

CORE ANALYSIS REPORT
FOR
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EXBRY-1 & EXPM-1
HENDRY COUNTY, FLORIDA



PETROLEUM SERVICES

CORE ANALYSIS REPORT
FOR
SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EXBRY-1 & EXPM-1
HENDRY COUNTY, FLORIDA

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Petroleum Services Division
2001 Commerce
Midland, Texas 79703
Tel: (432) 694-7761
Fax: (432) 694-3191
www.corelab.com

January 26, 2004

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
P.O. Box 24680
West Palm Beach, Florida 33416-4680

File No.: 57181-18707
Subject: Core Analysis
EXBRY-1 & EXPM-1
Hendry County, Florida

Gentlemen:

The subject well was cored using diamond coring equipment and core fluid to obtain 4 inch to 2 5/8 inch diameter cores from EXBRY-1 555 to 1354 feet rom the Tertiary Limestone formation.

Core analysis data is presented in tabular and graphical form for your convenience. A porosity vs. permeability plot was prepared for statistical evaluation. Core analysis data is contained on a 3 1/2 inch computer diskette.

We trust these data will be useful in the evaluation of your property and thank you for the opportunity of serving you.

Very truly yours,
CORE LABORATORIES

John Sebian
Laboratory Supervisor

JS/ym

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EXBRY-1 & EXPM-1
File No. 57181-18707
Procedural Page

The cores were transported to Midland by Core Laboratories from Houston, Texas personnel.

Core analysis was made on selected intervals requested on full diameter samples. Sample number fifteen was plugged for permeability measurements (EXPM-1 well).

Fluid removal was achieved using convection oven drying method.

No saturations data was requested.

Full diameter porosity was determined by direct pore volume measurement using Boyle's law helium expansion. Bulk volume was measured by Archimedes Principle. Grain density was calculated from dry weight, bulk volume and pore volume measurements.

$$\text{Grain Density} = \frac{\text{Dry Weight}}{\text{Bulk Vol.} - \text{Pore Vol.}}$$

In addition, full diameter direct grain volume measurement was made using Boyle's law helium expansion. Bulk volume was measured by Archimedes Principle on samples after cleaning. Porosity was calculated using bulk volume and grain volume measurements.

$$\text{Porosity} = \frac{\text{Bulk Vol.} - \text{Grain Vol.}}{\text{Bulk Vol.}} \times 100$$

Steady State Air Permeability was measured in two horizontal directions and vertically while the core was confined in a Hassler rubber sleeve. Please note sample number fifteen was plugged for permeability measurement (EXPM-1 well).

The core will be returned to Core Laboratories in Houston, Texas upon completion of analysis.

CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 Well : EXBRY-1 & EXPM-1
 Location :
 Co,State : HENDRY COUNTY, FLORIDA

Field :
 Formation :
 Coring Fluid :
 Elevation :

File No.: 57181-18707
 Date : 1-22-04
 API No. :
 Analysts: SEBIAN

C O R E A N A L Y S I S R E S U L T S

SAMPLE NUMBER	DEPTH ft	PERMEABILITY			POROSITY (HELIUM) %	GRAIN DENSITY gm/cc	DESCRIPTION
		(MAXIMUM) Kair md	(90 DEG) Kair md	(VERTICAL) Kair md			

EXBRY - 1

1	555.9- 56.3	437.	339.	193.	31.9	2.71	Lim, foss, moldic, chalk
2	555.2- 55.5	679.	587.	399.	37.3	2.71	Lim, foss, moldic, chalk
3	562.0- 62.7	28.7	22.1	10.3	27.3	2.70	Lim, foss, sli moldic, chalk
4	903.3- 03.9	4720.	3145.	2070.	34.2	2.69	Lim, foss, moldic
5	901.6- 01.9	2852.	2470.	998.	37.0	2.71	Lim, foss, moldic, chalk
6	905.4- 05.9	4794.	718.	1809.	26.7	2.70	Lim, foss, moldic
7	906.8- 07.6	488.	455.	243.	37.2	2.71	Lim, foss, sli moldic, chalk
8	910.3- 10.8	1990.	1861.	819.	35.2	2.70	Lim, foss, sli moldic, chalk
9	908.7- 09.2	5154.	5044.	60.8	32.3	2.71	Lim, foss, moldic, chalk
10	911.1- 11.8	1070.	489.	297.	33.8	2.71	Lim, foss, sli moldic, chalk

