PACIFIC SURVEYS

ELECTRIC LOG
GAMMA RAY

Job No.
22075

File No.

Company CASCADE DRILLING
Well PW-15
Field COLTON
County SAN BERNARDINO State CA

Location:

CITRUS ST, EAST OF TERESA AVE
GPS: N34°05.100' W117°20.600'

Sec. Twp. Rge.

Other Services:

SONIC/VDL
CALIPER

Permanent Datum	G.L.	Elevation above perm. datum	Elevation
Log Measured From	G.L. 0'		K.B.
Drilling Measured From	G.L.		D.F.
			G.L.

Date	10/17/2016		
Run Number	ONE		
Depth Driller	548'		
Depth Logger	548'		
Bottom Logged Interval	548'		
Top Log Interval	20'		
Casing Driller	16" OD @ 40'		
Casing Logger	40'		
Bit Size	12.25"		
Type Fluid in Hole	BENTONITE		
Density / Viscosity	9.9 | 43.7		
pH / Fluid Loss	8.5 | 11		
Source of Sample	TROFT		
Rm @ Meas. Temp	4.6 @ 73.2°F		
Rmf @ Meas. Temp	4.4 @ 73.2°F		
Rmc @ Meas. Temp	N/A		
Source of Rmf / Rmc	MEASURE		
Rm @ BHT	N/A		
Time Circulation Stopped	8:30 AM		
Time Logger on Bottom	10:45 AM		
Max. Recorded Temperature	N/A		
Equipment Number	PS-10		
Location	LA		
Recorded By	HOFFMAN		
Witnessed By	R. TORRES		

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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

Water table is at approximately 230 ft bgs. Water quality data above this depth is not applicable.

Calibration Report

Database File 22075.db
Dataset Pathname ELOG
Dataset Creation Mon Oct 17 10:43:20 2016

ELOG Calibration Report

Serial:	D4
Model:	DTQ
Shop Calibration Performed:	Mon Oct 17 09:16:51 2016
Before Survey Verification Performed:	Mon Aug 10 14:17:03 2015
After Survey Verification Performed:	Sat Sep 14 11:11:58 2013

Shop Calibration

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	0.932	47.415		0.500	50.000	Ohm-m	1.065	-0.493
Long	2.768	189.120		2.000	200.000	Ohm-m	1.063	-0.941
IEE	23.600	5775.040	counts	0.026	6.320	A		
VSN	140.040	6593.240	counts	2.671	125.758	V		
VLN	75.960	1669.300	counts	1.449	31.840	V		

Before Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	595.689	100.690		284.622	100.605	Ohm-m	0.372	63.173
Long	1048.540	102.773		545.833	102.665	Ohm-m	0.469	54.508
IEE	60.120	4905.320	counts	0.066	5.368	A		
VSN	402.360	5549.220	counts	7.675	105.845	V		
VLN	177.060	1416.000	counts	3.377	27.008	V		

After Survey Verification

	Readings			References			Results	
	Zero	Cal		Zero	Cal		Gain	Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	142.491	102.843		142.638	102.842	Ohm-m	1.004	-0.383
IEE	213.380	7077.580	counts	0.234	7.746	A		
VSN	96.540	8047.160	counts	1.841	153.490	V		
VLN	85.400	2044.440	counts	1.629	38.995	V		

