Characteristic logging tool responses for various lithologies and minerals

	Mineral/ lithology	Sonic/Acoustic								Density				Neutron					
		DT_c		DT_s		DT_c		DT_s		RHO_{grain}		Pe	U	$PhiN_{LS}$	$PhiN_{LS}$ when actual porosity = 0.15				
Matrix Values	sandstone	56.0	184.0	88.0	289	51.3 to 55.6	168 to 182	88.0	289	2.64	2640	1.8	4.8	$Phi_{actual} > PhiN_{LS}$	0.107	0.107	0.098	0.1	0.11
	limestone	49.0	161.0	88.4	290	43.5 to 47.6	143 to 156	88.4	290	2.71	2710	5.1	13.8	$Phi_{actual} = PhiN_{LS}$	0.15	0.15	0.15	0.15	0.15
	dolomite	44.0	144.0	72.0	236	38.5 to 43.5	126 to 143	72.0	236	2.85	2850	3.1	9.0	$Phi_{actual} < PhiN_{LS}$	0.232	0.174	0.17	0.165	0.21
	shale									(variable)		~3		$Phi_{actual} < PhiN_{LS}$	Schlumberger CNL; NPHI	Schlumberger CNL; TNPH	Halliburton DSN II	Weatherford CNS	Baker Atlas 2420 CN Log
	gas shale									< 2.53	< 2530			>0.35: swelling clays					
	salt	67.0	220.0	120.0	394	67.0	220.0	120.0	394	2.04	2040	4.7	9.5	-0.03					
	coal (average)	>105	>328			>105	>328			~1.3	~1300	~0.18	~0.22	>0.40					
	anhydrite	50.0	164.0			50.0	164.0			2.98	2980	5.1	15.0	-0.02					
	glauconite									2.86	2860	4.8	14.0	~0.38					
	kaolinite	212.0	698.0	328.0	1078	212.0	698.0	328.0	1078	2.41	2410	1.8	4.4	~0.37					
	chlorite									2.76	2760	6.3	17.0	-0.52					
	illite									2.52	2520	3.5	0.9	~0.30					
	montmorillonite									2.12	2120	2.0	4.0	~0.60					
	kerogen	80-160	260-525			80-160	260-525			1.0-1.4	1000-1400		0.18-0.28	0.50 - 0.65					
	hematite	42.9	141	79.3	261	42.9	141	79.3	261	5.18	5180	21.0	111.0	0.11					
	barite	69.7	229	132.7	436	69.7	229	132.7	436	4.09	4090	267.0	1090.0	-0.02					
	steel	57	187			57	187												
Fluid values	water: fresh to salt saturated					208 to 179 (189)	682 to 587 (620)			1.0 to 1.2	1000 to 1200		0.398 to 1.36	~1	**Lithology corrections vary with company and tool type, so it is important to use the chart or algorithm that applies to the specific tool type. One result is not "better" than another; there are just differences in tool response because of tool design.**				
	oil					230	755												
	gas					920	3018												
	Units	*usec/ft*	*usec/m*	*usec/ft*	*usec/m*	*usec/ft*	*usec/m*	*usec/ft*	*usec/m*	*g/cm3*	*Kg/m3*	*b/e*	*b/cm3*	*v/v decimal*					
		Gardner-Hunt-Raymer (GHR) "Empirical" or "Field Observation"				**Wyllie Time-Average**				**Density tool measurements**			***From RHOB and PE***	**Values vary with company and tool version**					

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Data Sources	BakerAtlas, 2003, Atlas Log Interpretation Charts; Baker Hughes website accessed 02 February 2010.
	Halliburton, (no date listed), Log Interpretation Charts, EL 1001, pp. APP-4a&4b, Halliburton, Houston, Texas.
	Schlumberger, 2009, Log Interpretation Charts, 2009 Edition, 09-FE-0058, Appendix B; Schlumberger, Sugar Land, Texas.
	Weatherford, 2007, Log Interpretation Charts Compact Tool Series, Document 4060.01, Chart Lith-3C, Weatherford, Houston, Texas.
	Rick Lewis, 2010, Notes from AAPG Basic Well Log Analysis course, July. *07.2010 Dak*