EXPM - 1

1	916.3- 16.9	3652.	3089.	1589.	37.1	2.71	Lim, foss, sli moldic, chalk
2	917.7- 17.7	499.	469.	361.	46.1	2.70	Lim, foss, chalk
3	920.0- 20.4	115.	115.	76.6	41.7	2.70	Lim, foss, chalk
4	925.7- 26.2	228.	228.	228.	41.6	2.71	Lim, foss, chalk
5	927.9- 28.3	693.	499.	189.	23.6	2.70	Lim, foss, sli chalk
6	931.3- 31.7	33.9	31.7	3.12	40.1	2.70	Lim, foss, chalk
7	932.2- 32.8	302.	208.	5.89	26.4	2.73	Lim, foss, rootlet, chalk
8	934.0- 34.4	4.34	3.84	8.98	22.9	2.72	Lim, foss, sli chalk
9	1056.4- 56.8	1557.	1397.	284.	41.0	2.70	Lim, foss, chalk
10	1057.6- 58.1	1052.	989.	286.	45.7	2.70	Lim, foss, chalk
11	1059.7- 60.1	124.	81.3	19.1	40.4	2.68	Lim, foss, chalk, sli kerogen
12	1060.3- 60.7	272.	258.	36.1	43.1	2.70	Lim, foss, chalk, sli kerogen

CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 Well : EXBRY-1 & EXPM-1

Field :
 Formation :

