PTS File No: 41187
Client: Shaw E & I

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TABLE 1

SOIL MOISTURE RETENTION CURVE FITTING FOR QUANTIFYING THE HYDRAULIC FUNCTIONS OF UNSATURATED SOILS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10678-GEO1 at 488.7 ft.

van Genuchten Parameters	
alpha (1/cm)	1.014E-01
n	2.050
residual water	0.167
total water	1.010
m	0.512
Water Perm (mD)	8029
NAPL Perm (mD)	2431
R^2	0.99490

Notes: alpha, n, and residual saturation are capillary parameters defined by the following equation (van Genuchten, 1980), with m = 1-1/n, S = water saturation, and h = capillary head (cm):

$$S_r + [(S_s - S_r)/(1+(\alpha h)^n)^m]$$

Laboratory Measured Data

Capillary Head (cm)	**10678-GEO1 at 488.7 ft.** Volumetric Moisture	Predicted Moisture by Curve Fit	RPD (%)
0.00	1.000	1.010	0.50%
1.09	1.000	1.005	0.27%
2.5	0.980	0.986	0.33%
4.4	0.959	0.939	1.07%
6.8	0.909	0.860	2.78%
9.8	0.736	0.760	1.58%
13.3	0.635	0.659	1.88%
17.4	0.554	0.571	1.49%
27.2	0.408	0.440	3.83%
46.0	0.341	0.331	1.49%
69.7	0.290	0.274	2.82%
109	0.250	0.235	3.11%
436	0.185	0.183	0.49%

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10678-GEO1 at 488.7 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective NAPL Perm.
0.001	1.010	8.03E+03	5.75E-10
0.020	1.010	8.00E+03	6.69E-06
0.040	1.010	7.98E+03	5.83E-05
0.050	1.010	7.97E+03	1.17E-04
0.080	1.010	7.93E+03	5.09E-04
0.090	1.010	7.91E+03	7.35E-04
1.00	1.006	6.63E+03	1.35E+00
1.20	1.004	6.36E+03	2.37E+00
1.30	1.003	6.22E+03	3.03E+00
1.50	1.001	5.95E+03	4.70E+00
2.00	0.994	5.30E+03	1.13E+01
3.00	0.975	4.13E+03	3.76E+01
5.00	0.919	2.40E+03	1.53E+02
7.00	0.853	1.35E+03	3.38E+02
9.00	0.786	7.63E+02	5.58E+02
11.0	0.723	4.40E+02	7.77E+02
15.0	0.620	1.61E+02	1.15E+03
20.0	0.527	5.50E+01	1.48E+03
25.0	0.463	2.23E+01	1.70E+03
30.0	0.417	1.03E+01	1.85E+03
35.0	0.382	5.29E+00	1.95E+03
40.0	0.356	2.94E+00	2.02E+03
45.0	0.335	1.74E+00	2.08E+03
50.0	0.318	1.09E+00	2.13E+03
60.0	0.292	4.76E-01	2.19E+03
70.0	0.274	2.36E-01	2.23E+03
75.0	0.267	1.72E-01	2.25E+03
80.0	0.260	1.28E-01	2.26E+03
85.0	0.255	9.72E-02	2.27E+03
90.0	0.250	7.48E-02	2.28E+03
95.0	0.245	5.83E-02	2.29E+03
100	0.241	4.61E-02	2.30E+03
120	0.228	1.99E-02	2.33E+03
140	0.219	9.80E-03	2.34E+03
160	0.212	5.29E-03	2.36E+03
180	0.207	3.07E-03	2.37E+03
200	0.203	1.89E-03	2.37E+03
220	0.200	1.22E-03	2.38E+03
240	0.197	8.14E-04	2.38E+03
260	0.195	5.62E-04	2.39E+03
280	0.192	3.99E-04	2.39E+03

