

CORE LABORATORIES

Company : Union Pacific Resources Company
Well : No. 4 Harker
Location : Sec. 34 T12S R43W
Co,State : Cheyenne, Colorado

Field : Harker
Formation : Morrow
Coring Fluid : Water Base Mud
Elevation : N/A

File No.: 57121-8465
Date : 23-Apr-1990
API No. :
Analysts: DS MW

CORE ANALYSIS RESULTS (HYDROSTATIC CONFINEMENT)

SAMPLE NUMBER	DEPTH ft	NET OVERBURDEN (800 psi)				POROSITY (HELIUM) %	SATURATION		GRAIN DENSITY gm/cc	DESCRIPTION
		K _o	K _{air}	b(He)	BETA		(PORE VOLUME)			
		md	md	psi	ft(-1)		OIL %	WATER %		
Core No.1 5252.0-5257.0 Cut 5.0' Rec. 3.3'										
1	5252.0- 53.0	1165.	1272.	3.29	1.55279E7	23.3	8.8	38.3	2.66	Sst bu f m gr
2	5253.0- 54.0	398.	442.	4.13	7.37862E7	18.3	13.0	45.8	2.67	Sst bu f m gr
3	5254.0- 55.0	0.042	0.058	26.85	1.3738E13	3.4	0.0	51.6	2.68	Sst gry vf f gr sli calc
4	5255.0- 55.3	0.086	0.121	26.67	2.2171E12	4.4	0.0	46.1	2.68	Sst gry vf f gr sli calc
	5255.3- 57.0									Core Loss
Core No.2 5257.0-5267.0 Cut 10.0' Rec. 10.0'										
5	5257.0- 58.0	0.087	0.134	35.04	3.4929E12	4.0	0.0	37.9	2.67	Sst gry vf f gr sli calc
6	5258.0- 59.0	1440.	1619.	4.42	1.43626E7	23.7	8.6	59.2	2.66	Sst bu f m gr
7	5259.0- 60.0	498.	512.	1.07	2.35366E8	17.4	8.8	61.0	2.68	Sst bu f crs gr
8	5260.0- 61.0	1036.	1060.	0.80	3.81893E7	20.8	8.8	61.3	2.65	Sst bu f crs gr
	5261.0- 67.0									Shale -- No Analysis -- Client Request
	5267.0- 74.0									Drilled Interval
Core No.3 5274.0-5297.2 Cut 23.2' Rec. 23.2'										
9A	5274.0- 74.5	47.8	50.5	2.40	5.85445E8	16.4			2.66	Sst gry vf f gr glauc
9	5274.5- 75.0	94.3	98.5	1.81	1.18076E8	16.5	15.3	39.2	2.67	Sst gry vf f gr glauc
10	5275.0- 75.5	177.	182.	1.12	8.92829E7	16.9	18.4	36.7	2.66	Sst gry vf f gr glauc
10A	5275.5- 76.0	31.3	33.7	3.34	4.46508E8	15.2			2.66	Sst gry vf f gr glauc
11A	5276.0- 76.5	41.5	43.7	2.25	3.90470E8	13.5			2.66	Sst gry vf f gr glauc



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HANDLING & CLEANING

Core Transportation : Pickup Truck To Aurora Facility
Solvent : Toluene
Extraction Equipment : Centrifuge
Extraction Time : 24 Hours
Drying Equipment : Convection Oven
Drying Time : 12 Hours
Drying Temperature : 180 Degrees Fahrenheit

ANALYSIS

Grain volume measured by Boyle's Law in a matrix cup using He
Bulk volume measured by calipering
Fluid saturations by retort
Permeabilities measured on one in. diameter drilled plugs
Core Gamma Spectral

REMARKS

Additional plugs were taken by client request for measurement of permeability and porosity, these samples are designated by an "A". The core material was picked up by Triple O Slabbing on April 27, 1990.

