1. Deriving density porosity form the density log track figure 1.0 and the corresponding chart (figure 2.0)

Procedure:

1. Find the bulk density (***RHOB***) taken from the density log in Figure 1.0.
2. Locate the picked value on the horizontal axis (***X-Axis***).
   - ❖ Note that the scale is displayed from the high values on the left to low values on the right.
3. Follow the ***RHOB*** value vertically until it intersects the proper matrix line (calcite/limestone or dolomite) then move horizontally to intersect the ***Y-Axis*** representing the proper fluid density.

Fill The Following Table Using Log Track (Figure 1.0) And Chart (Figure 2.0)

#	*Depth (ft)*	*Raw Data*	*DPHI*	
		RHOB	*Lime*	*Dolo*
1	11,508	2.73		
2	11,522			
3	11,545			
4	11,560			
5	11,593			
6	11,615			
7	11,631			
8	11,645			
9	11,655	2.64		
10	11,665			
11	11,696			

2. **Deriving Density Porosity form the density Log Track Figure 1.0 and the using the below equation:**

$$\emptyset_{den} = \frac{\rho_{ma} - \rho_b}{\rho_{ma} - \rho_f}$$

- Where:
  - $\emptyset_{den}$ is the density derived porosity
  - ρ_{ma} is the matrix density (see table 1.0 for values)
  - ρ_b is the formation bulk density (the log reading)
  - ρ_f is the fluid density (see table 1.0 for values)

Table 1.0: Matrix Densities and Photoelectric effect (P_e) values for common lithologies.

Lithology/ Fluid	ρ_{ma} or ρ_{fl} g/cm^3 [Kg/m^3]	P_e (b/e)
Sandstone	2.644 [2644]	1.81
Limestone	2.710 [2710]	5.08
Dolomite	2.877 [2877]	3.14
Anhydrite	2.960 [2960]	5.05
Salt	2.040 [2040]	4.65
Fresh water	1.0 [1000]	
Salt water	1.15 [1150]	
Barite (mud additive)		267

Fill the Following Table Using Log Track (Figure 1.0) and Above Equation

#	*Depth (ft)*	*Raw Data*	*DPHI*	
		RHOB	*Lime*	*Dolo*
1	11,508	2.73	-0.012	0.078
2	11,522	2.75	-0.023	0.068
3	11,545	2.67	0.023	0.110
4	11,560	2.96	-0.146	-0.044
5	11,593	2.7	0.06	0.094
6	11,615	2.97	-0.152	-0.056
7	11,631	2.5	0.123	0.201
8	11,645	2.82	-0.064	0.03
9	11,655	2.64	0.041	0.126
10	11,665	2.68	0.018	0.105
11	11,696	2.76	-0.029	0.062

1. **Fill The Following Table Using Log Track (Figure 1.0) And Chart (Figure 2.0)**

#	Depth (ft)	Raw Data RHOB	DPHI Lime	DPHI Dolo
1	11,508	2.73	−1 %	−8 %
2	11,522	2.75	−2 %	6 %
3	11,545	2.67	2 %	11 %
4	11,560	2.96	—	—
5	11,593	2.7	0.5 %	9.5 %
6	11,615	2.97	—	—
7	11,631	2.5	12 %	20 %
8	11,645	2.82	6 %	3 %
9	11,655	2.64	4 %	12 %
10	11,665	2.68	1.6 %	10 %
11	11,696	2.76	−3 %	6 %

2. ***Fill the Following Table Using Log Track (Figure 1.0) and Above Equation***

#	Depth (ft)	Raw Data RHOB	DPHI Lime	DPHI Dolo
1	11,508	2.73	−0.012	0.078
2	11,522	2.75	−0.023	0.068
3	11,545	2.67	0.023	0.110
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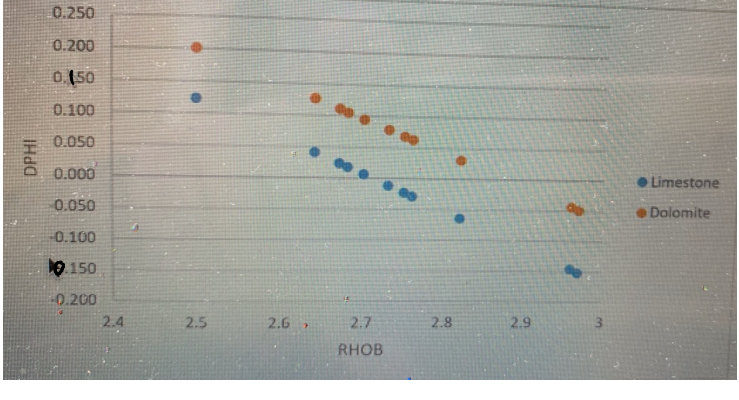
9	11,655	2.64	0.041	0.126
10	11,665	2.68	0.018	0.105
11	11,696	2.76	−0.029	0.062

