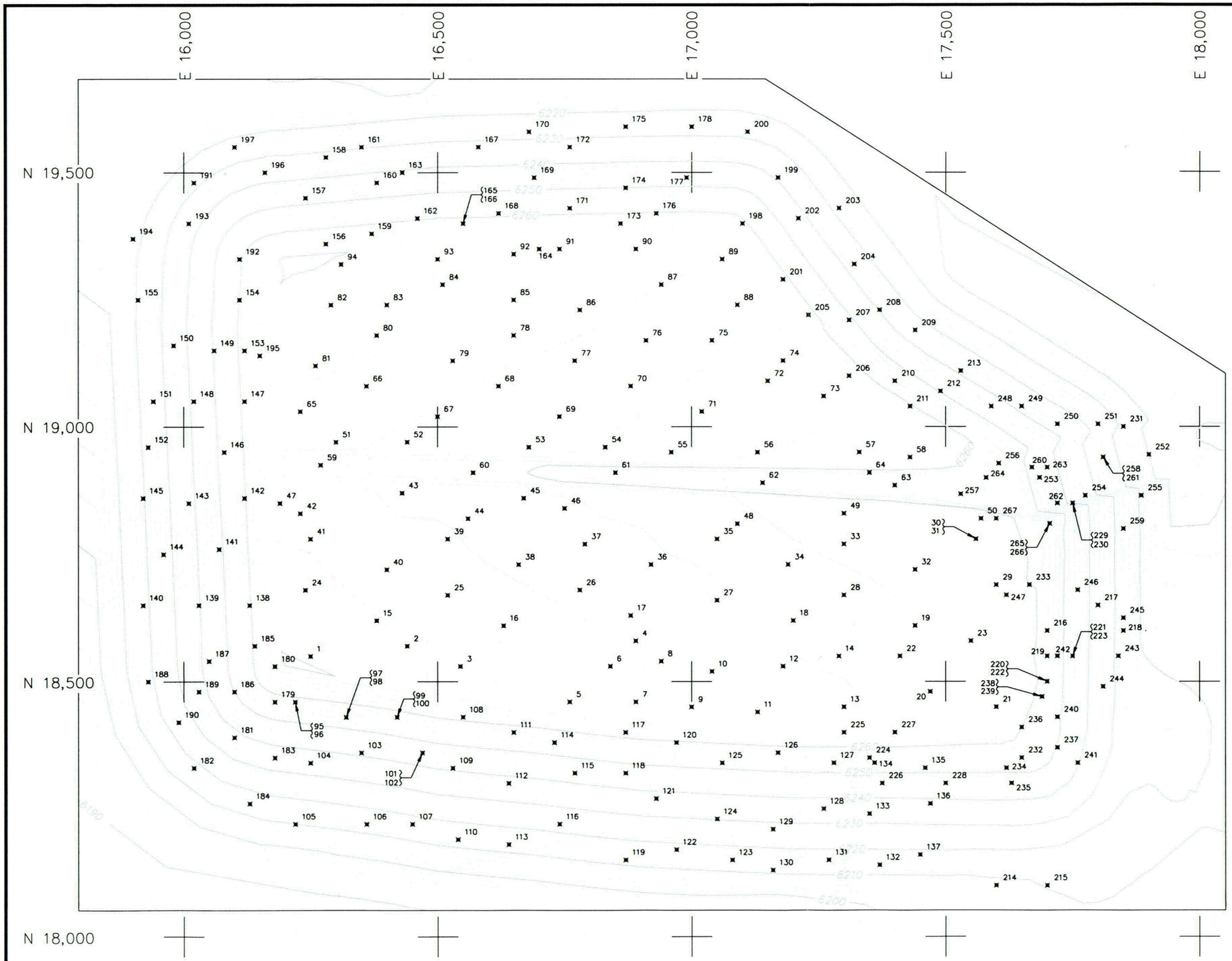


N

200 0 200

SCALE IN FEET

CONTOUR INTERVAL : 2'

NOTES:

1.) THE FROST BARRIER WAS PLACED TO THE LINES AND GRADE SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE SPECIFICATIONS DURING THE 1995, 1996 AND 1997 CONSTRUCTION SEASONS.

2.) THE FROST BARRIER WAS PLACED OVER THE APPROVED RADON BARRIER LAYER. FIELD AND LABORATORY TESTING WAS CONDUCTED IN ACCORDANCE WITH SPECIFICATION MAY-1, SECTION 7.3.

3.) THE FROST BARRIER SOILS WERE COMPACTED TO AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DENSITY AT A MOISTURE CONTENT BETWEEN PLUS OR MINUS 2% OF OPTIMUM AS DETERMINED BY ASTM D698. REFER TO INCLUDED SPREADSHEETS FOR TEST RESULT DETAILS.

LEGEND:

240 FIELD TEST LOCATION AND TEST NUMBER

NORTHING/EASTING GRID TICKS

MAYBELL HEAP LEACH FACILITY
FROST BARRIER FIELD TEST LOCATIONS
(SECOND LIFT)

UMETCO MINERALS CORPORATION

SECOND LIFT FROST BARRIER FIELD TEST LOCATIONS

MAYBELL HEAP LEACH FACILITY

DATE: AUGUST 2006 FIGURE 5

Maybell frost second lift.dwg

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction

Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
1	RFC-19	9/12/1995	18550	16250	128.2	17.3	111.0	110.9	15.6	15.6	97.2	97.1	P	RF-2	114.2	13.6	
2	RFC-20	9/12/1995	18570	16440	126.7	14.3	112.3	112.4	12.8	12.7	98.3	98.4	P	RF-2	114.2	13.6	
	RFC-20S	9/12/1995	18570	16440	126.9		112.0		13.3		98.1		N/A	RF-2	114.2	13.6	Sand-Cone
3	RFC-21	9/12/1995	18530	16545	127.6	16.9	110.7	110.7	15.3	15.3	96.9	96.9	P	RF-2	114.2	13.6	
4	RFC-22	9/12/1995	18580	16890	126.4	13.1	113.3	113.3	11.6	11.6	99.2	99.2	P	RF-2	114.2	13.6	
5	RFC-23	9/12/1995	18460	16760	126.9	13.7	113.1	113.2	12.2	12.1	99.0	99.1	P	RF-2	114.2	13.6	
6	RFC-24	9/12/1995	18530	16840	124.1	14.3	109.8	109.8	13.1	13.0	96.2	96.1	P	RF-2	114.2	13.6	
7	RFC-25	9/12/1995	18460	16890	129.6	17.0	112.6	112.6	15.1	15.1	98.6	98.6	P	RF-2	114.2	13.6	
8	RFC-26	9/12/1995	18540	16940	126.4	14.7	111.7	111.7	14.7	13.2	97.8	97.8	P	RF-2	114.2	13.6	
9	RFC-27	9/12/1995	18450	17000	124.9	13.7	111.2	111.2	12.3	12.3	97.4	97.4	P	RF-2	114.2	13.6	
10	RFC-28	9/12/1995	18520	17040	124.6	13.9	110.7	110.7	12.6	12.6	96.9	96.9	P	RF-2	114.2	13.6	
11	RFC-29	9/12/1995	18440	17130	125.3	13.1	112.2	112.2	11.7	11.7	98.3	98.2	P	RF-2	114.2	13.6	
12	RFC-30	9/12/1995	18530	17180	124.1	13.3	110.7	110.8	12.0	12.0	96.6	96.7	P	RF-3	114.6	13.8	
	RFC-30S	9/12/1995	18530	17180	124.9		110.2		13.1		96.2		N/A	RF-3	114.6	13.8	Sand-Cone
13	RFC-31	9/12/1995	18450	17300	124.3	14.1	110.2	110.2	12.8	12.8	96.2	96.2	P	RF-3	114.6	13.8	
14	RFC-32	9/12/1995	18550	17290	125.3	15.8	109.5	109.5	14.4	14.4	95.6	95.5	P	RF-3	114.6	13.8	
15	RFC-48	9/19/1995	18620	16380	124.6	14.5	110.2	110.1	13.2	13.2	95.8	95.7	P	RF-4	115.0	14.1	
16	RFC-49	9/19/1995	18610	16630	125.4	14.8	110.6	110.6	13.4	13.4	96.2	96.2	P	RF-4	115.0	14.1	
17	RFC-50	9/19/1995	18630	16880	125.9	15.6	110.3	110.3	14.1	14.1	95.9	95.9	P	RF-4	115.0	14.1	
	RFC-50S	9/19/1995	18630	16880	125.8		110.2		14.2		95.8		N/A	RF-4	115.0	14.1	Sand-Cone
18	RFC-51	9/19/1995	18620	17200	126.6	15.8	110.8	110.8	14.3	14.3	96.4	96.3	P	RF-4	115.0	14.1	
19	RFC-52	9/19/1995	18610	17440	125.1	15.1	110.0	110.0	13.7	13.7	95.7	95.7	P	RF-4	115.0	14.1	
20	RFC-53	9/19/1995	18480	17470	125.4	15.6	109.8	109.8	14.2	14.2	95.5	95.5	P	RF-4	115.0	14.1	
21	RFC-54	9/19/1995	18450	17600	125.7	15.3	110.4	110.4	13.8	13.9	96.0	96.0	P	RF-4	115.0	14.1	
22	RFC-55	9/19/1995	18550	17410	125.5	15.8	109.7	109.7	14.4	14.4	95.4	95.4	P	RF-4	115.0	14.1	
23	RFC-56	9/19/1995	18580	17550	126.2	15.5	110.7	110.7	14.0	14.0	96.3	96.3	P	RF-4	115.0	14.1	
24	RFC-70	9/20/1995	18680	16240	125.7	13.1	112.6	112.6	11.7	11.6	99.1	99.1	P	RF-5	113.6	13.6	
	RFC-70S	9/20/1995	18680	16240	126.0		113.2		11.4		99.7		N/A	RF-5	113.6	13.6	Sand-Cone, Fail Moisture on Sand-Cone Correlation
25	RFC-71	9/20/1995	18670	16520	126.2	13.3	112.9	112.9	11.8	11.8	99.4	99.4	P	RF-5	113.6	13.6	
26	RFC-72	9/20/1995	18680	16780	128.5	17.1	111.4	111.4	15.4	15.4	98.1	98.1	P	RF-5	113.6	13.6	
27	RFC-73	9/20/1995	18660	17050	129.3	14.1	115.3	115.2	12.2	12.2	101.5	101.4	P	RF-5	113.6	13.6	
28	RFC-74	9/20/1995	18670	17300	127.2	13.5	113.7	113.7	11.8	11.9	100.1	100.1	P	RF-5	113.6	13.6	
29	RFC-75	9/20/1995	18690	17600	125.9	13.9	112.0	112.0	12.4	12.4	97.7	97.7	P	RF-6	114.6	13.8	
30	RFC-87	9/21/1995	18780	17560	118.7	12.7	105.9	106.0	12.0	12.0	92.4	92.5	Fail	RF-6	114.6	13.8	Fail Compaction
31	RFC-87R	9/21/1995	18780	17560	125.4	14.3	111.1	111.1	12.8	12.9	97.0	96.9	P	RF-6	114.6	13.8	Retest of Test Number RFC-87
32	RFC-88	9/21/1995	18720	17440	125.2	14.6	110.6	110.6	13.2	13.2	96.5	96.5	P	RF-6	114.6	13.8	
33	RFC-89	9/21/1995	18770	17300	124.4	14.0	110.4	110.4	12.7	12.7	96.3	96.3	P	RF-6	114.6	13.8	
34	RFC-90	9/21/1995	18730	17190	126.4	15.8	110.5	110.6	14.3	14.3	96.8	96.8	P	RF-7	114.2	13.6	
	RFC-90S	9/21/1995	18730	17190	126.6		110.6		14.4		96.9		N/A	RF-7	114.2	13.6	Sand-Cone
35	RFC-91	9/21/1995	18780	17050	125.6	14.3	111.3	111.3	12.9	12.8	97.5	97.5	P	RF-7	114.2	13.6	
36	RFC-92	9/21/1995	18730	16920	126.8	16.7	110.1	110.1	15.2	15.2	96.4	96.4	P	RF-7	114.2	13.6	
37	RFC-93	9/21/1995	18770	16790	125.8	13.9	111.9	111.9	12.5	12.4	98.0	98.0	P	RF-7	114.2	13.6	
38	RFC-94	9/21/1995	18730	16660	125.8	14.5	111.2	111.3	13.1	13.0	97.4	97.5	P	RF-7	114.2	13.6	
39	RFC-95	9/21/1995	18780	16520	125.4	15.3	110.1	110.1	13.9	13.9	96.4	96.4	P	RF-7	114.2	13.6	
40	RFC-96	9/21/1995	18720	16400	127.1	16.4	110.7	110.7	14.8	14.8	96.9	96.9	P	RF-7	114.2	13.6	
41	RFC-97	9/21/1995	18780	16250	125.0	14.7	110.3	110.3	14.7	13.3	96.6	96.6	P	RF-7	114.2	13.6	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
42	RFC-129	9/27/1995	18830	16230	125.3	14.2	111.2	111.1	12.7	12.8	97.1	97.0	P	RF-9	114.5	13.5	
43	RFC-130	9/27/1995	18870	16430	126.0	16.0	110.1	110.0	14.5	14.5	96.2	96.1	P	RF-9	114.5	13.5	
	RFC-130S	9/27/1995	18870	16430	125.6		109.7		14.4		95.8		N/A	RF-9	114.5	13.5	Sand-Cone
44	RFC-131	9/27/1995	18820	16560	128.2	16.6	111.6	111.6	14.8	14.9	97.5	97.5	P	RF-9	114.5	13.5	
45	RFC-132	9/27/1995	18860	16670	126.8	16.0	110.8	110.8	14.4	14.4	96.8	96.8	P	RF-9	114.5	13.5	
46	RFC-133	9/27/1995	18840	16750	125.8	15.1	110.7	110.7	13.7	13.6	96.7	96.7	P	RF-9	114.5	13.5	
47	RFC-134	9/27/1995	18850	16190	125.4	14.9	110.5	110.5	13.5	13.5	96.5	96.5	P	RF-9	114.5	13.5	
48	RFC-135	9/27/1995	18810	17090	126.9	16.0	110.9	110.9	14.4	14.4	97.2	97.2	P	RF-10	114.1	14.0	
49	RFC-136	9/27/1995	18830	17300	126.7	13.7	113.0	113.0	12.1	12.1	99.0	99.0	P	RF-10	114.1	14.0	
50	RFC-137	9/27/1995	18820	17570	126.0	15.7	110.3	110.3	14.3	14.2	96.7	96.7	P	RF-10	114.1	14.0	
51	RFC-160	10/12/1995	18970	16300	124.4	15.3	109.1	109.1	14.0	14.0	95.2	95.2	P	RF-11	114.6	14.0	
	RFC-160S	10/12/1995	18970	16300	124.5		109.3		14.0		95.4		N/A	RF-11	114.6	14.0	Sand-Cone
52	RFC-161	10/12/1995	18970	16440	130.8	17.1	113.7	113.7	15.1	15.0	99.1	99.2	P	RF-11	114.6	14.0	
53	RFC-162	10/12/1995	18960	16680	128.0	15.9	112.1	112.1	14.2	14.2	97.8	97.8	P	RF-11	114.6	14.0	
54	RFC-163	10/12/1995	18960	16830	125.8	14.8	111.0	111.0	13.3	13.3	96.9	96.9	P	RF-11	114.6	14.0	
55	RFC-164	10/12/1995	18950	16960	125.9	14.6	111.3	111.3	13.1	13.1	97.1	97.1	P	RF-11	114.6	14.0	
56	RFC-165	10/12/1995	18950	17130	130.9	16.7	114.2	114.2	14.6	14.6	99.5	99.5	P	RF-12	114.8	14.6	
57	RFC-166	10/12/1995	18950	17330	127.9	14.7	113.2	113.2	13.0	13.0	98.6	98.6	P	RF-12	114.8	14.6	
58	RFC-167	10/12/1995	18940	17430	125.9	14.7	111.2	111.2	13.2	13.2	96.9	96.9	P	RF-12	114.8	14.6	
59	RFC-168	10/13/1995	18925	16270	129.0	15.2	113.8	113.8	13.4	13.4	99.1	99.1	P	RF-12	114.8	14.6	Channel 1
60	RFC-169	10/13/1995	18910	16570	124.3	14.4	109.8	109.9	13.1	13.1	95.6	95.7	P	RF-12	114.8	14.6	Channel 1
61	RFC-170	10/13/1995	18910	16850	125.8	15.3	110.5	110.5	13.8	13.8	96.2	96.3	P	RF-12	114.8	14.6	Channel 1
	RFC-170S	10/13/1995	18910	16850	125.9		110.8		13.7		96.5		N/A	RF-12	114.8	14.6	Sand-Cone, Channel 1
62	RFC-171	10/13/1995	18890	17140	125.7	14.9	110.8	110.8	13.5	13.4	96.4	96.5	P	RF-12	114.8	14.6	Channel 1
63	RFC-172	10/13/1995	18885	17400	126.7	14.3	112.4	112.4	12.7	12.7	97.9	97.9	P	RF-12	114.8	14.6	Channel 1
64	RFC-188	10/17/1995	18910	17350	125.4	14.5	110.9	110.9	13.1	13.1	96.9	96.9	P	RF-13	114.5	14.3	North Side 3:1 Slope of Channel 1
65	RFC-199	10/20/1995	19030	16230	126.3	14.6	111.7	111.7	13.1	13.1	98.0	98.0	P	RF-14	114.0	14.9	
66	RFC-200	10/20/1995	19080	16360	128.9	15.0	113.9	113.9	13.2	13.2	99.9	99.9	P	RF-14	114.0	14.9	
	RFC-200S	10/20/1995	19080	16360	129.4		114.1		13.4		100.1		N/A	RF-14	114.0	14.9	Sand-Cone
67	RFC-201	10/20/1995	19020	16500	126.3	14.9	111.4	111.4	13.4	13.4	97.7	97.7	P	RF-14	114.0	14.9	
68	RFC-202	10/20/1995	19080	16620	125.5	15.3	110.2	110.2	13.9	13.9	96.7	96.7	P	RF-14	114.0	14.9	
69	RFC-203	10/20/1995	19020	16740	125.9	14.8	111.1	111.1	13.3	13.3	97.5	97.5	P	RF-14	114.0	14.9	
70	RFC-204	10/20/1995	19080	16880	128.7	15.3	113.4	113.4	13.5	13.5	99.5	99.5	P	RF-14	114.0	14.9	
71	RFC-205	10/20/1995	19030	17020	124.7	15.0	109.7	109.7	13.6	13.7	96.2	96.2	P	RF-14	114.0	14.9	
72	RFC-206	10/20/1995	19090	17150	125.9	14.6	111.3	111.3	13.1	13.1	97.6	97.6	P	RF-14	114.0	14.9	
73	RFC-207	10/20/1995	19060	17260	124.9	14.6	110.3	110.3	13.3	13.2	96.7	96.8	P	RF-14	114.0	14.9	
74	RFC-278	10/27/1995	19130	17180	128.9	16.7	112.2	112.2	14.8	14.9	98.8	98.9	P	RF-19	113.5	14.2	
75	RFC-279	10/27/1995	19170	17040	126.5	15.4	111.2	111.1	13.8	13.9	98.0	97.9	P	RF-19	113.5	14.2	
76	RFC-280	10/27/1995	19170	16910	127.2	16.2	111.0	111.0	14.6	14.6	97.8	97.8	P	RF-19	113.5	14.2	
	RFC-280S	10/27/1995	19170	16910	127.0		111.2		14.2		98.0		N/A	RF-19	113.5	14.2	Sand-Cone
77	RFC-281	10/27/1995	19130	16770	127.9	15.8	112.1	112.1	14.1	14.1	98.8	98.8	P	RF-19	113.5	14.2	
78	RFC-282	10/27/1995	19180	16650	125.5	15.0	110.5	110.5	13.6	13.6	97.4	97.4	P	RF-19	113.5	14.2	
79	RFC-283	10/27/1995	19130	16530	125.9	15.6	110.3	110.3	14.2	14.1	97.2	97.2	P	RF-19	113.5	14.2	
80	RFC-284	10/27/1995	19180	16380	125.6	14.5	111.1	111.1	13.0	13.1	97.9	97.9	P	RF-19	113.5	14.2	
81	RFC-285	10/27/1995	19120	16260	128.0	15.1	112.9	112.9	13.4	13.4	99.7	99.6	P	RF-20	113.3	14.5	
82	RFC-286	10/27/1995	19240	16290	126.7	14.9	111.7	111.8	13.3	13.3	98.6	98.7	P	RF-20	113.3	14.5	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
83	RFC-287	10/27/1995	19240	16400	129.7	16.9	112.8	112.8	15.0	15.0	99.6	99.6	P	RF-20	113.3	14.5	
84	RFC-288	10/27/1995	19280	16510	128.1	16.1	111.9	112.0	14.4	14.4	98.8	98.9	P	RF-20	113.3	14.5	
85	RFC-289	10/27/1995	19250	16650	128.4	16.8	111.6	111.6	15.0	15.1	98.5	98.5	P	RF-20	113.3	14.5	
86	RFC-290	10/27/1995	19230	16780	127.2	15.0	112.2	112.2	13.4	13.4	99.0	99.0	P	RF-20	113.3	14.5	
	RFC-290S	10/27/1995	19230	16780	126.9		111.5		13.9		98.4		N/A	RF-20	113.3	14.5	Sand-Cone
87	RFC-291	10/27/1995	19280	16940	128.0	16.2	111.8	111.8	14.5	14.5	98.7	98.7	P	RF-20	113.3	14.5	
88	RFC-292	10/27/1995	19240	17090	129.1	16.5	112.6	112.6	14.6	14.7	99.4	99.4	P	RF-20	113.3	14.5	
89	RFC-293	10/27/1995	19330	17060	126.5	15.0	111.5	111.5	13.5	13.5	98.4	98.4	P	RF-20	113.3	14.5	
90	RFC-294	10/27/1995	19350	16890	125.7	14.6	111.1	111.1	13.1	13.1	98.1	98.1	P	RF-20	113.3	14.5	
91	RFC-295	10/27/1995	19350	16740	126.4	14.8	111.6	111.6	13.3	13.3	98.5	98.5	P	RF-20	113.3	14.5	
92	RFC-296	10/27/1995	19340	16650	126.2	15.8	110.4	110.4	14.3	14.3	97.4	97.4	P	RF-20	113.3	14.5	
93	RFC-297	10/27/1995	19330	16500	124.8	14.7	110.1	110.1	13.4	13.4	97.2	97.2	P	RF-20	113.3	14.5	
94	RFC-298	10/27/1995	19320	16310	126.9	16.0	110.9	110.9	14.4	14.4	97.9	97.9	P	RF-20	113.3	14.5	
95	RFC-381	6/21/1996	18460	16220	110.6	10.6	100.0	100.0	10.6	10.6	86.9	87.0	Fail	RF-28	115.0	14.9	Fail Moisture & Compaction
96	RFC-381R	6/22/1996	18460	16220	125.2	16.0	109.2	109.2	14.7	14.7	95.0	95.0	P	RF-28	115.0	14.9	Retest of Test Number RFC-381
97	RFC-382	6/21/1996	18430	16320	111.8	11.8	100.0	100.0	11.8	11.8	86.9	87.0	Fail	RF-28	115.0	14.9	Fail Moisture & Compaction
98	RFC-382R	6/22/1996	18430	16320	125.4	16.2	109.2	109.2	14.8	14.8	95.0	95.0	P	RF-28	115.0	14.9	Retest of Test Number RFC-382
99	RFC-383	6/21/1996	18430	16420	116.3	16.9	99.3	99.4	17.1	17.0	86.4	86.4	Fail	RF-28	115.0	14.9	Fail Moisture & Compaction
100	RFC-383R	6/22/1996	18430	16420	123.8	14.2	109.6	109.6	13.0	13.0	95.3	95.3	P	RF-28	115.0	14.9	Retest of Test Number RFC-383
101	RFC-384	6/21/1996	18360	16470	113.5	11.5	102.0	102.0	11.3	11.3	88.6	88.7	Fail	RF-28	115.0	14.9	Fail Moisture & Compaction
102	RFC-384R	6/22/1996	18360	16470	124.4	15.0	109.4	109.4	13.7	13.7	95.1	95.1	P	RF-28	115.0	14.9	Retest of Test Number RFC-384
103	RFC-385	6/22/1996	18360	16350	125.7	15.8	109.9	109.9	14.4	14.4	95.6	95.6	P	RF-28	115.0	14.9	
104	RFC-386	6/22/1996	18340	16250	124.9	15.4	109.5	109.5	14.1	14.1	95.2	95.2	P	RF-28	115.0	14.9	
105	RFC-387	6/22/1996	18220	16220	123.8	14.5	109.2	109.3	13.3	13.3	95.0	95.0	P	RF-28	115.0	14.9	
106	RFC-388	6/22/1996	18220	16360	124.4	14.1	110.3	110.3	12.8	12.8	95.9	95.9	P	RF-28	115.0	14.9	Verification calculation indicates failed moisture by minus 0.1%
107	RFC-389	6/22/1996	18220	16450	126.2	17.0	109.2	109.2	15.6	15.6	95.0	95.0	P	RF-28	115.0	14.9	
108	RFC-405	6/25/1996	18430	16550	123.3	14.0	109.3	109.3	12.8	12.8	95.9	95.9	P	RF-30	114.0	14.4	
109	RFC-406	6/25/1996	18330	16530	124.0	14.1	109.9	109.9	12.8	12.8	96.4	96.4	P	RF-30	114.0	14.4	
110	RFC-407	6/25/1996	18190	16540	124.2	14.0	110.2	110.2	12.7	12.7	96.7	96.7	P	RF-30	114.0	14.4	
111	RFC-408	6/25/1996	18400	16650	122.8	14.2	108.6	108.6	13.1	13.1	95.3	95.3	P	RF-30	114.0	14.4	
112	RFC-409	6/25/1996	18300	16640	124.9	14.4	110.5	110.5	13.0	13.0	96.9	96.9	P	RF-30	114.0	14.4	
113	RFC-410	6/25/1996	18180	16640	123.8	15.4	108.5	108.4	14.2	14.2	95.2	95.1	P	RF-30	114.0	14.4	
	RFC-410S	6/25/1996	18180	16640	124.4		109.7		13.5		96.2		N/A	RF-30	114.0	14.4	Sand-Cone
114	RFC-411	6/25/1996	18380	16730	123.7	14.4	109.3	109.3	13.2	13.2	95.9	95.9	P	RF-30	114.0	14.4	
115	RFC-412	6/25/1996	18320	16770	123.9	14.8	109.1	109.1	13.6	13.6	95.7	95.7	P	RF-30	114.0	14.4	
116	RFC-413	6/25/1996	18220	16740	124.6	14.9	109.7	109.7	13.6	13.6	96.2	96.2	P	RF-30	114.0	14.4	
117	RFC-414	6/25/1996	18400	16870	123.4	15.1	108.3	108.3	13.9	13.9	95.0	95.0	P	RF-30	114.0	14.4	
118	RFC-415	6/25/1996	18320	16870	127.5	19.1	108.4	108.4	17.6	17.6	95.1	95.1	P	RF-30	114.0	14.4	Verification calculation indicates failed moisture by plus 1.2%
119	RFC-416	6/25/1996	18150	16870	123.8	15.6	108.3	108.2	14.4	14.4	95.0	94.9	P	RF-30	114.0	14.4	Verification calculation indicates failed compaction by minus 0.1%
120	RFC-453	7/2/1996	18380	16970	123.9	14.1	109.8	109.8	12.9	12.8	95.2	95.2	P	RF-33	115.3	13.9	
121	RFC-454	7/2/1996	18270	16930	123.3	13.2	110.1	110.1	12.0	12.0	95.4	95.5	P	RF-33	115.3	13.9	
122	RFC-455	7/2/1996	18170	16970	125.5	14.8	110.7	110.7	13.4	13.4	96.0	96.0	P	RF-33	115.3	13.9	
123	RFC-456	7/2/1996	18150	17080	126.0	15.3	110.7	110.7	13.8	13.8	96.0	96.0	P	RF-33	115.3	13.9	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
124	RFC-457	7/2/1996	18230	17050	125.7	14.1	111.6	111.6	12.6	12.6	96.8	96.8	P	RF-33	115.3	13.9	
125	RFC-458	7/2/1996	18340	17060	126.4	15.2	111.2	111.2	13.7	13.7	96.4	96.4	P	RF-33	115.3	13.9	
126	RFC-459	7/2/1996	18360	17170	124.8	13.6	111.2	111.2	12.2	12.2	96.4	96.4	P	RF-33	115.3	13.9	
127	RFC-460	7/2/1996	18340	17280	126.6	16.1	110.5	110.5	14.6	14.6	95.8	95.8	P	RF-33	115.3	13.9	
	RFC-460S	7/2/1996	18340	17280	125.1		109.8		13.9		95.3		N/A	RF-33	115.3	13.9	Sand-Cone
128	RFC-461	7/2/1996	18250	17260	123.8	14.2	109.6	109.6	13.0	13.0	95.1	95.1	P	RF-33	115.3	13.9	
129	RFC-462	7/2/1996	18210	17160	126.2	15.7	110.5	110.5	14.2	14.2	95.8	95.8	P	RF-33	115.3	13.9	
130	RFC-463	7/2/1996	18130	17160	124.1	14.4	109.7	109.7	13.1	13.1	95.1	95.1	P	RF-33	115.3	13.9	
131	RFC-464	7/2/1996	18150	17270	125.8	16.2	109.6	109.6	14.8	14.8	95.0	95.1	P	RF-33	115.3	13.9	
132	RFC-465	7/2/1996	18140	17370	126.9	16.8	110.1	110.1	15.3	15.3	96.3	96.3	P	RF-34	114.3	14.5	
133	RFC-466	7/2/1996	18240	17350	124.5	15.0	109.5	109.5	13.7	13.7	95.8	95.8	P	RF-34	114.3	14.5	
134	RFC-467	7/2/1996	18340	17360	127.4	17.9	109.5	109.5	16.3	16.3	95.8	95.8	P	RF-34	114.3	14.5	
135	RFC-468	7/2/1996	18330	17460	126.4	17.3	109.1	109.1	15.9	15.9	95.5	95.5	P	RF-34	114.3	14.5	
136	RFC-469	7/2/1996	18260	17470	125.0	15.1	109.8	109.9	13.8	13.7	96.1	96.2	P	RF-34	114.3	14.5	
137	RFC-470	7/2/1996	18160	17450	127.3	16.6	110.7	110.7	15.0	15.0	96.9	96.9	P	RF-34	114.3	14.5	
	RFC-470S	7/2/1996	18160	17450	126.7		109.5		15.7		95.8		N/A	RF-34	114.3	14.5	Sand-Cone
138	RFC-523	7/22/1996	18650	16130	127.7	16.8	110.9	110.9	15.2	15.1	95.9	95.9	P	RF-37	115.6	13.4	
139	RFC-524	7/22/1996	18650	16030	125.4	14.2	111.2	111.2	12.7	12.8	96.2	96.2	P	RF-37	115.6	13.4	
140	RFC-525	7/22/1996	18650	15920	128.2	15.1	113.0	113.1	13.4	13.4	98.9	99.0	P	RF-38	114.2	14.1	
141	RFC-526	7/23/1996	18760	16070	126.8	15.0	111.8	111.8	13.4	13.4	97.9	97.9	P	RF-38	114.2	14.1	
142	RFC-527	7/23/1996	18860	16120	127.0	16.6	110.4	110.4	15.0	15.0	96.7	96.7	P	RF-38	114.2	14.1	
143	RFC-528	7/23/1996	18850	16010	124.9	16.0	108.9	108.9	14.7	14.7	95.4	95.4	P	RF-38	114.2	14.1	
144	RFC-529	7/23/1996	18750	15960	126.7	17.2	109.6	109.5	15.7	15.7	96.0	95.9	P	RF-38	114.2	14.1	
145	RFC-530	7/23/1996	18860	15920	127.5	16.7	110.8	110.8	15.1	15.1	97.1	97.0	P	RF-38	114.2	14.1	
	RFC-530S	7/23/1996	18860	15920	127.9		112.5		13.7		98.5		N/A	RF-38	114.2	14.1	Sand-Cone
146	RFC-531	7/25/1996	18950	16080	125.8	14.7	111.1	111.1	13.3	13.2	97.3	97.3	P	RF-38	114.2	14.1	
147	RFC-532	7/25/1996	19050	16120	124.2	13.4	110.7	110.8	12.1	12.1	97.0	97.0	P	RF-38	114.2	14.1	
148	RFC-533	7/25/1996	19050	16020	122.7	14.1	108.5	108.6	13.0	13.0	95.1	95.1	P	RF-38	114.2	14.1	
149	RFC-534	7/25/1996	19150	16060	122.3	13.4	108.8	108.9	12.4	12.3	95.3	95.4	P	RF-38	114.2	14.1	
150	RFC-535	7/25/1996	19160	15980	124.3	14.3	110.0	110.0	13.0	13.0	96.3	96.3	P	RF-38	114.2	14.1	
151	RFC-536	7/25/1996	19050	15940	123.3	14.7	108.6	108.6	13.6	13.5	95.1	95.1	P	RF-38	114.2	14.1	
152	RFC-537	7/25/1996	18960	15930	123.9	15.3	108.6	108.6	14.1	14.1	95.1	95.1	P	RF-38	114.2	14.1	
153	RFC-538	7/25/1996	19150	16120	125.6	16.7	108.9	108.9	15.3	15.3	95.4	95.4	P	RF-38	114.2	14.1	
154	RFC-580	8/8/1996	19250	16110	124.8	14.6	110.3	110.2	13.2	13.2	95.8	95.8	P	RF-41	115.0	14.2	
	RFC-580S	8/8/1996	19250	16110	122.9		109.5		12.2		95.3		N/A	RF-41	115.0	14.2	Sand-Cone
155	RFC-581	8/8/1996	19250	15910	129.6	17.6	112.0	112.0	15.8	15.7	97.3	97.4	P	RF-41	115.0	14.2	
156	RFC-582	8/9/1996	19360	16280	127.3	17.8	109.4	109.5	16.3	16.3	95.1	95.2	P	RF-41	115.0	14.2	Verification calculation indicates failed moisture by plus 0.1%
157	RFC-583	8/9/1996	19450	16240	127.5	16.5	111.0	111.0	14.8	14.9	96.5	96.5	P	RF-41	115.0	14.2	
158	RFC-584	8/9/1996	19530	16280	125.7	14.2	111.4	111.5	12.8	12.7	96.9	97.0	P	RF-41	115.0	14.2	
159	RFC-594	8/13/1996	19380	16370	123.4	13.1	110.4	110.3	11.8	11.9	95.4	95.4	P	RF-42	115.6	13.3	
160	RFC-595	8/13/1996	19480	16380	127.0	13.5	113.5	113.5	11.9	11.9	98.1	98.2	P	RF-42	115.6	13.3	
161	RFC-596	8/13/1996	19550	16350	124.7	13.4	111.3	111.3	12.1	12.0	96.2	96.3	P	RF-42	115.6	13.3	
162	RFC-597	8/13/1996	19410	16460	124.9	13.6	111.3	111.3	12.3	12.2	96.2	96.3	P	RF-42	115.6	13.3	
163	RFC-598	8/13/1996	19500	16430	122.3	12.4	109.9	109.9	11.3	11.3	95.0	95.1	P	RF-42	115.6	13.3	
164	RFC-620	8/15/1996	19350	16700	124.2	14.4	109.8	109.8	13.1	13.1	95.3	95.3	P	RF-44	115.2	13.0	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
	RFC-620S	8/15/1996	19350	16700	125.3		112.2		11.7		97.4		N/A	RF-44	115.2	13.0	Sand-Cone
165	RFC-621	8/15/1996	19400	16550	123.3	16.3	107.0	107.0	15.2	15.2	92.9	92.9	Fail	RF-44	115.2	13.0	Fail Moisture & Compaction
166	RFC-621R	8/15/1996	19400	16550	126.2	14.7	111.5	111.5	13.2	13.2	96.7	96.8	P	RF-44	115.2	13.0	Retest of Test Number RFC-621
167	RFC-622	8/15/1996	19550	16580	124.3	13.2	111.0	111.1	11.9	11.9	96.3	96.4	P	RF-44	115.2	13.0	
168	RFC-623	8/15/1996	19420	16620	126.5	16.4	110.1	110.1	14.9	14.9	95.5	95.6	P	RF-44	115.2	13.0	
169	RFC-624	8/15/1996	19490	16690	125.0	15.5	109.5	109.5	14.2	14.2	95.0	95.1	P	RF-44	115.2	13.0	
170	RFC-625	8/15/1996	19580	16680	124.6	14.7	109.8	109.9	13.4	13.4	95.3	95.4	P	RF-44	115.2	13.0	
171	RFC-626	8/15/1996	19430	16760	124.4	14.8	109.6	109.6	13.5	13.5	95.1	95.1	P	RF-44	115.2	13.0	
172	RFC-627	8/15/1996	19550	16760	126.8	14.2	112.6	112.6	12.6	12.6	97.7	97.7	P	RF-44	115.2	13.0	
173	RFC-628	8/15/1996	19400	16860	125.4	14.9	110.5	110.5	13.5	13.5	95.9	95.9	P	RF-44	115.2	13.0	
174	RFC-629	8/15/1996	19470	16870	124.8	12.6	112.2	112.2	11.2	11.2	97.4	97.4	P	RF-44	115.2	13.0	
175	RFC-630	8/15/1996	19590	16870	127.2	16.0	111.2	111.2	14.4	14.4	97.2	97.2	P	RF-45	114.4	13.4	
	RFC-630S	8/15/1996	19590	16870	128.5		113.6		13.1		99.3		N/A	RF-45	114.4	13.4	Sand-Cone
176	RFC-631	8/15/1996	19420	16930	125.6	13.5	112.0	112.1	12.1	12.0	97.9	98.0	P	RF-45	114.4	13.4	
177	RFC-632	8/15/1996	19490	16990	124.7	14.7	110.0	110.0	13.4	13.4	96.1	96.2	P	RF-45	114.4	13.4	
178	RFC-633	8/15/1996	19590	17000	126.4	15.9	110.5	110.5	14.4	14.4	96.5	96.6	P	RF-45	114.4	13.4	
179	RFC-671	9/12/1996	18460	16180	124.4	14.3	110.0	110.1	13.0	13.0	95.7	95.8	P	RF-47	114.9	13.9	
180	RFC-672	9/12/1996	18530	16180	124.7	14.4	110.3	110.3	13.1	13.1	96.0	96.0	P	RF-47	114.9	13.9	
181	RFC-673	9/12/1996	18390	16100	127.4	15.6	111.8	111.8	14.0	14.0	97.2	97.3	P	RF-47	114.9	13.9	
182	RFC-674	9/12/1996	18330	16020	123.2	13.1	110.1	110.1	11.9	11.9	95.8	95.8	P	RF-47	114.9	13.9	
183	RFC-675	9/12/1996	18350	16180	126.6	15.0	111.6	111.6	13.4	13.4	96.8	96.8	P	RF-48	115.3	13.3	
184	RFC-676	9/12/1996	18260	16130	125.7	15.6	110.1	110.1	14.2	14.2	95.4	95.5	P	RF-48	115.3	13.3	
185	RFC-677	9/12/1996	18570	16140	124.5	14.3	110.2	110.2	13.0	13.0	95.6	95.6	P	RF-48	115.3	13.3	
186	RFC-678	9/12/1996	18480	16100	125.8	15.4	110.4	110.4	14.0	13.9	95.7	95.8	P	RF-48	115.3	13.3	
187	RFC-679	9/12/1996	18540	16050	126.9	17.0	109.9	109.9	15.4	15.5	95.3	95.3	P	RF-48	115.3	13.3	Verification calculation indicates failed moisture by plus 0.2%
188	RFC-680	9/12/1996	18500	15930	127.0	16.9	110.1	110.1	15.3	15.3	95.4	95.5	P	RF-48	115.3	13.3	
	RFC-680S	9/12/1996	18500	15930	125.1		110.5		13.3		95.8		N/A	RF-48	115.3	13.3	Sand-Cone
189	RFC-681	9/12/1996	18480	16030	124.9	14.1	110.8	110.8	12.7	12.7	96.1	96.1	P	RF-48	115.3	13.3	
190	RFC-682	9/12/1996	18420	15990	126.5	16.2	110.3	110.3	14.7	14.7	95.6	95.7	P	RF-48	115.3	13.3	
191	RFC-710	9/19/1996	19480	16020	124.8	15.2	109.6	109.6	13.9	13.9	95.7	95.7	P	RF-50	114.5	13.5	
	RFC-710S	9/19/1996	19480	16020	123.9		108.8		13.8		95.1		N/A	RF-50	114.5	13.5	Sand-Cone
192	RFC-711	9/19/1996	19330	16110	129.4	16.2	113.2	113.2	14.3	14.3	98.8	98.9	P	RF-50	114.5	13.5	
193	RFC-712	9/19/1996	19400	16010	126.6	17.1	109.6	109.5	15.6	15.6	95.6	95.6	P	RF-50	114.5	13.5	Verification calculation indicates failed moisture by plus 0.1%
194	RFC-713	9/19/1996	19370	15900	126.0	16.2	109.8	109.8	14.7	14.8	95.9	95.9	P	RF-50	114.5	13.5	
195	RFC-714	9/19/1996	19140	16150	128.9	17.2	111.7	111.7	15.4	15.4	97.5	97.6	P	RF-50	114.5	13.5	
196	RFC-715	9/19/1996	19500	16160	125.9	15.6	110.3	110.3	14.1	14.1	96.3	96.3	P	RF-50	114.5	13.5	
197	RFC-716	9/19/1996	19550	16100	126.1	15.4	110.7	110.7	13.9	13.9	96.6	96.7	P	RF-50	114.5	13.5	
198	RFC-738	10/10/1996	19400	17100	127.1	16.2	110.9	110.9	14.6	14.6	95.9	96.0	P	RF-52	115.5	12.7	
199	RFC-739	10/10/1996	19490	17170	123.5	12.5	111.0	111.0	11.3	11.3	96.1	96.1	P	RF-52	115.5	12.7	
200	RFC-740	10/10/1996	19580	17110	125.7	14.9	110.8	110.8	13.5	13.4	95.9	95.9	P	RF-52	115.5	12.7	
	RFC-740S	10/10/1996	19580	17110	127.7		112.5		13.5		97.4		N/A	RF-52	115.5	12.7	Sand-Cone
201	RFC-741	10/11/1996	19290	17180	125.0	15.2	109.8	109.8	13.8	13.8	95.1	95.1	P	RF-52	115.5	12.7	
202	RFC-742	10/11/1996	19410	17210	126.8	14.8	111.9	112.0	13.3	13.2	96.8	97.0	P	RF-52	115.5	12.7	
203	RFC-743	10/11/1996	19430	17290	124.5	14.7	109.9	109.8	13.3	13.4	95.1	95.1	P	RF-52	115.5	12.7	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

