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: 10681-GEO2 at 451.5 ft.

van Genuchten Parameters	
alpha (1/cm)	7.000E-02
n	1.350
residual water	0.587
total water	1.005
m	0.259
Water Perm (mD)	5.54
NAPL Perm (mD)	262
R^2	0.98137

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)	**10681-GEO2 at 451.5 ft.** Volumetric Moisture	Predicted Moisture by Curve Fit	RPD (%)
0.00	1.000	1.005	0.25%
1.11	1.000	1.002	0.08%
2.50	0.996	0.995	0.04%
4.44	0.988	0.985	0.16%
6.93	0.977	0.972	0.25%
10.0	0.957	0.956	0.06%
13.6	0.942	0.939	0.13%
17.7	0.922	0.922	0.00%
27.7	0.884	0.890	0.38%
46.9	0.853	0.850	0.14%
71.0	0.837	0.819	1.09%
111	0.814	0.788	1.61%
444	0.682	0.712	2.20%

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10681-GEO2 at 451.5 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	1.005	5.16E+00	2.58E-04
0.020	1.005	4.48E+00	1.59E-02
0.040	1.005	4.21E+00	4.12E-02
0.050	1.005	4.11E+00	5.60E-02
0.080	1.005	3.88E+00	1.07E-01
0.090	1.005	3.82E+00	1.26E-01
1.00	1.002	2.04E+00	3.37E+00
1.20	1.001	1.88E+00	4.30E+00
1.30	1.001	1.80E+00	4.79E+00
1.50	1.000	1.67E+00	5.79E+00
2.00	0.998	1.41E+00	8.44E+00
3.00	0.993	1.05E+00	1.42E+01
5.00	0.982	6.43E-01	2.63E+01
7.00	0.971	4.27E-01	3.81E+01
9.00	0.961	2.99E-01	4.93E+01
11.0	0.951	2.17E-01	5.94E+01
15.0	0.933	1.25E-01	7.71E+01
20.0	0.914	7.02E-02	9.47E+01
25.0	0.898	4.31E-02	1.09E+02
30.0	0.884	2.84E-02	1.20E+02
35.0	0.873	1.96E-02	1.29E+02
40.0	0.862	1.41E-02	1.36E+02
45.0	0.853	1.05E-02	1.43E+02
50.0	0.845	8.01E-03	1.48E+02
60.0	0.831	4.98E-03	1.58E+02
70.0	0.820	3.31E-03	1.65E+02
75.0	0.815	2.75E-03	1.68E+02
80.0	0.810	2.31E-03	1.70E+02
85.0	0.806	1.96E-03	1.73E+02
90.0	0.802	1.68E-03	1.75E+02
95.0	0.798	1.45E-03	1.77E+02
100	0.795	1.26E-03	1.79E+02
120	0.783	7.59E-04	1.86E+02
140	0.773	4.94E-04	1.91E+02
160	0.765	3.40E-04	1.95E+02
180	0.758	2.44E-04	1.98E+02
200	0.752	1.82E-04	2.01E+02
220	0.747	1.39E-04	2.03E+02
240	0.742	1.08E-04	2.06E+02
260	0.738	8.64E-05	2.07E+02
280	0.734	7.00E-05	2.09E+02

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10681-GEO2 at 451.5 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	0.731	5.75E-05	2.11E+02
320	0.727	4.79E-05	2.12E+02
340	0.725	4.03E-05	2.13E+02
360	0.722	3.42E-05	2.14E+02
380	0.719	2.93E-05	2.15E+02
400	0.717	2.53E-05	2.16E+02
420	0.715	2.20E-05	2.17E+02
440	0.713	1.93E-05	2.18E+02
460	0.711	1.70E-05	2.19E+02
480	0.709	1.50E-05	2.20E+02
500	0.707	1.34E-05	2.20E+02
550	0.703	1.02E-05	2.22E+02
600	0.700	7.95E-06	2.23E+02
650	0.697	6.32E-06	2.24E+02
700	0.694	5.11E-06	2.25E+02
750	0.692	4.19E-06	2.26E+02
800	0.689	3.49E-06	2.27E+02
850	0.687	2.93E-06	2.28E+02
900	0.685	2.49E-06	2.29E+02
950	0.683	2.13E-06	2.30E+02
1000	0.682	1.84E-06	2.30E+02
1050	0.680	1.60E-06	2.31E+02
1100	0.679	1.40E-06	2.31E+02
1150	0.677	1.23E-06	2.32E+02
1200	0.676	1.09E-06	2.32E+02
1250	0.675	9.69E-07	2.33E+02
1300	0.673	8.66E-07	2.33E+02
1350	0.672	7.77E-07	2.34E+02
1400	0.671	7.00E-07	2.34E+02
1450	0.670	6.33E-07	2.34E+02
1500	0.669	5.74E-07	2.35E+02
1550	0.668	5.22E-07	2.35E+02
1600	0.667	4.77E-07	2.35E+02
1650	0.666	4.37E-07	2.36E+02
1700	0.666	4.01E-07	2.36E+02
1750	0.665	3.69E-07	2.36E+02
1800	0.664	3.40E-07	2.37E+02
1850	0.663	3.14E-07	2.37E+02
1900	0.663	2.91E-07	2.37E+02
1950	0.662	2.70E-07	2.37E+02
2000	0.661	2.51E-07	2.38E+02

