# CORE ANALYSIS REPORT

FOR

# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

# VARIOUS WELLS

FLORIDA



# **CORE LABORATORIES**

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### VARIOUS WELLS

#### FLORIDA

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September 3, 1999

SOUTH FLORIDA WATER MANAGEMENT DISTRICT 3301 Gun Club Road West Palm Beach, Florida 33406

> File No.: 57181-18054 Subject: Core Analysis Various Wells Florida

Gentlemen:

The subject well was cored using diamond coring equipment and drilling mud to obtain 2.4 inch diameter cores from 5 to 130 feet from 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. Digital core photographs are contained on a CD.

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, INC.

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John Sebian Laboratory Supervisor

JS/ym

SOUTH FLORIDA WATER MANAGEMENT DISTRICT Various Wells File No. 57181-18054 Procedural Page

The cores were <sub>t</sub>ransported to Midland by South Florida Water Management.

A Core Spectral Gamma Log was recorded for downhole E-log correlation.

Core analysis was made from selected intervals requested on full diameter samples.

Fluid removal was achieved using convection oven drying method.

Direct grain volume measurement was made using Boyle's law helium expansion. Bulk volume was measured by Archimedes Principle and caliper bulk volume on samples after cleaning. Porosity was calculated using bulk volume and grain volume measurements.

> Porosity = <u>Bulk Vol. - Grain Vol.</u> X 100 Bulk Vol.

Steady State Air Permeability was measured in two horizontal directions and vertically while the core was confined in a Hassler rubber sleeve at approximately 400 psig hydrostatic stress.

The core was slabbed after analysis.

The slabs were photographed under natural light and ultraviolet light.

Thin section billets were removed from slab and shipped to Core Laboratories in Carrollton, Texas for thin section making. Thin sections are to contain blue epoxy and a carbonate stain.

The core will remain at our Midland facility (thirty days free of charge) as we await further disposition instructions.

#### HYDRAULIC CONDUCTIVITY CONVERSIONS

#### DISCUSSION OF ANALYSIS THEORY

The micropermeameter device uses steady state air cross flow methodology to determine an air permeability. A full diameter cylinder is face from existing core fragments. The sample is placed in a rubber hassler sleeve under 400 psig confining pressure during testing. Upstream and downstream pressures are taken from mercury, water manometers or H-C gauge. Flow rates are measured using ceramic plates.

#### CONVERSION PERMEABILITY TO HYDRAULIC CONDUCTIVITY

k = (V\*L)/(A\*T\*P)

k = Hydraulic Conductivity(m/sec)

V = Incremental produced volume, (mA3)

L = Length, (m)

P = Differential pressure, (m of H2O)

- A = Cross-sectional area, (mA2)
- T = Incremental time, (sec)

```
Volume, (V)
Ceramic plate orifice value@200mmH2O*orifice water/200=cc/sec
(cc/sec)/(1,000,000)=m/sec
```

```
Area, (A)
19.64 cmA2/100/100=0.001964 mA2
```

```
Length, (L)
length in cm/100=m
```

```
Differential Pressure,(P)
Pl = -Pa+sqrt of (2000*0.01787*760/760)/C value of 60+760/760
Pl = 0.2632atm
```

```
0.2632 atm*1033.26=271.95 cmH20
271.95 cmH20/100=2.7195 mH20
```

Time,(T) sec

Conversion (m/sec)to(ft/sec)

(m/sec)\*3.2808399 ft/m=ft/sec

Conversion (ft/sec)to(ft/day)

(ft/sec) \*86,400 sec/day=ft/day

# CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT
well : VARIOUS WELLS
\_ocation :

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Co,State : FLORIDA

Field : Formation : TERTIARY Coring Fluid : Elevation :

