

### Well Identification:

API#	AREA	BLOCK	OPERATOR	WELL NAME	
55171000010000	Beaufort Sea	624	UNION OIL COMPANY OF CALIFORNIA	OCS Y-00849 HAMMERHEAD 1 ST00BP00	
LATITUDE	LONGITUDE	KB	WATER DEPTH	GEO DATUM	ZONE
70° 21' 52.65"	-146° 1' 27.92"	40	-102	NAD83	6

### Overview

The Hammerhead 1 was spud as an exploratory well on August 10<sup>th</sup>, 1985 and located in the Beaufort Sea off the North Slope. The operator reported non-commercial hydrocarbons discovered at this location, and the well was plugged and abandoned. The analytical data collection program included well logging by Schlumberger, cores, and drill cutting samples collected by Anadrill.

### Geologic Intervals used for Analysis:

Age/Period	Stratigraphy	Top	Source	Comments
Late Pliocene		350		
Early Pliocene		750		
Late Miocene		1250		
Early Miocene		2000		
Late Oligocene		2250		
Early Oligocene		4250		
	I-5 SAND	5290		
	I-5 SAND BASE	5320		
	I-7 SAND	5360		
	I-7 SAND BASE	5520		

### Logging Runs and Parameters:

LOGGED INTERVAL	TOP ft	BASE ft	TEMP degF	BITSIZE in	MWIN ppg	RM ohmm	WIRELINE RUNS												
							RUN#	GR	DLL	DIL	NUC	SON	VSP	DIP	MICRO	SGR	SP	TEMP	RFT
1	353	1063		26			1												
2	1063	2882		17.5	9.3		1						X						
3	2882	8034	106	12.25	10.7	0.379	1	X		X		X			X		X		
							2	X			X			X					X
							3						X						

### Cored Intervals and Sample Analysis:

TOP ft	BASE ft	WHOLE CORE		TOP ft	BASE ft	SWS CORE		
		ft	ROUTINE	ft	ft	#REC	ROUTINE	SCAL
				3087	6296	167	105	44

### Log Discussion:

The Hammerhead 1 well was drilled and logged with water-based drilling fluid containing Barite weighting material to total depth. Subsequent borehole sections were drilled with additional Barite to increase the borehole fluid pressure overbalance. All borehole sections required environmental corrections for hole size, temperature, pressure, and mud weight additives.

### Environmental Corrections:

The Schlumberger 2000 Edition chartbook was used to correct the logs for borehole size, temperature, pressure, and drilling mud additives. The Gamma Ray log was corrected using chart GR-1. Compensated

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Neutron log was corrected using Por-14c and Por -14d. Dual Laterolog Resistivity logs were corrected using Rcor-2c and invasion corrected using Rint-9b. Dual Induction logs were corrected using Rcor-4a and invasion corrected using Rint-10.

Some caliper enlargements were observed in various sections of the well, in cases where the borehole caliper readings were above the correction charts, the maximum chart correction was applied, however these corrections under estimate the true formation measurement.

The bulk density measurement was the most environmentally affected log in the dataset, where the density log readings measured drilling fluid when the caliper reading exceed 16 inches. Repair of the density log utilized a Gardner et al. (1974) sonic to density transform.

### **Observations Logged Interval**

Observed some minor caliper readings where density log was affected, the logged interval showed the bulk density required editing using the Gardner<sup>1</sup> density transform. Sonic log data was compared to the Faust<sup>4</sup> velocity transform to correct anomalies in borehole washouts. Logged intervals where the bulk density was not present the delta-t sonic was used as the porosity model input to the final computed results.

### **References**

1. Gardner et al., 1974, Formation velocity and density—the diagnostic basics for stratigraphic traps Geophysics, 39 (6) (1974), pp. 770-780
2. Graton, L. C., and H. J. Fraser, 1935, Systematic packing of spheres with particular reference to porosity and permeability: Journal of Geology, v. 43, p. 785–909, DOI: 10.1086/jg.1935.43.issue-8
3. Carmichael, R.S. ed. 1982. Handbook of Physical Properties of Rocks, Vol. 2, 1-228. Boca Raton, Florida: CRC Press Inc.
4. L. Y. Faust, "A Velocity Function Including Lithologic Variation," Geophysics, Vol. 18, No. 2, 1953, pp. 271-288.