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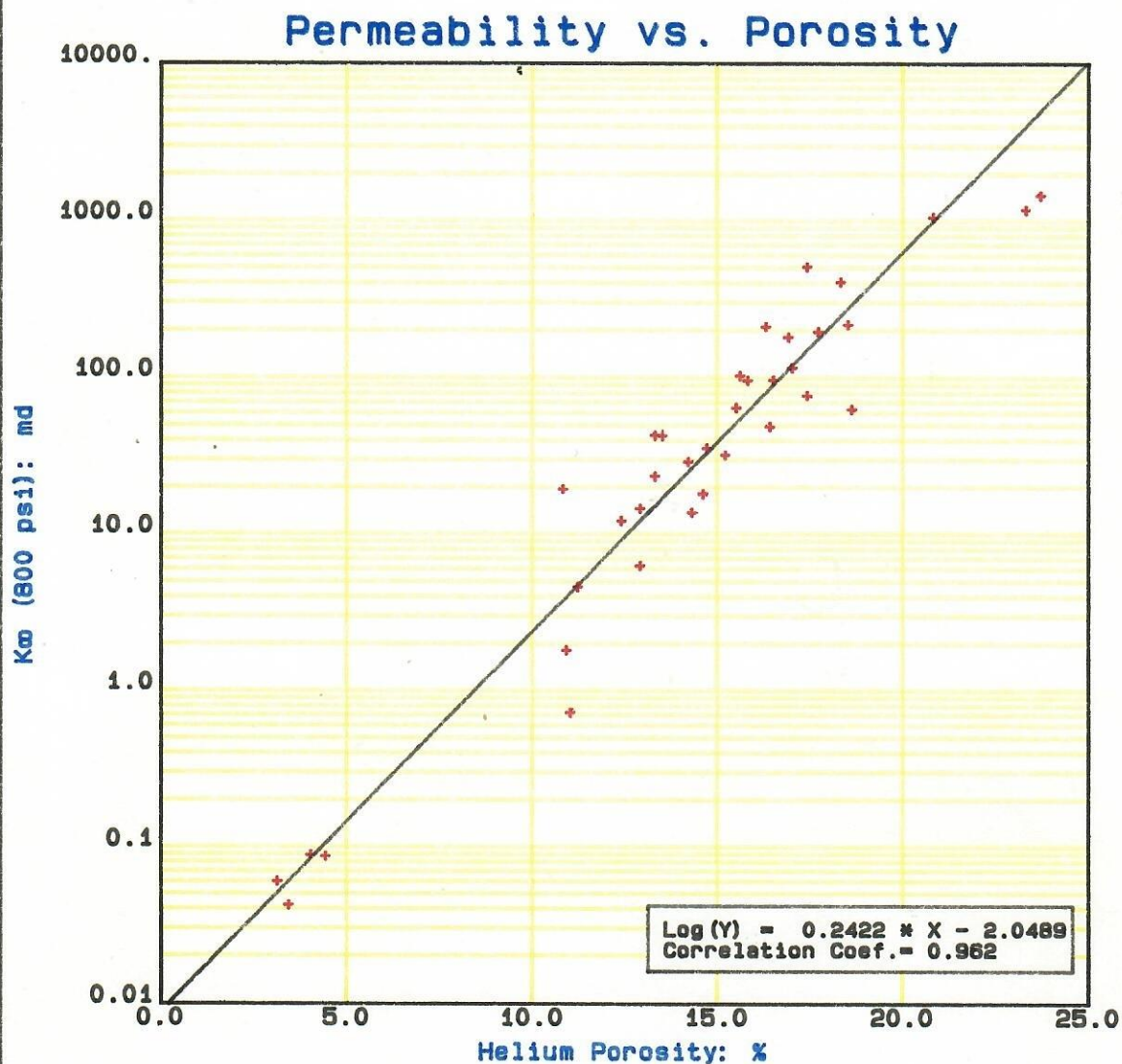
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TABLE I

SUMMARY OF CORE DATA

ZONE AND CUTOFF DATA		CHARACTERISTICS REMAINING AFTER CUTOFFS			
ZONE:		ZONE:		PERMEABILITY:	
Identification -----	Morrow	Number of Samples -----	36	Flow Capacity -----	5744.4 md-ft
Top Depth -----	5252.0 ft	Thickness Represented -	27.3 ft	Arithmetic Average ----	210. md
Bottom Depth -----	5297.2 ft			Geometric Average -----	26.6 md
Number of Samples -----	36			Harmonic Average -----	0.471 md
		POROSITY:		Minimum -----	0.042 md
DATA TYPE:		Storage Capacity -----	391.6 ϕ -ft	Maximum -----	1440. md
Porosity ----- (HELIUM)		Arithmetic Average ----	14.3 %	Median -----	41.7 md
Permeability ----- K _o (800 psi)		Minimum -----	3.1 %	Standard Dev. (Geom) --	K \cdot 10 ^{\pm1.180} md
		Maximum -----	23.7 %		
CUTOFFS:		Median -----	14.9 %	HETEROGENEITY (Permeability):	
Porosity (Minimum) -----	0.0 %	Standard Deviation ----	\pm 4.9 %	Dykstra-Parsons Var. --	0.841
Porosity (Maximum) -----	100.0 %			Lorenz Coefficient ----	0.653
Permeability (Minimum) ---	0.0000 md	GRAIN DENSITY:			
Permeability (Maximum) ---	100000. md	Arithmetic Average ----	2.66 gm/cc	AVERAGE SATURATIONS (Pore Volume):	
Water Saturation (Maximum)	100.0 %	Minimum -----	2.65 gm/cc	Oil -----	8.5 %
Oil Saturation (Minimum) -	0.0 %	Maximum -----	2.71 gm/cc	Water -----	51.1 %
Grain Density (Minimum) --	2.00 gm/cc	Median -----	2.66 gm/cc		
Grain Density (Maximum) --	3.00 gm/cc	Standard Deviation ----	\pm 0.01 gm/cc		
Lithology Excluded -----	NONE				