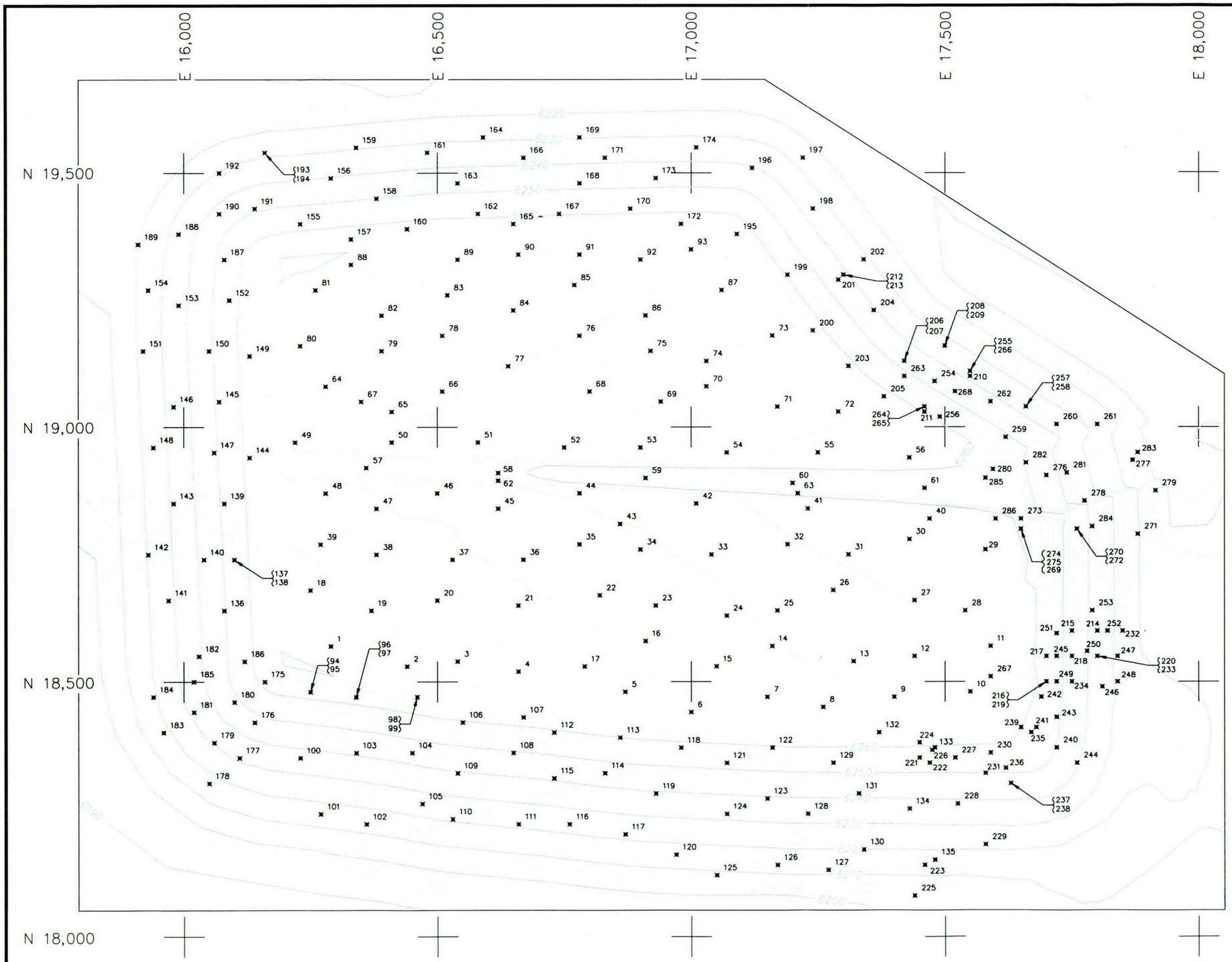
Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
204	RFC-744	10/11/1996	19320	17320	125.4	15.3	110.0	110.1	13.9	13.9	95.2	95.3	P	RF-52	115.5	12.7	
205	RFC-745	10/11/1996	19220	17230	126.1	15.6	110.4	110.5	14.2	14.1	95.6	95.7	P	RF-52	115.5	12.7	
206	RFC-770	10/19/1996	19100	17310	129.6	16.7	112.9	112.9	14.8	14.8	97.2	97.2	P	RF-54	116.2	13.0	
	RFC-770S	10/19/1996	19100	17310	130.9		113.7		15.2		97.8		N/A	RF-54	116.2	13.0	Fail Moisture on Sand-Cone Correlation
207	RFC-771	10/19/1996	19210	17310	127.0	16.4	110.6	110.6	14.8	14.8	95.1	95.2	P	RF-54	116.2	13.0	
208	RFC-772	10/19/1996	19230	17370	125.5	14.6	110.9	110.9	13.2	13.2	95.4	95.4	P	RF-54	116.2	13.0	
209	RFC-773	10/19/1996	19190	17440	126.5	14.3	112.2	112.2	12.7	12.7	96.6	96.6	P	RF-54	116.2	13.0	
210	RFC-774	10/19/1996	19090	17400	125.4	14.4	111.1	111.0	12.9	13.0	95.5	95.5	P	RF-54	116.2	13.0	
211	RFC-775	10/19/1996	19040	17430	126.0	15.5	110.5	110.5	14.0	14.0	95.1	95.1	P	RF-54	116.2	13.0	
212	RFC-776	10/19/1996	19070	17490	126.0	14.9	111.1	111.1	13.4	13.4	95.6	95.6	P	RF-54	116.2	13.0	
213	RFC-777	10/19/1996	19110	17530	125.9	14.0	111.9	111.9	12.5	12.5	96.3	96.3	P	RF-54	116.2	13.0	
214	RFC-785	5/15/1997	18100	17600	126.0	12.8	113.3	113.3	11.3	11.3	96.7	96.7	P	RF-57	117.1	14.2	Reverification South toe, Verification calculation indicates failed moisture by minus 0.9%
215	RFC-786	5/15/1997	18100	17700	129.0	13.8	115.3	115.3	11.9	11.9	98.4	98.4	P	RF-57	117.1	14.2	Reverification South toe, Verification calculation indicates failed moisture by minus 0.3%
216	RFC-800	5/21/1997	18600	17700	127.5	14.5	113.0	113.0	12.8	12.8	95.8	95.8	P	RF-58	117.9	13.1	
217	RFC-801	5/21/1997	18650	17800	127.5	15.0	112.5	112.5	13.3	13.3	95.4	95.4	P	RF-58	117.9	13.1	
	RFC-801S	5/21/1997	18650	17800	131.4	14.8	116.6	116.6	12.6	12.7	98.9		N/A	RF-58	117.9	13.1	Sand-Cone
218	RFC-802	5/21/1997	18600	17850	132.0	17.0	115.0	115.0	14.7	14.8	97.7	97.8	P	RF-59	117.6	12.9	
219	RFC-806	5/21/1997	18550	17700	128.5	15.8	112.8	112.8	13.9	14.0	95.8	95.9	P	RF-59	117.6	12.9	
220	RFC-807	5/21/1997	18500	17700	130.0	16.3	113.8	113.8	14.2	14.3	96.7	96.7	P	RF-59	117.6	12.9	
221	RFC-808	5/21/1997	18550	17750	127.0	13.0	114.0	114.0	11.4	11.4	96.9	96.9	P	RF-59	117.6	12.9	
222	RFC-809	5/21/1997	18500	17700	126.5	13.3	113.3	113.3	11.7	11.7	96.3	96.3	P	RF-59	117.6	12.9	
223	RFC-810	5/21/1997	18550	17750	125.0	13.3	111.8	111.8	11.8	11.9	95.0	95.0	P	RF-59	117.6	12.9	
224	RFC-834	7/2/1997	18350	17350	128.6	14.9	113.7	113.7	13.1	13.1	97.0	97.0	P	RF-62	117.2	13.3	SE corner
225	RFC-835	7/2/1997	18400	17300	128.0	14.7	113.3	113.3	12.9	13.0	96.7	96.7	P	RF-62	117.2	13.3	SE corner
226	RFC-836	7/2/1997	18300	17375	128.7	16.3	112.4	112.4	14.3	14.5	95.8	95.9	P	RF-62	117.2	13.3	SE corner
227	RFC-839	7/3/1997	18400	17400	130.7	15.3	115.4	115.4	13.2	13.3	98.4	98.5	P	RF-62	117.2	13.3	SE corner
228	RFC-840	7/3/1997	18300	17500	126.6	13.4	113.2	113.2	11.8	11.8	96.6	96.6	P	RF-62	117.2	13.3	SE corner
229	RFC-902	8/7/1997	18850	17750	122.1	12.6	109.4	109.5	11.5	11.5	94.1	94.2	Fail	RF-69	116.3	13.5	Fail Compaction, Reverification East slope
230	RFC-903	8/7/1997	18850	17750	124.6	13.4	111.2	111.2	12.1	12.1	95.6	95.6	P	RF-69	116.3	13.5	Retest of Test Number RFC-902, Reverification east slope
231	RFC-904	8/7/1997	19000	17850	124.4	13.4	111.0	111.0	12.1	12.1	95.4	95.4	P	RF-69	116.3	13.5	Reverification East slope
232	RFC-914	8/9/1997	18350	17650	132.1	14.2	117.8	117.9	12.1	12.0	101.4	101.5	P	RF-70	116.2	13.6	
233	RFC-920	8/13/1997	18690	17665	125.7	15.2	110.5	110.5	13.8	13.8	95.1	95.1	P	RF-70	116.2	13.6	
234	RFC-921	8/14/1997	18330	17620	126.9	17.1	109.8	109.8	15.6	15.6	95.6	95.6	P	RF-71	114.8	13.9	SE corner
	RFC-921S	8/14/1997	18330	17620	126.9	16.3	110.6	110.6	14.7	14.7	96.4		N/A	RF-71	114.8	13.9	Sand-Cone, SE corner
235	RFC-922	8/14/1997	18300	17630	128.3	13.9	114.3	114.4	12.2	12.2	99.5	99.7	P	RF-71	114.8	13.9	SE corner
236	RFC-931	8/15/1997	18410	17650	126.3	14.6	111.7	111.7	13.0	13.1	96.9	97.0	P	RF-72	115.2	13.7	SE corner
	RFC-931S	8/15/1997	18410	17650	127.6	13.5	114.1	114.1	11.8	11.8	99.0	99.0	N/A	RF-72	115.2	13.7	Sand-Cone, SE corner
237	RFC-934	8/16/1997	18370	17720	128.4	15.7	112.7	112.7	13.9	13.9	97.8	97.8	P	RF-72	115.2	13.7	SE corner

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 2

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
238	RFC-942	8/16/1997	18470	17690	126.3	16.5	109.8	109.8	15.0	15.0	94.1	94.1	Fail	RF-73	116.7	12.9	Fail Moisture & Compaction, SE corner
239	RFC-943	8/16/1997	18470	17690	126.3	15.5	110.9	110.8	14.0	14.0	95.0	94.9	P	RF-73	116.7	12.9	Retest of Test Number RFC-942, SE corner, Verification calculation indicates failed compaction by minus 0.1%
240	RFC-944	8/16/1997	18430	17720	127.0	16.0	111.0	111.0	14.4	14.4	95.1	95.1	P	RF-73	116.7	12.9	SE corner
241	RFC-945	8/16/1997	18340	17760	124.6	13.7	110.9	110.9	12.4	12.4	95.0	95.0	P	RF-73	116.7	12.9	SE corner
242	RFC-955	8/18/1997	18550	17720	126.0	14.8	111.2	111.2	13.3	13.3	95.2	95.3	P	RF-74	116.7	13.8	East slope
243	RFC-956	8/18/1997	18550	17840	126.0	14.2	111.8	111.8	12.7	12.7	95.8	95.8	P	RF-74	116.7	13.8	East slope
244	RFC-957	8/18/1997	18490	17810	127.6	15.1	112.5	112.5	13.4	13.4	96.4	96.4	P	RF-74	116.7	13.8	East slope
245	RFC-961	8/19/1997	18625	17850	130.6	16.6	114.0	114.0	14.5	14.6	97.8	97.8	P	RF-75	116.6	13.3	Reverification East slope
246	RFC-961D	8/19/1997	18680	17760	130.0	14.9	115.1	115.1	12.9	12.9	98.6	98.7	P	RF-75	116.6	13.3	Duplicated Number, Reverification East slope
	RFC-961S	8/19/1997	18625	17850	132.8	15.6	117.2	117.2	13.3	13.3	100.5	100.5	N/A	RF-75	116.6	13.3	Sand-Cone, East slope
247	RFC-962	8/19/1997	18670	17620	128.6	14.0	114.6	114.6	12.2	12.2	98.3	98.3	P	RF-75	116.6	13.3	Reverification East slope
248	RFC-989	8/21/1997	19040	17590	128.4	14.3	114.1	114.1	12.5	12.5	97.9	97.9	P	RF-77	116.5	14.1	North slope
249	RFC-990	8/21/1997	19040	17650	131.4	16.4	115.0	115.0	14.3	14.3	98.7	98.7	P	RF-77	116.5	14.1	Reverification
250	RFC-991	8/22/1997	19005	17720	129.2	15.4	113.8	113.8	13.6	13.5	97.7	97.8	P	RF-78	116.4	14.1	Reverification North slope
	RFC-991S	8/22/1997	19005	17720	130.1	14.7	115.4	115.4	12.7	12.7	99.0	99.1	N/A	RF-78	116.4	14.1	Sand-Cone, Reverification North slope
251	RFC-992	8/22/1997	19005	17800	131.3	13.3	117.0	118.0	12.3	11.3	100.5	101.4	P	RF-78	116.4	14.1	Reverification North slope, Verification calculation indicates failed moisture by minus 0.7%
252	RFC-1096	9/17/1997	18945	17900	126.5	16.7	109.8	109.8	15.2	15.2	95.4	95.5	P	RF-88	115.0	15.3	North of Channel 1 between channel and NE slope
253	RFC-1097	9/17/1997	18900	17685	129.0	15.8	113.2	113.2	13.9	14.0	98.4	98.4	P	RF-88	115.0	15.3	North of Channel 1 between channel and NE slope
254	RFC-1099	9/17/1997	18865	17775	127.9	15.9	112.0	112.0	14.2	14.2	97.4	97.4	P	RF-88	115.0	15.3	North of Channel 1 between channel and NE slope
255	RFC-1100	9/17/1997	18865	17885	128.0	16.5	111.5	111.5	14.8	14.8	96.9	97.0	P	RF-88	115.0	15.3	Channel 1 bottom section on 6:1 slope
256	RFC-1115	9/17/1997	18928	17605	128.3	15.8	112.6	112.5	14.0	14.0	96.7	96.6	P	RF-90	116.4	14.2	North of Channel 1 between channel and NE slope
257	RFC-1121	9/18/1997	18868	17530	128.1	16.4	111.7	111.7	14.7	14.7	95.3	95.3	P	RF-91	117.2	14.2	Channel 1 bottom
	RFC-1121S	9/18/1997	18868	17530	129.5	16.5	113.0	113.0	13.7	14.6	96.4	96.4	N/A	RF-91	117.2	14.2	Sand-Cone, Channel 1 bottom
258	RFC-1126	9/25/1997	18940	17810	129.6	17.3	112.3	112.3	15.4	15.4	95.8	95.8	P	RF-91	117.2	14.2	
259	RFC-1134	9/29/1997	18800	17850	129.0	16.2	112.7	112.8	14.4	14.4	98.0	98.1	P	RF-92	115.0	14.0	
260	RFC-1135	9/29/1997	18920	17670	128.4	16.9	111.5	111.5	15.2	15.2	96.9	97.0	P	RF-92	115.0	14.0	
261	RFC-1136	9/29/1997	18940	17810	126.8	16.5	110.3	110.3	15.0	15.0	95.8	95.9	P	RF-92	115.0	14.0	
262	RFC-1137	9/29/1997	18850	17720	130.5	16.3	114.1	114.2	14.3	14.3	99.2	99.3	P	RF-92	115.0	14.0	Reverification
263	RFC-1138	9/29/1997	18920	17700	125.5	15.8	109.6	109.7	14.5	14.4	95.3	95.4	P	RF-92	115.0	14.0	
264	RFC-1144	9/30/1997	18900	17580	128.6	15.9	112.6	112.7	14.2	14.1	97.2	97.3	P	RF-93	115.8	13.9	
265	RFC-1145	9/30/1997	18810	17705	124.6	15.4	109.2	109.2	14.2	14.1	94.2	94.3	Fail	RF-93	115.8	13.9	Fail Compaction
266	RFC-1146	10/1/1997	18810	17705	128.6	14.8	113.8	113.8	13.0	13.0	98.2	98.3	P	RF-93	115.8	13.9	Retest of Test Number RFC-1145
267	RFC-1149	10/1/1997	18820	17600	127.3	16.8	110.5	110.5	15.2	15.2	95.4	95.4	P	RF-93	115.8	13.9	



N

200 0 200

SCALE IN FEET

CONTOUR INTERVAL : 2'

NOTES:

1.) THE FROST BARRIER WAS PLACED TO THE LINES AND GRADE SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE SPECIFICATIONS DURING THE 1995, 1996 AND 1997 CONSTRUCTION SEASONS.

2.) THE FROST BARRIER WAS PLACED OVER THE APPROVED RADON BARRIER LAYER. FIELD AND LABORATORY TESTING WAS CONDUCTED IN ACCORDANCE WITH SPECIFICATION MAY-1, SECTION 7.3.

3.) THE FROST BARRIER SOILS WERE COMPACTED TO AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DENSITY AT A MOISTURE CONTENT BETWEEN PLUS OR MINUS 2% OF OPTIMUM AS DETERMINED BY ASTM D698. REFER TO INCLUDED SPREADSHEETS FOR TEST RESULT DETAILS.

LEGEND:

267 FIELD TEST LOCATION AND TEST NUMBER

NORTHING/EASTING GRID TICKS

MAYBELL HEAP LEACH FACILITY
FROST BARRIER FIELD TEST LOCATIONS
(THIRD LIFT)

UMETCO MINERALS CORPORATION

THIRD LIFT FROST BARRIER FIELD TEST LOCATIONS

MAYBELL HEAP LEACH FACILITY

DATE: AUGUST 2006 FIGURE 6

Maybell frost third lift.dwg

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
1	RFC-33	9/12/1995	18570	16290	126.3	16.2	110.0	110.1	14.8	14.7	96.0	96.1	P	RF-3	114.6	13.8	
2	RFC-34	9/12/1995	18530	16440	125.2	16.2	109.0	109.0	14.8	14.9	95.1	95.1	P	RF-3	114.6	13.8	
3	RFC-35	9/12/1995	18540	16540	122.5	12.9	109.5	109.6	11.8	11.8	95.6	95.6	P	RF-3	114.6	13.8	
4	RFC-36	9/13/1995	18520	16660	126.0	15.4	110.6	110.6	13.9	13.9	96.5	96.5	P	RF-3	114.6	13.8	
5	RFC-57	9/19/1995	18480	16870	125.6	15.4	110.2	110.2	13.9	14.0	95.8	95.8	P	RF-4	115.0	14.1	
6	RFC-58	9/19/1995	18440	17000	130.9	16.3	114.6	114.6	14.2	14.2	99.7	99.7	P	RF-4	115.0	14.1	
7	RFC-59	9/19/1995	18470	17150	125.0	15.7	109.3	109.3	14.4	14.4	95.0	95.0	P	RF-4	115.0	14.1	
8	RFC-60	9/19/1995	18450	17260	126.6	16.4	110.1	110.2	14.9	14.9	96.9	97.0	P	RF-5	113.6	13.6	
	RFC-60S	9/19/1995	18450	17260	127.0		111.8		13.6		98.4		N/A	RF-5	113.6	13.6	Sand-Cone
9	RFC-61	9/19/1995	18470	17400	127.8	17.1	110.7	110.7	15.4	15.4	97.4	97.4	P	RF-5	113.6	13.6	
10	RFC-62	9/19/1995	18480	17550	125.8	15.8	110.0	110.0	14.4	14.4	96.8	96.8	P	RF-5	113.6	13.6	
11	RFC-63	9/19/1995	18570	17590	125.4	14.6	110.8	110.8	13.2	13.2	97.5	97.5	P	RF-5	113.6	13.6	
12	RFC-64	9/19/1995	18550	17440	124.0	13.7	110.3	110.3	12.4	12.4	97.1	97.1	P	RF-5	113.6	13.6	
13	RFC-65	9/19/1995	18540	17320	121.8	12.7	109.0	109.1	11.7	11.6	96.0	96.0	P	RF-5	113.6	13.6	
14	RFC-66	9/19/1995	18570	17160	129.5	16.2	113.2	113.3	14.3	14.3	99.7	99.7	P	RF-5	113.6	13.6	
15	RFC-67	9/19/1995	18530	17050	123.9	13.6	110.3	110.3	12.3	12.3	97.1	97.1	P	RF-5	113.6	13.6	
16	RFC-68	9/19/1995	18580	16910	124.0	14.8	109.2	109.2	13.6	13.6	96.1	96.1	P	RF-5	113.6	13.6	
17	RFC-69	9/19/1995	18530	16790	125.0	13.4	111.6	111.6	12.0	12.0	98.2	98.2	P	RF-5	113.6	13.6	
18	RFC-98	9/25/1995	18680	16250	125.8	13.6	112.2	112.2	12.1	12.1	98.2	98.2	P	RF-7	114.2	13.6	
19	RFC-99	9/25/1995	18640	16370	127.2	14.1	113.1	113.1	12.5	12.5	99.0	99.0	P	RF-7	114.2	13.6	
20	RFC-100	9/25/1995	18660	16500	127.6	14.9	112.7	112.7	13.2	13.2	98.7	98.7	P	RF-7	114.2	13.6	
	RFC-100S	9/25/1995	18660	16500	127.7		112.6		13.4		98.6		N/A	RF-7	114.2	13.6	Sand-Cone
21	RFC-101	9/25/1995	18650	16660	125.7	13.7	112.0	112.0	12.2	12.2	98.1	98.1	P	RF-7	114.2	13.6	
22	RFC-102	9/25/1995	18670	16820	125.5	13.6	111.9	111.9	12.1	12.2	98.0	98.0	P	RF-7	114.2	13.6	
23	RFC-103	9/25/1995	18650	16930	122.5	13.1	109.3	109.4	12.0	12.0	95.7	95.8	P	RF-7	114.2	13.6	
24	RFC-104	9/25/1995	18630	17070	127.1	13.5	113.7	113.6	11.8	11.9	99.6	99.5	P	RF-7	114.2	13.6	
25	RFC-105	9/25/1995	18640	17170	125.8	13.3	112.5	112.5	11.8	11.8	98.4	98.4	P	RF-8	114.3	13.8	
26	RFC-106	9/25/1995	18680	17280	127.5	14.2	113.3	113.3	12.5	12.5	99.1	99.1	P	RF-8	114.3	13.8	
27	RFC-107	9/25/1995	18660	17440	123.7	13.1	110.6	110.6	11.8	11.8	96.8	96.8	P	RF-8	114.3	13.8	
28	RFC-108	9/25/1995	18640	17540	123.3	13.9	109.3	109.4	12.7	12.7	95.6	95.7	P	RF-8	114.3	13.8	
29	RFC-109	9/25/1995	18760	17580	123.6	13.3	110.3	110.3	12.1	12.1	96.5	96.5	P	RF-8	114.3	13.8	
30	RFC-110	9/25/1995	18780	17430	125.9	15.0	110.9	110.9	13.5	13.5	97.0	97.0	P	RF-8	114.3	13.8	
	RFC-110S	9/25/1995	18780	17430	125.9		110.9		13.5		97.0		N/A	RF-8	114.3	13.8	Sand-Cone
31	RFC-111	9/25/1995	18750	17310	123.0	13.2	109.8	109.8	12.0	12.0	96.1	96.1	P	RF-8	114.3	13.8	
32	RFC-112	9/25/1995	18770	17190	123.8	14.6	109.2	109.2	13.4	13.4	95.5	95.5	P	RF-8	114.3	13.8	
33	RFC-113	9/25/1995	18750	17040	124.7	13.4	111.3	111.3	12.0	12.0	97.4	97.4	P	RF-8	114.3	13.8	
34	RFC-114	9/25/1995	18760	16900	126.7	14.3	112.4	112.4	12.7	12.7	98.3	98.3	P	RF-8	114.3	13.8	
35	RFC-115	9/25/1995	18770	16780	125.9	14.0	111.9	111.9	12.5	12.5	97.9	97.9	P	RF-8	114.3	13.8	
36	RFC-116	9/25/1995	18740	16670	125.6	13.5	112.1	112.1	12.0	12.0	98.1	98.1	P	RF-8	114.3	13.8	
37	RFC-117	9/25/1995	18740	16530	124.1	13.8	110.3	110.3	12.5	12.5	96.5	96.5	P	RF-8	114.3	13.8	
38	RFC-118	9/25/1995	18750	16380	123.1	13.2	109.9	109.9	12.0	12.0	96.1	96.2	P	RF-8	114.3	13.8	
39	RFC-119	9/25/1995	18770	16270	124.4	13.5	110.9	110.9	12.2	12.2	97.0	97.0	P	RF-8	114.3	13.8	
40	RFC-138	9/27/1995	18820	17470	124.5	13.8	110.7	110.7	12.5	12.5	97.0	97.0	P	RF-10	114.1	14.0	
41	RFC-139	9/27/1995	18840	17230	127.2	13.7	113.5	113.5	12.1	12.1	99.5	99.5	P	RF-10	114.1	14.0	
42	RFC-140	9/27/1995	18850	17010	126.7	13.6	113.1	113.1	12.0	12.0	99.1	99.1	P	RF-10	114.1	14.0	
	RFC-140S	9/27/1995	18850	17010	126.6		113.1		12.0		99.1		N/A	RF-10	114.1	14.0	Sand-Cone
43	RFC-141	9/27/1995	18810	16860	126.3	16.3	110.0	110.0	14.8	14.8	96.4	96.4	P	RF-10	114.1	14.0	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
44	RFC-142	9/27/1995	18870	16780	129.2	14.8	114.4	114.4	12.9	12.9	100.3	100.3	P	RF-10	114.1	14.0	
45	RFC-143	9/27/1995	18840	16620	125.1	14.6	110.5	110.5	13.2	13.2	96.8	96.8	P	RF-10	114.1	14.0	
46	RFC-144	9/27/1995	18870	16500	125.9	15.1	110.8	110.8	13.6	13.6	97.1	97.1	P	RF-10	114.1	14.0	
47	RFC-145	9/27/1995	18840	16380	125.5	14.6	110.9	110.9	13.2	13.2	97.2	97.2	P	RF-10	114.1	14.0	
48	RFC-146	9/27/1995	18870	16280	125.7	15.9	109.8	109.8	14.5	14.5	96.2	96.2	P	RF-10	114.1	14.0	
49	RFC-173	10/13/1995	18970	16220	129.2	16.9	112.3	112.3	15.1	15.0	97.8	97.8	P	RF-12	114.8	14.6	
50	RFC-174	10/13/1995	18970	16410	128.5	18.1	110.4	110.4	16.3	16.4	96.1	96.2	P	RF-12	114.8	14.6	
51	RFC-175	10/13/1995	18970	16580	126.1	15.5	110.5	110.6	14.1	14.0	96.2	96.3	P	RF-12	114.8	14.6	
52	RFC-176	10/13/1995	18960	16750	126.4	17.2	109.2	109.2	15.7	15.8	95.1	95.1	P	RF-12	114.8	14.6	
53	RFC-177	10/13/1995	18960	16900	127.0	15.3	111.7	111.7	13.7	13.7	97.2	97.3	P	RF-12	114.8	14.6	
54	RFC-178	10/13/1995	18950	17070	126.3	16.6	109.7	109.7	15.1	15.1	95.6	95.6	P	RF-12	114.8	14.6	
55	RFC-179	10/13/1995	18950	17250	126.2	16.8	109.3	109.4	15.4	15.4	95.2	95.3	P	RF-12	114.8	14.6	
56	RFC-180	10/13/1995	18940	17430	127.4	15.2	112.2	112.2	13.6	13.5	98.0	98.0	P	RF-13	114.5	14.3	
	RFC-180S	10/13/1995	18940	17430	127.9		112.5		13.7		98.3		N/A	RF-13	114.5	14.3	Sand-Cone
57	RFC-181	10/16/1995	18920	16360	131.1	15.6	115.5	115.5	13.5	13.5	100.8	100.9	P	RF-13	114.5	14.3	Channel 1
58	RFC-182	10/16/1995	18910	16620	127.2	14.8	112.3	112.4	13.2	13.2	98.1	98.2	P	RF-13	114.5	14.3	Channel 1
59	RFC-183	10/16/1995	18900	16910	128.4	14.4	114.0	114.0	12.6	12.6	99.6	99.6	P	RF-13	114.5	14.3	Channel 1
60	RFC-184	10/16/1995	18890	17200	126.1	14.7	111.4	111.4	13.2	13.2	97.3	97.3	P	RF-13	114.5	14.3	Channel 1
61	RFC-185	10/16/1995	18880	17460	126.2	14.9	111.3	111.3	13.4	13.4	97.2	97.2	P	RF-13	114.5	14.3	Channel 1
62	RFC-186	10/17/1995	18895	16620	124.8	14.2	110.6	110.6	12.8	12.8	96.6	96.6	P	RF-13	114.5	14.3	South Side 3:1 Slope of Channel 1
63	RFC-187	10/17/1995	18870	17210	126.0	14.7	111.2	111.3	13.2	13.2	97.1	97.2	P	RF-13	114.5	14.3	South Side 3:1 Slope of Channel 1
64	RFC-299	10/30/1995	19080	16280	125.5	14.5	111.0	111.0	13.1	13.1	98.0	98.0	P	RF-20	113.3	14.5	
65	RFC-300	10/30/1995	19030	16410	126.8	16.4	110.5	110.4	14.8	14.9	96.9	96.8	P	RF-21	114.0	13.5	
	RFC-300S	10/30/1995	19030	16410	127.0		110.2		15.2		96.7		N/A	RF-21	114.0	13.5	Sand-Cone
66	RFC-301	10/30/1995	19070	16510	124.2	15.0	109.2	109.2	13.7	13.7	95.8	95.8	P	RF-21	114.0	13.5	
67	RFC-302	10/30/1995	19050	16350	125.4	15.2	110.2	110.2	13.8	13.8	96.7	96.7	P	RF-21	114.0	13.5	
68	RFC-303	10/30/1995	19070	16800	125.5	14.9	110.6	110.6	13.5	13.5	97.0	97.0	P	RF-21	114.0	13.5	
69	RFC-304	10/30/1995	19050	16940	124.4	14.3	110.1	110.1	13.0	13.0	96.6	96.6	P	RF-21	114.0	13.5	
70	RFC-305	10/30/1995	19080	17030	125.3	16.2	109.1	109.1	14.9	14.8	95.7	95.7	P	RF-21	114.0	13.5	
71	RFC-306	10/30/1995	19040	17170	124.8	15.8	109.0	109.0	14.5	14.5	95.6	95.6	P	RF-21	114.0	13.5	
72	RFC-307	10/30/1995	19030	17290	125.5	15.4	110.1	110.1	14.0	14.0	96.6	96.6	P	RF-21	114.0	13.5	
73	RFC-308	10/31/1995	19180	17160	125.6	15.5	110.1	110.1	14.1	14.1	96.6	96.6	P	RF-21	114.0	13.5	
74	RFC-309	10/31/1995	19130	17030	126.4	15.0	111.4	111.4	13.5	13.5	97.7	97.7	P	RF-21	114.0	13.5	
75	RFC-310	10/31/1995	19150	16920	125.2	15.9	109.3	109.3	14.5	14.5	95.9	95.9	P	RF-21	114.0	13.5	
	RFC-310S	10/31/1995	19150	16920	125.0		108.7		15.0		95.3		N/A	RF-21	114.0	13.5	Sand-Cone
76	RFC-311	10/31/1995	19180	16780	127.6	16.6	111.0	111.0	15.0	15.0	97.4	97.4	P	RF-21	114.0	13.5	
77	RFC-312	10/31/1995	19120	16640	127.0	15.8	111.2	111.2	14.2	14.2	97.5	97.5	P	RF-21	114.0	13.5	
78	RFC-313	10/31/1995	19180	16510	125.8	14.5	111.3	111.3	13.0	13.0	97.6	97.6	P	RF-21	114.0	13.5	
79	RFC-314	10/31/1995	19150	16390	125.8	15.7	110.1	110.1	14.3	14.3	96.6	96.6	P	RF-21	114.0	13.5	
80	RFC-315	10/31/1995	19160	16230	127.9	16.6	111.3	111.3	14.9	14.9	98.2	98.1	P	RF-22	113.4	14.3	
81	RFC-316	10/31/1995	19270	16260	126.3	14.6	111.7	111.7	13.1	13.1	98.5	98.5	P	RF-22	113.4	14.3	
82	RFC-317	10/31/1995	19220	16390	127.4	14.6	112.7	112.8	13.0	12.9	99.4	99.5	P	RF-22	113.4	14.3	
83	RFC-318	10/31/1995	19260	16520	125.7	15.6	110.1	110.1	14.1	14.2	97.1	97.1	P	RF-22	113.4	14.3	
84	RFC-319	10/31/1995	19230	16650	124.5	14.6	109.9	109.9	13.3	13.3	96.9	96.9	P	RF-22	113.4	14.3	
85	RFC-320	10/31/1995	19280	16770	126.3	16.5	109.8	109.8	15.0	15.0	96.8	96.8	P	RF-22	113.4	14.3	
	RFC-320S	10/31/1995	19280	16770	126.1		109.8		14.9		96.8		N/A	RF-22	113.4	14.3	Sand-Cone