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10678-GEO1 at 488.7 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective NAPL Perm.
300	0.191	2.90E-04	2.39E+03
320	0.189	2.15E-04	2.40E+03
340	0.188	1.63E-04	2.40E+03
360	0.187	1.25E-04	2.40E+03
380	0.186	9.74E-05	2.40E+03
400	0.185	7.68E-05	2.40E+03
420	0.184	6.13E-05	2.41E+03
440	0.183	4.94E-05	2.41E+03
460	0.182	4.02E-05	2.41E+03
480	0.182	3.31E-05	2.41E+03
500	0.181	2.74E-05	2.41E+03
550	0.180	1.76E-05	2.41E+03
600	0.179	1.18E-05	2.41E+03
650	0.178	8.14E-06	2.42E+03
700	0.177	5.78E-06	2.42E+03
750	0.176	4.20E-06	2.42E+03
800	0.176	3.11E-06	2.42E+03
850	0.175	2.35E-06	2.42E+03
900	0.175	1.81E-06	2.42E+03
950	0.174	1.41E-06	2.42E+03
1000	0.174	1.11E-06	2.42E+03
1050	0.174	8.86E-07	2.42E+03
1100	0.173	7.14E-07	2.42E+03
1150	0.173	5.81E-07	2.42E+03
1200	0.173	4.78E-07	2.42E+03
1250	0.173	3.95E-07	2.42E+03
1300	0.172	3.30E-07	2.42E+03
1350	0.172	2.77E-07	2.42E+03
1400	0.172	2.34E-07	2.42E+03
1450	0.172	1.99E-07	2.42E+03
1500	0.172	1.70E-07	2.42E+03
1550	0.172	1.46E-07	2.42E+03
1600	0.171	1.26E-07	2.43E+03
1650	0.171	1.09E-07	2.43E+03
1700	0.171	9.54E-08	2.43E+03
1750	0.171	8.34E-08	2.43E+03
1800	0.171	7.32E-08	2.43E+03
1850	0.171	6.45E-08	2.43E+03
1900	0.171	5.70E-08	2.43E+03
1950	0.171	5.06E-08	2.43E+03
2000	0.171	4.50E-08	2.43E+03

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10678-GEO1 at 488.7 ft.

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

Capillary Head (cm)	(van Genuchten, 1980) Volumetric Moisture	(Mualem, 1976) Effective Water Perm.	(Mualem, 1976) Effective NAPL Perm.
2200	0.170	2.89E-08	2.43E+03
2400	0.170	1.94E-08	2.43E+03
2600	0.170	1.34E-08	2.43E+03
2800	0.170	9.49E-09	2.43E+03
3000	0.169	6.90E-09	2.43E+03
3200	0.169	5.12E-09	2.43E+03
3400	0.169	3.87E-09	2.43E+03
3600	0.169	2.97E-09	2.43E+03
3800	0.169	2.31E-09	2.43E+03
4000	0.169	1.82E-09	2.43E+03
4200	0.169	1.45E-09	2.43E+03
4400	0.169	1.17E-09	2.43E+03
4600	0.169	9.55E-10	2.43E+03
4800	0.169	7.84E-10	2.43E+03
5000	0.169	6.49E-10	2.43E+03
5200	0.169	5.42E-10	2.43E+03
5400	0.169	4.55E-10	2.43E+03
5600	0.168	3.85E-10	2.43E+03
5800	0.168	3.27E-10	2.43E+03
6000	0.168	2.79E-10	2.43E+03
6500	0.168	1.93E-10	2.43E+03
7000	0.168	1.37E-10	2.43E+03
7500	0.168	9.96E-11	2.43E+03
8000	0.168	7.39E-11	2.43E+03
8500	0.168	5.58E-11	2.43E+03
9000	0.168	4.28E-11	2.43E+03
9500	0.168	3.34E-11	2.43E+03
10000	0.168	2.63E-11	2.43E+03

