JAMES R. DERBY

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Res: 918/742-0101

July 18, 1980

Mr. Alan B. Erwin
Keplinger & Associates, Inc.
320 South Boston
Tulsa, Oklahoma 74103

Dear Mr. Erwin:

At the request of Mr. John Williams of your company, I have examined the logs of eight wells in the Thayer Field of Neosho County, Kansas, in order to interpret an interval of apparent anomalously high porosity in the lower Cherokee.

The anomalous unit is interpreted to be a coal bed 1' to 3' thick, generally 1-1.5', except in the Stitt L-3 where it is probably a shaly coal, coaly shale or siltstone, or smut (weathered or reworked coal). The density is consistent with coal units in the Oklahoma-Kansas area. In coal evaluations work we normally consider the unit as clean coal when the density curve crosses the ρ_b=1.75 line. Experience with cored intervals shows this to be a fair approximation. The minimum densities recorded are well within the expected range for coals.

The two neutron logs provided valuable confirmation of my suspicion that this is a coal. The neutron in a coal will normally read slightly to the left (higher apparent porosity) than the wettest shale in the interval. Both read just left of "wet" shales.

Other parameters are expectable, except for the lack of SP in the #2 Dudley.

Other possible explanations for this interval, such as highly weathered chert gravel ("chat"), paleo-soil horizon or extremely porous sand and all require too many fortuitous combinations of gamma ray characters, density, and porosity to be probable. The lateral extent, 3/4 x 1/4 mile, and uniform thickness, as well as stratigraphic position are consistent with a coal.

Very truly yours,

James R. Derby

James R. Derby

Attachments

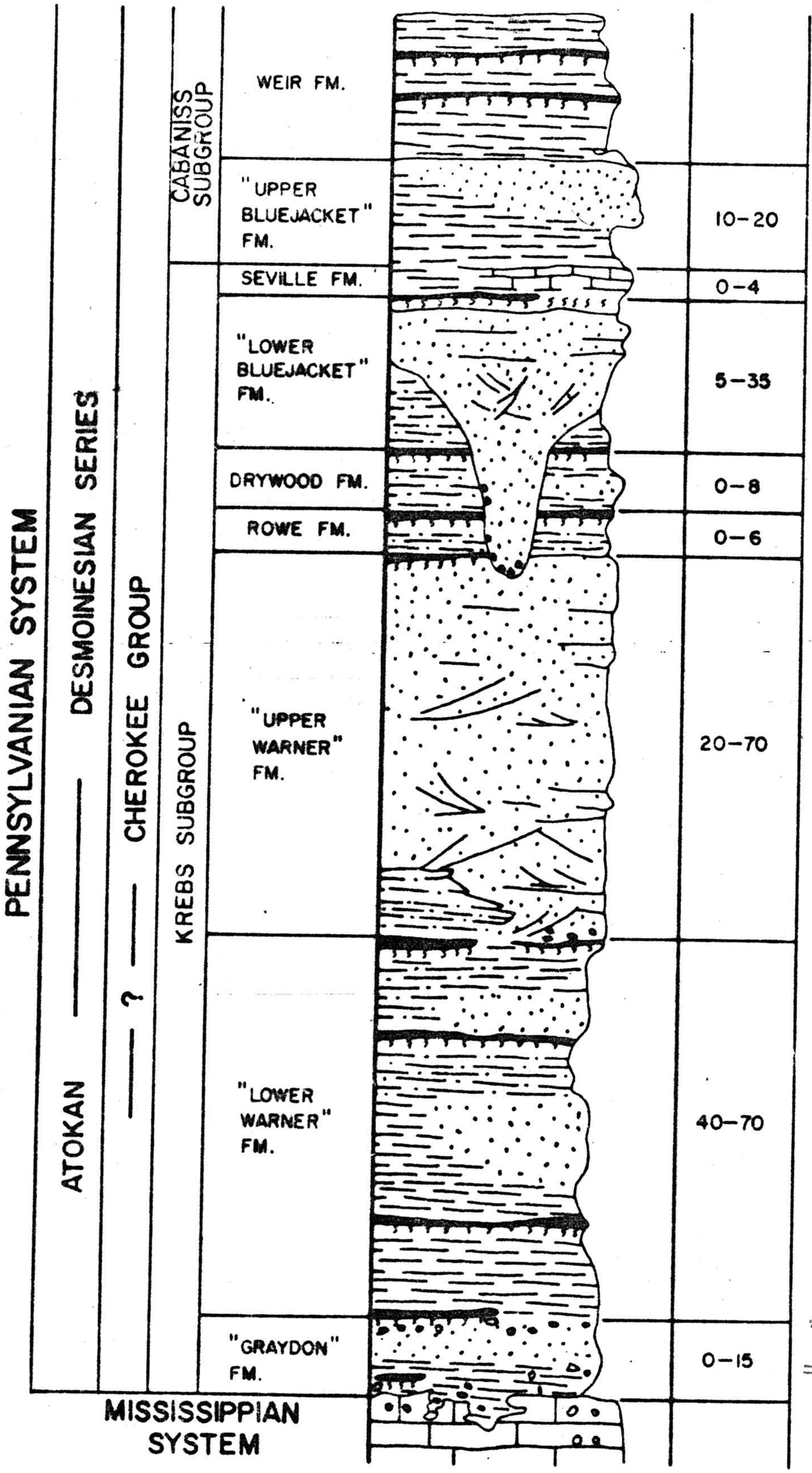
Substance	Chemical Composition	Resistivity ohm-m	Travel Time microsec./ft.		Density gm/cc		Log Density gm/cc.	Neutron App. Ls. Por. %	Gamma Ray API U.	Σma ( )*
			avg.	range	avg.	range				
COMMON ROCK										
Anhydrite	$CaSO_4$	10^4-10^{10}	50		2.96	2.9-3.	2.98	0	0-30	12 (18-21)
Dolomite	$CaMg \cdot 2CO_3$	10^8	43.5		2.86	2.8-3.0	2.87	1-3	5-20	4.7 (8-12)
Halite	NaCl	10^4-10^{14}	67		2.16		2.03	-2	0	760
Limestone	$CaCO_3$	10^7-10^{12}	47.5		2.71		2.71	0	0-5	7.5 (8-10)
Sandstone	SiO_2	10^{12}-10^{1}	55.5	47-56	2.65	2.65-2.7	2.65	-2	10-30	4.3 (8-12)
Shale	clays +	.3-100		70-150		2.2-2.8		25-75	80-140	20-50
OTHER SOLIDS										
Aluminum	Al	3 X 10^{-8}	49 61(1)		2.70		2.60			14
Aragonite	$CaSO_4$		53		2.94		2.95			8
Barite	$BaSO_4$		77		4.45	4.3-4.6	4.05			19
Basalt	Al+Fe+ ? + SiO_3	10^3-10^5	53	50-58		2.8-3.0			15-30	5
Bauxite	$Al_2O_3.2H_2O$	10^2-10^6			2.55					
Biotite	$H_2K(Mg,Fe)Al(SiO_4)_3$	10^{14}-10^{1}	60	60-80	2.9	2.6-3.0	2.85			25
Calcite	$CaCO_3$	10^7-10^{12}	47.5		2.71		2.71			7.5 (8-10)
Carnallite	$KMgCl_3 6H_2O$		78		1.61		1.57		200	370

