac. consisting of 30+ ownership tracts. Developed tract participation formulas for the proposed unit and provided client with a tract/ownership database for automated mailings. Developed a database program (for client's use) to monitor waterflood operations. The database records injection rates/pressures, chemical usage and residuals, and bacteria analyses from individual wells/facilities.

Tex-Mex S.E. (Wichita-Albany) Field – Permian Basin (Central Basin Platform)

Project Type/Services *Field Study / Formation Evaluation & Petrophysical Analysis / (3P) Reserve Evaluation (Deterministic Method)*
Depositional Environment *Tidal Flat and Inner Ramp Carbonates*

Prepared a reservoir/geological field study of the Tex-Mex S.E. (Wichita-Albany) Field – Gaines County, TX. Formations evaluated included Wichita-Albany, Lower Clear Fork, Upper Clear Fork, San Andres, and Seven Rivers. Contracted a consulting geophysicist firm to perform seismic inversion within the Lower Clear Fork to determine areas of porosity development, and incorporated their work into the reservoir/geological study. These studies led to a 3000+ ac. field extension, resulting in twelve commercial wells (100% success rate). Prepared a third party (3P) reserve report used during the divestment of the property (risk adjusted value of this report was within 5% of purchase price).

Horizontal Wolfcamp Shale / Canyon Sands – Permian Basin (Midland Basin / Eastern Shelf)
Project Type/Services *Unconventional Reserve/Resource Evaluations (Deterministic & Probabilistic Methods)*
Depositional Environment *Siliciclastic/Calcareous Turbidites and Organic-Rich Mudstones*

Assisted in the development of a regional geologic/reservoir model of the Wolfcamp Shale and Canyon sandstone formations located in the southern Midland Basin/Eastern Shelf. Analyzed operated/non-operated horizontal exploration wells using Rate-Transient-Analysis (RTA) to estimate production profiles and reserves. Built and maintained a corporate production/completion database of regional results/practices. Generated detailed statistical analysis (Risk/Portfolio Modeling) utilizing the database and provided recommendations to senior management staff concerning the results of this study.

Horizontal Bone Spring / Avalon Shale – Permian Basin (Delaware Basin)
Project Type/Services *Unconventional Reserve/Resource Evaluations (Deterministic & Probabilistic Methods)*
Depositional Environment *Siliciclastic/Calcareous Turbidites and Organic-Rich Mudstones*

Assisted in the development of a regional geologic/reservoir model for the Avalon Shale/Leonardian Shale and 3rd Bone Spring sandstone formations located in the Central Delaware Basin. Provided recommendations to senior management concerning prospective leasing areas. Built and maintained a corporate production/completion database of regional results/practices. Generated a detailed statistical analysis (Risk/Portfolio Modeling) utilizing the database. The results of this study aided management in capital resource allocation. Results from these studies also formed the basis of a presentation/paper presented at the 2011 Southwest Section AAPG Annual Conference.

Arenoso (Penn. Detrital) Field – Permian Basin (Central Basin Platform)
Project Type/Services *Field Study / Formation Evaluation and Petrophysical Analysis*
Depositional Environment *Alluvial Fans / Fluvial Deltaic*

Prepared a reservoir/geological field study of the Arenoso Field – Winkler County, TX. Formations evaluated included the Pennsylvanian Detrital and Pennsylvanian Limestones. The studied area was complexly faulted and reservoir development was extremely heterogeneous (alluvial fans/braided streams). Advanced Petrophysical techniques were employed to describe the complex mineralogy for mapping the various lithologies across the field. Provided senior management with assessments of the project's reservoir complexities.