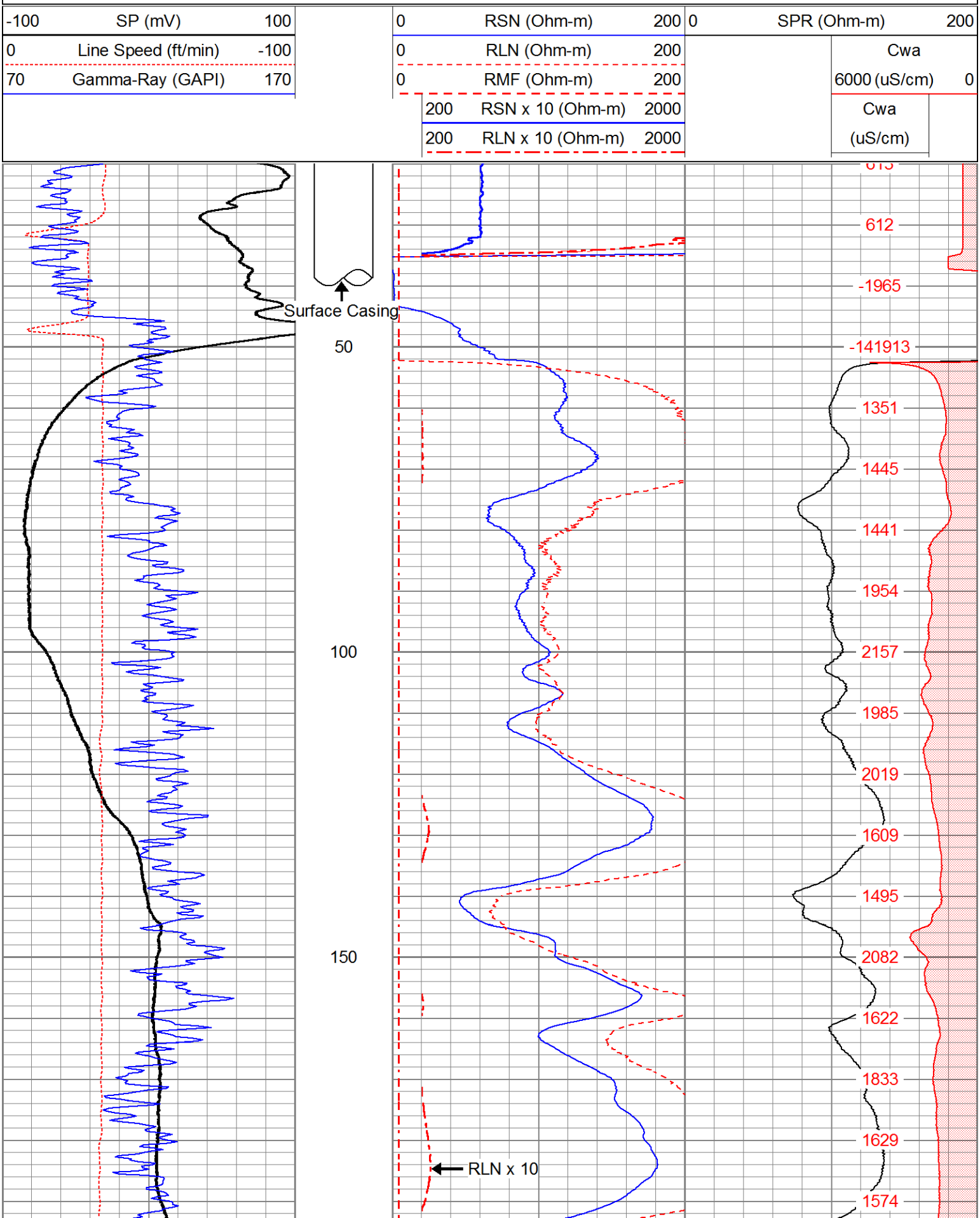
After Survey Verification compared to Before Survey Calibration

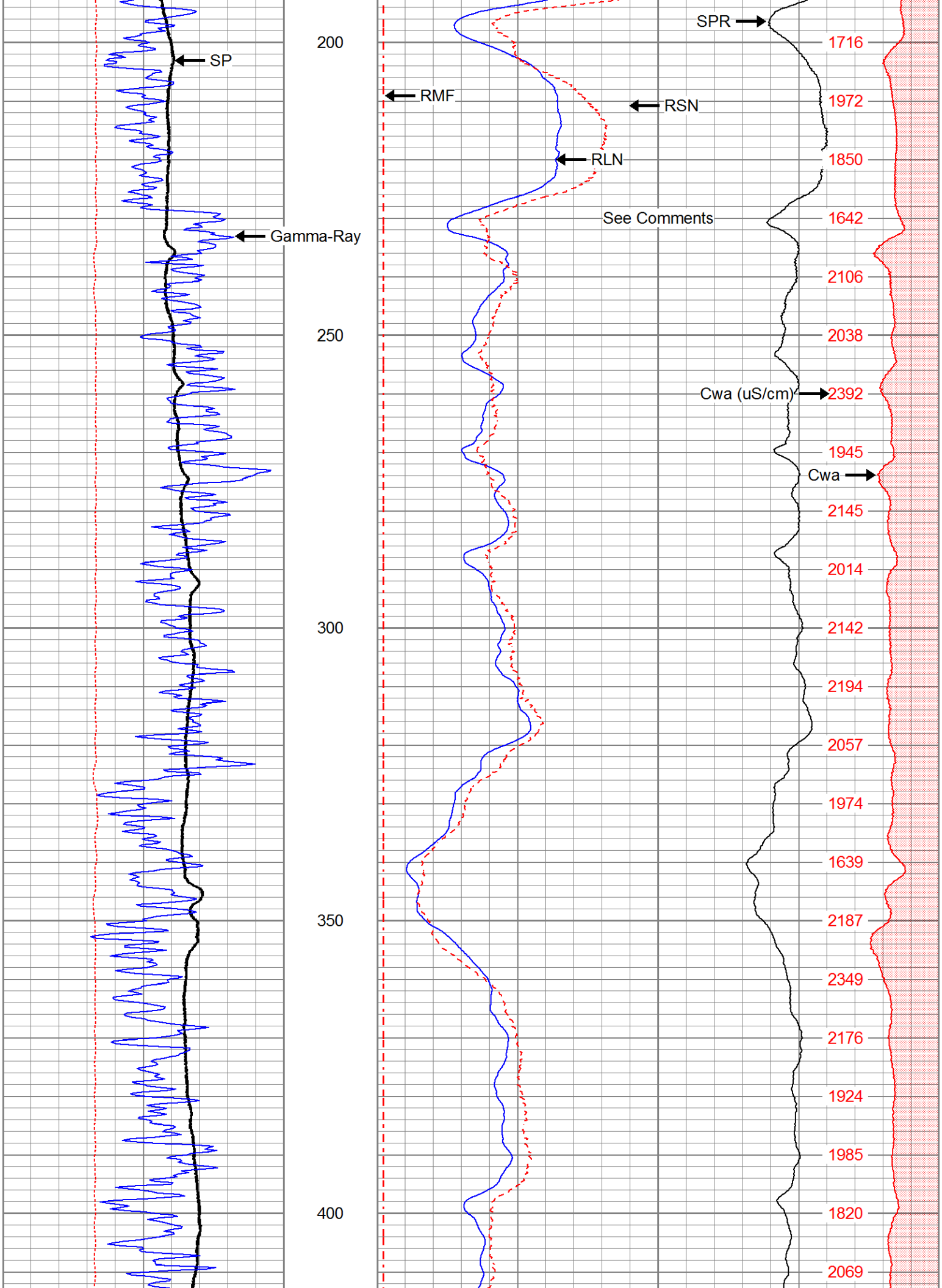
	Zero			Cal		
	Before	After		Before	After	
Short	284.622	40.249	Ohm-m	100.605	101.201	Ohm-m
Long	545.833	142.638	Ohm-m	102.665	102.842	Ohm-m