dwh

From Hilchie 1978

Substance	Chemical Composition	Resistivity ohm-m	Travel Time microsec./ft.		Density gm/cc		Log Density gm/cc.	Neutron App. Ls. Por. %	Gamma Ray API U.	Σma
			avg.	range	avg.	range				
Cement			95	83-95	1.99	2.-2.5			10-30	13-17
Chalk	$CaCO_3$		47.5		2.71		2.71			7.5 (8-10)
Chert	SiO_2	10^6	55.5		2.65	2.6-2.7	2.65			(8-12)
Chlorite	$(Mg,Al,Fe)_{12}(Si,Al)_8$		62		2.74	2.6-3.2	2.77			18
Cinnabar	HgS	10^6-10^{10}			8.1	8.-8.2	6.99			
Coal (Anthr)	C	10^{-4}-10^{-2}	105	90-120		1.4-1.8	1.4-1.8	>50		1
Coal (Bitu)	C	10-10^6	120	110-140		1.3-1.5	1.3-1.5	>50		1.5
Copper	Cu	2 X 10^{-8}	60		8.9		8.5			320
Dawsonite	$NaAl(OH)_2CO_3$					2.35-2.42				
Diabase		10^3-10^4	44.5	44-46		2.8-3.2	2.78-3.15			17
Dunite			38	35-41	3.28		3.31			17
Feldspar (Ortho)	$KAlSi_3O_8$	10^8		53-82	2.57	2.5-2.6	2.54			16
Feldspar (plag.)	$xNaAlSi_2O_8$ $yCaAl_2Si_2O_8$	10^8		46-53	2.69	2.6-2.8	2.65			7
Gabbro		10^3-10^5	42.4	42-48	2.98	2.8-3.1	2.96			
Galena	PbS	10^{-2}-10^{-5}			7.5		6.38			

dwh



← Probable position of "mystery bed" = "Chatt"

From Jack W...