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
86	RFC-321	10/31/1995	19220	16910	125.5	14.8	110.7	110.7	13.4	13.4	97.6	97.6	P	RF-22	113.4	14.3	
87	RFC-322	10/31/1995	19270	17060	125.9	15.8	110.1	110.1	14.4	14.4	97.1	97.1	P	RF-22	113.4	14.3	
88	RFC-323	10/31/1995	19320	16330	123.5	14.2	109.3	109.3	13.0	13.0	96.4	96.4	P	RF-22	113.4	14.3	
89	RFC-324	10/31/1995	19330	16540	124.7	15.7	109.0	109.0	14.4	14.4	96.1	96.1	P	RF-22	113.4	14.3	
90	RFC-325	10/31/1995	19340	16660	126.2	15.6	110.6	110.6	14.1	14.1	97.5	97.5	P	RF-22	113.4	14.3	
91	RFC-326	10/31/1995	19340	16780	127.2	15.4	111.8	111.8	13.8	13.8	98.6	98.6	P	RF-22	113.4	14.3	
92	RFC-327	10/31/1995	19330	16900	125.0	14.3	110.7	110.7	13.0	12.9	97.6	97.6	P	RF-22	113.4	14.3	
93	RFC-328	10/31/1995	19350	17000	124.8	15.2	109.6	109.6	13.9	13.9	96.7	96.6	P	RF-22	113.4	14.3	
94	RFC-402	6/25/1996	18480	16250	116.5	12.9	103.6	103.6	12.5	12.5	90.5	90.6	Fail	RF-29	114.4	14.1	Fail Compaction
95	RFC-402R	6/26/1996	18480	16250	124.1	15.0	109.1	109.1	13.8	13.7	95.4	95.4	P	RF-29	114.4	14.1	Retest of Test Number RFC-402
96	RFC-403	6/25/1996	18470	16340	122.6	11.1	111.5	111.5	10.0	10.0	97.4	97.5	Fail	RF-29	114.4	14.1	Fail Moisture
97	RFC-403R	6/26/1996	18470	16340	125.2	16.4	108.8	108.8	15.1	15.1	95.1	95.1	P	RF-29	114.4	14.1	Retest of Test Number RFC-403
98	RFC-404	6/25/1996	18470	16460	118.1	10.7	107.4	107.4	10.0	10.0	93.8	93.9	Fail	RF-29	114.4	14.1	Fail Moisture & Compaction
99	RFC-404R	6/26/1996	18470	16460	124.1	15.4	108.7	108.7	14.2	14.2	95.0	95.0	P	RF-29	114.4	14.1	Retest of Test Number RFC-404
100	RFC-417	6/26/1996	18350	16230	125.9	15.7	110.2	110.2	14.3	14.2	96.7	96.7	P	RF-30	114.0	14.4	
101	RFC-418	6/26/1996	18240	16270	124.4	15.5	108.9	108.9	14.2	14.2	95.5	95.5	P	RF-30	114.0	14.4	
102	RFC-419	6/26/1996	18220	16360	123.2	14.6	108.6	108.6	13.4	13.4	95.3	95.3	P	RF-30	114.0	14.4	
103	RFC-420	6/26/1996	18360	16340	124.8	14.1	110.7	110.7	12.7	12.7	97.3	97.3	P	RF-31	113.8	13.5	
	RFC-420S	6/26/1996	18360	16340	125.9		112.4		12.0		98.8		N/A	RF-31	113.8	13.5	Sand-Cone
104	RFC-421	6/26/1996	18360	16450	126.1	15.0	111.1	111.1	13.5	13.5	97.6	97.6	P	RF-31	113.8	13.5	
105	RFC-422	6/26/1996	18260	16470	124.5	14.7	109.8	109.8	13.4	13.4	96.5	96.5	P	RF-31	113.8	13.5	
106	RFC-423	6/26/1996	18420	16550	125.6	15.7	109.8	109.9	14.3	14.3	96.5	96.6	P	RF-31	113.8	13.5	
107	RFC-424	6/26/1996	18430	16670	124.8	15.3	109.5	109.5	14.0	14.0	96.2	96.2	P	RF-31	113.8	13.5	
108	RFC-425	6/26/1996	18360	16650	124.0	14.3	109.7	109.7	13.0	13.0	96.4	96.4	P	RF-31	113.8	13.5	
109	RFC-426	6/26/1996	18320	16540	125.4	15.9	109.5	109.5	14.5	14.5	96.2	96.2	P	RF-31	113.8	13.5	
110	RFC-427	6/26/1996	18230	16530	123.6	14.0	109.6	109.6	12.8	12.8	96.3	96.3	P	RF-31	113.8	13.5	
111	RFC-428	6/26/1996	18220	16660	125.9	17.3	108.6	108.6	15.9	15.9	95.4	95.4	P	RF-31	113.8	13.5	Verification calculation indicates failed moisture by plus 0.4%
112	RFC-429	6/26/1996	18400	16730	123.9	15.1	108.8	108.8	13.9	13.9	95.6	95.6	P	RF-31	113.8	13.5	
113	RFC-430	6/26/1996	18390	16860	124.5	15.1	109.4	109.4	13.8	13.8	96.1	96.1	P	RF-31	113.8	13.5	
	RFC-430S	6/26/1996	18390	16860	123.4		108.2		14.1		95.1		N/A	RF-31	113.8	13.5	Sand-Cone
114	RFC-431	6/26/1996	18320	16830	127.5	17.7	109.8	109.8	16.1	16.1	96.5	96.5	P	RF-31	113.8	13.5	Verification calculation indicates failed moisture by plus 0.6%
115	RFC-432	6/26/1996	18310	16730	126.9	17.8	109.1	109.1	16.3	16.3	95.8	95.9	P	RF-31	113.8	13.5	Verification calculation indicates failed moisture by plus 0.8%
116	RFC-433	6/26/1996	18220	16760	124.4	15.4	109.0	109.0	14.1	14.1	95.8	95.8	P	RF-31	113.8	13.5	
117	RFC-434	6/26/1996	18200	16870	125.1	15.9	109.2	109.2	14.6	14.6	96.0	96.0	P	RF-31	113.8	13.5	
118	RFC-471	7/3/1996	18370	16980	125.6	16.3	109.3	109.3	14.9	14.9	95.6	95.6	P	RF-34	114.3	14.5	
119	RFC-472	7/3/1996	18280	16930	125.2	14.4	110.9	110.8	12.9	13.0	97.0	96.9	P	RF-34	114.3	14.5	
120	RFC-473	7/3/1996	18160	16970	125.3	15.8	109.4	109.5	14.5	14.4	95.7	95.8	P	RF-34	114.3	14.5	
121	RFC-475	7/3/1996	18340	17070	126.1	16.0	110.0	110.1	14.6	14.5	96.2	96.3	P	RF-34	114.3	14.5	
122	RFC-476	7/3/1996	18370	17160	125.6	15.3	110.2	110.3	13.9	13.9	96.4	96.5	P	RF-34	114.3	14.5	
123	RFC-477	7/3/1996	18270	17150	125.8	15.9	109.9	109.9	14.5	14.5	96.1	96.2	P	RF-34	114.3	14.5	
124	RFC-478	7/3/1996	18240	17070	126.4	16.8	109.6	109.6	15.4	15.3	95.8	95.9	P	RF-34	114.3	14.5	
125	RFC-479	7/3/1996	18120	17050	125.5	16.7	108.8	108.8	15.3	15.3	95.2	95.2	P	RF-34	114.3	14.5	
126	RFC-480	7/3/1996	18140	17170	125.9	15.1	110.8	110.8	13.7	13.6	96.7	96.8	P	RF-35	114.5	13.8	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
	RFC-480S	7/3/1996	18140	17170	127.2		111.5		14.1		97.4		N/A	RF-35	114.5	13.8	Sand-Cone
127	RFC-481	7/3/1996	18130	17270	124.9	15.3	109.6	109.6	14.0	14.0	95.7	95.7	P	RF-35	114.5	13.8	
128	RFC-482	7/3/1996	18240	17230	127.4	18.4	109.0	109.0	16.9	16.9	95.2	95.2	P	RF-35	114.5	13.8	Verification calculation indicates failed moisture by plus 1.1%
129	RFC-483	7/3/1996	18340	17280	125.8	15.9	109.9	109.9	14.5	14.5	96.0	96.0	P	RF-35	114.5	13.8	
130	RFC-484	7/3/1996	18170	17340	126.1	16.0	110.1	110.1	14.6	14.5	96.1	96.2	P	RF-35	114.5	13.8	
131	RFC-485	7/3/1996	18280	17330	125.6	16.8	108.8	108.8	15.4	15.4	95.0	95.0	P	RF-35	114.5	13.8	
132	RFC-486	7/3/1996	18400	17370	127.1	17.1	110.0	110.0	15.6	15.5	96.1	96.1	P	RF-35	114.5	13.8	
133	RFC-487	7/3/1996	18370	17480	126.3	16.9	109.4	109.4	15.5	15.4	95.6	95.5	P	RF-35	114.5	13.8	
134	RFC-488	7/3/1996	18250	17430	125.6	15.4	110.2	110.2	14.0	14.0	96.2	96.2	P	RF-35	114.5	13.8	
135	RFC-489	7/3/1996	18150	17480	126.8	16.9	109.9	109.9	15.4	15.4	95.9	96.0	P	RF-35	114.5	13.8	
136	RFC-539	7/26/1996	18640	16080	123.0	13.6	109.4	109.4	12.5	12.4	95.8	95.8	P	RF-38	114.2	14.1	
137	RFC-540	7/26/1996	18740	16100	129.3	17.8	111.4	111.5	16.0	16.0	97.9	98.0	Fail	RF-39	113.8	14.2	Fail on Sand-Cone Correlation, See Retest
	RFC-540S	7/26/1996	18740	16100	135.9		118.7		14.4		104.3		N/A	RF-39	113.8	14.2	Sand-Cone
138	RFC-540R	7/26/1996	18740	16100	128.1	16.9	111.2	111.2	15.2	15.2	97.8	97.7	P	RF-39	113.8	14.2	Retest of Test Number RFC-540
	RFC-540RS	7/26/1996	18740	16100	128.1		112.5		13.8		98.8		N/A	RF-39	113.8	14.2	Sand-Cone, Retest of Test Number RFC-540R
139	RFC-541	7/26/1996	18850	16080	125.8	16.7	109.1	109.1	15.3	15.3	95.9	95.9	P	RF-39	113.8	14.2	
140	RFC-542	7/26/1996	18740	16040	126.1	14.7	111.4	111.4	13.2	13.2	97.9	97.9	P	RF-39	113.8	14.2	
141	RFC-543	7/26/1996	18660	15970	123.2	14.1	109.0	109.1	13.0	12.9	95.8	95.9	P	RF-39	113.8	14.2	
142	RFC-544	7/26/1996	18750	15930	123.6	14.6	109.0	109.0	13.4	13.4	95.8	95.8	P	RF-39	113.8	14.2	
143	RFC-545	7/26/1996	18850	15980	127.2	15.6	111.6	111.6	14.0	14.0	98.1	98.1	P	RF-39	113.8	14.2	
144	RFC-546	7/26/1996	18940	16130	127.5	17.3	110.2	110.2	15.7	15.7	96.9	96.8	P	RF-39	113.8	14.2	
145	RFC-547	7/26/1996	19050	16070	123.8	14.9	108.9	108.9	13.7	13.7	95.7	95.7	P	RF-39	113.8	14.2	
146	RFC-548	7/26/1996	19040	15980	126.7	15.6	111.1	111.1	14.0	14.0	97.6	97.6	P	RF-39	113.8	14.2	
147	RFC-549	7/26/1996	18950	16060	125.1	15.8	109.3	109.3	14.4	14.5	96.1	96.0	P	RF-39	113.8	14.2	
148	RFC-550	7/26/1996	18960	15940	124.7	15.5	109.2	109.2	14.2	14.2	96.0	96.0	P	RF-39	113.8	14.2	
	RFC-550S	7/26/1996	18960	15940	125.1		109.2		14.5		96.0		N/A	RF-39	113.8	14.2	Sand-Cone
149	RFC-551	7/29/1996	19140	16130	122.6	13.4	109.2	109.2	12.3	12.3	96.0	96.0	P	RF-39	113.8	14.2	
150	RFC-552	7/29/1996	19150	16050	124.6	15.7	109.0	108.9	14.4	14.4	95.8	95.7	P	RF-39	113.8	14.2	
151	RFC-553	7/29/1996	19150	15920	123.2	14.7	108.5	108.5	13.5	13.5	95.4	95.3	P	RF-39	113.8	14.2	
152	RFC-585	8/9/1996	19250	16090	124.3	14.0	110.3	110.3	12.7	12.7	95.3	95.4	P	RF-42	115.6	13.3	
153	RFC-586	8/9/1996	19240	15990	122.7	12.7	110.0	110.0	11.5	11.5	95.1	95.2	P	RF-42	115.6	13.3	
154	RFC-587	8/9/1996	19270	15930	127.1	13.4	113.7	113.7	11.8	11.8	98.3	98.4	P	RF-42	115.6	13.3	
155	RFC-612	8/14/1996	19400	16230	124.5	15.0	109.5	109.5	13.7	13.7	96.0	95.9	P	RF-43	114.2	12.7	
156	RFC-613	8/14/1996	19490	16290	124.2	15.6	108.6	108.6	14.3	14.4	95.1	95.1	P	RF-43	114.2	12.7	
157	RFC-614	8/14/1996	19370	16330	124.3	15.2	109.1	109.1	13.9	13.9	95.6	95.5	P	RF-43	114.2	12.7	
158	RFC-615	8/14/1996	19450	16380	128.3	16.2	112.1	112.1	14.4	14.5	97.2	97.3	P	RF-44	115.2	13.0	
159	RFC-616	8/14/1996	19550	16340	121.8	12.3	109.5	109.5	11.2	11.2	95.0	95.1	P	RF-44	115.2	13.0	
160	RFC-617	8/14/1996	19390	16440	124.2	13.8	110.4	110.4	12.5	12.5	95.8	95.8	P	RF-44	115.2	13.0	
161	RFC-618	8/14/1996	19540	16480	124.7	15.1	109.6	109.6	13.8	13.8	95.1	95.1	P	RF-44	115.2	13.0	
162	RFC-639	8/16/1996	19420	16580	121.8	12.6	109.2	109.2	11.6	11.5	95.4	95.5	P	RF-45	114.4	13.4	
163	RFC-640	8/16/1996	19480	16540	124.7	15.0	109.7	109.7	13.7	13.7	95.9	95.9	P	RF-45	114.4	13.4	
	RFC-640S	8/16/1996	19480	16540	126.0		111.4		13.1		97.4		N/A	RF-45	114.4	13.4	Sand-Cone
164	RFC-641	8/16/1996	19570	16590	126.5	15.9	110.6	110.6	14.4	14.4	96.8	96.7	P	RF-45	114.4	13.4	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
165	RFC-642	8/16/1996	19400	16650	124.8	13.3	111.5	111.5	12.0	11.9	97.4	97.5	P	RF-45	114.4	13.4	
166	RFC-643	8/16/1996	19530	16670	124.3	14.2	110.1	110.1	12.9	12.9	96.2	96.2	P	RF-45	114.4	13.4	
167	RFC-644	8/16/1996	19420	16740	124.8	15.8	109.1	109.0	14.5	14.5	95.3	95.3	P	RF-45	114.4	13.4	
168	RFC-645	8/16/1996	19480	16780	123.8	13.0	110.7	110.8	11.8	11.7	95.6	95.7	P	RF-46	115.8	13.4	
169	RFC-646	8/16/1996	19570	16780	125.8	14.6	111.2	111.2	13.1	13.1	96.0	96.0	P	RF-46	115.8	13.4	
170	RFC-647	8/16/1996	19430	16880	126.0	13.5	112.5	112.5	12.0	12.0	97.1	97.2	P	RF-46	115.8	13.4	
171	RFC-648	8/16/1996	19530	16830	123.4	13.1	110.3	110.3	11.9	11.9	95.2	95.3	P	RF-46	115.8	13.4	
172	RFC-649	8/16/1996	19400	16980	125.7	14.7	111.0	111.0	13.2	13.2	95.8	95.9	P	RF-46	115.8	13.4	
173	RFC-650	8/16/1996	19490	16930	124.2	13.9	110.3	110.3	12.6	12.6	95.2	95.3	P	RF-46	115.8	13.4	
	RFC-650S	8/16/1996	19490	16930	126.1		111.3		13.3		96.1		N/A	RF-46	115.8	13.4	Sand-Cone
174	RFC-651	8/16/1996	19550	17010	122.6	12.5	110.1	110.1	11.4	11.4	95.0	95.1	P	RF-46	115.8	13.4	
175	RFC-683	9/13/1996	18500	16160	125.5	15.2	110.3	110.3	13.7	13.8	95.7	95.7	P	RF-48	115.3	13.3	
176	RFC-684	9/13/1996	18420	16140	127.2	15.7	111.5	111.5	14.0	14.1	96.7	96.7	P	RF-48	115.3	13.3	
177	RFC-685	9/13/1996	18350	16110	130.6	16.6	113.9	114.0	14.6	14.6	98.7	98.9	P	RF-48	115.3	13.3	
178	RFC-686	9/13/1996	18300	16050	126.5	15.3	111.2	111.2	13.7	13.8	96.4	96.4	P	RF-48	115.3	13.3	
179	RFC-687	9/13/1996	18380	16060	127.7	15.2	112.5	112.5	13.5	13.5	97.5	97.6	P	RF-48	115.3	13.3	
180	RFC-688	9/13/1996	18460	16100	126.0	14.5	111.5	111.5	13.0	13.0	96.7	96.7	P	RF-48	115.3	13.3	
181	RFC-689	9/13/1996	18440	16020	125.4	15.0	110.4	110.4	13.6	13.6	95.7	95.8	P	RF-48	115.3	13.3	
182	RFC-690	9/13/1996	18550	16030	127.7	15.6	112.2	112.1	13.9	13.9	97.2	97.1	P	RF-49	115.4	13.7	
	RFC-690S	9/13/1996	18550	16030	125.3		111.1		12.8		96.3		N/A	RF-49	115.4	13.7	Sand-Cone
183	RFC-691	9/13/1996	18400	15960	123.7	13.5	110.2	110.2	12.2	12.3	95.5	95.5	P	RF-49	115.4	13.7	
184	RFC-692	9/13/1996	18470	15940	128.8	17.4	111.4	111.4	15.6	15.6	96.5	96.5	P	RF-49	115.4	13.7	
185	RFC-693	9/13/1996	18500	16020	130.2	17.0	113.1	113.2	15.1	15.0	98.0	98.1	P	RF-49	115.4	13.7	
186	RFC-694	9/13/1996	18540	16120	124.6	13.4	111.2	111.2	12.0	12.1	96.3	96.4	P	RF-49	115.4	13.7	
187	RFC-717	9/19/1996	19330	16080	128.2	16.2	112.0	112.0	14.4	14.5	97.8	97.8	P	RF-50	114.5	13.5	
188	RFC-718	9/19/1996	19380	15990	126.2	16.3	109.9	109.9	14.8	14.8	96.0	96.0	P	RF-50	114.5	13.5	
189	RFC-719	9/19/1996	19360	15910	126.8	14.8	111.9	112.0	13.2	13.2	97.7	97.8	P	RF-50	114.5	13.5	
190	RFC-720	9/19/1996	19420	16070	126.2	16.8	109.4	109.4	15.4	15.4	95.1	95.0	P	RF-51	115.1	13.8	
	RFC-720S	9/19/1996	19420	16070	126.0		110.6		13.9		96.1		N/A	RF-51	115.1	13.8	Sand-Cone
191	RFC-721	9/20/1996	19430	16140	132.3	15.0	117.3	117.3	12.8	12.8	101.9	101.9	P	RF-51	115.1	13.8	
192	RFC-722	9/20/1996	19500	16070	124.7	15.4	109.3	109.3	14.1	14.1	95.0	95.0	P	RF-51	115.1	13.8	
193	RFC-723	9/20/1996	19540	16160	126.3	17.1	109.2	109.2	15.6	15.7	94.9	94.9	Fail	RF-51	115.1	13.8	Fail Compaction
194	RFC-723R	9/24/1996	19540	16160	125.6	15.2	110.4	110.4	13.8	13.8	95.9	95.9	P	RF-51	115.1	13.8	Retest of Test Number RFC-723
195	RFC-746	10/11/1996	19380	17090	126.6	15.6	111.0	111.0	14.1	14.1	96.0	96.1	P	RF-52	115.5	12.7	
196	RFC-747	10/11/1996	19510	17120	125.0	15.1	109.8	109.9	13.8	13.7	95.1	95.2	P	RF-52	115.5	12.7	
197	RFC-748	10/11/1996	19530	17220	123.6	12.7	110.9	110.9	11.4	11.5	96.0	96.0	P	RF-52	115.5	12.7	
198	RFC-749	10/11/1996	19430	17240	125.5	14.7	110.8	110.8	13.3	13.3	95.9	95.9	P	RF-52	115.5	12.7	
199	RFC-750	10/11/1996	19300	17190	127.2	17.2	110.0	110.0	15.7	15.6	95.7	95.8	P	RF-53	114.8	14.0	
	RFC-750S	10/11/1996	19300	17190	127.1		111.0		14.5		96.7		N/A	RF-53	114.8	14.0	Sand-Cone
200	RFC-751	10/11/1996	19190	17240	124.4	15.3	109.1	109.1	14.0	14.0	95.0	95.0	P	RF-53	114.8	14.0	
201	RFC-752	10/11/1996	19290	17290	126.2	16.8	109.4	109.4	15.4	15.4	95.2	95.3	P	RF-53	114.8	14.0	
202	RFC-753	10/11/1996	19330	17340	130.4	15.2	115.1	115.2	13.2	13.2	100.2	100.3	P	RF-53	114.8	14.0	
203	RFC-778	10/25/1996	19120	17310	126.4	16.0	110.4	110.4	14.5	14.5	95.0	95.0	P	RF-54	116.2	13.0	
204	RFC-779	10/25/1996	19230	17360	130.1	13.4	116.6	116.7	11.5	11.5	100.3	100.4	P	RF-54	116.2	13.0	
205	RFC-780	10/25/1996	19060	17380	125.3	14.5	110.7	110.8	13.1	13.1	97.2	97.2	P	RF-55	114.0	13.9	
	RFC-780S	10/25/1996	19060	17380	125.8		111.6		12.7		97.9		N/A	RF-55	114.0	13.9	Sand-Cone

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
206	RFC-781	10/25/1996	19130	17420	114.9	12.7	102.2	102.2	12.4	12.4	89.7	89.6	Fail	RF-55	114.0	13.9	Fail Compaction
207	RFC-781R	10/25/1996	19130	17420	124.0	13.9	110.1	110.1	12.7	12.6	96.6	96.6	P	RF-55	114.0	13.9	Retest of Test Number RFC-781
208	RFC-782	10/25/1996	19160	17500	115.7	11.8	103.9	103.9	11.3	11.4	91.1	91.1	Fail	RF-55	114.0	13.9	Fail Moisture & Compaction
209	RFC-782R	10/25/1996	19160	17500	123.7	14.2	109.5	109.5	13.0	13.0	96.1	96.1	P	RF-55	114.0	13.9	Retest of Test Number RFC-782
210	RFC-783	10/25/1996	19100	17550	123.8	14.3	109.5	109.5	13.1	13.1	96.1	96.1	P	RF-55	114.0	13.9	
211	RFC-784	10/25/1996	19030	17460	123.7	15.3	108.4	108.4	14.1	14.1	95.1	95.1	P	RF-55	114.0	13.9	
212	RFC-788	5/19/1997	19300	17300	119.5	12.3	107.3	107.3	11.4	11.4	91.5	91.6	Fail	RF-57	117.1	14.2	Fail Moisture & Compaction, Notch
213	RFC-790	5/20/1997	19300	17300	128.5	14.3	114.3	114.3	12.4	12.5	97.5	97.6	P	RF-57	117.1	14.2	Retest of Test Number RFC-788, Notch
214	RFC-811	5/21/1997	18600	17800	127.0	14.3	112.8	112.8	12.6	12.6	95.8	95.9	P	RF-59	117.6	12.9	
	RFC-811S	5/21/1997	18600	17800	132.5	14.9	117.6	117.6	12.7	12.7	100.0	100.0	N/A	RF-59	117.6	12.9	Sand-Cone
215	RFC-812	5/21/1997	18600	17750	124.0	13.3	110.8	110.8	11.9	12.0	96.2	96.2	P	RF-60	115.1	13.7	
216	RFC-813	5/21/1997	18500	17700	126.5	15.0	111.5	111.5	13.4	13.5	96.8	96.9	P	RF-60	115.1	13.7	
217	RFC-814	5/21/1997	18550	17700	125.5	13.0	112.5	112.5	11.5	11.6	97.7	97.7	P	RF-60	115.1	13.7	Verification calculation indicates failed moisture by minus 0.1%
218	RFC-815	5/21/1997	18550	17750	126.0	13.3	112.8	112.8	11.8	11.8	97.9	98.0	P	RF-60	115.1	13.7	
219	RFC-821	5/21/1997	18500	17700	126.5	16.0	110.5	110.5	14.4	14.5	96.0	96.0	P	RF-60	115.1	13.7	
	RFC-821S	5/21/1997	18500	17700	129.4	14.9	114.5	114.5	13.1	13.0	99.4	99.5	N/A	RF-60	115.1	13.7	Sand-Cone
220	RFC-822	5/21/1997	18550	17800	125.5	13.8	111.8	111.8	12.3	12.3	95.1	95.1	P	RF-61	117.5	12.8	
221	RFC-846	7/30/1997	18350	17450	129.7	14.0	115.7	115.7	12.1	12.1	98.8	98.9	P	RF-63	117.0	13.0	SE corner
222	RFC-847	7/30/1997	18340	17470	129.0	15.5	113.4	113.5	13.7	13.7	96.9	97.0	P	RF-63	117.0	13.0	SE corner
223	RFC-848	7/30/1997	18140	17460	132.0	16.8	115.2	115.2	14.6	14.6	98.4	98.5	P	RF-63	117.0	13.0	SE corner
224	RFC-858	7/31/1997	18380	17450	132.6	14.6	118.0	118.0	12.4	12.4	100.8	100.9	P	RF-64	117.0	13.5	SE corner
225	RFC-859	7/31/1997	18080	17440	128.9	14.5	114.4	114.4	12.7	12.7	97.7	97.8	P	RF-64	117.0	13.5	SE corner
226	RFC-860	7/31/1997	18365	17475	132.8	17.3	115.4	115.5	15.0	15.0	98.6	98.7	P	RF-64	117.0	13.5	SE corner
227	RFC-862	7/31/1997	18350	17520	126.9	16.4	110.5	110.5	14.8	14.8	95.4	95.4	P	RF-65	115.8	14.3	SE corner
228	RFC-863	7/31/1997	18260	17525	129.2	17.4	111.8	111.8	15.6	15.6	96.5	96.5	P	RF-65	115.8	14.3	SE corner
229	RFC-864	7/31/1997	18180	17580	129.6	15.7	113.9	113.9	13.8	13.8	98.3	98.4	P	RF-65	115.8	14.3	Reverification SE corner
230	RFC-865	8/1/1997	18360	17590	126.5	15.1	111.5	111.4	13.5	13.6	96.2	96.2	P	RF-65	115.8	14.3	Reverification SE corner
231	RFC-866	8/1/1997	18320	17580	129.0	15.7	113.4	113.3	13.8	13.9	97.9	97.8	P	RF-65	115.8	14.3	Reverification SE corner
232	RFC-911	8/9/1997	18600	17850	125.3	13.1	112.1	112.2	11.7	11.7	96.5	96.6	P	RF-70	116.2	13.6	East slope
	RFC-911S	8/9/1997	18600	17850	124.1	13.0	111.1	111.1	11.7	11.7	95.6	95.6	N/A	RF-70	116.2	13.6	Sand-Cone, East slope
233	RFC-912	8/9/1997	18550	17800	127.9	14.0	113.9	113.9	12.0	12.3	98.1	98.0	P	RF-70	116.2	13.6	East slope
234	RFC-913	8/9/1997	18500	17750	130.9	16.0	114.9	114.9	14.5	13.9	98.8	98.9	P	RF-70	116.2	13.6	East slope
235	RFC-915	8/9/1997	18400	17670	127.7	15.9	111.8	111.8	14.3	14.2	96.2	96.2	P	RF-70	116.2	13.6	
236	RFC-923	8/14/1997	18330	17620	125.1	13.4	111.6	111.7	12.0	12.0	97.2	97.3	P	RF-71	114.8	13.9	SE corner
237	RFC-924	8/14/1997	18300	17630	126.5	15.9	110.6	110.6	14.4	14.4	96.3	96.3	P	RF-71	114.8	13.9	SE corner
238	RFC-925	8/14/1997	18300	17630	133.8	18.1	115.7	115.7	15.6	15.6	100.8	100.8	P	RF-71	114.8	13.9	SE corner
239	RFC-933	8/15/1997	18410	17650	127.4	13.6	113.9	113.8	11.9	12.0	98.8	98.8	P	RF-72	115.2	13.7	SE corner
240	RFC-940	8/16/1997	18370	17720	125.1	13.1	112.0	112.0	11.7	11.7	97.1	97.2	P	RF-72	115.2	13.7	SE corner
241	RFC-941	8/16/1997	18410	17680	126.3	15.3	111.1	111.0	13.8	13.8	95.1	95.1	P	RF-73	116.7	12.9	SE corner
	RFC-941S	8/16/1997	18410	17680	128.1	14.4	113.7	113.7	12.6	12.7	97.5	97.4	N/A	RF-73	116.7	12.9	Sand-Cone, SE corner
242	RFC-946	8/16/1997	18470	17690	125.2	14.3	111.0	110.9	12.9	12.9	95.1	95.0	P	RF-73	116.7	12.9	SE corner
243	RFC-947	8/16/1997	18430	17720	128.9	14.1	114.9	114.8	12.2	12.3	98.4	98.4	P	RF-73	116.7	12.9	SE corner
244	RFC-948	8/16/1997	18340	17760	124.8	13.5	111.4	111.3	12.1	12.1	95.4	95.4	P	RF-73	116.7	12.9	SE corner

