Seal quality evaluations of selected formations of Umiat wells,

Umiat No. 2, 312'-322' of cuttings,
Umiat No. 7, 1,057'-1,060' of cuttings,
Umiat No. 8, 1,240'-1,243' of cuttings, and
Umiat No. 11, 1,670'-1,680' of cuttings,

Brooks Range foothills, Alaska.

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Total of 28 pages in report

Alaska Geologic Materials Center Data Report No. 301

Seal Quality Evaluation of Selected Formations, Foothills, Alaska

TABLE 2

Summary of Pore System and Capillary Properties From Mercury Injection

Sample	Mercury Injection Phi (%)	Mercury Injection K (md)	Median Pore Aperture	Entry Pressure (psia)	Sneider Seal Type	Rock Description
Umiat #2 312 - 322 ft.	6.29	0.0002	0.0009	3710	A	Shale, slightly silty
Umiat #7 1,057 - 060 ft.	3.40	-	0.0193	806	B	Sandstone, F, argillaceous, burrowed
Umiat #8 1,240 - 243 ft.	6.21	0.0003	0.0123	3100	A	Argillaceous siltstone and shale, laminated
Umiat #11 1,670 - 680 ft.	5.38	0.0002	0.0123	2830	A	Argillaceous siltstone, burrowed

FIGURE 1

Mercury Injection Capillary Pressure (Pore Volume)

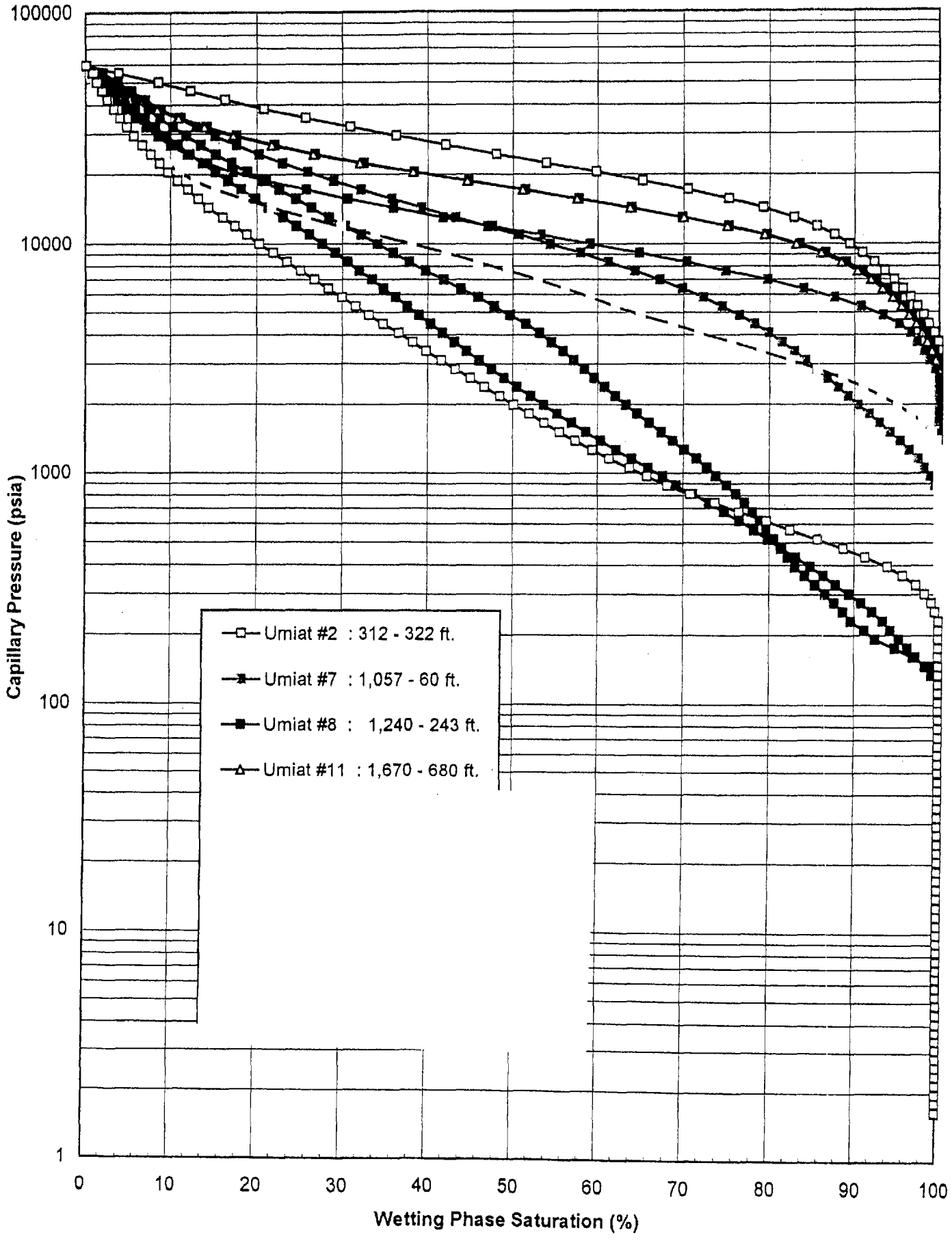
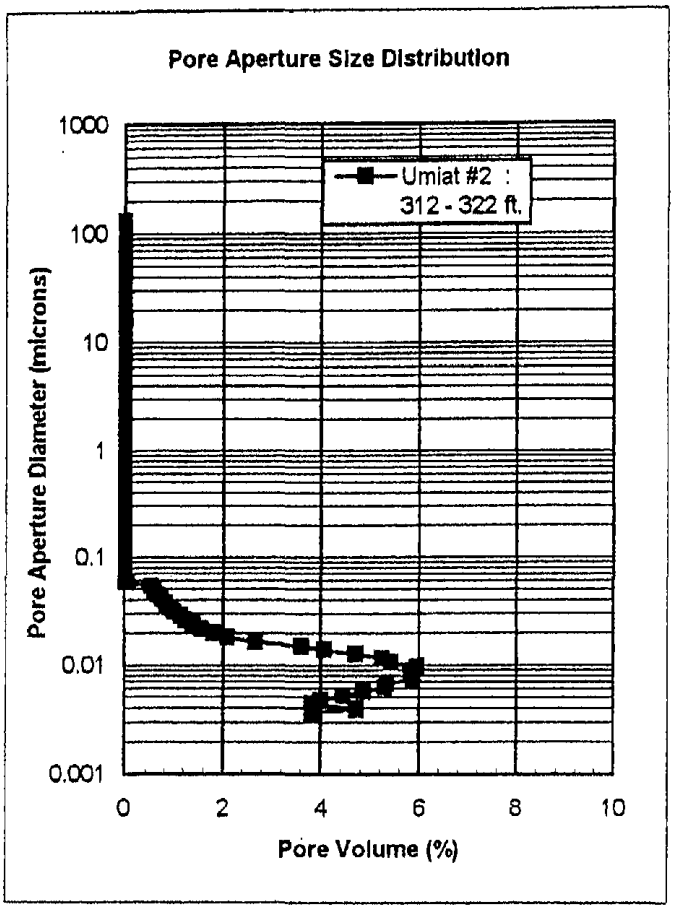
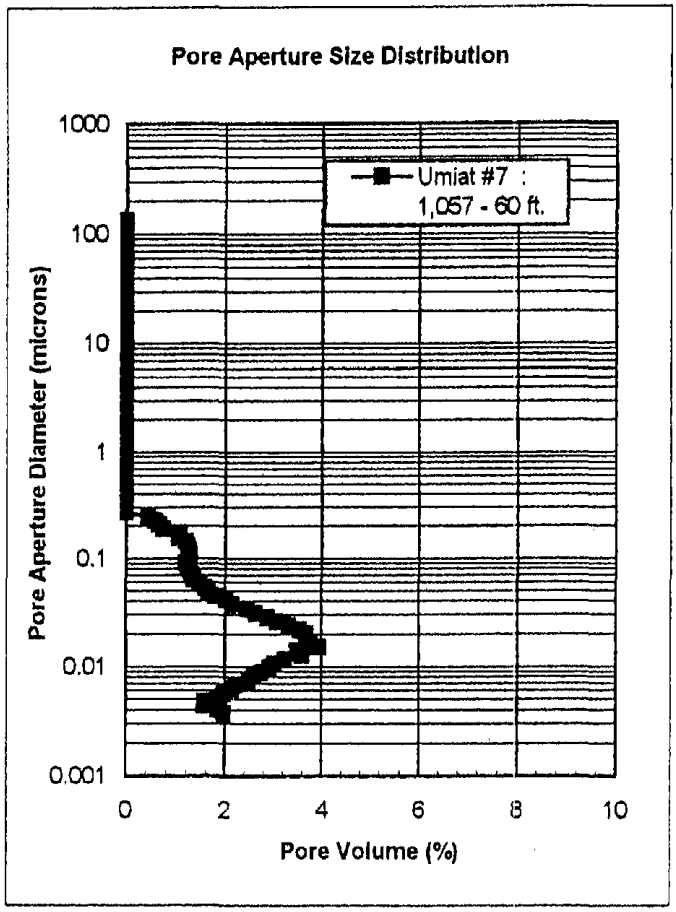
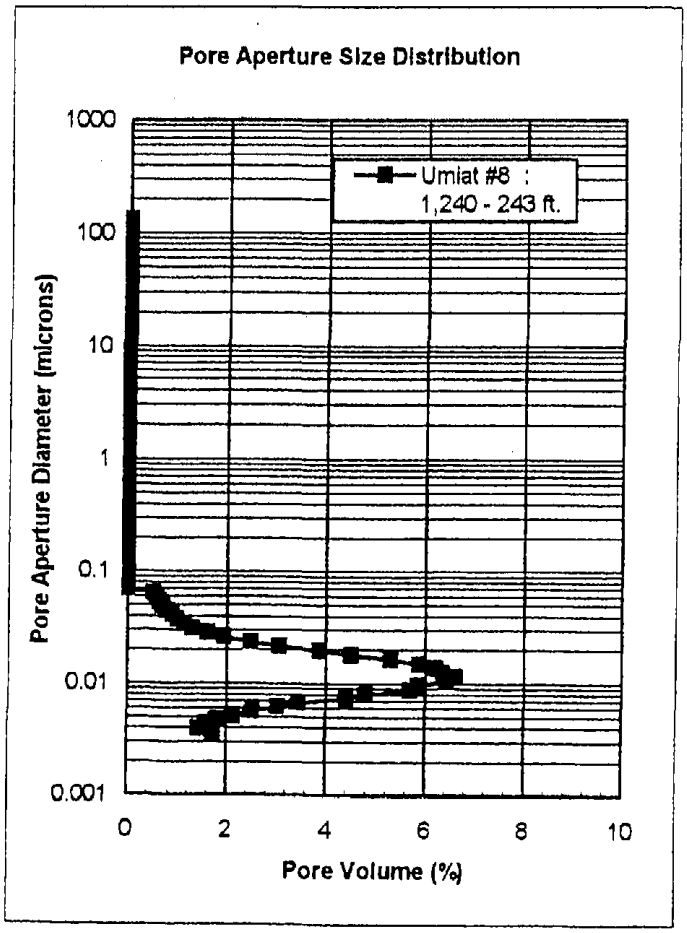
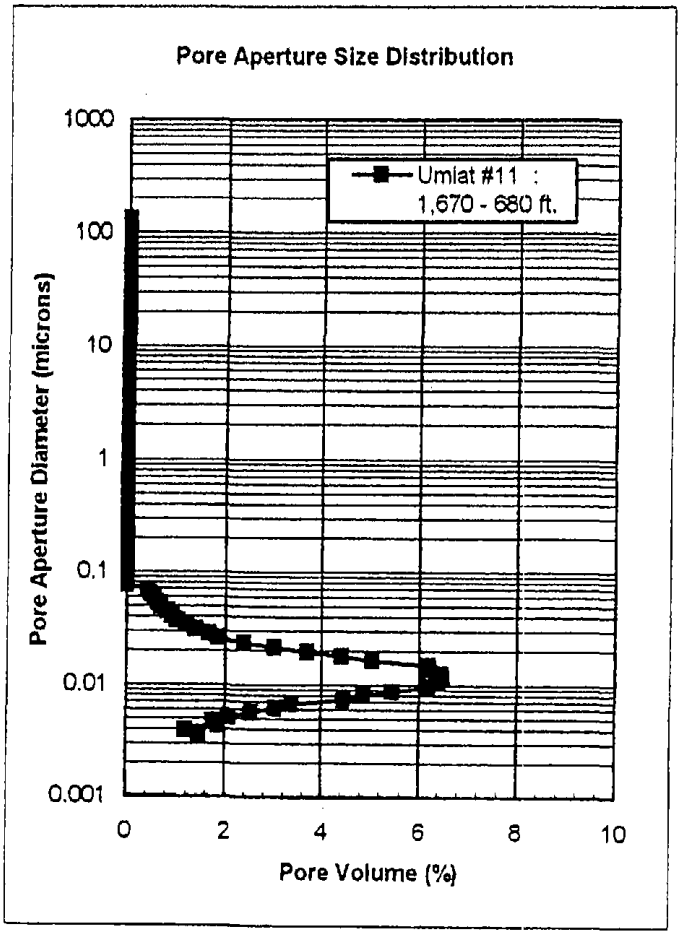


