UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Geophysical Log Suite from Drill Hole No. 7A Mariano Lake-Lake Valley Drilling Project, McKinley County, New Mexico

by

U.S. Geological Survey

Open-File Report 81-973

1981

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ILLUSTRATIONS

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INTRODUCTION

In the fall of 1980, the U.S. Geological Survey contracted with Longman Drilling Company of Albuquerque, New Mexico to rotary drill and core twelve holes along a north-south line from Mariano Lake to the vicinity of Lake Valley, New Mexico. This report incorporates the logs from drill hole no. 7A. Similar reports on Holes No. 1, 2, 3, 4, 5, 6 and 7 were released as U.S. Geological Survey (1981a-f).

The drilling project is funded under a reimbursable interagency agreement between the U.S. Bureau of Indian Affairs (BIA) and the U.S. Geological Survey (USGS). The program was designed by representatives of the BIA, USGS, and the Minerals Department of the Navajo Tribe.

PURPOSE

The principal objective of this project was to provide core samples and geophysical logs for petrologic, sedimentologic, geophysical, and geochemical studies of the Upper Jurassic Morrison Formation. Other objectives included the following: stratigraphic and coal studies of Upper Cretaceous rocks; hydrologic and water monitoring of well no. 2; control for a proposed seismic study of the same geogrpahic area; and development of water wells by the Navajo Tribal Water and Sanitation Department.

GENERAL DRILLING PLAN

The locations of all twelve drill holes are shown on figure 1, which is a portion of the Gallup 1^{o} x 2^{o} Quadrangle. The general plan called for most holes to be rotary drilled into the Upper Cretaceous Dakota Sandstone and then cored into or through the Recapture Member of the Morrison Formation. The interval to be cored in each hole was about 600 ft.

Exceptions to the general drilling were as follows: Hole No. 2, rotary drilled, surface to Jurassic Entrada Sandstone; Hole No. 4A, cored 21-218 feet, to test an observed near-surface I. P. anomaly; Hole No. 6, deepened after coring by rotary drilling into the Jurassic Entrada Sandstone; Hole No. 7A, cored only the Westwater Canyon Member of the Morrison Formation; Hole No. 8, abandoned in lower part of Westwater Canyon Member of the Morrison Formation; and Holes No. 9 and 10 abandoned in Upper Cretaceous rocks.