CBM Exploration – Appalachian Basin (Eastern Ohio) and Illinois Basin (Southern Indiana/Illinois)
Project Type/Services *Coal Bed Methane Resource Evaluation / Project Management*
Depositional Environment *Shallow Pennsylvanian Coal Seams*

Prepared two Coal Bed Methane (CBM) Phase I Exploration Reports consisting of a regional geological/reservoir study, production rate forecasts, and preliminary economic modeling. Analytically modeled the de-watering process (material balance / pressure transient analysis of observation wells) of two pilot projects and prepared reports to Investors. Provided project supervision of coring operations for several exploratory CBM wells located in the Appalachian Basin – Eastern Ohio (Pennsylvanian coal seams). Results from the pilot projects formed the basis of a Master's Thesis which studied the anticipated production forecast from these reservoirs using horizontal well technology (Probabilistic Methods); developed proprietary software (Excel™ VBA add-in using Palisade @Risk™).

HP/HT Wilcox Formation Recompletions – South Texas
Project Type/Services *Completion Design/Supervision and Regulatory Permitting*

Designed re-completion procedures and provided project supervision for four HP/HT Wilcox Formation tight gas wells located in the George West Field – Starr County, TX. The complex design involved fracture injection rates of 30+ BPM, and 13,000+ psi surface pressures thru-tubing. Prepared regulatory filings (completion permits and monthly production reports) on client's behalf.

Shallow Exploratory Salt Domes – Texas Gulf Coast
Project Type/Services *Drilling Design/Supervision and Regulatory Permitting*

Prepared drilling procedures, regulatory filings (drilling permits/exhibits), and assisted onsite project supervision for four exploratory salt dome wells (Frio and Catahoula sand prospects) located in the Brookshire Salt Dome Field – Austin County, TX.

Prospect Generation
Project Type/Services *Prospect Generation and Field Extensions*
Depositional Environment *Alluvial / Fluvial Clastics and Tidal / Lagoonal Carbonates*

Prepared numerous oil and gas exploration prospects located on the Central Kansas Uplift and Permian Basin. Prospects generated included Arbuckle karsted surface, Lansing-Kansas City combination traps, Pennsylvanian Conglomerate alluvial fans within the Central Kansas Uplift, and several carbonate reservoir field extensions within the Permian Basin. One of these prospects led to the formation of a proposed 8,000+ ac. secondary recovery unit (San Andres Formation).

Publications and Presentations

"Statistical Analysis of the Wolfberry Using R", Texas Tech University Graduate Seminar, Chad Kronkosky, September 2014

"Statistical Analysis of the Wolfberry Using R", SPEE Midland Chapter Monthly Meeting, Chad Kronkosky, September 2014

"Geology and Development of the Bone Springs Sandstone and Avalon Shale in Loving County and Adjacent Areas", Horizontal Drilling Case Studies, 2011 Southwest Section AAPG Annual Convention, Co-author / Co-presenter, John Worrall and Chad Kronkosky, June 2011.

"Prediction of CBM Reservoir Performance Using Stochastic Methods: Horizontal Well Completion in the Illinois Basin Indiana Seelyville Coal Formation", Master of Science Thesis, Texas Tech University, May 2009.

Technical Training / Seminar / Conferences

HDS 2000 Advanced Petrophysical Analysis Software Training, Hydrocarbon Data Systems, Houston, TX, June 2011.

Shale Reservoirs – Short Course Presented by Corelab, 2011 AAPG Annual Southwest Section Meeting, Ruidoso, NM, June 2011.

2010 Shale and Unconventional Resource Analysis, Midland College Petroleum Professional Development Center, Midland, TX, December 2010.

SPE Tight Gas Completions Conference, SPE, San Antonio, TX, November 2010

PETRA Advanced Mapping & Advanced Cross-Section , Geoplus Corporation, Tulsa, OK, June 2008.

Shaly Sandstone Analysis, G.B. Asquith, Midland College Petroleum Professional Development Center, Midland, TX, May 2008.

Basic Welllog Analysis, G.B. Asquith, Midland College Petroleum Professional Development Center, Midland, TX, December 2007.

Basic Workflow Approach to Understanding Geoplus PETRA, Midland College Petroleum Professional Development Center, Midland, TX, August 2007.