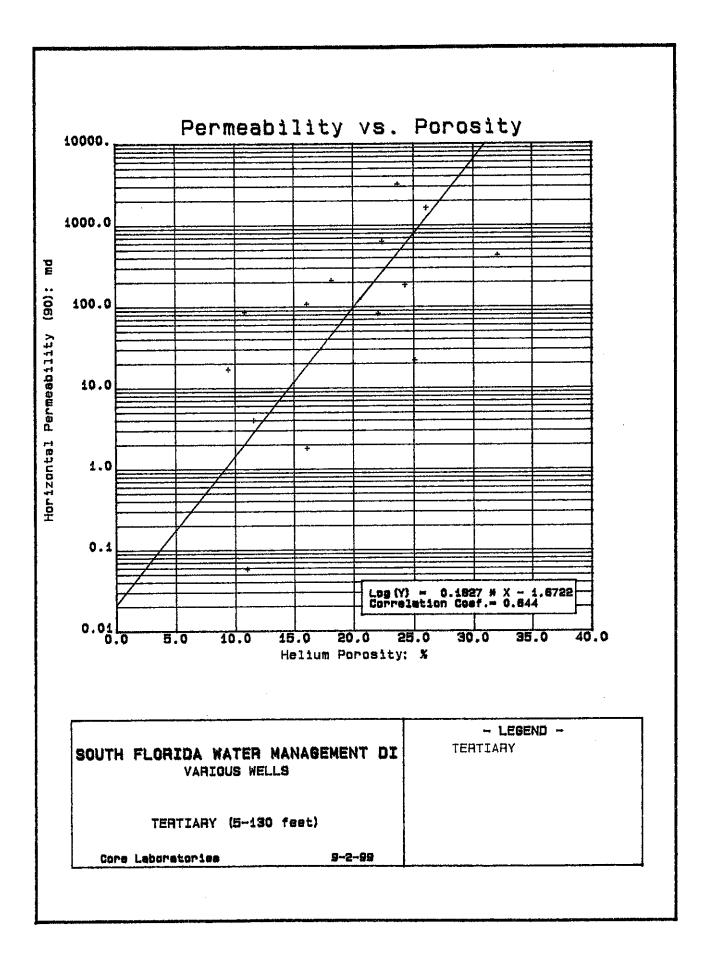
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#### File No.: 57181-18054 Date : 9-2-99 API No. : Analysts: SEBIAN

## CORE ANALYSIS RESULTS

	SAMPLE	DEPTH		PERMEABILI	TΥ	POROSITY	GRAIN	DESCRIPTION	
	NUMBER	שבריוו	(MAXIMUM) Kair	(90 DEG) Kair	(VERTICAL) Kair	(HELIUM)	DENSITY		
	La	<u>ያድና</u> ft	md	md	md	%	gm/cc		
	к 1-3	19.0-20.0	504.	1.80	0.70	16.1	2.69	MOP1A - Lim, foss, sndy, sl moldic	
	K 2-3	20.0- 25.0	TBFA	TBFA	22695.	28.8	2.70	MOP1A - Lim, foss, v/sndy, moldic	
	K 3-3	25.0- 30.0	330.	212.	85.6	18.2	2.69	MOP1A - Sd, tn, vfgr, v/lmy, pp	
	K 4-72	_ 10.0-15.0	127.	108.	0.25	16.1	2.70	MOP2A – Lim, foss, sndy, pp, tr moldic	
	K 5-3	20.5- 25.5	3664.	3207.	6587.	23.7	2.71	MOP2A - Lim, foss, sndy, moldic	
	K 6-3	17.0- 22.0	0.17	0.06	0.01	11.0	2.69	MP1A – Lim, foss, v/sndy, pp, tr moldic	
a Ma	FK 7-3	27.0-32.0	1696.	1649.	2609.	26.1	2.69	MP1A - Lim, foss, v/sndy, pp, sl moldic	
mp	K 8-3	20.0-25.0	13.8	4.01	6.04	11.6	2.70	MP2A – Lim, foss, sndy, sl pp, sl moldic	
i	9-3 کل	5.0- 10.0	176.	86.5	3.90	10.8	2.69	MP2A – Lim, foss, v/sndy, pp	
	К 10-Ч	31.0- 35.0	214.	82.9	1.63	22.1	2.68	MP2A - Lim, foss, v/sndy, chlky, pp	
<u> ሰ</u> የን	K 11-4	125.0- 30.0	981.	430.	26.9	32.1	2.78	MP3A - Dol, foss, v/sndy, moldic	
10-C	<u>K 12</u> -3	15.0- 20.0	19.5	17.0	37.6	9.4	2.71	MP3A - Lim, foss, sndy, pp	
.0 -	K 13	36.0- 41.0	25.7	21.8	47.8	25.1	2.70	S10CA - Lim, chlky, sl sndy, pp	
	K 14	30.0- 35.0	917.	186.	90.6	24.3	2.68	S10CA - Lim, foss, v/sndy, pp	
/	K 15-3	15.5- 20.5	4660.	636.	23469.	22.4	2.69	MOP2A - Lim, foss, sndy, s1 pp, moldic	

