Company	CASCADE DRILLING	Well	PW-15
Field	COLTON	County	SAN BERNARDINO
State	CA	Other Services	DSN/CDL CALIPER
Permanent Datum	GL	Elevation	0 ft
Log Measured From	GL	Above Perm. Datum	25 ft
Drilling Measured From	GL		
Date	10/13/2016		
Run Number	ONE		
Depth Driller	1418		
Depth Logger	1417		
Bottom Logged Interval	1413		
Top Logged Interval	SURFACE		
Casing Driller Size at Shoe	10 3/4 @ 40'		
Casing Logger	40'		
Bit Size	9 7/8		
Type Fluid in Hole	WATER		
Density / Viscosity	8.4 / 28		
PH / Fluid Loss	9.0 / N/A		
Source of Sample	PIT		
Rm @ Meas. Temp.	0.7 @ 80°		
Rmf @ Meas. Temp.	0.6 @ 80°		
Rmc @ Meas. Temp.	1.1 @ 80°		
Source Rmf / Rmc	MEASURED / CALC		
Rm @ BHT	0.5 @ 90°		
Time Since Circulation	24 HRS		
Time Since Last Log	1 HR		
Max. Recorded Temp.	90°		
Equipment / Location	5-5 / 29		
Recorded By	M.CHAVEZ		
Witnessed By	G.LUCAS		

PACIFIC SURVEYS

ELECTRIC LOG
GAMMA RAY

>>> Fold Here >>>

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 11:11:56 2013

Shop Calibration

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results 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 Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	505.689	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	152.360	5446.200	counts	7.675	195.845	V		
VLN	177.060	1416.000	counts	3.317	27.008	V		

After Survey Verification

	Readings Zero	Readings Cal		References Zero	References Cal		Results Gain	Results Offset
Short	40.270	101.200		40.249	101.201	Ohm-m	1.000	-0.035
Long	101.410	102.843		102.638	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	133.490	V		
VLN	85.400	2344.000	counts	1.628	38.995	V		

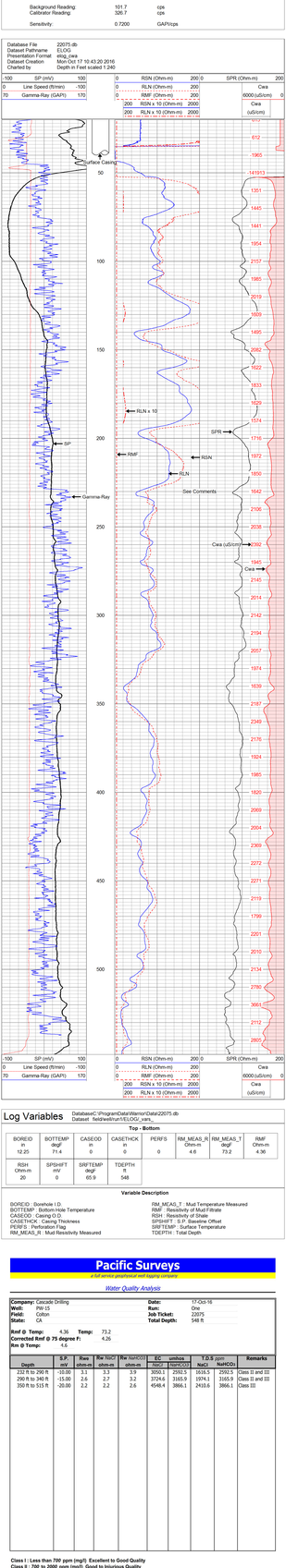
After Survey Verification compared to Before Survey Calibration

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



Log Variables

DatabaseC:\ProgramData\Warrior\Data\22075.db
Dataset fieldHeliRun\ELOG2_HPL

Top - Bottom

BOREID in	BOTTEMP degF	CASEOD in	CASETHCK in	PERFS ft	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.
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	Rwa obtm-m	Rw NaCl obtm-m	Rw NaHCO3 obtm-m	EC umhos 77deg	TDS ppm 75deg	T.D.S. ppm NaCl	NaHCO3	Remarks
232 ft to 290 ft	-10.00	3.1	3.3	3.9	3050.1	2593.5	1618.5	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	4546.4	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 accuracy 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.

800.618.7555 *4456 via st. ambrose* *fax: 909.399.3018*
909.625.6262 *claremont ca 91711*