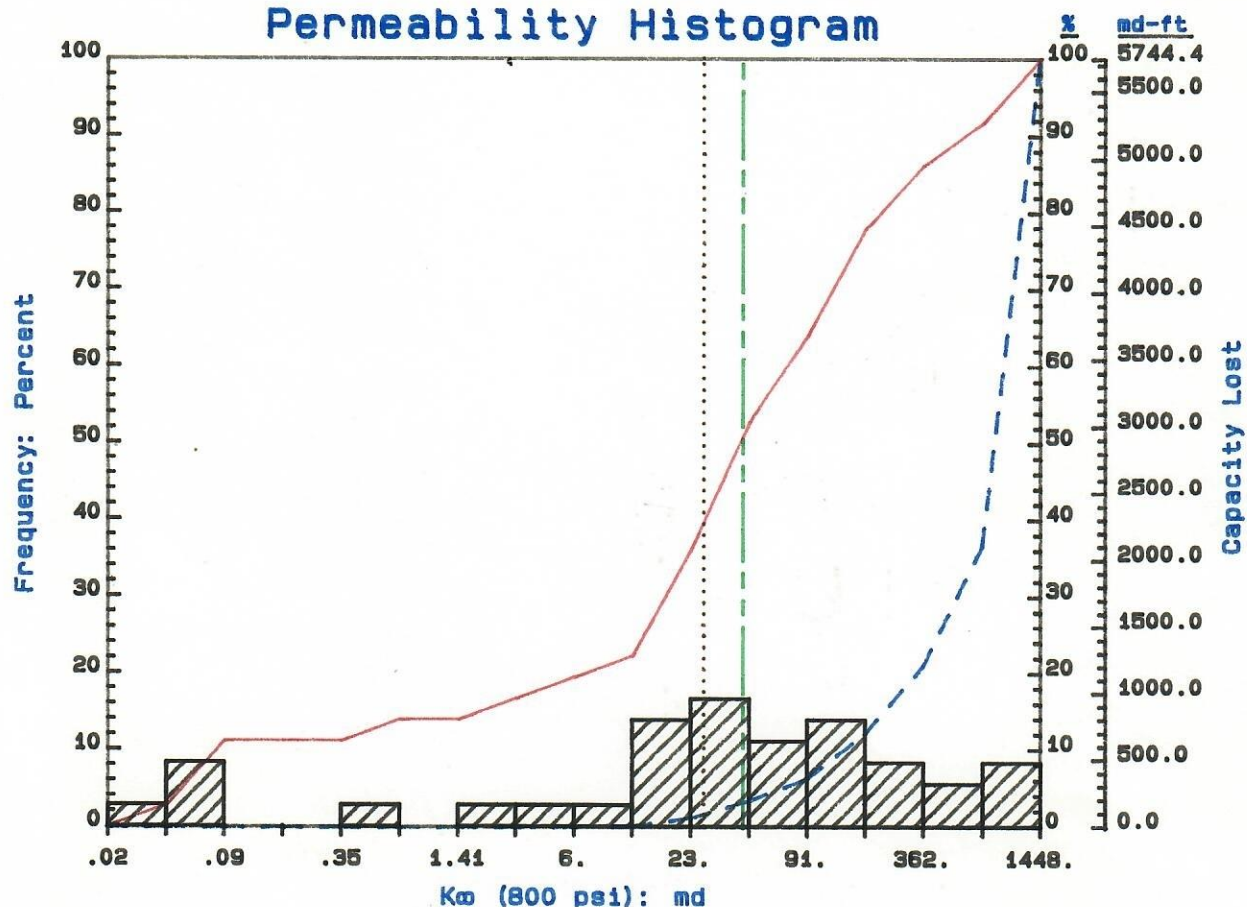


Union Pacific Resources Company
No. 4 Harker Well
Harker Field
Cheyenne County, Colorado
Morrow Formation
5252.0-5297.2 feet
Core Laboratories