MOPS



# CORE LABORATORIES

Company : SOUTH FLORIDA WATER MANAGEMENT DISTRICT √e11 : VARIOUS WELLS

Field : Formation : TERTIARY File No.: 57181-18054 Date : 9-2-99

## TABLE I

# SUMMARY OF CORE DATA

# ZONE AND CUTOFF DATA CHARACTERISTICS REMAINING AFTER CUTOFFS

ZONE:		ZONE:		PERMEABILITY:		
Identification	TERTIARY	Number of Samples	15			
Top Depth	5.0 ft	Thickness Represented -	70.0 ft	Flow Capacity	33116.9	md-ft
Bottom Depth	130.0 ft			Arithmetic Average	509.	md
Number of Samples	15	POROSITY:		Geometric Average	73.3	md
				Harmonic Average	0.73	md
DATA TYPE:		Storage Capacity	1402.5 ø-ft	Minimum	0.06	۳nd
Porosity	(HELIUM)	Arithmetic Average	20.0 %	Maximum	3207.	md
Permeability (90	DEG) Kair	Minimum	9.4 %	Median	97.2	md
		Maximum	32.1 %	Standard Dev. (Geom)	K-10 <sup>±1.268</sup>	mđ
CUTOFFS:		Median	22.1 %			
Porosity (Minimum)	0.0 %	Standard Deviation	±7.1 %	HETEROGENEITY (Permeabili	ty):	
Porosity (Maximum)	100.0 %					
Permeability (Minimum)	0.0100 md	GRAIN DENSITY:		Dykstra-Parsons Var	0.889	
Permeability (Maximum)	10000. md			Lorenz Coefficient	0.690	)
Water Saturation (Maximum)	TBFA	Arithmetic Average	2.70 gm/cc			
Oil Saturation (Minimum) -	TBFA	Minimum	2.68 gm/cc	AVERAGE SATURATIONS (Pore	Volume):	
Grain Density (Minimum)	2.00 gm/c	c Maximum	2.78 gm/cc		•	
Grain Density (Maximum)	3.00 gm/c	c Median	2.69 gm/cc	0il	TBFA	
Lithology Excluded	NONE	Standard Deviation	±0.02 gm/cc	Water	TBFA	-