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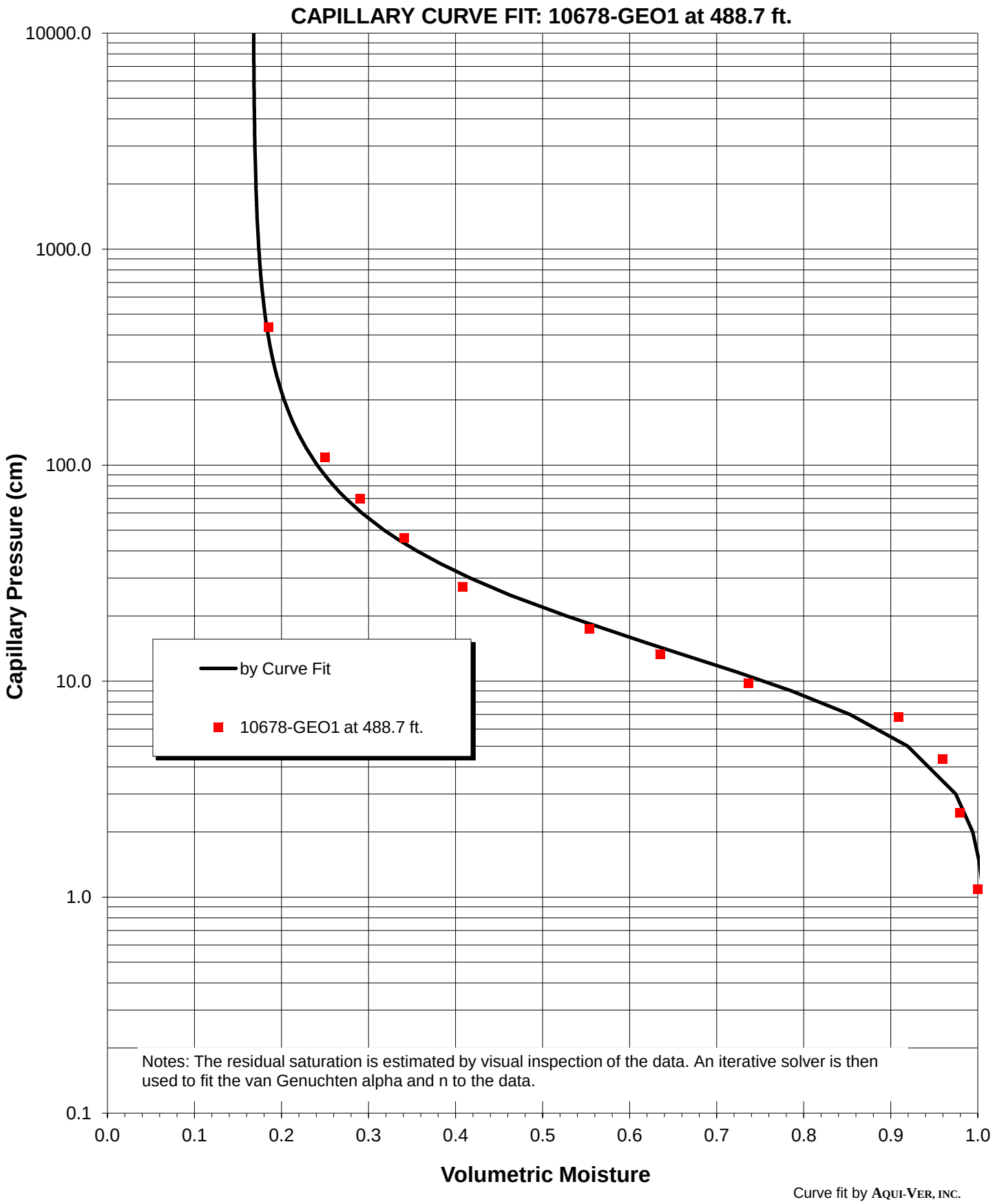

Curve fit by AQUI-VER, INC.