FIGURE 2


Pore Aperture Size Distribution
Umiat #2 : 312 - 322 ft.
Pore Aperture Diameter (microns)
1000
100
10
1
0.1
0.01
0.001
0
2
4
6
8
10
Pore Volume (%)


Pore Aperture Size Distribution
Umiat #7 : 1,057 - 60 ft.
Pore Aperture Diameter (microns)
1000
100
10
1
0.1
0.01
0.001
0
2
4
6
8
10
Pore Volume (%)


Pore Aperture Size Distribution
Umiat #8 : 1,240 - 243 ft.
Pore Aperture Diameter (microns)
1000
100
10
1
0.1
0.01
0.001
0
2
4
6
8
10
Pore Volume (%)


Pore Aperture Size Distribution
Umiat #11 : 1,670 - 680 ft.
Pore Aperture Diameter (microns)
1000
100
10
1
0.1
0.01
0.001
0
2
4
6
8
10
Pore Volume (%)

Mercury Injection Capillary Pressure

Umiat #2 : 312 - 322 feet
File 001-558

Sample Information	
Bulk Volume = 4.2620 cc	Porosity = 6.29% (mercury)
Pore Volume = 0.2683 cc	Permeability = 0.0002 md (mercury)
Closure = 0.80%BV @ 3710 psia	Median Pore Aperture = 0.009 microns

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1.64	130	0.01	100.0	0.00	0.0000
1.80	119	0.01	100.0	0.00	0.0000
1.96	109	0.01	100.0	0.00	0.0000
2.15	99.2	0.02	100.0	0.00	0.0000
2.35	90.8	0.02	100.0	0.00	0.0000
2.57	83.0	0.02	100.0	0.00	0.0000
2.81	75.9	0.03	100.0	0.00	0.0000
3.08	69.3	0.03	100.0	0.00	0.0000
3.37	63.3	0.03	100.0	0.00	0.0000
3.68	58.0	0.04	100.0	0.00	0.0000
4.03	52.9	0.04	100.0	0.00	0.0000
4.41	48.4	0.05	100.0	0.00	0.0000
4.82	44.3	0.05	100.0	0.00	0.0000
5.27	40.5	0.05	100.0	0.00	0.0000
5.77	37.0	0.06	100.0	0.00	0.0000
6.31	33.8	0.06	100.0	0.00	0.0000
6.90	30.9	0.06	100.0	0.00	0.0000
7.55	28.3	0.07	100.0	0.00	0.0000
8.26	25.8	0.07	100.0	0.00	0.0000
9.04	23.6	0.08	100.0	0.00	0.0000
9.89	21.6	0.08	100.0	0.00	0.0000
10.8	19.8	0.09	100.0	0.00	0.0000
11.8	18.1	0.09	100.0	0.00	0.0000
12.9	16.5	0.10	100.0	0.00	0.0000
14.2	15.0	0.11	100.0	0.00	0.0000
15.5	13.8	0.11	100.0	0.00	0.0000
16.9	12.6	0.12	100.0	0.00	0.0000
18.5	11.5	0.13	100.0	0.00	0.0000
20.3	10.5	0.13	100.0	0.00	0.0000
22.2	9.61	0.14	100.0	0.00	0.0000
24.3	8.78	0.15	100.0	0.00	0.0000
26.6	8.02	0.16	100.0	0.00	0.0000
29.0	7.36	0.17	100.0	0.00	0.0000
31.8	6.71	0.19	100.0	0.00	0.0000
34.8	6.13	0.21	100.0	0.00	0.0000
38.0	5.61	0.23	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

Umiat #2 : 312 - 322 feet
File 001-558

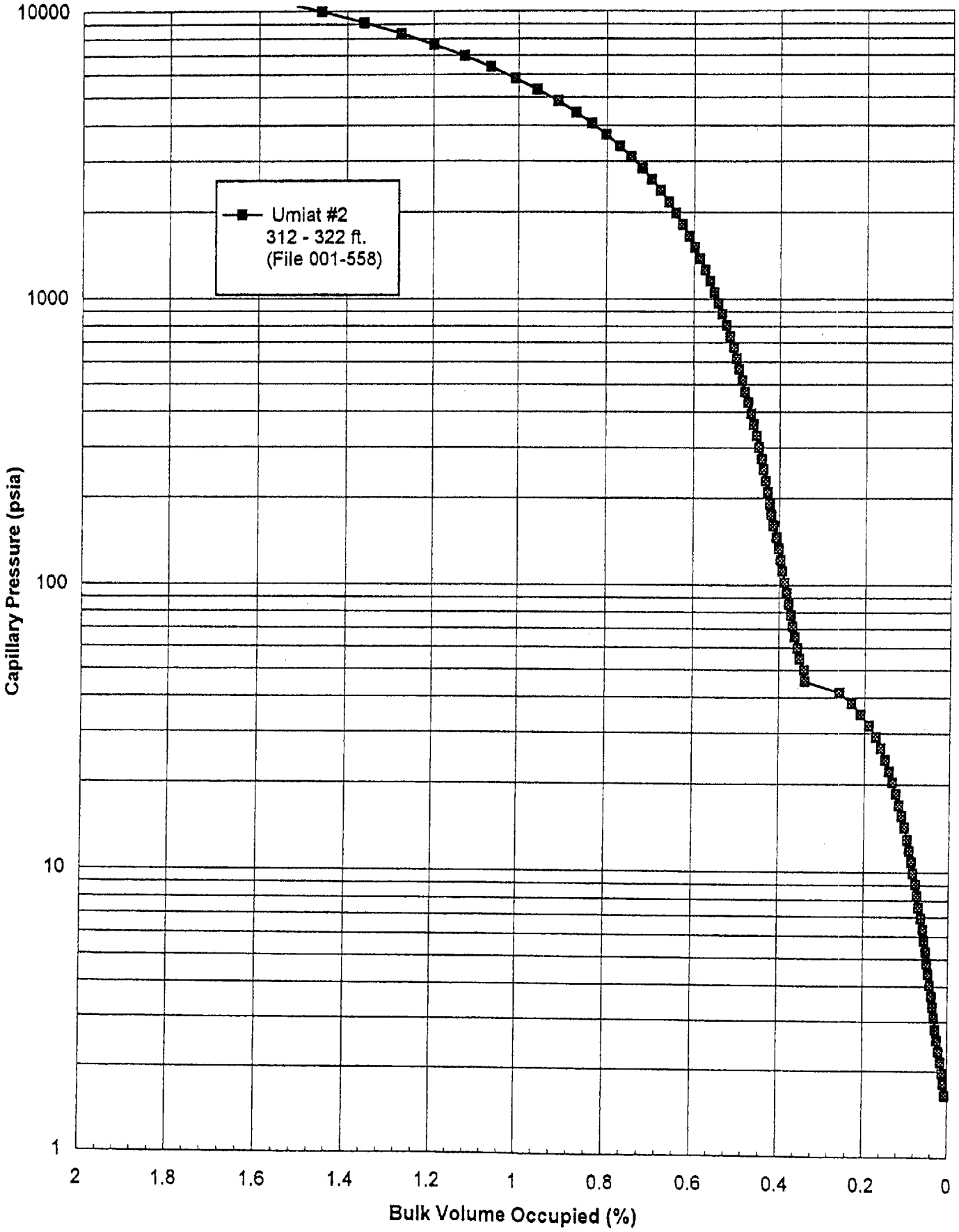
Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
41.6	5.13	0.26	100.0	0.00	0.0000
45.5	4.69	0.34	100.0	0.00	0.0000
49.8	4.28	0.34	100.0	0.00	0.0000
54.5	3.91	0.35	100.0	0.00	0.0000
59.6	3.58	0.36	100.0	0.00	0.0000
65.2	3.27	0.36	100.0	0.00	0.0000
71.3	2.99	0.37	100.0	0.00	0.0000
78.0	2.73	0.37	100.0	0.00	0.0000
85.3	2.50	0.38	100.0	0.00	0.0000
93.4	2.28	0.38	100.0	0.00	0.0000
102	2.09	0.39	100.0	0.00	0.0000
112	1.90	0.39	100.0	0.00	0.0000
122	1.75	0.40	100.0	0.00	0.0000
134	1.59	0.40	100.0	0.00	0.0000
146	1.46	0.41	100.0	0.00	0.0000
160	1.33	0.41	100.0	0.00	0.0000
175	1.22	0.42	100.0	0.00	0.0000
191	1.12	0.42	100.0	0.00	0.0000
209	1.02	0.43	100.0	0.00	0.0000
229	0.932	0.43	100.0	0.00	0.0000
251	0.850	0.44	100.0	0.00	0.0000
274	0.779	0.44	100.0	0.00	0.0000
300	0.711	0.45	100.0	0.00	0.0000
328	0.650	0.45	100.0	0.00	0.0000
359	0.594	0.46	100.0	0.00	0.0000
393	0.543	0.47	100.0	0.00	0.0000
430	0.496	0.47	100.0	0.00	0.0000
470	0.454	0.48	100.0	0.00	0.0000
514	0.415	0.49	100.0	0.00	0.0000
563	0.379	0.49	100.0	0.00	0.0000
615	0.347	0.50	100.0	0.00	0.0000
673	0.317	0.51	100.0	0.00	0.0000
736	0.290	0.51	100.0	0.00	0.0000
806	0.265	0.52	100.0	0.00	0.0000
881	0.242	0.53	100.0	0.00	0.0000
964	0.221	0.54	100.0	0.00	0.0000
1050	0.203	0.55	100.0	0.00	0.0000
1150	0.186	0.56	100.0	0.00	0.0000
1260	0.169	0.57	100.0	0.00	0.0000
1380	0.155	0.59	100.0	0.00	0.0000
1510	0.141	0.60	100.0	0.00	0.0000
1650	0.129	0.61	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