# South Florida Water Management Distric Various Wells Hydraulic Conductivity

Sample Number	Project Number	Depth Top feet	Depth Bottom feet	Hydraulic Conductivity (m/sec)	Hydraulic Conductivity (ft/day)	K(air) md	K(direction)	Description
K1	MOP1A	19.0	20.0	0.00000043	0.1225	0.705	K(vertical)	Lim, foss, sndy, sl moldic
				0.00027234	77.1978	504.055	K(horiz,max)	
				0.00000111	0.3137	1.804	K(horiz,min)	the face words moldic
K2	MOP1A	20.0	25.0	0.01200692	3403.5350	22694.671	K(vertical)	Lim, foss, v/sndy, moldic
				-999	-999	-999	K(horiz,max)	
				-999	-999	-999	K(horiz,min)	Ed to vfor v/imv op
K3	MOP1A	25.0	30.0	0.00005249	14.8783	85.580	K(vertical)	Sd, tn, vfgr, v/lmy, pp
				0.00017905	50.7550	330.021	K(horiz,max)	
				0.00011472	32.5191	212.015	K(horiz,min)	Lim, foss, sndy, pp, tr moldic
K4	MOP2A	10.0	15.0	0.00000015	0.0435	0.250	K(vertical)	Lim, loss, sing, pp, ir molaid
				0.00006872	19.4807	127.014	K(horiz,max)	
				0.00005850	16.5838	108.068	K(horiz,min)	Line from and considio
K5	MOP2A	20.5	25.5	0.00355660	1008.1688	6586.781	K(vertical)	Lim, foss, sndy, moldic
				0.00194169	550,3997	3664.172	K(horiz,max)	
				0.00166447	471.8192	3207.207	K(horiz,min)	the first stands and to modeling
K6	MP1A	17.0	22.0	0.00000001	0.0023	0.013	K(vertical)	Lim, foss, v/sndy, pp, tr moldic
				0.00000011	0.0303	0.174	K(horiz,max)	
				0.00000004	0.0101	0.058	K(horiz,min)	
K7	MP1A	27.0	32.0	0.00141513	401.1406	2609.459	K(vertical)	Lim, foss, v/sndy, pp, sl moldic
				0.00091593	259.6325	1695.933	K(horiz,max)	
				0.00089080	252.5089	1649.061	K(horiz,min)	
K8	MP2A	20.0	25.0	0.00000370	1.0494	6.036	K(vertical)	Lim, foss, sndy, sl pp, sl moldic
				0.00000849	2.4067	13.843	K(horiz,max)	
				0.00000245	0.6958	4.002	K(horiz,min)	
K9	MP2A	5.0	10.0	0.00000240	0.6790	3.905	K(vertical)	Lim, foss, v/sndy, pp
				0.00007055	19. <del>9</del> 979	130.014	K(horiz,max)	
				0.00004689	13.2924	86.479	K(horiz,min)	
K10	MP2A	31.0	35.0	0.00000100	0.2837	1.632	K(vertical)	Lim, foss, v/sndy, chlky, pp
				0.00011577	32.8173	213.853	K(horiz,max)	
				0.00004494	12.7384	82.924	K(horiz,min)	