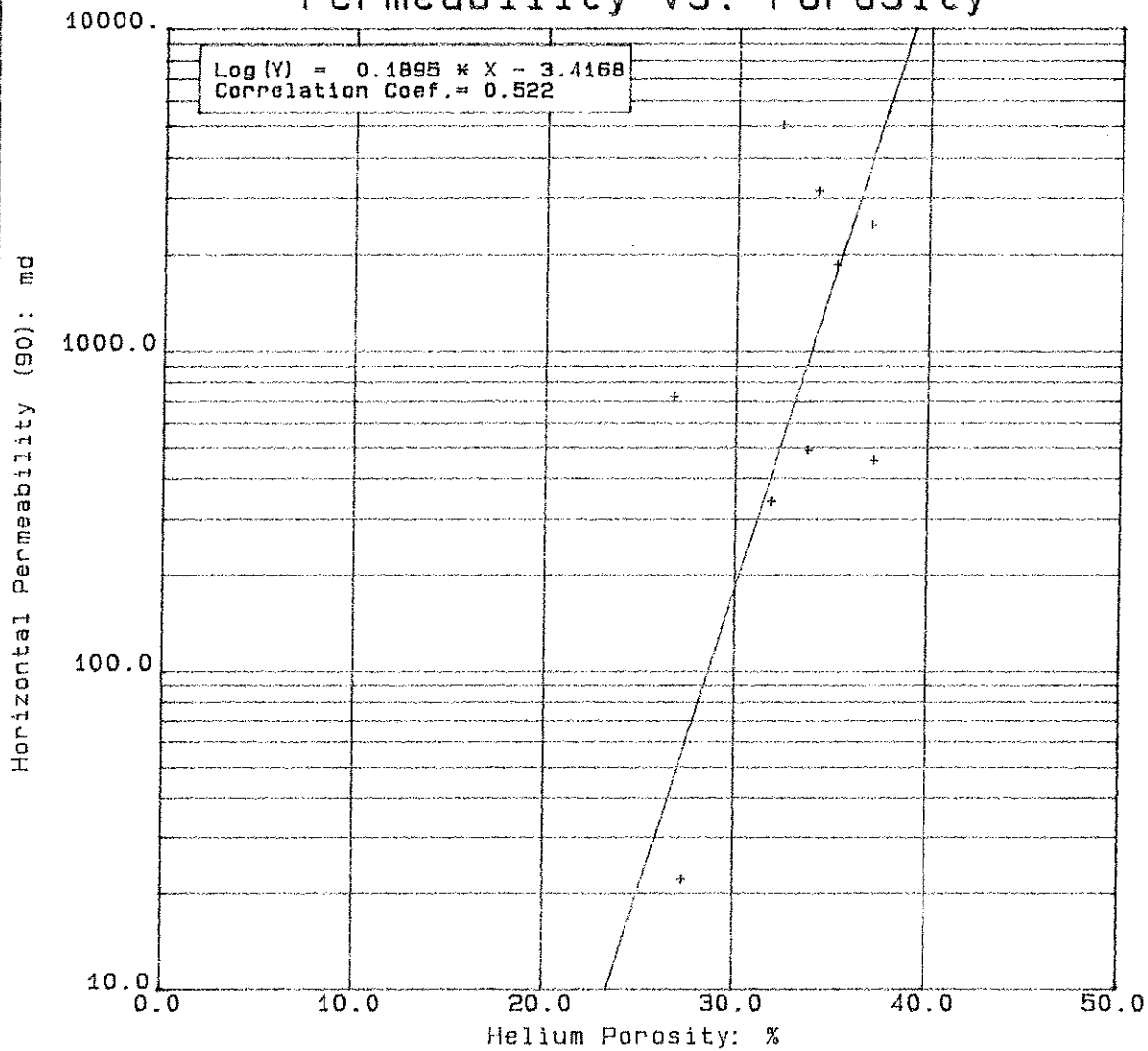
File No.: 57181-18707
 Date : 1-22-04

C O R E A N A L Y S I S R E S U L T S

SAMPLE NUMBER	DEPTH ft	PERMEABILITY			POROSITY (HELIUM) %	GRAIN DENSITY gm/cc	DESCRIPTION
		(MAXIMUM) K _{air} md	(90 DEG) K _{air} md	(VERTICAL) K _{air} md			
13	1064.0- 64.3	3182.	2175.	16.2	40.2	2.71	Lim, foss, ool
14	1065.4- 65.8	1337.	1313.	305.	40.5	2.71	Lim, foss, ool
* 15	1350.5- 50.9		382.	437.	42.1	2.72	Lim, foss, ool
16	1352.7- 53.1	579.	384.	16.7	42.3	2.68	Lim, foss, chalk, sli kerogen
17	1354.0- 54.4	251.	206.	26.4	39.1	2.68	Lim, foss, chalk, tr kerogen

* INDICATES PLUG ANALYSIS

Permeability vs. Porosity



<p style="text-align: center;">SOUTH FLORIDA WATER MANAGEMENT EXBRY-1 & EXPM-1</p> <p style="text-align: center;">EXBRY-1 (555-1355 feet)</p> <p>Core Laboratories 1-22-04</p>	<p style="text-align: center;">-- LEGEND --</p> <p style="text-align: center;">EXBRY-1</p>
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CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 Well : EXBRY-1 & EXPM-1

Field :
 Formation :

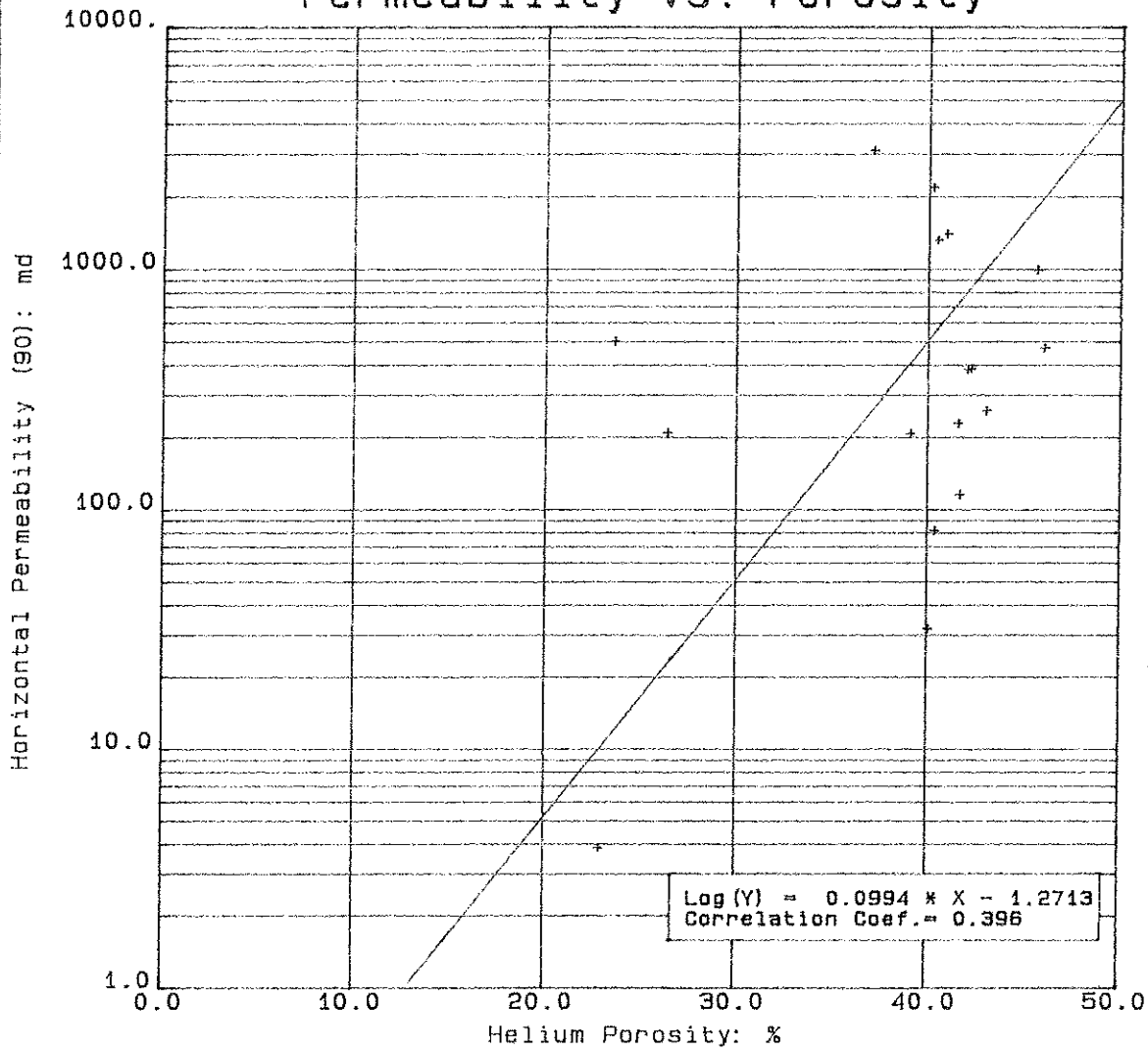
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TABLE I