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TABLE 2

FUNCTIONAL RELATIONSHIPS BASED ON DERIVED CAPILLARY PARAMETERS

PROJECT NAME: Kirtland AFB BFF
PROJECT NO: 140705
SAMPLE ID: 10681-GEO2 at 451.5 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	0.659	1.91E-07	2.38E+02
2400	0.657	1.49E-07	2.39E+02
2600	0.655	1.18E-07	2.40E+02
2800	0.653	9.56E-08	2.40E+02
3000	0.652	7.84E-08	2.41E+02
3200	0.650	6.51E-08	2.41E+02
3400	0.649	5.47E-08	2.42E+02
3600	0.648	4.64E-08	2.42E+02
3800	0.646	3.97E-08	2.43E+02
4000	0.645	3.43E-08	2.43E+02
4200	0.644	2.98E-08	2.43E+02
4400	0.643	2.61E-08	2.44E+02
4600	0.643	2.29E-08	2.44E+02
4800	0.642	2.03E-08	2.44E+02
5000	0.641	1.81E-08	2.45E+02
5200	0.640	1.61E-08	2.45E+02
5400	0.640	1.45E-08	2.45E+02
5600	0.639	1.30E-08	2.45E+02
5800	0.638	1.18E-08	2.45E+02
6000	0.638	1.07E-08	2.46E+02
6500	0.636	8.49E-09	2.46E+02
7000	0.635	6.86E-09	2.47E+02
7500	0.634	5.63E-09	2.47E+02
8000	0.633	4.68E-09	2.47E+02
8500	0.632	3.93E-09	2.48E+02
9000	0.631	3.33E-09	2.48E+02
9500	0.630	2.85E-09	2.48E+02
10000	0.629	2.46E-09	2.48E+02

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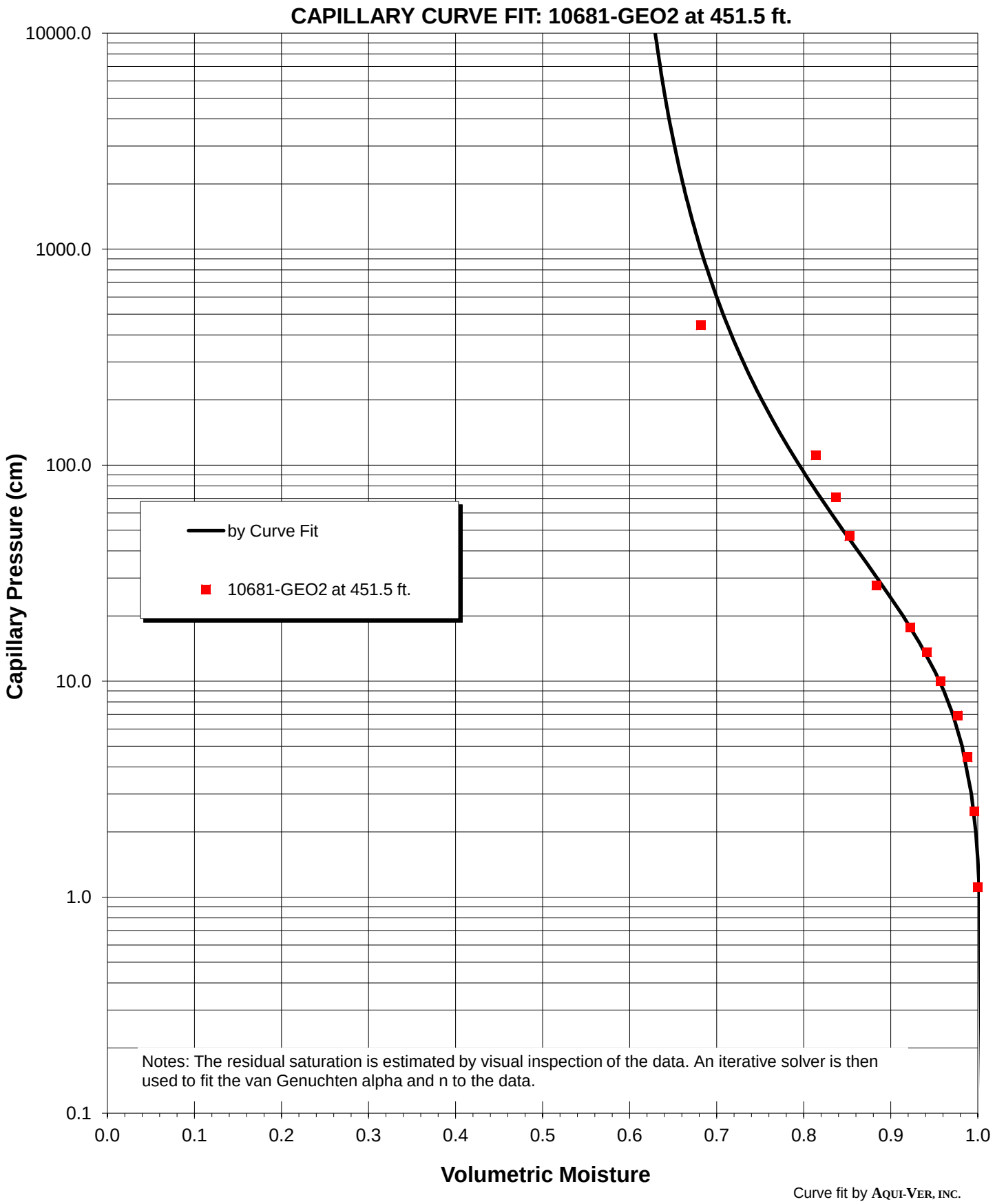