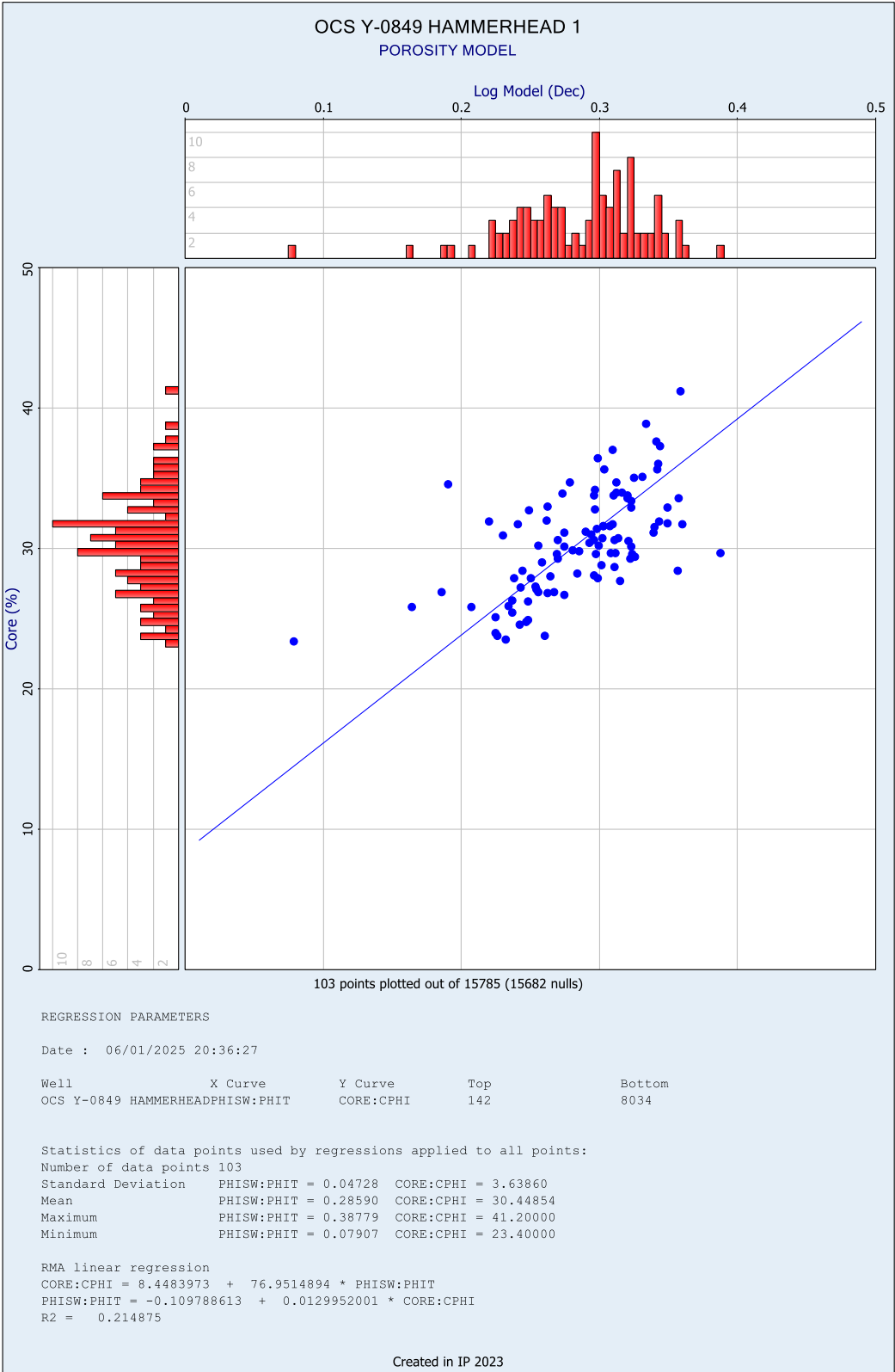
### **Summation Report:**

RESERVOIR SUMMARY											
Zone	Zone Name	Top	Bottom	Gross	Net	N/G	Av Phi	Av Sw	Av Vcl	Phi*H	PhiSo*H
1	ORIGINAL BOREHOLE	142	8034	7892	120.5	0.015	0.273	0.355	0.206	32.94	21.26

Reservoir summary cut off values used were porosity greater than 10% (PHIE > 0.1), shale volume less than 50% (VSHALE < 0.5), and water saturation less than 50% (SW < 0.5).