## South Florida Water Management Distric Various Wells Hydraulic Conductivity

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Project Number	Depth Top feet	Depth Bottom feet	Hydraulic Conductivity (m/sec)	Hydraulic Conductivity (ft/day)	K(air) md	K(direction)	Description
MP3A	125.0	130.0	0.00001651	4.6795 150 6921	26.916 980.680	K(vertical) K(horiz.max)	Dol, foss, v/sndy, moldic
						• • •	
MP3A	15.0	20.0				• • •	Lim, foss, sndy, pp
	10.0			3.3881	19.488	K(horiz,max)	
			0.00001040	2.9491	16.963	K(horiz,min)	
S10CA	36.0	41.0	0.00002932	8.3109	47.804	K(vertical)	Lim, chlky, sl sndy, pp
			0.00001578	4.4718	25.722	K(horiz,max)	
			0.00001338	3.7930	21.817	K(horiz,min)	
S10CA	30.0	35.0	0.00005558	15.7556	90.626	K(vertical)	Lim, foss, v/sndy, pp
			0.00049830	141.2517	916.946	K(horiz,max)	
			0.00010086	28.5906	186.274	K(horiz,min)	
MOP2A	15.5	20.5	0.01104494	3130.8493	23469.098	K(vertical)	Lim, foss, sndy, sl pp, moldic
			0.00241849	685.5559	4660.090	K(horiz,max)	
			0.00034481	97.7416	636.004	K(horiz,min)	
	Number MP3A MP3A S10CA S10CA	NumberTop feetMP3A125.0MP3A15.0S10CA36.0S10CA30.0	NumberTop feetBottom feetMP3A125.0130.0MP3A15.020.0S10CA36.041.0S10CA30.035.0	Number         Top feet         Bottom feet         Conductivity (m/sec)           MP3A         125.0         130.0         0.00001651 0.00053161 0.00023336           MP3A         15.0         20.0         0.00002304 0.00001195 0.0000140           S10CA         36.0         41.0         0.00002932 0.00001578 0.00001578           S10CA         30.0         35.0         0.00005558 0.00049830 0.00010086           MOP2A         15.5         20.5         0.01104494 0.00241849	Number         Top feet         Bottom feet         Conductivity (m/sec)         Conductivity (ft/day)           MP3A         125.0         130.0         0.00001651         4.6795           0.00053161         150.6921         0.00023336         66.1489           MP3A         15.0         20.0         0.00002304         6.5314           0.0000195         3.3881         0.0000140         2.9491           S10CA         36.0         41.0         0.00002332         8.3109           0.00001578         4.4718         0.00001578         4.4718           0.00001338         3.7930         510CA         30.0         35.0         0.00005558         15.7556           0.00010086         28.5906         0.00010086         28.5906         0.00241849         685.5559	Number         Top feet         Bottom feet         Conductivity (m/sec)         Conductivity (ft/day)         K(air) md           MP3A         125.0         130.0         0.00001651         4.6795         26.916           0.00053161         150.6921         980.680         0.00023336         66.1489         430.096           MP3A         15.0         20.0         0.00002304         6.5314         37.569           0.00001195         3.3881         19.488         0.00001400         2.9491         16.963           S10CA         36.0         41.0         0.00002932         8.3109         47.804           0.00001578         4.4718         25.722         0.00001338         3.7930         21.817           S10CA         30.0         35.0         0.00005558         15.7556         90.626           0.0001086         28.5906         186.274         0.00010086         28.5906         186.274           MOP2A         15.5         20.5         0.01104494         3130.8493         23469.098           0.00241849         685.5559         4660.090         4660.090         14660.090	Number         Top feet         Bottom feet         Conductivity (m/sec)         Conductivity (ft/day)         K(air) md         K(direction)           MP3A         125.0         130.0         0.00001651         4.6795         26.916         K(vertical)           MP3A         125.0         130.0         0.00001651         4.6795         26.916         K(vertical)           MP3A         15.0         20.0         0.00023336         66.1489         430.096         K(horiz,max)           MP3A         15.0         20.0         0.00002304         6.5314         37.569         K(vertical)           0.00001195         3.3881         19.488         K(horiz,max)         0.00001040         2.9491         16.963         K(horiz,max)           0.00001040         2.9491         16.963         K(horiz,max)         0.00001578         4.4718         25.722         K(horiz,max)           0.00001338         3.7930         21.817         K(horiz,max)         0.00001338         3.7930         21.817         K(horiz,max)           0.0001038         141.2517         916.946         K(horiz,max)         0.00010086         28.5906         186.274         K(horiz,min)           MOP2A         15.5         20.5         0.01104494         3

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#### Sample Identification: K1

K1, 19.0 ft to 20.0 ft., MOP1A, Ground Surface Elevation 12.46 ft, Sample Elevation -6.54ft to -7.54 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
19	0.0022	0.59	0	4	0
19.25	0.0018	0.73	0	4	0
19.5	0.0006	1.03	0	3.7	0
19.75	0.001	0.91	0	3.7	0
20	0.0014	0.76	0	3.7	0