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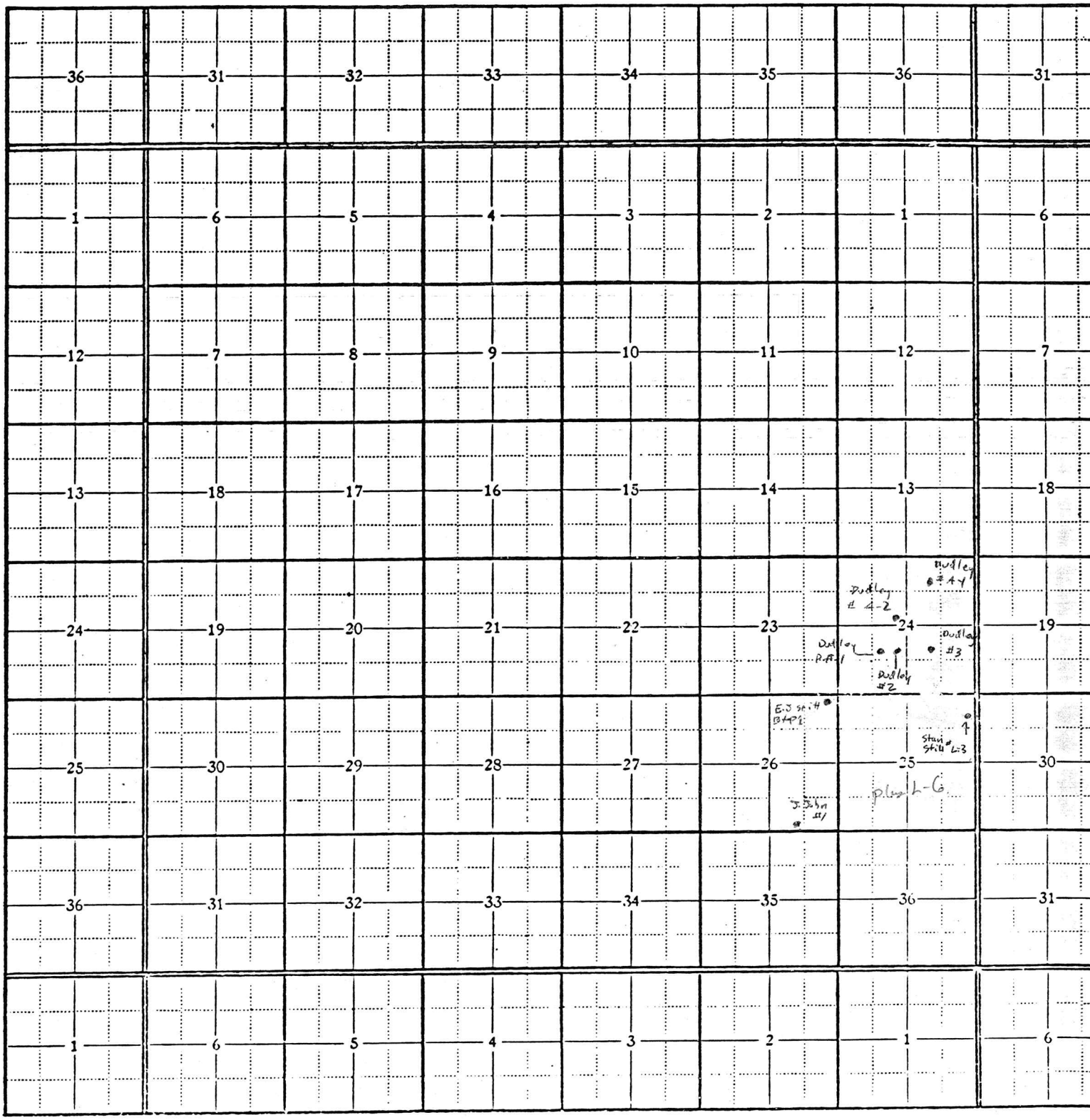
TOWNSHIP 29S, RANGE 17E, COUNTY Neosho, STATE KS



T29-17E (Sec 24,25,26)

Summary of Log Characters of "Mystery" high ϕ zone, lower Cherokee, Thayer Field

	Footage	h	ρ_b	ϕ_D SS	γ API	Neut vs Sh line	MICROLOG SEP	Ind ohms.	SP	Interpreted Rock Types.
Exito Dudley A-1	1072-1073	1'	1.69		74					Coal
Exito Dudley #A-2	1088-1091	3'	1.6		75	—		22	-22	Coal
Exito Dudley #3	1042-1043.5	1.5'	1.63		74			21	-32	Coal
Exito Dudley #2	1068.5-1070	1.5'	1.61		77	—	—	19	0	Coal
Post Dudley "P" #1	1084-1085	1'	1.71		92	—				Coal
Lampco StanStiff #L-3 ?	1084	0	2.06		98		0	22	+10	"Bony", ie shaly coal or "Smut"
Post E.J.Stiff B-P1	1095.5-1096.5	1'	1.67		98			24	-24	Coal
Lampco J.John #1	1074.5-1076	1.5'	1.62		80	+1.25 CD		24	-15	Coal
Lampco Stan Stiff L-6	1090-1091	1'	1.61		85	+.25 CD	+1 CO	25	-22	Coal