23-Apr-1990

- LEGEND -
Morrow

Permeability Histogram



Union Pacific Resources Company

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Harker Field

Cheyenne County, Colorado

Morrow Formation

5252.0-5297.2 feet

Core Laboratories

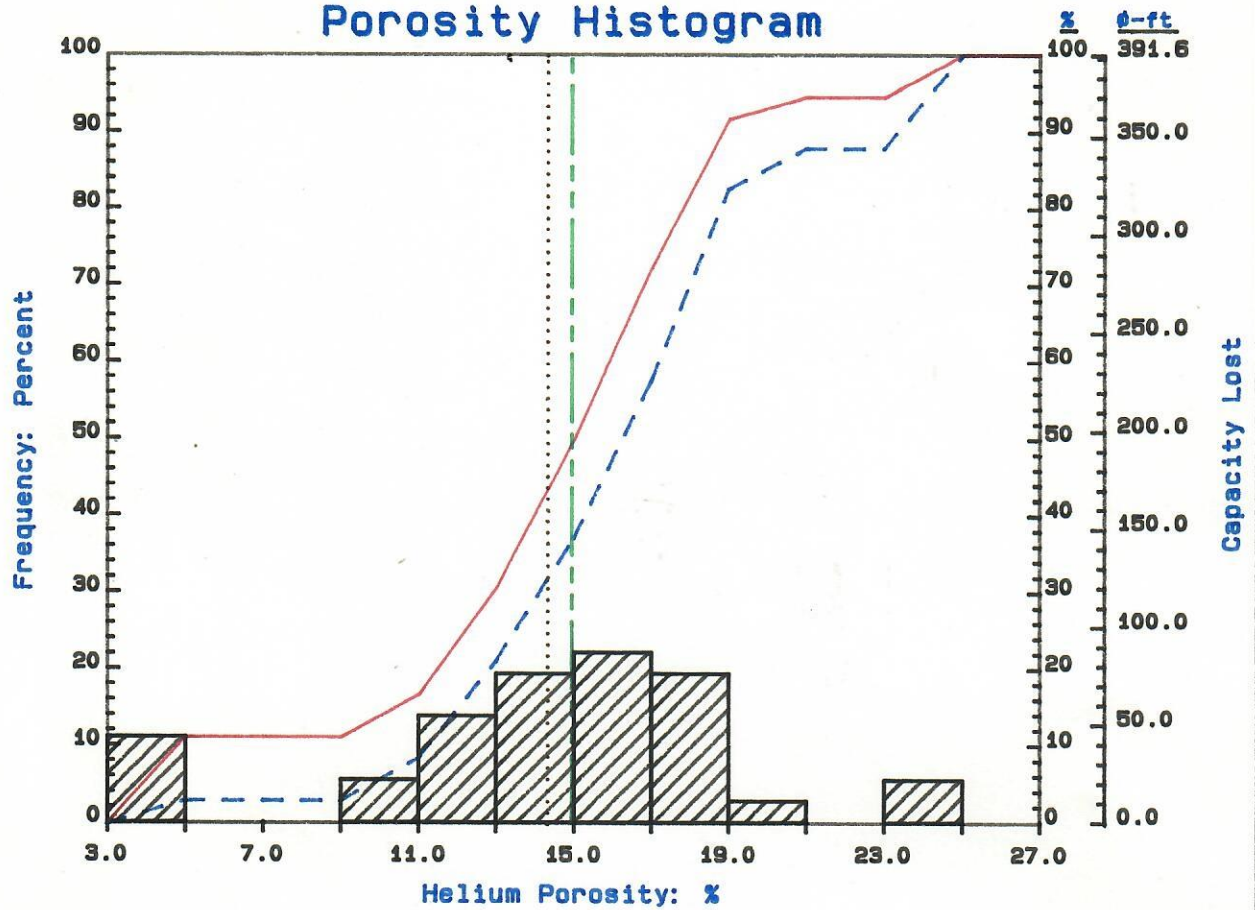
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- LEGEND -

- Median Value (41.7)
- Geom. Average (26.6)
- Cumulative Frequency
- - Cumulative Capacity Lost

36 Samples

Porosity Histogram



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Morrow Formation

5252.0-5297.2 feet

Core Laboratories

23-Apr-1990

- LEGEND -

- Median Value (14.9)
- Arith. Average (14.3)
- Cumulative Frequency
- - - Cumulative Capacity Lost

36 Samples