#### Sample Identification: K2

K2, 20.0 ft to 25.0 ft., MOP1A, Ground Surface Elevation 12.46 ft, Sample Elevation -7.54 ft to -12.54 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
22	0.0035	0	0	3.5	3.5
22.25	0.0032	0	0.43	4.1	4.1
22.5	0.0013	0	1.19	3.7	3.7
22.75	0.002	0	0.53	3	3
23	0.0036	0	0	3.6	3.6

#### Sample Identification: K3

K3, 25.0 ft to 30.0 ft., MOP1A, Ground Surface Elevation 12.46 ft, Sample Elevation -12.54 ft to -17.54 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
27	0.0037	0	0	3.7	3.7
27.25	0.0023	0.01	0	2.3	2.2
27.5	0.0014	0.07	0.45	2.4	1.1
27.75	0.0035	0	0	3.5	3.5
28	0.0033	0.3	0	4.1	• 0

#### Sample Identification: K4

K4, 10.0 ft to 15.0 ft., MOP2A, Ground Surface Elevation 15.90 ft, Sample Elevation 14.90 ft to 10.90 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
12	0.0028	0	0.44	3.7	3.7
12.25	0.0011	0.34	0.57	3.2	0.5
12.5	0	0.6	0.54	2.6	0
12.75	0.0003	0.53	0.65	3.2	0
13	0.0012	0.27	0.71	3.4	1.2

## South Florida Water Management District Various Wells Spectral Gamma Log Data

#### Sample Identification: K5

K5, 20.5 ft to 25.5 ft., MOP2A, Ground Surface Elevation 15.90 ft, Sample Elevation -4.60 ft to -9.60 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
22	0.0024	0.34	0.15	3.1	<b>`</b> 0´
22.25	0.0027	0	0.52	3.7	3.7
22.5	0.0013	0	1.35	4	4
22,75	0	0.64	1.03	4	0
23	0.0018	0.56	0	3.5	0

#### Sample Identification: K6

K6, 17.0 ft to 22.0 ft., MP1A, Ground Surface Elevation 16.10 ft, Sample Elevation -0.90 ft to -5.90 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
19	0.0033	0	0.37	4.1	4.1
19.25	0.003	0.01	0.35	3.7	3.6
19,5	0.0026	0.41	0.19	4.2	0
19,75	0.0046	0	0	4.6	4.6
20	0.0028	0	0.76	4.3	4.3

#### Sample Identification: K7

K7, 27.0 ft to 32.0 ft., MP1A, Ground Surface Elevation 16.10 ft, Sample Elevation -10.90 ft to -15.90 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
16	0.0032	0.12	0	3.5	1.8
16.25	0.0018	0.5	0.05	3.4	0
16.5	0	1.23	0	3.7	0
16.75	0	0.92	0.26	3.3	0
17	0.0006	0.6	0.4	3.2	0

#### Sample Identification: K8

K8, 20.0 ft to 25.0 ft., MP2A, Ground Surface Elevation 15.61 ft, Sample Elevation -4.39 ft to -9.39 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE
					(API)
22	0	1.07	0.23	3.7	0
22.25	0.0011	0.5	0.22	2.7	0
22.5	0.0004	0.89	0.22	3.5	0
22.75	0.0017	0	1.13	4	4
23	0.0009	0	1.31	3.5	3.5

#### Sample Identification: K9

K9, 5.0 ft to 10.0 ft., MP2A, Ground Surface Elevation 15.61 ft, Sample Elevation 10.61 ft. to 5.61 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
6	0	0	0.8	4.2	4.2
6.25	0.0039	0	0	3.9	3.9
6.5	0.0034	0	0	3.4	3.4
6,75	0.003	0	0.14	3.3	3.3
7	0.0019	0	0.71	3.3	3.3

#### Sample Identification: K10

K10, 31.0 ft to 35.0 ft., MP2A, Ground Surface Elevation 15.61 ft, Sample Elevation -15.39 ft to -19.39 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
32	0	1.43	0	4.3	0
32.25	0	1.48	0	4.4	0
32.5	0,0031	0	0.37	3.8	3.8
32.75	0.0009	0.64	0.36	3.6	0
33	0.0006	0.91	0.04	3.4	0