SUMMARY OF CORE DATA

ZONE AND CUTOFF DATA	CHARACTERISTICS REMAINING AFTER CUTOFFS	
ZONE:	ZONE:	PERMEABILITY:
Identification ----- EXBRY-1	Number of Samples ----- 9	Flow Capacity ----- 7297.4 md-ft
Top Depth ----- 555.9 ft	Thickness Represented - 5.0 ft	Arithmetic Average ---- 1459. md
Bottom Depth ----- 911.8 ft		Geometric Average ----- 629. md
Number of Samples ----- 9	POROSITY:	Harmonic Average ----- 134. md
	Storage Capacity ----- 164.0 ϕ -ft	Minimum ----- 22.1 md
DATA TYPE:	Arithmetic Average ---- 32.8 %	Maximum ----- 5044. md
Porosity ----- (HELIUM)	Minimum ----- 26.7 %	Median ----- 718. md
Permeability ----- (90 DEG) Kair	Maximum ----- 37.2 %	Standard Dev. (Geom) -- K-10 \pm 0.716 md
	Median ----- 33.8 %	
CUTOFFS:	Standard Deviation ---- \pm 3.8 %	HETEROGENEITY (Permeability):
Porosity (Minimum) ----- 0.0 %		Dykstra-Parsons Var. -- 0.750
Porosity (Maximum) ----- 100.0 %	GRAIN DENSITY:	Lorenz Coefficient ---- 0.558
Permeability (Minimum) --- 0.0000 md	Arithmetic Average ---- 2.70 gm/cc	
Permeability (Maximum) --- 10000. md	Minimum ----- 2.69 gm/cc	AVERAGE SATURATIONS (Pore Volume):
Water Saturation (Maximum)	Maximum ----- 2.71 gm/cc	Oil -----
Oil Saturation (Minimum) -	Median ----- 2.71 gm/cc	Water -----
Grain Density (Minimum) -- 2.00 gm/cc	Standard Deviation ---- \pm 0.01 gm/cc	
Grain Density (Maximum) -- 3.00 gm/cc		
Lithology Excluded ----- NONE		

Permeability vs. Porosity



SOUTH FLORIDA WATER MANAGEMENT DISTRICT
EXBRY-1 & EXPM-1

EXPM-1 (916.3-1354.4 feet)

Core Laboratories

1-22-04

- LEGEND -
EXPM-1

CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT
 Well : EXBRY-1 & EXPM-1

Field :
 Formation :