3. Relationship between Dolomite & Limstone



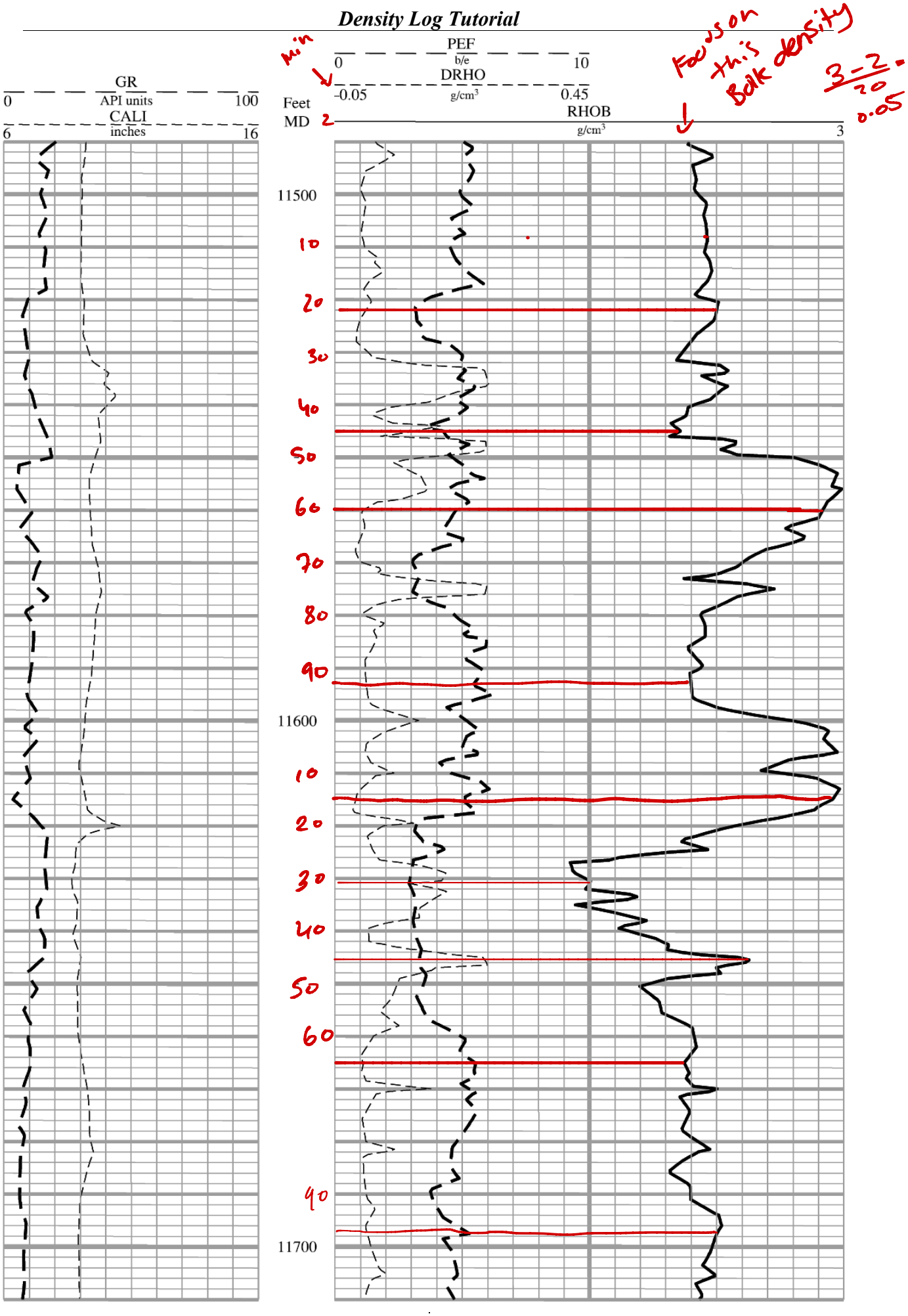


Figure 1: Example of Density log with GR and Caliper Log