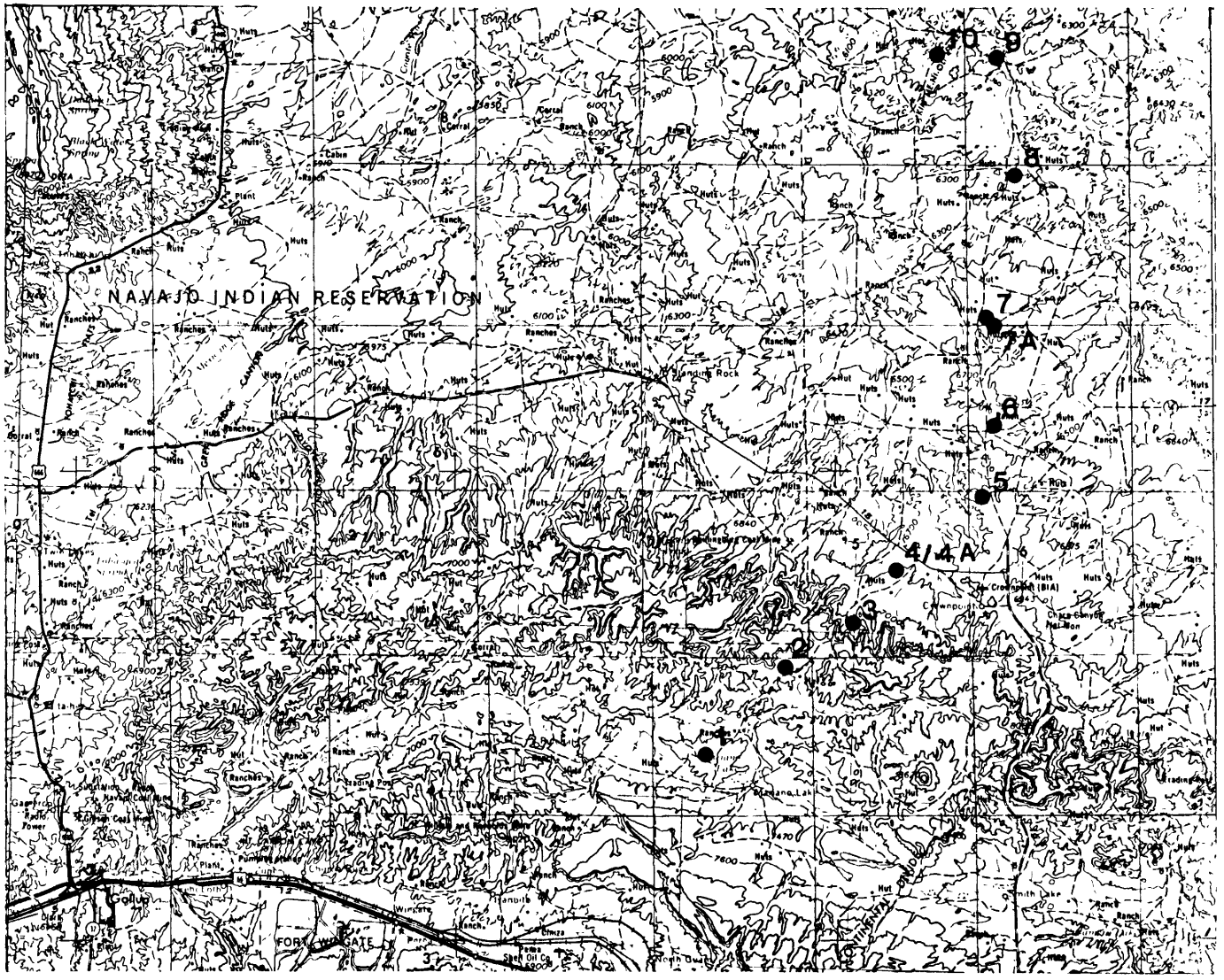

Figure 1. - Location of USGS Drill Holes, Gallup 1^{o} x 2^{o} Quadrangle.

DRILL HOLE NO. S-7A

The location of this well is shown on figure 2.

The vital statistics on this well are:

Spud Date: March 9, 1981.

Location: T 19 N., R. 12 W., SE 1/4 sec. 31

Lat. 35°49'43", Long. 108°08'49"

Collar Elevation:	6515 ft. (topo)	Menefee Formation (Cretaceous)
Core Point Top:	2930 ft. (depth)	Brushy Basin Member Morrison Formation (Jurassic)
Core Point Bottom:	3231 ft. (depth)	Recapture (?) Shale Member Morrison Formation (Jurassic)
Total Depth:	3231 ft. (depth)	Recapture (?) Shale Member Morrison Formation (Jurassic)

Completion of well: Abandoned, April 1, 1981.

14 feet of 8 1/2 inch surface casing

The following suite of geophysical logs were run on this hole and accompany this report: natural gamma, self potential, resistance, neutron-neutron porosity, deviation, caliper, gamma-gamma density, magnetic susceptability, KUT, prompt fission neutron, and high resolution 4 arm digital dipmeter.

The self potential, resistance and resistivity logs are of poor quality due to a high-salt-based mud used to maximize hole stability and core

recovery. Salt concentrations at the time of logging was greater than 40,000 ppm and possibly as high as 80,000 ppm.

Thin coal beds were encountered at: 125, 135, 240, 360, 445, 451, 2754, 2764 and 2773 feet. Zones of uranium mineralization were encountered at: 3133-3139 and 3160-3169. Other gamma ray anomalies occur at: 2960, 2997, 3009 and 3111.