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

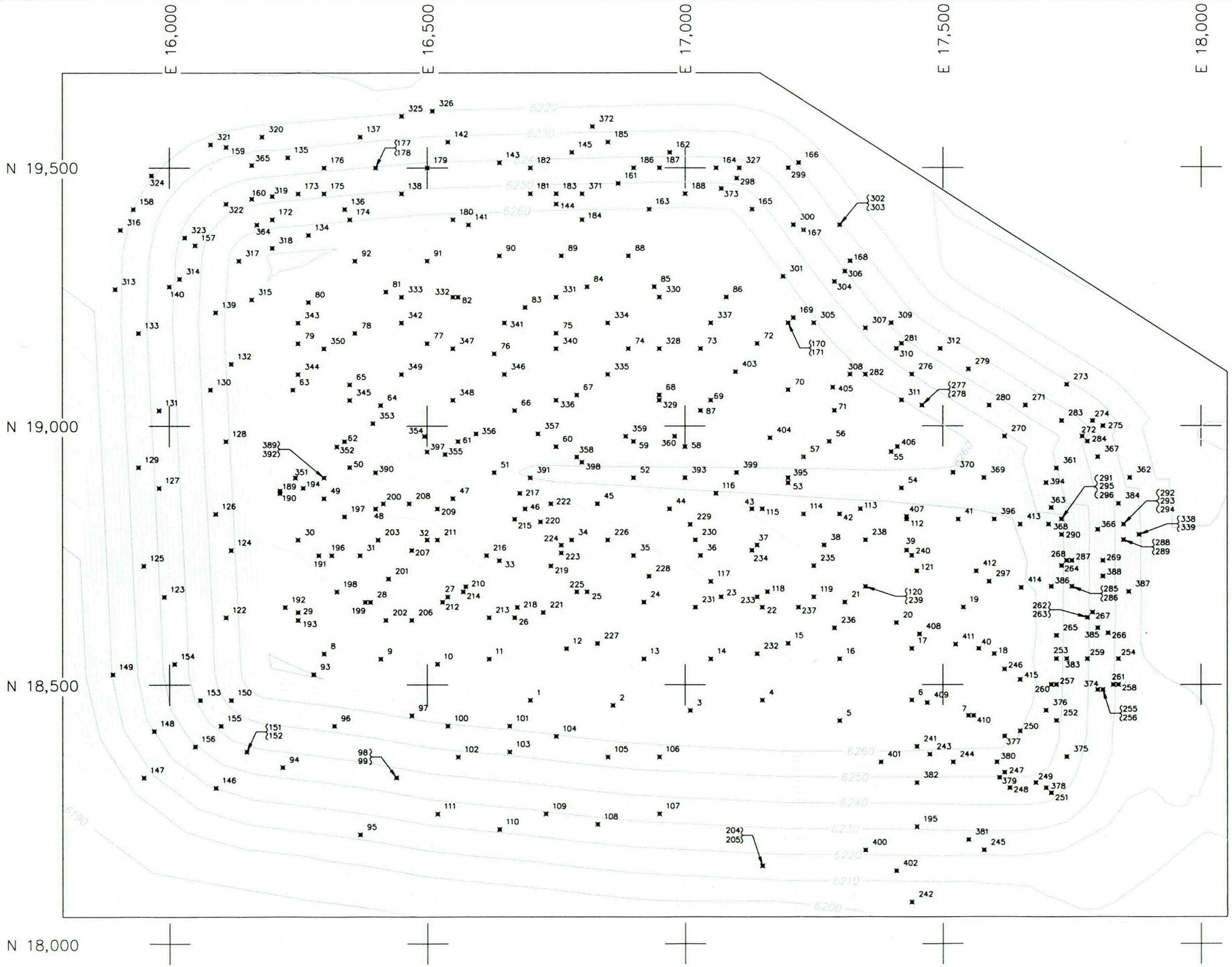
Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
245	RFC-958	8/18/1997	18550	17720	126.6	15.1	111.5	111.5	13.6	13.5	95.5	95.5	P	RF-74	116.7	13.8	East slope
246	RFC-959	8/18/1997	18490	17810	130.3	15.5	114.7	114.8	13.5	13.5	98.3	98.4	P	RF-74	116.7	13.8	East slope
247	RFC-960	8/18/1997	18550	17840	128.6	15.9	112.7	112.7	14.1	14.1	96.5	96.6	P	RF-74	116.7	13.8	East slope
248	RFC-967	8/19/1997	18500	17840	127.1	16.0	111.2	111.1	14.4	14.4	95.3	95.3	P	RF-75	116.6	13.3	East slope
249	RFC-968	8/19/1997	18500	17720	130.9	15.4	115.5	115.5	13.3	13.3	99.0	99.1	P	RF-75	116.6	13.3	East slope
250	RFC-969	8/19/1997	18560	17780	125.0	14.2	110.8	110.8	13.6	12.8	95.0	95.0	P	RF-75	116.6	13.3	East slope
251	RFC-977	8/20/1997	18595	17720	128.1	15.4	112.7	112.7	13.7	13.7	96.3	96.3	P	RF-76	117.0	13.8	East slope
252	RFC-978	8/20/1997	18600	17820	128.5	16.7	111.8	111.8	14.9	14.9	95.5	95.6	P	RF-76	117.0	13.8	East slope
253	RFC-979	8/20/1997	18640	17790	129.5	15.1	114.4	114.4	13.2	13.2	97.7	97.8	P	RF-76	117.0	13.8	East slope
254	RFC-986	8/21/1997	19090	17480	126.8	15.4	111.5	111.4	13.8	13.8	95.6	95.6	P	RF-77	116.5	14.1	Reverification North slope
255	RFC-987	8/21/1997	19110	17550	128.1	14.7	113.4	113.4	12.9	13.0	97.3	97.3	P	RF-77	116.5	14.1	Reverification North slope
256	RFC-988	8/21/1997	19020	17490	128.3	16.3	111.9	112.0	14.6	14.6	96.1	96.1	P	RF-77	116.5	14.1	Reverification North slope
257	RFC-993	8/22/1997	19040	17660	124.0	16.5	107.5	107.5	15.4	15.3	92.3	92.4	Fail	RF-78	116.4	14.1	Fail Compaction, North slope
258	RFC-993R	8/22/1997	19040	17660	128.5	15.2	113.3	113.3	13.4	13.4	97.3	97.3	P	RF-78	116.4	14.1	Retest of Test Number RFC-993, North slope
259	RFC-994	8/22/1997	18980	17620	125.1	14.4	110.6	110.7	13.1	13.0	95.0	95.1	P	RF-78	116.4	14.1	North slope
260	RFC-995	8/22/1997	19005	17720	129.0	17.4	111.6	111.6	15.6	15.6	95.8	95.9	P	RF-78	116.4	14.1	North slope
261	RFC-996	8/22/1997	19005	17800	126.8	14.5	112.3	112.3	12.9	12.9	96.4	96.5	P	RF-78	116.4	14.1	North slope
262	RFC-1001	8/23/1997	19050	17590	128.7	16.3	112.4	112.4	14.5	14.5	96.3	96.3	P	RF-79	116.7	13.6	North slope
	RFC-1001S	8/23/1997	19050	17590	130.9	15.0	115.9	115.9	12.9	12.9	99.3	99.3	N/A	RF-79	116.7	13.6	Sand-Cone, North slope
263	RFC-1004	8/23/1997	19100	17420	125.7	13.4	112.2	112.3	12.0	11.9	96.1	96.2	P	RF-79	116.7	13.6	Reverification, North slope
264	RFC-1005	8/23/1997	19040	17460	122.2	13.1	109.2	109.1	12.0	12.0	93.5	93.5	Fail	RF-79	116.7	13.6	Fail Compaction, North slope
265	RFC-1006	8/23/1997	19040	17460	127.7	14.0	113.7	113.7	12.4	12.3	97.4	97.4	P	RF-79	116.7	13.6	Retest of Test Number RFC-1005, North slope
266	RFC-1007	8/23/1997	19110	17550	127.0	14.1	112.9	112.9	12.5	12.5	96.7	96.7	P	RF-79	116.7	13.6	North slope
267	RFC-1025	8/26/1997	18510	17590	130.6	15.1	115.5	115.5	13.1	13.1	98.7	98.7	P	RF-81	117.0	13.0	East crest south of channel
268	RFC-1046	9/4/1997	19070	17520	128.8	14.0	114.9	114.8	12.2	12.2	100.0	100.0	P	RF-83	114.8	14.0	Reverification
269	RFC-1062	9/12/1997	18800	17650	129.0	16.7	112.3	112.3	14.9	14.9	96.8	96.8	P	RF-85	116.0	13.0	Reverification South of Channel 1 on east slope
270	RFC-1063	9/12/1997	18800	17760	129.3	15.7	113.6	113.6	13.8	13.8	97.9	97.9	P	RF-85	116.0	13.0	Reverification South of Channel 1 on east slope
271	RFC-1064	9/12/1997	18790	17880	129.5	16.0	113.5	113.5	14.1	14.1	97.8	97.8	P	RF-85	116.0	13.0	Reverification South of Channel 1 on east slope
272	RFC-1065	9/12/1997	18800	17760	127.8	15.9	111.9	111.9	14.2	14.2	96.4	96.5	P	RF-85	116.0	13.0	Reverification South of Channel 1 on east slope
273	RFC-1066	9/12/1997	18820	17650	126.7	16.5	110.2	110.2	15.0	15.0	95.0	95.0	P	RF-85	116.0	13.0	Reverification South of Channel 1 on east slope
274	RFC-1077	9/15/1997	18800	17650	130.6	15.1	115.5	115.5	13.1	13.1	98.1	98.1	P	RF-86	117.7	13.4	Reverification South of Channel 1 on east slope
275	RFC-1078	9/15/1997	18800	17650	129.7	16.1	113.6	113.6	14.2	14.2	96.5	96.5	P	RF-86	117.7	13.4	Reverification South of Channel 1 on east slope
276	RFC-1111	9/17/1997	18905	17700	129.5	16.5	113.1	113.0	14.6	14.6	97.2	97.1	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
	RFC-1111S	9/17/1997	18905	17700	130.3	15.4	114.9	114.9	13.4	13.4	98.7	98.7	N/A	RF-90	116.4	14.2	Sand-Cone, Channel 1 bottom section on 6:1

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 3

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
277	RFC-1112	9/17/1997	18935	17870	126.1	14.8	111.4	111.3	13.3	13.3	95.7	95.6	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
278	RFC-1113	9/17/1997	18855	17775	128.3	15.9	112.4	112.4	14.1	14.1	96.6	96.6	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
279	RFC-1114	9/17/1997	18875	17915	128.4	15.4	113.1	113.0	13.6	13.6	97.2	97.1	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
280	RFC-1119	9/18/1997	18917	17595	129.2	15.4	113.7	113.8	13.6	13.5	97.7	97.8	P	RF-90	116.4	14.2	North of Channel 1 between channel and NE 5:1 slope
281	RFC-1125	9/25/1997	18910	17740	130.1	17.8	112.3	112.3	15.8	15.9	95.8	95.8	P	RF-91	117.2	14.2	
282	RFC-1128	9/25/1997	18930	17660	130.0	16.7	113.3	113.3	14.7	14.7	96.7	96.7	P	RF-91	117.2	14.2	
283	RFC-1129	9/25/1997	18950	17880	128.2	16.7	111.6	111.5	14.9	15.0	95.2	95.1	P	RF-91	117.2	14.2	
284	RFC-1139	9/30/1997	18805	17790	126.4	16.2	110.1	110.2	14.7	14.7	95.7	95.8	P	RF-92	115.0	14.0	
285	RFC-1147	10/1/1997	18900	17580	129.3	16.1	113.2	113.2	14.2	14.2	97.7	97.8	P	RF-93	115.8	13.9	
286	RFC-1175	10/6/1997	18820	17600	125.3	14.3	111.0	111.0	12.9	12.9	95.3	95.4	P	RF-94	116.4	14.2	Channel 1 South 3:1 slope



N

200 0 200

SCALE IN FEET

CONTOUR INTERVAL : 2'

NOTES:

1.) THE FROST BARRIER WAS PLACED TO THE LINES AND GRADE SHOWN ON THE DRAWINGS AND AS DESCRIBED IN THE SPECIFICATIONS DURING THE 1995, 1996 AND 1997 CONSTRUCTION SEASONS.

2.) THE FROST BARRIER WAS PLACED OVER THE APPROVED RADON BARRIER LAYER. FIELD AND LABORATORY TESTING WAS CONDUCTED IN ACCORDANCE WITH SPECIFICATION MAY-1, SECTION 7.3.

3.) THE FROST BARRIER SOILS WERE COMPACTED TO AT LEAST 95% OF STANDARD PROCTOR MAXIMUM DENSITY AT A MOISTURE CONTENT BETWEEN PLUS OR MINUS 2% OF OPTIMUM AS DETERMINED BY ASTM D698. REFER TO INCLUDED SPREADSHEETS FOR TEST RESULT DETAILS.

LEGEND:

253 FIELD TEST LOCATION AND TEST NUMBER

NORTHING/EASTING GRID TICKS

MAYBELL HEAP LEACH FACILITY
FROST BARRIER FIELD TEST LOCATIONS
(FOURTH LIFT)

UMETCO MINERALS CORPORATION

FOURTH LIFT FROST BARRIER

FIELD TEST LOCATIONS

MAYBELL HEAP LEACH FACILITY

DATE: AUGUST 2006 FIGURE 7

Maybell frost fourth lift.dwg

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
1	RFC-216	10/20/1995	18470	16700	128.7	15.9	112.8	112.8	14.1	14.1	98.1	98.1	P	RF-15	115.0	14.3	
2	RFC-217	10/20/1995	18460	16860	127.2	15.1	112.1	112.1	13.5	13.5	97.5	97.5	P	RF-15	115.0	14.3	
3	RFC-218	10/20/1995	18450	17010	125.2	15.3	109.9	109.9	13.9	13.9	95.6	95.6	P	RF-15	115.0	14.3	
4	RFC-219	10/20/1995	18470	17150	125.6	15.6	110.0	110.0	14.1	14.2	95.6	95.7	P	RF-15	115.0	14.3	
5	RFC-220	10/20/1995	18430	17300	125.1	15.3	109.8	109.8	13.9	13.9	95.5	95.5	P	RF-15	115.0	14.3	
	RFC-220S	10/20/1995	18430	17300	125.3		110.3		13.7		95.9	0.0	N/A	RF-15	115.0	14.3	Sand-Cone
6	RFC-221	10/20/1995	18470	17440	126.2	14.9	111.3	111.3	13.4	13.4	96.8	96.8	P	RF-15	115.0	14.3	
7	RFC-222	10/20/1995	18440	17550	125.0	14.5	110.5	110.5	13.2	13.1	96.1	96.1	P	RF-15	115.0	14.3	
8	RFC-223	10/20/1995	18560	16300	125.6	15.2	110.4	110.4	13.8	13.8	96.0	96.0	P	RF-15	115.0	14.3	
9	RFC-224	10/20/1995	18550	16410	126.4	15.5	110.9	110.9	14.0	14.0	96.4	96.4	P	RF-15	115.0	14.3	
10	RFC-225	10/20/1995	18540	16520	128.2	16.5	111.7	111.7	14.8	14.8	97.6	97.6	P	RF-16	114.5	13.6	
11	RFC-226	10/20/1995	18550	16620	125.9	15.7	110.2	110.2	14.3	14.2	96.2	96.2	P	RF-16	114.5	13.6	
12	RFC-227	10/20/1995	18570	16770	127.3	16.7	110.6	110.6	15.1	15.1	96.6	96.6	P	RF-16	114.5	13.6	
13	RFC-228	10/20/1995	18550	16920	125.4	15.4	110.0	110.0	14.0	14.0	96.1	96.1	P	RF-16	114.5	13.6	
14	RFC-229	10/20/1995	18550	17050	125.8	15.8	110.0	110.0	14.4	14.4	96.1	96.1	P	RF-16	114.5	13.6	
15	RFC-230	10/20/1995	18580	17200	127.3	15.6	111.7	111.7	13.9	14.0	97.6	97.6	P	RF-16	114.5	13.6	
	RFC-230S	10/20/1995	18580	17200	127.6		112.3		13.6		98.1	0.0	N/A	RF-16	114.5	13.6	Sand-Cone
16	RFC-231	10/20/1995	18550	17300	127.4	16.2	111.2	111.2	14.6	14.6	97.1	97.1	P	RF-16	114.5	13.6	
17	RFC-232	10/20/1995	18570	17440	127.9	15.9	112.0	112.0	14.2	14.2	97.8	97.8	P	RF-16	114.5	13.6	
18	RFC-233	10/20/1995	18560	17600	125.5	15.6	110.0	109.9	14.2	14.2	96.1	96.0	P	RF-16	114.5	13.6	
19	RFC-234	10/20/1995	18650	17540	125.1	15.4	109.7	109.7	14.0	14.0	95.8	95.8	P	RF-16	114.5	13.6	
20	RFC-235	10/20/1995	18620	17410	126.6	15.7	110.9	110.9	14.2	14.2	96.9	96.9	P	RF-16	114.5	13.6	
21	RFC-236	10/20/1995	18660	17310	127.7	14.7	113.1	113.0	13.0	13.0	98.8	98.7	P	RF-16	114.5	13.6	
22	RFC-237	10/20/1995	18650	17150	125.1	15.1	110.0	110.0	13.7	13.7	96.1	96.1	P	RF-16	114.5	13.6	
23	RFC-238	10/20/1995	18670	17070	126.3	15.5	110.8	110.8	14.0	14.0	96.8	96.8	P	RF-16	114.5	13.6	
24	RFC-239	10/20/1995	18660	16920	127.0	15.1	111.9	111.9	13.5	13.5	97.7	97.7	P	RF-16	114.5	13.6	
25	RFC-240	10/20/1995	18680	16810	126.8	15.0	111.9	111.8	13.4	13.4	98.2	98.1	P	RF-17	114.0	14.3	
	RFC-240S	10/20/1995	18680	16810	126.9		112.1		13.3		98.3	0.0	N/A	RF-17	114.0	14.3	Sand-Cone
26	RFC-241	10/20/1995	18630	16670	125.5	15.2	110.3	110.3	13.8	13.8	96.8	96.8	P	RF-17	114.0	14.3	
27	RFC-242	10/20/1995	18670	16540	126.5	14.8	111.1	111.7	13.2	13.2	97.5	98.0	P	RF-17	114.0	14.3	
28	RFC-243	10/20/1995	18660	16390	125.5	15.0	110.5	110.5	13.6	13.6	96.9	96.9	P	RF-17	114.0	14.3	
29	RFC-244	10/20/1995	18640	16250	128.0	14.7	113.3	113.3	13.0	13.0	99.4	99.4	P	RF-17	114.0	14.3	
30	RFC-245	10/25/1995	18780	16250	127.7	16.5	111.2	111.2	14.8	14.8	97.5	97.5	P	RF-17	114.0	14.3	
31	RFC-246	10/25/1995	18750	16370	125.2	15.4	110.1	109.8	14.0	14.0	96.6	96.3	P	RF-17	114.0	14.3	
32	RFC-247	10/25/1995	18780	16500	125.2	15.1	110.1	110.1	13.7	13.7	96.6	96.6	P	RF-17	114.0	14.3	
33	RFC-248	10/25/1995	18740	16640	128.6	17.4	111.3	111.2	15.6	15.6	97.6	97.5	P	RF-17	114.0	14.3	
34	RFC-249	10/25/1995	18780	16780	126.1	14.5	111.6	111.6	13.0	13.0	97.9	97.9	P	RF-17	114.0	14.3	
35	RFC-250	10/25/1995	18750	16900	126.1	15.0	111.1	111.1	13.5	13.5	97.5	97.5	P	RF-17	114.0	14.3	
	RFC-250S	10/25/1995	18750	16900	125.8		110.9		13.4		97.3	0.0	N/A	RF-17	114.0	14.3	Sand-Cone
36	RFC-251	10/25/1995	18750	17030	126.5	14.7	111.8	111.8	13.2	13.1	98.1	98.1	P	RF-17	114.0	14.3	
37	RFC-252	10/25/1995	18770	17140	127.4	16.7	110.7	110.7	15.1	15.1	97.1	97.1	P	RF-17	114.0	14.3	
38	RFC-253	10/25/1995	18770	17270	129.2	16.9	112.2	112.3	15.1	15.0	98.4	98.5	P	RF-17	114.0	14.3	
39	RFC-254	10/25/1995	18760	17430	128.1	16.4	111.7	111.7	14.7	14.7	98.0	98.0	P	RF-17	114.0	14.3	
40	RFC-255	10/25/1995	18570	17570	126.6	15.4	111.2	111.2	13.9	13.8	97.4	97.4	P	RF-18	114.2	13.6	
41	RFC-256	10/25/1995	18820	17530	125.6	15.1	110.5	110.5	13.7	13.7	96.8	96.8	P	RF-18	114.2	13.6	
42	RFC-257	10/25/1995	18830	17300	125.2	15.6	109.6	109.6	14.2	14.2	96.0	96.0	P	RF-18	114.2	13.6	
43	RFC-258	10/25/1995	18840	17130	126.6	16.2	110.4	110.4	14.7	14.7	96.7	96.7	P	RF-18	114.2	13.6	
44	RFC-259	10/25/1995	18840	16970	127.2	14.8	112.5	112.4	13.1	13.2	98.5	98.4	P	RF-18	114.2	13.6	
45	RFC-260	10/25/1995	18850	16830	128.0	15.2	112.8	112.8	13.5	13.5	98.8	98.8	P	RF-18	114.2	13.6	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
	RFC-260S	10/25/1995	18850	16830	127.8		112.4		13.7		98.4	0.0	N/A	RF-18	114.2	13.6	Sand-Cone
46	RFC-261	10/25/1995	18840	16690	127.4	15.0	112.3	112.4	13.4	13.3	98.3	98.4	P	RF-18	114.2	13.6	
47	RFC-262	10/25/1995	18860	16550	124.5	14.6	110.0	109.9	13.3	13.3	96.3	96.2	P	RF-18	114.2	13.6	
48	RFC-263	10/25/1995	18840	16400	126.7	15.2	111.5	111.5	13.6	13.6	97.6	97.6	P	RF-18	114.2	13.6	
49	RFC-264	10/25/1995	18860	16300	125.4	14.9	110.5	110.5	13.5	13.5	96.8	96.8	P	RF-18	114.2	13.6	
50	RFC-329	11/6/1995	18920	16350	127.2	14.6	112.6	112.6	13.0	13.0	99.3	99.3	P	RF-22	113.4	14.3	
51	RFC-330	11/6/1995	18910	16630	128.4	16.8	111.6	111.6	15.0	15.1	97.5	97.5	P	RF-23	114.5	14.1	
	RFC-330S	11/6/1995	18910	16630	128.6		111.6		15.2		97.5	0.0	N/A	RF-23	114.5	14.1	Sand-Cone
52	RFC-331	11/6/1995	18900	16900	126.0	15.1	110.9	110.9	13.6	13.6	96.9	96.9	P	RF-23	114.5	14.1	
53	RFC-332	11/6/1995	18890	17200	126.8	16.4	110.4	110.4	14.9	14.9	96.4	96.4	P	RF-23	114.5	14.1	
54	RFC-333	11/6/1995	18880	17420	127.7	16.0	111.7	111.7	14.3	14.3	97.6	97.6	P	RF-23	114.5	14.1	
55	RFC-334	11/6/1995	18950	17400	126.0	14.5	111.5	111.5	13.0	13.0	97.4	97.4	P	RF-23	114.5	14.1	
56	RFC-335	11/6/1995	18970	17280	124.8	14.9	109.9	109.9	13.5	13.6	96.0	96.0	P	RF-23	114.5	14.1	
57	RFC-336	11/6/1995	18940	17230	126.4	15.0	111.4	111.4	13.5	13.5	97.3	97.3	P	RF-23	114.5	14.1	
58	RFC-337	11/6/1995	18960	17000	128.7	15.5	113.1	113.2	13.7	13.7	98.8	98.9	P	RF-23	114.5	14.1	
59	RFC-338	11/6/1995	18970	16900	126.1	14.6	111.5	111.5	13.1	13.1	97.4	97.4	P	RF-23	114.5	14.1	
60	RFC-339	11/6/1995	18960	16750	128.2	16.1	112.1	112.1	14.4	14.4	97.9	97.9	P	RF-23	114.5	14.1	
61	RFC-340	11/6/1995	18970	16560	126.1	15.4	110.7	110.7	13.9	13.9	96.7	96.7	P	RF-23	114.5	14.1	
	RFC-340S	11/6/1995	18970	16560	125.8		110.4		14.0		96.4	0.0	N/A	RF-23	114.5	14.1	Sand-Cone
62	RFC-341	11/6/1995	18970	16340	127.5	15.5	112.0	112.0	13.8	13.8	97.8	97.8	P	RF-23	114.5	14.1	
63	RFC-342	11/6/1995	19070	16240	125.6	14.4	111.1	111.2	13.0	12.9	97.0	97.1	P	RF-23	114.5	14.1	
64	RFC-343	11/6/1995	19040	16410	127.2	15.9	111.3	111.3	14.3	14.3	97.2	97.2	P	RF-23	114.5	14.1	
65	RFC-344	11/6/1995	19080	16350	127.4	15.6	111.9	111.8	13.9	14.0	97.7	97.6	P	RF-23	114.5	14.1	
66	RFC-345	11/6/1995	19030	16670	125.8	16.2	109.7	109.6	14.7	14.8	95.9	95.8	P	RF-24	114.4	13.3	
67	RFC-346	11/6/1995	19060	16790	127.7	16.0	111.7	111.7	14.3	14.3	97.6	97.6	P	RF-24	114.4	13.3	
68	RFC-347	11/6/1995	19060	16950	126.2	16.6	109.6	109.6	15.2	15.1	95.8	95.8	P	RF-24	114.4	13.3	
69	RFC-348	11/6/1995	19050	17050	127.1	16.4	110.7	110.7	14.8	14.8	96.8	96.8	P	RF-24	114.4	13.3	
70	RFC-349	11/6/1995	19070	17200	125.9	15.1	110.8	110.8	13.6	13.6	96.9	96.9	P	RF-24	114.4	13.3	
71	RFC-350	11/6/1995	19030	17290	126.7	15.4	111.3	111.3	13.8	13.8	97.3	97.3	P	RF-24	114.4	13.3	
	RFC-350S	11/6/1995	19030	17290	126.9		111.4		13.9		97.4	0.0	N/A	RF-24	114.4	13.3	Sand-Cone
72	RFC-351	11/6/1995	19160	17140	126.0	16.3	109.8	109.7	14.8	14.9	96.0	95.9	P	RF-24	114.4	13.3	
73	RFC-352	11/6/1995	19150	17030	126.0	15.2	110.8	110.8	13.7	13.7	96.9	96.9	P	RF-24	114.4	13.3	
74	RFC-353	11/6/1995	19150	16890	125.3	16.1	109.2	109.2	14.7	14.7	95.5	95.5	P	RF-24	114.4	13.3	
75	RFC-354	11/6/1995	19180	16750	124.5	15.0	109.5	109.5	13.7	13.7	95.7	95.7	P	RF-24	114.4	13.3	
76	RFC-355	11/6/1995	19140	16630	125.2	14.8	110.5	110.4	13.4	13.4	96.6	96.5	P	RF-24	114.4	13.3	
77	RFC-356	11/6/1995	19160	16500	125.1	16.3	108.8	108.8	15.0	15.0	95.1	95.1	P	RF-24	114.4	13.3	
78	RFC-357	11/6/1995	19180	16360	128.2	14.9	113.4	113.3	13.1	13.2	99.1	99.0	P	RF-24	114.4	13.3	
79	RFC-358	11/6/1995	19160	16250	126.1	16.7	109.4	109.4	15.3	15.3	95.6	95.6	P	RF-24	114.4	13.3	
80	RFC-359	11/6/1995	19240	16270	126.0	15.0	111.0	111.0	13.5	13.5	97.0	97.0	P	RF-24	114.4	13.3	
81	RFC-360	11/6/1995	19260	16420	126.5	16.2	110.4	110.3	14.6	14.7	96.7	96.6	P	RF-25	114.2	13.3	
	RFC-360S	11/6/1995	19260	16420	126.9		110.6		14.8		96.8	0.0	N/A	RF-25	114.2	13.3	Sand-Cone
82	RFC-361	11/6/1995	19250	16560	125.4	15.9	109.5	109.5	14.5	14.5	95.9	95.9	P	RF-25	114.2	13.3	
83	RFC-362	11/6/1995	19230	16690	125.2	15.5	109.7	109.7	14.1	14.1	96.1	96.1	P	RF-25	114.2	13.3	
84	RFC-363	11/6/1995	19270	16810	123.1	14.1	109.0	109.0	12.9	12.9	95.5	95.4	P	RF-25	114.2	13.3	
85	RFC-364	11/6/1995	19270	16940	125.3	16.0	109.3	109.3	14.6	14.6	95.7	95.7	P	RF-25	114.2	13.3	
86	RFC-365	11/6/1995	19250	17080	127.6	16.1	111.5	111.5	14.4	14.4	97.6	97.6	P	RF-25	114.2	13.3	
87	RFC-366	11/6/1995	19030	17030	126.4	14.4	112.0	112.0	12.9	12.9	98.1	98.1	P	RF-25	114.2	13.3	
88	RFC-367	11/6/1995	19330	16890	127.1	15.1	112.0	112.0	13.5	13.5	98.1	98.1	P	RF-25	114.2	13.3	
89	RFC-368	11/6/1995	19330	16760	128.4	15.4	113.0	113.0	13.6	13.6	98.9	98.9	P	RF-25	114.2	13.3	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
90	RFC-369	11/6/1995	19330	16640	126.2	16.4	109.7	109.8	15.0	14.9	96.1	96.1	P	RF-25	114.2	13.3	
91	RFC-370	11/6/1995	19320	16500	123.8	14.3	109.6	109.5	13.0	13.1	96.0	95.9	P	RF-25	114.2	13.3	
	RFC-370S	11/6/1995	19320	16500	123.3		109.3		12.9		95.7	0.0	N/A	RF-25	114.2	13.3	Sand-Cone
92	RFC-371	11/6/1995	19320	16360	127.0	15.1	111.9	111.9	13.5	13.5	98.0	98.0	P	RF-25	114.2	13.3	
93	RFC-490	7/8/1996	18520	16280	125.2	14.8	110.5	110.4	13.4	13.4	96.4	96.4	P	RF-35	114.5	13.8	
	RFC-490S	7/8/1996	18520	16280	124.8		111.2		12.3		97.1	0.0	N/A	RF-35	114.5	13.8	Sand-Cone
94	RFC-491	7/8/1996	18340	16220	130.7	18.1	112.5	112.6	16.1	16.1	98.2	98.3	P	RF-35	114.5	13.8	
95	RFC-492	7/8/1996	18210	16370	123.2	14.0	109.2	109.2	12.8	12.8	95.4	95.4	P	RF-35	114.5	13.8	
96	RFC-493	7/8/1996	18420	16320	131.1	15.5	115.6	115.6	13.4	13.4	101.0	101.0	P	RF-35	114.5	13.8	
97	RFC-494	7/8/1996	18440	16470	123.4	14.6	108.8	108.8	13.4	13.4	95.0	95.0	P	RF-35	114.5	13.8	
98	RFC-495	7/8/1996	18320	16440	124.4	15.2	109.2	109.2	13.9	13.9	94.1	94.1	Fail	RF-36	116.1	14.0	Fail Compaction
99	RFC-495R	7/8/1996	18320	16440	128.7	16.8	111.8	111.9	15.1	15.0	96.3	96.4	P	RF-36	116.1	14.0	Retest of Test Number RFC-495
100	RFC-496	7/10/1996	18420	16540	126.7	15.9	110.8	110.8	14.3	14.4	95.4	95.4	P	RF-36	116.1	14.0	
101	RFC-497	7/10/1996	18420	16660	125.3	14.5	110.8	110.8	13.1	13.1	95.4	95.4	P	RF-36	116.1	14.0	
102	RFC-498	7/17/1996	18360	16560	130.4	17.3	113.1	113.1	15.3	15.3	97.3	97.4	P	RF-36	116.1	14.0	
103	RFC-499	7/17/1996	18370	16660	127.2	15.4	111.8	111.8	13.7	13.8	96.2	96.3	P	RF-36	116.1	14.0	
104	RFC-500	7/17/1996	18400	16750	128.1	17.1	111.0	111.0	15.4	15.4	96.0	96.0	P	RF-37	115.6	13.4	
	RFC-500S	7/17/1996	18400	16750	127.5		113.0		12.8		97.8	0.0	N/A	RF-37	115.6	13.4	Sand-Cone
105	RFC-501	7/17/1996	18360	16850	127.7	17.0	110.6	110.7	15.4	15.4	95.7	95.8	P	RF-37	115.6	13.4	
106	RFC-502	7/17/1996	18360	16950	127.9	17.1	110.8	110.8	15.5	15.4	95.8	95.8	P	RF-37	115.6	13.4	
107	RFC-503	7/17/1996	18250	16950	128.0	15.8	112.1	112.2	14.1	14.1	96.9	97.1	P	RF-37	115.6	13.4	
108	RFC-504	7/17/1996	18230	16830	126.5	16.6	109.9	109.9	15.1	15.1	95.0	95.1	P	RF-37	115.6	13.4	
109	RFC-505	7/17/1996	18250	16730	127.2	16.5	110.6	110.7	15.0	14.9	95.6	95.8	P	RF-37	115.6	13.4	
110	RFC-506	7/17/1996	18220	16640	127.1	17.0	110.1	110.1	15.5	15.4	95.2	95.2	P	RF-37	115.6	13.4	
111	RFC-507	7/17/1996	18250	16520	126.5	15.6	110.9	110.9	14.0	14.1	95.9	95.9	P	RF-37	115.6	13.4	
112	RFC-554	7/29/1996	18820	17430	124.5	14.4	110.1	110.1	13.1	13.1	96.8	96.7	P	RF-39	113.8	14.2	
113	RFC-555	7/29/1996	18840	17340	124.7	14.1	110.5	110.6	12.8	12.7	97.0	97.0	P	RF-40	114.0	14.1	
114	RFC-556	7/29/1996	18830	17230	125.3	14.5	110.8	110.8	13.1	13.1	97.2	97.2	P	RF-40	114.0	14.1	
115	RFC-557	7/29/1996	18840	17150	125.7	14.3	111.3	111.4	12.8	12.8	97.7	97.7	P	RF-40	114.0	14.1	
116	RFC-558	7/29/1996	18870	17060	127.2	14.1	113.1	113.1	12.5	12.5	99.2	99.2	P	RF-40	114.0	14.1	
117	RFC-559	7/29/1996	18700	17050	123.9	15.0	108.9	108.9	13.8	13.8	95.5	95.5	P	RF-40	114.0	14.1	
118	RFC-560	7/29/1996	18680	17160	122.6	14.3	108.2	108.3	13.2	13.2	95.0	95.0	P	RF-40	114.0	14.1	
	RFC-560S	7/29/1996	18680	17160	124.1		108.5		14.4		95.1	0.0	N/A	RF-40	114.0	14.1	Sand-Cone
119	RFC-561	7/29/1996	18670	17250	124.0	14.6	109.4	109.4	13.3	13.3	96.0	96.0	P	RF-40	114.0	14.1	
120	RFC-562	7/29/1996	18690	17350	122.5	13.7	108.8	108.8	12.6	12.6	95.5	95.4	P	RF-40	114.0	14.1	
121	RFC-563	7/29/1996	18720	17450	130.3	14.9	115.4	115.4	12.9	12.9	101.3	101.2	P	RF-40	114.0	14.1	
122	RFC-564	8/7/1996	18630	16110	126.3	16.2	110.1	110.1	14.7	14.7	96.6	96.6	P	RF-40	114.0	14.1	
123	RFC-565	8/7/1996	18670	15990	125.1	15.8	109.3	109.3	14.4	14.5	95.9	95.9	P	RF-40	114.0	14.1	
124	RFC-573	8/8/1996	18760	16120	123.1	13.3	109.8	109.8	12.1	12.1	95.5	95.5	P	RF-41	115.0	14.2	
125	RFC-574	8/8/1996	18730	15950	126.0	14.7	111.4	111.3	13.2	13.2	96.8	96.8	P	RF-41	115.0	14.2	
126	RFC-575	8/8/1996	18830	16090	124.6	14.6	110.1	110.0	13.2	13.3	95.7	95.7	P	RF-41	115.0	14.2	
127	RFC-576	8/8/1996	18880	15980	129.1	14.3	114.8	114.8	12.4	12.5	99.7	99.8	P	RF-41	115.0	14.2	
128	RFC-588	8/9/1996	18970	16110	126.1	15.8	110.3	110.3	14.3	14.3	95.4	95.4	P	RF-42	115.6	13.3	
129	RFC-589	8/9/1996	18920	15940	126.8	15.1	111.7	111.7	13.5	13.5	96.6	96.6	P	RF-42	115.6	13.3	
130	RFC-590	8/9/1996	19070	16080	123.7	13.0	110.7	110.7	11.7	11.7	95.8	95.8	P	RF-42	115.6	13.3	
	RFC-590S	8/9/1996	19070	16080	122.4		109.9		11.4		95.1	0.0	N/A	RF-42	115.6	13.3	Sand-Cone
131	RFC-591	8/9/1996	19030	15980	122.4	12.4	109.9	110.0	11.3	11.3	95.1	95.2	P	RF-42	115.6	13.3	
132	RFC-592	8/9/1996	19120	16120	123.4	12.5	110.9	110.9	11.3	11.3	95.9	95.9	P	RF-42	115.6	13.3	
133	RFC-593	8/9/1996	19180	15940	123.2	12.6	110.5	110.6	11.4	11.4	95.6	95.7	P	RF-42	115.6	13.3	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
134	RFC-634	8/15/1996	19370	16270	125.9	14.3	111.6	111.6	12.8	12.8	97.5	97.6	P	RF-45	114.4	13.4	
135	RFC-635	8/15/1996	19520	16230	127.5	16.2	111.3	111.3	14.5	14.6	97.2	97.3	P	RF-45	114.4	13.4	
136	RFC-636	8/15/1996	19420	16340	123.9	14.7	109.2	109.2	13.5	13.5	95.4	95.5	P	RF-45	114.4	13.4	
137	RFC-637	8/15/1996	19560	16370	124.8	14.9	109.9	109.9	13.6	13.6	96.0	96.1	P	RF-45	114.4	13.4	
138	RFC-638	8/15/1996	19450	16450	126.6	15.1	111.5	111.5	13.5	13.5	97.4	97.5	P	RF-45	114.4	13.4	
139	RFC-652	8/16/1996	19220	16090	127.2	16.4	110.8	110.8	14.8	14.8	95.6	95.7	P	RF-46	115.8	13.4	
140	RFC-653	8/16/1996	19270	16000	125.5	15.4	110.1	110.1	14.0	14.0	95.0	95.1	P	RF-46	115.8	13.4	
141	RFC-654	8/27/1996	19390	16580	124.9	14.8	110.1	110.1	13.4	13.4	95.1	95.1	P	RF-46	115.8	13.4	
142	RFC-655	8/27/1996	19550	16540	123.9	13.5	110.4	110.4	12.3	12.2	95.3	95.3	P	RF-46	115.8	13.4	
143	RFC-656	8/27/1996	19510	16640	126.6	15.1	111.5	111.5	13.6	13.5	96.3	96.3	P	RF-46	115.8	13.4	
144	RFC-657	8/27/1996	19430	16750	124.0	13.9	110.1	110.1	12.6	12.6	95.1	95.1	P	RF-46	115.8	13.4	
145	RFC-658	8/27/1996	19530	16780	127.1	16.4	110.7	110.7	14.8	14.8	95.6	95.6	P	RF-46	115.8	13.4	
146	RFC-695	9/16/1996	18300	16090	125.5	13.3	112.2	112.2	11.9	11.9	97.2	97.2	P	RF-49	115.4	13.7	
147	RFC-696	9/16/1996	18320	15950	127.2	14.4	112.8	112.8	12.8	12.8	97.7	97.7	P	RF-49	115.4	13.7	
148	RFC-697	9/16/1996	18410	15970	124.2	14.4	109.7	109.8	13.1	13.1	95.1	95.1	P	RF-49	115.4	13.7	
149	RFC-698	9/16/1996	18520	15890	128.5	16.6	112.0	111.9	14.8	14.8	97.0	97.0	P	RF-49	115.4	13.7	
150	RFC-699	9/16/1996	18470	16120	129.8	13.8	115.9	116.0	11.9	11.9	100.4	100.5	P	RF-49	115.4	13.7	
151	RFC-700	9/16/1996	18370	16150	128.4	17.5	110.9	110.9	15.8	15.8	96.1	96.1	Fail	RF-49	115.4	13.7	Failed Moisture & Sand-Cone Correlation, See Retest
	RFC-700S	9/16/1996	18370	16150	124.6		109.0		14.4		94.5	0.0	N/A	RF-49	115.4	13.7	Sand-Cone, Failed Compaction & Correlation, See Retest
152	RFC-700R	9/26/1996	18370	16150	129.9	18.4	111.5	111.5	16.5	16.5	96.6	96.6	P	RF-49	115.4	13.7	Retest of Test Number RFC-700
	RFC-700RS	9/26/1996	18370	16150			113.7		15.1		98.5	0.0	N/A	RF-49	115.4	13.7	Sand-Cone, Retest
153	RFC-701	9/16/1996	18470	16060	128.2	13.8	114.3	114.4	12.1	12.1	99.0	99.1	P	RF-49	115.4	13.7	
154	RFC-702	9/16/1996	18540	16010	128.9	15.1	113.8	113.8	13.3	13.3	98.6	98.6	P	RF-49	115.4	13.7	
155	RFC-724	9/26/1996	18420	16100	126.8	16.7	110.1	110.1	15.2	15.2	95.6	95.7	P	RF-51	115.1	13.8	
156	RFC-725	9/26/1996	18380	16050	126.0	16.6	109.4	109.4	15.2	15.2	95.0	95.0	P	RF-51	115.1	13.8	
157	RFC-726	10/2/1996	19350	16050	129.0	14.6	114.5	114.4	12.7	12.8	99.4	99.4	P	RF-51	115.1	13.8	
158	RFC-727	10/2/1996	19420	15930	126.1	15.3	110.7	110.8	13.9	13.8	96.1	96.3	P	RF-51	115.1	13.8	
159	RFC-728	10/2/1996	19540	16110	131.1	15.3	115.8	115.8	13.2	13.2	100.6	100.6	P	RF-51	115.1	13.8	
160	RFC-729	10/2/1996	19440	16160	127.7	15.1	112.6	112.6	13.4	13.4	97.8	97.8	P	RF-51	115.1	13.8	
161	RFC-754	10/14/1996	19470	16870	126.8	15.5	111.3	111.3	13.9	13.9	96.9	97.0	P	RF-53	114.8	14.0	
162	RFC-755	10/14/1996	19530	16970	125.0	14.8	110.2	110.2	13.4	13.4	95.9	96.0	P	RF-53	114.8	14.0	
163	RFC-756	10/14/1996	19420	16930	125.5	14.0	111.5	111.5	12.6	12.6	97.1	97.1	P	RF-53	114.8	14.0	
164	RFC-757	10/14/1996	19500	17060	127.6	14.6	113.0	113.0	12.9	12.9	98.4	98.4	P	RF-53	114.8	14.0	
165	RFC-758	10/14/1996	19420	17130	123.4	13.8	109.6	109.6	12.6	12.6	95.5	95.5	P	RF-53	114.8	14.0	
166	RFC-759	10/14/1996	19510	17220	126.1	16.9	109.2	109.2	15.5	15.5	95.1	95.1	P	RF-53	114.8	14.0	
167	RFC-760	10/14/1996	19380	17230	124.4	14.6	109.8	109.8	13.3	13.3	95.6	95.6	P	RF-53	114.8	14.0	
	RFC-760S	10/14/1996	19380	17230	123.2		109.3		12.7		95.2	0.0	N/A	RF-53	114.8	14.0	Sand-Cone
168	RFC-761	10/14/1996	19320	17320	125.4	15.9	109.5	109.5	14.5	14.5	95.4	95.4	P	RF-53	114.8	14.0	
169	RFC-762	10/14/1996	19210	17210	125.7	15.8	110.0	109.9	14.4	14.4	95.7	95.7	P	RF-53	114.8	14.0	
170	RFC-787	5/19/1997	19200	17200	123.5	14.8	108.8	108.8	13.5	13.6	92.8	92.9	Fail	RF-57	117.1	14.2	Fail Compaction, Notch
171	RFC-789	5/20/1997	19200	17200	129.5	14.0	115.5	115.5	12.2	12.1	98.6	98.6	P	RF-57	117.1	14.2	Retest of Test Number RFC-787, Notch
172	RFC-791	5/20/1997	19400	16200	129.5	15.0	114.5	114.5	13.1	13.1	97.7	97.8	P	RF-57	117.1	14.2	
	RFC-791S	5/20/1997	19400	16200	127.9	14.6	113.3	113.3	12.9	12.9	96.7	96.8	N/A	RF-57	117.1	14.2	Sand-Cone
173	RFC-792	5/20/1997	19450	16250	128.5	15.5	113.0	113.0	13.7	13.7	95.8	95.8	P	RF-58	117.9	13.1	
174	RFC-803	5/21/1997	19400	16350	127.0	13.5	113.5	113.5	11.8	11.9	96.5	96.5	P	RF-59	117.6	12.9	
175	RFC-804	5/21/1997	19450	16300	127.5	14.3	113.3	113.3	12.5	12.6	96.3	96.3	P	RF-59	117.6	12.9	
176	RFC-805	5/21/1997	19500	16300	129.3	14.5	114.8	114.8	12.6	12.6	97.5	97.6	P	RF-59	117.6	12.9	