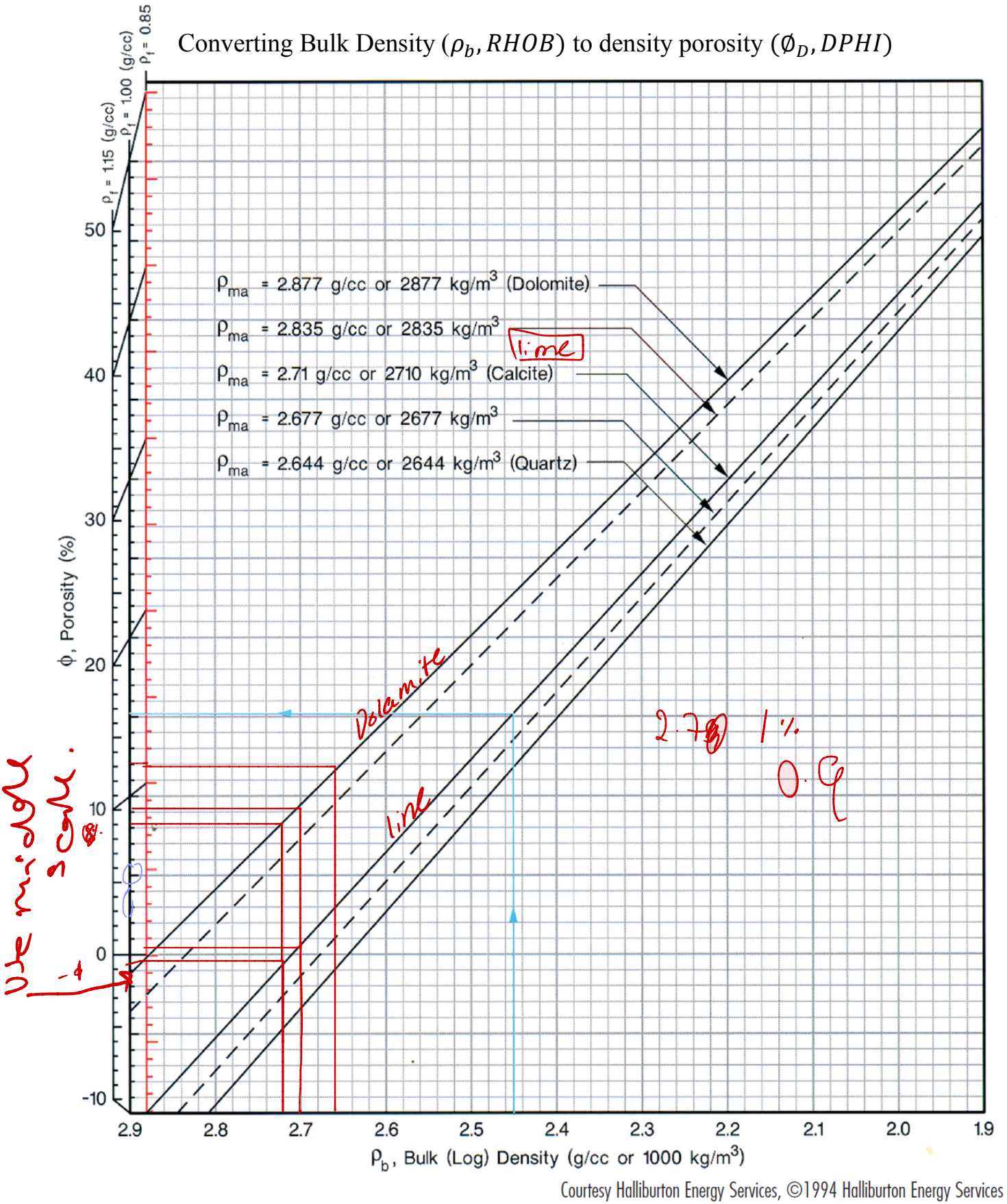


Figure 2: Chart for converting Bulk Density ($\boldsymbol{\rho_b, RHOB}$) to density porosity ($\boldsymbol{\emptyset_D, DPHI}$)