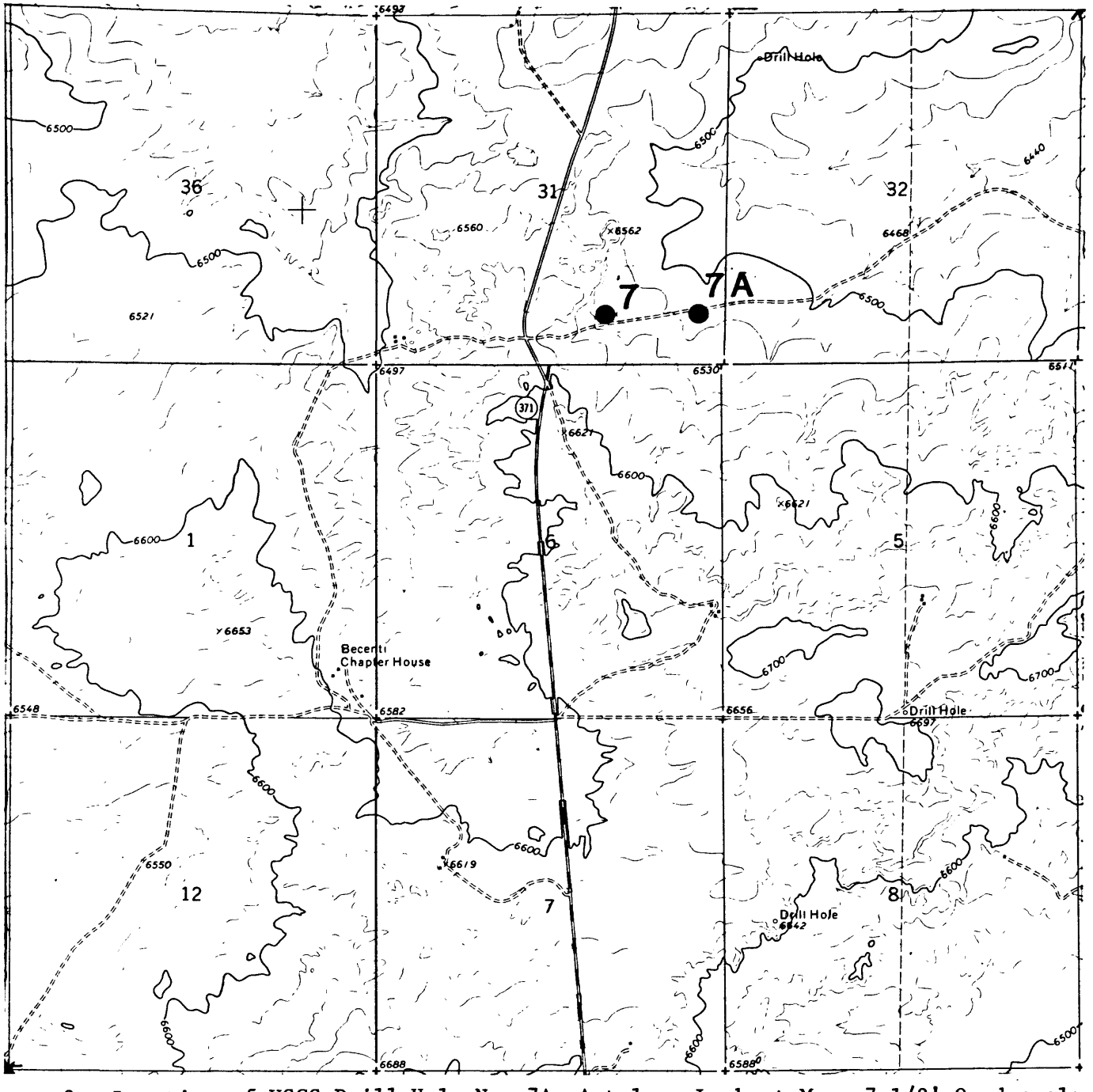

Figure 2.--Location of USGS Drill Hole No. 7A, Antelope Lookout Mesa 7 1/2' Quadrangle, T19N, R12W.

References

U.S. Geological Survey, 1981a, Geophysical Log Suite from Drill Hole Nos. 1 and 2, Mariano Lake - Lake Valley Drilling Project, McKinley County, New Mexico: U.S. Geological Survey Open-File Report 81-172.

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U.S. Geological Survey, 1981f, Geophysical Log Suite from Drill Hole No. 7, Mariano Lake - Lake Valley Drilling Project, McKinley County, New Mexico: U.S. Geological Survey Open-File Report 81-972.

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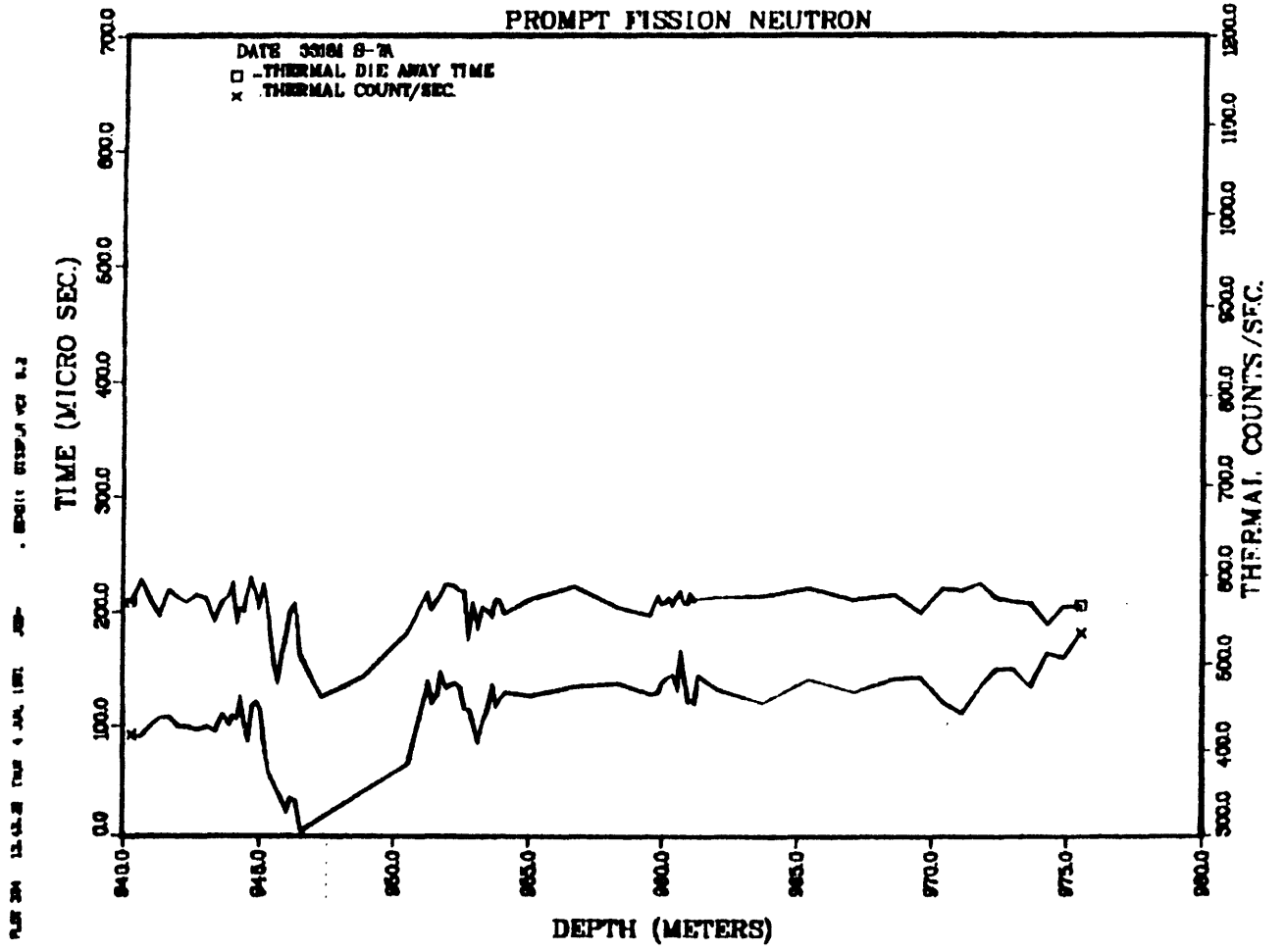

BENDIX FIELD ENGINEERING CORP.
Operators: J. Burnham
D. George

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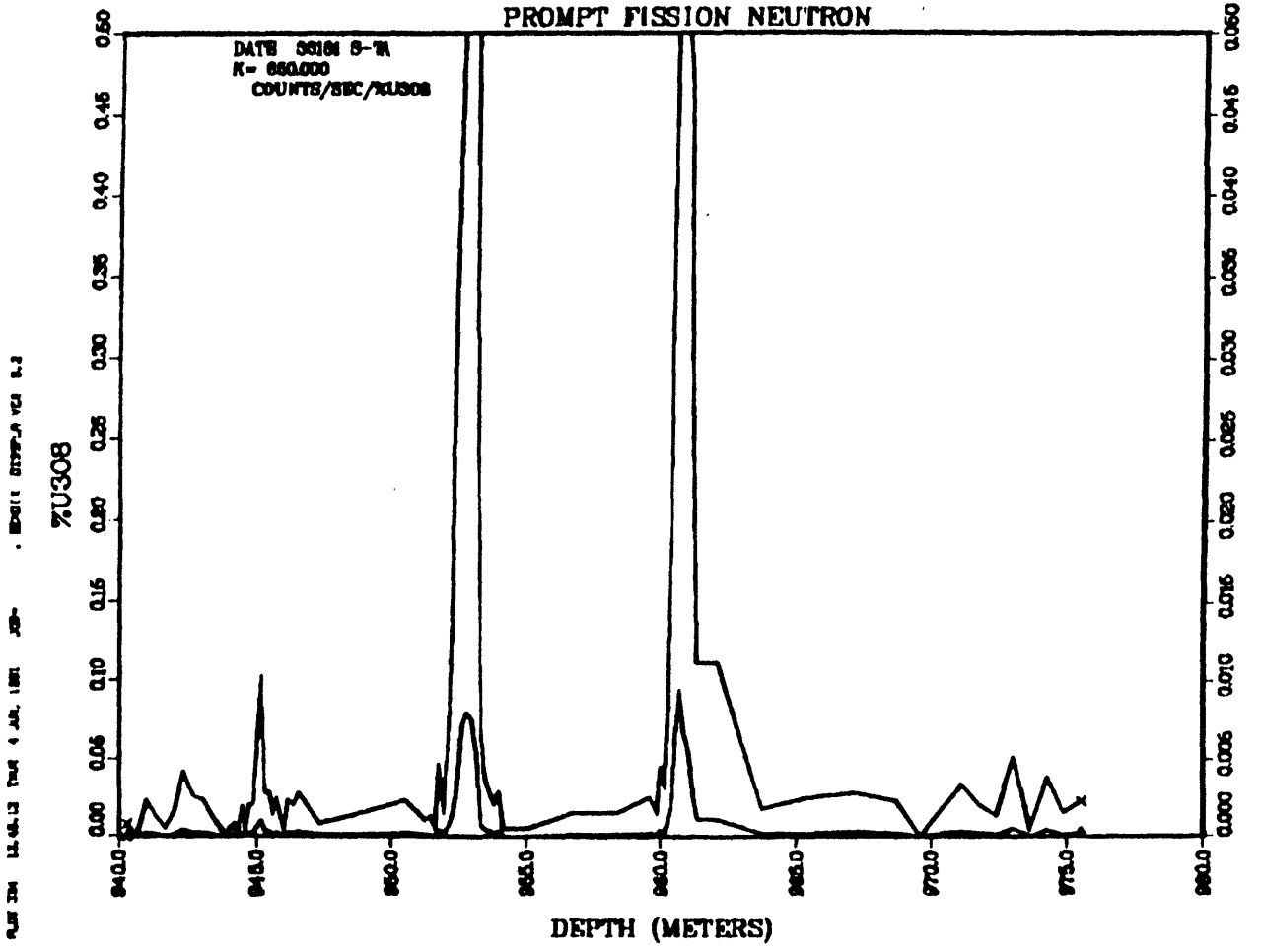

BENDIX FIELD ENGINEERING CORP.

Operators: J. Burnham
C. George

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PROMPT FISSION NEUTRON

DATE• 33181 FILE 5 RECS 447
CROWN POINT #7 UPHOLE PFN LOG, 975.46-917.07 METERS DEPTH.