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
177	RFC-816	5/21/1997	19500	16400	126.0	12.5	113.5	113.5	11.0	11.0	98.6	98.6	Fail	RF-60	115.1	13.7	Fail Moisture
178	RFC-817	5/21/1997	19500	16400	128.0	13.5	114.5	114.5	11.8	11.8	99.4	99.5	P	RF-60	115.1	13.7	Retest of Test Number RFC-816
179	RFC-818	5/21/1997	19500	16500	127.0	14.8	112.3	112.3	13.1	13.1	97.5	97.5	P	RF-60	115.1	13.7	
180	RFC-819	5/21/1997	19400	16550	129.5	15.0	114.5	114.5	13.1	13.1	99.4	99.5	P	RF-60	115.1	13.7	
181	RFC-820	5/21/1997	19450	16700	124.5	13.5	111.0	111.0	12.2	12.2	96.4	96.4	P	RF-60	115.1	13.7	
182	RFC-823	5/22/1997	19500	16700	125.5	13.5	112.0	112.0	12.1	12.1	95.3	95.3	P	RF-61	117.5	12.8	
183	RFC-824	5/22/1997	19450	16750	126.0	13.3	112.8	112.8	11.8	11.8	95.9	96.0	P	RF-61	117.5	12.8	
184	RFC-825	5/22/1997	19400	16800	127.0	13.3	113.8	113.8	11.6	11.6	96.8	96.8	P	RF-61	117.5	12.8	
185	RFC-826	5/22/1997	19550	16850	127.5	14.3	113.3	113.3	12.6	12.6	96.3	96.4	P	RF-61	117.5	12.8	
186	RFC-827	5/22/1997	19500	16900	125.5	13.0	112.5	112.5	11.5	11.6	95.7	95.7	P	RF-61	117.5	12.8	
187	RFC-828	5/22/1997	19500	16950	125.5	13.8	111.8	111.8	12.3	12.3	95.1	95.1	P	RF-61	117.5	12.8	
188	RFC-829	5/22/1997	19450	17000	126.5	12.8	113.8	113.8	11.2	11.2	96.8	96.8	P	RF-61	117.5	12.8	
189	RFC-841	7/29/1997	18875	16215	126.3	14.1	112.2	112.2	12.6	12.6	95.8	95.9	P	RF-63	117.0	13.0	Fail on Sand-Cone Correlation, Top of heap
	RFC-841S	7/29/1997	18875	16215	130.9	13.5	117.4	117.4	11.4	11.5	100.3	100.3	N/A	RF-63	117.0	13.0	Sand-Cone, Top of heap
190	RFC-841R	7/30/1997	18870	16215	128.5	14.5	114.0	114.0	12.7	12.7	97.4	97.4	P	RF-63	117.0	13.0	Retest of Sand-Cone Correlation, Top of heap
	RFC-841RS	7/30/1997	18870	16215	131.3	14.9	116.4	116.4	12.8	12.8	99.5	99.5	N/A	RF-63	117.0	13.0	Sand-Cone, Top of heap
191	RFC-842	7/29/1997	18750	16290	130.2	16.7	113.5	113.5	14.8	14.7	97.0	97.0	P	RF-63	117.0	13.0	Reverification Top of heap
192	RFC-843	7/29/1997	18650	16225	129.9	16.0	113.9	113.9	14.0	14.0	97.3	97.4	P	RF-63	117.0	13.0	Reverification Top of heap
193	RFC-844	7/30/1997	18625	16250	129.3	15.7	113.6	113.6	13.8	13.8	97.1	97.1	P	RF-63	117.0	13.0	Reverification Top of heap
194	RFC-845	7/30/1997	18880	16260	126.9	13.5	113.3	113.4	12.0	11.9	96.8	96.9	P	RF-63	117.0	13.0	Reverification Top of heap
195	RFC-849	7/30/1997	18225	17450	128.7	15.4	113.3	113.3	13.6	13.6	96.8	96.8	P	RF-63	117.0	13.0	SE corner
196	RFC-850	7/31/1997	18750	16315	130.4	15.2	115.2	115.2	13.2	13.2	98.4	98.5	P	RF-63	117.0	13.0	Reverification Top of heap
197	RFC-851	7/31/1997	18825	16340	127.8	14.4	113.4	113.4	12.7	12.7	96.9	96.9	P	RF-64	117.0	13.5	Reverification Top of heap
	RFC-851S	7/31/1997	18825	16340	130.2	14.1	116.2	116.2	12.1	12.1	99.3	99.3	N/A	RF-64	117.0	13.5	Sand-Cone, Reverification Top of heap
198	RFC-852	7/31/1997	18680	16325	129.9	14.8	115.1	115.1	12.9	12.9	98.3	98.4	P	RF-64	117.0	13.5	Reverification Top of heap
199	RFC-853	7/31/1997	18660	16380	127.2	15.8	111.4	111.4	14.2	14.2	95.2	95.2	P	RF-64	117.0	13.5	Reverification Top of heap
200	RFC-854	7/31/1997	18850	16415	128.0	13.7	114.3	114.3	12.0	12.0	97.6	97.7	P	RF-64	117.0	13.5	Reverification Top of heap
201	RFC-855	7/31/1997	18705	16425	129.6	16.3	113.3	113.3	14.4	14.4	96.8	96.8	P	RF-64	117.0	13.5	Reverification Top of heap
202	RFC-856	7/31/1997	18625	16420	131.0	15.3	115.7	115.7	13.2	13.2	98.8	98.9	P	RF-64	117.0	13.5	Reverification Top of heap
203	RFC-857	7/31/1997	18780	16405	131.4	15.8	115.6	115.6	13.7	13.7	98.7	98.8	P	RF-64	117.0	13.5	Reverification Top of heap
204	RFC-861	8/1/1997	18150	17150	127.1	16.4	110.7	110.7	14.8	14.8	95.6	95.6	P	RF-65	115.8	14.3	Fail on Sand-Cone Correlation, SE corner
	RFC-861S	8/1/1997	18150	17150	133.1	14.4	117.7	118.7	13.1	12.1	101.7	102.5	N/A	RF-65	115.8	14.3	Sand-Cone, SE corner
205	RFC-861R	8/1/1997	18150	17150	126.4	16.1	110.3	110.3	14.6	14.6	95.2	95.3	P	RF-65	115.8	14.3	Retest of Sand-Cone Correlation, SE corner
	RFC-861RS	8/1/1997	18150	17150	130.8	14.6	116.2	116.2	12.6	12.6	100.4	100.3	N/A	RF-65	115.8	14.3	Retest, SE corner
206	RFC-867	8/1/1997	18625	16470	124.6	14.4	110.3	110.2	13.0	13.1	95.2	95.2	P	RF-65	115.8	14.3	Reverification Top of heap
207	RFC-868	8/1/1997	18760	16470	128.7	17.0	111.7	111.7	15.2	15.2	96.4	96.5	P	RF-65	115.8	14.3	Reverification Top of heap
208	RFC-869	8/1/1997	18850	16465	128.5	15.3	113.3	113.2	13.5	13.5	97.8	97.8	P	RF-65	115.8	14.3	Reverification Top of heap
209	RFC-870	8/1/1997	18840	16520	130.6	18.3	112.3	112.3	16.3	16.3	96.9	97.0	P	RF-65	115.8	14.3	Reverification Top of heap
210	RFC-871	8/1/1997	18690	16575	128.2	16.2	112.1	112.0	14.4	14.5	95.7	95.6	P	RF-66	117.1	13.9	Reverification Top of heap
	RFC-871S	8/1/1997	18690	16575	133.9	15.1	118.8	118.8	12.7	12.7	101.6	101.6	N/A	RF-67	117.0	13.2	Sand-Cone, Reverification Top of heap
211	RFC-872	8/1/1997	18780	16520	127.2	15.7	111.5	111.5	14.0	14.1	95.2	95.2	P	RF-66	117.1	13.9	Reverification Top of heap
212	RFC-873	8/1/1997	18660	16530	128.4	17.0	111.4	111.4	15.2	15.3	95.1	95.1	P	RF-66	117.1	13.9	Reverification Top of heap
213	RFC-874	8/1/1997	18630	16620	125.8	14.0	111.8	111.8	12.5	12.5	95.4	95.5	P	RF-66	117.1	13.9	Reverification Top of heap
214	RFC-875	8/1/1997	18680	16570	129.4	16.3	113.1	113.1	14.4	14.4	96.6	96.6	P	RF-66	117.1	13.9	Reverification Top of heap
215	RFC-876	8/1/1997	18820	16670	126.8	14.8	112.0	112.0	13.2	13.2	95.6	95.6	P	RF-66	117.1	13.9	Reverification Top of heap
216	RFC-877	8/1/1997	18750	16615	131.3	15.2	116.1	116.1	13.1	13.1	99.1	99.1	P	RF-66	117.1	13.9	Reverification Top of heap
217	RFC-878	8/1/1997	18870	16680	127.5	16.2	111.4	111.3	14.5	14.6	95.1	95.0	P	RF-66	117.1	13.9	Reverification Top of heap
218	RFC-879	8/2/1997	18650	16675	128.9	14.6	114.3	114.3	12.7	12.8	97.6	97.6	P	RF-66	117.1	13.9	Reverification Top of heap

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
219	RFC-880	8/2/1997	18730	16740	128.9	14.8	114.0	114.1	13.0	13.0	97.3	97.4	P	RF-66	117.1	13.9	Reverification Top of heap
220	RFC-881	8/2/1997	18815	16720	127.2	15.0	112.2	112.2	13.3	13.4	95.9	95.9	P	RF-67	117.0	13.2	Reverification Top of heap
	RFC-881S	8/2/1997	18815	16720	133.9	15.1	118.8	118.8	12.7	12.7	101.6	101.6	N/A	RF-67	117.0	13.2	Sand-Cone, Reverification Top of heap
221	RFC-882	8/2/1997	18640	16725	128.7	14.6	114.2	114.1	12.7	12.8	97.5	97.5	P	RF-67	117.0	13.2	Reverification Top of heap
222	RFC-883	8/2/1997	18850	16740	129.8	13.2	116.6	116.6	11.3	11.3	99.6	99.7	P	RF-67	117.0	13.2	Reverification Top of heap
223	RFC-884	8/2/1997	18755	16760	127.0	15.1	111.9	111.9	13.5	13.5	95.6	95.6	P	RF-67	117.0	13.2	Reverification Top of heap
224	RFC-885	8/2/1997	18770	16760	131.0	13.8	117.2	117.2	11.7	11.8	100.2	100.2	P	RF-67	117.0	13.2	Reverification Top of heap
225	RFC-886	8/4/1997	18680	16790	126.2	14.2	112.1	112.0	12.6	12.7	95.7	95.7	P	RF-67	117.0	13.2	Reverification Top of heap
226	RFC-887	8/4/1997	18780	16850	127.0	14.1	112.9	112.9	12.5	12.5	96.5	96.5	P	RF-67	117.0	13.2	Reverification Top of heap
227	RFC-888	8/4/1997	18580	16830	129.5	15.8	113.6	113.7	13.9	13.9	97.1	97.2	P	RF-67	117.0	13.2	Reverification Top of heap
228	RFC-889	8/4/1997	18710	16930	128.5	13.9	114.6	114.6	12.1	12.1	98.0	97.9	P	RF-67	117.0	13.2	Reverification Top of heap
229	RFC-890	8/5/1997	18810	17010	129.1	15.1	114.1	114.0	13.2	13.2	97.5	97.4	P	RF-67	117.0	13.2	Reverification Top of heap
230	RFC-891	8/5/1997	18780	17020	130.1	14.4	115.7	115.7	12.4	12.4	98.6	98.6	P	RF-68	117.4	13.1	Reverification Top of heap
	RFC-891S	8/5/1997	18780	17020	130.9	14.1	116.8	116.8	12.1	12.1	99.5	99.5	N/A	RF-68	117.4	13.1	Sand-Cone, Reverification Top of heap
231	RFC-892	8/5/1997	18650	17020	129.0	15.4	113.6	113.6	13.5	13.6	96.7	96.8	P	RF-68	117.4	13.1	Reverification Top of heap
232	RFC-893	8/5/1997	18560	17140	129.3	15.9	113.5	113.4	14.0	14.0	96.6	96.6	P	RF-68	117.4	13.1	Reverification Top of heap
233	RFC-894	8/5/1997	18670	17140	128.4	14.1	114.4	114.3	12.3	12.3	97.4	97.4	P	RF-68	117.4	13.1	Reverification Top of heap
234	RFC-895	8/5/1997	18760	17130	128.8	14.3	114.5	114.5	12.5	12.5	97.5	97.5	P	RF-68	117.4	13.1	Reverification Top of heap
235	RFC-896	8/5/1997	18730	17250	127.8	15.9	111.9	111.9	14.2	14.2	95.3	95.3	P	RF-68	117.4	13.1	Reverification Top of heap
236	RFC-897	8/5/1997	18610	17290	126.2	14.0	112.3	112.2	12.4	12.5	95.6	95.6	P	RF-68	117.4	13.1	Reverification Top of heap
237	RFC-898	8/5/1997	18650	17220	126.0	14.2	111.9	111.8	12.7	12.7	95.3	95.2	P	RF-68	117.4	13.1	Reverification Top of heap
238	RFC-899	8/6/1997	18780	17350	131.1	15.8	115.3	115.3	13.7	13.7	98.2	98.2	P	RF-68	117.4	13.1	Reverification Top of heap
239	RFC-900	8/6/1997	18690	17350	127.5	14.3	113.2	113.2	12.6	12.6	96.4	96.4	P	RF-68	117.4	13.1	Reverification Top of heap
240	RFC-901	8/6/1997	18750	17440	132.0	14.8	117.3	117.2	12.6	12.6	100.8	100.8	P	RF-69	116.3	13.5	Reverification Top of heap
	RFC-901S	8/6/1997	18750	17440	133.2	13.9	119.3	119.3	11.6	11.7	102.6	102.6	N/A	RF-69	116.3	13.5	Sand-Cone, Reverification Top of heap
241	RFC-906	8/8/1997	18380	17450	127.9	16.1	111.8	111.8	14.4	14.4	96.1	96.1	P	RF-69	116.3	13.5	SE corner
242	RFC-907	8/8/1997	18080	17440	130.8	15.3	115.5	115.5	13.2	13.2	99.3	99.3	P	RF-69	116.3	13.5	SE corner
243	RFC-908	8/8/1997	18365	17475	129.0	14.8	114.2	114.2	12.9	13.0	98.2	98.2	P	RF-69	116.3	13.5	SE corner
244	RFC-909	8/8/1997	18350	17520	128.3	15.1	113.2	113.2	13.3	13.3	97.3	97.3	P	RF-69	116.3	13.5	SE corner
245	RFC-910	8/8/1997	18180	17580	126.4	14.6	111.8	111.8	13.0	13.1	96.1	96.1	P	RF-69	116.3	13.5	SE corner
246	RFC-916	8/13/1997	18530	17620	130.9	15.8	115.1	115.1	13.7	13.7	99.0	99.1	P	RF-70	116.2	13.6	
247	RFC-929	8/15/1997	18330	17620	125.6	16.3	109.3	109.3	14.9	14.9	95.2	95.2	P	RF-71	114.8	13.9	SE corner
248	RFC-930	8/15/1997	18300	17630	127.2	16.8	110.5	110.4	15.2	15.2	96.2	96.2	P	RF-71	114.8	13.9	SE corner
249	RFC-935	8/16/1997	18310	17680	126.6	13.7	112.9	112.9	12.1	12.1	97.9	98.0	P	RF-72	115.2	13.7	SE corner
250	RFC-936	8/16/1997	18410	17650	127.9	14.6	113.4	113.3	12.9	12.9	98.4	98.4	P	RF-72	115.2	13.7	SE corner
251	RFC-949	8/16/1997	18290	17710	125.6	13.7	111.9	111.9	12.2	12.2	95.9	95.9	P	RF-73	116.7	12.9	SE corner
252	RFC-950	8/16/1997	18430	17720	127.4	14.1	113.3	113.3	12.4	12.4	97.1	97.1	P	RF-73	116.7	12.9	SE corner
253	RFC-963	8/19/1997	18550	17720	127.5	13.9	113.6	113.6	12.2	12.2	97.4	97.4	P	RF-75	116.6	13.3	East slope
254	RFC-964	8/19/1997	18550	17840	128.1	13.0	115.1	115.1	11.3	11.3	98.7	98.7	P	RF-75	116.6	13.3	East slope
255	RFC-965	8/19/1997	18490	17810	124.2	16.1	108.1	108.1	14.9	14.9	92.6	92.7	Fail	RF-75	116.6	13.3	Fail Compaction, East slope
256	RFC-966	8/19/1997	18490	17810	131.9	14.3	117.6	117.6	12.2	12.2	100.9	100.9	P	RF-75	116.6	13.3	Retest of Test Number RFC-965, East slope
257	RFC-970	8/19/1997	18500	17720	126.9	15.6	111.4	111.3	14.0	14.0	95.5	95.5	P	RF-75	116.6	13.3	East slope
258	RFC-971	8/19/1997	18500	17840	129.9	17.0	112.9	112.9	15.0	15.1	96.5	96.5	P	RF-76	117.0	13.8	East slope
	RFC-971S	8/19/1997	18500	17840	130.5	15.5	115.0	115.0	13.5	13.5	98.2	98.3	N/A	RF-76	117.0	13.8	Sand-Cone, East slope
259	RFC-972	8/20/1997	18550	17780	124.2	13.0	111.2	111.2	12.2	11.7	95.0	95.0	P	RF-76	117.0	13.8	East slope
260	RFC-973	8/20/1997	18500	17710	127.5	14.8	112.6	112.7	13.2	13.1	96.2	96.3	P	RF-76	117.0	13.8	East slope
261	RFC-974	8/20/1997	18500	17830	128.5	15.1	113.3	113.4	13.3	13.3	96.8	96.9	P	RF-76	117.0	13.8	East slope
262	RFC-975	8/20/1997	18630	17780	125.0	15.1	109.9	109.9	13.7	13.7	93.9	93.9	Fail	RF-76	117.0	13.8	Fail Compaction, East slope

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
263	RFC-976	8/20/1997	18630	17780	127.1	13.7	113.4	113.4	12.1	12.1	96.9	96.9	P	RF-76	117.0	13.8	Retest of Test Number RFC-975, East slope
264	RFC-980	8/20/1997	18730	17730	129.8	15.2	114.6	114.6	13.3	13.3	97.9	97.9	P	RF-76	117.0	13.8	Reverification East slope
265	RFC-981	8/20/1997	18595	17720	126.0	14.9	111.1	111.1	13.4	13.4	95.3	95.4	P	RF-77	116.5	14.1	East slope
	RFC-981S	8/20/1997	18595	17720	125.3	13.8	111.5	111.5	12.4	12.4	95.7	95.7	N/A	RF-77	116.5	14.1	Sand-Cone, East slope
266	RFC-982	8/20/1997	18600	17820	127.2	15.2	112.0	112.0	13.6	13.6	96.1	96.1	P	RF-77	116.5	14.1	East slope
267	RFC-983	8/21/1997	18640	17790	128.6	16.2	113.0	112.4	14.6	14.4	96.4	96.5	P	RF-77	116.5	14.1	East slope
268	RFC-984	8/21/1997	18740	17740	131.3	15.4	115.9	115.9	13.2	13.3	99.5	99.5	P	RF-77	116.5	14.1	Reverification East slope
269	RFC-985	8/21/1997	18740	17810	131.1	16.0	115.6	115.1	13.9	13.9	99.2	98.8	P	RF-77	116.5	14.1	Reverification East slope
270	RFC-997	8/22/1997	18980	17620	132.1	16.7	115.4	115.4	14.5	14.5	99.1	99.1	P	RF-78	116.4	14.1	North slope
271	RFC-998	8/22/1997	19040	17660	129.5	16.3	113.2	113.2	14.4	14.4	97.2	97.3	P	RF-78	116.4	14.1	North slope
272	RFC-999	8/23/1997	18980	17770	127.7	16.5	111.2	111.2	14.9	14.8	95.5	95.5	P	RF-78	116.4	14.1	North slope
273	RFC-1000	8/23/1997	19080	17740	130.4	17.6	112.8	112.8	15.6	15.6	96.9	96.9	P	RF-78	116.4	14.1	North slope
274	RFC-1002	8/23/1997	19010	17790	128.5	17.1	111.4	111.4	15.4	15.4	95.4	95.5	P	RF-79	116.7	13.6	North slope
275	RFC-1003	8/23/1997	19000	17810	127.3	13.7	113.6	113.6	12.1	12.1	97.3	97.3	P	RF-79	116.7	13.6	North slope
276	RFC-1008	8/23/1997	19100	17440	127.4	15.7	111.7	111.7	14.1	14.1	95.7	95.7	P	RF-79	116.7	13.6	North slope
277	RFC-1009	8/23/1997	19040	17460	127.4	16.9	110.5	110.5	15.3	15.3	94.7	94.7	Fail	RF-79	116.7	13.6	Fail Compaction, North slope
278	RFC-1010	8/23/1997	19040	17460	128.6	16.7	111.9	111.9	15.0	14.9	95.8	95.9	P	RF-79	116.7	13.6	Retest of Test Number RFC-1009, North slope
279	RFC-1011	8/23/1997	19110	17550	127.2	17.2	110.0	110.0	15.7	15.6	95.6	95.7	P	RF-80	115.0	14.1	North slope
	RFC-1011S	8/23/1997	19110	17550	131.6	15.7	115.9	115.9	13.5	13.5	100.8	100.8	N/A	RF-80	115.0	14.1	Sand-Cone, North slope
280	RFC-1012	8/23/1997	19040	17590	126.9	15.6	111.3	111.3	14.0	14.0	96.7	96.8	P	RF-80	115.0	14.1	North slope
281	RFC-1013	8/25/1997	19160	17420	128.1	16.8	111.2	111.3	15.1	15.1	96.7	96.8	P	RF-80	115.0	14.1	Reverification North slope
282	RFC-1014	8/25/1997	19100	17350	129.1	14.8	114.3	114.3	12.9	12.9	99.3	99.4	P	RF-80	115.0	14.1	Reverification North slope
283	RFC-1015	8/25/1997	19010	17730	129.2	15.2	114.0	114.0	13.3	13.3	99.1	99.1	P	RF-80	115.0	14.1	North slope
284	RFC-1016	8/25/1997	18970	17780	131.7	16.0	115.8	115.7	13.8	13.8	100.6	100.6	P	RF-80	115.0	14.1	North slope
285	RFC-1017	8/25/1997	18690	17750	126.6	18.6	108.0	108.0	17.2	17.2	93.9	93.9	Fail	RF-80	115.0	14.1	Fail Moisture & Compaction, East slope
286	RFC-1018	8/25/1997	18690	17750	126.1	16.6	109.5	109.5	15.2	15.2	95.1	95.2	P	RF-80	115.0	14.1	Retest of Test Number RFC-1017, East slope
287	RFC-1019	8/25/1997	18740	17750	130.8	16.4	114.4	114.4	14.4	14.3	99.4	99.5	P	RF-80	115.0	14.1	East slope
288	RFC-1020	8/25/1997	18780	17850	127.4	21.1	106.3	106.3	19.8	19.8	92.4	92.4	Fail	RF-80	115.0	14.1	Fail Moisture & Compaction, East slope
289	RFC-1021	8/26/1997	18780	17850	127.5	14.0	113.5	113.5	12.3	12.3	97.0	97.0	P	RF-81	117.0	13.0	Retest of Test Number RFC-1020, East slope
	RFC-1021S	8/26/1997	18780	17850	131.3	14.4	116.9	116.9	12.3	12.3	99.9	99.9	N/A	RF-81	117.0	13.0	Sand-Cone, East slope
290	RFC-1022	8/26/1997	18790	17730	127.8	13.8	114.0	114.0	12.1	12.1	97.4	97.4	P	RF-81	117.0	13.0	East slope
291	RFC-1023	8/26/1997	18820	17730	127.5	15.2	112.3	112.3	13.5	13.5	95.9	96.0	P	RF-81	117.0	13.0	East slope
292	RFC-1024	8/26/1997	18810	17850	128.9	15.9	113.0	113.0	14.1	14.1	96.5	96.6	P	RF-81	117.0	13.0	East slope
293	RFC-1026	8/27/1997	18810	17850	128.0	17.7	110.2	110.3	16.1	16.0	94.2	94.3	Fail	RF-81	117.0	13.0	Fail Moisture & Compaction
294	RFC-1027	8/27/1997	18810	17850	127.3	12.9	114.4	114.4	11.3	11.3	97.7	97.8	P	RF-81	117.0	13.0	Retest of Test Number RFC-1026
295	RFC-1028	8/27/1997	18820	17730	129.7	18.2	111.5	111.5	16.3	16.3	95.3	95.3	Fail	RF-81	117.0	13.0	Fail Moisture
296	RFC-1029	8/27/1997	18820	17730	129.1	16.4	112.7	112.7	14.5	14.6	96.3	96.3	P	RF-81	117.0	13.0	Retest of Test Number RFC-1028
297	RFC-1030	8/27/1997	18700	17590	126.5	14.8	111.7	111.7	13.2	13.2	95.4	95.5	P	RF-81	117.0	13.0	East crest south of channel
298	RFC-1031	9/2/1997	19480	17100	132.5	15.6	116.9	116.9	13.4	13.3	100.1	100.2	P	RF-82	116.7	13.8	Reverification North slope
	RFC-1031S	9/2/1997	19480	17100	133.3	14.2	119.1	119.1	11.9	11.9	102.1	102.1	N/A	RF-82	116.7	13.8	Reverification North slope
299	RFC-1032	9/2/1997	19500	17200	128.0	15.1	112.9	112.9	13.4	13.4	96.7	96.7	P	RF-82	116.7	13.8	Reverification North slope
300	RFC-1033	9/2/1997	19390	17210	125.8	14.8	111.1	111.0	13.3	13.3	95.1	95.1	P	RF-82	116.7	13.8	Reverification North slope
301	RFC-1034	9/2/1997	19290	17190	128.0	14.3	113.7	113.7	12.6	12.6	97.4	97.4	P	RF-82	116.7	13.8	Reverification North slope
302	RFC-1035	9/2/1997	19390	17300	123.9	15.3	108.7	108.6	14.1	14.1	93.0	93.1	Fail	RF-82	116.7	13.8	Fail Compaction, Reverification North slope