File No.: 57181-18707
 Date : 1-22-04

TABLE II

SUMMARY OF CORE DATA

ZONE AND CUTOFF DATA	CHARACTERISTICS REMAINING AFTER CUTOFFS	
ZONE: Identification ----- EXPM-1 Top Depth ----- 916.3 ft Bottom Depth ----- 1354.4 ft Number of Samples ----- 17 DATA TYPE: Porosity ----- (HELIUM) Permeability ----- (90 DEG) Kair CUTOFFS: Porosity (Minimum) ----- 0.0 % Porosity (Maximum) ----- 100.0 % Permeability (Minimum) --- 0.0000 md Permeability (Maximum) --- 10000. md Water Saturation (Maximum) Oil Saturation (Minimum) - Grain Density (Minimum) -- 2.00 gm/cc Grain Density (Maximum) -- 3.00 gm/cc Lithology Excluded ----- NONE	ZONE: Number of Samples ----- 17 Thickness Represented - 7.9 ft POROSITY: Storage Capacity ----- 306.6 ϕ -ft Arithmetic Average ---- 38.8 % Minimum ----- 22.9 % Maximum ----- 46.1 % Median ----- 40.5 % Standard Deviation ---- ± 7.1 % GRAIN DENSITY: Arithmetic Average ---- 2.70 gm/cc Minimum ----- 2.68 gm/cc Maximum ----- 2.73 gm/cc Median ----- 2.70 gm/cc Standard Deviation ---- ± 0.01 gm/cc	PERMEABILITY: Flow Capacity ----- 5576.8 md-ft Arithmetic Average ---- 706. md Geometric Average ----- 321. md Harmonic Average ----- 56.3 md Minimum ----- 3.84 md Maximum ----- 3089. md Median ----- 382. md Standard Dev. (Geom) -- $K \cdot 10^{\pm 0.712}$ md HETEROGENEITY (Permeability): Dykstra-Parsons Var. -- 0.709 Lorenz Coefficient ---- 0.578 AVERAGE SATURATIONS (Pore Volume): Oil ----- Water -----

CORE LABORATORIES

CODE KEY - DESCRIPTIONS

a	= Plug from full diameter sample	i	= Intergranular	SCAL	= Removed for special core analysis
anhy	= Anhydrite	incl	= Inclusions	sdv	= Sandy
AST	= Appears similar to	lam	= Laminae (Laminated)	SEM	= Scanning electron microscope analysis
bk	= Break	lmy	= Limy	sh	= Shale
bldr	= Boulder	ls	= Limestone	shy	= Moderately shaly (20-40%)
c	= Coarse	lv	= Large vug	sltst	= Siltstone
calc	= Calcite (areous)	m	= Medium	slty	= Silty
carb	= Carbonaceous	mi	= Mud invaded	SP	= Small plug
cbl	= Cobble	mic	= Micaceous	ss	= Sandstone
CEC	= Cation exchange capacity	mshy	= Moderately shaly (20-40%)	sshy	= Slightly Shaly (<20%)
cem	= Cemented	mv	= Medium vug	sty	= Stylolite (ic)
cgl	= Conglomerate	NA	= Not analysed by request	sulf	= Sulphur
cht	= Chert	NP	= No permeability measurement	sv	= Small vug
coal	= Coal/Coal Inclusion	NR	= Not received	tr	= Trace
dol	= Dolomite	ool	= Oolitic	TS	= Thin section
f	= Fine	OB	= Overburden	uncons	= Unconsolidated
fest	= Ironstone	P	= Preserved for future studies	vfrac	= Vertical fracture
foss	= Fossil (iferous)	pbl	= Pebble	vf	= Very fine
frac	= Fracture	PET	= Removed for petrographic analysis	VOB	= Vertical overburden sample
fri	= Friable	POA	= Portion removed for oil analysis	vshy	= Very shaly (>40%)
glauc	= Glauconite (ic)	ppv	= Pinpoint Vug	VSP	= Vertical small plug
grnl	= Granule	PSA	= Particle size analysis	vug	= Vuggy (ular)
gyp	= Gypsum	pyr	= Pyrite (ic)	ws	= Water sand
hfrac	= Horizontal fracture	pyrbit	= Pyrobitumen	XRD	= X-ray diffraction
hal	= Halite (Salt)	SA	= Sieve Analysis		

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MANAGEMENT DISTRICT
ATTN: MICHAEL BENNETT
PO BOX 24680
WEST PALM BEACH FL 33416-4680

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COLLIER CONSULTING
ATTN: HUGHBERT COLLIER
741 WEST COLLEGE STREET
STEPHENVILLE TX 76401