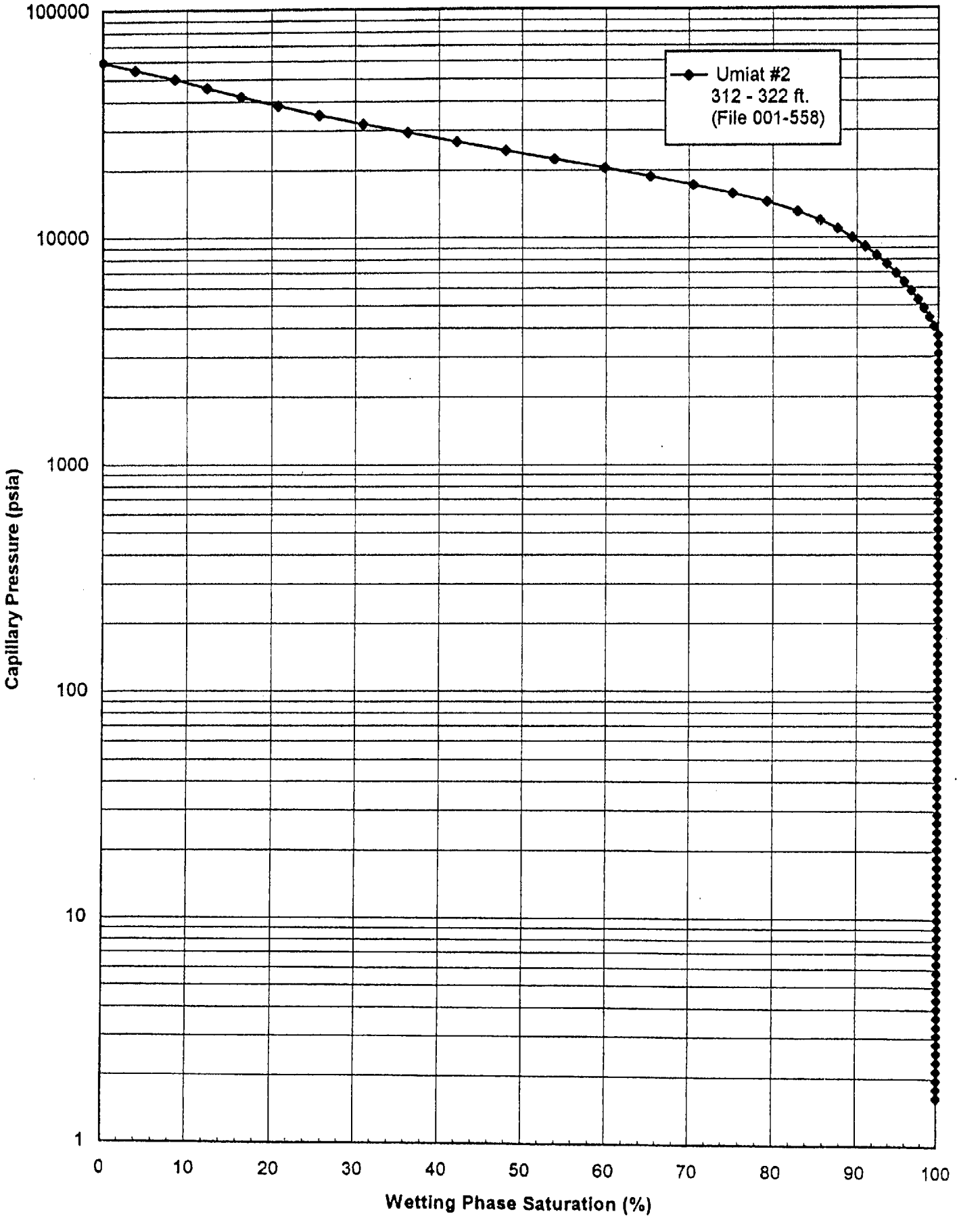
Umiat #2 : 312 - 322 feet
File 001-558

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1810	0.1179	0.63	100.0	0.00	0.0000
1980	0.1077	0.64	100.0	0.00	0.0000
2160	0.0988	0.66	100.0	0.00	0.0000
2370	0.0900	0.68	100.0	0.00	0.0000
2590	0.0824	0.70	100.0	0.00	0.0000
2830	0.0754	0.72	100.0	0.00	0.0000
3100	0.0688	0.74	100.0	0.00	0.0000
3390	0.0629	0.77	100.0	0.00	0.0000
3710	0.0575	0.80	100.0	0.04	0.0001
4060	0.0525	0.83	99.4	0.53	0.0015
4440	0.0480	0.87	98.9	0.58	0.0015
4850	0.0440	0.91	98.2	0.65	0.0016
5310	0.0402	0.96	97.5	0.74	0.0016
5810	0.0367	1.01	96.6	0.82	0.0016
6360	0.0335	1.07	95.7	0.91	0.0017
6950	0.0307	1.13	94.7	0.99	0.0017
7610	0.0280	1.20	93.6	1.14	0.0017
8320	0.0256	1.27	92.4	1.23	0.0017
9100	0.0234	1.36	91.0	1.38	0.0018
9960	0.0214	1.46	89.4	1.56	0.0018
10900	0.0196	1.57	87.7	1.80	0.0019
11900	0.0179	1.70	85.6	2.10	0.0021
13000	0.0164	1.87	82.9	2.66	0.0024
14300	0.0149	2.09	79.3	3.61	0.0028
15600	0.0137	2.35	75.2	4.07	0.0031
17100	0.0125	2.64	70.5	4.70	0.0031
18700	0.0114	2.97	65.3	5.24	0.0033
20400	0.0105	3.31	59.8	5.42	0.0032
22300	0.0096	3.68	53.9	5.96	0.0031
24400	0.0087	4.04	48.1	5.83	0.0028
26700	0.0080	4.41	42.2	5.89	0.0026
29300	0.0073	4.78	36.3	5.87	0.0023
32000	0.0067	5.11	31.0	5.34	0.0020
35000	0.0061	5.44	25.7	5.30	0.0018
38300	0.0056	5.74	20.8	4.86	0.0015
41900	0.0051	6.02	16.4	4.45	0.0012
45800	0.0047	6.27	12.4	4.00	0.0010
50100	0.0043	6.51	8.5	3.82	0.0009
54800	0.0039	6.80	3.8	4.71	0.0010
59500	0.0036	7.04	0.0	3.83	0.0008

Mercury Injection Capillary Pressure (Bulk Volume)

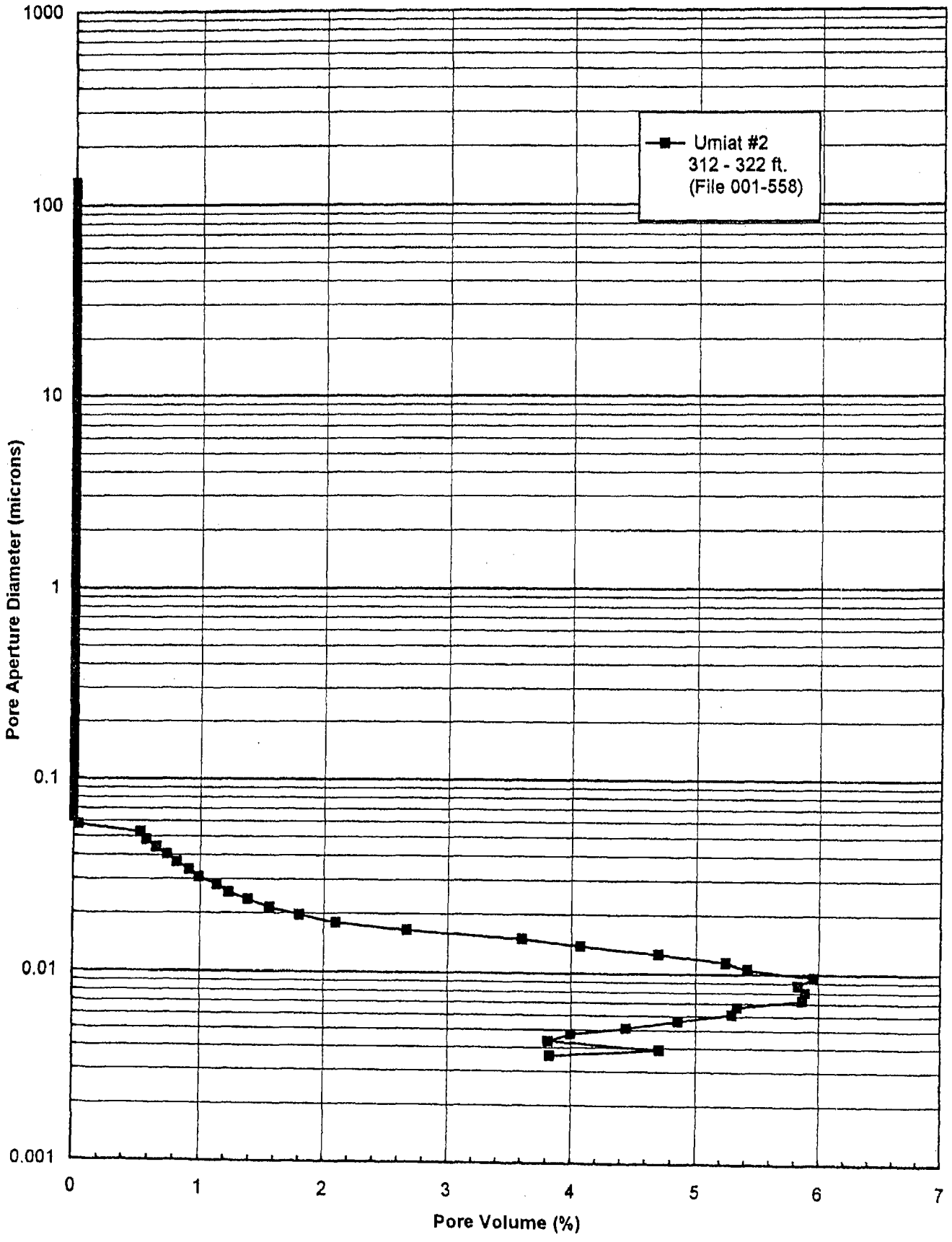


Mercury Injection Capillary Pressure (Pore Volume)



PETROTECH ASSOCIATES

Pore Aperture Size Distribution



Mercury Injection Capillary Pressure

Umiat #7 : 1,057-60 feet
File 001-556

Sample Information	
Bulk Volume = 5.4109 cc	Porosity = 3.4% (mercury)
Pore Volume = 0.1851 cc	Permeability = N/A
Closure = 0.70 %BV @ 806 psia	Median Pore Aperture = 0.0193 microns

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1.64	130	0.01	100.0	0.00	0.0000
1.80	119	0.02	100.0	0.00	0.0000
1.96	109	0.02	100.0	0.00	0.0000
2.15	99.2	0.03	100.0	0.00	0.0000
2.35	90.8	0.03	100.0	0.00	0.0000
2.57	83.0	0.04	100.0	0.00	0.0000
2.81	75.9	0.04	100.0	0.00	0.0000
3.08	69.3	0.05	100.0	0.00	0.0000
3.37	63.3	0.05	100.0	0.00	0.0000
3.68	58.0	0.06	100.0	0.00	0.0000
4.03	52.9	0.06	100.0	0.00	0.0000
4.41	48.4	0.07	100.0	0.00	0.0000
4.82	44.3	0.08	100.0	0.00	0.0000
5.27	40.5	0.10	100.0	0.00	0.0000
5.77	37.0	0.11	100.0	0.00	0.0000
6.31	33.8	0.12	100.0	0.00	0.0000
6.90	30.9	0.13	100.0	0.00	0.0000
7.55	28.3	0.14	100.0	0.00	0.0000
8.26	25.8	0.15	100.0	0.00	0.0000
9.04	23.6	0.16	100.0	0.00	0.0000
9.89	21.6	0.17	100.0	0.00	0.0000
10.8	19.8	0.18	100.0	0.00	0.0000
11.8	18.1	0.19	100.0	0.00	0.0000
12.9	16.5	0.20	100.0	0.00	0.0000
14.2	15.0	0.22	100.0	0.00	0.0000
15.5	13.8	0.22	100.0	0.00	0.0000
16.9	12.6	0.24	100.0	0.00	0.0000
18.5	11.5	0.26	100.0	0.00	0.0000
20.3	10.5	0.29	100.0	0.00	0.0000
22.2	9.61	0.30	100.0	0.00	0.0000
24.3	8.78	0.31	100.0	0.00	0.0000
26.6	8.02	0.33	100.0	0.00	0.0000
29.0	7.36	0.34	100.0	0.00	0.0000
31.8	6.71	0.36	100.0	0.00	0.0000
34.8	6.13	0.38	100.0	0.00	0.0000
38.0	5.61	0.40	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

Umiat #7 : 1,057-60 feet
File 001-556

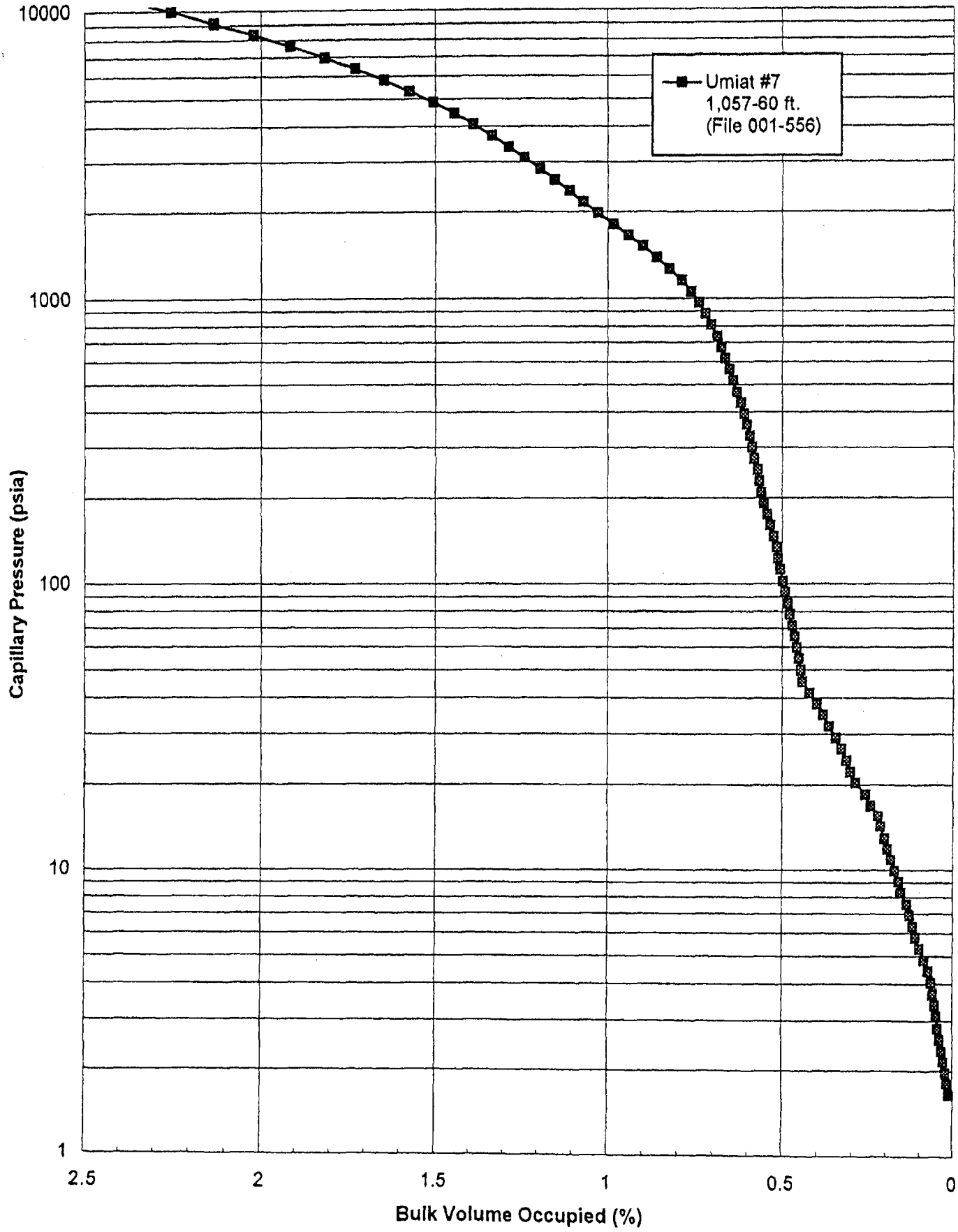
Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
41.6	5.13	0.42	100.0	0.00	0.0000
45.5	4.69	0.44	100.0	0.00	0.0000
49.8	4.28	0.45	100.0	0.00	0.0000
54.5	3.91	0.45	100.0	0.00	0.0000
59.6	3.58	0.46	100.0	0.00	0.0000
65.2	3.27	0.46	100.0	0.00	0.0000
71.3	2.99	0.47	100.0	0.00	0.0000
78.0	2.73	0.48	100.0	0.00	0.0000
85.3	2.50	0.48	100.0	0.00	0.0000
93.4	2.28	0.49	100.0	0.00	0.0000
102	2.09	0.50	100.0	0.00	0.0000
112	1.90	0.51	100.0	0.00	0.0000
122	1.75	0.51	100.0	0.00	0.0000
134	1.59	0.52	100.0	0.00	0.0000
146	1.46	0.52	100.0	0.00	0.0000
160	1.33	0.53	100.0	0.00	0.0000
175	1.22	0.54	100.0	0.00	0.0000
191	1.12	0.55	100.0	0.00	0.0000
209	1.02	0.56	100.0	0.00	0.0000
229	0.932	0.57	100.0	0.00	0.0000
251	0.850	0.57	100.0	0.00	0.0000
274	0.779	0.58	100.0	0.00	0.0000
300	0.711	0.59	100.0	0.00	0.0000
328	0.650	0.59	100.0	0.00	0.0000
359	0.594	0.60	100.0	0.00	0.0000
393	0.543	0.61	100.0	0.00	0.0000
430	0.496	0.62	100.0	0.00	0.0000
470	0.454	0.63	100.0	0.00	0.0000
514	0.415	0.64	100.0	0.00	0.0000
563	0.379	0.65	100.0	0.00	0.0000
615	0.347	0.66	100.0	0.00	0.0000
673	0.317	0.68	100.0	0.00	0.0000
736	0.290	0.69	100.0	0.00	0.0000
806	0.265	0.70	100.0	0.00	0.0000
881	0.242	0.72	99.6	0.45	0.0060
964	0.221	0.74	99.0	0.59	0.0071
1050	0.203	0.76	98.3	0.67	0.0077
1150	0.186	0.79	97.5	0.75	0.0075
1260	0.169	0.82	96.5	1.06	0.0096
1380	0.155	0.86	95.5	1.04	0.0087
1510	0.141	0.90	94.3	1.18	0.0091
1650	0.129	0.94	93.0	1.23	0.0088

Mercury Injection Capillary Pressure

Umiat #7 : 1,057-60 feet
File 001-556

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1810	0.1179	0.98	91.8	1.26	0.0078
1980	0.1077	1.03	90.5	1.28	0.0075
2160	0.0988	1.07	89.3	1.24	0.0069
2370	0.0900	1.11	88.1	1.18	0.0056
2590	0.0824	1.15	86.9	1.22	0.0055
2830	0.0754	1.19	85.6	1.27	0.0053
3100	0.0688	1.24	84.3	1.32	0.0049
3390	0.0629	1.28	82.9	1.34	0.0046
3710	0.0575	1.33	81.5	1.47	0.0046
4060	0.0525	1.39	79.9	1.59	0.0045
4440	0.0480	1.44	78.2	1.65	0.0043
4850	0.0440	1.50	76.4	1.79	0.0044
5310	0.0402	1.57	74.4	2.03	0.0044
5810	0.0367	1.65	72.3	2.13	0.0043
6360	0.0335	1.73	69.8	2.45	0.0045
6950	0.0307	1.82	67.2	2.62	0.0044
7610	0.0280	1.92	64.3	2.89	0.0044
8320	0.0256	2.02	61.3	3.07	0.0043
9100	0.0234	2.13	57.9	3.31	0.0042
9960	0.0214	2.25	54.4	3.55	0.0041
10900	0.0196	2.38	50.7	3.69	0.0039
11900	0.0179	2.50	47.0	3.67	0.0037
13000	0.0164	2.63	43.2	3.79	0.0034
14300	0.0149	2.77	39.3	3.95	0.0030
15600	0.0137	2.88	35.8	3.49	0.0027
17100	0.0125	3.01	32.2	3.60	0.0024
18700	0.0114	3.12	29.0	3.24	0.0020
20400	0.0105	3.22	25.9	3.03	0.0018
22300	0.0096	3.32	23.0	2.92	0.0015
24400	0.0087	3.41	20.3	2.75	0.0013
26700	0.0080	3.50	17.7	2.59	0.0011
29300	0.0073	3.58	15.2	2.49	0.0010
32000	0.0067	3.66	13.0	2.22	0.0008
35000	0.0061	3.73	10.8	2.14	0.0007
38300	0.0056	3.80	8.9	1.96	0.0006
41900	0.0051	3.86	7.0	1.89	0.0005
45800	0.0047	3.92	5.4	1.58	0.0004
50100	0.0043	3.97	3.8	1.57	0.0004
54800	0.0039	4.03	2.0	1.85	0.0004
59500	0.0036	4.10	0.0	1.97	0.0004