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
303	RFC-1036	9/2/1997	19390	17300	127.5	16.1	111.4	111.4	14.5	14.5	95.4	95.4	P	RF-82	116.7	13.8	Retest of Test Number RFC-1035, Reverification North slope
304	RFC-1037	9/2/1997	19280	17290	125.7	13.3	112.4	112.4	11.8	11.8	96.3	96.3	P	RF-82	116.7	13.8	Reverification North slope
305	RFC-1038	9/3/1997	19200	17250	126.2	14.7	111.4	111.5	13.2	13.2	95.4	95.5	P	RF-82	116.7	13.8	Reverification North slope
306	RFC-1039	9/3/1997	19300	17310	130.6	15.2	115.3	115.4	13.2	13.2	98.8	98.9	P	RF-82	116.7	13.8	Reverification North slope
307	RFC-1040	9/3/1997	19190	17350	130.7	16.2	114.4	114.5	14.2	14.1	98.0	98.1	P	RF-82	116.7	13.8	Reverification North slope
308	RFC-1041	9/3/1997	19100	17320	132.2	16.6	115.6	115.6	14.4	14.4	100.6	100.7	P	RF-83	114.8	14.0	Reverification North slope
	RFC-1041S	9/3/1997	19100	17320	131.1	15.5	115.6	115.6	13.4	13.4	100.7	100.7	N/A	RF-83	114.8	14.0	Sand-Cone, Reverification North slope
309	RFC-1042	9/3/1997	19200	17400	129.2	15.5	113.7	113.7	13.7	13.6	99.0	99.0	P	RF-83	114.8	14.0	Reverification North slope
310	RFC-1043	9/3/1997	19150	17410	128.2	16.0	112.8	112.2	14.2	14.3	98.2	97.7	P	RF-83	114.8	14.0	Reverification North slope
311	RFC-1044	9/4/1997	19050	17420	127.5	15.6	112.0	111.9	13.9	13.9	97.5	97.5	P	RF-83	114.8	14.0	Reverification
312	RFC-1045	9/4/1997	19150	17495	126.3	13.6	112.7	112.7	12.0	12.1	98.1	98.2	P	RF-83	114.8	14.0	Reverification
313	RFC-1047	9/6/1997	19265	15895	128.2	14.5	113.7	113.7	12.8	12.8	98.9	99.0	P	RF-83	114.8	14.0	Reverification NW 5:1 corner slope
314	RFC-1048	9/6/1997	19285	16020	127.6	14.9	112.7	112.7	13.2	13.2	98.1	98.2	P	RF-83	114.8	14.0	Reverification NW 5:1 corner slope
315	RFC-1049	9/6/1997	19245	16160	125.7	14.9	110.8	110.8	13.4	13.4	96.5	96.5	P	RF-83	114.8	14.0	Reverification NW 5:1 corner slope
316	RFC-1050	9/6/1997	19380	15905	126.8	14.8	112.1	112.0	13.2	13.2	97.6	97.6	P	RF-83	114.8	14.0	Reverification NW 5:1 corner slope
317	RFC-1051	9/6/1997	19320	16135	131.0	15.7	115.3	115.3	13.6	13.6	99.6	99.6	P	RF-84	115.8	14.2	Reverification NW 5:1 corner slope
	RFC-1051S	9/6/1997	19320	16135	134.7	14.8	119.9	119.9	12.3	12.3	103.5	103.5	N/A	RF-84	115.8	14.2	Sand-Cone, Reverification NW 5:1 corner slope
318	RFC-1052	9/6/1997	19345	16200	129.6	17.1	112.5	112.5	15.2	15.2	97.2	97.2	P	RF-84	115.8	14.2	Reverification NW 5:1 corner slope
319	RFC-1053	9/6/1997	19445	16200	130.4	16.0	114.4	114.4	14.0	14.0	98.8	98.8	P	RF-84	115.8	14.2	Reverification NW 5:1 corner slope
320	RFC-1054	9/6/1997	19560	16180	129.7	15.9	113.8	113.8	14.0	14.0	98.3	98.3	P	RF-84	115.8	14.2	Reverification NW 5:1 corner slope
321	RFC-1055	9/6/1997	19545	16080	127.2	15.7	111.5	111.5	14.1	14.1	96.3	96.3	P	RF-84	115.8	14.2	Reverification NW 5:1 corner slope
322	RFC-1056	9/6/1997	19430	16110	130.2	16.3	113.9	113.9	14.3	14.3	97.6	97.6	P	RF-82	116.7	13.8	Reverification NW 5:1 corner slope
323	RFC-1057	9/6/1997	19365	16030	130.6	15.6	114.9	115.0	13.6	13.6	98.5	98.5	P	RF-82	116.7	13.8	Reverification NW 5:1 corner slope
324	RFC-1058	9/6/1997	19485	15965	128.7	15.8	112.9	112.9	14.0	14.0	96.7	96.7	P	RF-82	116.7	13.8	Reverification NW 5:1 corner slope
325	RFC-1059	9/6/1997	19600	16450	129.1	15.8	113.3	113.3	13.9	13.9	97.1	97.1	P	RF-82	116.7	13.8	Reverification North 5:1slope
326	RFC-1060	9/6/1997	19610	16510	129.7	15.7	114.0	114.0	13.8	13.8	97.7	97.7	P	RF-82	116.7	13.8	Reverification North 5:1slope
327	RFC-1061	9/12/1997	19500	17105	129.4	16.4	113.0	113.0	14.5	14.5	97.4	97.4	P	RF-85	116.0	13.0	Reverification North slope
	RFC-1061S	9/12/1997	19500	17105	133.5	16.0	117.5	117.5	13.6	13.6	101.3	101.3	N/A	RF-85	116.0	13.0	Sand-Cone, Reverification North slope
328	RFC-1067	9/13/1997	19150	16950	130.1	14.5	115.6	115.6	12.5	12.5	99.6	99.7	P	RF-85	116.0	13.0	Reverification Top of heap North of Channel 1
329	RFC-1068	9/13/1997	19050	16950	128.5	16.1	112.4	112.4	14.3	14.3	96.9	96.9	P	RF-85	116.0	13.0	Reverification Top of heap North of Channel 1
330	RFC-1069	9/13/1997	19250	16950	128.9	14.0	114.9	114.9	12.2	12.2	99.0	99.1	P	RF-85	116.0	13.0	Reverification Top of heap North of Channel 1
331	RFC-1070	9/13/1997	19250	16750	130.6	16.4	114.2	114.2	14.3	14.4	98.4	98.4	P	RF-85	116.0	13.0	Reverification Top of heap North of Channel 1
332	RFC-1071	9/13/1997	19250	16550	130.0	14.9	115.1	115.1	12.9	12.9	97.8	97.8	P	RF-86	117.7	13.4	Reverification Top of heap North of Channel 1
	RFC-1071S	9/13/1997	19250	16550	132.1	14.2	117.9	117.9	12.1	12.0	100.2	100.2	N/A	RF-86	117.7	13.4	Sand-Cone, Reverification Top of heap North of Channel 1
333	RFC-1072	9/13/1997	19250	16450	131.3	15.3	116.0	116.0	13.2	13.2	98.5	98.6	P	RF-86	117.7	13.4	Reverification Top of heap North of Channel 1
334	RFC-1073	9/13/1997	19200	16850	130.8	14.6	116.2	116.2	12.5	12.6	98.7	98.7	P	RF-86	117.7	13.4	Reverification Top of heap North of Channel 1
335	RFC-1074	9/13/1997	19100	16850	127.2	15.1	112.1	112.1	13.4	13.5	95.2	95.2	P	RF-86	117.7	13.4	Reverification Top of heap North of Channel 1
336	RFC-1075	9/13/1997	19050	16750	126.2	14.3	112.0	111.9	12.7	12.8	95.1	95.1	P	RF-86	117.7	13.4	Reverification Top of heap North of Channel 1
337	RFC-1076	9/13/1997	19200	17050	128.6	15.1	113.5	113.5	13.3	13.3	96.4	96.4	P	RF-86	117.7	13.4	Reverification
338	RFC-1079	9/15/1997	18790	17880	126.8	16.5	110.3	110.3	15.0	15.0	93.7	93.7	Fail	RF-86	117.7	13.4	Fail Compaction, Reverification South of Channel 1 on east slope
339	RFC-1080	9/15/1997	18790	17880	129.6	14.9	114.7	114.7	13.0	13.0	97.4	97.5	P	RF-86	117.7	13.4	Retest of Test Number RFC-1079
340	RFC-1083	9/16/1997	19150	16750	128.4	16.6	111.9	111.8	14.8	14.8	96.2	96.2	P	RF-87	116.2	14.2	Reverification
341	RFC-1084	9/16/1997	19200	16650	130.0	17.2	112.8	112.8	15.2	15.2	97.1	97.1	P	RF-87	116.2	14.2	Reverification
342	RFC-1085	9/16/1997	19200	16450	131.4	16.2	115.2	115.2	14.0	14.1	99.1	99.1	P	RF-87	116.2	14.2	Reverification
343	RFC-1086	9/16/1997	19200	16250	132.8	15.1	117.7	117.7	12.8	12.8	101.3	101.3	P	RF-87	116.2	14.2	Reverification

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
344	RFC-1087	9/16/1997	19100	16250	129.2	17.2	112.0	112.0	15.3	15.4	96.3	96.4	P	RF-87	116.2	14.2	Reverification
345	RFC-1088	9/16/1997	19050	16350	128.5	17.4	111.2	111.1	15.6	15.7	95.6	95.6	P	RF-87	116.2	14.2	Reverification
346	RFC-1089	9/16/1997	19100	16650	126.0	15.0	111.0	111.0	13.5	13.5	95.5	95.5	P	RF-87	116.2	14.2	Reverification
347	RFC-1090	9/16/1997	19150	16550	132.1	17.2	114.9	114.9	15.0	15.0	98.8	98.9	P	RF-87	116.2	14.2	Reverification
348	RFC-1091	9/16/1997	19050	16550	130.4	17.1	113.1	113.3	15.1	15.1	98.5	98.5	P	RF-88	115.0	15.3	Reverification
	RFC-1091S	9/16/1997	19050	16550	132.0	15.6	116.4	116.4	13.3	13.4	101.2	101.2	N/A	RF-88	115.0	15.3	Sand-Cone
349	RFC-1094	9/16/1997	19100	16450	125.2	15.5	109.7	109.7	14.1	14.1	95.3	95.4	P	RF-88	115.0	15.3	Reverification
350	RFC-1095	9/16/1997	19150	16300	128.9	17.1	111.9	111.8	15.3	15.3	97.2	97.2	P	RF-88	115.0	15.3	Reverification
351	RFC-1101	9/17/1997	18900	16245	130.5	14.4	116.1	116.1	12.4	12.4	99.8	99.8	P	RF-89	116.3	13.9	Reverification Top north half of heap
	RFC-1101S	9/17/1997	18900	16245	132.4	13.9	118.5	118.5	11.7	11.7	101.9	101.9	N/A	RF-89	116.3	13.9	Fail Moisture on Sand-Cone Correlation
352	RFC-1102	9/17/1997	18960	16325	127.4	15.4	112.0	112.0	13.7	13.8	96.3	96.3	P	RF-89	116.3	13.9	Reverification Top north half of heap
353	RFC-1103	9/17/1997	19005	16395	127.9	15.7	112.2	112.2	14.0	14.0	96.5	96.5	P	RF-89	116.3	13.9	Reverification Top north half of heap
354	RFC-1104	9/17/1997	18980	16495	128.6	16.0	112.7	112.6	14.2	14.2	96.8	96.8	P	RF-89	116.3	13.9	Reverification Top north half of heap
355	RFC-1105	9/17/1997	18945	16535	129.9	16.4	113.5	113.5	14.4	14.4	97.6	97.6	P	RF-89	116.3	13.9	Reverification Top north half of heap
356	RFC-1106	9/17/1997	18985	16595	126.2	15.7	110.6	110.5	14.2	14.2	95.0	95.0	P	RF-89	116.3	13.9	Reverification Top north half of heap
357	RFC-1107	9/17/1997	18985	16715	130.3	15.7	114.7	114.6	13.7	13.7	98.5	98.5	P	RF-89	116.3	13.9	Reverification Top north half of heap
358	RFC-1108	9/17/1997	18940	16790	131.4	15.3	116.1	116.1	13.2	13.2	99.8	99.8	P	RF-89	116.3	13.9	Reverification Top north half of heap
359	RFC-1109	9/17/1997	18980	16885	129.1	14.9	114.3	114.2	13.0	13.0	98.2	98.2	P	RF-89	116.3	13.9	Reverification Top north half of heap
360	RFC-1110	9/17/1997	18980	16980	127.6	16.1	111.5	111.5	14.4	14.4	95.9	95.9	P	RF-89	116.3	13.9	Reverification Top north half of heap
361	RFC-1116	9/17/1997	18918	17720	129.5	17.7	111.9	111.8	15.8	15.8	96.1	96.0	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
362	RFC-1117	9/17/1997	18900	17862	126.8	16.1	110.8	110.7	14.5	14.5	95.1	95.1	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
363	RFC-1118	9/17/1997	18842	17710	129.6	15.7	113.9	113.9	13.8	13.8	97.8	97.9	P	RF-90	116.4	14.2	Channel 1 bottom section on 6:1 slope
364	RFC-1132	9/29/1997	19390	16170	130.8	16.8	113.9	114.0	14.8	14.7	99.0	99.1	P	RF-92	115.0	14.0	Reverification of North slope rill adjacent to A Rock
365	RFC-1133	9/29/1997	19505	16160	134.0	17.3	116.6	116.7	14.9	14.8	101.4	101.5	P	RF-92	115.0	14.0	Reverification of North slope rill adjacent to A Rock
366	RFC-1140	9/30/1997	18800	17800	129.2	14.9	114.3	114.3	13.0	13.0	99.5	99.4	P	RF-92	115.0	14.0	
367	RFC-1141	9/30/1997	18940	17800	127.2	15.4	111.8	111.8	13.7	13.8	96.5	96.5	P	RF-93	115.8	13.9	
	RFC-1141S	9/30/1997	18940	17800	130.5	15.3	115.2	115.2	13.3	13.3	99.5	99.5	N/A	RF-93	115.8	13.9	Sand-Cone
368	RFC-1148	10/1/1997	18810	17705	131.5	16.7	114.7	114.8	14.5	14.5	99.0	99.1	P	RF-93	115.8	13.9	
369	RFC-1150	10/1/1997	18900	17580	127.5	14.2	113.3	113.3	12.5	12.5	97.8	97.8	P	RF-93	115.8	13.9	
370	RFC-1151	10/1/1997	18910	17520	128.9	17.4	111.5	111.5	15.6	15.6	95.8	95.8	P	RF-94	116.4	14.2	
	RFC-1151S	10/1/1997	18910	17520	131.7	16.7	115.0	115.0	14.5	14.5	98.8	98.8	N/A	RF-94	116.4	14.2	Sand-Cone
371	RFC-1152	10/1/1997	19450	16800	131.4	15.9	115.5	115.5	13.8	13.8	99.2	99.2	P	RF-78	116.4	14.1	Reverification North slope
372	RFC-1153	10/1/1997	19580	16820	131.5	16.0	115.4	115.5	13.9	13.9	99.1	99.2	P	RF-78	116.4	14.1	Reverification North slope
	RFC-1153S	10/1/1997	19580	16820	132.7	15.0	117.7	117.7	12.7	12.7	101.1	101.1	N/A	RF-78	116.4	14.1	Sand-Cone, Reverification North slope
373	RFC-1154	10/1/1997	19460	17070	129.8	16.7	113.0	113.1	14.8	14.8	97.1	97.2	P	RF-78	116.4	14.1	Reverification North slope
374	RFC-1155	10/1/1997	18490	17800	131.1	16.9	114.2	114.2	14.8	14.8	99.4	99.5	P	RF-71	114.8	13.9	Reverification SE corner
375	RFC-1156	10/1/1997	18360	17740	126.2	15.2	111.0	111.0	13.6	13.7	96.7	96.7	P	RF-71	114.8	13.9	Reverification SE corner
	RFC-1156S	10/1/1997	18360	17740	127.5	14.6	112.9	112.9	12.9	12.9	98.4	98.3	N/A	RF-71	114.8	13.9	Sand-Cone, Reverification SE corner
376	RFC-1157	10/1/1997	18450	17700	130.4	16.2	114.1	114.2	14.2	14.2	99.3	99.5	P	RF-71	114.8	13.9	Reverification SE corner
377	RFC-1158	10/1/1997	18400	17620	132.5	16.3	116.2	116.2	14.1	14.0	101.2	101.2	P	RF-71	114.8	13.9	Reverification SE corner
378	RFC-1159	10/1/1997	18300	17700	130.8	16.4	114.3	114.4	14.4	14.3	99.5	99.7	P	RF-71	114.8	13.9	Reverification SE corner
379	RFC-1160	10/1/1997	18320	17610	131.7	17.0	114.7	114.7	14.8	14.8	99.8	99.9	P	RF-71	114.8	13.9	Reverification SE corner
380	RFC-1161	10/1/1997	18350	17605	130.9	15.8	115.1	115.1	13.8	13.7	100.2	100.3	P	RF-71	114.8	13.9	Reverification SE corner
381	RFC-1162	10/1/1997	18200	17550	129.1	15.8	113.3	113.3	14.0	13.9	98.6	98.7	P	RF-71	114.8	13.9	Reverification SE corner
382	RFC-1163	10/1/1997	18310	17450	131.6	15.1	116.5	116.5	12.9	13.0	101.4	101.5	P	RF-71	114.8	13.9	Reverification SE corner
383	RFC-1164	10/2/1997	18550	17740	131.4	16.5	114.9	114.9	14.3	14.4	98.5	98.5	P	RF-75	116.6	13.3	Reverification East slope
	RFC-1164S	10/2/1997	18550	17740	129.6	14.3	115.3	115.3	12.4	12.4	98.9	98.9	N/A	RF-75	116.6	13.3	Sand-Cone, Reverification East slope

Maybell Heap Leach Repository Frost Barrier Test Results
Lift 4

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 2% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
384	RFC-1165	10/2/1997	18850	17840	130.6	17.2	113.5	113.4	15.1	15.2	97.3	97.3	P	RF-75	116.6	13.3	Reverification East slope
385	RFC-1166	10/2/1997	18610	17800	131.0	13.1	117.9	117.9	11.1	11.1	101.1	101.1	P	RF-75	116.6	13.3	Reverification East slope
386	RFC-1167	10/2/1997	18690	17710	129.8	12.7	117.2	117.1	10.8	10.8	100.4	100.4	P	RF-75	116.6	13.3	Reverification East slope
387	RFC-1168	10/2/1997	18680	17860	130.1	11.8	118.3	118.3	10.0	10.0	101.5	101.5	P	RF-75	116.6	13.3	Reverification East slope
388	RFC-1169	10/2/1997	18710	17810	133.1	16.0	117.2	117.1	13.6	13.7	100.5	100.4	P	RF-75	116.6	13.3	Reverification East slope
389	RFC-1170	10/6/1997	18900	16300	127.3	15.9	111.4	111.4	14.3	14.3	95.7	95.7	P	RF-94	116.4	14.2	Reverification Channel 1 Top of heap
390	RFC-1171	10/6/1997	18910	16400	129.2	11.3	117.9	117.9	12.4	9.6	101.3	101.3	P	RF-94	116.4	14.2	Reverification Channel 1 Top of heap
391	RFC-1172	10/6/1997	18900	16700	132.0	17.7	114.3	114.3	15.5	15.5	98.1	98.2	P	RF-94	116.4	14.2	Reverification Channel 1 Top of heap
392	RFC-1173	10/6/1997	18900	16300	134.4	17.1	117.3	117.3	14.6	14.6	100.7	100.8	P	RF-94	116.4	14.2	Reverification Channel 1 Top of heap
393	RFC-1174	10/6/1997	18900	17000	132.7	18.1	114.6	114.6	15.7	15.8	98.4	98.5	P	RF-94	116.4	14.2	Reverification Channel 1 Top of heap
394	RFC-1176	10/6/1997	18890	17700	129.2	12.6	116.5	116.6	10.8	10.8	100.1	100.2	P	RF-94	116.4	14.2	Fail Moisture, Approved per conversation 10-6-97 with T.B.
395	RFC-1177	10/6/1997	18900	17200	131.1	18.3	112.8	112.8	16.2	16.2	96.9	96.9	P	RF-94	116.4	14.2	
396	RFC-1178	10/6/1997	18820	17600	127.6	15.7	111.9	111.9	14.0	14.0	96.0	96.1	P	RF-95	116.5	13.7	
	RFC-1178S	10/6/1997	18820	17600	132.2	15.6	116.6	116.6	13.4	13.4	100.1	100.1	N/A	RF-95	116.5	13.7	Sand-Cone
397	RFC-1179	10/7/1997	18950	16500	130.4	15.6	114.8	114.8	13.6	13.6	98.5	98.5	P	RF-95	116.5	13.7	Reverification
398	RFC-1180	10/7/1997	18930	16800	128.1	15.7	112.4	112.4	14.0	14.0	96.4	96.5	P	RF-95	116.5	13.7	Reverification
399	RFC-1181	10/7/1997	18910	17100	124.0	13.0	111.0	111.0	11.7	11.7	95.2	95.3	P	RF-95	116.5	13.7	Reverification
400	RFC-1182	10/10/1997	18180	17350	135.0	15.7	119.3	119.3	13.1	13.2	102.3	102.4	P	RF-95	116.5	13.7	Reverification South haul road - bottom west
401	RFC-1183	10/10/1997	18350	17380	129.3	16.0	113.3	113.3	14.1	14.1	97.2	97.3	P	RF-95	116.5	13.7	Reverification South haul road - top west
402	RFC-1184	10/10/1997	18140	17410	130.4	15.8	114.6	114.6	13.8	13.8	98.3	98.4	P	RF-95	116.5	13.7	Reverification South haul road - bottom east
403	RFC-1185	10/14/1997	19105	17098	127.1	16.0	111.2	111.1	14.4	14.4	95.4	95.4	P	RF-95	116.5	13.7	Reverification Top NE area of heap
404	RFC-1186	10/14/1997	18977	17165	131.8	16.6	115.2	115.2	14.4	14.4	98.9	98.9	P	RF-95	116.5	13.7	Reverification Top NE area of heap
405	RFC-1187	10/14/1997	19075	17287	129.3	14.9	114.4	114.4	13.0	13.0	98.1	98.2	P	RF-95	116.5	13.7	Reverification Top NE area of heap
406	RFC-1188	10/14/1997	18960	17412	131.7	17.1	114.6	114.6	14.9	14.9	98.1	98.1	P	RF-96	116.8	13.2	Reverification Top NE area of heap
	RFC-1188S	10/14/1997	18960	17412	133.1	16.4	116.7	116.7	14.1	14.1	99.9	99.9	N/A	RF-96	116.8	13.2	Reverification Top NE area of heap
407	RFC-1189	10/15/1997	18825	17430	131.0	16.9	114.1	114.1	14.8	14.8	97.7	97.7	P	RF-96	116.8	13.2	Reverification Top SE area of heap
408	RFC-1190	10/15/1997	18598	17455	132.0	15.5	116.5	116.5	13.3	13.3	99.7	99.7	P	RF-96	116.8	13.2	Reverification Top SE area of heap
409	RFC-1191	10/15/1997	18465	17470	132.5	15.5	117.0	117.0	13.3	13.2	100.1	100.2	P	RF-96	116.8	13.2	Reverification Top SE area of heap
410	RFC-1192	10/15/1997	18440	17560	130.0	14.5	115.5	115.5	12.6	12.6	98.8	98.9	P	RF-96	116.8	13.2	Reverification Top SE area of heap
411	RFC-1193	10/15/1997	18578	17525	129.9	15.4	114.5	114.5	13.5	13.4	98.0	98.0	P	RF-96	116.8	13.2	Reverification Top SE area of heap
412	RFC-1194	10/15/1997	18720	17565	132.1	14.7	117.3	117.4	12.6	12.5	100.4	100.5	P	RF-96	116.8	13.2	Reverification Top SE area of heap
413	RFC-1195	10/15/1997	18810	17650	131.9	15.7	116.2	116.2	13.5	13.5	99.4	99.5	P	RF-96	116.8	13.2	Reverification Top SE area of heap
414	RFC-1196	10/15/1997	18688	17652	128.5	14.3	114.1	114.2	12.6	12.5	97.7	97.8	P	RF-96	116.8	13.2	Reverification Top SE area of heap
415	RFC-1197	10/15/1997	18510	17650	133.1	15.9	117.2	117.2	13.6	13.6	100.3	100.3	P	RF-96	116.8	13.2	Reverification Top SE area of heap

Maybell Ancillary Cell Frost Barrier Test Results

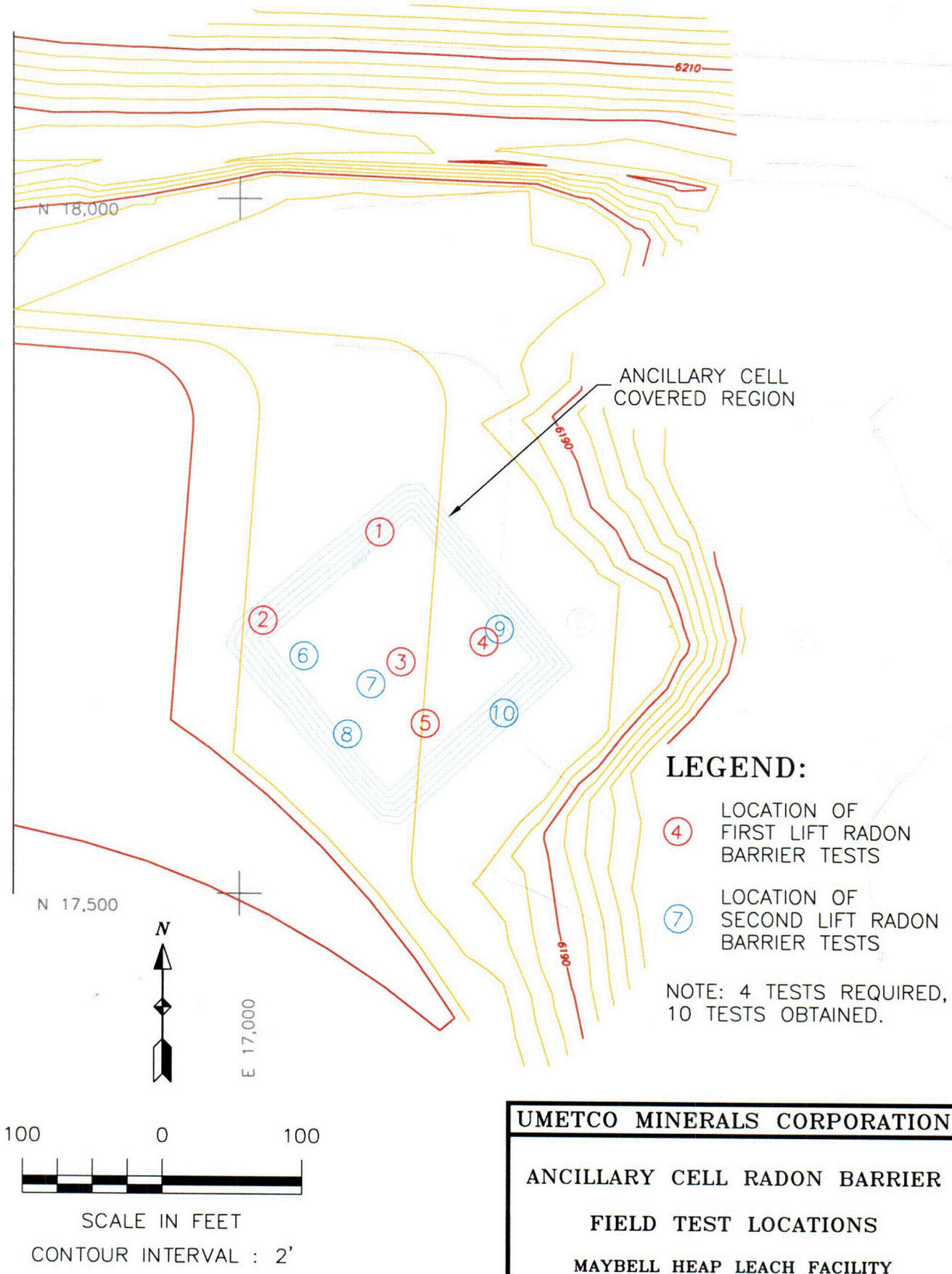
Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction
Frost Protection passing requirements: compaction - above 95%; moisture - minus 4% of optimum to plus 2% of optimum

Point Number	Test Number	Date	Northing	Easting	Lift	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
11	WSP11	9/14/2005	17758	17105	1	116.4	15.0	101.3	101.4	14.8	14.8	96.7	96.8	Pass	RFP1	104.8	14.5	
12	WSP12	9/14/2005	17689	17046	1	114.3	12.6	101.7	101.7	12.4	12.4	97.0	97.0	Pass	RFP1	104.8	14.5	
13	WSP13	9/14/2005	17677	17083	1	114.1	14.4	99.7	99.7	14.5	14.4	95.1	95.1	Pass	RFP1	104.8	14.5	
14	WSP14	9/14/2005	17713	17159	1	114.8	13.5	101.3	101.3	13.3	13.3	96.7	96.7	Pass	RFP1	104.8	14.5	
15	WSP15	9/14/2005	17676	17207	1	119.1	15.8	103.3	103.3	15.3	15.3	95.9	95.9	Pass	RFP2	107.7	14.6	
16	WSP16	9/14/2005	17664	17156	1	115.8	12.3	103.5	103.5	11.9	11.9	96.1	96.1	Pass	RFP2	107.7	14.6	
17	WSP17	9/14/2005	17612	17165	1	119.4	18.4	101.0	101.0	18.2	18.2	93.8	93.8	Fail	RFP2	107.7	14.6	Failed Moisture and Compaction
	WSP17A	9/15/2005	17612	17165	1	118.3	16.0	102.4	102.3	15.6	15.6	95.1	95.0	Pass	RFP2	107.7	14.6	Retest
	WSP17ASC	9/15/2005	17612	17165	1	123.9		109.1		13.5		101.3		NA	RFP2	107.7	14.6	Sand-Cone
18	WSP18	9/14/2005	17607	17083	1	118.5	15.4	103.1	103.1	14.9	14.9	95.7	95.7	Pass	RFP2	107.7	14.6	
19	WSP19	9/15/2005	17658	17056	2	122.6	13.0	109.6	109.6	12.2	11.9	95.1	95.1	Pass	RFP3	115.3	12.0	
20	WSP20	9/15/2005	17730	17109	2	123.5	12.6	110.9	110.9	11.4	11.4	96.2	96.2	Pass	RFP3	115.3	12.0	
21	WSP21	9/15/2005	17659	17212	2	122.5	11.1	111.4	111.4	10.0	10.0	96.6	96.6	Pass	RFP3	115.3	12.0	
22	WSP22	9/16/2005	17619	17116	2	124.0	10.5	113.6	113.5	9.2	9.3	98.5	98.4	Pass	RFP3	115.3	12.0	
	WSP22SC	9/16/2005	17619	17116	2	121.8		110.4		10.4		95.7		NA	RFP3	115.3	12.0	Sand-Cone
23	WSP23	9/16/2005	17662	17060	2	126.0	14.6	111.4	111.4	13.1	13.1	96.6	96.6	Pass	RFP3	115.3	12.0	
24	WSP24	9/17/2005	17679	17179	3	124.8	13.8	111.0	111.0	12.5	12.4	95.4	95.4	Pass	RFP4	116.4	12.5	
25	WSP25	9/17/2005	17744	17177	3	121.8	11.2	110.6	110.6	10.2	10.1	95.0	95.0	Pass	RFP4	116.4	12.5	
26	WSP26	9/17/2005	17625	17115	3	123.2	12.2	110.9	111.0	11.0	11.0	95.3	95.4	Pass	RFP4	116.4	12.5	
27	WSP27	9/17/2005	17675	17065	3	128.2	12.2	115.9	116.0	10.6	10.5	99.6	99.7	Pass	RFP4	116.4	12.5	
28	WSP28	9/17/2005	17725	17140	4	126.1	13.5	112.6	112.6	12.0	12.0	95.2	95.2	Pass	RFP5	118.3	11.9	
29	WSP29	9/17/2005	17657	17162	4	126.2	12.6	113.6	113.6	11.1	11.1	96.0	96.0	Pass	RFP5	118.3	11.9	
30	WSP30	9/19/2005	17622	17098	4	125.9	13.1	112.9	112.8	11.6	11.6	95.4	95.4	Pass	RFP5	118.3	11.9	
31	WSP31	9/19/2005	17650	17082	4	124.1	10.7	113.4	113.4	9.4	9.4	95.6	95.9	Pass	RFP5	118.3	11.9	
32	WSP32	9/22/2005	17694	17155	5	126.3	13.9	112.4	112.4	12.4	12.4	95.7	95.7	Pass	RFP6	117.4	12.5	
	WSP32SC	9/22/2005	17694	17155	5	127.8		114.0		12.1		97.0		NA	RFP6	117.4	12.5	Sand-Cone
33	WSP33	9/22/2005	17759	17120	5	122.4	10.2	112.2	112.2	9.1	9.1	95.6	95.6	Pass	RFP6	117.4	12.5	
34	WSP34	9/22/2005	17684	17073	5	129.4	16.4	113.0	113.0	14.6	14.5	96.3	96.3	Pass	RFP6	117.4	12.5	
35	WSP35	9/22/2005	17610	17124	5	125.3	11.5	113.8	113.8	10.1	10.1	96.9	96.9	Pass	RFP6	117.4	12.5	
36	WSP36	9/24/2005	17582	17097	6	123.3	11.6	111.6	111.7	10.4	10.4	95.1	95.1	Pass	RFP6	117.4	12.5	
37	WSP37	9/24/2005	17649	17044	6	124.6	12.1	112.5	112.5	10.7	10.8	95.8	95.8	Pass	RFP6	117.4	12.5	
38	WSP38	9/24/2005	17644	17036	7	124.0	10.3	113.6	113.7	9.1	9.1	96.8	96.8	Pass	RFP6	117.4	12.5	

Maybell Ancillary Cell Radon Barrier Test Results

Sand-Cone Correlation
Verification Calculation
Calculation Error and Correction

Point Number	Test Number	Date	Northing	Easting	Lift	Wet Density pcf	Moisture pcf	Reported Dry Density pcf	Calculated Dry Density pcf	Reported Percent Moisture	Calculated Percent Moisture	Reported Percent Compaction	Calculated Percent Compaction	Pass/ Fail	Proctor Number	Maximum Dry Density pcf	Optimum Moisture	Remarks
1	WSP1	9/7/2005	17760	17100	1	129.8	17.2	112.6	112.6	15.2	15.3	95.5	95.5	Pass	RBP1	117.9	13.5	
2	WSP2	9/7/2005	17017	17697	1	129.5	17.2	112.3	112.3	15.3	15.3	95.3	95.3	Pass	RBP1	117.9	13.5	
3	WSP3	9/8/2005	17668	17116	1	130.9	16.6	114.3	114.3	14.5	14.5	96.9	96.9	Pass	RBP1	117.9	13.5	
4	WSP4	9/8/2005	17682	17175	1	130.0	17.0	113.0	113.0	15.1	15.0	95.8	95.8	Pass	RBP1	117.9	13.5	
5	WSP5	9/8/2005	17624	17133	1	130.4	13.1	117.3	117.3	11.2	11.2	99.5	99.5	Pass	RBP1	117.9	13.5	
6	WSP6	9/9/2005	17672	17672	2	131.9	14.5	117.4	117.4	12.3	12.4	99.6	99.6	Pass	RBP1	117.9	13.5	
	WSP6SC	9/9/2005	17672	17672	2	132.4		117.8		12.4		100.0		NA	RBP1	117.9	13.5	Sand-Cone
7	WSP7	9/9/2005	17652	17094	2	131.4	13.4	118.0	118.0	11.4	11.4	100.1	100.1	Pass	RBP1	117.9	13.5	
8	WSP8	9/12/2005	17616	17077	2	127.2	13.5	113.7	113.7	11.8	11.9	96.4	96.4	Pass	RBP1	117.9	13.5	
9	WSP9	9/12/2005	17691	17186	2	133.5	14.5	119.0	119.0	12.2	12.2	100.9	100.9	Pass	RBP1	117.9	13.5	
10	WSP10	9/12/2005	17631	17189	2	127.4	13.4	114.0	114.0	11.8	11.8	96.7	96.7	Pass	RBP1	117.9	13.5	



UMETCO MINERALS CORPORATION

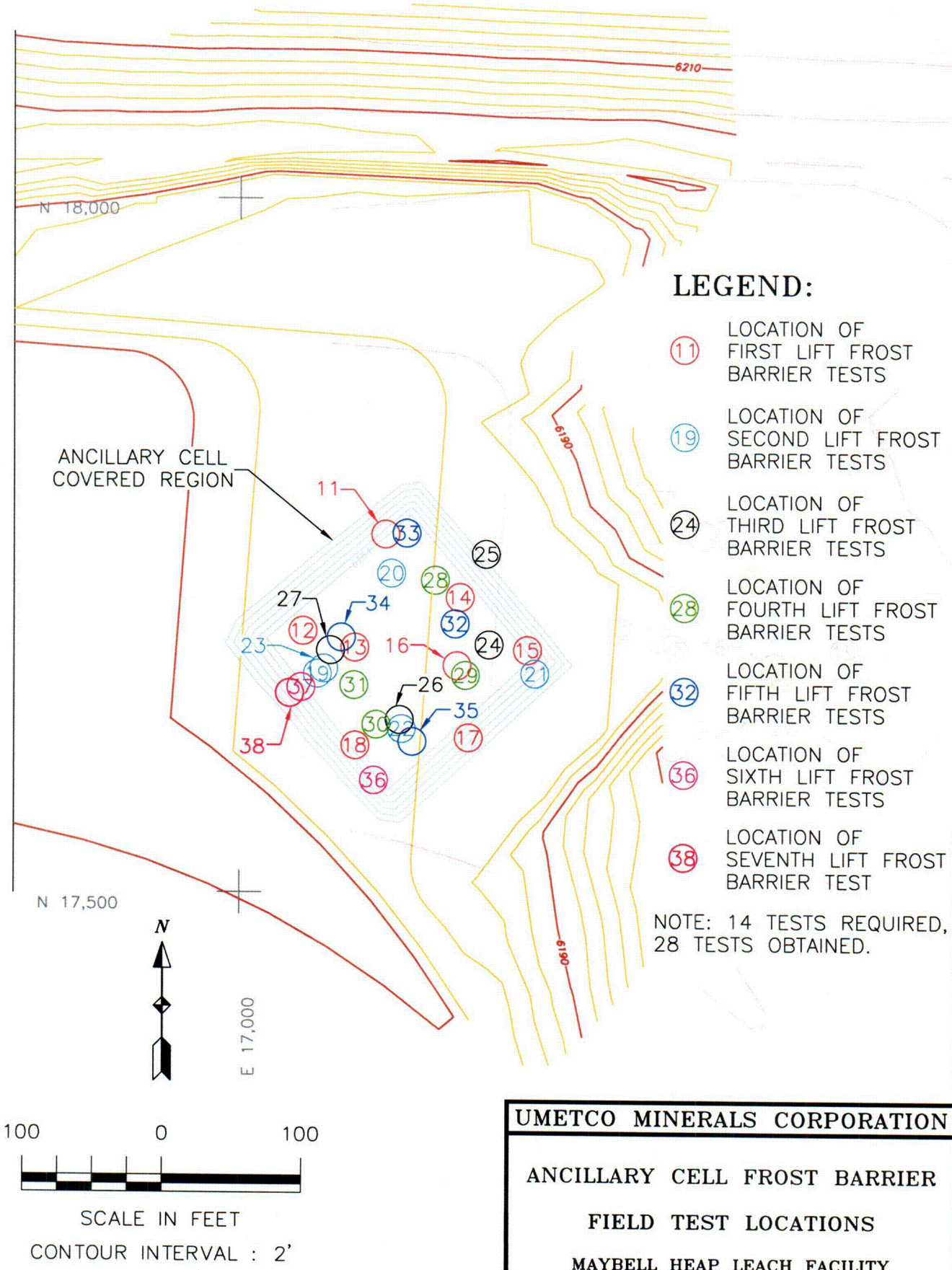
ANCILLARY CELL RADON BARRIER FIELD TEST LOCATIONS

MAYBELL HEAP LEACH FACILITY

AUGUST 2006

FIGURE 8

Maybell ancillary clay.dwg



UMETCO MINERALS CORPORATION

ANCILLARY CELL FROST BARRIER FIELD TEST LOCATIONS

MAYBELL HEAP LEACH FACILITY

AUGUST 2006

FIGURE 9

Maybell ancillary random.dwg

Maybell Heap Leach Facility
Response to NRC Comments
August 14, 2006

Response to NRC comments regarding the adequacy of the rock layer placed in Channel No. 1.

To resolve this concern, all aspects regarding the design and construction of the channel were reviewed.

Design Review:

Upon review of the original design calculations it was noted that the somewhat conservative Rational Formula (with a runoff coefficient of 1) was used to determine PMF discharge and the Safety Factors method was used to size riprap for the channel. The use of the Safety Factors method for determining the required rock size on slopes greater than 10-percent is inappropriate in this application where the slope is 17-percent and thus, overly conservative results were originally obtained. Based on current design guidance, the discharge channel can be more appropriately evaluated as a 95-foot wide channel outlet apron or discharge apron section. The outlet apron (channel) was reevaluated using the as-built geometry (approximate 6:1 slope), the originally determined peak flow rate (6.59-cfs/ft) and both the Stephenson, and Abt and Johnson methods for determining the required rock size. The following table provides a comparison of results from the respective design methods:

Channel Outlet Apron Design Method Comparison

Design Method	Required D_{50} (inches)	Required Layer Thickness (inches)
Safety Factors	22.5	30
Stephenson	10.8	16.2 – say 18
Abt and Johnson	7.0	14

Based on this comparison it can be seen that the original design is overly conservative by a factor of at least two. Design worksheets are attached.

Construction Review:

A review of rock placement techniques, quality control (QC) observations, photographs, test records and as-built surveys for the channel construction was also conducted.

The rock in the upper portion of the channel was placed from the top down with loads of rock being deposited at the top of the channel and transported/placed down the slope with a D-7 Dozer Tractor. This method of placement explains why fine grain particles are prevalent at the surface in the upper portion of the placement. As the placement progressed down-slope the D-7 tractor would carry newly dumped rock material (from near the crest of the channel) over the previously placed material depositing fines on the surface with the larger rock particles being deposited in the leading edge/lower portion of the layer. The appearance of surface fines were noted as a concern in the QC observations and the placement technique was changed (approximately half way down the channel slope) to an operation where the rock was placed with a track type Excavator, yielding acceptable results. Rock near the toe of the channel was placed with Loader type equipment. The attached photographs taken of the initial placement technique support the conclusion that larger size rock was deposited in the lower portion of the layer and fine material was pushed over the surface. The last photo shows the general transition point were the placement technique was changed and Excavator type equipment was used.

Due to the small quantity of Type D riprap required for the project (4,814 – cubic yards), one as-built gradation test was performed. The results of this test where plotted against the reevaluated design criteria presented in Figure 1 and are found to be acceptable.

Review of as-built civil surveys indicates that the originally specified depth of erosion protection material (30-inches) was provided throughout the channel section and alignment.

Based on the reevaluated design and review of as-built conditions, the outlet channel apron as constructed meets or exceeds criteria and is deemed acceptable.

View looking north of Type D rock placement on the crest of Channel No. 1.
Truck dumps material on crest for placement with D-7 Dozer Tractor.
Umetco Photo, October 1997

View looking north of Type D rock placement on Channel No. 1.
D-7 Dozer pushes dumped rock down slope. Note large rock falls at leading edge of layer with fines dropping out on top.
Umetco Photo, October 1997

View looking northwest of Type D rock placement on Channel No. 1.
Note deposition of large rock in lower portion of placement layer.
Umetco Photo, October 1997

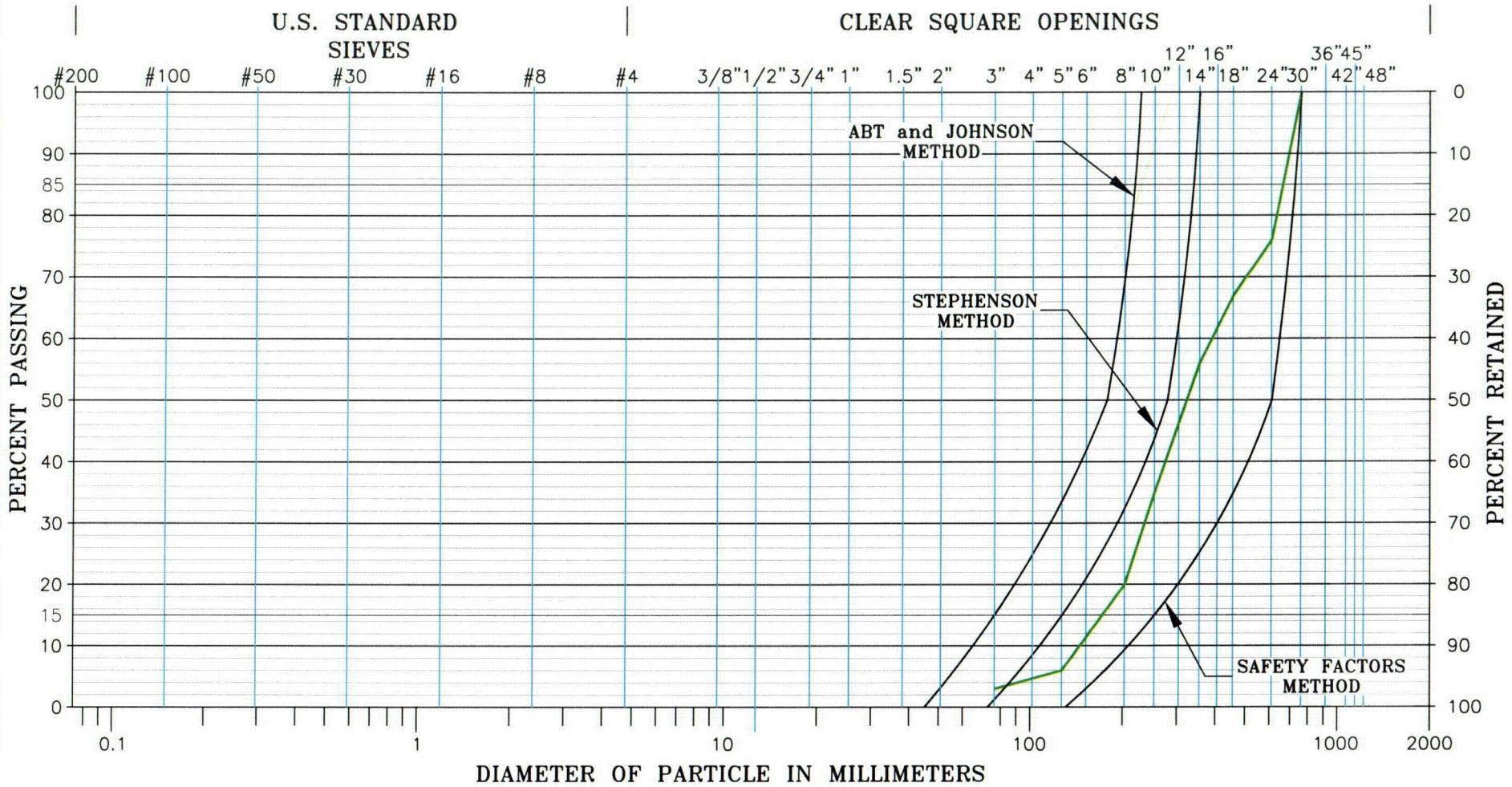
View looking north of Type D rock placement on Channel No. 1.
Note large rock at leading edge of placement with fines on top.
CDPHE Photo, Site Inspection of October 15 1997

View looking north of Type D rock placement on Channel No. 1.
Note large rock at leading edge of placement with fines on top.
CDPHE Photo, Site Inspection of October 15 1997

View looking west of channel riprap placement. Note large rock at leading edge of placement at the crest of the slope.
CDPHE Photo, Site Inspection of October 15 1997

View looking west of the east side of the cell and channel No. 1. Note the placement of large rock advancing down the channel slope. CDPHE Inspection personnel in foreground. CDPHE Photo, Site Inspection of October 15 1997

View looking northwest of completed Type D rock placement on Channel No. 1. Note how fines were spread over top surface in the upper portion of channel. Placement technique changed below that point with Excavator placement. Rock at the toe was placed with Loader type equipment.
Umetco Photo, October 1997



DESIGN GRADATION

(BASED ON DESIGN REEVALUATION)

SIZE	LOWER[1] LIMIT	LOWER[2] LIMIT	UPPER[3] LIMIT
D_{100}	9"	14"	30"
D_{50}	7"	11"	24"
D_{15}	3"	5"	10"

[1] BASED ON ABT AND JOHNSON METHOD
[2] BASED ON STEPHENSON METHOD
[3] BASED ON SAFETY FACTORS METHOD

AS-BUILT GRADATION

PERFORMED NOVEMBER 7, 1997

SIEVE	PERCENT PASSING	SIEVE	PERCENT PASSING
30"	100	10"	35
24"	76	8"	20
18"	67	6"	6
14"	56	3"	5

$$C_u \text{ as-built} = \frac{D_{60}}{D_{10}} = \frac{390}{145} = 2.69$$

Umetco Minerals Corp.
Remedial Activities
MAYBELL FACILITY
TYPE D RIPRAP GRADATION

August 2006 Figure 1

Maybell Reclamation Project - Design of Erosion Protection

- Design Reference: Final Staff Technical Position, Design of Erosion Protection Covers for Stabilization of Uranium Mill Tailings Sites, U.S. Nuclear Regulatory Commission, August 1990.

- PMP Determination: "The PMF at the Maybell site is caused by the Probable Maximum 1-hour local storm (thunderstorm). The high rainfall intensity associated with the local PMP storm results in high peak flows of very short duration. A general PMP storm results in much lower peak flows than the local storm, but has a higher toral volume of runoff. The 1-hour, local PMP storm for the Maybell site was determined with the data and procedure developed in the Hydrometeorological Report No. 49 (NOAA 1977). The 1-hour, local PMP storm is 7.05 inches." (Section 6.6.1, page 17, Reclamation Plan for Maybell Heap Leach Facility, Umetco Minerals Corporation, January 23,1989)

Erosion Protection Channel Discharging from Top of Heap: (Segment 2)

Riprap Design is based on D_{50} rock sized as determined by procedures given in Appendix D, NRC STP.

Design Data:

Channel Slope = 0.2000 ft/ft

PMP = 7.05 inches
Design Method - Safety Factors Method

Peak Flow Rate (q) = 625.61 cfs

Design D_{50} = 22.5 inches

Design Gradation based on methods for determination of Riprap grading recommended by Corps of Engineers and NUREG/CR-4480.

Percent Passing (Finer)	**Size Range (inches)**
Maximum Size	**30"**
D_{50}	**18" to 24"**
D_{15}	**5" to 10"**

RIPRAP DESIGN FOR CHANNELS
Safety Factors Method

Date:

Project: Channel (5:1 side slope)

Riprap Design:

Specific Weight of Liquid	62.4	
Specific Weight of Rock	2.68	
Angle of Repose of Riprap	40	(Refer to Fig. 4.8; Page 46; NUREG/CR-4620)
Depth of Flow	0.56	feet (from FlowMaster or channel design calculations)
Channel Slope	0.2	,ft./ft.
D_{50} of Riprap	22.5	inches (Input Trial Riprap D_{50})

Channel Slope	11.31	degrees
Mannings Coefficient	0.0439	
Bed Shear Stress	6.9888	lbs/sq. ft.
Stability Number	0.7467	
Safety Factor =	**1.0002**	

NUREG/CR4620 recommends a minimum SF of 1.5 for non-PMF applications. A SF of slightly greater than 1.0 is recommended for PMF or maximum credible flood circumstances. Refer to page 48, Section 4.2.2.1 for minimum riprap thickness.

RIPRAP DESIGN:
Stephenson Method for Slopes Greater than 10% (Channel Outlet Apron)

Project: Maybell Heap Leach Facility
Item: Channel 1 - Segment 2
Date: 8/11/2006

Comment: **Design Review - As-Built Geometry**

Channel Apron Hydrology

Apron Slope:			
	Horizontal	5.88	feet
	Vertical	1	feet
Peak Channel Discharge		626	cfs
Channel Apron Width		95	feet
Slope (S)		0.17	ft/ft
Slope; angle from horizontal (θ)		9.65	degrees
Peak Flow Rate per unit width (q)		6.59	cfs/ft

Riprap Design:

Rockfill Porosity (n)	0.4	
Relative Density of Rock (s)	2.68	
Angle of Friction (ϕ)	41	degrees
Empirical Factor (C)	0.27	*(varies from 0.22 for gravel and pebbles to 0.27 for crushed granite; NUREG/CR-4620 page 48)*

D_{50} = 0.90 feet
10.83 inches

$D_{50} = [q(\tan\theta)^{7/6} n^{1/6} / C\, g^{1/2} ((1-n)(s-1)\cos\theta\,(\tan\phi - \tan\theta))^{5/3}]^{2/3}$ *Eq 4.28; 4620*

acceleration of gravity (g) = 32.174 feet/second^2

TYPICAL VALUES:

Porosity of Rock Layer (n)	0.39 to 0.46
Angle of Friction	37 to 42
Relative Density of Rock (s):	
Limestone -	2.42 to 2.74
Limy Sandstone -	2.14 to 2.67
Sandstone -	2.20 to 2.50
Quartzite -	2.66
Basalt -	2.58
Granite -	2.41

RIPRAP DESIGN:
Abt and Johnson Method for Slopes Up to 50% (Channel Outlet Apron)

Project: Maybell Heap Leach Facility
Item: Channel 1-Segment 2
Date: 8/11/2006

Comment: **Design Review - As-Built Geometry**

The Abt and Johnson method for riprap design may be used if the following conditions are met:

Criteria:	Check:
1) The PMP/PMF is used	Yes
2) The rock is angular	Yes
3) The rock has a specific gravity $\gamma_s \geq 2.65$	Yes
4) The rock thickness will be at least 2 times the D_{50}	Yes
5) Rock placement and verification procedures are met	Yes

Channel Apron Hydrology:

Apron Slope:		
Horizontal	5.88	feet
Vertical	1	feet
Peak Channel Discharge	626	cfs
Channel Apron Width	95	feet
Slope (S)	0.17	ft/ft
Peak Flow Rate per unit width (q_f)	6.59	cfs/ft

Riprap Design:

$D_{50} = 5.23 \times (S)^{0.43} \times (q_f)^{0.56} =$	**0.58**	**feet**	*NUREG-1623, Appendix D*
	7.02	**Inches**	

Layer Thickness:

$D_{50} \times 2 =$	**1.17**	**feet**	*NUREG-1623, Appendix D*
	14.04	**Inches**	

Maybell Heap Leach Facility
Response to NRC Comments
August 2, 2006

Response to NRC comments regarding gully erosion on the south side of the cell.

In order to fully address this issue, the design of the riprap for the toe of the disposal cell was re-examined. The adequacy of the as-built toe apron was confirmed using guidance provided in Appendix D of NUREG-1623 for "Riprap Sizing at the Toe of Embankment Slopes". The maximum as-built slope section of the cell was evaluated. The recommended equation to compute the median stone size (D_{50}) for riprap used to prevent erosion from flow transitioning off an embankment side slope onto the toe region is expressed as:

$$D_{50} = 10.46 \times S^{0.43} \times (C_f \times q_d)^{0.56}$$

Where: D_{50} = the median stone diameter in inches,
S = the embankment slope in decimal form (rise/run), 83'/433' = 0.1917, say 0.20…5:1 typical embankment slope,
C_f = the flow concentration factor, (3), and
q_d = the design unit discharge in cubic ft per second (0.4369 cfs).

$$D_{50} = 10.46 \times 0.20^{0.43} \times (3 \times 0.4369)^{0.56}$$

Required D_{50} = 6.09-inches

D_{50} of the Type B riprap used to construct the toe apron = 6.5-inches ✓

Guidance recommends that toe apron treatments should extend from the toe outward 15 median rock sizes and the rock should be placed 3 median rock sizes deep or:

Required apron length = 15 x 6.09-inches = 7.61-feet,

As-built apron length = 10-feet ✓

Required apron thickness = 3 x 6.09-inches = 1.52-feet,

As-built apron thickness = 2-feet ✓

Final grading, in the former process area beyond the cell embankment toe on the south side of the site, incorporated slope angles designed to replicate stable vegetated slopes found in the general vicinity of the facility. Such (stable) slopes vary from 3:1 to 6:1 and exhibit sparse to medium vegetative cover. In an effort to emulate natural conditions, the process area was re-graded to approximate 6:1 slopes and seeded. To retard erosion during the vegetation establishment period, grade bars constructed of Type B riprap (with Type A bedding) were installed at the top nick point and toe of the slopes. The adequacy

of the Type B riprap used to construct grade bars was verified using the criteria found in Appendix D of NUREG-1623 noted above. Areas exhibiting erosion potential during construction were also in-filled with Type B riprap to further reduce erosion until vegetation could become fully established.

While the establishment of stable vegetated slopes is expected to reduce erosion it is acknowledged that some rilling and gully formation may occur. Therefore, an evaluation of the long term potential for gully formation and gully intrusion or advancement into the cell is presented.

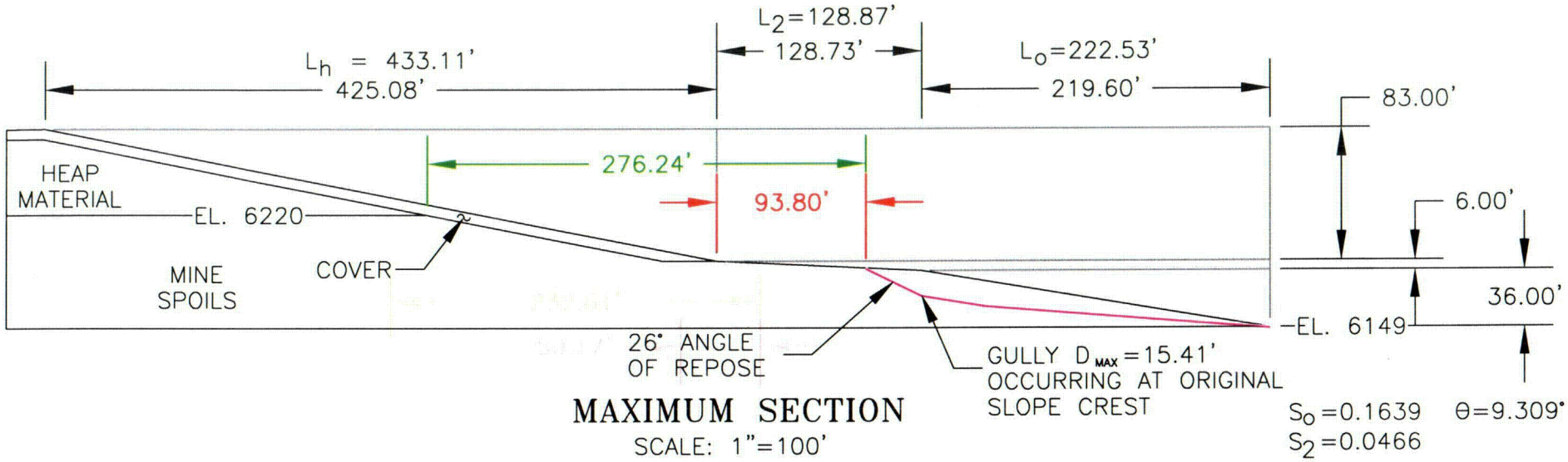
The geometric configuration of the southern side of the site consists of the 5:1 cell embankment slope which transitions to a gently sloped (less than 5-percent) apron area which varies in width from 68-feet to 174-feet. The apron area then transitions to a 6:1 slope with a maximum (slope) length of approximately 222-feet which terminates at a level deposition area. The actual contaminated heap leach materials are located 29-feet up vertically from the toe of the 5:1 cell embankment at approximate elevation 6,220.

The procedure to estimate potential gully formation of Type 2 embankments over time presented in Appendix B of NUREG-1623 was used to evaluate two critical sections along the south side of the cell. A Microsoft Excel spreadsheet was developed based on the gully incision procedure outlined in the guidance and was checked with the example provided. The first gully formation evaluation examines the maximum section or longest flow path along the lower (6:1) slope. The second evaluation examines the section which exhibits the shortest transition apron distance between the toe of the embankment cell and the crest of the lower 6:1 slope. In both evaluations, the runoff contribution from the crest to the toe of the cell embankment is included in the calculations and a 1,000-year design life was input. The lower embankment material is composed of less than 15-percent clay and has an angle of repose of 26-degrees. The annual average precipitation in the Maybell, Colorado area is reported by the Western Regional Climate Center to be 12.21-inches (period of record - 6/1/1958 to 12/31/2005).

The spreadsheet evaluations are attached and results are graphically presented in Figure 1. The maximum section evaluation indicates that a 15.41-foot deep by 34.24-foot wide gully could potentially form along the lower 6:1 embankment slope occurring (as recommended) at the crest of the slope, with the head cut terminating 93.8-feet away from the toe of the cell. The minimum apron length evaluation indicates that an 8.37-foot deep by 16.98-foot wide gully could form in this area, with the head cut terminating 50.17-feet away from the cell embankment toe.

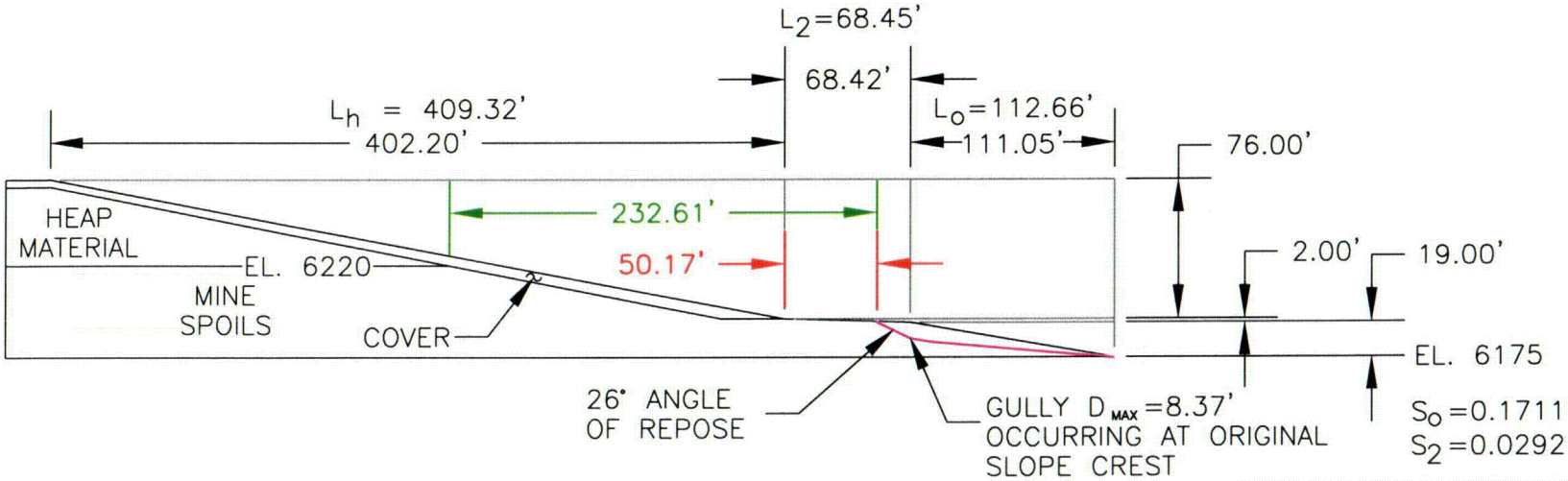
The gully formation simulations indicate that somewhat dramatic gullies could potentially form at the crest of the lower 6:1 slope over the next 1,000-years, however the gully incisions will not destabilize the cell embankment or involve the containment of contaminated heap leach material.

MAYBELL gully potential.DWG



MAXIMUM SECTION

SCALE: 1"=100'



MINIMUM APRON SECTION

SCALE: 1"=100'

LEGEND:

- MAXIMUM GULLY INCISION CONFIGURATION (1,000 YEARS)
- CRITICAL DISTANCE FROM GULLY INCISION TO EMBANKMENT TOE.
- CRITICAL DISTANCE FROM GULLY INCISION TO WASTE MATERIALS.

UMETCO MINERALS CORPORATION

MAXIMUM GULLY INCISION EVALUATION GEOMETRY

MAYBELL HEAP LEACH FACILITY

July 31, 2006

FIGURE 1

Empirical Gully Incision Prediction Procedure
From guidance in reference NUREG-1623

Project: Maybelll Heap Leach Facility
Evaluation Southern Process Area Slope
Feature: Maximum Section Evaluation
Date: 31-Jul-06
By: JHH

Type 2 Embankment Geometry Evaluation
Embankment material is composed of less than 15% clay, and has an angle of repose of 26 degrees.

Desgin Life (D_l): 1000 years

Embankment Geometry:

Embankment Height (H_o)	36.00	feet	10.97	meters
Embankment Slope Length (L_o)	222.53	feet	67.83	meters
Embankment Slope (S_o), (θ)	0.16	rise/run	9.31	degrees
Top Embankment Length (L_2)	128.87	feet	39.28	meters
Top Embankment Slope (S_2)	0.05	rise/run	2.67	degrees
Heap Embankment Length (L_h)	433.11	feet	132.01	meters

Precipitation:

Average Annual Precititation (P_a)	12.21	inches	0.31	meters

Potential Tributary Drainage Area (A): *Include contribution from heap slope L_h*

Total Embankment Length ($L_t = L_o+L_2+L_h$)= 239.12 meters
Embankment Slope (θ) 9.31 degrees
$A = 0.276 \times (L_t \times \cos(\theta))^{1.636}$ 2,103.29 meters^2

Potential Depth of Precipitation (D_t):
$D_t = P_a+D_l$ 310.13 meters

Cumulative Volume of Runoff (V_r):
Runoff to Rainfall Ratio (R_r) 0.13 Ratio for arid/semiarid regions
$V_r = D_t \times R_r \times A$ 82,842.40 meters^3

Soil Composition - Gully Factor (G_f):

Clay Content <15%	0.42	Equation (B-8) NUREG-1623
Clay Content >15%<50%	0.34	Equation (B-9) NUREG-1623
Clay Content >50%	0.28	Equation (B-10) NUREG-1623

Maximum Depth of Gully Incision (D_{max}):
$D_{max} = G_f \times L_o \times S$

D_{max} for Clay Content <15%	4.70 meters	15.41 feet
D_{max} for Clay Content >15%<50%	3.74 meters	12.27 feet
D_{max} for Clay Content >50%	3.10 meters	10.17 feet

Top Width of Gully Incision (W)
$W = (D_{max}/.61)^{1.149}$

W for Clay Content <15%	10.44 meters	34.24 feet
W for Clay Content >15%<50%	8.03 meters	26.36 feet
W for Clay Content >50%	6.47 meters	21.23 feet

Location of Maximim Depth (D_l)
$D_l = D_{max} \times (.716 \times ((V_r \times S)/(L_o)^3)^{-.415})$

D_l for Clay Content <15%	12.35 meters	40.52 feet
D_l for Clay Content >15%<50%	9.79 meters	32.13 feet
D_l for Clay Content >50%	8.11 meters	26.62 feet

Empirical Gully Incision Prediction Procedure
From guidance in reference NUREG-1623

Project:	Maybelll Heap Leach Facility
Evaluation	Southern Process Area Slope
Feature:	Minimum Apron Evaluation
Date:	31-Jul-06
By:	JHH

Type 2 Embankment Geometry Evaluation
Embankment material is composed of less than 15% clay, and has an angle of repose of 26 degrees.

Desgin Life (D_l): 1000 years

Embankment Geometry:

Embankment Height (H_o)	19.00	feet	5.79	meters
Embankment Slope Length (L_o)	112.66	feet	34.34	meters
Embankment Slope (S_o), (θ)	0.17	rise/run	9.71	degrees
Top Embankment Length (L_2)	68.45	feet	20.86	meters
Top Embankment Slope (S_2)	0.03	rise/run	1.67	degrees
Heap Embankment Length (L_h)	409.32	feet	124.76	meters

Precipitation:

Average Annual Precititation (P_a)	12.21	inches	0.31	meters

Potential Tributary Drainage Area (A): Include contribution from heap slope L_h

Total Embankment Length ($L_t = L_o+L_2+L_h$)= 179.96 meters
Embankment Slope (θ) 9.71 degrees
$A = 0.276 \times (L_t \times \cos(\theta))^{1.636}$ 1,318.68 meters^2

Potential Depth of Precipitation (D_t):

$D_t = P_a+D_l$ 310.13 meters

Cumulative Volume of Runoff (V_r):

Runoff to Rainfall Ratio (R_r) 0.13 Ratio for arid/semiarid regions
$V_r = D_t \times R_r \times A$ 51,938.81 meters^3

Soil Composition - Gully Factor (G_f):

Clay Content <15%	0.43	Equation (B-8) NUREG-1623
Clay Content >15%<50%	0.35	Equation (B-9) NUREG-1623
Clay Content >50%	0.28	Equation (B-10) NUREG-1623

Maximum Depth of Gully Incision (D_{max}):

$D_{max} = G_f \times L_o \times S$

D_{max} for Clay Content <15%	2.55 meters	8.37 feet
D_{max} for Clay Content >15%<50%	2.05 meters	6.73 feet
D_{max} for Clay Content >50%	1.65 meters	5.41 feet

Top Width of Gully Incision (W)

$W = (D_{max}/.61)^{\wedge 1.149}$

W for Clay Content <15%	5.18 meters	16.98 feet
W for Clay Content >15%<50%	4.03 meters	13.23 feet
W for Clay Content >50%	3.14 meters	10.29 feet

Location of Maximim Depth (D_l)

$D_l = D_{max} \times (.716 \times ((V_r \times S)/(L_o)^{\wedge 3})^{\wedge -.415})$

D_l for Clay Content <15%	3.43 meters	11.25 feet
D_l for Clay Content >15%<50%	2.75 meters	9.01 feet
D_l for Clay Content >50%	2.21 meters	7.24 feet

Empirical Gully Incision Prediction Procedure
From guidance in reference NUREG-1623

Project: Maybelll Heap Leach Facility
Evaluation NUREG-1623 Example Check
Feature: Sheet
Date: 31-Jul-06
By: JHH

Type 2 Embankment Geometry Evaluation
Embankment material is composed of less than 13% clay, and has an angle of repose of 34 degrees.

Desgin Life (D_l): 200 years

Embankment Geometry:

Embankment Height (H_o)		feet	9	meters
Embankment Slope Length (L_o)		feet	55	meters
Embankment Slope (S_o)	0.15	rise/run	8.53	degrees
Top Embankment Length (L_2)		feet	100	meters
Top Embankment Slope (S_2)	0.05	rise/run	0	degrees
Heap Embankment Length (L_h)	0	feet	0	meters

Precipitation:

Average Annual Precititation (P_a)		inches	0.2	meters

Potential Tributary Drainage Area (A):

Total Embankment Length (T_l = Lo+L2+Lh): 155 meters
Embankment Slope (S_o) 8.53 degrees
$A = 0.276 \times (L_t \times \cos(\theta))^{1.636}$ 1038.457 meters^2

Potential Depth of Precipitation (D_t):

$D_t = P_a + D_l$ 40 meters

Cumulative Volume of Runoff (V_r):

Runoff to Rainfall Ratio (R_r) 0.13 Ratio for arid/semiarid regions
Vr = Dt x Rr x A 5399.977 meters^3

Soil Composition - Gully Factor (G_f):

Clay Content <15% 0.380417 Equation (B-8) NUREG-1623
Clay Content >15%<50% 0.280304 Equation (B-9) NUREG-1623
Clay Content >50% 0.264537 Equation (B-10) NUREG-1623

Maximum Depth of Gully Incision (D_{max}):

$D_{max} = G_f \times L_o \times S$

D_{max} for Clay Content <15%	3.138437 meters ✓	10.29668 feet
D_{max} for Clay Content >15%<50%	2.312509 meters	7.58695 feet
D_{max} for Clay Content >50%	2.182428 meters	7.160174 feet

Top Width of Gully Incision (W):

$W = (D_{max}/.61)^{\wedge 1.149}$

W for Clay Content <15%	6.567191 meters ✓	21.54584 feet
W for Clay Content >15%<50%	4.623682 meters	15.16951 feet
W for Clay Content >50%	4.326114 meters	14.19324 feet

Location of Maximim Depth (D_l):

$D_l = D_{max} \times (.716 \times ((V_r \times S)/(L_o)^{\wedge 3})^{\wedge -.415})$

D_l for Clay Content <15%	20.4813 meters ✓	67.19565 feet
D_l for Clay Content >15%<50%	15.0281 meters	49.30464 feet
D_l for Clay Content >50%	14.18275 meters	46.53119 feet

MAYBELL, COLORADO (055446)

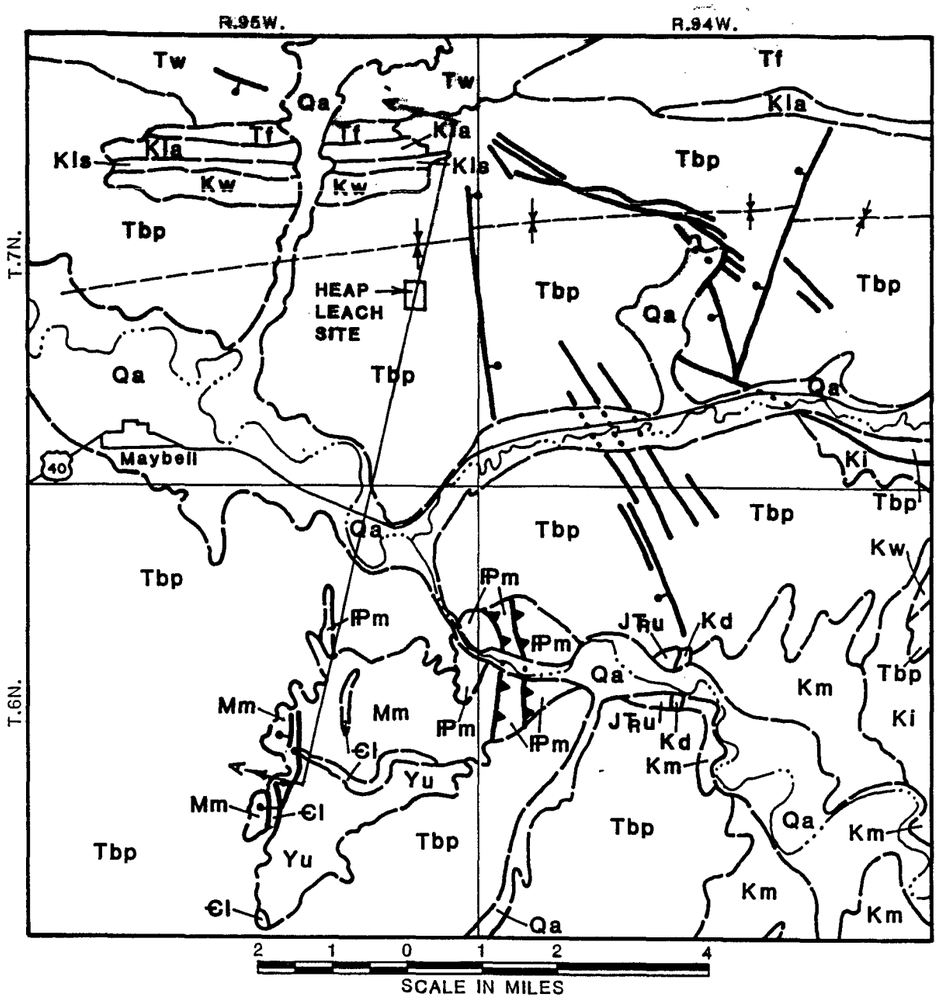
Period of Record Monthly Climate Summary

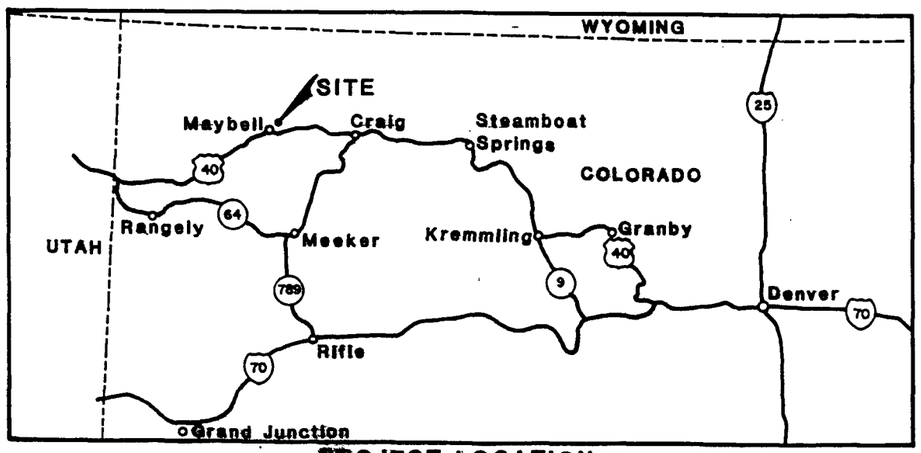
Period of Record : 6/ 1/1958 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	32.8	37.6	48.0	59.2	69.9	79.6	87.2	84.6	74.8	62.7	45.5	34.5	59.7
Average Min. Temperature (F)	2.6	7.3	18.0	26.2	33.5	40.5	46.8	45.5	36.2	25.2	15.4	4.4	25.1
Average Total Precipitation (in.)	0.82	0.85	1.04	1.36	1.13	0.97	0.83	0.88	1.10	1.21	1.15	0.87	12.21
Average Total SnowFall (in.)	12.2	10.3	8.4	4.4	0.8	0.1	0.0	0.0	0.5	1.7	9.9	12.1	60.4
Average Snow Depth (in.)	5	5	2	0	0	0	0	0	0	0	1	3	1

Percent of possible observations for period of record.
Max. Temp.: 83% Min. Temp.: 82.7% Precipitation: 83.9% Snowfall: 82% Snow Depth: 77.7%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu





PROJECT LOCATION

EXPLANATION

GEOLOGIC MAP UNITS

QUATERNARY	HOLOCENE	Qa	ALLUVIUM
TERTIARY	MIOCENE	Tbp	BROWNS PARK FORMATION
	EOCENE	Tw	WASATCH FORMATION
	PALEOCENE	Tf	FORT UNION FORMATION
CRETACEOUS		Kla	LANCE FORMATION
		Kls	LEWIS SHALE
		Kw	WILLIAMS FORK FORMATION
		Ki	ILES FORMATION
		Km	MANCOS SHALE
		Kd	DAKOTA SANDSTONE
JURASSIC-TRIASSIC		JTRu	UNDIVIDED JURASSIC AND TRIASSIC ROCKS
PENNSYLVANIAN		IPm	MORGAN FORMATION
MISSISSIPPIAN		Mm	LEADVILLE LIMESTONE
CAMBRIAN		€l	LODORE FORMATION
PRECAMBRIAN		Yu	UINTA MOUNTAIN GROUP

CONTACT
Approximate boundary between geologic units

HIGH ANGLE FAULT
Ball on downthrown side

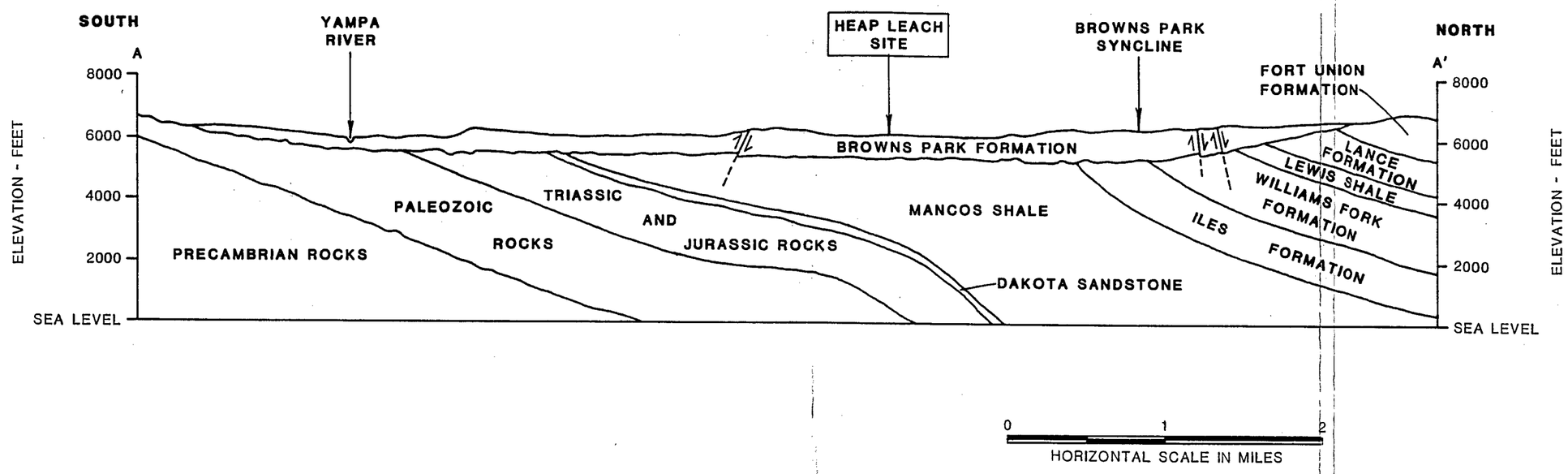
THRUST FAULT
Sawteeth on upper plate

SYNCLINE
Browns Park Syncline

A — A'
GENERALIZED SECTION
(Fig. 6.2)

SOURCES: Miller, 1977; Tweto, 1976, and Rowley, et. al., 1985.

1 150 88	Chen & Associates	GEOLOGIC MAP MAYBELL, COLORADO AREA	Fig. 6.1



SOURCE: BERGIN (1959) ADAPTED BY DAMES & MOORE (1975)

1 150 88	Chen & Associates	GENERALIZED GEOLOGIC CROSS SECTION MAYBELL, COLORADO AREA	Fig. 6.2

Northeast Heap Monitor Well

FORM NO. GWS-31 11/90

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only

1. WELL PERMIT NUMBER N/A

2. OWNER NAME(S) Umetco Minerals Corporation
Mailing Address P. O. Box 1029
City, St. Zip Grand Junction, CO 81502
Phone (303) 245-3700

3. WELL LOCATION AS DRILLED: SW 1/4 NW 1/4, Sec. 24 Twp. 7 N, Range 95 W.
DISTANCES FROM SEC. LINES:
1200 ft. from N (north or south) Sec. line. and 1150 ft. from W (east or west) Sec. line. OR
SUBDIVISION: _____ LOT ____ BLOCK ____ FILING(UNIT) ____.
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 6213.67 ft. DRILLING METHOD rotary.
DATE COMPLETED 09/08/91. TOTAL DEPTH 260 ft. DEPTH COMPLETED 215.5 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
	Refer to attached log

6. HOLE DIAM. (in.)

	From (ft)	To (ft)
12	0	18
7 5/8	18	260

7. PLAIN CASING

OD (in)	Kind	Wall Size	From(ft)	To(ft)
4.5	PVC/40	0.237 in	0	192.5
4.5	PVC/40	0.237 in	212.5	215.5

PERF. CASING: Screen Slot Size:

4.5	PVC/40	0.01"	192.5	212.5

8. FILTER PACK:
Material quartz sand
Size #16 - #30
Interval 188 - 213

9. PACKER PLACEMENT:
Type n/a
Depth n/a

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
n/a	n/a	n/a	n/a	n/a

REMARKS: Note that hole caved below 215.5 feet

11. DISINFECTION: Type n/a Amt. Used n/a

12. WELL TEST DATA: [X] Check box if Test Data is submitted on Supplemental Form.
TESTING METHOD Refer to attachment.
Static Level ____ ft. Date/Time measured ____, Production Rate ____ gpm.
Pumping level ____ ft. Date/Time measured ____, Test length (hrs.) ____.
Remarks Because of small volume of water, a series of pump tests was run. Refer to Attachment

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR B. F. Kissner Drilling Co. Phone (303) 856-3177 Lic. No. x 817
Mailing Address 2285 U-75 Road Cedaredge, CO 81413

Name/Title (Please type or print)	Signature	Date
Bill F. Kissner	x Bill F. Kissner	x 11/06/91

LITHOLOGIC LOG: NORTHEAST HEAP MONITOR WELL

Feet Below Surface	
0 - 10	Brown, sandy soil. Begin returning a few weathered sandstone cuttings at 9 feet.
10 - 20	Light grayish tan, calcareous fine-grained sandstone. Can crush the few cuttings with fingers.
20 - 45	Similar, but less gray, more tan, and darker. Few harder cuttings at 40 feet.
45 - 65	Cuttings becoming greenish tan.
65 - 70	Similar, but slightly damp. Drillers began using foam at 70 feet.
70 - 175	Fine to very fine-grained sandstone, color obscured by gray foam, but green/gray. Occasionally, the bit bangs on hard strata, but drilling mostly effortless.
175 - 240	Fine to very fine sand, similar to above. Hardly any cuttings. At 223 to 226 feet, pressure put on bit for first time.
240 - 260	Fine-grained sand/sandstone similar to above. Greenish gray. Driller believes some of the banging of the bit is caused by fractures in the formation.
EOH	

WELL TESTS: NORTHEAST HEAP MONITOR WELL

09/07/91: Not enough water in well to fill hose. Need check valve in pump.

09/09/91

Yield 16.8 gallons in 7 minutes.
Yield 5.5 gallons in 40 seconds.
Yield 5.9 gallons in 35 seconds.
Yield 5.9 gallons in 35 seconds.
Yield 5.9 gallons in 6 minutes, 20 seconds.
Yield 19.55 gallons in ca. 6 minutes.
Yield 13.65 gallons in ca. 5 minutes.

These tests done to clear well of foamy water at first believed to be from additive used in drilling. However, Don Steel later stated that nearly all wells and exploration holes in the area yield foamy water. This is probably attributable to alkalinity.

Pump was on bottom. Fine sediment was in the discharge.

09/10/91: Pump well 10 minutes. Yield ca. 25 gallons (includes water remaining in hose from last test, plus recharge).

Wait ca. 2 hours.

Yield 34 gallons Wait 15 minutes.
Yield 7 gallons Wait 15 minutes.
Yield 8 gallons Wait 15 minutes.
Yield 8.5 gallons Pull pump.

After 17 minutes WL = -204 feet
After 18 minutes WL = -203.85 feet
After 19 minutes WL - -203.25 feet
After 20 minutes WL = -203.25 feet

Results: Recovery rate is approximately 0.5 gpm.

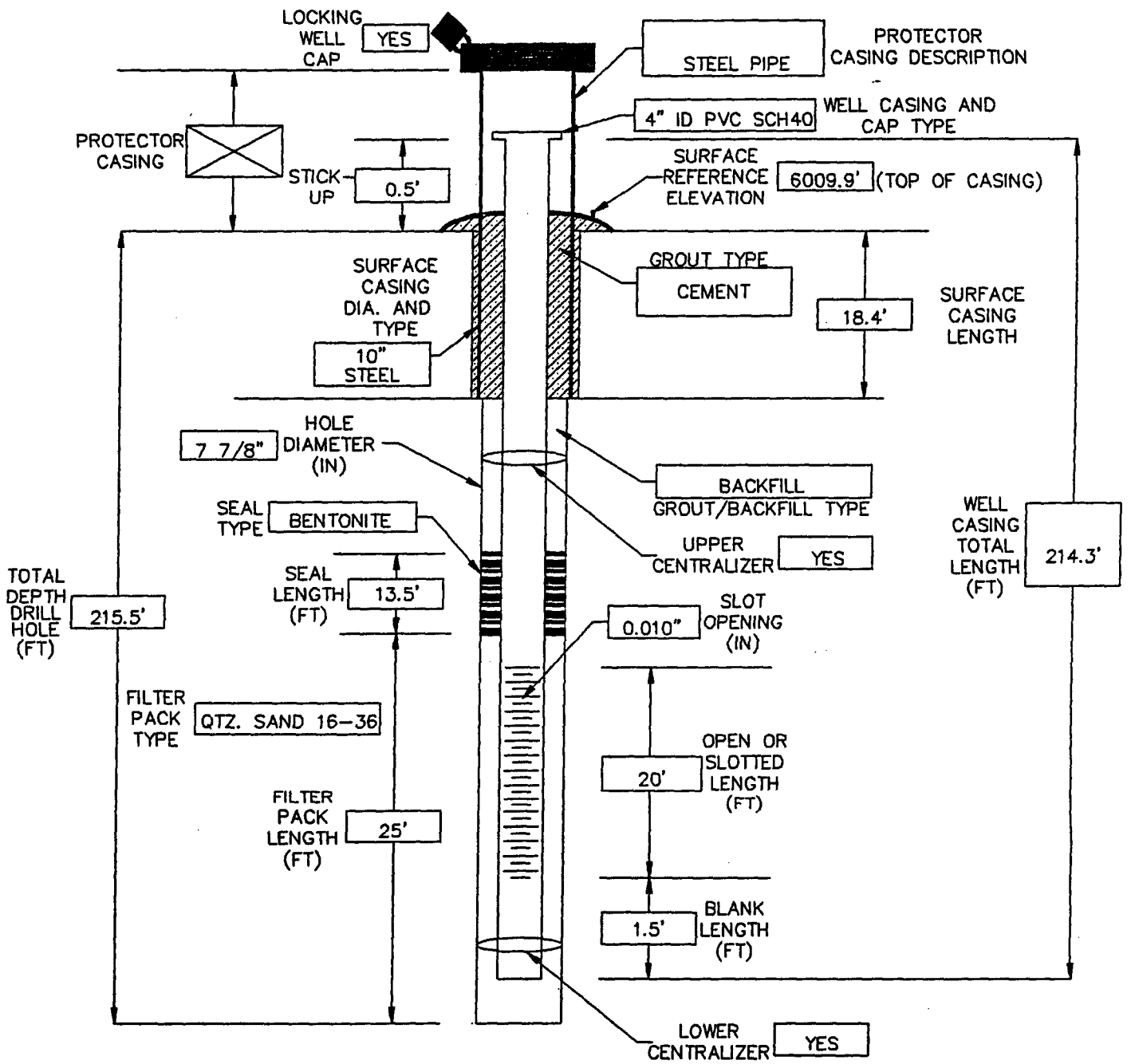
SITE: MAYBELL, COLORADO PURCHASE ORDER NUMBER:

LOCATION: NE OF HEAP PILE

WELL NUMBER: NE HEAP HORIZONTAL CONTROL:

DATE INSTALLED: SEPTEMBER 8, 1992 NORTHING: 19,812.48 EASTING: 17,124.59

☐ GROUND ☐ CASING ☐ PROTECTOR CASING ☐ ABOVE GROUND LEVEL ☐ ABOVE MEAN SEA LEVEL



CONTRACTOR'S NAME & ADDRESS: KISSNER DRILLING Co., 2285 U-75 RD., CEDEREDGE, CO 81413

LOGGER'S NAME & ADDRESS: JOHN TRAMELL, 2040 BARBERRY AVE., G.J., CO 81506

DRILLER'S NAME & ADDRESS:

REMARKS (i.e. ZONE TO BE MONITORED): DRILL HOLE CAVED BELOW BOTTOM OF WELL CASING.

WELL CASING BOTTOM SET 2.5 FEET INTO CAVED ZONE.

Mill Site Well No. 2

FORM NO. GWS-31 11/90

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only

1. WELL PERMIT NUMBER N/A

2. OWNER NAME(S) Umetco Minerals Corporation
Mailing Address P. O. Box 1029
City, St. Zip Grand Junction, CO 81502
Phone (303) 245-3700

3. WELL LOCATION AS DRILLED: E 1/4 ____ 1/4, Sec. 23 Twp. 7 N, Range 95 W
DISTANCES FROM SEC. LINES:
2700 ft. from N (north or south) Sec. line. and 100 ft. from E (east or west) Sec. line. OR
SUBDIVISION: ____ LOT ____ BLOCK ____ FILING(UNIT) ____
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 6192.22 ft. DRILLING METHOD rotary
DATE COMPLETED 09/11/91. TOTAL DEPTH 258.5 ft. DEPTH COMPLETED 258.5 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
	Refer to attached log

6. HOLE DIAM. (in.)

	From (ft)	To (ft)
12	0	15
7 5/8	15	258.5

7. PLAIN CASING

OD (in)	Kind	Wall Size	From(ft)	To(ft)
4.5	PVC/40	0.237	0	235.5
4.5	PVC/40	0.237	255.5	258.5

PERF. CASING: Screen Slot Size:

4.5	PVC/40	0.01"	235.5	255.5

8. FILTER PACK:
Material quartz sand
Size #16 - #30
Interval 231.5 - 258.5

9. PACKER PLACEMENT:
Type n/a
Depth n/a

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
n/a	n/a	n/a	n/a	n/a

REMARKS:

11. DISINFECTION: Type n/a Amt. Used n/a

12. WELL TEST DATA: [X] Check box if Test Data is submitted on Supplemental Form.
TESTING METHOD refer to attachment
Static Level ____ ft. Date/Time measured ____, Production Rate ____ gpm.
Pumping level ____ ft. Date/Time measured ____, Test length (hrs.) ____
Remarks Because of small vol. of water, a series of pump tests was run. Refer to attachment

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR B. F. Kissner Drilling Co. Phone (303) 856-3177 Lic. No. X 817
Mailing Address 2285 U-75 Road, Cedaredge, CO 81413

Name/Title (Please type or print)	Signature	Date
Bill F. Kissner	x Bill F. Kissner	x 11/06/91

LITHOLOGIC LOG: MAYBELL MILLSITE MONITOR WELL NO. 2

Feet Below Surface	
0 - 8	Brown, sandy soil. Color change at 8 feet to olive/tan.
8 - 15	Olive/tan fine-grained to very fine-grained sandstone. Poorly sorted. Some fine-medium grained, spherical, well-rounded grains, but mostly subangular to subround. Limonitic. Ten percent or more femags and VRFs. Variably calcareous.
8 - 15	Tan, fine-grained sandstone. Otherwise similar to 8 - 15.
25 - 30	Olive/tan fine-grained sandstone. Otherwise similar to 8 - 15.
30 - 40	Brown, more limonitic, fine-grained sandstone. Otherwise similar to 8 - 15.
40 - 55	Brown/olive fine-grained sandstone. Otherwise similar to 8 - 15.
55 - 130	Olive fine-grained sandstone, variably limonitic. Otherwise similar to 8 - 15.
130 - 145	Light tan/olive sandstone, similar to 8 - 15.
145 - 185	Gray sandstone. Similar to 0-145, except no limonite. Pyrite very fine grained, difficult to identify.
185 - 215	Gray sandstone, as above. At 185 - 190, drill clatters on hard rock or fractures; lose circulation. Circulation returns at 210 feet. Blow hole long time.
215 - 230	Mostly no return. Start to trip out to clean hole. Get stuck on "sand collars".
230 - 258	No samples accurately representative of depth in formation available because of complications associated with difficulty in completion of drilling to 258.5 feet. Samples collected are fine- to very fine-grained greenish sandstone, containing black femags and VRFs, and very fine-grained pyrite.

EOH

WELL TESTS: MILLSITE NO. 2 MONITOR WELL

09/11-12/91 Nine (9) pump-to-dry tests spaced at 15-minute intervals yield 23 gallons each.

Wait 1 hour.

Yield 29 gallons.

Raise pump 5 feet off bottom, wait 15 minutes.

Yield <23 gallons, wait 15 minutes.

Yield 23 gallons.

Raise pump additional 5 feet off bottom. Cease operations until tomorrow.

09/12/91 Yield 18.3 gallons in 2 minutes of pumping. Wait 17 minutes.

Yield ca. 18.3 gallons in 1 minute, 56 seconds. Wait 17 minutes.

Yield 17 gallons in 1 minute, 55 seconds. Collect sediment sample from water. Wait 32 minutes.

Yield 18.5 gallons in 1 minute, 58 seconds. Wait 1 minute.

Yield 3 gallons in 40 seconds.

Pull pump

0949 Hours: WL = -224.5
1000 Hours: WL = -223.7
1015 Hours: WL = -223.3
1051 Hours: WL = -223.3

Results: With pump on bottom, recovery rate is 1.5 gpm at 15-minute intervals.

With pump 10 feet above bottom, recovery rate is approximately 1 gpm.

Full recovery of the well takes 48 minutes, indicating an average recovery rate of 0.5 gpm.

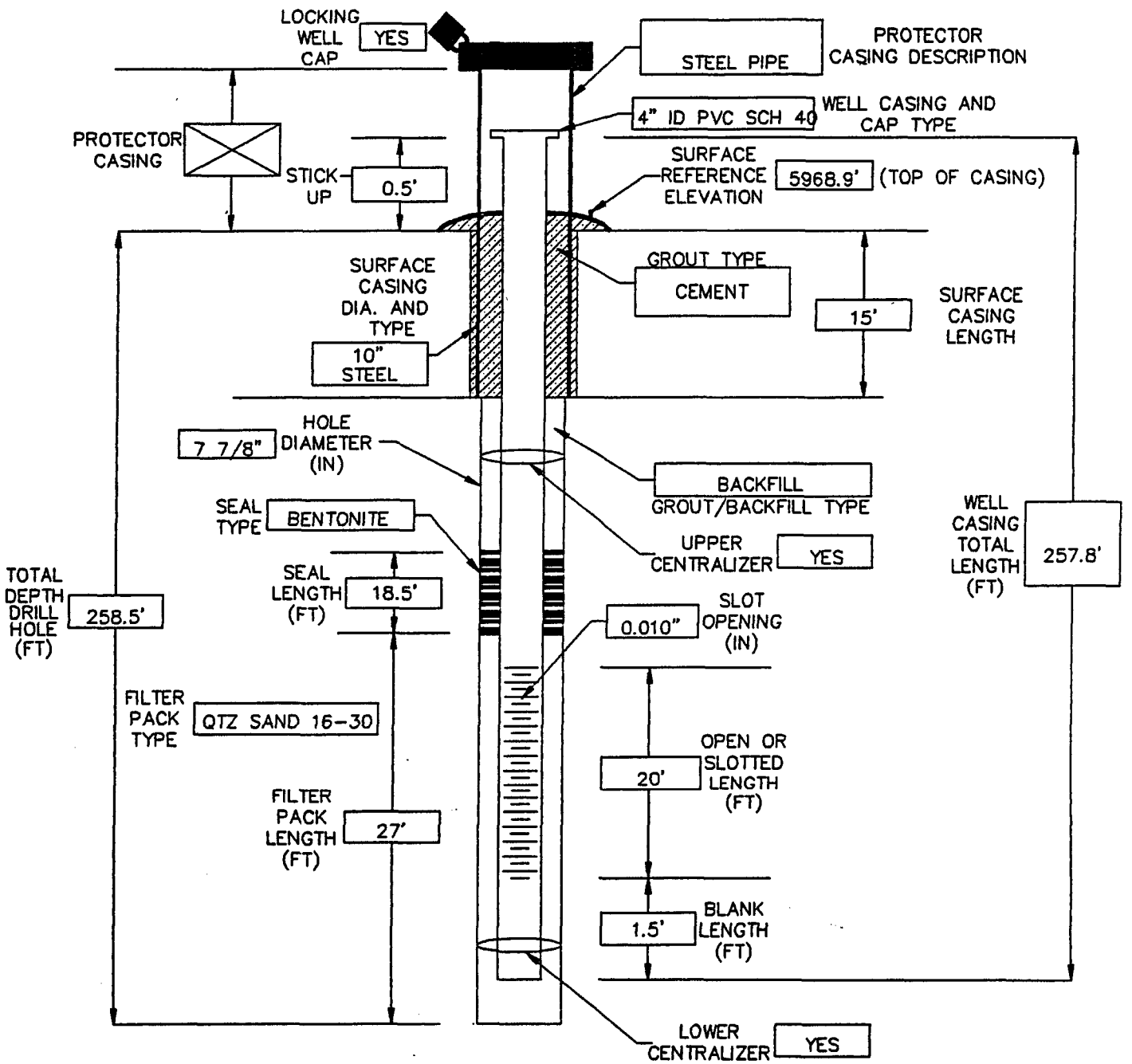
SITE: MAYBELL, COLORADO PURCHASE ORDER NUMBER:

LOCATION: SOUTHWEST OF HEAP PILE

WELL NUMBER: MILLSITE #2 HORIZONTAL CONTROL:

DATE INSTALLED: SEPTEMBER 11, 1991 NORTHING: 18,227.40 EASTING: 15,717.14

☐ GROUND ☐ CASING ☐ PROTECTOR CASING ☐ ABOVE GROUND LEVEL ☐ ABOVE MEAN SEA LEVEL



CONTRACTOR'S NAME & ADDRESS: KISSNER DRILLING Co., 2285 U 75 RD, CEDEREDGE, CO 81413

LOGGER'S NAME & ADDRESS: JOHN TRAMELL, 2040 BARBERRY AVE, G.J., CO 81506

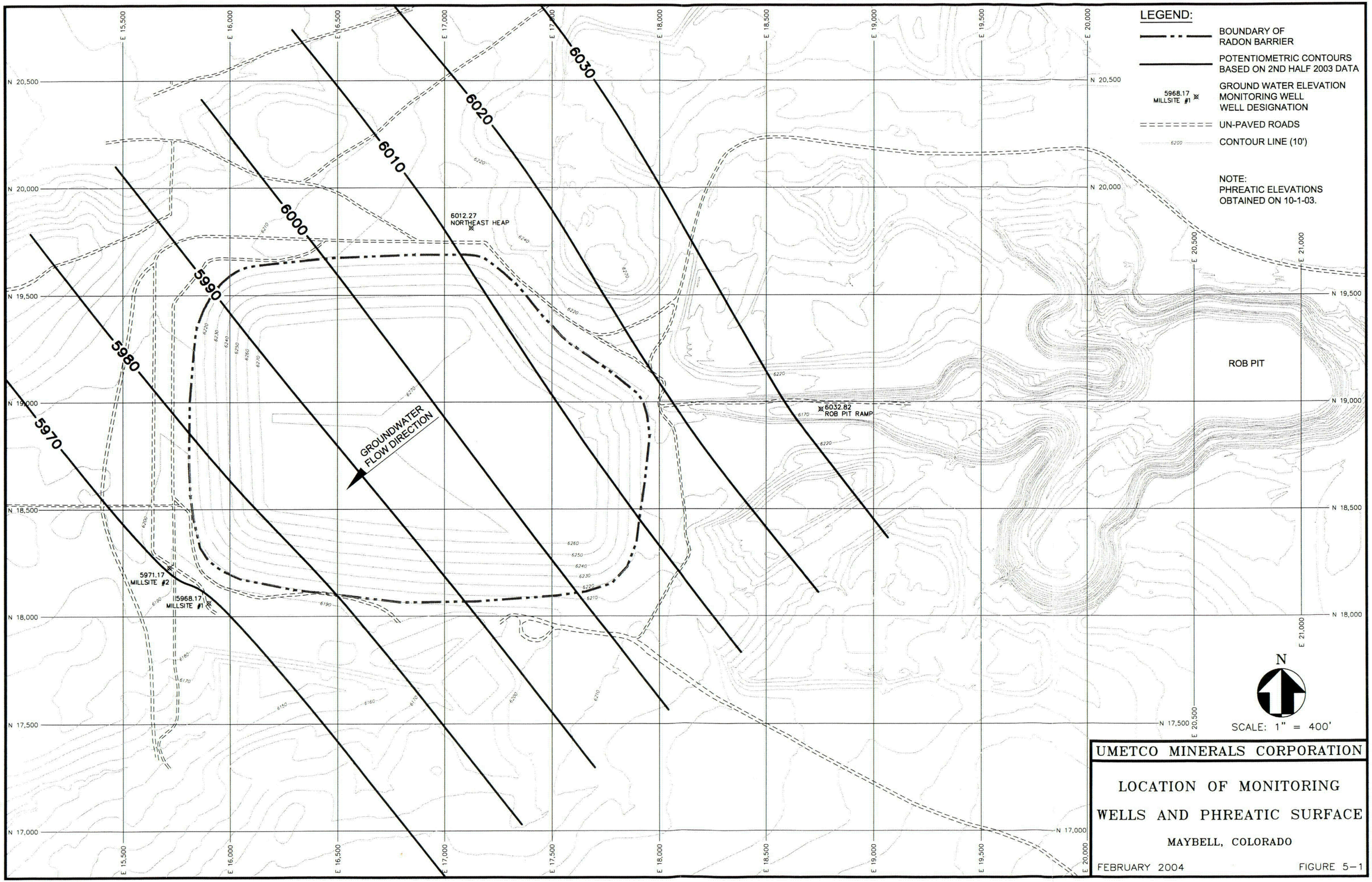
DRILLER'S NAME & ADDRESS:

REMARKS (i.e. ZONE TO BE MONITORED): BOTTOM CAP BELIEVED TO BE RUPTURED DURING WELL CONSTRUCTION. WELL WAS CLEARED OF FILTER SAND DURING DEVELOPMENT.

View of Rob Pit looking West with Rob Ramp at top of picture.

View of Rob Pit looking Northwest from rim.

Rob Pit from bottom of ramp looking Northeast.



MB-AR04-FIG-51.dwg