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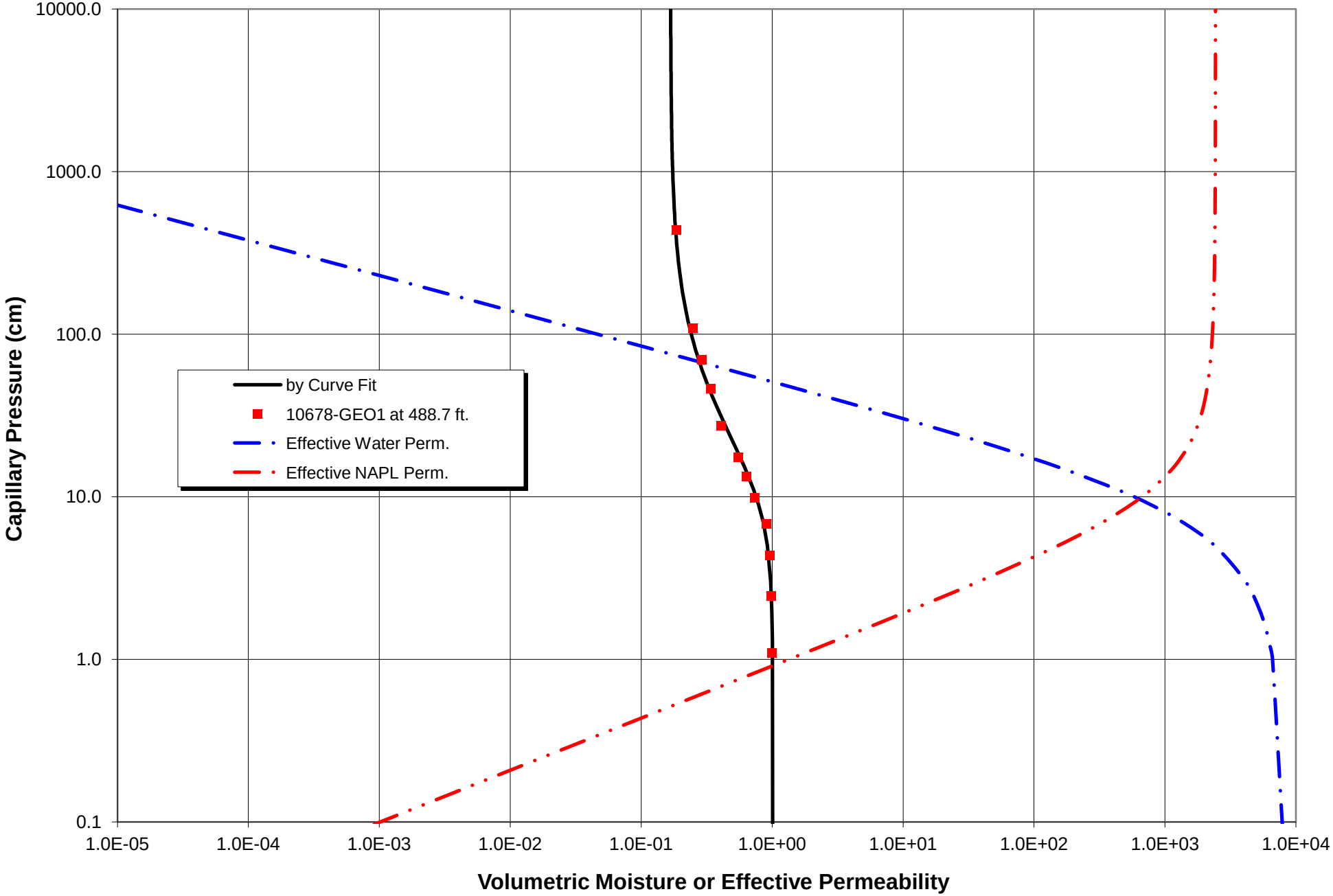
CAPILLARY CURVE FIT: 10678-GEO1 at 488.7 ft.



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