

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Data Report for a Seismic-Refraction Investigation:
Morro Bay to the Sierra Nevada, California

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Open-File Report 84-642

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the USGS.

1. USGS Menlo Park, California

1984

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INTRODUCTION

In 1982 and 1983 the USGS conducted seismic refraction surveys between Morro Bay, California, and the Sierra Nevada foothills (figure 1). These surveys were designed to study the San Andreas fault zone, the boundary between the Coast Ranges and the San Joaquin Valley (including the Coast Range thrust), and the structure of the basement beneath the San Joaquin Valley.

Two seismic refraction profiles were recorded in July of 1982. The first extended from the San Andreas Fault eastward across the San Joaquin Valley to the Sierra Nevada foothills (plate 1). The second profile extended northeasterly from Morro Bay to the Kettleman Hills, crossing the Nacimiento and Rinconada faults, the Salinian block, and the San Andreas fault (plate 2). Because the station spacing for these profiles was too large to resolve the complex lateral changes in velocity which occur between the Kettleman Hills and the San Joaquin Valley, the first profile was reoccupied between the Cholame Valley and the San Joaquin Valley in June of 1983 (plate 3). Altogether, nine shots were fired (table 1).

This report is a compilation of the data obtained from both the 1982 and the 1983 surveys. Interpretations of these data will be published separately.

DESCRIPTION OF THE SURVEY

The locations and elevations of instruments and shot points were determined using USGS 1:24,000 topographic maps (appendix A). These locations are accurate to within 50 ft. All three separate instrument deployments are shown in figure 1 (each deployment lies between two numbers marking the deployment profile). During the first deployment, four shots (at SP 4, SP 5, SP 6, and SP 7) were recorded by one hundred instruments placed along a 140 km long east-west line from the San Andreas fault to the foothills of the Sierra Nevada (plate 1). During the second deployment, four shots (at SP 1, SP 2, SP 3, and SP 4) were recorded by ninety-three instruments located along a 110 km long northeast-trending line between Morro Bay and the Kettleman hills (plate 2). For the third deployment, a single shot (at SP 8) was recorded by one hundred twenty stations placed along a 75 km long line which extended from the San Andreas fault near Cholame and ended in the San Joaquin Valley east of Interstate Highway 5 (plate 3).

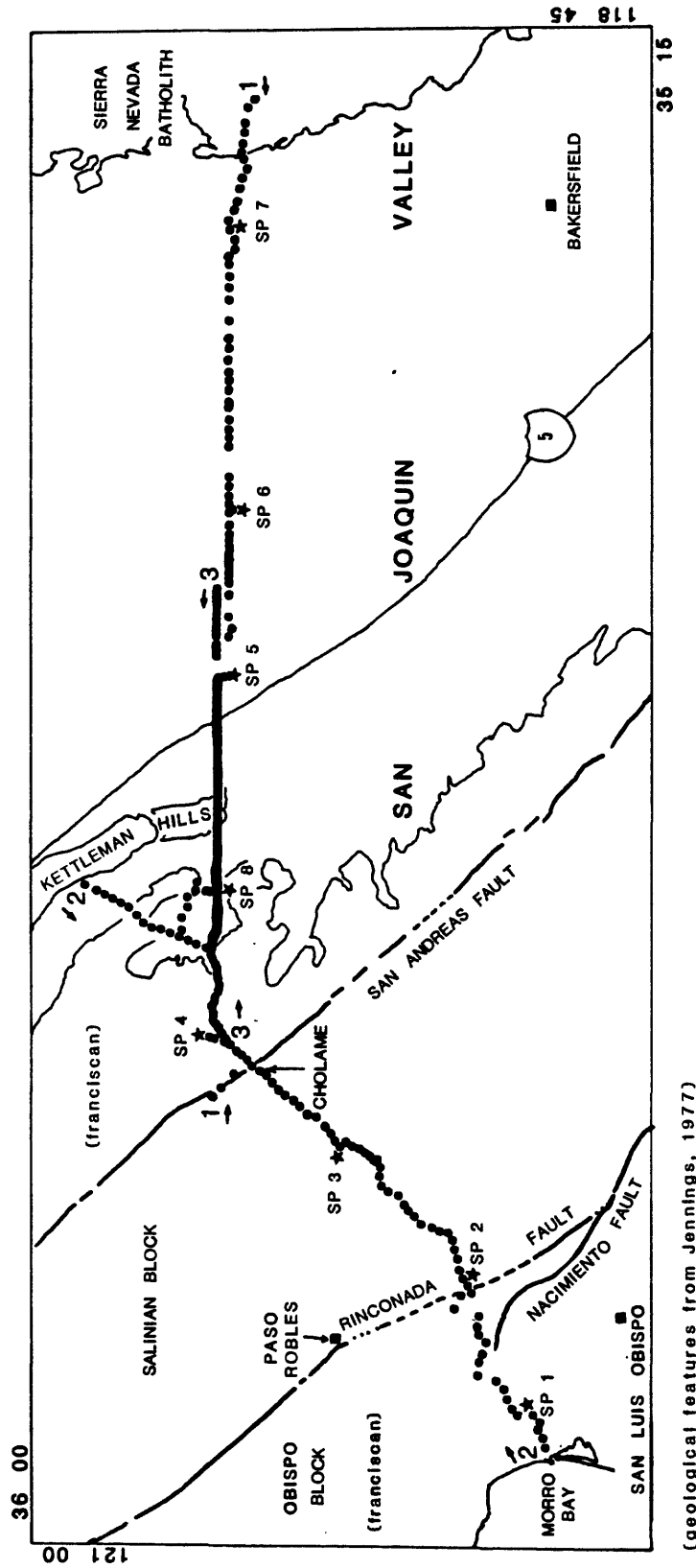


Figure 1. 1982 and 1983 profiles. Dots indicate seismic recorder locations. Each deployment lies between two numbers marking the profile:

- 1 Cholame Valley to Sierra Nevada (1982)
- 2 Morro Bay to Kettleman Hills (1982)
- 3 Cholame Valley to San Joaquin Valley (1983)

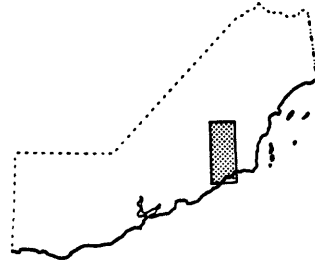


TABLE 1
DKDAT MASTER SHOT LIST
EXPERIMENT 20 MORRO BAY, CALIFORNIA

SHOT NUMBER	DATE	SHOT POINT	LATITUDE	LONGITUDE	SHOT TIME	SIZE (LBS)	
1	JUL 15, 1982	7	35 45.6658	119 2.8157	196 6 0	3000	E. OF DELAND WEAK
2	JUL 15, 1982	5	35 45.9812	119 42.5414	196 6 30	2000	LOST HILLS
3	JUL 15, 1982	4	35 47.0764	120 14.6654	196 6 45	2000	CHOLAME! TIME FROM SHOT STATION
4	JUL 15, 1982	6	35 45.4024	119 27.6915	196 7 30	2000	W. OF DELAND
5	JUL 19, 1982	4	35 47.0764	120 14.6654	200 7 1	3000	CHOLAME VERY WEAK
6	JUL 19, 1982	2	35 28.3749	120 36.7113	200 7 16	2000	ATASCADERO
7	JUL 19, 1982	1	35 23.5771	120 48.1078	200 7 31	2000	MORRO BAY
8	JUL 19, 1982	3	35 37.6245	120 24.3988	200 8 31	2000	SHANDON
9	MAY 21, 1983	8	35 46.4145	120 1.6081	141 8 0	1400	PYRAMID HILLS 7.5 QUAD

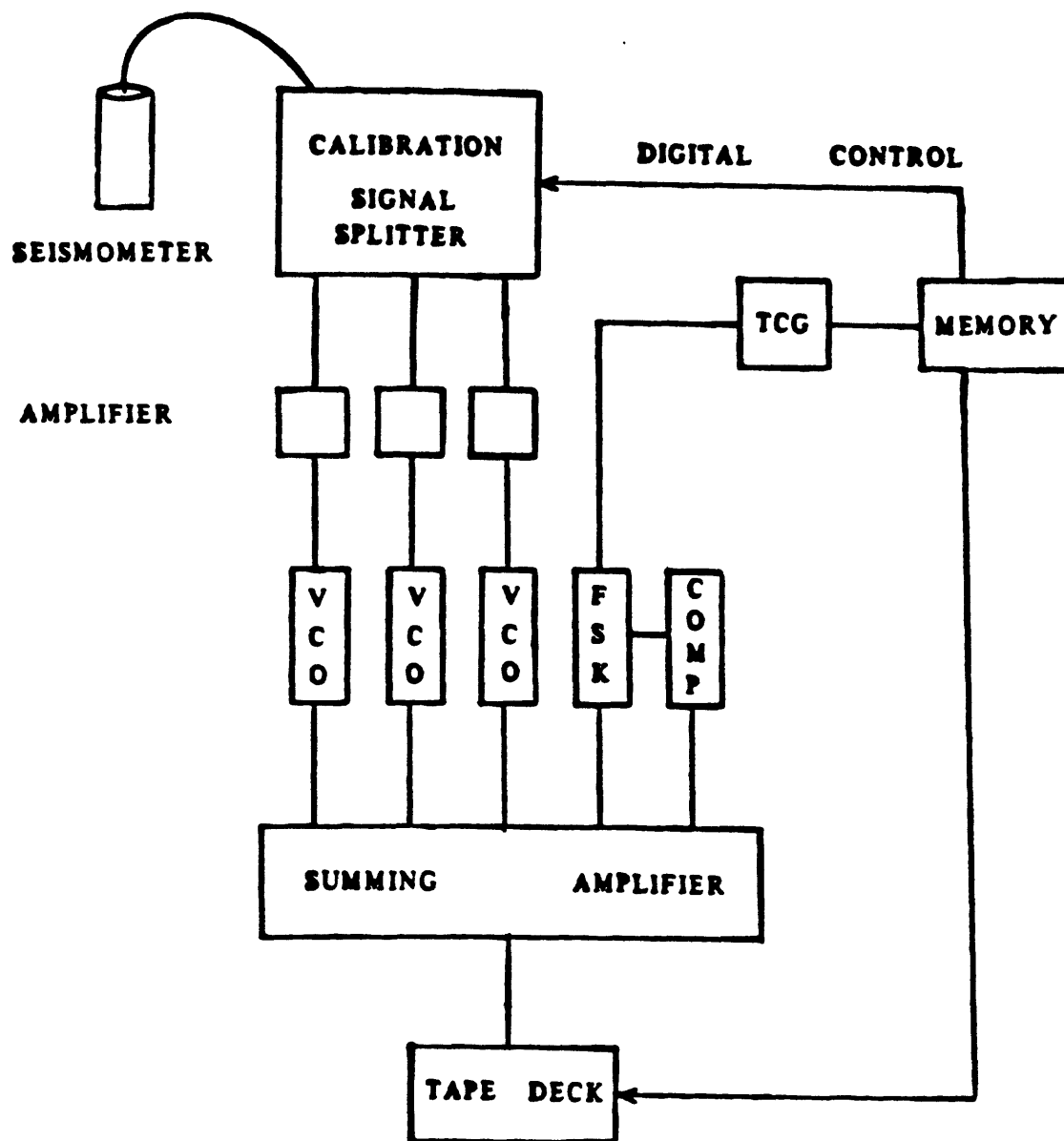
The shot holes were 20 cm in diameter and ranged in depth from 20 m to 46 m (table 2). They were filled with an ammonium nitrate explosive which was detonated by electric caps. The cap signal and two time code signals, WWVB and IRIG E, were recorded on paper strip-chart records, as described by Healy et al., (1982). With the exception of shot 3, the shots were fired automatically and the origin times were read from the cap break on the paper record. The reported shot times are accurate to within ± 2 milliseconds, assuming that the explosives detonated at the exact time of the cap break. Shot 3 was fired manually due to a shooting system malfunction, and because the paper shot record was not recoverable, the origin time for this shot was calculated using the arrival time at the station closest to the shot point (46 m from the shotpoint). A surficial velocity of 2.0 km/sec was assumed. We estimate that the time of this shot is only accurate to within 10 milliseconds.

INSTRUMENTATION AND DATA REDUCTION

Seismic Recorders

The instruments used in the seismic refraction surveys have been described by Healy et al. (1982), (figure 2). Each instrument contains a 2-Hz vertical-component geophone, and the signal from this geophone passes through three parallel amplifiers. The gain for each amplifier is set manually with switches. The three seismic signals plus an internally generated time code (IRIG E), a radio received time code (WWVB), and a fixed reference frequency are recorded as a multiplexed signal on analog cassette tape. The units contain a memory board which allows data to be recorded during ten predetermined time windows. Prior to recording the seismic data, the instrument records a geophone pulse, an amplification step, and 10 Hz sine wave calibration signals at 1, 10, 100, 1000 mv. The displacement frequency response curve for the system peaks at about 20 Hz (figure 3).

Field technicians synchronize the clock unit of each instrument with a USGS master reference clock (Healy et al., 1982) which drifts approximately one millisecond per week. After the shots have been recorded the clock units of each instrument are compared to the master reference clock to obtain recorder clock drift corrections at shot time.



COMP = COMPENSATION
 FSK = FREQUENCY SHIFT KEYING
 TCG = TIME CODE GENERATOR
 VCO = VOLTAGE-CONTROLLED OSCILLATOR

Figure 2. Schematic diagram of seismic recorders

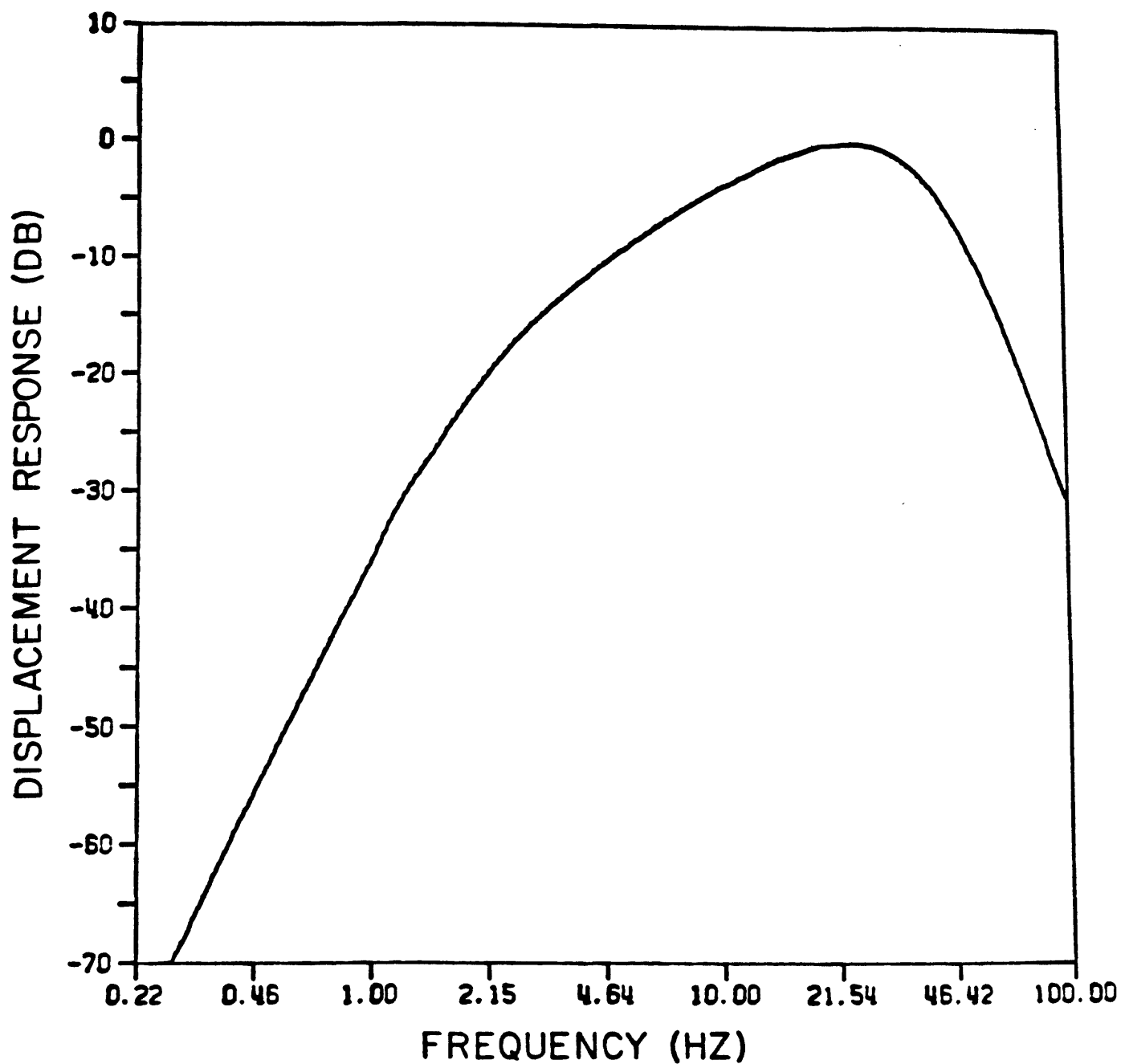


Figure 3. System response curve for cassette recording units with 2 Hz seismometers

Data reduction

Information pertaining to the operation of each instrument was entered on team data sheets (appendix C). Attenuation settings of every instrument have been checked against the calibration signals. Where calibration signals indicated a different dB setting than listed on the field sheets, the correct settings were calculated and entered into the computer. After checking for errors in clock drift and site locations, the analog data were digitized for 20 seconds, starting $(X/6 - 2)$ seconds prior to shot time (where X is the shot point to recorder distance in km). The sampling rate was 200 samples per second. In order to make the record sections (plates 4-13) easier to analyze, a few traces were deleted in areas where stations were close together or where a noisy trace obscured surrounding data. Where a seismogram has been omitted, the reason is indicated by a tape grade code number which is listed on the team data sheets.

First arrival times relative to shot time were determined for each shot (appendix B). The arrival times were picked from record sections plotted with a reduction velocity of 6.0 km per second, and absolute arrival times were subsequently calculated from the reduced times.

Data Quality

Assuming that the instrument is operating correctly, the strength of the signal at any receiver is related to geometric effects and geological structure along the ray path, and shot hole factors. It is beyond the scope of this report to discuss the geometric effects or the geology along the ray path. These subjects are addressed in reports which contain analysis of the data.

Shot hole depths and conditions (wet or dry) are listed in table 2 and the amount of explosives in pounds is given in table 1. The same explosives were used in all shot holes for this experiment, thus eliminating variations in source strength due to variable mixtures of explosives. However, the 3000 lbs shots at shot points 7 and 4 (shots 1 and 5 respectively) produced weaker signals than the 2000 lbs shots at the other shot points. This may be due to partial detonation of the 3000 lbs shots caused by a phenomenon known as 'dead pressing', whereby explosives under higher confining pressure only partially detonate. Since the 3000 lbs shots were loaded into single drill holes it is possible that the extra 1000 lbs of explosive raised the pressure sufficiently to cause 'dead pressing'. Weak signals due to poor energy coupling at the shot point can not be the explanation, as two shots were fired

at shot point 4 (shots 3 and 5), and the 2000 lbs charge produced stronger seismic signals than the 3000 lbs charge. The shot fired into the 1983 profile (shot 9) also produced weak signals. However, because there was a substantial amount of mud in the hole, poor detonation was probably caused by mud mixed with the explosives.

In general the data collected from the first deployment (San Andreas fault to the Sierra Nevada) have a low background noise level. The data collected from the second deployment (Morro Bay to the Kettleman Hills) have high background noise. Although the background noise level was low for most areas of the third deployment (San Andreas fault to the San Joaquin Valley), poor energy coupling at the shot point resulted in lower signal to noise ratio than for the other two deployments. No energy from the shot was detected in the area of Interstate Highway 5. As a result, the data from this area were omitted from the record sections.

TABLE 2
SHOT HOLE DATA

<u>SHOT POINT</u>	<u>SHOT</u>	<u>CONDITION</u>	<u>DEPTH (m)</u>
1	7	WET	2 - 21.3
2	6	DRY	2 - 24.4
3	8	WET	39.6
4	3	WET	39.6
4	5	WET	64.0
5	2	WET	39.6
6	4	WET	39.6
7	1	WET	39.6
8	9	WET	54.9

RECORD SECTIONS

For each shot a normalized record section with a maximum peak-to-peak amplitude of .76 cm is presented (plates 4-13). True amplitude record sections are presented for shots 2-9 (plates 5-12), and for shots 6 and 7, (plates 9 and 10), 1-15 Hz bandpass filtered normalized and true amplitude record sections are also presented.

On the true amplitude record sections, the width of each trace is proportional to the actual ground motion. Adjustments were made for instrument gain, distance from the shot point, and shot energy. Thus, the true amplitude $A(t)$ is computed from the observed amplitude $A_o(t)$ by

$$A(t) = A_o(t)f_a f_d f_s$$

where f_a , f_d , and f_s are multiplicative factors adjusting for the instrument amplifier gain, distance from the shot, and shot energy, respectively.

The multiplication factor for instrument amplification is:

$$f_a = 10(A/20)$$

where A is the attenuation setting in decibels for each trace. The attenuation setting for each instrument is listed above the trace on the true amplitude record sections.

The formula used to determine the multiplication factor for distance is:

$$f_d = \frac{X}{150} B$$

where X is the shotpoint to recording station distance in km and 'B' is a constant chosen for each shot to account for geometric spreading (table 3).

The shot energy factor, f_s , is a scalar multiplier that is applied to all traces for a particular shot to provide the best display of energy on a true amplitude record section (table 3). The energy factor is inversely proportional to the shot signal strength.

TABLE 3
SCALING FACTORS FOR TRUE AMPLITUDE PLOTS

<u>SHOT</u>	<u>EXPONENT</u>	<u>EFFICIENCY FACTOR</u>
2	2	.02
3	1	.005
4	2	.05
5	2	1.0
6	1.5	.05
7	2	.2
8	2	.3
9	2	.5

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APPENDIX A
SEISMIC RECORDER LOCATIONS

U.S.G.S. SEISMIC RECORDER LOCATIONS

MORRO BAY 1982

LOCATION NUMBER	LATITUDE (DEG,MIN,SEC)	LONGITUDE (DEG,MIN,SEC)	ELEV (FT)
101	35 47 57.3	120 0 48.7	650
102	35 48 3.1	120 1 34.1	650
103	35 48 39.7	120 2 7.5	650
104	35 48 38.3	120 3 1.9	625
105	35 49 4.5	120 3 58.0	680
106	35 49 4.2	120 5 4.4	710
107	35 48 1.2	120 6 20.8	775
108	35 46 56.8	120 7 19.0	950
109	35 46 36.6	120 8 12.5	1100
110	35 46 27.6	120 9 16.5	1500
111	35 46 24.9	120 10 29.4	1500
112	35 46 49.8	120 11 46.0	1800
113	35 46 46.3	120 12 40.1	1950
114	35 46 32.7	120 13 39.7	1750
115	35 47 5.5	120 14 40.9	1570
116	35 46 1.1	120 15 5.2	1375
117	35 45 5.5	120 15 56.4	1200
118	35 45 17.8	120 17 59.5	1150
119	35 46 13.3	120 19 10.0	1150
120	35 46 51.0	120 19 55.9	1150
121	35 45 41.3	119 7 54.4	483
122	35 45 41.3	119 9 2.7	444
124	35 45 40.1	119 10 54.0	385
126	35 45 40.5	119 12 31.0	345
127	35 45 39.7	119 13 20.6	337
128	35 45 44.8	119 14 25.6	315
129	35 45 40.9	119 15 28.6	298
130	35 45 40.5	119 16 15.5	285
131	35 45 41.3	119 17 4.2	278
132	35 45 40.1	119 18 8.7	265
133	35 45 42.8	119 18 38.8	244
134	35 45 39.3	119 19 43.3	257
135	35 45 41.3	119 20 36.3	250
136	35 45 39.7	119 21 21.7	247
137	35 45 41.3	119 22 9.5	245
137	35 45 39.7	119 24 49.5	230
141	35 45 40.1	119 25 38.7	225
142	35 45 40.1	119 26 31.7	220
143	35 45 40.1	119 27 13.3	217
144	35 45 24.9	119 27 41.5	215
145	35 45 39.7	119 27 58.2	214
146	35 45 38.5	119 29 2.9	213
147	35 45 38.5	119 29 52.6	213
148	35 45 38.9	119 30 58.3	215
149	35 45 38.9	119 31 47.0	215
150	35 45 39.3	119 32 35.8	215
151	35 45 39.3	119 33 24.0	215
152	35 45 38.9	119 34 13.2	215
153	35 45 39.1	119 35 17.4	215
155	35 45 40.5	119 37 11.1	220

U.S.G.S. SEISMIC RECORDER LOCATIONS

MORRO BAY 1982

LOCATION NUMBER	LATITUDE (DEG,MIN,SEC)	LONGITUDE (DEG,MIN,SEC)	ELEV (FT)
156	35 45 26.3	119 38 12.8	220
157	35 45 40.3	119 38 58.1	215
161	35 45 41.3	119 6 54.7	514
162	35 45 42.1	119 5 51.0	550
163	35 45 42.4	119 5 9.2	572
164	35 45 16.7	119 4 31.8	600
165	35 45 17.5	119 3 43.3	650
166	35 45 38.8	119 2 49.4	637
167	35 45 43.5	119 1 58.8	637
168	35 45 18.6	119 1 2.6	688
169	35 45 5.8	119 0 17.8	688
170	35 44 54.8	118 59 5.0	740
171	35 44 43.9	118 58 13.0	760
172	35 44 22.4	118 57 22.5	759
173	35 44 37.7	118 56 31.6	820
175	35 44 46.7	118 55 54.8	800
176	35 44 41.2	118 55 8.1	966
177	35 44 33.4	118 54 7.6	1160
178	35 44 31.9	118 53 14.4	1360
179	35 44 20.0	118 51 52.8	1540
180	35 43 50.8	118 51 8.5	1620
181	35 46 31.3	119 59 20.4	545
182	35 46 29.2	119 58 17.4	505
184	35 46 28.9	119 56 43.9	580
185	35 46 31.3	119 55 58.2	525
186	35 46 29.1	119 55 13.8	515
187	35 46 28.8	119 53 5.3	465
188	35 46 28.8	119 54 8.4	435
189	35 46 29.8	119 52 1.1	335
190	35 46 29.8	119 51 11.1	325
191	35 46 28.8	119 50 15.4	305
192	35 46 29.1	119 49 17.5	285
193	35 46 31.0	119 47 28.5	250
194	35 46 29.3	119 48 19.2	260
195	35 46 36.2	119 46 41.1	235
196	35 46 33.3	119 45 42.1	220
197	35 46 32.4	119 44 25.7	215
198	35 46 32.2	119 43 35.4	210
199	35 46 28.1	119 43 4.7	210
200	35 45 58.6	119 42 31.7	210
201	35 22 42.5	120 51 2.1	80
202	35 22 51.8	120 50 9.8	80
203	35 23 14.2	120 49 25.3	120
204	35 23 5.5	120 48 45.0	240
206	35 24 44.3	120 48 11.0	260
207	35 25 6.9	120 47 36.4	300
208	35 25 30.0	120 46 47.2	400
209	35 25 43.5	120 45 53.9	660
210	35 26 17.6	120 45 8.7	920

U.S.G.S. SEISMIC RECORDER LOCATIONS
MORRO BAY 1982

LOCATION NUMBER	LATITUDE (DEG,MIN,SEC)	LONGITUDE (DEG,MIN,SEC)	ELEV (FT)
211	35 27 37.4	120 44 43.4	1100
212	35 27 31.9	120 43 30.8	1280
213	35 27 16.0	120 42 46.4	1400
214	35 27 1.9	120 41 45.7	1000
215	35 27 32.0	120 41 6.2	1000
216	35 27 39.3	120 40 24.4	960
217	35 27 31.7	120 39 23.8	960
218	35 29 20.6	120 38 47.2	850
219	35 28 50.8	120 37 36.3	920
220	35 23 35.0	120 48 7.4	470
221	35 40 30.8	120 20 49.8	1090
222	35 40 57.6	120 20 19.7	1100
223	35 41 33.8	120 19 21.3	1100
224	35 42 4.6	120 19 51.4	1120
225	35 42 31.6	120 18 45.1	1140
226	35 42 57.3	120 18 5.9	1160
227	35 43 25.7	120 17 43.4	1157
228	35 43 59.9	120 17 17.6	1130
229	35 44 21.0	120 16 42.2	1140
230	35 44 43.5	120 16 17.9	1140
231	35 45 7.8	120 15 52.5	1280
232	35 45 33.9	120 15 22.4	1300
234	35 46 43.9	120 14 49.0	1450
235	35 47 3.8	120 14 39.5	1575
236	35 46 12.4	120 14 23.7	1675
237	35 46 22.2	120 13 49.8	1625
238	35 46 42.8	120 13 22.5	1775
239	35 46 46.3	120 12 32.4	2000
240	35 46 55.6	120 11 56.5	1850
241	35 56 6.0	120 1 4.3	675
242	35 55 14.4	120 1 35.4	560
243	35 54 39.1	120 1 57.0	510
244	35 54 4.2	120 2 18.5	595
245	35 53 30.0	120 2 41.5	550
246	35 52 55.1	120 3 4.7	600
247	35 52 19.4	120 3 48.5	650
248	35 51 50.6	120 4 29.4	750
249	35 51 14.0	120 4 54.3	850
250	35 50 34.6	120 5 3.2	746
251	35 49 54.4	120 5 23.3	725
252	35 49 14.5	120 5 43.4	725
253	35 48 36.2	120 6 3.0	750
254	35 47 60.0	120 6 21.2	775
255	35 47 18.8	120 6 42.9	850
256	35 46 56.4	120 7 20.0	975
259	35 46 21.2	120 9 59.7	1400
260	35 46 41.2	120 11 27.4	1725
261	35 34 39.7	120 26 10.5	1210
262	35 34 43.5	120 26 58.2	1270
263	35 34 34.8	120 27 51.1	1450

U.S.G.S. SEISMIC RECORDER LOCATIONS
MORRO BAY 1982

LOCATION NUMBER	LATITUDE (DEG,MIN,SEC)	LONGITUDE (DEG,MIN,SEC)	ELEV (FT)
264	35 34 4.8	120 28 20.6	1470
265	35 33 22.9	120 28 42.1	1326
266	35 32 56.2	120 29 30.8	1173
267	35 32 39.3	120 30 1.3	1110
268	35 32 12.6	120 30 31.3	1130
269	35 31 43.6	120 31 14.5	1090
270	35 30 56.2	120 31 31.9	1130
271	35 30 22.8	120 31 51.2	1150
272	35 29 45.7	120 31 59.9	1170
273	35 29 26.7	120 32 39.1	1190
275	35 29 18.5	120 33 29.6	1290
276	35 29 4.8	120 34 19.8	1389
277	35 28 58.6	120 35 17.9	1400
278	35 28 42.8	120 36 4.7	1251
279	35 28 21.2	120 36 42.4	1030
280	35 28 4.3	120 37 21.9	890
281	34 54 39.6	120 37 14.4	710
282	35 20 39.6	120 48 53.4	290
283	35 28 52.8	120 54 40.8	160
284	35 34 55.0	120 25 45.6	1190
285	35 35 0.4	120 25 39.2	1180
286	35 35 7.0	120 25 36.8	1160
287	35 34 53.4	120 25 38.2	1190
288	35 34 57.5	120 25 33.7	1150
289	35 34 50.9	120 25 29.1	1160
290	35 35 24.5	120 25 13.6	1205
291	35 35 46.8	120 24 53.9	1270
292	35 36 12.7	120 24 34.1	1320
293	35 36 42.4	120 24 19.8	1260
294	35 37 10.0	120 23 57.0	1195
295	35 37 36.6	120 24 23.5	1138
296	35 37 56.6	120 23 56.2	1142
297	35 38 14.8	120 23 14.0	1116
298	35 38 40.6	120 22 34.9	1080
299	35 39 19.0	120 21 46.6	1041
300	35 39 57.2	120 21 31.0	1055

U.S.G.S. SEISMIC RECORDER LOCATIONS
MORRO BAY 1983

LOCATION NUMBER	LATITUDE (DEG·MIN·SEC)	LONGITUDE (DEG·MIN·SEC)	ELEV (FT)
901	35 45 37.8	120 15 19.1	1400
902	35 45 56.8	120 15 0.0	1460
903	35 46 4.4	120 14 37.4	1460
904	35 46 18.2	120 14 10.3	1500
905	35 46 23.3	120 13 49.1	1650
906	35 46 41.8	120 13 25.7	1600
907	35 46 49.5	120 13 1.6	1675
908	35 46 46.3	120 12 37.6	1950
909	35 46 52.1	120 12 13.6	2050
910	35 46 54.5	120 11 53.1	1925
911	35 46 41.5	120 11 28.4	1800
912	35 46 38.5	120 11 4.2	1775
913	35 46 22.7	120 10 23.7	1500
914	35 46 20.6	120 9 56.6	1400
915	35 46 24.9	120 9 31.0	1425
916	35 46 30.3	120 8 58.8	1250
917	35 46 29.9	120 8 29.2	1150
918	35 46 39.6	120 8 4.6	1075
919	35 46 48.6	120 7 41.4	1000
920	35 46 56.4	120 7 17.6	950
921	35 46 34.2	120 0 34.4	575
922	35 46 34.2	120 0 15.3	575
923	35 46 35.0	119 59 57.6	550
924	35 46 31.1	119 59 39.0	550
925	35 46 29.6	119 59 19.4	525
926	35 46 28.4	119 58 58.8	525
927	35 46 28.4	119 58 39.3	510
928	35 46 27.6	119 58 19.7	505
929	35 46 29.9	119 58 0.9	500
930	35 46 30.3	119 57 41.2	515
931	35 46 29.2	119 57 20.7	540
934	35 46 30.3	119 56 23.1	625
935	35 46 29.9	119 56 4.0	530
936	35 46 29.9	119 55 44.4	535
937	35 46 29.9	119 55 25.4	525
938	35 46 29.9	119 55 6.2	500
939	35 46 29.9	119 54 47.6	470
941	35 46 29.2	120 0 50.7	580
942	35 46 28.8	120 1 10.2	590
943	35 46 28.8	120 1 29.8	590
944	35 46 28.0	120 1 49.4	600
945	35 46 28.1	120 2 9.9	605
946	35 46 27.8	120 2 29.5	610
947	35 46 27.8	120 2 48.9	620
948	35 46 27.6	120 3 8.5	630
949	35 46 27.1	120 3 27.7	645
950	35 46 27.6	120 3 47.9	680
951	35 46 27.6	120 4 6.9	680
952	35 46 28.0	120 4 26.2	690
953	35 46 28.0	120 4 45.3	725

U.S.G.S. SEISMIC RECORDER LOCATIONS
MORRO BAY 1983

LOCATION NUMBER	LATITUDE (DEG·MIN·SEC)	LONGITUDE (DEG·MIN·SEC)	ELEV (FT)
954	35 46 28.0	120 5 5.1	750
955	35 46 39.4	120 5 22.4	760
956	35 46 45.4	120 5 41.1	775
957	35 46 50.6	120 5 59.4	800
958	35 46 51.0	120 6 19.9	860
959	35 46 52.4	120 6 38.8	875
960	35 46 54.8	120 6 58.1	900
961	35 46 33.4	119 40 45.8	212
962	35 46 32.7	119 40 12.9	212
963	35 46 33.4	119 39 41.4	212
964	35 46 34.6	119 38 56.7	212
965	35 46 34.2	119 38 29.7	212
966	35 46 33.4	119 37 57.1	215
967	35 46 33.8	119 37 24.6	215
968	35 46 31.9	119 36 52.7	215
969	35 46 31.9	119 36 20.2	215
970	35 46 31.5	119 35 47.9	215
971	35 46 31.5	119 35 16.4	212
972	35 46 31.5	119 34 44.1	212
973	35 45 39.1	119 34 10.8	212
974	35 45 39.1	119 33 38.8	212
975	35 45 39.1	119 33 6.7	212
976	35 45 39.1	119 32 34.6	212
977	35 45 39.1	119 32 2.3	212
978	35 45 39.1	119 31 30.7	212
979	35 45 39.1	119 30 57.8	212
980	35 45 39.1	119 30 26.3	212
981	35 46 31.1	119 47 42.6	252
982	35 46 31.1	119 47 22.5	246
983	35 46 31.5	119 47 3.2	242
984	35 46 31.9	119 46 45.1	240
985	35 46 32.3	119 46 26.1	232
986	35 46 32.3	119 45 56.8	224
987	35 46 32.3	119 45 46.4	222
988	35 46 32.3	119 45 36.3	220
989	35 46 32.3	119 45 18.7	217
990	35 46 34.2	119 44 51.2	214
991	35 46 31.4	119 44 29.4	213
992	35 46 31.4	119 44 10.8	212
993	35 46 31.5	119 43 50.9	212
994	35 46 31.7	119 43 32.1	211
995	35 46 31.1	119 43 12.9	209
996	35 46 29.6	119 42 52.4	211
997	35 46 24.2	119 42 36.4	211
998	35 47 1.5	120 1 36.0	602
999	35 47 18.9	120 1 36.0	606
1000	35 46 44.5	120 1 36.0	599
1001	35 46 29.6	119 53 4.1	450
1002	35 46 29.6	119 52 49.6	390
1003	35 46 29.6	119 52 29.4	347

U.S.G.S. SEISMIC RECORDER LOCATIONS

MORRO BAY 1983

LOCATION NUMBER	LATITUDE (DEG,MIN,SEC)	LONGITUDE (DEG,MIN,SEC)	ELEV (FT)
1004	35 46 29.6	119 52 17.3	340
1005	35 46 29.6	119 52 1.3	335
1006	35 46 29.1	119 51 44.6	333
1007	35 46 29.7	119 53 26.4	515
1008	35 46 29.2	119 51 13.8	325
1009	35 46 29.7	119 53 47.6	515
1010	35 46 29.6	119 50 43.5	315
1011	35 46 29.2	119 50 15.0	305
1012	35 46 29.6	119 49 59.3	300
1013	35 46 29.6	119 49 42.8	295
1014	35 46 30.4	119 49 26.9	288
1015	35 46 30.6	119 49 11.0	280
1016	35 46 30.7	119 48 55.4	278
1017	35 46 30.9	119 48 39.3	275
1018	35 46 30.9	119 48 23.3	262
1019	35 46 31.0	119 48 7.3	257
1020	35 46 29.9	119 54 8.5	465

APPENDIX B

FIRST ARRIVAL TIMES

Each shot is listed in distance order (shot point to recorder station distance in km). Negative distances are west of the shot point. DISTANCE is in kilometers; TIME is in seconds; and AZIMUTH is in degrees.

SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH	SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH
1	163	1.480	0.892	-3.524	271.204	2	147	6.733	3.550	19.099	91.879
1	164	1.328	0.881	-2.683	254.479	2	146	6.883	3.492	20.346	91.764
1	165	0.905	0.650	-1.531	243.154	2	145	7.085	3.423	21.971	91.540
1	166	0.033	0.027	0.038	198.058	2	143	7.238	3.388	23.099	91.435
1	168	1.155	0.696	2.752	103.826	2	142	7.366	3.342	24.142	91.373
1	169	1.382	0.725	3.941	105.503	2	137	8.183	3.062	30.728	91.011
1	170	1.651	0.685	5.796	103.880	2	135	8.503	2.992	33.067	90.940
1	171	1.852	0.661	7.144	103.984	2	134	8.691	2.958	34.400	91.004
1	172	2.056	0.633	8.542	106.253	2	133	8.892	2.888	36.018	90.786
1	173	2.256	0.644	9.672	101.438	2	132	9.019	2.890	36.775	90.901
1	175	2.377	0.621	10.535	98.948	2	131	9.253	2.854	38.395	90.809
1	177	2.784	0.575	13.257	98.896	2	130	9.376	2.773	39.619	90.819
1	179	3.359	0.581	16.667	98.497	2	129	9.480	2.681	40.795	90.778
						2	128	9.721	2.658	42.377	90.587
						2	127	9.935	2.600	44.012	90.768
2	120	12.921	3.526	-56.372	271.632	2	126	10.120	2.577	45.258	90.717
2	118	12.573	3.665	-53.448	268.641	2	124	10.399	2.450	47.695	90.695
2	117	11.674	3.280	-50.369	268.127	2	122	10.684	2.269	50.491	90.615
2	115	11.618	3.539	-48.479	272.428	2	121	10.913	2.211	52.206	90.595
2	114	11.334	3.515	-46.914	271.272	2	161	11.058	2.108	53.704	90.574
2	113	11.029	3.458	-45.426	271.844	2	163	11.385	1.992	56.355	90.517
2	112	10.815	3.469	-44.073	272.040	2	164	11.509	1.958	57.308	91.301
2	111	10.433	3.411	-42.130	271.090	2	165	11.654	1.900	58.527	91.247
2	110	10.128	3.411	-40.301	271.259	2	166	11.797	1.819	59.868	90.592
2	109	9.838	3.388	-38.700	271.720	2	168	12.154	1.727	62.563	91.136
2	108	9.630	3.400	-37.380	272.737	2	169	12.332	1.715	63.698	91.472
2	107	9.527	3.515	-36.069	275.997	2	170	12.557	1.635	65.537	91.725
2	104	9.234	4.023	-31.264	279.042	2	171	12.696	1.554	66.854	91.980
2	102	8.625	3.804	-28.925	277.606	2	172	12.854	1.496	68.149	92.501
2	101	8.179	3.550	-27.771	277.549	2	173	13.064	1.496	69.407	92.065
2	181	7.785	3.562	-25.338	272.263	2	175	13.133	1.413	70.322	91.800
2	182	7.451	3.492	-23.753	272.252	2	176	13.263	1.346	71.499	91.918
2	183	7.229	3.504	-22.350	272.535	2	177	13.517	1.346	73.027	92.066
2	185	6.777	3.400	-20.264	272.830	2	178	13.706	1.311	74.365	92.066
2	186	6.487	3.596	-19.146	272.786	2	179	14.050	1.311	76.429	92.284
2	188	6.064	3.146	-17.504	273.017						
2	189	5.289	2.904	-14.313	273.816						
2	190	5.023	2.846	-13.061	274.183						
2	191	4.802	2.858	-11.663	274.531	3	120	2.286	0.965	-7.924	266.754
2	192	4.503	2.800	-10.216	275.227	3	118	1.883	0.885	-5.992	236.343
2	194	4.168	2.708	-8.760	276.149	3	117	1.105	0.412	-4.158	207.137
2	193	3.796	2.546	-7.500	277.591	3	115	-0.026	-0.027	0.008	180.000
2	195	3.351	2.292	-6.350	280.450	3	114	0.649	0.342	1.839	123.408
2	196	2.621	1.808	-4.880	282.554	3	113	0.904	0.389	3.091	101.051
2	197	1.700	1.196	-3.025	289.944	3	112	1.240	0.504	4.418	96.277
2	198	1.106	0.792	-1.884	303.032	3	111	1.739	0.665	6.439	101.219
2	199	0.705	0.504	-1.210	318.057	3	110	2.129	0.758	8.230	98.163
2	200	0.011	0.008	0.021	110.428	3	109	2.471	0.839	9.795	95.228
2	157	2.872	1.969	5.415	96.071	3	108	2.781	0.931	11.101	91.387
2	155	3.918	2.569	8.092	94.016	3	107	3.251	1.138	12.675	82.235
2	153	4.682	2.858	10.945	93.187	3	104	4.691	1.727	17.782	80.746
2	152	5.147	3.054	12.557	92.805	3	103	5.009	1.819	19.138	81.276
2	151	5.479	3.181	13.792	92.504	3	102	5.183	1.877	19.838	84.867
2	150	5.785	3.285	15.002	92.302	3	101	5.312	1.819	20.959	85.637
2	148	6.504	3.596	17.449	92.018	3	181	5.734	1.877	23.141	92.609
						3	182	6.240	2.119	24.726	92.598

SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH	SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH
3	183	6.682	2.327	26.129	92.336	3	176	20.122	0.173	119.695	92.124
3	185	7.064	2.362	28.215	92.139	3	177	20.215	0.012	121.221	92.211
3	186	7.273	2.385	29.333	92.194	3	178	20.426	0.000	122.555	92.209
3	188	7.605	2.442	30.976	92.095	3	179	20.735	-0.035	124.616	92.340
3	189	8.530	2.835	34.171	91.847						
3	190	8.704	2.800	35.425	91.781	4	120	15.671	2.541	-78.779	271.946
3	191	9.099	2.961	36.825	91.762	4	118	15.147	2.510	-75.821	269.851
3	192	9.468	3.089	38.277	91.681	4	117	14.468	2.346	-72.733	269.546
3	194	9.781	3.158	39.740	91.608	4	115	14.457	2.642	-70.887	272.526
3	193	10.201	3.365	41.013	91.485	4	114	14.184	2.631	-69.319	271.746
3	196	10.634	3.354	43.681	91.303	4	113	13.983	2.677	-67.834	272.139
3	197	11.058	3.458	45.601	91.284	4	112	13.849	2.769	-66.481	272.276
3	198	11.315	3.504	46.865	91.256	4	111	13.479	2.723	-64.534	271.662
3	199	11.513	3.573	47.639	91.388	4	110	13.220	2.769	-62.706	271.787
3	157	12.408	3.427	53.885	92.794	4	109	12.942	2.758	-61.107	272.093
3	155	12.763	3.335	56.569	92.655	4	108	12.780	2.815	-59.789	272.737
3	153	13.146	3.242	59.424	92.568	4	107	12.673	2.931	-58.452	274.749
3	152	13.369	3.196	61.036	92.506	4	106	12.675	3.219	-56.734	276.866
3	151	13.517	3.138	62.271	92.445	4	104	12.347	3.415	-53.589	276.411
3	150	13.661	3.081	63.481	92.398	4	102	11.732	3.185	-51.285	275.482
3	148	13.999	3.011	65.928	92.320	4	101	11.390	3.035	-50.133	275.401
3	147	14.078	2.815	67.577	92.273	4	181	11.242	3.285	-47.746	272.486
3	146	14.274	2.804	68.824	92.232	4	182	10.958	3.264	-46.161	272.488
3	145	14.441	2.700	70.447	92.151	4	183	10.703	3.244	-44.758	272.637
3	143	14.583	2.654	71.574	92.108	4	185	10.474	3.362	-42.673	272.782
3	142	14.699	2.596	72.617	92.077	4	186	10.245	3.319	-41.554	272.760
3	140	15.042	2.511	75.184	92.015	4	188	10.064	3.411	-39.912	272.860
3	137	15.469	2.269	79.199	91.879	4	189	9.508	3.388	-36.720	273.158
3	135	15.746	2.188	81.347	91.825	4	190	9.323	3.411	-35.466	273.270
3	134	15.968	2.188	82.678	91.837	4	191	9.170	3.492	-34.068	273.352
3	133	16.098	2.050	84.289	91.728	4	194	8.720	3.527	-31.156	273.696
3	132	16.178	2.004	85.045	91.770	4	193	8.543	3.562	-29.888	273.954
3	131	16.470	2.027	86.660	91.713	4	196	8.042	3.504	-27.228	274.489
3	130	16.628	1.981	87.881	91.705	4	198	7.420	3.411	-24.052	275.002
3	129	16.823	1.981	89.054	91.674	4	199	7.233	3.354	-23.274	274.856
3	128	16.970	1.865	90.639	91.570	4	200	7.097	3.365	-22.389	272.722
3	127	17.265	1.888	92.362	91.638	4	157	6.200	3.365	-17.006	271.677
3	126	17.196	1.612	93.505	91.602	4	155	5.637	3.250	-14.319	272.016
3	124	17.474	1.485	95.935	91.568	4	153	4.861	2.950	-11.464	272.308
3	122	17.777	1.323	98.732	91.503	4	152	4.303	2.661	-9.851	272.652
3	121	17.950	1.212	100.433	91.478	4	151	3.902	2.465	-8.617	273.111
3	161	18.199	1.212	101.926	91.453	4	150	3.469	2.235	-7.407	273.620
3	162	18.381	1.027	103.522	91.420	4	148	2.531	1.704	-4.965	275.268
3	163	18.374	0.946	104.570	91.401	4	147	1.704	1.150	-3.323	277.678
3	164	18.489	0.900	105.533	91.817	4	146	1.118	0.769	-2.093	282.244
3	165	18.587	0.796	106.747	91.782	4	145	0.391	0.285	-0.637	318.844
3	166	18.739	0.727	108.075	91.414	4	144	0.023	0.019	-0.024	360.000
3	168	19.039	0.577	110.772	91.700	4	143	0.498	0.354	0.863	55.264
3	169	19.275	0.623	111.909	91.885	4	142	0.992	0.688	1.821	74.331
3	170	19.373	0.415	113.745	92.024	4	140	2.313	1.589	4.348	83.662
3	171	19.512	0.335	115.061	92.168	4	137	3.858	2.465	8.358	86.379
3	172	19.647	0.254	116.357	92.471	4	136	4.300	2.708	9.553	87.120
3	173	19.925	0.323	117.609	92.214	4	135	4.663	2.881	10.694	87.171
3	175	19.903	0.150	118.520	92.064	4	134	4.758	2.754	12.023	87.771

SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH	SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH
6	293	4.988	0.949	24.238	50.535	7	262	7.746	1.406	38.038	57.187
6	295	5.127	0.916	25.263	47.470	7	261	7.888	1.388	38.995	58.288
6	296	5.297	0.932	26.186	47.497	7	284	8.021	1.392	39.775	58.186
6	297	5.523	0.965	27.350	48.133	7	292	8.583	1.487	42.580	56.722
6	298	5.734	0.985	28.614	48.260	7	293	8.717	1.487	43.384	55.972
6	299	6.022	0.970	30.309	48.121	7	295	8.864	1.487	44.262	54.108
6	300	6.246	1.014	31.390	46.998	7	296	9.016	1.487	45.180	53.988
6	223	7.026	1.150	35.257	46.233	7	297	9.197	1.469	46.369	54.199
6	224	7.161	1.085	36.459	45.979	7	298	9.434	1.495	47.633	54.114
6	225	7.253	0.970	37.692	46.034	7	299	9.816	1.597	49.312	53.827
6	226	7.506	1.014	38.951	46.200	7	300	10.005	1.618	50.325	53.008
6	228	7.870	1.009	41.167	45.429	7	224	10.813	1.596	55.302	51.789
6	229	7.991	0.949	42.256	45.648	7	225	10.863	1.440	56.533	51.699
6	230	8.145	0.949	43.180	45.556	7	226	11.137	1.504	57.796	51.687
6	231	8.248	0.889	44.157	45.442	7	227	11.243	1.446	58.782	51.358
6	232	8.427	0.883	45.260	45.388	7	229	11.552	1.377	61.048	51.010
6	236	8.741	0.883	47.145	45.620	7	231	11.807	1.319	62.926	50.703
6	238	9.022	0.872	48.900	46.097	7	232	11.955	1.285	64.021	50.575
6	239	9.182	0.867	49.891	47.012	7	236	12.286	1.300	65.915	50.592
6	240	9.379	0.920	50.748	47.468	7	235	12.337	1.233	66.627	49.320
6	259	9.591	0.879	52.271	50.507	7	239	12.679	1.221	68.748	51.401
6	256	10.299	0.951	56.089	52.261	7	240	12.855	1.250	69.633	51.679
6	255	10.544	1.003	57.247	52.285	7	259	13.168	1.280	71.333	53.814
6	253	10.982	1.064	59.509	51.056						
7	203	0.468	0.120	-2.086	252.468	8	201	9.518	1.382	-48.816	235.595
7	204	0.351	0.131	-1.323	227.286	8	204	8.979	1.382	-45.583	233.877
7	220	0.008	0.004	0.027	297.510	8	220	8.788	1.408	-44.281	234.104
7	206	0.449	0.090	2.151	356.952	8	206	8.623	1.434	-43.136	236.470
7	207	0.725	0.235	2.942	14.962	8	207	8.420	1.416	-42.024	236.601
7	208	1.067	0.387	4.079	29.370	8	208	8.113	1.347	-40.596	236.477
7	210	1.704	0.582	6.733	41.800	8	210	7.564	1.278	-37.715	236.250
7	211	2.155	0.644	9.068	34.403	8	211	7.202	1.226	-35.854	238.950
7	212	2.510	0.829	10.090	43.562	8	212	6.993	1.261	-34.394	237.137
7	213	2.481	0.719	10.570	49.811	8	213	6.840	1.217	-33.736	235.406
7	214	2.699	0.777	11.535	56.378	8	214	6.623	1.165	-32.749	233.263
7	215	3.010	0.863	12.881	55.390	8	215	6.398	1.165	-31.394	233.534
7	216	3.229	0.915	13.884	57.099	8	216	6.243	1.174	-30.415	232.695
7	217	3.601	1.089	15.074	61.004	8	217	6.086	1.191	-29.366	230.527
7	218	4.134	1.187	17.681	52.914	8	218	5.630	1.197	-26.594	234.843
7	219	4.455	1.348	18.642	58.493	8	219	5.413	1.126	-25.725	230.876
7	279	4.423	1.192	19.385	62.891	8	279	5.148	0.932	-25.295	227.337
7	278	4.528	1.106	20.534	62.449	8	278	4.947	0.923	-24.146	226.968
7	275	4.751	1.117	21.805	62.746	8	277	4.723	0.897	-22.957	225.851
7	277	5.187	1.100	24.525	64.399	8	275	4.343	0.906	-20.623	221.784
7	272	5.547	1.060	26.926	64.870	8	272	4.115	1.027	-18.528	218.299
7	271	5.716	1.112	27.625	62.911	8	271	3.979	1.061	-17.502	220.060
7	270	5.931	1.175	28.535	61.515	8	270	3.804	1.070	-16.403	221.072
7	269	6.241	1.302	29.635	59.439	8	269	3.921	1.416	-15.027	223.462
7	268	6.548	1.377	31.027	59.036	8	268	3.515	1.243	-13.630	222.732
7	266	6.968	1.464	33.026	58.394	8	266	3.040	1.105	-11.611	221.717
7	265	7.208	1.458	34.501	58.301	8	265	2.751	1.053	-10.189	219.640
7	264	7.359	1.417	35.650	56.989	8	264	2.590	1.113	-8.856	222.276
7	263	7.552	1.423	36.776	56.414	8	263	2.427	1.148	-7.675	222.806
7						8	262	2.200	1.096	-6.621	215.916

SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH	SHOT	RECORDER LOCATION	TRAVEL TIME (REAL)	TRAVEL TIME (T-X/6)	DISTANCE	AZIMUTH
8	261	2.104	1.087	-6.099	206.092	9	953	1.879	1.089	-4.743	271.160
8	288	1.899	1.027	-5.234	199.602	9	951	1.580	0.950	-3.779	271.277
8	290	1.897	1.183	-4.284	196.982	9	950	1.448	0.898	-3.301	271.462
8	291	1.574	0.992	-3.493	192.468	9	949	1.294	0.829	-2.794	271.432
8	293	0.834	0.551	-1.701	176.528	9	947	0.902	0.598	-1.821	272.877
8	294	0.558	0.378	-1.083	141.333	9	946	0.740	0.517	-1.335	273.926
8	295	0.002	-0.003	-0.028	159.759	9	945	0.514	0.373	-0.846	276.842
8	296	0.461	0.309	0.913	49.876	9	944	0.274	0.217	-0.338	286.539
8	297	0.996	0.646	2.102	56.843	9	943	0.217	0.183	0.208	53.995
8	298	1.544	0.984	3.364	54.645	9	942	0.421	0.310	0.671	79.681
8	299	2.110	1.269	5.046	51.674	9	998	0.647	0.459	1.131	0.629
8	300	2.410	1.390	6.120	45.292	9	921	0.799	0.535	1.587	79.535
8	221	2.741	1.477	7.585	45.244	9	922	0.970	0.627	2.060	81.957
8	222	2.919	1.468	8.705	44.879	9	923	1.159	0.742	2.503	82.841
8	223	3.196	1.529	10.002	43.259	9	924	1.310	0.817	2.957	86.275
8	224	3.380	1.512	11.211	42.753	9	925	1.513	0.938	3.447	87.600
8	225	3.516	1.442	12.441	43.239	9	927	1.911	1.169	4.453	88.611
8	226	3.759	1.477	13.694	43.967	9	928	2.068	1.244	4.944	89.024
8	227	3.912	1.460	14.717	43.182	9	929	2.257	1.354	5.416	88.348
8	228	4.159	1.503	15.934	42.288	9	930	2.466	1.481	5.911	88.371
8	229	4.243	1.408	17.013	43.033	9	931	2.615	1.544	6.425	88.822
8	230	4.406	1.416	17.939	42.946	9	934	3.087	1.775	7.873	88.777
8	231	4.556	1.403	18.919	42.800	9	936	3.313	1.839	8.845	88.988
8	232	4.676	1.339	20.023	42.839	9	939	3.598	1.887	10.272	89.129
8	236	5.023	1.373	21.900	43.557	9	1020	3.826	1.950	11.253	89.200
8	235	5.106	1.304	22.815	40.091	9	1009	3.959	1.996	11.779	89.275
8	238	5.287	1.347	23.641	44.694	9	1007	4.146	2.094	12.312	89.307
8	239	5.468	1.364	24.619	46.603	9	1001	4.303	2.158	12.871	89.357
8	240	5.662	1.416	25.474	47.524	9	1003	4.581	2.290	13.741	89.398
8	259	5.901	1.390	27.065	53.391	9	1004	4.672	2.331	14.046	89.411
8	255	7.004	1.649	32.131	56.109	9	1005	4.756	2.348	14.447	89.419
8	254	7.087	1.538	33.299	54.819	9	1010	5.212	2.479	16.401	89.496
8	253	7.451	1.731	34.320	53.734	9	1014	6.273	3.219	18.325	89.467
9	903	5.166	1.895	-19.625	269.157	9	1016	6.411	3.225	19.117	89.460
9	904	4.866	1.710	-18.936	268.376	9	1017	6.456	3.202	19.523	89.457
9	906	4.547	1.577	-17.820	271.700	9	1019	6.584	3.196	20.326	89.471
9	907	4.396	1.526	-17.224	273.524	9	993	8.445	3.985	26.765	89.563
9	908	4.297	1.527	-16.618	272.277	9	995	8.662	4.042	27.720	89.603
9	909	4.226	1.556	-16.023	273.005	9	997	8.850	4.077	28.637	90.043
9	912	3.812	1.435	-14.265	271.688	9	961	9.289	4.054	31.414	89.518
9	913	3.567	1.360	-13.242	269.711	9	963	9.536	4.031	33.033	89.542
9	914	3.442	1.348	-12.563	269.398	9	964	9.677	3.985	34.154	89.496
9	915	3.289	1.302	-11.920	270.000	9	965	9.802	3.996	34.834	89.524
9	916	3.137	1.285	-11.112	270.866	9	968	10.104	3.892	37.269	89.667
9	917	2.978	1.250	-10.368	270.863	9	969	10.217	3.849	38.085	89.674
9	918	2.882	1.256	-9.757	272.665	9	970	10.525	4.042	38.896	89.699
9	919	2.771	1.238	-9.195	274.567	9	978	11.364	3.800	45.381	91.782
9	960	2.547	1.192	-8.130	276.511	9	979	11.490	3.789	46.209	91.750
9	959	2.483	1.210	-7.640	276.384	9	991	8.297	3.997	25.798	89.551
9	958	2.386	1.192	-7.163	276.463	9	967	9.973	3.895	36.467	89.816
9	957	2.289	1.181	-6.651	276.838	9	1018	6.518	3.197	19.924	89.468
9	955	2.158	1.210	-5.692	274.499						
9	954	2.008	1.135	-5.242	271.050						

APPENDIX C

TEAM DATA SHEETS

The data sheets contain all the information related to the performance of the seismic recorders. The recorders are grouped into five teams of twenty instruments for shots 1-8 and six teams of twenty instruments for shot 9. Each set of teams is then listed in shot order. The column headings are as follows:

LOC	- location from the seismic recorder location file
DIST (KM)	- distance from the shot point to the recorder location in kilometers
AZIM (DEG)	- azimuth clockwise north from the shotpoint to the recorder location
UNIT	- I. D. number of the recording unit
CHRON	- chronometer correction in milliseconds for the recorder at shot time (calculated from the total drift assuming a linear drift rate)
CHAN	- channel number (1, 2, or 3) which was digitized
C1 C2 C3	- attenuation settings (dB) for channels 1, 2, and 3
TAPE GRADE	- number used to code the instrument performance, the data quality, and/or the reason for omitting the trace from a record section

DIRECTORY OF TAPE GRADE CODES

- 0 - Digitized
- 1 - Tape did not run
- 3 - Skipped record time
- 6 - Weak signal; Low record level;
Cannot read time code translator
- 12 - Random noise
- 13 - Bad clock
- 16 - Incomplete record; recorder stopped
- 17 - Bad time code
- 20 - Not deployed
- 21 - Geophone disconnected or shorted
- 25 - Bad geophone test
- 28 - Unit damaged
- 29 - Wrong time
- 30 - Digitized without calibrations
- 31 - amplifier out of balance
- 32 - No seismic arrival
- 33 - Trace deleted from record section;
Deployed off line
- 34 - Trace deleted from record section;
Overlapping traces
- 35 - Clipped record

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 1 TEAM 3
 SHOT POINT 7
 SHOT TIME: 196: 6: 0: 0.008

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	141	34.410	270.0	41	7		36	18	94	6/13
2	142	35.742	270.0	42	-5	2	36	18	94	0
3	143	36.786	270.0	43	-33	2	36	18	94	0
4	144	37.499	269.3	44	-32	2	36	18	94	0
5	145	37.914	270.0	45	6	2	36	18	94	0
6	146	39.541	269.9	46	-90	2	36	18	94	0
7	147	40.788	269.9	47	100	2	36	18	94	0
8	148	42.439	270.0	48	20	2	36	36	74	0
9				49	0		36	18	74	21
10	150	44.887	270.0	50	-4	2	36	18	74	0
11	151	46.099	270.0	51	0	2	36	18	74	0
12	152	47.336	270.0	52	-22	2	36	18	74	0
13	153	48.949	270.0	53	2	2	36	18	74	0
14	154			54	-19	2	36	18	74	20
15	155	51.805	270.0	55	13	2	36	18	74	0
16				56	--	--	36	18	74	1
17	157	54.493	270.0	57	-30	2	36	18	74	0
18				58	--	--	36	18	74	20
19				59	--	--	36	18	74	20
20				60	--	--	36	18	74	20

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 1 TEAM 1
 SHOT POINT 7
 SHOT TIME: 196: 6: 0: 0.008

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	101	87.294	272.8	1	11	2	36	18	54	0
2	102	88.438	272.9	2	-111	2	36	18	54	0
3	103	89.333	273.5	3	6		36	18	54	12
4	104	90.691	273.5	4	-2	2	36	18	54	0
5	105	92.142	273.9	5	--		36	18	54	28
6	106	93.800	273.8	6	11	2	36	18	54	0
7	107	95.611	272.6	7	5	2	36	18	74	0
8	108	97.011	271.4	8	21	2	36	18	74	0
9	109	98.341	271.0	9	46	2	36	18	74	0
10	110	99.942	270.8	10	-4	1	36	18	74	0
11	111	101.768	270.8	11	17	2	36	18	74	0
12	112	103.697	271.2	12	4	2	36	18	94	0
13	113	105.049	271.1	13	-2	2	36	18	94	0
14	114	106.539	270.9	14	18	2	36	18	94	0
15	115	108.085	271.4	15	5	2	36	18	94	0
16	116	108.677	270.3	16	18		36	18	94	29
17	117	109.973	269.4	17	27	2	36	18	94	0
18	118	113.052	269.7	18	6	2	36	18	94	0
19	119	114.813	270.5	19	7		36	18	74	29
20	120	115.970	271.1	20	5	2	36	18	74	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 1 TEAM 2
 SHOT POINT 7
 SHOT TIME: 196: 6: 0: 0.008

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	121	7.673	270.3	21	7	2	36	18	74	0
2	122	9.389	270.2	22	11	2	36	18	74	0
3	123			23	--		36	18	74	13
4	124	12.184	270.0	24	-9	2	36	18	74	0
5	125			25	--		36	18	74	13
6	126	14.621	270.1	26	10	2	36	18	74	0
7	127	15.869	270.0	27	-41	1	36	18	74	0
8	128	17.502	270.5	28	16	1	36	18	54	0
9	129	19.085	270.1	29	12	1	36	18	54	0
10	130	20.261	270.0	30	5	1	36	18	54	0
11	131	21.485	270.1	31	12	2	36	18	54	0
12	132	23.106	270.0	32	-7	2	36	18	54	0
13	133	23.862	270.2	33	-82	2	36	18	74	0
14	134	25.482	270.0	34	4	2	36	18	74	0
15	135	26.814	270.1	35	-39	2	36	18	74	0/12
16	136	27.954	270.0	36	-6	1	36	18	74	0
17	137	29.154	270.1	37	-5	2	36	18	74	0
18	138			38	--					13
19	139			39	--					13
20	140	33.174	270.0	40	5	2	36	18	94	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 1 TEAM 4
 SHOT POINT 7
 SHOT TIME: 196: 6: 0: 0.008

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	165	1.530	243.2	61	9	2	36	18	94	0
2	164	3.683	254.5	62	9	2	36	18	94	0
3	163	3.524	271.2	63	9	2	36	18	94	0
4	162	4.574	270.8	64	6	2	36	18	94	0
5	161	6.175	270.4	65	-2	2	36	18	74	0
6	166	0.038	198.1	66	7	3	36	18	94	0
7	167	1.263	85.0	67	-39	2	36	18	94	0/12
8	168	2.752	103.8	68	0	2	36	18	94	0
9	169	3.941	105.5	69	6	2	36	18	94	0
10	170	5.796	103.9	70	7	2	36	18	74	0
11	171	7.144	104.0	71	-23	2	36	18	74	0
12	172	8.542	106.3	72	11	2	36	18	74	0
13	173	9.672	101.4	73	4	2	36	18	74	0
14				74	--	--	36	18	74	20
15	175	10.535	99.0	75	10	2	36	18	94	0
16	176	11.718	98.9	76	-13	2	36	18	74	0
17	177	13.257	98.9	77	-2	2	36	18	74	0
18	178	14.586	98.3	78	7		36	18	54	32
19	179	16.668	98.5	79	0	2	36	18	54	0
20	180	17.917	100.8	80	12	2	36	18	54	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 2 TEAM 4
 SHOT POINT 5
 SHOT TIME: 196: 6:30: 0.007

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	165	58.527	91.2	61	9	2	36	18	94
2	164	57.308	91.3	62	9	2	36	18	94
3	163	56.355	90.5	63	9	2	36	18	94
4	162	55.304	90.5	64	6	2	36	18	94
5	161	53.704	90.6	65	-2	2	36	18	94
6	166	59.868	90.6	66	7	2	36	18	94
7	167	61.136	90.4	67	-40	2	36	18	94
8	168	62.563	91.1	68	0	2	36	18	94
9	169	63.698	91.5	69	6	2	36	18	94
10	170	65.537	91.7	70	7	2	36	18	94
11	171	66.854	92.0	71	-23	2	36	18	94
12	172	68.150	92.5	72	11	2	36	18	94
13	173	69.407	92.1	73	4	2	36	18	94
14	175	70.322	91.8	74	--	--	36	18	94
15	175	70.322	91.8	75	10	2	36	18	94
16	176	71.499	91.9	76	-13	2	36	18	94
17	177	73.027	92.1	77	-3	2	36	18	94
18	178	74.365	92.1	78	8	2	36	18	94
19	179	76.429	92.3	79	0	2	36	18	94
20	180	77.586	92.9	80	13	3	36	18	94

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 3 TEAM 1
 SHOT POINT 4
 SHOT TIME: 196: 6:45: 6.437

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	101	20.937	85.6	1	12	1	36	18	54
2	102	19.816	84.8	2	-116	3	36	18	54
3	103	19.119	81.2	3	6	3	36	18	54
4	104	17.763	80.6	4	-2	3	36	18	54
5	105	16.535	77.1	5	--	--	36	18	54
6	106	14.914	75.7	6	11	3	36	18	54
7	107	12.655	82.1	7	5	3	36	18	54
8	108	11.076	91.2	8	22	3	36	18	54
9	109	9.769	95.1	9	48	3	36	18	54
10	110	8.202	98.0	10	-4	3	36	18	54
11	111	6.410	101.0	11	18	3	36	18	54
12	112	4.391	96.0	12	5	3	36	18	54
13	113	3.062	100.6	13	-2	3	36	18	54
14	114	1.804	123.1	14	19	3	36	18	54
15	115	0.038	320.0	15	5	3	36	18	54
16	116	2.057	198.0	16	19	3	36	18	54
17	117	4.144	207.6	17	28	3	36	18	54
18	118	5.997	236.7	18	6	3	36	18	54
19	119	6.966	256.9	19	7	3	36	18	54
20	120	7.946	267.0	20	5	3	36	18	54

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 2 TEAM 5
 SHOT POINT 5
 SHOT TIME: 196: 6:30: 0.007

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	181	25.338	272.3	81	-21	3	36	18	54
2	182	23.753	272.3	82	-10	3	36	18	54
3	183	22.350	272.5	83	15	3	36	18	54
4	184	21.407	272.5	84	13	3	36	18	54
5	185	20.264	272.8	85	-42	3	36	18	54
6	186	19.146	272.8	86	2	3	36	18	54
7	187	15.923	273.3	87	10	3	36	18	54
8	188	17.504	273.0	88	23	3	36	18	54
9	189	14.313	273.8	89	20	3	36	18	54
10	190	13.061	274.2	90	22	3	36	18	54
11	191	11.663	274.5	91	8	3	36	18	54
12	192	10.216	275.2	92	22	3	36	18	54
13	193	7.500	277.6	93	9	3	36	18	54
14	194	6.760	276.1	94	10	3	36	18	54
15	195	6.350	280.4	95	23	3	36	18	54
16	196	4.880	282.6	96	-47	3	36	18	54
17	197	3.025	289.9	97	13	3	36	18	54
18	198	1.884	303.0	98	-14	3	36	18	54
19	199	1.210	318.1	99	7	3	36	18	54
20	200	0.021	110.4	100	7	3	36	18	54

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 3 TEAM 2
 SHOT POINT 4
 SHOT TIME: 196: 6:45: 6.437

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	121	100.408	91.5	21	7	1	36	18	74
2	122	98.697	91.5	22	11	1	36	18	74
3	123			23	--	--	36	18	74
4	124	95.910	91.6	24	-9	1	36	18	74
5	125			25	--	--	36	18	74
6	126	93.480	91.6	26	10	1	36	18	74
7	127	92.237	91.6	27	-41	1	36	18	74
8	128	90.604	91.6	28	17	1	36	18	54
9	129	89.029	91.7	29	13	1	36	18	54
10	130	87.856	91.7	30	5	1	36	18	54
11	131	86.635	91.7	31	12	1	36	18	54
12	132	85.020	91.8	32	-7	1	36	18	54
13	133	84.264	91.7	33	-84	1	36	18	74
14	134	82.653	91.8	34	4	1	36	18	74
15	135	81.322	91.8	35	-39	1	36	18	74
16	136	80.188	91.9	36	-7	3	36	18	74
17	137	79.174	91.9	37	-5	2	36	18	74
18	138			38	--	--			0/31
19	139			39	--	--			13
20	140	75.159	92.0	40	5	1	36	18	94

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 3 TEAM 5
 SHOT POINT 4
 SHOT TIME: 196: 6:45: 6.437

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	181	23.116	92.5	81	-21	3	36	18 54	0
2	182	24.701	92.5	82	-10	3	36	18 54	0
3	183	26.104	92.3	83	15	3	36	18 54	0
4	184	27.047	92.3	84	13	3	36	18 54	1
5	185	28.190	92.1	85	-42	3	36	18 54	0
6	186	29.308	92.1	86	2	3	36	18 54	0
7	187	32.533	91.9	87	10	3	36	18 54	1
8	188	30.951	92.0	88	23	3	36	18 54	0
9	189	34.146	91.8	89	20	3	36	18 54	0
10	190	35.401	91.7	90	22	3	36	18 54	0
11	191	36.800	91.7	91	8	1	36	18 74	0
12	192	38.252	91.6	92	22	1	36	18 74	0
13	193	40.988	91.4	93	9	1	36	18 74	0
14	194	39.715	91.6	94	10	1	36	18 74	0
15	195	42.174	91.2	95	23	3	36	18 74	12
16	196	43.657	91.3	96	-47	1	36	18 74	0
17	197	45.576	91.2	97	13	1	36	18 94	0
18	198	46.840	91.2	98	-14	1	36	18 94	0/31
19	199	47.614	91.4	99	7	1	36	18 94	0
20	200	48.473	92.4	100	7	3	36	18 94	0/12

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 3 TEAM 3
 SHOT POINT 4
 SHOT TIME: 196: 6:45: 6.437

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	141	73.923	92.0	41	8		36	18 94	6/13
2	142	72.592	92.1	42	-5	1	36	18 94	0
3	143	71.549	92.1	43	-34	1	36	18 94	0
4	144	70.861	92.5	44	-33	2	36	18 94	0/34
5	145	70.422	92.1	45	6	1	36	18 94	0
6	146	68.798	92.2	46	-92	1	36	18 94	0
7	147	67.552	92.2	47	102	1	36	18 94	0
8	148	65.903	92.3	48	20	1	36	36 74	0
9				49	0		36	18 74	21
10	150	63.456	92.4	50	-4	1	36	18 74	0
11	151	62.245	92.4	51	0	1	36	18 74	0
12	152	61.011	92.5	52	-23	1	36	18 74	0
13	153	59.398	92.5	53	2	1	36	18 74	0
14	154			54	-19	1	36	18 74	20
15	155	56.544	92.6	55	13	1	36	18 74	0
16				56	--		36	18 74	1
17	157	53.859	92.8	57	-30	1	36	18 74	0
18				58	--		36	18 74	20
19				59	--		36	18 74	20
20				60	--		36	18 74	20

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 4 TEAM 1
 SHOT POINT 6
 SHOT TIME: 196: 7:30: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	101	50.133	275.4	1	12	1	36	18 54	0
2	102	51.285	275.5	2	-122	1	36	18 54	0
3	103	52.236	276.6	3	6	3	36	18 54	0/12
4	104	53.589	276.4	4	-2	1	36	18 54	0/31
5	105	55.081	277.1	5	--		36	18 54	28
6	106	56.734	276.9	6	12	1	36	18 54	0
7	107	58.452	274.7	7	5		36	18 74	0
8	108	59.789	272.7	8	23		36	18 74	0
9	109	61.107	272.1	9	50		36	18 74	0
10	110	62.706	271.8	10	-5	2	36	18 74	0
11	111	64.534	271.7	11	19		36	18 74	0
12	112	66.481	272.3	12	5	1	36	18 94	0
13	113	67.834	272.1	13	-2	2	36	18 94	0
14	114	69.319	271.7	14	20		36	18 94	0
15	115	70.888	272.5	15	5	2	36	18 94	0
16	116	71.448	270.9	16	20		36	18 94	0/32/12
17	117	72.733	269.5	17	29	2	36	18 94	0
18	118	75.821	269.9	18	6	2	36	18 94	0
19	119	77.601	271.1	19	7		36	18 74	29
20	120	78.778	271.9	20	5	2	36	18 74	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 3 TEAM 4
 SHOT POINT 4
 SHOT TIME: 196: 6:45: 6.437

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	165	106.722	91.8	61	9	1	36	18 94	0
2	164	105.508	91.8	62	9	1	36	18 94	0
3	163	104.545	91.4	63	9	1	36	18 94	0
4	162	103.497	91.4	64	6	1	36	18 94	12
5	161	101.902	91.4	65	-2	1	36	18 74	0
6	166	108.050	91.4	66	7	1	36	18 94	0
7	167	109.312	91.3	67	-40		36	18 94	25/32
8	168	110.747	91.7	68	0	1	36	18 94	0
9	169	111.884	91.9	69	6	1	36	18 94	0
10	170	113.721	92.0	70	7	2	36	18 74	0
11	171	115.036	92.2	71	-23	2	36	18 74	0
12	172	116.332	92.5	72	11	2	36	18 74	0
13	173	117.584	92.2	73	4	2	36	18 74	0
14				74	--		36	18 74	20
15	175	118.495	92.1	75	10	2	36	18 94	0
16	176	119.670	92.1	76	-13	2	36	18 74	0
17	177	121.196	92.2	77	-3	2	36	18 74	0
18	178	122.531	92.2	78	8	2	36	18 54	0
19	179	124.591	92.3	79	0	2	36	18 54	0
20	180	125.747	92.7	80	13		36	18 54	25/32

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 4 TEAM 4
 SHOT POINT 6
 SHOT TIME: 196: 7:30: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	165	36.132	90.3	61	10	1	36	18	94	0
2	164	34.913	90.4	62	9	1	36	18	94	0
3	163	33.977	89.1	63	9	1	36	18	94	0
4	162	32.926	89.0	64	6	1	36	18	94	0
5	161	31.326	89.0	65	-2	1	36	18	94	0
6	166	37.487	89.3	66	7	1	36	18	94	0
7	167	38.759	89.1	67	-41	1	36	18	94	25/32
8	168	40.170	90.2	68	0	1	36	18	94	0
9	169	41.300	90.8	69	6	1	36	18	94	0
10	170	43.135	91.2	70	7	1	36	18	94	0
11	171	44.449	91.6	71	-24	1	36	18	94	0
12	172	45.742	92.4	72	12	1	36	18	94	0
13	173	47.002	91.7	73	4	1	36	18	94	0
14	175	47.920	91.4	75	--	1	36	18	94	20
15	176	49.095	91.5	76	-14	1	36	18	94	0
16	177	50.622	91.8	77	-3	1	36	18	94	0
17	178	51.960	91.8	78	8	2	36	18	54	0
18	179	54.022	92.1	79	0	1	36	18	54	0
19	180	55.177	93.0	80	13	1	36	18	54	25/32

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 4 TEAM 2
 SHOT POINT 6
 SHOT TIME: 196: 7:30: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	121	29.828	89.0	21	7	1	36	18	94	0
2	122	28.112	88.9	22	12	1	36	18	94	0
3	123	25.316	88.9	23	--	1	36	18	94	13
4	124	25.316	88.9	24	-9	1	36	18	94	0
5	125	22.880	88.7	25	--	1	36	18	94	13
6	126	21.632	88.7	26	11	1	36	18	94	0
7	127	20.004	88.2	27	-42	3	36	18	94	0
8	128	18.418	88.4	28	17	3	36	18	94	0
9	129	17.241	88.3	29	13	3	36	18	94	0
10	130	16.019	88.1	30	5	3	36	18	94	0
11	131	13.646	87.6	31	13	3	36	18	94	0
12	132	12.023	87.8	32	-7	3	36	18	94	0
13	133	10.694	87.2	33	-86	3	36	18	94	0
14	134	9.553	87.1	34	4	3	36	18	94	0
15	135	8.358	86.4	35	-40	3	36	18	94	0
16	136	4.348	83.7	36	-7	3	36	18	94	0
17	137			37	-5	1	36	18	94	0/31
18	138			38	--					13
19	139			39	--					13
20	140			40	5	3	36	18	94	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 4 TEAM 5
 SHOT POINT 6
 SHOT TIME: 196: 7:30: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	181	47.747	272.5	81	-21	1	36	18	54	0
2	182	46.161	272.5	82	-11	1	36	18	54	0
3	183	44.758	272.6	83	15	1	36	18	54	0
4	184	43.815	272.6	84	14	1	36	18	54	1
5	185	42.673	272.8	85	-43	1	36	18	54	0
6	186	41.554	272.8	86	2	1	36	18	54	0
7	187	38.330	273.0	87	10	1	36	18	54	1
8	188	39.912	272.9	88	23	1	36	18	54	0
9	189	36.720	273.2	89	21	1	36	18	54	0
10	190	35.466	273.3	90	23	1	36	18	54	0
11	191	34.048	273.4	91	8	1	36	18	74	0
12	192	32.617	273.5	92	23	2	36	18	74	0/31
13	193	29.888	274.0	93	9	1	36	18	74	0
14	194	31.156	273.7	94	10	1	36	18	74	0
15	195	28.712	274.4	95	23	1	36	18	74	12
16	196	27.228	274.5	96	-48	1	36	18	74	0
17	197	25.313	274.0	97	14	1	36	18	94	0/12
18	198	24.052	275.0	98	-15	1	36	18	94	0
19	199	23.274	274.9	99	7	1	36	18	94	0
20	200	22.389	272.7	100	7	1	36	18	94	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 4 TEAM 3
 SHOT POINT 6
 SHOT TIME: 196: 7:30: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	141	3.124	80.9	41	8		36	18	94	6/13
2	142	1.821	74.3	42	-5	3	36	18	94	0
3	143	0.863	55.3	43	-35	3	36	18	94	0
4	144	0.024	360.0	44	-33	3	36	18	94	0
5	145	0.637	318.8	45	7	3	36	18	94	0
6	146	2.093	282.2	46	-94	3	36	18	94	0
7	147	3.323	277.7	47	104	3	36	18	94	0
8	148	4.965	275.3	48	21	3	36	36	74	0
9				49	0		36	18	74	21
10	150	7.407	273.6	50	-4	3	36	18	74	0
11	151	8.617	273.1	51	-2	3	36	18	74	0
12	152	9.851	272.7	52	-23	3	36	18	74	0
13	153	11.464	272.3	53	2	3	36	18	74	0
14	154			54	-20	3	36	18	74	20
15	155	14.319	272.0	55	13	3	36	18	74	0
16				56	--		36	18	74	1
17	157	17.006	271.7	57	-31	3	36	18	74	0
18				58	--		36	18	74	20
19				59	--		36	18	74	20
20				60	--		36	18	74	20

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 5 TEAM 3
 SHOT POINT 4
 SHOT TIME: 200: 7: 1: 0.011

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
1	241	26.405	50.8	41	6	1	36	18 54	0
2	242	24.808	52.5	42	0	1	36	18 54	0
3	243	23.722	53.8	43	-40	2	36	18 54	0
4	244	22.660	55.2	44	-36	3	36	18 54	0/12
5	245	21.591	56.6	45	3	2	36	18 54	0
6	246	20.523	58.2	46	-109	2	36	18 54	0
7	247	19.013	59.3	47	96	2	36	18 54	1
8	248	17.679	60.1	48	45	3	36	18 54	0
9	249	16.590	62.4	49	6	3	36	18 54	1
10	250	15.860	65.9	50	-6	3	36	18 54	0/31
11	251	14.923	69.5	51	16	1	36	18 54	0/31
12	252	14.054	73.4	52	-16	1	36	18 54	0
13	253	13.283	77.7	53	6	2	36	18 74	0
14	254	12.640	82.2	54	-25	1	36	18 74	0
15	255	11.987	87.9	55	13	1	36	18 74	0
16	256	11.052	91.3	56	-6	1	36	18 74	0
17	257			57	-17		36	18 74	3
18	258			58	-11		36	18 74	12
19	259	7.163	100.8	59	2	1	36	18 74	0
20	260	4.889	98.5	60	-12	1	36	18 74	0/16

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 5 TEAM 1
 SHOT POINT 4
 SHOT TIME: 200: 7: 1: 0.011

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
1	201	71.057	230.6	1	32	2	36	18 94	0
2	202	69.858	230.1	2	227	2	36	18 94	0/13
3	203	68.554	230.0	3	12	2	36	18 94	0/12
4	204	67.955	229.3	4	-2	2	36	18 94	0
5				5	--		36	18 94	20
6	206	65.337	230.8	6	14		36	18 94	32
7	207	64.221	230.8	7	-21	2	36	18 94	0
8	208	62.810	230.6	8	128	2	36	18 74	0/12
9	209	61.512	230.1	9	227		36	18 74	28
10	210	59.962	230.1	10	14	2	36	18 68	0
11	211	57.910	231.6	11	115	2	36	18 74	0
12	212	56.600	230.3	12	14	2	36	18 54	0/12
13	213	56.064	229.2	13	9	2	36	18 54	0
14	214	55.209	227.8	14	78	2	36	18 74	0
15	215	53.846	227.8	15	10	2	36	18 74	0
16	216	52.916	227.3	16	45	2	36	18 68	0
17	217	51.971	225.9	17	91	2	36	18 94	0
18	218	49.003	228.0	18	-2	1	36	18 94	0
19	219	48.330	225.8	19	-45	2	36	18 94	0/34
20	220	46.643	229.3	20	23	2	36	18 94	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 5 TEAM 4
 SHOT POINT 4
 SHOT TIME: 200: 7: 1: 0.011

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
1	261	28.784	217.1	61	13	2	36	18 74	0/12
2	262	29.434	219.1	62	8	2	36	18 74	0/12
3	263	30.494	220.7	63	8	2	36	18 74	0
4	264	31.677	220.7	64	10	2	36	18 74	0
5	265	33.015	219.9	65	7	2	36	18 54	0
6	266	34.433	220.6	66	6	2	36	18 54	0/12
7	267	35.330	221.0	67	-24		36	18 54	25/32
8	268	36.446	221.0	68	3	2	36	18 74	0
9	269	37.836	221.4	69	8	2	36	18 94	0
10	270	39.227	220.5	70	19	2	36	18 74	0
11	271	40.328	220.0	71	-16	2	36	18 74	0
12	272	41.350	219.3	72	16	2	36	18 74	0
13	273	42.430	219.8	73	-3		36	18 74	3/16
14	274			74	--		36	18 74	20
15	275	43.444	220.9	75	16	2	36	18 74	0
16	276	44.546	221.7	76	-14		36	18 94	1
17	277	45.722	222.9	77	6	2	36	18 94	0
18	278	46.883	223.6	78	5	2	36	18 94	0
19	279	48.020	223.9	79	7	2	36	18 94	0
20	280	49.088	224.3	80	17		36	18 94	25/32

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 5 TEAM 2
 SHOT POINT 4
 SHOT TIME: 200: 7: 1: 0.011

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
1	221	15.288	217.4	21	4	1	36	18 74	0
2	222	14.171	217.1	22	19	1	36	18 74	0
3	223	12.852	217.5	23	10	1	42	18 74	0
4	224	11.640	217.4	24	-6	1	36	18 74	0
5	225	10.428	216.2	25	-8	1	36	18 74	0
6	226	9.213	214.2	26	11	1	36	18 74	0
7	227	8.172	214.4	27	-111	1	36	18 74	0
8	228	6.933	214.8	28	28	1	36	18 74	0
9	229	5.905	211.4	29	19	1	36	18 74	0
10	230	4.995	209.5	30	8	1	36	18 94	0
11	231	4.036	206.9	31	21	1	36	18 94	0
12	232	2.993	200.9	32	1	1	36	18 94	0
13	233			33	-39		36	18 94	1
14	234	0.676	199.7	34	11	3	36	18 94	0
15	235	0.027	154.1	35	-56	3	36	18 94	0
16	236	1.659	165.8	36	-8	3	36	18 94	0
17	237	1.816	136.1	37	-27	2	36	18 94	0/12
18	238	2.057	109.1	38	8	1	36	18 94	0/35
19	239	3.253	100.0	39	13	1	36	18 94	0
20	240	4.113	93.8	40	9	1	36	18 74	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 6 TEAM 2
 SHOT POINT 2
 SHOT TIME: 200: 7:16: 0.009

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	221	32.855	46.9	21	4	1	36	18	74
2	222	33.973	46.8	22	19	1	36	18	74
3	223	35.257	46.2	23	10	1	42	18	74
4	224	36.459	46.0	24	-6	1	36	18	74
5	225	37.692	46.0	25	-8	1	36	18	74
6	226	38.951	46.2	26	12	1	36	18	74
7	227	39.965	45.9	27	-112	3	36	18	74
8	228	41.167	45.4	28	28	1	36	18	74
9	229	42.256	45.6	29	19	1	36	18	74
10	230	43.180	45.6	30	8	1	36	18	74
11	231	44.157	45.4	31	21	1	36	18	74
12	232	45.260	45.4	32	1	1	36	18	74
13	233	47.382	44.2	33	-39	1	36	18	74
14	234	47.988	43.9	34	11	2	36	18	74
15	235	47.988	43.9	35	-57	1	36	18	74
16	236	47.145	45.6	36	-8	1	36	18	74
17	237	47.966	46.1	37	-27	2	36	18	74
18	238	48.900	46.1	38	8	2	36	18	74
19	239	49.891	47.0	39	13	2	36	18	74
20	240	50.748	47.5	40	9	2	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 5 TEAM 5
 SHOT POINT 4
 SHOT TIME: 200: 7: 1: 0.011

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	281	102.955	199.4	81	-48	2	36	18	54
2	282	71.136	226.6	82	-10	2	36	18	54
3	283	69.148	240.9	83	41	2	36	18	54
4	284	28.032	216.7	84	29	2	36	18	74
5	285	27.803	216.6	85	-14	2	36	18	74
6	286	27.603	216.8	86	3	2	36	18	74
7	287	27.959	216.3	87	14	2	36	18	74
8	288	27.792	216.3	88	33	2	36	18	74
9	289	27.887	215.8	89	20	2	36	18	74
10	290	26.822	216.4	90	37	1	36	18	74
11	291	25.974	216.5	91	9	1	36	18	74
12	292	25.035	216.6	92	33	2	36	18	74
13	293	24.089	217.2	93	26	1	36	18	74
14	294	23.064	217.4	94	18	1	36	18	74
15	295	22.840	220.0	95	29	2	36	18	74
16	296	21.927	219.6	96	-45	2	36	18	74
17	297	20.823	218.4	97	16	2	36	18	74
18	298	19.590	217.5	98	-16	1	36	18	74
19	299	17.913	216.8	99	15	1	36	18	74
20	300	16.741	218.1	100	10	1	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 6 TEAM 3
 SHOT POINT 2
 SHOT TIME: 200: 7:16: 0.009

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	241	74.285	46.4	41	6	1	36	18	54
2	242	72.628	46.8	42	0	1	36	18	54
3	243	71.491	47.2	43	-40	2	36	18	54
4	244	70.367	47.5	44	-36	2	36	18	54
5	245	69.231	47.9	45	3	2	36	18	54
6	246	68.002	48.2	46	-110	3	36	18	54
7	247	66.529	48.3	47	96	3	36	18	54
8	248	65.172	48.3	48	45	3	36	18	54
9	249	63.958	48.6	49	6	1	36	18	54
10	250	62.995	49.3	50	-7	1	36	18	54
11	251	61.010	49.9	51	16	3	36	18	54
12	252	60.636	50.5	52	-16	1	36	18	54
13	253	59.509	51.1	53	6	1	36	18	74
14	254	58.458	51.6	54	-25	3	36	18	74
15	255	57.247	52.3	55	13	2	36	18	74
16	256	56.009	52.3	56	-6	2	36	18	74
17	257			57	-17		36	18	74
18	258			58	-11		36	18	74
19	259	52.271	50.5	59	2	2	36	18	74
20	260	50.996	48.4	60	-12	2	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 6 TEAM 1
 SHOT POINT 2
 SHOT TIME: 200: 7:16: 0.009