Mercury Injection Capillary Pressure (Bulk Volume)



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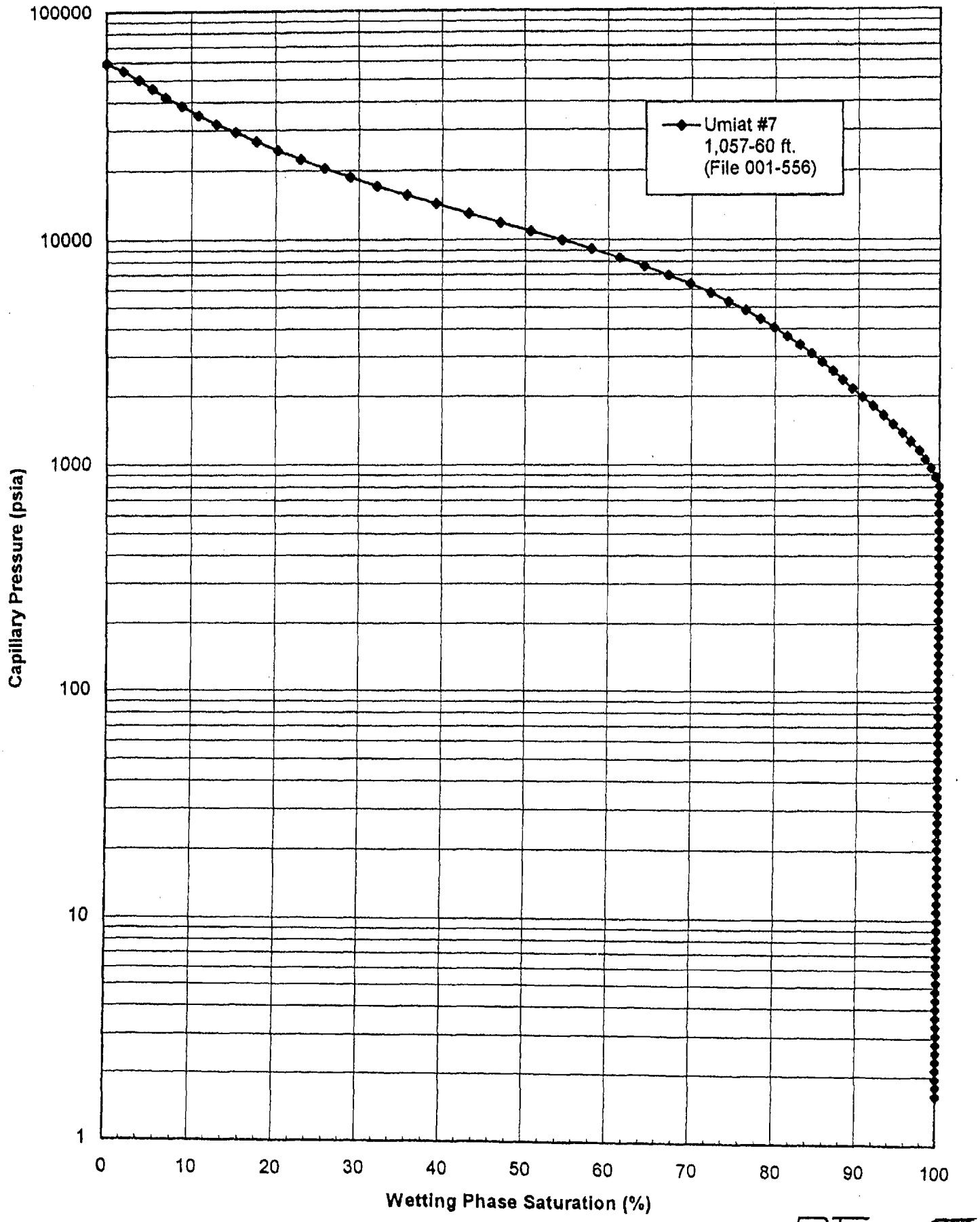
Mercury Injection Capillary Pressure (Pore Volume)



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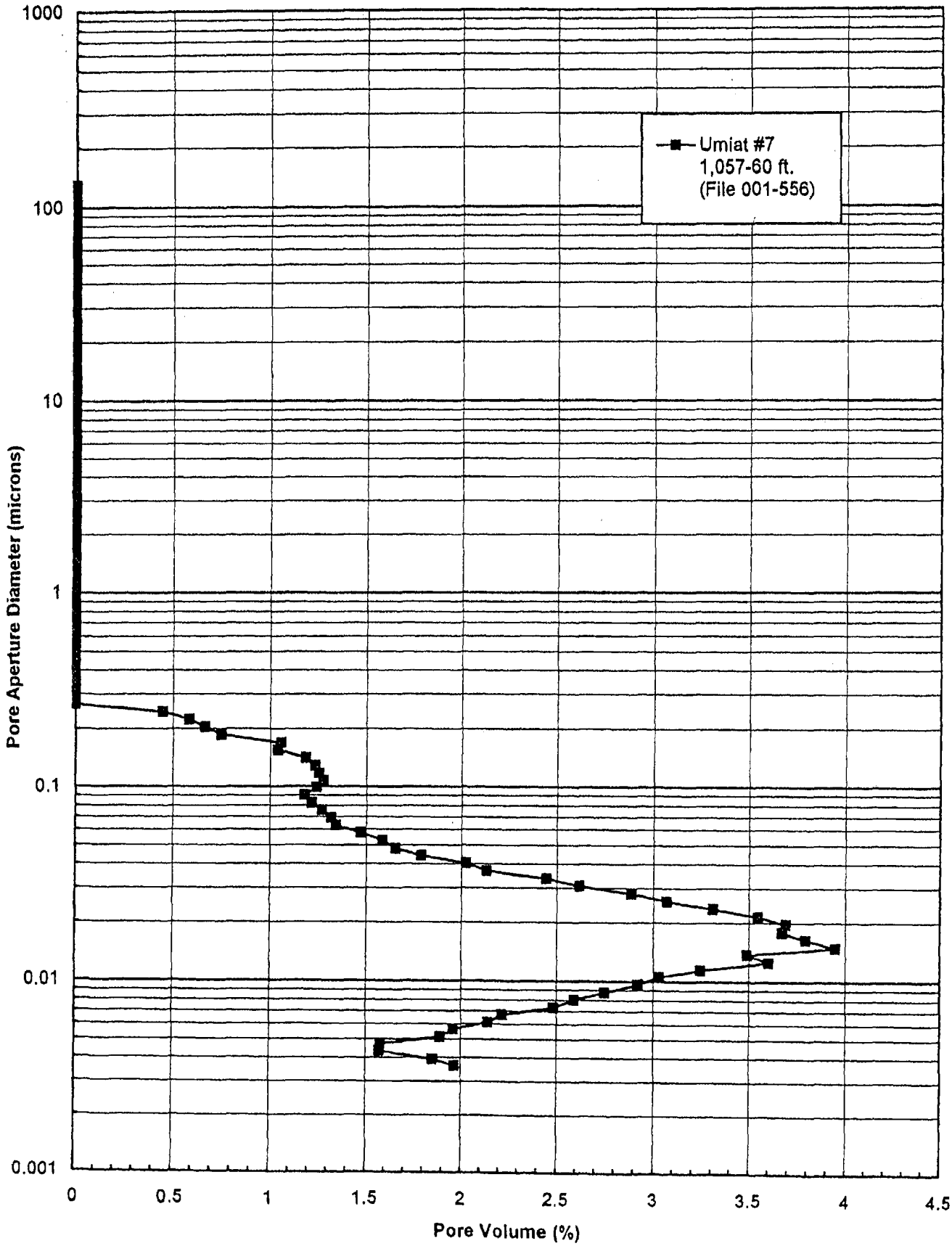
Pore Aperture Size Distribution



Mercury Injection Capillary Pressure

Umiat #8 : 1,240 - 243 feet
File 001-560

Sample Information	
Bulk Volume = 4.6342 cc	Porosity = 6.21% (mercury)
Pore Volume = 0.2880 cc	Permeability = 0.0003 md (mercury)
Closure = 0.58%BV @ 3100 psia	Median Pore Aperture = 0.0123 microns

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1.64	130	0.00	100.0	0.00	0.0000
1.80	119	0.00	100.0	0.00	0.0000
1.96	109	0.00	100.0	0.00	0.0000
2.15	99.2	0.00	100.0	0.00	0.0000
2.35	90.8	0.01	100.0	0.00	0.0000
2.57	83.0	0.01	100.0	0.00	0.0000
2.81	75.9	0.01	100.0	0.00	0.0000
3.08	69.3	0.01	100.0	0.00	0.0000
3.37	63.3	0.01	100.0	0.00	0.0000
3.68	58.0	0.01	100.0	0.00	0.0000
4.03	52.9	0.02	100.0	0.00	0.0000
4.41	48.4	0.02	100.0	0.00	0.0000
4.82	44.3	0.02	100.0	0.00	0.0000
5.27	40.5	0.02	100.0	0.00	0.0000
5.77	37.0	0.03	100.0	0.00	0.0000
6.31	33.8	0.03	100.0	0.00	0.0000
6.90	30.9	0.03	100.0	0.00	0.0000
7.55	28.3	0.04	100.0	0.00	0.0000
8.26	25.8	0.04	100.0	0.00	0.0000
9.04	23.6	0.04	100.0	0.00	0.0000
9.89	21.6	0.05	100.0	0.00	0.0000
10.8	19.8	0.05	100.0	0.00	0.0000
11.8	18.1	0.05	100.0	0.00	0.0000
12.9	16.5	0.06	100.0	0.00	0.0000
14.2	15.0	0.06	100.0	0.00	0.0000
15.5	13.8	0.09	100.0	0.00	0.0000
16.9	12.6	0.10	100.0	0.00	0.0000
18.5	11.5	0.10	100.0	0.00	0.0000
20.3	10.5	0.11	100.0	0.00	0.0000
22.2	9.61	0.12	100.0	0.00	0.0000
24.3	8.78	0.13	100.0	0.00	0.0000
26.6	8.02	0.14	100.0	0.00	0.0000
29.0	7.36	0.15	100.0	0.00	0.0000
31.8	6.71	0.17	100.0	0.00	0.0000
34.8	6.13	0.18	100.0	0.00	0.0000
38.0	5.61	0.19	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

Umiat #8 : 1,240 - 243 feet
File 001-560

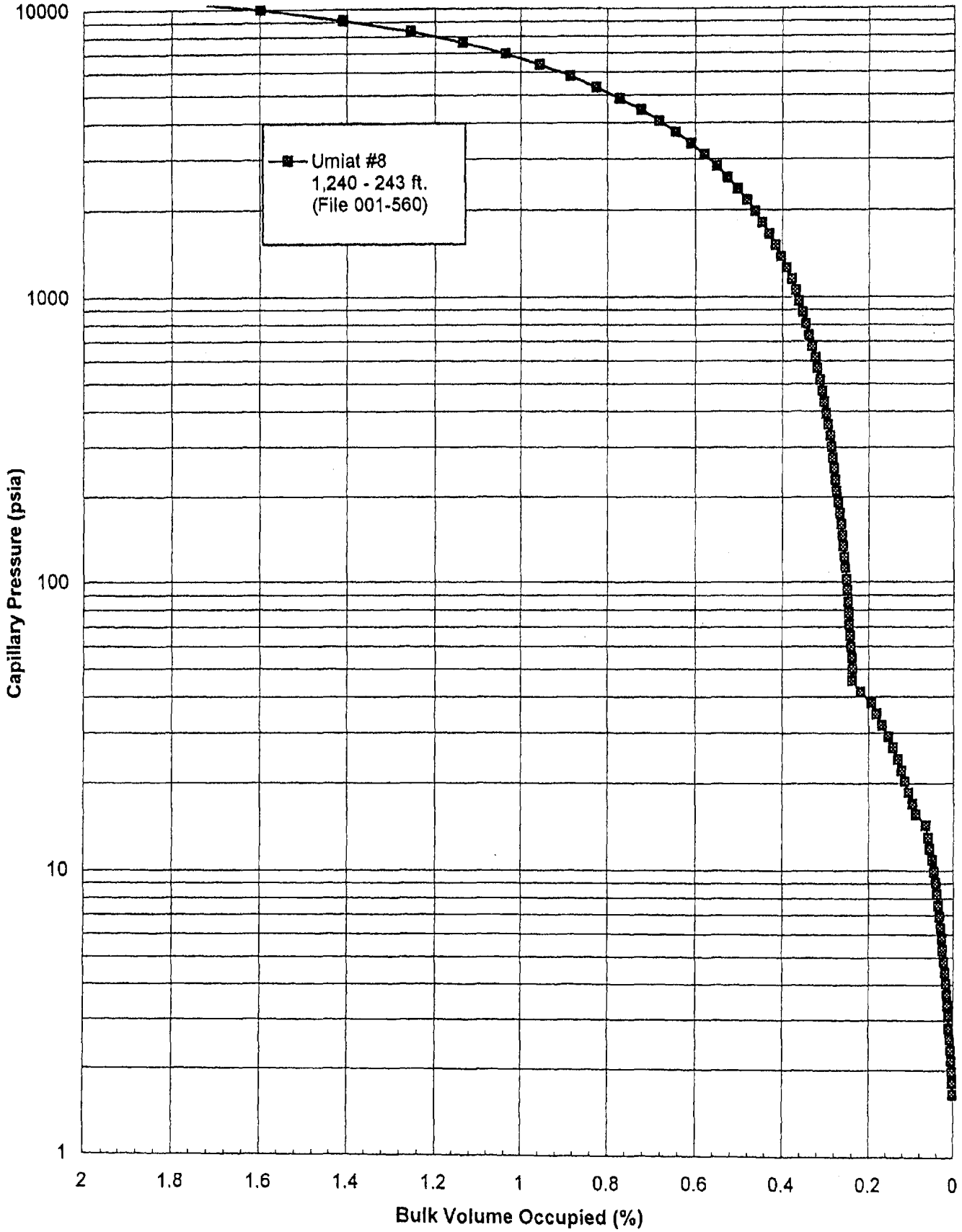
Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
41.6	5.13	0.22	100.0	0.00	0.0000
45.5	4.69	0.24	100.0	0.00	0.0000
49.8	4.28	0.24	100.0	0.00	0.0000
54.5	3.91	0.24	100.0	0.00	0.0000
59.6	3.58	0.24	100.0	0.00	0.0000
65.2	3.27	0.24	100.0	0.00	0.0000
71.3	2.99	0.24	100.0	0.00	0.0000
78.0	2.73	0.25	100.0	0.00	0.0000
85.3	2.50	0.25	100.0	0.00	0.0000
93.4	2.28	0.25	100.0	0.00	0.0000
102	2.09	0.25	100.0	0.00	0.0000
112	1.90	0.25	100.0	0.00	0.0000
122	1.75	0.26	100.0	0.00	0.0000
134	1.59	0.26	100.0	0.00	0.0000
146	1.46	0.26	100.0	0.00	0.0000
160	1.33	0.26	100.0	0.00	0.0000
175	1.22	0.27	100.0	0.00	0.0000
191	1.12	0.27	100.0	0.00	0.0000
209	1.02	0.27	100.0	0.00	0.0000
229	0.932	0.28	100.0	0.00	0.0000
251	0.850	0.28	100.0	0.00	0.0000
274	0.779	0.28	100.0	0.00	0.0000
300	0.711	0.29	100.0	0.00	0.0000
328	0.650	0.29	100.0	0.00	0.0000
359	0.594	0.29	100.0	0.00	0.0000
393	0.543	0.30	100.0	0.00	0.0000
430	0.496	0.30	100.0	0.00	0.0000
470	0.454	0.31	100.0	0.00	0.0000
514	0.415	0.31	100.0	0.00	0.0000
563	0.379	0.32	100.0	0.00	0.0000
615	0.347	0.32	100.0	0.00	0.0000
673	0.317	0.33	100.0	0.00	0.0000
736	0.290	0.34	100.0	0.00	0.0000
806	0.265	0.35	100.0	0.00	0.0000
881	0.242	0.35	100.0	0.00	0.0000
964	0.221	0.36	100.0	0.00	0.0000
1050	0.203	0.37	100.0	0.00	0.0000
1150	0.186	0.38	100.0	0.00	0.0000
1260	0.169	0.39	100.0	0.00	0.0000
1380	0.155	0.40	100.0	0.00	0.0000
1510	0.141	0.42	100.0	0.00	0.0000
1650	0.129	0.43	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

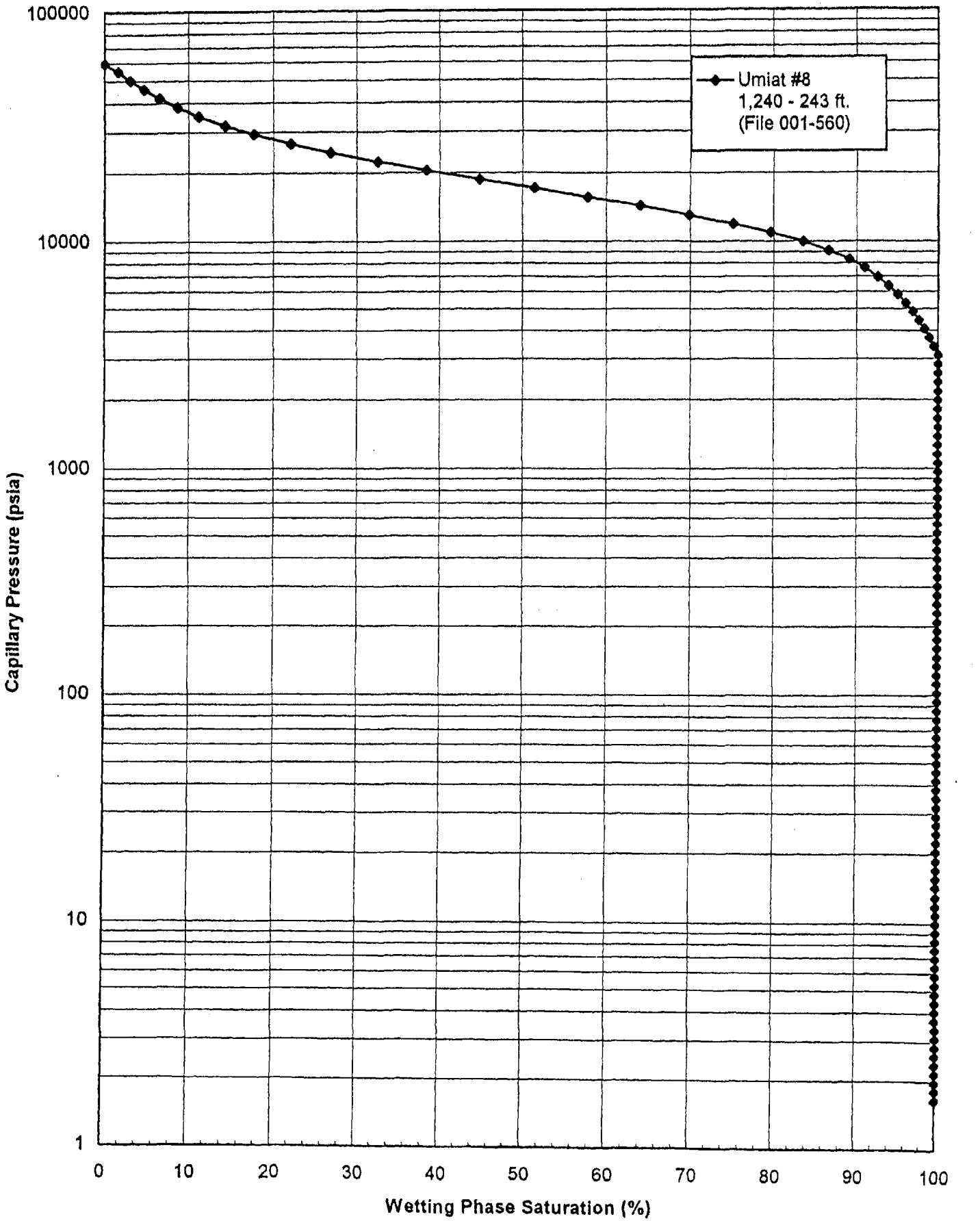
Umiat #8 : 1,240 - 243 feet
File 001-560

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1810	0.1179	0.45	100.0	0.00	0.0000
1980	0.1077	0.46	100.0	0.00	0.0000
2160	0.0988	0.48	100.0	0.00	0.0000
2370	0.0900	0.50	100.0	0.00	0.0000
2590	0.0824	0.53	100.0	0.00	0.0000
2830	0.0754	0.55	100.0	0.00	0.0000
3100	0.0688	0.58	100.0	0.00	0.0000
3390	0.0629	0.61	99.5	0.50	0.0017
3710	0.0575	0.64	98.9	0.56	0.0017
4060	0.0525	0.68	98.3	0.61	0.0017
4440	0.0480	0.72	97.7	0.68	0.0018
4850	0.0440	0.77	96.9	0.77	0.0019
5310	0.0402	0.83	96.0	0.87	0.0019
5810	0.0367	0.89	95.0	0.98	0.0020
6360	0.0335	0.96	93.9	1.13	0.0021
6950	0.0307	1.04	92.6	1.30	0.0022
7610	0.0280	1.14	91.0	1.60	0.0024
8320	0.0256	1.25	89.1	1.93	0.0027
9100	0.0234	1.41	86.6	2.49	0.0032
9960	0.0214	1.60	83.5	3.06	0.0036
10900	0.0196	1.84	79.7	3.88	0.0041
11900	0.0179	2.12	75.2	4.50	0.0045
13000	0.0164	2.44	69.9	5.28	0.0048
14300	0.0149	2.81	64.0	5.87	0.0045
15600	0.0137	3.19	57.8	6.22	0.0048
17100	0.0125	3.58	51.4	6.35	0.0042
18700	0.0114	3.99	44.8	6.62	0.0041
20400	0.0105	4.39	38.4	6.42	0.0038
22300	0.0096	4.75	32.5	5.86	0.0031
24400	0.0087	5.11	26.9	5.68	0.0027
26700	0.0080	5.40	22.1	4.78	0.0021
29300	0.0073	5.67	17.7	4.40	0.0017
32000	0.0067	5.89	14.2	3.44	0.0013
35000	0.0061	6.07	11.2	3.03	0.0010
38300	0.0056	6.23	8.7	2.51	0.0008
41900	0.0051	6.36	6.6	2.13	0.0006
45800	0.0047	6.47	4.8	1.79	0.0005
50100	0.0043	6.57	3.2	1.60	0.0004
54800	0.0039	6.66	1.7	1.43	0.0003
59500	0.0036	6.77	0.0	1.73	0.0004

Mercury Injection Capillary Pressure (Bulk Volume)



Mercury Injection Capillary Pressure (Pore Volume)



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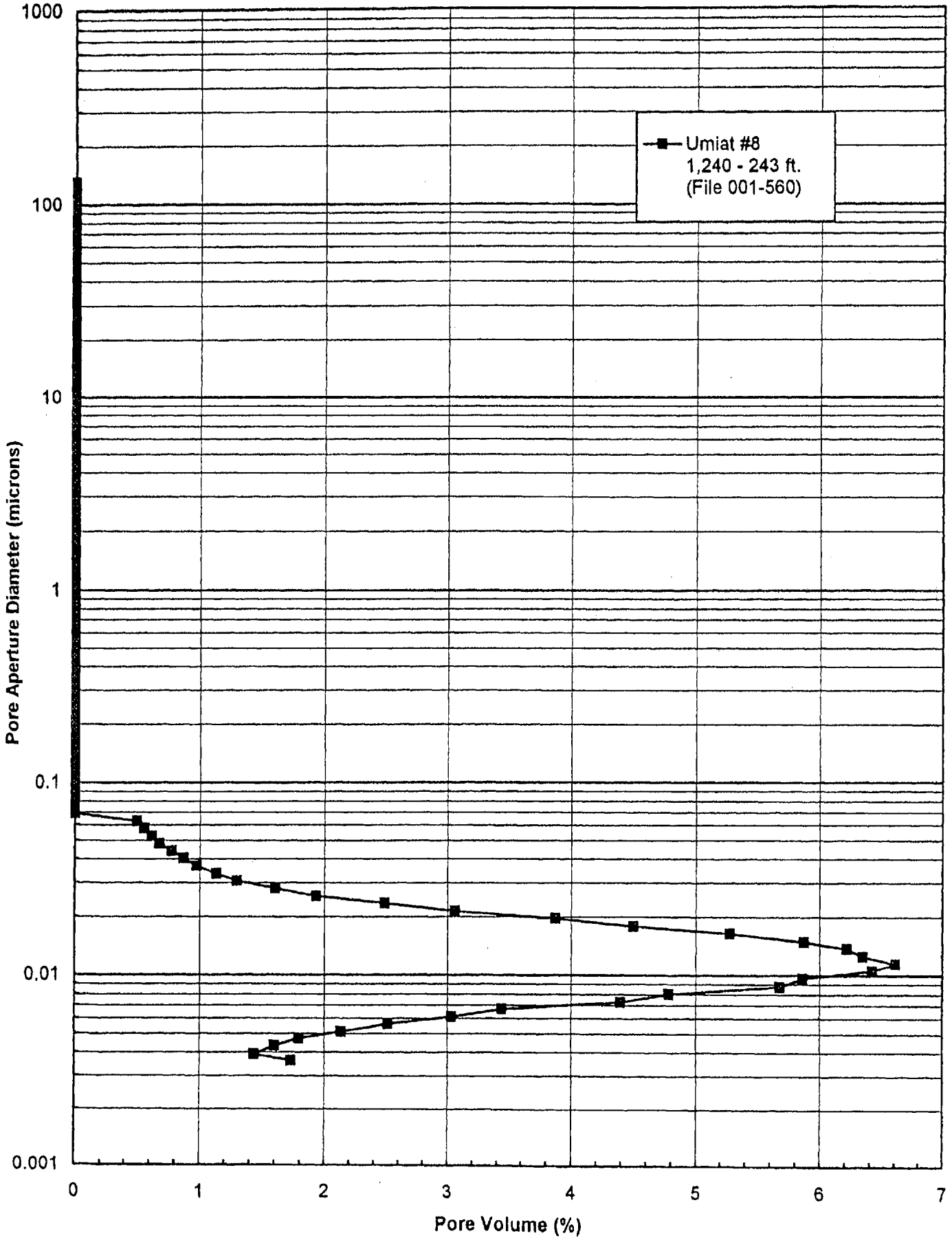
Pore Aperture Size Distribution



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Mercury Injection Capillary Pressure

Umiat #11 : 1,670 - 680 feet
File 001-561

Sample Information	
Bulk Volume = 6.6428 cc	Porosity = 5.38% (mercury)
Pore Volume = 0.3574 cc	Permeability = 0.0002 md (mercury)
Closure = 0.50%BV @ 2830 psia	Median Pore Aperture = 0.0123 microns

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1.64	130	0.00	100.0	0.00	0.0000
1.80	119	0.01	100.0	0.00	0.0000
1.96	109	0.01	100.0	0.00	0.0000
2.15	99.2	0.01	100.0	0.00	0.0000
2.35	90.8	0.02	100.0	0.00	0.0000
2.57	83.0	0.02	100.0	0.00	0.0000
2.81	75.9	0.03	100.0	0.00	0.0000
3.08	69.3	0.03	100.0	0.00	0.0000
3.37	63.3	0.03	100.0	0.00	0.0000
3.68	58.0	0.04	100.0	0.00	0.0000
4.03	52.9	0.04	100.0	0.00	0.0000
4.41	48.4	0.05	100.0	0.00	0.0000
4.82	44.3	0.05	100.0	0.00	0.0000
5.27	40.5	0.05	100.0	0.00	0.0000
5.77	37.0	0.06	100.0	0.00	0.0000
6.31	33.8	0.06	100.0	0.00	0.0000
6.90	30.9	0.06	100.0	0.00	0.0000
7.55	28.3	0.07	100.0	0.00	0.0000
8.26	25.8	0.07	100.0	0.00	0.0000
9.04	23.6	0.07	100.0	0.00	0.0000
9.89	21.6	0.08	100.0	0.00	0.0000
10.8	19.8	0.08	100.0	0.00	0.0000
11.8	18.1	0.09	100.0	0.00	0.0000
12.9	16.5	0.09	100.0	0.00	0.0000
14.2	15.0	0.09	100.0	0.00	0.0000
15.5	13.8	0.10	100.0	0.00	0.0000
16.9	12.6	0.10	100.0	0.00	0.0000
18.5	11.5	0.11	100.0	0.00	0.0000
20.3	10.5	0.11	100.0	0.00	0.0000
22.2	9.61	0.12	100.0	0.00	0.0000
24.3	8.78	0.12	100.0	0.00	0.0000
26.6	8.02	0.13	100.0	0.00	0.0000
29.0	7.36	0.14	100.0	0.00	0.0000
31.8	6.71	0.15	100.0	0.00	0.0000
34.8	6.13	0.16	100.0	0.00	0.0000
38.0	5.61	0.17	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

Umiat #11 : 1,670 - 680 feet
File 001-561

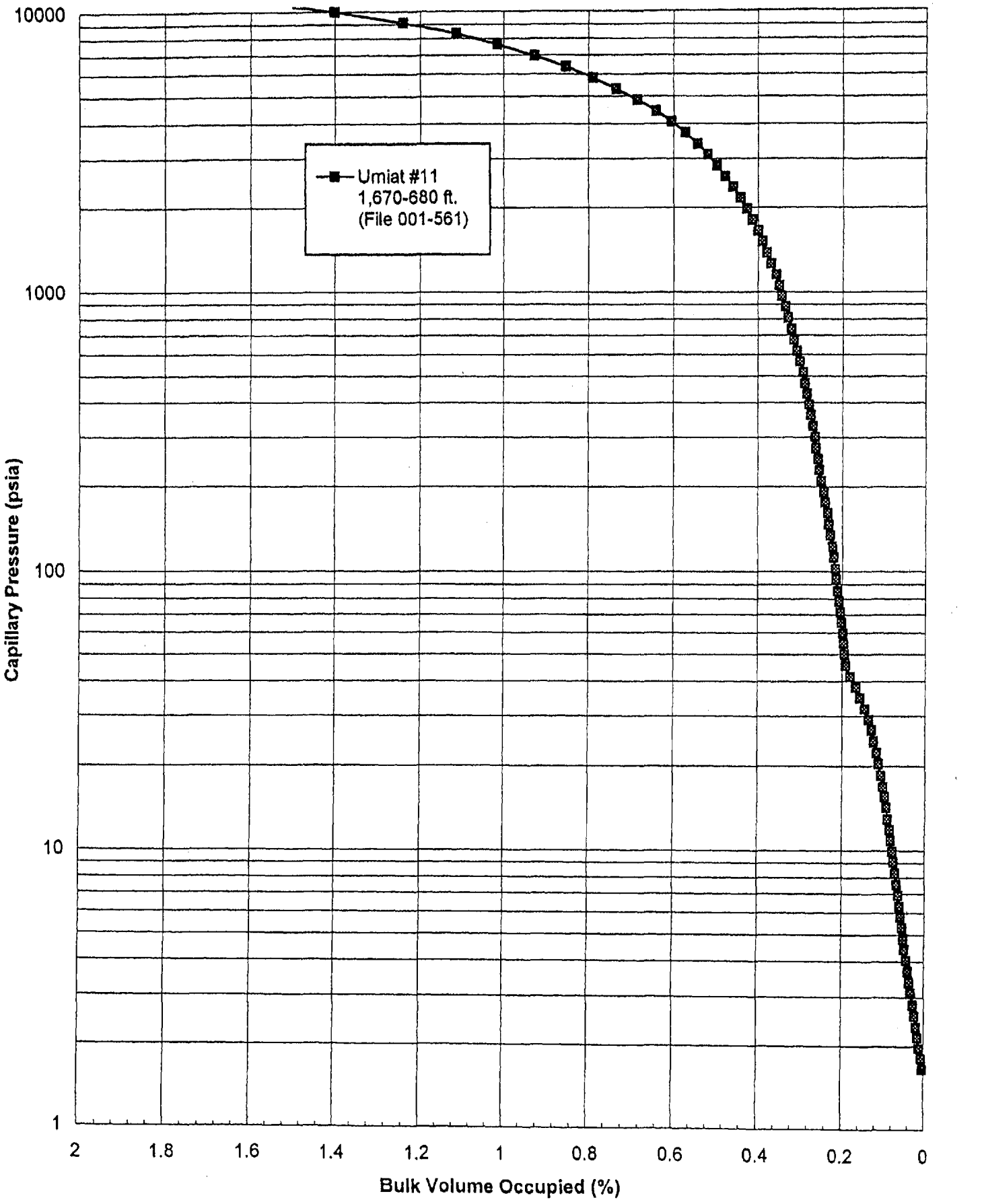
Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
41.6	5.13	0.18	100.0	0.00	0.0000
45.5	4.69	0.19	100.0	0.00	0.0000
49.8	4.28	0.19	100.0	0.00	0.0000
54.5	3.91	0.20	100.0	0.00	0.0000
59.6	3.58	0.20	100.0	0.00	0.0000
65.2	3.27	0.20	100.0	0.00	0.0000
71.3	2.99	0.20	100.0	0.00	0.0000
78.0	2.73	0.21	100.0	0.00	0.0000
85.3	2.50	0.21	100.0	0.00	0.0000
93.4	2.28	0.21	100.0	0.00	0.0000
102	2.09	0.22	100.0	0.00	0.0000
112	1.90	0.22	100.0	0.00	0.0000
122	1.75	0.22	100.0	0.00	0.0000
134	1.59	0.23	100.0	0.00	0.0000
146	1.46	0.23	100.0	0.00	0.0000
160	1.33	0.23	100.0	0.00	0.0000
175	1.22	0.24	100.0	0.00	0.0000
191	1.12	0.24	100.0	0.00	0.0000
209	1.02	0.25	100.0	0.00	0.0000
229	0.932	0.25	100.0	0.00	0.0000
251	0.850	0.26	100.0	0.00	0.0000
274	0.779	0.26	100.0	0.00	0.0000
300	0.711	0.27	100.0	0.00	0.0000
328	0.650	0.27	100.0	0.00	0.0000
359	0.594	0.27	100.0	0.00	0.0000
393	0.543	0.28	100.0	0.00	0.0000
430	0.496	0.28	100.0	0.00	0.0000
470	0.454	0.29	100.0	0.00	0.0000
514	0.415	0.29	100.0	0.00	0.0000
563	0.379	0.30	100.0	0.00	0.0000
615	0.347	0.31	100.0	0.00	0.0000
673	0.317	0.31	100.0	0.00	0.0000
736	0.290	0.32	100.0	0.00	0.0000
806	0.265	0.33	100.0	0.00	0.0000
881	0.242	0.33	100.0	0.00	0.0000
964	0.221	0.34	100.0	0.00	0.0000
1050	0.203	0.35	100.0	0.00	0.0000
1150	0.186	0.36	100.0	0.00	0.0000
1260	0.169	0.37	100.0	0.00	0.0000
1380	0.155	0.38	100.0	0.00	0.0000
1510	0.141	0.39	100.0	0.00	0.0000
1650	0.129	0.40	100.0	0.00	0.0000

Mercury Injection Capillary Pressure

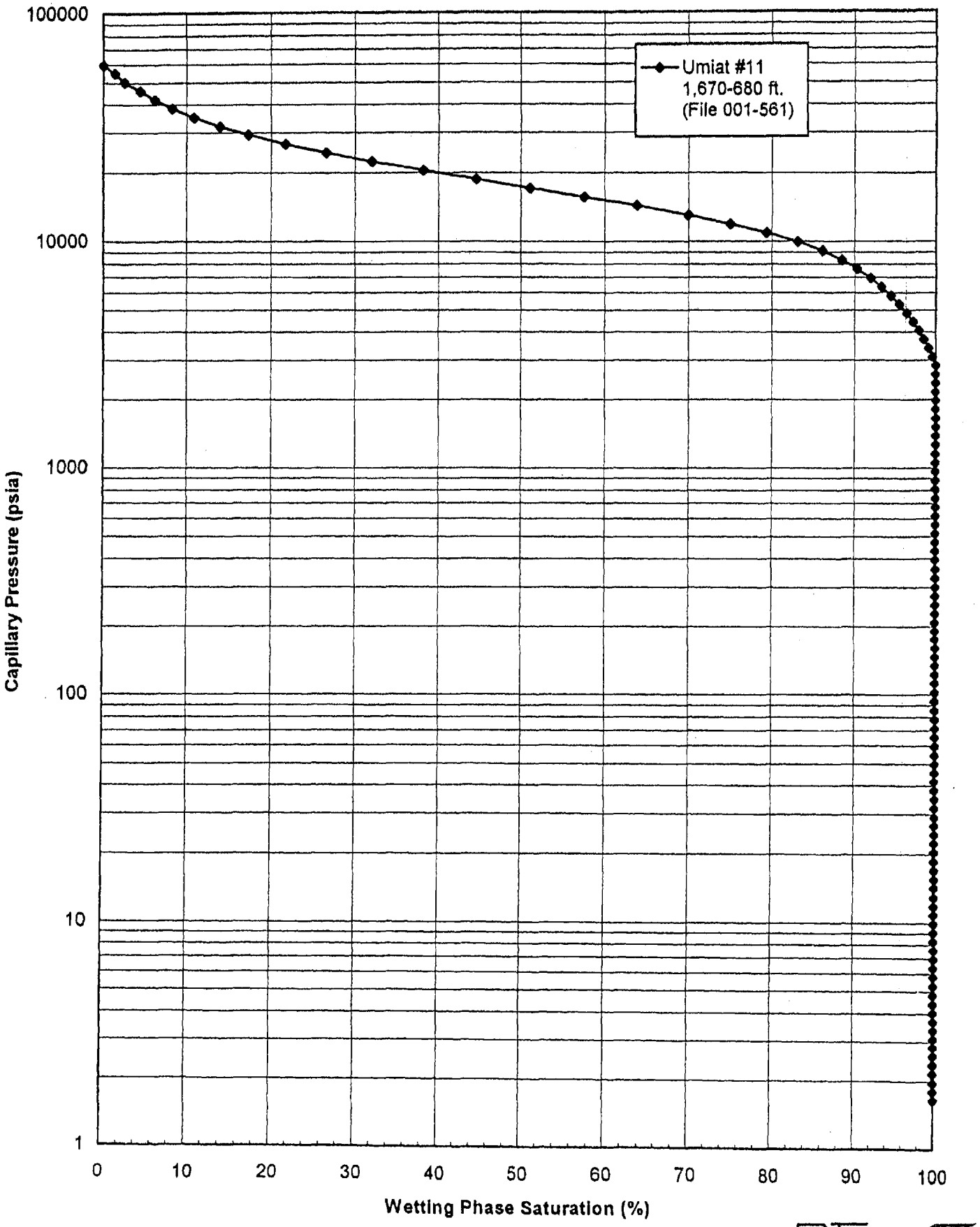
Umiat #11 : 1,670 - 680 feet
File 001-561

Capillary Pressure (psia)	Pore Aperture Diameter (microns)	Cumulative Bulk Vol. (%)	Wetting Phase Saturation (%)	Incremental Wetting Phase Change (%)	Saturation Change per psia
1810	0.1179	0.41	100.0	0.00	0.0000
1980	0.1077	0.43	100.0	0.00	0.0000
2160	0.0988	0.44	100.0	0.00	0.0000
2370	0.0900	0.46	100.0	0.00	0.0000
2590	0.0824	0.48	100.0	0.00	0.0000
2830	0.0754	0.50	100.0	0.00	0.0000
3100	0.0688	0.52	99.6	0.41	0.0015
3390	0.0629	0.54	99.1	0.47	0.0016
3710	0.0575	0.57	98.6	0.54	0.0017
4060	0.0525	0.61	98.0	0.62	0.0018
4440	0.0480	0.64	97.3	0.69	0.0018
4850	0.0440	0.69	96.4	0.81	0.0020
5310	0.0402	0.73	95.5	0.92	0.0020
5810	0.0367	0.79	94.5	1.01	0.0020
6360	0.0335	0.85	93.3	1.19	0.0022
6950	0.0307	0.93	91.9	1.38	0.0023
7610	0.0280	1.01	90.3	1.65	0.0025
8320	0.0256	1.11	88.5	1.84	0.0026
9100	0.0234	1.24	86.1	2.38	0.0030
9960	0.0214	1.40	83.1	3.00	0.0035
10900	0.0196	1.60	79.4	3.69	0.0039
11900	0.0179	1.83	75.0	4.40	0.0044
13000	0.0164	2.10	69.9	5.05	0.0046
14300	0.0149	2.44	63.8	6.19	0.0048
15600	0.0137	2.77	57.5	6.21	0.0048
17100	0.0125	3.11	51.1	6.45	0.0043
18700	0.0114	3.46	44.6	6.47	0.0040
20400	0.0105	3.80	38.2	6.39	0.0038
22300	0.0096	4.13	32.0	6.19	0.0033
24400	0.0087	4.43	26.6	5.45	0.0026
26700	0.0080	4.69	21.7	4.85	0.0021
29300	0.0073	4.92	17.3	4.45	0.0017
32000	0.0067	5.10	13.9	3.36	0.0012
35000	0.0061	5.27	10.9	3.03	0.0010
38300	0.0056	5.40	8.4	2.53	0.0008
41900	0.0051	5.51	6.3	2.08	0.0006
45800	0.0047	5.61	4.5	1.75	0.0004
50100	0.0043	5.71	2.7	1.86	0.0004
54800	0.0039	5.77	1.5	1.20	0.0003
59500	0.0036	5.85	0.0	1.47	0.0003

Mercury Injection Capillary Pressure (Bulk Volume)



Mercury Injection Capillary Pressure (Pore Volume)



Pore Aperture Size Distribution