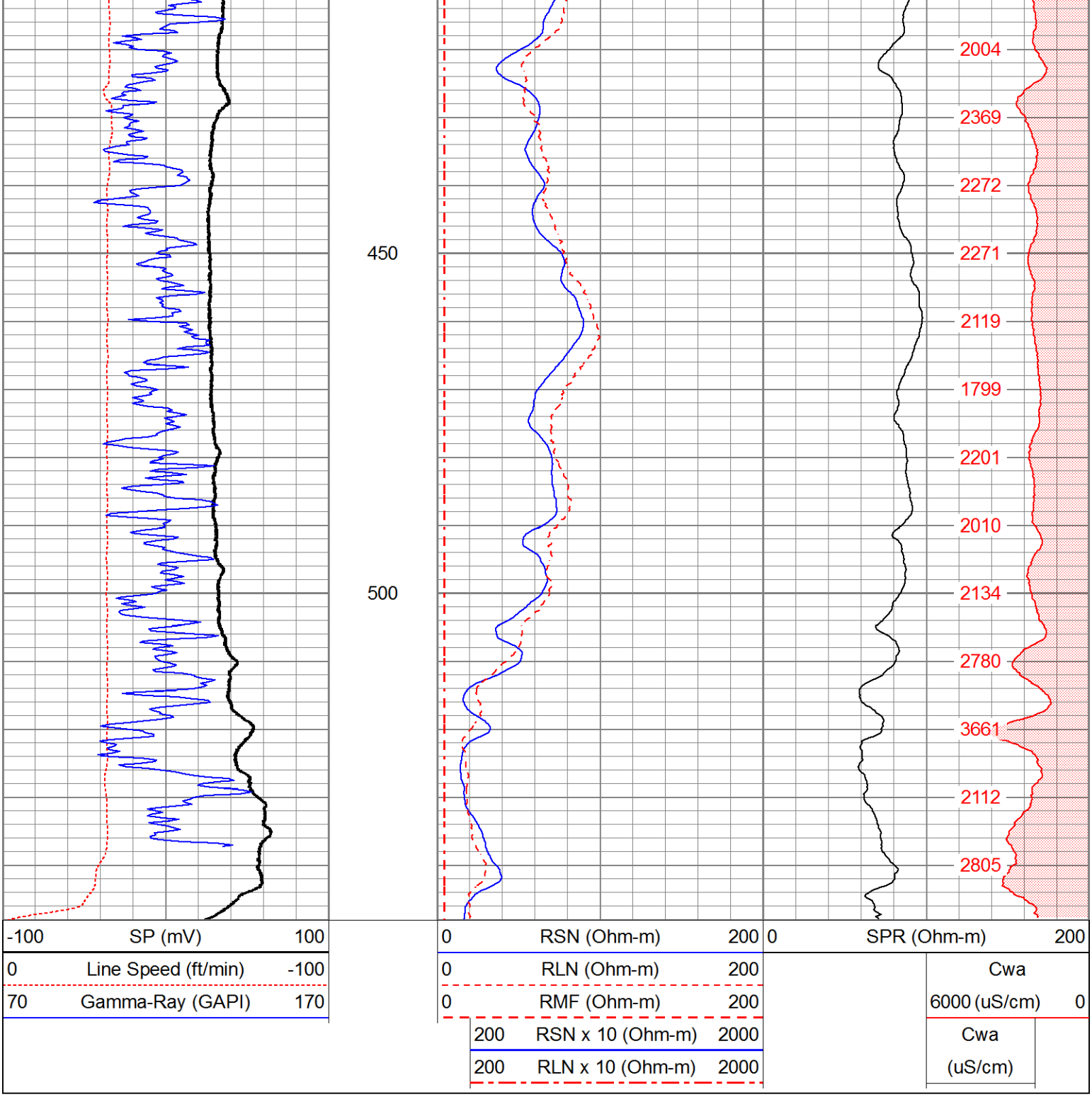
Gamma Ray Calibration Report

Serial Number:	D4	
Tool Model:	ELOG	
Performed:	Wed Jan 27 16:07:18 2016	
Calibrator Value:	162.0	GAPI
Background Reading:	101.7	cps
Calibrator Reading:	326.7	cps
Sensitivity:	0.7200	GAPI/cps

Database File	22075.db
Dataset Pathname	ELOG
Presentation Format	elog_cwa
Dataset Creation	Mon Oct 17 10:43:20 2016
Charted by	Depth in Feet scaled 1:240




SP
Gamma-Ray
200
250
300
350
400
RMF
RSN
RLN
See Comments
SPR
Cwa (uS/cm)
Cwa
1716
1972
1850
1642
2106
2038
2392
1945
2145
2014
2142
2194
2057
1974
1639
2187
2349
2176
1924
1985
1820
2069



Log Variables

DatabaseC:\ProgramData\Warrior\Data\22075.db
Dataset field/well/run1/ELOG/_vars_

Top - Bottom

BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	PERFS	RM_MEAS_R Ohm-m	RM_MEAS_T degF	RMF Ohm-m
12.25	71.4	0	0	0	4.6	73.2	4.36

RSH Ohm-m	SPSHIFT mV	SRFTEMP degF	TDEPTH ft
20	0	65.9	548

Variable Description

BOREID : Borehole I.D.

RM_MEAS_T : Mud Temperature Measured

BOREID : Borehole I.D.
BOTTEMP : Bottom Hole Temperature
CASEOD : Casing O.D.
CASETHCK : Casing Thickness
PERFS : Perforation Flag
RM_MEAS_R : Mud Resistivity Measured
RM_MEAS_T : Mud Temperature Measured
RMF : Resistivity of Mud Filtrate
RSH : Resistivity of Shale
SPSHIFT : S.P. Baseline Offset
SRFTEMP : Surface Temperature
TDEPTH : Total Depth

Pacific Surveys

a full service geophysical well logging company

Water Quality Analysis

Company:	Cascade Drilling	**Date:**	17-Oct-16
Well:	PW-15	**Run:**	One
Field:	Colton	**Job Ticket:**	22075
State:	CA	**Total Depth:**	548 ft

Rmf @ Temp: 4.36 **Temp:** 73.2
Corrected Rmf @ 75 degree F: 4.26
Rm @ Temp: 4.6

Depth	S.P. mV	Rwe ohm-m	Rw *NaCl* ohm-m	Rw *NaHCO3* ohm-m	EC umhos *NaCl*	EC umhos *NaHCO3*	T.D.S *ppm* NaCl	T.D.S *ppm* NaHCO3	Remarks
232 ft to 290 ft	-10.00	3.1	3.3	3.9	3050.1	2592.5	1616.5	2592.5	Class II and III
290 ft to 340 ft	-15.00	2.6	2.7	3.2	3724.6	3165.9	1974.1	3165.9	Class II and III
350 ft to 515 ft	-20.00	2.2	2.2	2.6	4548.4	3866.1	2410.6	3866.1	Class III

Class I : Less than *700* ppm (mg/l) Excellent to Good Quality
Class II : *700* to *2000* ppm (mg/l) Good to Injurious Quality
Class III: More than *2000* ppm (mg/l) Injurious to Unsatisfactory

This interpretation represents our best judgement based on given values. Since all interpretations are opinions based solely on interference from electrical and other measurements, we can not and do not guarantee the accurancy or correctness of this interpretation and shall not be liable for any cost, damages or expenses that may be incurred from this or any other interpretation.

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