H S-7A
H USGS/CRN.PT.
H SAN JUAN BASIN
H USGS
H MCKINLEY
H N.M.
H 6-1/4
H SALT BRINE
H LONGMAN
H SEVERAL
H 3211/CORE POINT
H BURNHAM/GEORGE
H ?
H LOU
H 33181
LOGUP

DATE REC	33181 TIME	DEPTH	SIGEPI	SIGTH	TAU	U308(%)	U308(%)-TAU	ITERS	BKR	SDV
6	1728 1	975.52	1.1	534.9	206.3	.0023	.0026	74	.35	2.124
10	172810	974.90	.8	507.2	205.4	.0015	.0017	70	.65	1.664
14	172818	974.29	1.9	511.5	190.1	.0038	.0046	70	.75	2.106
18	172826	973.67	.3	473.8	208.8	.0005	.0006	66	.50	1.381
22	172835	973.05	2.5	493.4	210.5	.0051	.0056	75	.35	1.740
26	172843	972.42	.6	493.9	212.7	.0013	.0014	71	.35	1.959
30	172852	971.80	1.0	473.5	226.5	.0020	.0021	71	.41	.749
34	1729 0	971.15	1.6	443.5	219.5	.0033	.0035	72	.45	1.882
38	1729 8	970.42	.9	456.4	221.6	.0018	.0018	70	.38	1.288
42	172917	969.58	0.0	485.5	200.9	0.0000	0.0000	71	.49	1.532
46	172925	968.67	1.1	482.9	215.3	.0023	.0024	76	.48	.758
50	172934	967.12	1.4	467.6	211.2	.0028	.0030	69	.31	1.159
54	172942	965.42	1.3	482.4	221.5	.0025	.0026	67	.30	1.599
58	172950	963.73	.9	455.1	213.9	.0018	.0019	67	.59	1.273
62	172959	962.08	5.5	470.2	213.5	.0112	.0121	68	.58	1.037
66	1730 7	961.34	5.5	487.3	212.3	.0112	.0121	73	.36	1.915
70	173016	961.20	12.6	455.2	210.3	.0257	.0281	70	.65	1.627
74	173024	961.08	23.3	457.9	216.6	.0473	.0503	72	.54	1.681
78	173032	960.95	29.4	456.3	207.1	.0598	.0664	72	.49	1.487
82	173041	960.82	32.6	480.8	207.9	.0664	.0735	69	.63	1.377
86	173049	960.68	45.0	509.6	218.0	.0916	.0967	72	.58	1.812
90	173058	960.54	32.5	470.7	213.5	.0662	.0713	70	.83	1.605
94	1731 6	960.40	9.6	487.7	206.7	.0196	.0218	67	.73	2.238
98	173114	960.26	3.6	485.9	213.1	.0074	.0080	69	.65	1.226
102	173123	960.12	1.6	482.0	208.5	.0033	.0037	65	.58	1.705
106	173131	959.98	2.1	477.6	207.6	.0043	.0048	72	.64	1.636
110	173140	959.84	.8	466.4	214.5	.0015	.0016	68	.64	1.149
114	173148	959.57	1.3	465.5	197.9	.0025	.0030	71	.48	1.847
118	173156	958.37	.8	477.3	204.6	.0015	.0017	67	.61	1.865
122	1732 5	956.70	.8	474.1	222.4	.0015	.0016	68	.50	1.938
126	173213	955.07	.3	463.0	211.1	.0005	.0006	67	.20	1.892
130	173222	954.14	.3	467.3	198.9	.0005	.0006	73	.53	1.889