#### Sample Identification: K11

K11, 125.0 ft to 130.0 ft., MP3A, Ground Surface Elevation 17.20 ft, Sample Elevation -107.80 ft to -112.00 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
126	0.0034	0	0	3.4	3.4
126.25	0.0005	0.72	0.32	3.3	0
126.5	0	0.94	0	2.8	0
126.75	0.0005	0.89	0	3.1	0
127	0.0032	0	0	3.2	3.2

#### Sample Identification: K12

K12, 15.0 ft to 20.0 ft., MP3A, Ground Surface Elevation 17.20 ft, Sample Elevation 2.80 ft to -2.80 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
16	0.0013	0.93	0	4.1	Ò
16.25	0.0006	0.95	0	3.4	0
16.5	0	1.27	0	3.8	0
16.75	0.0015	0.83	0	4	0
17	0.0022	0	0.87	4	4

#### Sample Identification: K13

K13, 36.0 ft to 41.0 ft., S10CA, Ground Surface Elevation 22.21 ft, Sample Elevation -13.59 ft to -23.80 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
37	0	0.94	0	3	0
37.25	0.0014	0.58	0	3.1	. 0
37.5	0.0021	0	0.4	2.5	2.5
37.75	0.0011	0	0.93	3	3
38	0	0	1.18	2.4	2.4

#### Sample Identification: K14

K14, 30.0 ft to 35.0 ft., S10CA, Ground Surface Elevation 22.21 ft, Sample Elevation -7.79 ft to -12.79 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (API)	TOTAL URANIUM FREE (API)
32	0.0035	0	0	3.5	3.5
32.25	0,0032	Ō	0.17	3.6	3.6
32.5	0.0017	0	0.82	3.3	3.3
32.75	0.0002	0.36	0.66	2.6	0
33	0.0004	0.45	0.53	2.8	0

#### Sample Identification: K15

K15, 15.5 ft to 20.5 ft., MOP2A, Ground Surface Elevation 15.90 ft, Sample Elevation 0.40 ft to -4.60 ft.

DEPTH (ft)	POTASSIUM (%/100)	URANIUM (ppm)	THORIUM (ppm)	TOTAL (APi)	TOTAL URANIUM FREE (API)
16	0.0033	0.44	0	4.6	ົວ໌
16.25	0.0037	0.3	. 0	4.6	0
16.5	0	1.39	0.14	4.5	0
16.75	0	0.98	0.17	3,3	0
17	0.0008	0.21	0.98	3.4	0.1

# **CORE LABORATORIES**



#### LITHOLOGICAL ABBREVIATIONS

Anhy, anhyAnhydrite (-ic)Ark, arkarkos (-ic)bndband (-ed)brecbrecciaCalc, calccalcite (-ic)carbcarbonaceouscrs grcourse grainedChk, chkychalk (-y)Cdl, cdlconglomerate (-ic)crs xlncoursely crystallinednsdenseDol, doldolomite (-ic)Fracrandomly oriented fracturesfracslightly fracturedf grfine grainedfossfossil (-iferous)f xlnfinely crystallineGlauc, claucglauconite (-itc)GrtgraniteGyp, gypgypsum (-iferous)hor fracperdominantly horizontally finclinclusion (-ded)intbdinterbeddedlamlamina (-tions,-ated)	vug xhd	<pre>limestone medium grain matrix interval not analyzed nodules (-ar) oolite (-itic) pisolite (-itic) pin-point (porosity) pyrite (-itized, itic) sand (-y) solid hydrocarbon residue slightly siltstone, silty stylolite (-itic) sucrosic sulphur, sulphurous TOO BROKEN FOR ANALYSIS tripolitic very dominantly vertically fractured vuggy crossbedded medium crystalline crystal</pre>
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