Curve fit by AQUI-VER, INC.

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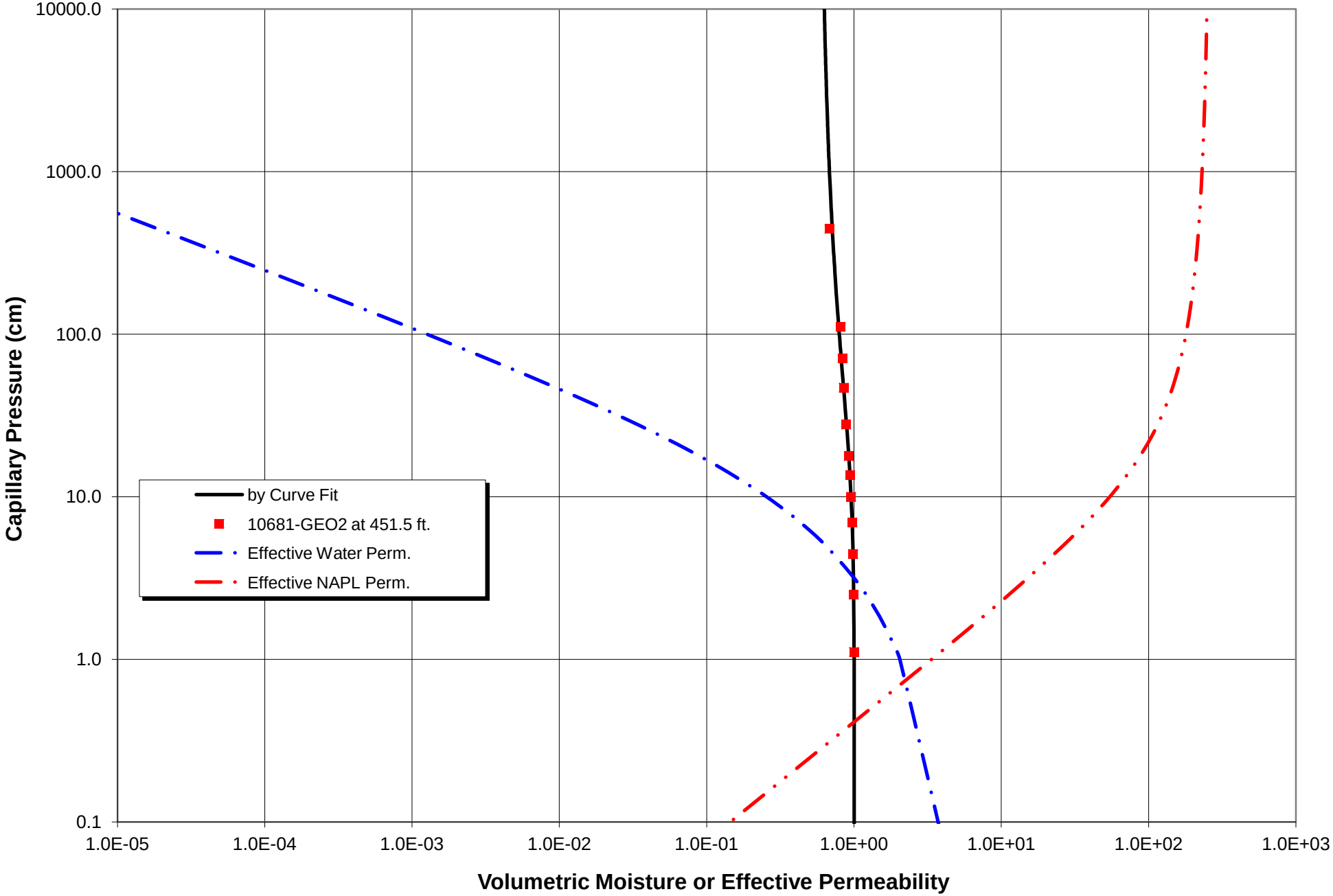
CAPILLARY CURVE FIT: 10681-GEO2 at 451.5 ft.



Curve fit by AQUI-VER, INC.