134	173230	953.99	1.4	460.6	210.3	.0028	.0031	72	.53	1.336
138	173238	953.82	1.0	451.4	211.5	.0020	.0022	68	.56	1.548
142	173247	953.66	1.4	472.8	197.1	.0028	.0033	67	.63	1.720
146	173255	953.50	1.9	444.9	201.9	.0038	.0043	69	.48	1.513
150	1733 4	953.33	3.5	433.3	203.9	.0071	.0080	70	.44	1.238
154	173312	953.17	25.3	409.6	187.7	.0514	.0630	59	.61	1.703
158	173320	953.00	36.8	426.7	206.8	.0748	.0832	69	.41	1.088
162	173329	952.82	39.0	446.6	179.5	.0794	.1017	77	.56	1.638
166	173337	952.65	34.6	447.5	218.2	.0705	.0743	73	.48	1.150
170	173346	952.48	16.3	473.6	219.2	.0331	.0347	71	.44	1.906
174	173354	952.31	6.8	478.3	222.7	.0137	.0142	67	.49	.947
178	1734 2	952.14	3.1	476.3	223.9	.0064	.0065	69	.73	2.395
182	173411	951.97	.9	472.1	224.8	.0018	.0018	64	.41	2.182
186	173419	951.79	2.1	488.4	214.5	.0043	.0046	68	.55	1.632
190	173428	951.62	.3	462.6	210.3	.0005	.0006	67	.55	1.370
194	173436	951.45	.6	455.3	201.7	.0013	.0015	68	.65	1.251
198	173444	951.28	.5	477.3	216.7	.0010	.0011	65	.40	1.149
202	173453	950.55	1.1	384.6	182.0	.0023	.0029	68	.56	1.589
206	1735 1	948.93	.8	269.5	143.8	.0015	.0024	72	.43	.876
210	173510	947.32	.4	257.8	125.2	.0008	.0014	600	.46	.876
214	173518	946.55	1.4	306.0	163.7	.0028	.0039	71	.51	1.411
218	173526	946.37	1.0	341.1	206.7	.0020	.0023	63	.49	.883
222	173535	946.17	1.1	342.8	198.7	.0023	.0027	70	.43	1.093
226	173543	946.01	.3	328.6	174.9	.0005	.0007	67	.43	1.483
230	173552	945.88	.6	273.0	162.3	.0013	.0018	72	.68	1.132
234	1736 0	945.74	1.1	241.3	140.2	.0023	.0038	600	.58	1.132
238	1736 8	945.60	.8	258.6	154.6	.0015	.0023	600	.41	1.132
242	173617	945.46	1.4	297.2	173.1	.0028	.0037	76	.48	1.801
246	173625	945.32	1.4	376.3	209.1	.0028	.0031	66	.40	1.455
250	173634	945.18	4.8	412.5	222.8	.0097	.0100	72	.50	1.663
254	173642	945.03	3.1	445.7	205.0	.0064	.0071	68	.45	1.921
258	173650	944.89	1.0	455.6	217.0	.0020	.0022	70	.59	2.236
262	173659	944.74	1.0	451.9	228.6	.0020	.0020	73	.44	1.528
266	1737 7	944.61	.3	412.3	217.5	.0005	.0005	71	.65	1.672
270	173716	944.46	.9	427.5	200.0	.0018	.0020	66	.71	1.665
274	173724	944.32	0.0	457.8	203.2	0.0000	0.0000	67	.60	1.276
278	173732	944.18	.4	436.8	192.6	.0008	.0009	73	.56	1.917
282	173741	944.04	.3	439.3	223.5	.0005	.0005	65	.70	1.501
286	173749	943.89	0.0	428.7	213.5	0.0000	0.0000	60	.66	.814
290	173758	943.67	.3	441.4	209.4	.0005	.0006	71	.31	2.069
294	1738 6	943.38	.6	421.7	192.9	.0013	.0015	67	.56	1.338
298	173814	943.05	1.1	427.3	211.5	.0023	.0025	70	.44	.908
302	173823	942.71	1.3	422.7	214.5	.0025	.0027	69	.56	1.732
306	173831	942.37	2.0	426.9	208.0	.0041	.0045	72	.34	1.422
310	173840	942.03	.8	427.1	212.0	.0015	.0017	68	.40	1.064
314	173848	941.68	.3	437.1	219.0	.0005	.0005	65	.34	1.581
318	173856	941.34	.6	437.1	196.8	.0013	.0015	66	.31	1.159
322	1739 5	941.00	1.1	428.0	210.0	.0023	.0025	63	.49	1.232
326	173913	940.66	0.0	415.3	227.2	0.0000	0.0000	68	.45	1.496
330	173922	940.30	.4	416.4	207.3	.0008	.0008	70	.40	1.610