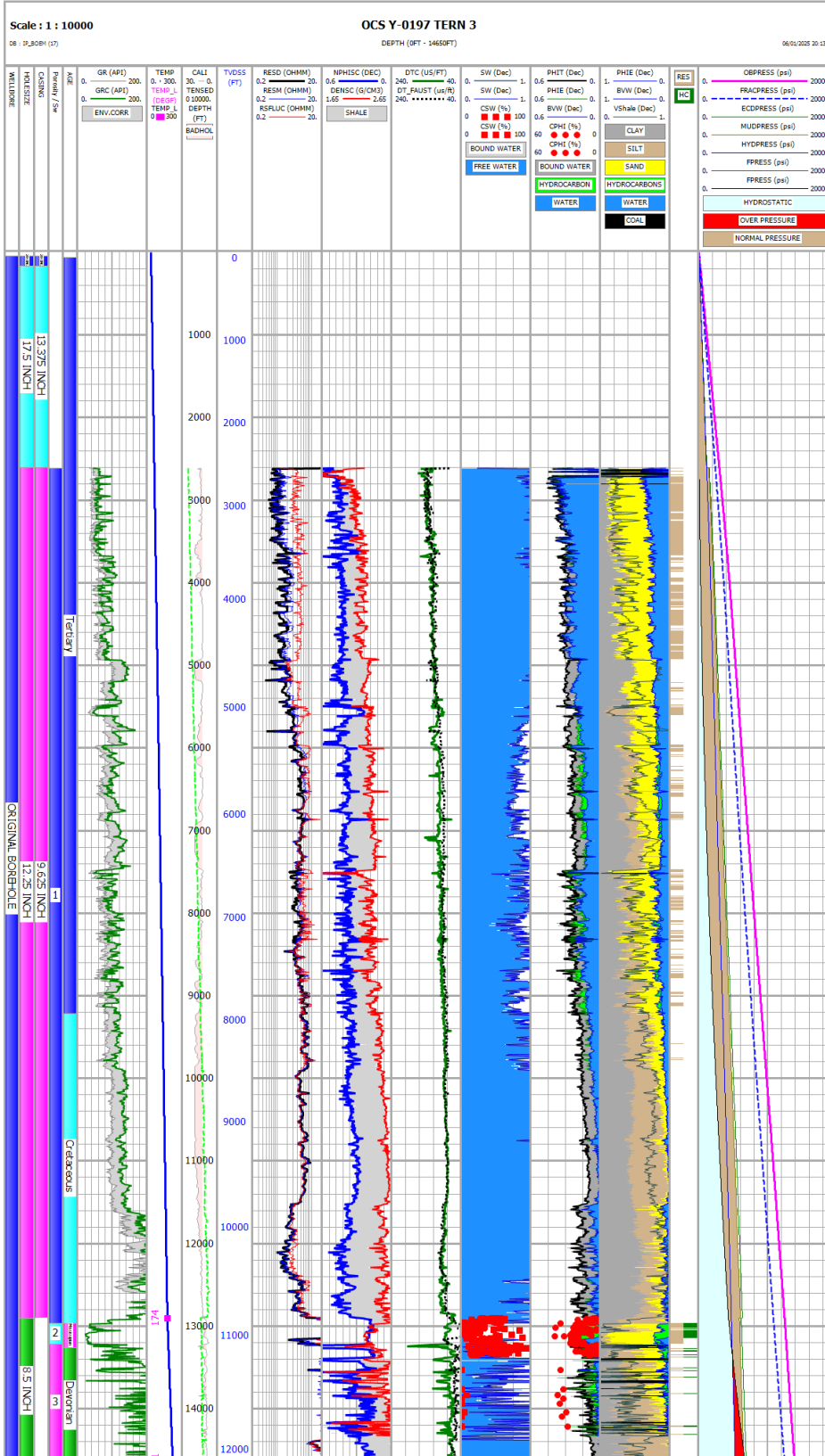
Report Date:

Core versus Log Porosity Crossplot:



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Summary Plot:



Report Date: