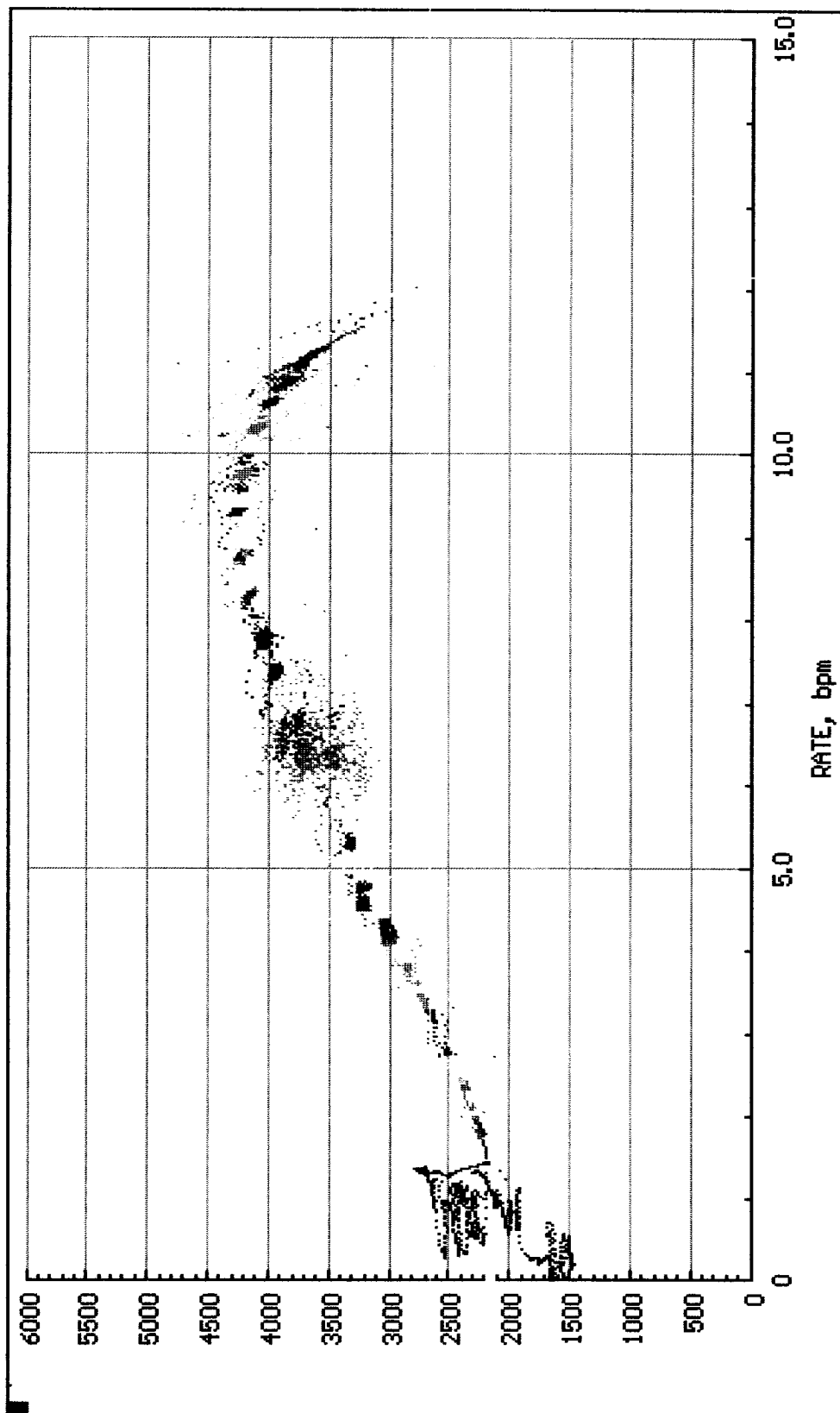
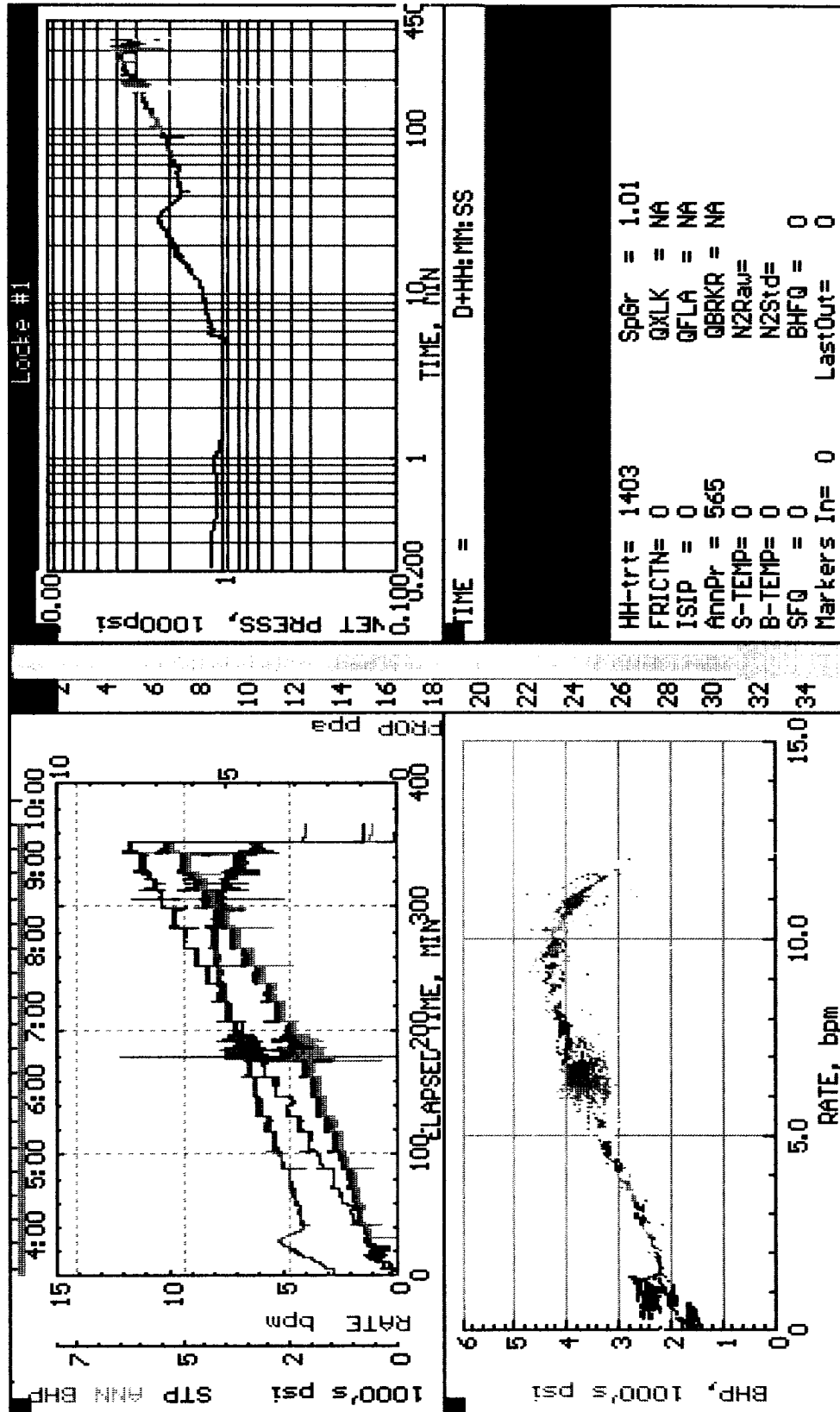


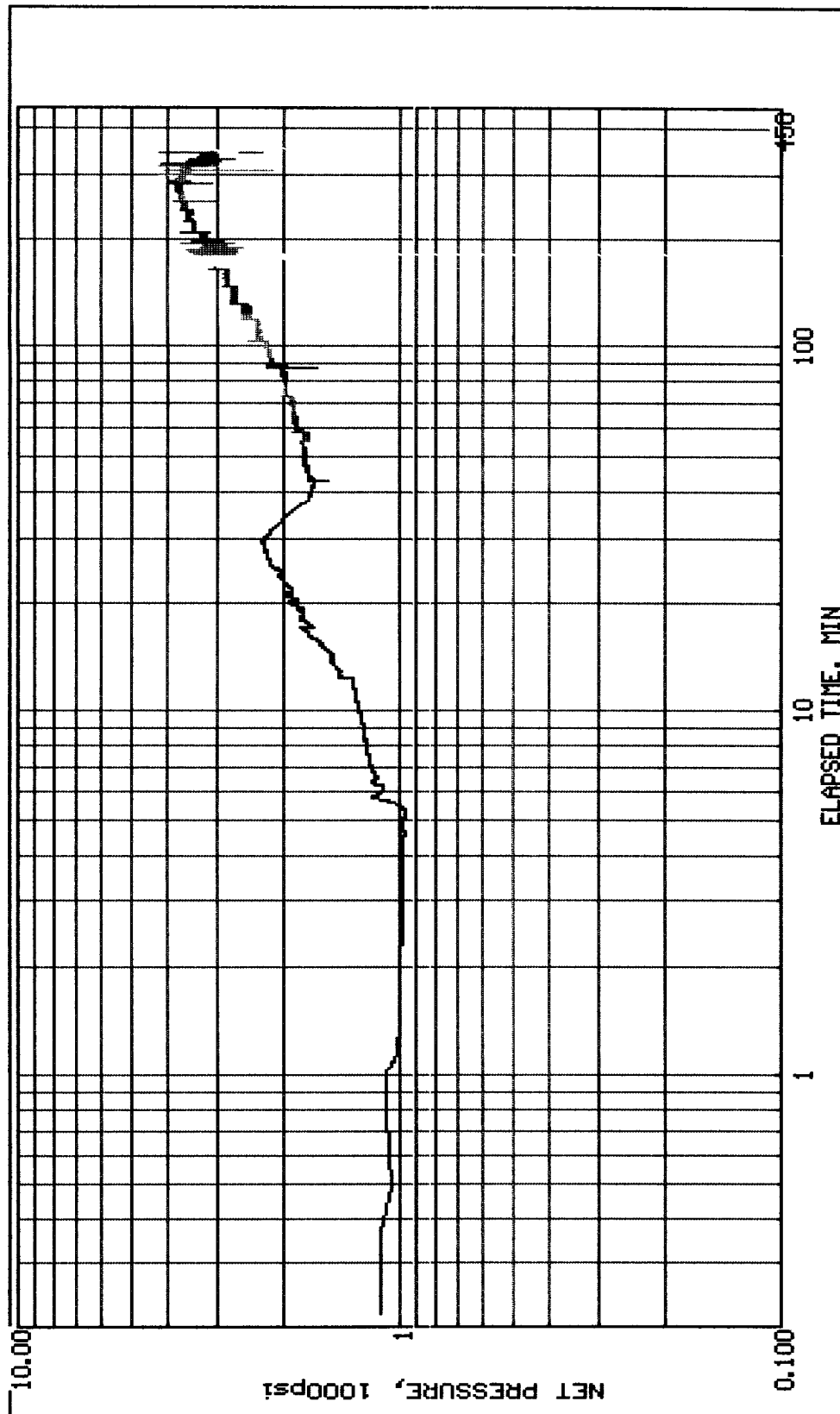
Desc: Locke #1
Mesaverde
Dugan Productio Company
Step Rate Test / October 9, 2002

PAGE : 1-G (10/9/2002 15:40:07) Data stored in C:\SMARTS\DATADIR\LOCKE1





Desc: Locke #1
Mesaverde
Dugan Productio Company
Step Rate Test / October 9, 2002
PAGE : 11-G (10/9/2002 15:40:07) Data stored in C:\SMARTS\DATADIR\LOCKE



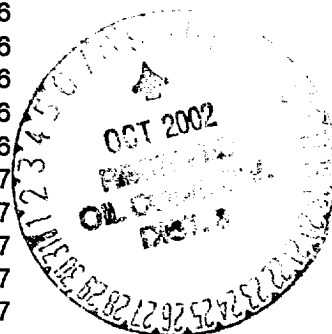
Descriptior : Dugan Production Company
 Step Rate Test / Locke #1 / October
 PAGE :1 Data printed approx. every 0.5 min. Data

+++++

ELAPSED	Calc	A	SLURRY	4INCH	BACKSIDE	BRADEN
TIME	BH	TREATING	PUMP	PUMP	PRESSUR	HEAD
Pressure	Pressure	RATE	RATE	Pressure		
min.	psi	PSI	BPM	BPM	PSI	PSI

=====

0.5	1546	134	0.56	0.98	40	6
1	1578.4	170	0.13	1.2	40	6
1.5	1490.3	80	0.35	1.22	40	6
2.019	1484.6	75	0.28	1.1	40	6
2.534	1481.3	72	0.25	1.14	40	6
3.052	1477.8	68	0.23	1.16	40	6
3.567	1475.3	66	0.21	1.25	41	6
4.068	1471.3	62	0.21	1.15	41	6
4.568	1467	58	0.2	1.09	41	6
5.086	1466.2	57	0.19	1.28	41	7
5.6	1542.5	144	0.07	1.29	41	7
6.101	1595.1	184	0	1.31	42	7
6.618	1647.9	262	0.03	1.1	42	7
7.118	1684.9	272	0.29	1.11	42	7
7.619	1702.8	280	0.26	1.25	41	7
8.133	1716.5	290	0.25	1.31	42	7
8.634	1729.5	296	0.23	1.03	42	7
9.151	1739.9	297	0.22	1.14	42	7
9.669	1749.7	305	0.2	1.14	41	8
10.183	1771.8	312	0.29	1.19	41	8
10.684	1784.4	327	0.28	1.18	41	8
11.186	1799.7	332	0.27	1.02	40	8
11.701	1812	336	0.27	1.12	40	8
12.201	1818.9	330	0.27	1.27	40	8
12.702	1935.3	437	0.98	1.36	40	8
13.202	1946.8	419	0.84	1.36	39	8
13.72	1981.2	447	0.87	1.47	39	8
14.233	1996.2	427	0.63	1.41	39	8
14.734	2033.9	446	0.8	1.52	38	8
15.234	2100.1	489	1.05	1.36	38	9
15.735	2133.6	510	1.07	1.58	37	8
16.252	2208.7	545	1.28	1.48	37	9
16.753	2265.5	561	1.33	1.43	36	9
17.267	2207.8	503	0.41	1.37	37	9
17.767	2281.5	542	0.94	1.47	36	9
18.267	2271.6	472	0.75	1.48	36	9
18.771	2279.2	477	0.53	1.4	35	10
19.284	2297.2	473	0.55	1.47	35	9
19.784	2384	553	0.95	1.46	35	10
20.284	2354.3	485	0.33	1.48	34	9
20.784	2444.4	564	1.13	1.3	35	10



21.285	2436.6	416	1.11	1.49	34	10
21.803	2406.5	487	0.31	1.48	34	10
22.303	2450.4	513	0.64	1.42	34	10
22.817	2497.7	547	0.95	1.52	34	10
23.319	2528.4	531	0.97	1.62	34	10
23.837	2562.7	551	0.95	1.49	33	10
24.352	2525.4	524	0.37	1.47	33	10
24.869	2573	475	0.97	1.44	33	10
25.37	2659.2	608	1.24	1.49	33	10
25.886	2672.4	620	1.3	1.58	33	10
26.4	2689.7	608	1.32	1.57	33	10
26.902	2712.8	636	1.33	1.54	33	10
27.403	2728.1	634	1.34	1.43	32	10
27.917	2740.3	641	1.35	1.48	32	10
28.418	2753.5	658	1.34	1.36	32	10
28.921	2766.3	653	1.36	1.48	32	10
29.421	2759.8	667	1.36	1.51	31	11
29.933	2731.1	663	1.37	1.47	32	10
30.434	2713.6	677	1.38	1.52	31	10
30.934	2677.3	676	1.34	1.51	31	12
31.436	2646.5	672	1.33	1.54	31	11
31.937	2615	682	1.33	1.42	31	11
32.451	2586.1	698	1.34	1.57	31	10
32.953	2553.5	702	1.31	1.53	30	11
33.47	2526.3	705	1.29	1.41	31	11
33.986	2488.7	683	1.28	1.61	30	11
34.486	2458.7	713	1.32	1.56	30	11
34.987	2426.1	715	1.34	1.46	31	11
35.487	2395.3	718	1.36	1.49	30	11
36	2363.6	712	1.36	1.71	30	11
36.501	2326.8	725	1.39	1.47	30	12
37.002	2293.4	707	1.41	1.53	30	12
37.502	2258.9	711	1.42	1.6	30	12
38.003	2222.4	724	1.43	1.62	30	12
38.516	2215.2	715	1.42	1.58	30	12
39.018	2211.1	740	1.43	1.49	30	12
39.536	2202.1	742	1.44	1.64	30	12
40.054	2199	746	1.43	1.44	30	12
40.555	2190.2	748	1.44	1.48	30	12
41.068	2180.6	749	1.43	1.68	30	12
41.569	2176.3	740	1.44	1.47	30	13
42.087	2169.3	740	1.44	1.57	30	12
42.587	2076.9	405	1.27	1.66	29	12
43.087	2182.2	778	1.61	1.65	29	12
43.601	2198.5	789	1.8	2.11	29	13
44.102	2222	815	1.83	2.01	29	13
44.621	2211.4	803	1.82	1.9	29	13
45.137	2242.5	837	1.86	2.07	29	13
45.638	2245.4	826	1.87	1.86	29	12
46.138	2258.4	850	1.94	1.99	29	13
46.653	2262.5	852	1.94	2.19	29	13

47.153	2229.6	816	1.86	2.01	29	13
47.653	2265	859	1.92	2	29	13
48.172	2264.6	859	1.91	2.05	29	13
48.685	2267.1	861	1.93	2.08	29	13
49.187	2263.8	840	1.93	2	29	13
49.688	2265.8	869	1.92	2.1	28	13
50.202	2258.2	865	1.93	2.13	29	13
50.72	2266.7	871	1.94	2.14	28	13
51.237	2269.4	848	1.96	2.19	29	13
51.755	2274	877	1.97	2.11	28	13
52.255	2270.7	879	1.97	1.97	28	13
52.769	2276.7	884	1.98	1.98	28	13
53.287	2268.2	856	1.98	2.03	28	13
53.805	2277.7	856	1.98	2.3	28	13
54.321	2287.7	865	1.99	2.23	28	14
54.835	2263.2	852	1.99	2.15	28	14
55.337	2238.5	850	1.74	2.05	28	14
55.851	2250.4	854	1.75	2.05	28	14
56.355	2251.2	857	1.76	1.75	28	14
56.855	2256.8	860	1.78	2.05	28	14
57.371	2263.9	866	1.83	1.94	27	14
57.884	2267.8	863	1.87	1.91	27	14
58.388	2403.7	998	2.01	2.2	27	15
58.902	2299.6	894	2.11	2.07	28	15
59.402	2369.1	964	2.33	2.63	27	15
59.902	2375.4	970	2.37	2.53	27	15
60.404	2371.9	966	2.36	2.62	27	15
60.921	2360.3	954	2.36	2.56	27	15
61.421	2379.6	973	2.39	2.51	27	15
61.938	2383.6	977	2.38	2.5	27	16
62.455	2388.7	982	2.37	2.44	27	16
62.97	2357.8	951	2.38	2.46	27	16
63.488	2396.9	990	2.39	2.69	26	15
64.001	2398.8	992	2.41	2.45	27	15
64.502	2398.9	992	2.42	2.56	27	16
65.004	2372.9	966	2.41	2.53	27	16
65.522	2363.9	957	2.41	2.57	27	16
66.039	2368.8	962	2.42	2.57	27	16
66.555	2367.7	961	2.43	2.57	27	16
67.069	2407.8	1001	2.42	2.57	26	15
67.571	2397.7	991	2.43	2.56	27	16
68.072	2407.7	1001	2.43	2.58	26	16
68.587	2397.7	991	2.43	2.57	26	16
69.088	2374.6	968	2.46	2.57	26	16
69.588	2413.7	1007	2.44	2.58	27	15
70.105	2406.6	1000	2.46	2.6	26	16
70.622	2395.5	989	2.48	2.6	27	16
71.136	2390.6	984	2.47	2.59	26	16
71.637	2408.5	1002	2.49	2.6	26	16
72.155	2402.6	996	2.46	2.59	26	16
72.669	2428.5	1022	2.49	2.62	26	16

73.17	2522.6	1118	2.9	3.1	26	16
73.672	2479.2	1074	2.79	2.95	26	16
74.188	2494.3	1089	2.77	2.94	26	16
74.689	2485.2	1080	2.78	2.93	26	16
75.203	2502.3	1097	2.77	2.93	25	16
75.704	2472.2	1067	2.78	2.89	26	16
76.204	2474.3	1069	2.76	2.87	26	16
76.719	2475.2	1070	2.78	2.87	25	16
77.222	2484.2	1079	2.78	2.87	26	16
77.737	2496.3	1091	2.77	2.88	26	16
78.238	2488.2	1083	2.78	2.88	25	16
78.738	2499.3	1094	2.76	2.88	26	16
79.238	2497.3	1092	2.76	2.87	25	16
79.755	2482.3	1077	2.77	2.88	25	16
80.283	2509.3	1104	2.77	2.87	25	16
80.789	2489.3	1084	2.75	2.88	25	16
81.289	2509.3	1104	2.77	2.86	26	16
81.803	2511.2	1106	2.78	2.88	26	16
82.304	2511.3	1106	2.77	2.89	25	16
82.806	2479.3	1074	2.76	2.88	25	16
83.319	2481.3	1076	2.77	2.89	25	17
83.822	2485.3	1080	2.76	2.86	25	16
84.322	2512.3	1107	2.77	2.88	25	17
84.838	2485.3	1080	2.76	2.88	25	17
85.355	2485.2	1080	2.78	2.85	25	17
85.871	2517.3	1112	2.77	2.87	25	17
86.387	2519.2	1114	2.78	2.88	25	17
86.887	2519.3	1114	2.77	2.88	24	17
87.387	2512.2	1107	2.78	2.89	25	17
87.889	2699.5	1298	3.39	3.51	25	17
88.402	2625.2	1222	3.15	3.27	25	17
88.903	2618.5	1216	3.26	3.38	25	17
89.405	2663.4	1261	3.27	3.4	24	17
89.905	2634.4	1232	3.27	3.38	24	17
90.406	2663.4	1261	3.27	3.32	24	17
90.923	2667.4	1265	3.27	3.28	24	17
91.436	2674.3	1272	3.29	3.3	24	18
91.939	2677.4	1275	3.28	3.31	24	17
92.456	2650.2	1248	3.3	3.34	24	17
92.973	2686.2	1284	3.3	3.32	24	18
93.487	2686.2	1284	3.3	3.32	24	18
93.988	2671.1	1269	3.32	3.36	24	18
94.503	2701.1	1299	3.32	3.35	24	18
95.005	2690.9	1289	3.34	3.36	25	18
95.505	2676.9	1275	3.35	3.35	25	18
96.007	2700.9	1299	3.35	3.38	24	19
96.523	2712.8	1311	3.36	3.39	24	18
97.039	2689.7	1288	3.37	3.4	24	18
97.539	2716.6	1315	3.38	3.42	24	19
98.054	2723.5	1322	3.39	3.4	24	19
98.555	2727.5	1326	3.4	3.42	24	19

99.072	2710.5	1309	3.4	3.42	24	19
99.573	2729.4	1328	3.41	3.44	24	18
100.086	2736.3	1335	3.42	3.45	24	18
100.588	2739.2	1338	3.43	3.46	24	18
101.091	2728.1	1327	3.45	3.48	24	19
101.605	2722	1321	3.46	3.49	24	19
102.106	2751.9	1351	3.47	3.47	24	19
102.606	2741.7	1341	3.49	3.48	24	19
103.122	2789.9	1394	3.94	3.98	24	19
103.622	2843.3	1444	3.65	3.66	23	18
104.136	2810.4	1413	3.82	3.9	24	19
104.637	2864.3	1467	3.83	3.88	23	19
105.139	2837.1	1440	3.85	3.84	23	19
105.64	2841.5	1444	3.81	3.83	24	19
106.156	2819.2	1422	3.84	3.84	24	19
106.674	2799.4	1402	3.82	3.88	24	20
107.187	2846.7	1449	3.8	3.84	24	20
107.688	2854.4	1457	3.82	3.83	24	20
108.189	2863.4	1466	3.82	3.83	24	20
108.708	2858.4	1461	3.82	3.86	24	20
109.22	2843.3	1446	3.83	3.84	24	20
109.722	2860.3	1463	3.83	3.83	24	20
110.24	2845.4	1448	3.82	3.8	23	20
110.756	2822.3	1425	3.83	3.87	23	20
111.274	2857.4	1460	3.82	3.86	23	20
111.787	2822	1424	3.77	3.87	23	20
112.289	2816.4	1419	3.82	3.87	23	20
112.79	2864.5	1467	3.81	3.83	23	20
113.29	2822.4	1425	3.82	3.84	23	20
113.79	2863.3	1466	3.83	3.8	23	21
114.305	2820.5	1423	3.81	3.89	23	20
114.806	2825.7	1428	3.8	3.79	23	20
115.317	2862.5	1465	3.81	3.81	23	20
115.822	2874.5	1477	3.81	3.88	23	20
116.339	2849.8	1452	3.79	3.82	23	20
116.857	2817.8	1420	3.79	3.86	23	20
117.373	2832	1434	3.77	3.83	22	21
117.89	2856.7	1459	3.8	3.83	23	21
118.408	2953.7	1557	3.88	3.96	22	20
118.924	3052.1	1663	4.37	4.35	22	20
119.44	3027.4	1634	4.12	4.39	23	20
119.954	3062.8	1672	4.28	4.37	22	20
120.457	2989.6	1597	4.17	4.32	22	21
120.973	3068.9	1678	4.27	4.42	22	21
121.491	3060	1670	4.32	4.37	22	21
122.004	3029.2	1639	4.31	4.37	23	21
122.506	2964.1	1572	4.2	4.41	23	21
123.023	2992.3	1600	4.19	4.37	22	21
123.525	2972.4	1580	4.18	4.35	22	22
124.038	3018.3	1627	4.25	4.37	22	22
124.539	3045.3	1656	4.36	4.37	23	22

125.041	2971.3	1579	4.19	4.36	22	22
125.557	3023	1633	4.32	4.37	22	22
126.074	2977.1	1585	4.2	4.31	23	22
126.591	3006	1616	4.32	4.39	23	22
127.105	3019.4	1627	4.18	4.34	23	22
127.606	3049.4	1659	4.3	4.42	23	22
128.124	2976.6	1584	4.17	4.32	23	22
128.624	2998.8	1609	4.33	4.36	23	23
129.124	3024.3	1633	4.25	4.34	23	23
129.638	3004	1614	4.32	4.35	23	22
130.14	3005.4	1615	4.3	4.4	23	22
130.64	3042.9	1652	4.27	4.4	22	22
131.14	3221	1842	4.79	5.01	23	22
131.657	3161.3	1782	4.78	4.98	23	22
132.174	3187.5	1809	4.81	4.97	22	22
132.692	3229.9	1852	4.83	4.99	22	22
133.207	3187.5	1807	4.74	4.98	22	22
133.722	3201.9	1822	4.76	5.01	22	22
134.222	3232.5	1852	4.74	4.99	22	22
134.74	3238.2	1858	4.75	4.94	22	22
135.258	3181.3	1802	4.78	5	22	22
135.773	3183.9	1804	4.76	4.99	22	22
136.29	3192.5	1812	4.74	4.99	22	22
136.808	3207.2	1827	4.75	5.02	22	23
137.308	3241	1862	4.79	5.01	22	23
137.822	3258.6	1879	4.77	5.03	22	23
138.323	3164.8	1786	4.8	5.02	22	23
138.84	3205.3	1826	4.78	5.01	22	23
139.341	3221.8	1843	4.8	4.98	22	23
139.841	3179.9	1800	4.76	4.97	22	23
140.355	3240.3	1858	4.67	5	22	23
140.856	3200.8	1816	4.57	4.97	22	22
141.357	3206.3	1821	4.55	5.02	22	22
141.875	3256	1870	4.52	5.01	21	22
142.388	3248.2	1862	4.51	5.04	21	22
142.89	3220.5	1835	4.54	4.97	21	22
143.391	3197	1811	4.52	5.01	22	23
143.892	3235	1850	4.56	5	22	23
144.406	3237	1852	4.56	4.96	22	23
144.907	3245.4	1862	4.63	5.01	22	23
145.407	3250.4	1867	4.63	5	22	23
145.909	3175.9	1793	4.65	5	22	23
146.421	3213.4	1830	4.63	4.98	21	23
147.662	3326.5	1966	4.95	5.295	21.5	23.5
148.174	3293.7	1933	4.96	5.29	21	23
148.685	3334.7	1974	4.94	5.29	21	23
149.2	3329.3	1969	4.94	5.3	21	24
149.707	3319.8	1960	4.96	5.31	22	23
150.215	3318.2	1957	4.97	5.28	21	24
150.717	3326.7	1966	4.95	5.29	21	24
151.218	3341.8	1982	4.97	5.31	21	24

151.732	3333.6	1972	4.97	5.27	21	24
152.233	3313.7	1953	4.97	5.29	21	24
152.733	3312.5	1950	4.97	5.25	21	24
153.233	3336.2	1975	4.97	5.28	22	24
153.734	3328.4	1969	4.96	5.32	21	24
154.251	3339.3	1979	4.99	5.3	22	24
154.766	3308.6	1947	4.99	5.27	21	24
155.268	3297.6	1936	4.98	5.27	21	24
155.782	3339.6	1978	4.96	5.27	21	25
156.283	3350.4	1987	4.97	5.23	21	25
156.784	3343.1	1981	5	5.26	21	25
157.286	3347.1	1985	4.97	5.26	21	25
157.799	3314.5	1952	4.97	5.25	21	25
158.301	3318.5	1956	4.99	5.25	21	25
158.802	3315.9	1957	4.99	5.33	21	25
159.302	3360.5	2004	4.99	5.38	21	25
159.818	3329.5	1973	4.99	5.38	21	24
160.332	3317.1	1955	4.98	5.26	20	25
160.834	3310.7	1950	4.98	5.29	21	25
161.336	3351.4	1992	4.99	5.32	21	25
161.851	3322.5	1967	4.98	5.4	21	25
162.366	3292.5	1935	4.98	5.36	21	25
162.866	3443.4	2097	5.12	5.57	21	25
163.368	3546	2228	5.53	5.99	21	25
163.882	3510.7	2178	5.4	5.79	21	25
164.382	3504	2172	5.39	5.8	21	25
164.883	3499.7	2167	5.38	5.79	21	25
165.385	3456.6	2126	5.38	5.82	20	25
165.902	3510.4	2177	5.39	5.78	20	25
166.418	3497.3	2166	5.4	5.81	20	25
166.935	3434.7	2102	5.38	5.79	21	25
167.453	3493.3	2162	5.41	5.81	21	25
167.965	3478	2146	5.38	5.8	21	25
168.466	3474.9	2145	5.41	5.83	21	25
168.969	3469	2137	5.39	5.8	20	25
169.484	3464	2132	5.4	5.8	21	25
169.986	3467.2	2138	5.39	5.84	21	25
170.499	3426.7	2094	5.4	5.79	21	25
171.001	3393.7	2061	5.42	5.79	21	26
171.501	3417.6	2087	5.42	5.82	21	26
172.019	3486.6	2156	5.44	5.82	21	26
172.519	3427	2095	5.46	5.8	21	26
173.033	3420	2088	5.44	5.8	21	26
173.534	3405.7	2073	5.47	5.79	21	26
174.034	3449	2117	5.49	5.8	21	26
174.534	3431.7	2099	5.43	5.79	21	26
175.036	3468.7	2136	5.43	5.79	21	26
175.549	3518	2119	5.43	3.68	21	26
176.051	3087.5	1732	2.88	5.4	20	26
176.552	3108.6	1737	4.7	5.02	20	26
177.069	3459.9	2108	4.95	5.47	20	25

177.585	3414	2076	4.99	5.71	20	25
178.107	3749	2392	5.11	5.37	20	26
178.617	3537.9	2238	6.28	6.2	21	26
179.135	3205.1	1922	5.56	6.37	21	26
179.636	2837.8	2355	6.27	9.19	22	26
180.136	3913.6	2594	6	5.97	21	27
180.636	3698.2	2402	6.23	6.24	21	27
181.15	3649.2	2396	6.5	6.63	21	27
181.651	3877	2597	6.09	6.4	21	26
182.152	3226.2	1942	5.91	6.36	22	27
182.653	3716.7	2414	6.42	6.17	22	27
183.169	3934.5	2680	6.47	6.62	22	27
183.669	3267.5	1963	5.91	6.15	21	26
184.184	3239.1	1956	5.83	6.37	21	27
184.684	3645.6	2370	6.51	6.44	21	27
185.185	4111.9	2869	6.18	6.71	21	26
185.685	3768	2505	6.49	6.55	21	27
186.202	3297.8	2029	6.37	6.5	21	26
186.702	3657.2	2363	6.21	6.26	21	27
187.218	3659	2360	5.85	6.21	21	27
187.735	3683.3	2392	6.06	6.29	20	26
188.235	3682.3	2410	6.04	6.47	20	26
188.752	3715	2407	6.11	6.11	21	27
189.253	3735.7	2459	6.19	6.43	21	26
189.766	3715.1	2408	6.16	6.12	20	27
190.268	3733.4	2428	5.95	6.14	21	26
190.768	3703.1	2421	5.81	6.38	20	26
191.269	3652.8	2375	6	6.42	21	26
191.771	3492.2	2196	5.88	6.24	20	26
192.284	3714.6	2439	5.97	6.44	20	26
192.803	3710.4	2451	5.96	6.58	20	27
193.32	3568.7	2370	6.13	7.01	21	27
193.836	3942.1	2799	6.6	7.32	21	27
194.336	3700.1	2599	6.39	7.52	21	27
194.85	3758.4	2538	6.07	6.87	20	27
195.351	3820.9	2589	6.17	6.79	20	27
195.852	3859.6	2599	6.4	6.57	20	27
196.352	3654.7	2399	6.14	6.61	20	26
196.87	3816.9	2565	6.44	6.64	21	27
197.385	3576.3	2287	6.17	6.31	20	27
197.886	3713.5	2483	6.24	6.8	20	27
198.386	3734.5	2504	6.35	6.8	21	27
198.903	3725.7	2498	6.34	6.82	21	27
199.417	3719.7	2492	6.37	6.82	20	27
199.921	3744.1	2515	6.36	6.81	20	27
200.434	3713.5	2483	6.28	6.8	20	27
200.934	3749.7	2515	6.24	6.77	20	27
201.437	3770.2	2530	6.22	6.73	20	27
201.938	3733.2	2493	6.26	6.73	20	27
202.453	3760.1	2524	6.21	6.76	20	27
202.953	3754.1	2518	6.25	6.76	20	27

203.467	3751.1	2515	6.26	6.76	21	27
203.97	3738.8	2500	6.28	6.74	20	27
204.487	3730.5	2489	6.24	6.72	20	27
205.002	3750.8	2512	6.27	6.74	20	27
205.504	3767.8	2529	6.26	6.74	20	27
206.019	3769.5	2532	6.26	6.75	20	27
206.519	3765.8	2527	6.27	6.74	20	27
207.036	3723.2	2483	6.28	6.73	21	28
207.553	3734.8	2496	6.29	6.74	20	28
208.07	3764.7	2657	6.92	7.49	21	27
208.583	3953.1	2808	6.8	7.31	21	28
209.085	3987	2840	6.83	7.3	21	28
209.587	3945.6	2825	6.85	7.43	21	28
210.104	3960.5	2842	6.87	7.44	21	27
210.621	3946.1	2805	6.81	7.33	21	28
211.134	3948.1	2815	6.9	7.37	21	27
211.635	3960.6	2840	6.9	7.43	21	28
212.136	3983.1	2846	6.86	7.35	21	28
212.654	3914.1	2779	6.86	7.36	21	27
213.171	3944.1	2811	6.88	7.37	21	28
213.686	3965.1	2826	6.86	7.34	21	27
214.204	3935.1	2800	6.73	7.36	20	28
214.704	3914	2785	6.78	7.39	21	27
215.221	3944	2813	6.84	7.38	20	27
215.735	3925.7	2803	6.86	7.42	20	27
216.236	3926.2	2812	6.86	7.46	20	27
216.755	3948.1	2809	6.85	7.34	20	27
217.269	3932.9	2806	6.87	7.4	20	27
217.77	3957.1	2820	6.85	7.35	20	27
218.288	3949.1	2806	6.85	7.32	20	27
218.804	3941	2810	6.88	7.38	20	27
219.318	3915	2786	6.88	7.39	20	27
219.819	3949	2818	6.85	7.38	20	27
220.321	3954.1	2819	6.86	7.36	20	27
220.821	3946.1	2801	6.87	7.31	20	28
221.321	3946	2817	6.86	7.39	20	27
221.839	3905	2774	6.85	7.38	20	28
222.352	3916.1	2783	6.84	7.37	20	27
222.852	3890.8	2766	6.91	7.41	20	27
223.37	4079.9	3009	7.07	7.65	20	28
223.87	4048.4	3026	7.27	7.84	20	27
224.371	4039.7	3020	7.23	7.85	20	28
224.871	4059	3042	7.31	7.86	20	28
225.386	4022.4	3000	7.25	7.84	20	27
225.888	4030.7	3011	7.3	7.85	20	28
226.388	4080.3	3042	7.32	7.78	20	28
226.905	4080.8	3053	7.35	7.82	20	28
227.405	4057.4	3027	7.39	7.81	20	27
227.918	3999.8	2972	7.4	7.82	20	28
228.42	4025.7	3006	7.41	7.85	21	28
228.937	4036.5	3025	7.41	7.88	21	28

229.439	4083.9	3043	7.41	7.77	20	28
229.951	4040.4	3018	7.42	7.84	21	28
230.455	4030.8	3003	7.43	7.82	21	28
230.955	4064.4	3034	7.34	7.81	21	28
231.471	4044.1	3011	7.23	7.8	21	28
231.971	4039.1	3006	7.33	7.8	21	28
232.485	4053.7	2995	7.33	7.7	21	28
232.986	4068.1	3017	7.31	7.73	21	28
233.487	4025.1	2974	7.33	7.73	21	29
233.988	3985.3	2947	7.26	7.78	21	29
234.502	4007.3	2969	7.32	7.78	21	29
235.003	4025.1	2974	7.21	7.73	21	29
235.504	4029.7	2971	7.23	7.7	21	29
236.018	4050.3	3012	7.28	7.78	22	29
236.521	3976.1	2951	7.31	7.83	22	29
237.021	4053.2	2997	7.26	7.71	22	29
237.537	4015.7	2962	7.28	7.72	21	29
238.038	3993.6	2945	7.22	7.74	21	29
238.539	4150	3273	7.75	8.31	20	29
239.052	4178.5	3291	7.84	8.28	21	29
239.571	4161.9	3271	7.87	8.27	21	29
240.088	4185.9	3295	7.89	8.27	21	29
240.601	4149.4	3283	7.89	8.34	20	28
241.102	4174.8	3277	7.88	8.25	20	28
241.603	4138.8	3276	7.88	8.35	20	28
242.105	4138.5	3258	7.86	8.3	20	28
242.605	4135.2	3276	7.86	8.36	20	28
243.121	4154.5	3274	7.83	8.3	20	28
243.621	4170.2	3311	7.82	8.36	21	28
244.136	4170.8	3273	7.8	8.25	20	28
244.636	4201	3317	7.74	8.29	21	29
245.137	4121	3244	7.62	8.31	21	29
245.637	4135.5	3262	7.71	8.32	21	29
246.139	4185.5	3312	7.71	8.32	21	29
246.64	4149.5	3269	7.69	8.3	21	29
247.152	4175	3291	7.67	8.29	21	29
247.653	4148.2	3289	7.69	8.36	21	29
248.155	4149.4	3283	7.64	8.34	21	29
248.656	4162.5	3282	7.62	8.3	21	29
249.173	4166.5	3286	7.62	8.3	20	29
249.689	4128.9	3259	7.63	8.33	20	28
250.205	4164.5	3284	7.6	8.3	21	28
250.721	4164.5	3284	7.57	8.3	20	28
251.222	4163.9	3273	7.59	8.27	20	28
251.737	4148	3271	7.67	8.31	20	28
252.255	3702.5	2788	7.52	8.2	19	28
252.755	4225.6	3555	8.07	8.82	20	28
253.272	4253.9	3556	8.03	8.76	19	28
253.786	4185.8	3506	8.03	8.8	19	28
254.291	4193.4	3500	8.06	8.77	19	28
254.804	4197.4	3513	8.08	8.79	20	28

255.304	4238.9	3550	8.1	8.78	20	28
255.806	4277.9	3580	8.11	8.76	20	28
256.306	4239.4	3578	8	8.84	20	28
256.806	4219.4	3526	8.02	8.77	20	28
257.321	4258.8	3552	8.06	8.74	20	28
257.822	4240.4	3556	7.97	8.79	20	28
258.339	4266.9	3569	7.97	8.76	20	28
258.856	4220.6	3550	8.05	8.82	20	28
259.372	4203.8	3524	8.03	8.8	20	29
259.887	4172	3506	8.04	8.83	20	28
260.388	4208.2	3533	8.09	8.81	20	28
260.889	4215.4	3531	8.01	8.79	20	28
261.39	4234.9	3537	8.1	8.76	19	29
261.903	4220.2	3545	8.1	8.81	20	29
262.405	4261.4	3568	8.14	8.77	20	29
262.922	4275.8	3569	8.12	8.74	21	29
263.423	4163.2	3488	8.03	8.81	21	29
263.94	4243	3523	8.06	8.71	21	29
264.454	4208.9	3511	8.09	8.76	21	29
264.954	4266.6	3551	8.11	8.72	21	29
265.454	4190.9	3493	8.14	8.76	20	29
265.956	4240.9	3552	8.14	8.78	20	29
266.472	4254.9	3557	8.13	8.76	20	29
266.973	4200.4	3507	8.08	8.77	19	29
267.489	4211.4	3527	8.13	8.79	20	29
268.006	4275.2	3873	8.62	9.33	20	29
268.507	4253.8	3828	8.07	9.29	21	29
269.02	4236.9	3817	8.13	9.3	21	29
269.52	4251.8	3826	8.53	9.29	21	29
270.021	4252	3838	8.68	9.31	21	29
270.522	4256	3842	8.7	9.31	21	29
271.023	4191.2	3795	8.75	9.34	21	29
271.539	4272.6	3841	8.74	9.28	21	29
272.041	4235.9	3816	8.74	9.3	21	29
272.555	4231.2	3829	8.67	9.33	21	29
273.057	4214.1	3806	8.58	9.32	20	29
273.572	4263	3849	8.56	9.31	21	29
274.073	4267.8	3842	8.54	9.29	20	29
274.574	4234.9	3815	8.56	9.3	20	29
275.087	4282.6	3851	8.62	9.28	20	29
275.587	4298.9	3879	8.59	9.3	21	28
276.088	4238.2	3842	8.57	9.34	20	29
276.588	4277.1	3869	8.59	9.32	21	29
277.09	4306.6	3875	8.6	9.28	20	29
277.604	4263.9	3844	8.64	9.3	21	29
278.105	4270	3856	8.6	9.31	21	29
278.607	4273.2	3830	8.58	9.26	20	28
279.123	4286	3872	8.6	9.31	20	28
279.639	4238	3824	8.63	9.31	20	28
280.139	4265.9	3846	8.58	9.3	20	28
280.657	4238.8	3813	8.64	9.29	20	28

281.173	4279.6	3848	8.66	9.28	20	28
281.69	4215.2	3819	8.63	9.34	19	28
282.191	4265	3851	8.64	9.31	20	28
282.706	4212.1	3804	8.64	9.32	20	28
283.223	4196.9	3464	8.12	8.68	20	28
283.738	4117.1	4090	9.12	9.88	20	28
284.24	4243.3	4224	9.12	9.89	20	28
284.74	4193.8	3991	8.84	9.64	20	28
285.24	4221.7	4119	8.99	9.78	20	28
285.755	4261	4129	8.96	9.74	20	29
286.256	4224.7	4100	8.95	9.75	20	29
286.774	4230.3	4135	8.88	9.79	20	29
287.288	4278.2	4139	8.84	9.73	20	29
287.788	4196.1	4086	8.87	9.77	20	29
288.288	4207.4	4090	8.89	9.76	20	29
288.788	4209.1	4099	8.95	9.77	21	29
289.29	4205.4	4088	9.04	9.76	21	29
289.79	4243.7	4119	9.08	9.75	21	29
290.307	4211.7	4087	9.11	9.75	20	29
290.823	4179.2	4040	9.08	9.73	20	29
291.34	4188.4	4071	9.08	9.76	20	29
291.856	4193.7	4069	9.11	9.75	20	29
292.357	4207.3	4112	9.11	9.79	20	29
292.873	4189.7	4065	9.15	9.75	20	29
293.373	4217.7	4093	9.15	9.75	20	29
293.89	4241.7	4081	9.18	9.7	20	29
294.406	4219.7	4095	9.17	9.75	20	29
294.906	4239.6	4086	9.1	9.71	20	29
295.407	4203	4071	9.08	9.74	20	29
295.924	4226.7	4102	9.09	9.75	20	29
296.424	4217.7	4093	9.16	9.75	20	29
296.938	4187	4055	9.22	9.74	20	29
297.439	4230.7	4106	9.21	9.75	20	29
297.94	4198.4	4081	9.19	9.76	20	29
298.44	4261.4	4448	9.46	10.14	21	29
298.955	4083	4414	9.73	10.3	21	29
299.457	4092.7	4452	9.7	10.33	20	29
299.974	4141.3	4463	9.66	10.29	21	29
300.474	4077.7	4437	9.7	10.33	20	29
300.987	4066.6	4407	9.68	10.31	20	29
301.487	4127.6	4440	9.62	10.28	20	29
301.99	4099.6	4440	9.7	10.31	21	30
302.49	4110.2	4395	9.7	10.25	21	30
302.99	4080	4411	9.63	10.3	21	30
303.507	4152.3	4474	9.69	10.29	22	30
304.007	4120.6	4461	9.75	10.31	22	30
304.522	4099.6	4440	9.73	10.31	22	30
305.023	4078.2	4428	9.65	10.32	22	30
305.523	2972.3	4991	10.73	11.64	21	30
306.024	4078.9	4545	9.86	10.44	21	30
306.541	4083.7	4462	9.72	10.35	21	30

307.057	4093.7	4453	9.72	10.33	21	29
307.574	4096.3	4418	9.7	10.29	21	29
308.074	4049.5	4447	9.73	10.37	21	29
308.589	4071.2	4440	9.7	10.34	20	29
309.089	4070.7	4430	9.71	10.33	21	29
309.59	4064.2	4414	9.76	10.32	20	29
310.091	4102.2	4452	9.74	10.32	21	29
310.607	4087.2	4456	9.74	10.34	21	29
311.124	4093.2	4443	9.76	10.32	21	29
311.624	4110.2	4460	9.76	10.32	21	29
312.14	4099.7	4459	9.75	10.33	21	29
312.657	4060.7	4420	9.76	10.33	20	29
313.157	4109.3	4431	9.72	10.29	20	29
313.672	3964.8	4628	10.01	10.63	20	29
314.173	3868.5	4642	10.06	10.73	20	29
314.674	3998.3	4640	10	10.61	20	29
315.191	3711.4	4884	10.32	11.06	20	29
315.706	3981.2	4699	9.98	10.68	20	29
316.207	3991.6	4644	9.92	10.62	20	29
316.724	3961	4635	9.88	10.64	21	29
317.24	3995.3	4637	9.8	10.61	21	29
317.74	3951.8	4615	9.85	10.63	21	29
318.24	3955.6	4608	9.79	10.62	22	30
318.74	4020.7	4641	9.65	10.59	21	29
319.24	3958.6	4611	9.59	10.62	21	29
319.74	3930.2	4637	9.67	10.67	21	29
320.24	4014	4688	9.73	10.64	21	29
320.74	3928	4602	9.69	10.64	21	29
321.257	3951	4625	9.7	10.64	22	29
321.774	3937.2	4644	9.68	10.67	22	29
322.291	3936.3	4825	9.87	10.83	22	30
322.791	3832.8	4757	9.91	10.86	22	30
323.307	3876.1	4753	9.95	10.82	22	30
323.807	3824.7	4737	9.99	10.85	22	29
324.307	3912.3	4801	10.06	10.83	21	29
324.807	3869.9	4806	10.1	10.87	21	29
325.307	3920.4	4774	10.14	10.8	20	28
325.807	3770.9	4719	10.19	10.88	20	28
326.323	3729.4	4928	10.38	11.08	20	28
326.823	3862.9	4799	10.29	10.87	20	28
327.324	3849.5	4846	10.3	10.92	20	28
327.824	3549.8	5063	10.56	11.31	20	28
328.339	3434.5	5094	10.71	11.41	20	28
328.84	3767.8	5019	10.8	11.12	20	28
329.341	3615.7	5030	10.62	11.24	20	28
329.857	3788.4	4987	10.62	11.08	21	29
330.357	3601.7	5044	10.61	11.26	20	28
330.874	3623.7	5038	10.63	11.24	21	28
331.374	3691.2	5023	10.66	11.18	20	28
331.874	3764.2	4989	10.66	11.1	21	29
332.374	3744	4982	10.63	11.11	21	29

332.874	3637.2	5010	10.65	11.21	21	29
333.39	3668.2	5000	10.67	11.18	21	29
333.89	3747	4985	10.65	11.11	21	28
334.39	3737.8	4989	10.6	11.12	21	29
334.89	3655.6	5001	10.53	11.19	21	29
335.39	3629.7	5044	10.53	11.24	22	29
335.89	3791.2	5016	10.48	11.1	22	29
336.39	3655.9	5015	10.43	11.2	21	29
336.907	3757.8	5009	10.52	11.12	22	29
337.407	3707.8	4999	10.57	11.15	22	29
337.907	3655.6	5056	10.53	11.23	22	29
338.407	3667.8	4986	10.58	11.17	22	29
338.907	3724.4	4936	10.58	11.09	22	29
339.424	3707.8	4959	10.62	11.12	22	29
339.941	3598.7	5027	10.62	11.25	21	29
340.441	3638.4	5025	10.64	11.22	22	29
340.941	3725.2	5003	10.64	11.14	22	29
341.441	3769.4	4981	10.65	11.09	21	29
341.957	3554.5	5025	10.64	11.28	22	30
342.457	3665.2	5038	10.68	11.21	22	30
342.957	3666.5	5525	11.28	11.54	22	29
343.457	3426.4	5238	10.95	11.51	22	29
343.957	3220.4	5305	11.15	11.68	22	29
344.457	3275	5343	11.18	11.67	22	29
344.957	3186.5	5338	11.13	11.72	22	29
345.457	3496.2	5231	10.99	11.46	22	29
345.957	3449.6	5215	10.96	11.48	22	29
346.457	3163.7	5349	11.21	11.74	22	29
346.957	3285.4	5420	11.2	11.71	22	29
347.457	3393.5	5445	11.25	11.66	22	29
347.957	3288.4	5373	11.24	11.68	22	29
348.457	3254	5322	11.15	11.67	22	29
348.957	3247.1	5365	11.2	11.7	22	29
349.457	3198.5	5350	11.21	11.72	22	29
349.957	3300.5	5452	11.18	11.72	22	29
350.457	3242.8	5344	11.22	11.69	22	29
350.957	3227.5	5379	11.18	11.72	22	29
351.457	3308.8	5410	11.19	11.69	22	29
351.957	3200.6	5369	11.23	11.73	22	28
352.457	3212.6	5381	11.24	11.73	22	28
352.957	2260	914	3.87	1.25	22	29
353.457	2175.8	777	0	0	22	28
353.957	2161.4	760	0	0	22	29
354.457	2157	754	0	0	21	28
354.957	2153.5	749	0	0	21	28
355.457	2151	747	0	0	21	28
355.957	2148.9	745	0	0	21	28
356.457	2148.3	743	0	0.06	21	28
356.957	2145.8	742	0	0	21	28
357.457	2143.9	740	0	0	21	27
357.957	2142.9	739	0	0	21	27

358.457	2141.6	737	0	0	21	28
358.957	2140.3	737	0	0	21	28
359.457	2138.9	735	0	0	21	28
359.957	2137.8	734	0	0	22	28
360.457	2137.2	734	0	0	22	28
360.957	2136	732	0	0	22	28
361.457	2134.8	731	0	0	22	28
361.957	2134.3	730	0	0	22	28
362.457	2133.2	730	0	0	22	27
362.957	2131.9	728	0	0	22	27
363.457	2131.6	727	0	0	21	27
363.957	2130.8	727	0	0	21	27
364.457	2129.6	726	0	0	21	27
364.957	2128.8	725	0	0	22	27
365.457	2127.9	724	0	0	21	27
365.957	2127.5	723	0	0	21	27
366.457	2126.8	723	0	0	21	27
366.957	2125.8	722	0	0	22	27
367.457	2125	721	0	0	21	27

Bottom Hole tool @ ~~318~~ 3150'

ISFP

5min - 750

10min - 728

15min - 720



Dugan Production Company Locke #1

San Juan, New Mexico
Sec.10,T29N,R14W
Mesaverde

Step Rate Test

October 4, 2002

Prepared for: Mr. John Alexander
VP

Dugan Production Company
(505) 325-1821

Prepared by: Mike McNeese
AMERICAN ENERGY SERVICES

Service Point: Farmington
Sales Contact: Mike McNeese

American Energy Services - Disclaimer Notice:

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Prices quoted are estimates only and are good for 30 days from the date of issue. Actual charges may vary depending upon time, equipment, and material ultimately required to perform these services. Terms beyond 30 days are billable as provided in the quote terms on the estimate page. Freedom from infringement of patents of American Energy Services or others is not to be inferred.

AMERICAN ENERGY SERVICES

GENERAL INFORMATION

Customer : **Dugan Production Company**
Well Name : **Locke #1**
County, State : **San Juan, New Mexico**
Note : **Step Rate Test**
Prepared for : **Mr. John Alexander**
Customer Title: **VP**
Phone No. : **(505) 325-1821**
Prepared by : **Mike McNeese**
Title: **Technical Sales**
Phone No. : **(505) 325-4192**
Service point :

Farmington	▼
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State : **New Mexico**
Sales Contact: **Mike McNeese**
Sales Title: **Account Manager**
Phone No. : **(505) 325-4192**
Sec.,T,R **Sec.10,T29N,R14W**
Field **Undesignated MV**
Formation: **Mesaverde**
Date: **October 4, 2002**
Miles To Location: **15**
No. Units **7**

Dugan Production Company
 Locke #1
 Sec.10,T29N,R14W
 Mesaverde
 San Juan, New Mexico
 Step Rate Test

JOB DATA

Job Type:	Step Rate Test	
Treating Conductor:	Tubing	
Est. Pump Rate (bpm):	12.125	
Est. Pressure (psi):	5,590	3,000 (max psi)

Fluid Requirements:	Produced Water	98,438 gallons
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Total Water Required:	98,438 gallons
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Proppant/Diverter Requirements:

Total Sand Volume:	0
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(lbs sand/foot pay)	0
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WELL DATA

Formation:	Mesaverde	
Top Perforation (ft.):	3,188	
Bottom Perforation (ft.):	3,547	
Mid Perforation (ft.):	3,368	
No. of Perforations:	38	
Perforation Diameter (inches):	0.38	
Frac Height (ft.):	n/a	
Net Pay (ft.):	60	
Fracture Gradient (psi/ft):	0.7893	
Bottomhole Pressure (psi):	n/a	
Surface Ground Temp (deg. F):	65	
Bottom Hole Temp (deg. F):	100	(based on 1.1 deg. F per 100')
Porosity (%):	n/a	
Permeability (md):	n/a	
Tubing Size:	2 3/8", Lined Tubing, 0'-3116' (Packer)	
Casing Size:	4 1/2", 10.5#, 0'-PBSD	
Liner Size:	n/a	
Well/Production type:	Salt Water Disposal	

Additional Information: *Produced water will be supplied by the customer.*

Fluid 1: Produced Water

LOADING PER 1000 GALS.

[illegible]

Produced water will be furnished by the customer.

Frac Calculations

Dugan Production Company
 Locke #1
 Sec.10,T29N,R14W
 Mesaverde
 San Juan, New Mexico
 Step Rate Test

INPUT

Top Perforation (ft.):	3,188	
Bottom Perforation (ft):	3,547	
Mid Perforation (ft):	3,368	
Fracture Gradient (psi/ft):	0.79	
Pipe Friction (psi/ft):	1,300	
No. of Perforations:	38	
Perforation Diameter (inches):	0.38	
Fluid S.G.	1.000	
Tubing Size:	2 3/8", Lined Tubing, 0'-3116' (Packer)	
Casing Size:	4 1/2", 10.5#, 0'-PBTD	
Liner Size:	n/a	
Est. Pump Rate (bpm):	12.125	
Csg./Tbg Capacity (bbl/ft):	0.00387	0.0159
Flush Volume (gal):	568	

Definitions:

BHFP = Bottomhole Frac Pressure (psi)

HH = Hydrostatic Head (psi)

PF = Friction Pressure Loss (psi)

PPF = Perforation Friction Pressure (psi)
 $= \{2.93 * (\text{rate} / \# \text{perfs})^2 / (\text{perf diameter})^4\}$
 * specific gravity

ISDP = Instantaneous Shut Down Pressure
 $= \text{BHFP} - \text{HH}$

STP = Surface Treating Pressure (psi)
 $= \text{BHFP} - \text{HH} + \text{PF} + \text{PPF}$

HHP = Hydraulic horsepower (hhp)
 $= \text{STP} * \text{Rate} / 40.8$

Calculations:

BHFP = 2,658 psi

HH = 1,460 psi

PF = 4,378 psi

PPF = 14 psi

ISDP = 1,198 psi

STP = 5,590 psi

HHP = 1,661



Procedure For Step Rate Test:

- 1. Pump produced water at 0.25 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 2. Pump produced water at 0.75 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 3. Pump produced water at 1.25 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 4. Pump produced water at 1.75 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 5. Pump produced water at 2.25 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 6. Pump produced water at 2.75 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 7. Pump produced water at 3.25 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 8. Pump produced water at 3.75 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 9. Pump produced water at 4.25 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 10. Pump produced water at 4.75 bpm for exactly 15 minutes and record all of the rates and pressure. Use a choke assembly to pinch back the rate and adjust to the desired rate.***
- 11. Pump produced water at 5.25 bpm for exactly 15 minutes and record all of the rates and pressure.***

- 12. Pump produced water at 5.75 bpm for exactly 15 minutes and record all of the rates and pressure.***

*Air in pump - pressure gauge showed wide fluctuations
~ 800 psi*

13. *Pump produced water at 6.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
14. *Pump produced water at 6.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
15. *Pump produced water at 7.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
16. *Pump produced water at 7.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
17. *Pump produced water at 8.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
18. *Pump produced water at 8.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
19. *Pump produced water at 9.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
20. *Pump produced water at 9.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
21. *Pump produced water at 10.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
22. *Pump produced water at 10.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
23. *Pump produced water at 11.25 bpm for exactly 15 minutes and record all of the rates and pressure.*
24. *Pump produced water at 11.75 bpm for exactly 15 minutes and record all of the rates and pressure.*
25. *Pump produced water at 12.25 bpm for exactly 15 minutes and record all of the rates and pressure.*

STP required to fracture the formation = 2,658 psi
 (based on ISIP from pump-in) ISDP = 1,200
 Frac Gradient From ISDP = 0.7893 psi/ft

, Pump Schedule

Dugan Production Company
 Locke #1
 Sec.10,T29N,R14W
 Mesaverde
 San Juan, New Mexico
 Step Rate Test

Number of tanks Using 450 Usable BBL/Tank:

5.21

Fluid & Proppant Pumping Schedule

Fluid Type	Fluid Volume (gals)	Conc. (lb/gal)	Totals (lbs)	Proppant Mesh Size	Clean Fluid (bbls)	Volume Cum Clean (bbls)	Slurry Fluid (bbls)	Cum Slurry (bbls)
Produced Water	158	0.00	0	Pad	4	4	4	4
Produced Water	473	0.00	0	0.00	11	15	11	15
Produced Water	788	0.00	0	0.00	19	34	19	34
Produced Water	1103	0.00	0	0.00	26	60	26	60
Produced Water	1418	0.00	0	0.00	34	94	34	94
Produced Water	1733	0.00	0	0.00	41	135	41	135
Produced Water	2048	0.00	0	0.00	49	184	49	184
Produced Water	2363	0.00	0	0.00	56	240	56	240
Produced Water	2678	0.00	0	0.00	64	304	64	304
Produced Water	2993	0.00	0	0.00	71	375	71	375
Produced Water	3308	0.00	0	0.00	79	454	79	454
Produced Water	3623	0.00	0	0.00	86	540	86	540
Produced Water	3938	0.00	0	0.00	94	634	94	634
Produced Water	4253	0.00	0	0.00	101	735	101	735
Produced Water	4568	0.00	0	0.00	109	844	109	844
Produced Water	4883	0.00	0	0.00	116	960	116	960
Produced Water	5198	0.00	0	0.00	124	1084	124	1084
Produced Water	5513	0.00	0	0.00	131	1215	131	1215
Produced Water	5828	0.00	0	0.00	139	1354	139	1354
Produced Water	6143	0.00	0	0.00	146	1500	146	1500
Produced Water	6458	0.00	0	0.00	154	1654	154	1654
Produced Water	6773	0.00	0	0.00	161	1815	161	1815
Produced Water	7088	0.00	0	0.00	169	1984	169	1984
Produced Water	7403	0.00	0	0.00	176	2160	176	2160
Produced Water	7718	0.00	0	0.00	184	2344	184	2344
Totals	98438		0		2344		2344	

Rate Schedule

Fluid Type	Fluid Volume (gals)	Proppant Conc. (lb/gal)	Slurry Rate (bpm)	Clean Fluid Rate (bpm)	Proppant Rate (lbs/min)	Slurry Volume (bbls)	Cum Slurry (bbls)	Pump Time (min)
Produced Water	158	0.00	0.250	0.3	0	4	4	15.00
Produced Water	473	0.00	0.750	0.8	0	11	15	15.00
Produced Water	788	0.00	1.250	1.3	0	19	34	15.00
Produced Water	1103	0.00	1.750	1.8	0	26	60	15.00
Produced Water	1418	0.00	2.250	2.3	0	34	94	15.00
Produced Water	1733	0.00	2.750	2.8	0	41	135	15.00
Produced Water	2048	0.00	3.250	3.3	0	49	184	15.00
Produced Water	2363	0.00	3.750	3.8	0	56	240	15.00
Produced Water	2678	0.00	4.250	4.3	0	64	304	15.00
Produced Water	2993	0.00	4.750	4.8	0	71	375	15.00
Produced Water	3308	0.00	5.250	5.3	0	79	454	15.00
Produced Water	3623	0.00	5.750	5.8	0	86	540	15.00
Produced Water	3938	0.00	6.250	6.3	0	94	634	15.00
Produced Water	4253	0.00	6.750	6.8	0	101	735	15.00
Produced Water	4568	0.00	7.250	7.3	0	109	844	15.00
Produced Water	4883	0.00	7.750	7.8	0	116	960	15.00
Produced Water	5198	0.00	8.250	8.3	0	124	1084	15.00
Produced Water	5513	0.00	8.750	8.8	0	131	1215	15.00
Produced Water	5828	0.00	9.250	9.3	0	139	1354	15.00
Produced Water	6143	0.00	9.750	9.8	0	146	1500	15.00
Produced Water	6458	0.00	10.250	10.3	0	154	1654	15.00
Produced Water	6773	0.00	10.750	10.8	0	161	1815	15.00
Produced Water	7088	0.00	11.250	11.3	0	169	1984	15.00
Produced Water	7403	0.00	11.750	11.8	0	176	2160	15.00
Produced Water	7718	0.00	12.250	12.3	0	184	2344	15.00

Total Pump Time (min)

376

Total Pump Time (hrs.)

6.25

AMERICAN ENERGY SERVICES

Dugan Production Company
 Locke #1
 Sec.10,T29N,R14W
 Mesaverde
 San Juan, New Mexico
 Step Rate Test

CODE

PRICE ESTIMATE

Chemicals

Unit Cost

Book Total

Proppants/Diversers

Chemical Total:

\$0.00

Equipment

Proppant Total:

\$0.00

se0215	1 ea	Minimum Pump Charge for 1000 HHP Pump, first 4 hrs	\$3,500.00	\$3,500.00
se0302	1 ea	0 - 10 BPM Blender, first 4 hrs	\$1,550.00	\$1,550.00
ts0102	1 job	Computer Van Frac Unit, Real Time Monitoring Unit	\$3,300.00	\$3,300.00
se001	105 mi	Unit Mileage Charge-Trucks, Cars, and Vans (except bulk units)	\$4.40	\$462.00
se0100	1 ea	Acid Pump Service I (0 - 300 HHP)	\$1,100.00	\$1,100.00
se0600	4 job	2" Valve Rental	\$290.00	\$1,160.00

Equipment Total:

\$11,072.00

JOB TOTAL:

\$11,072.00

DISCOUNTED TOTAL:

\$6,643.20

The above pricing does not include Federal, State, and Local taxes.