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	201	24.079	244.2	1	32	2	36	18	94
2	202	22.768	243.4	2	228	1	36	18	94
3	203	21.455	243.7	3	12	1	36	18	94
4	204	20.674	241.8	4	-2	1	36	18	94
5				5	--		36	18	94
6	206	18.617	248.8	6	14	1	36	18	94
7	207	17.554	249.9	7	-21	1	36	18	94
8	208	16.145	250.8	8	128	1	36	18	74
9	209	14.740	250.6	9	228	1	36	18	74
10	210	13.328	253.2	10	14	1	36	18	68
11	211	12.199	263.5	11	115	1	36	18	74
12	212	10.408	261.4	12	14	3	36	18	54
13	213	9.397	257.4	13	9	3	36	18	54
14	214	8.035	252.0	14	78	3	36	18	74
15	215	6.824	256.8	15	10	3	36	18	74
16	216	5.745	256.6	16	46	3	36	18	68
17	217	4.354	248.9	17	91	3	36	18	94
18	218	3.614	299.7	18	-2	3	36	18	94
19	219	1.609	302.8	19	-45	3	36	18	94
20	220	19.411	242.8	20	23	1	36	18	94

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 7 TEAM 1
 SHOT POINT 1
 SHOT TIME: 200: 7:31: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	201	4.714	250.1	1	33	3	36	18 94	0	
2	202	3.380	247.0	2	230	3	36	18 94	0/13	
3	203	2.086	252.5	3	12	3	36	18 94	0	
4	204	1.323	227.3	4	-2	3	36	18 94	0	
5				5	--				20	
6	206	2.151	357.0	6	14	3	36	18 94	0	
7	207	2.942	15.0	7	-21	3	36	18 94	0	
8	208	4.079	29.4	8	129	3	36	18 74	0	
9	209	5.192	40.1	9	229				28	
10	210	6.733	41.8	10	14	3	36	18 68	0	
11	211	9.068	34.4	11	116	3	36	18 74	0	
12	212	10.090	43.6	12	14	3	36	18 54	0	
13	213	10.570	49.8	13	9	3	36	18 54	0	
14	214	11.535	56.4	14	79	1	36	18 74	0	
15	215	12.881	55.4	15	10	1	36	18 74	0	
16	216	13.884	57.1	16	46	1	36	18 48	0	
17	217	15.074	61.0	17	92	3	36	18 94	0	
18	218	17.681	52.9	18	-2	1	36	18 94	0	
19	219	18.643	58.5	19	-45	3	36	18 94	0	
20	220	0.027	297.5	20	23	3	36	18 94	0	

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 7 TEAM 2
 SHOT POINT 1
 SHOT TIME: 200: 7:31: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	221	51.776	52.8	21	4	1	36	18 74	0	
2	222	52.879	52.6	22	19	1	36	18 74	0	
3	223	54.123	52.1	23	10	3	42	18 74	0	
4	224	55.302	51.8	24	-6	1	36	18 74	0	
5	225	56.533	51.7	25	-8	1	36	18 74	0	
6	226	57.796	51.7	26	12	2	36	18 74	0	
7	227	58.782	51.4	27	-112	2	36	18 74	0	
8	228	59.950	51.0	28	29	1	36	18 74	0	
9	229	61.048	51.0	29	19	2	36	18 74	0	
10	230	61.962	50.9	30	8	1	36	18 94	0/12	
11	231	62.926	50.7	31	22	1	36	18 94	0	
12	232	64.020	50.6	32	1	2	36	18 94	0	
13	233	66.047	49.6	33	-39	1	36	18 94	1	
14	234	66.657	49.3	34	11	2	36	18 94	0/34	
15	235	66.657	49.3	35	-57	2	36	18 94	0	
16	236	65.915	50.6	36	-8	2	36	18 94	0	
17	237	66.765	50.9	37	-27	2	36	18 94	0/12	
18	238	67.697	50.8	38	8	2	36	18 94	3/29	
19	239	68.748	51.4	39	13	2	36	18 94	0	
20	240	69.633	51.7	40	9	2	36	18 74	0	

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 6 TEAM 4
 SHOT POINT 2
 SHOT TIME: 200: 7:16: 0.009

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	261	19.720	53.9	61	13	1	36	18 74	0	
2	262	18.833	51.4	62	8	1	36	18 74	0	
3	263	17.635	49.4	63	9	1	36	18 74	0	
4	264	16.473	50.2	64	10	1	36	18 74	0	
5	265	15.242	52.6	65	7	1	36	18 54	0	
6	266	13.770	52.2	66	6	1	36	18 54	0	
7	267	12.843	52.0	67	-24	1	36	18 54	25/32	
8	268	11.743	52.8	68	3	1	36	18 74	0	
9	269	10.335	53.2	69	8	1	36	18 94	0	
10	270	9.154	58.8	70	19	3	36	18 74	0	
11	271	8.229	63.2	71	-16	3	36	18 74	32	
12	272	7.575	70.2	72	16	3	36	18 74	0	
13	273	6.451	72.2	73	-3				3/16	
14	274			74	--				20	
15	275	5.165	70.5	75	16	3	36	18 74	0	
16	276	3.830	70.1	76	-14	3	36	18 94	1	
17	277	2.409	62.5	77	6	3	36	18 94	0	
18	278	1.144	56.8	78	5	3	36	18 94	0	
19	279	0.039	169.8	79	7	3	36	18 94	0	
20	280	1.137	240.4	80	17				25/32	

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 6 TEAM 5
 SHOT POINT 2
 SHOT TIME: 200: 7:16: 0.009

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	281	62.344	180.7	81	-48	2	36	18 54	0/33	
2	282	23.312	232.3	82	-10	1	36	18 54	0/33	
3	283	27.196	272.0	83	41	2	36	18 54	0/33	
4	284	20.503	53.8	84	30	1	36	18 74	0/34	
5	285	20.731	53.7	85	-14	1	36	18 74	0	
6	286	20.900	53.4	86	3	1	36	18 74	1	
7	287	20.627	54.3	87	14	1	36	18 74	0/33	
8	288	20.791	54.2	88	33	1	36	18 74	0/33	
9	289	20.768	54.8	89	20	1	36	18 74	0/33	
10	290	21.691	53.2	90	38	1	36	18 74	0	
11	291	22.502	52.5	91	9	1	36	18 94	0	
12	292	23.386	51.7	92	33	1	36	18 94	0	
13	293	24.238	50.5	93	26	1	36	18 94	0	
14	294	25.224	49.9	94	18	1	36	18 94	0/34	
15	295	25.263	47.5	95	29	1	36	18 94	0	
16	296	26.186	47.5	96	-45	1	36	18 94	0	
17	297	27.350	48.1	97	16	1	36	18 94	0	
18	298	28.614	48.3	98	-16	1	36	18 94	0	
19	299	30.309	48.1	99	15	1	36	18 74	0	
20	300	31.390	47.0	100	10	1	36	18 74	0	

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 7 TEAM 5
 SHOT POINT 1
 SHOT TIME: 200: 7:31: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	281	55.957	162.8	81	-49	2	36	18	54	0/33
2	282	5.523	192.4	82	-10	1	36	18	54	0/33
3	283	13.967	314.6	83	41	1	36	18	54	0/33
4	284	39.775	58.2	84	30	1	36	18	74	0
5	285	39.999	58.1	85	-14	1	36	18	74	0/34
6	286	40.158	57.9	86	3	3	36	18	74	1
7	287	39.909	58.4	87	14	2	36	18	74	0/33
8	288	40.070	58.3	88	33	2	36	18	74	0/33
9	289	40.064	58.7	89	20	1	36	18	74	0/33
10	290	40.939	57.7	90	38	1	36	18	74	0
11	291	41.727	57.3	91	9	3	36	18	74	12
12	292	43.580	56.7	92	33	1	36	18	94	0
13	293	43.384	56.0	93	26	1	36	18	94	0
14	294	44.337	55.5	94	18	1	36	18	94	0/34
15	295	44.262	54.1	95	29	2	36	18	94	0
16	296	45.180	54.0	96	-46	1	36	18	94	0
17	297	46.369	54.2	97	16	1	36	18	94	0
18	298	47.633	54.1	98	-16	1	36	18	94	0
19	299	49.311	53.8	99	15	1	36	18	74	0
20	300	50.325	53.0	100	10	1	36	18	74	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 7 TEAM 3
 SHOT POINT 1
 SHOT TIME: 200: 7:31: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	241	92.992	49.7	41	6	2	36	18	54	0
2	242	91.372	50.2	42	0	2	36	18	54	0
3	243	90.261	50.5	43	-40	2	36	18	54	0
4	244	89.163	50.8	44	-37	2	36	18	54	0
5	245	88.050	51.1	45	3	2	36	18	54	0
6	246	86.925	51.4	46	-111	2	36	18	54	0
7	247	85.380	51.5	47	97	2	36	18	54	1
8	248	84.025	51.6	48	45	2	36	18	54	0
9	249	82.837	51.9	49	6	2	36	18	54	1
10	250	81.917	52.5	50	-7	2	36	18	54	0
11	251	80.765	53.0	51	17	2	36	18	54	0
12	252	79.683	53.4	52	-16	2	36	18	54	0
13	253	78.589	53.9	53	6	2	36	18	74	0
14	254	77.568	54.4	54	-25	2	36	18	74	0
15	255	76.391	54.9	55	13	2	36	18	74	0
16	256	75.233	55.0	56	-6	2	36	18	74	0
17	257			57	-17	2	36	18	74	3
18	258			58	-11	2	36	18	74	12
19	259	71.333	53.8	59	2	2	36	18	74	0
20	260	69.939	52.3	60	-12	2	36	18	74	0/34

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 8 TEAM 1
 SHOT POINT 3
 SHOT TIME: 200: 8:31: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	201	48.816	235.6	1	33	2	36	18	94	0
2	202	47.568	235.0	2	234	2	36	18	94	0/13
3	203	46.253	234.9	3	13	2	36	18	94	0
4	204	45.584	233.9	4	-2	2	36	18	94	0
5				5	--	2	36	18	94	20
6	206	43.136	236.5	6	14	2	36	18	94	0
7	207	42.024	236.6	7	-21	2	36	18	94	0
8	208	40.596	236.5	8	131	2	36	18	74	0
9	209	39.249	235.9	9	234	2	36	18	74	28
10	210	37.715	236.2	10	14	2	36	18	68	0
11	211	35.854	239.0	11	118	2	36	18	74	0
12	212	34.394	237.1	12	14	2	36	18	54	0
13	213	33.736	235.4	13	10	2	36	18	54	0
14	214	32.748	233.3	14	80	2	36	18	74	0
15	215	31.394	233.5	15	10	2	36	18	74	0
16	216	30.415	232.7	16	47	2	36	18	68	0
17	217	29.366	230.5	17	93	2	36	18	94	0
18	218	26.594	234.0	18	-2	1	36	18	94	0
19	219	25.725	230.9	19	-46	1	36	18	94	0
20	220	44.281	234.1	20	24	2	36	18	94	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 7 TEAM 4
 SHOT POINT 1
 SHOT TIME: 200: 7:31: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE	GRADE
1	261	38.995	58.3	61	13	2	36	18	74	0
2	262	38.038	57.2	62	8	2	36	18	74	0
3	263	36.776	56.4	63	9	2	36	18	74	0
4	264	35.650	57.0	64	10	2	36	18	74	0
5	265	34.501	58.3	65	7	2	36	18	54	0
6	266	33.026	58.4	66	7	2	36	18	54	0
7	267	32.099	58.5	67	-24	3	36	18	74	25/32
8	268	31.027	59.0	68	3	1	36	18	74	0
9	269	29.635	59.4	69	8	1	36	18	94	0
10	270	28.535	61.5	70	20	1	36	18	74	0
11	271	27.625	62.9	71	-16	1	36	18	74	0
12	272	26.926	64.9	72	16	1	36	18	74	0
13	273	25.783	65.1	73	-3	3	36	18	74	3/16
14	274			74	74	--	36	18	74	20
15	275	24.525	64.4	75	16	1	36	18	74	0
16	276	23.200	64.0	76	-14	1	36	18	94	1
17	277	21.805	62.7	77	6	1	36	18	94	0
18	278	20.534	62.4	78	5	1	36	18	94	0
19	279	19.384	62.9	79	7	1	36	18	94	0
20	280	18.260	62.9	80	17	1	36	18	94	25/32

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 8 TEAM 2
 SHOT POINT 3
 SHOT TIME: 200: 8:31: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	221	7.585	45.2	21	4	3	36	18	74
2	222	8.706	44.9	22	19	3	36	18	74
3	223	10.002	43.3	23	10	3	42	18	74
4	224	11.211	42.8	24	-6	1	36	18	74
5	225	12.441	43.2	25	-8	1	36	18	74
6	226	13.694	44.0	26	12	1	36	18	74
7	227	14.717	43.2	27	-114	1	36	18	74
8	228	15.934	42.3	28	29	1	36	18	74
9	229	17.013	43.0	29	19	1	36	18	74
10	230	17.939	42.9	30	8	1	36	18	74
11	231	18.919	42.8	31	22	2	36	18	74
12	232	20.023	42.8	32	1	2	36	18	74
13	233			33	-40	2	36	18	74
14	234	22.193	40.6	34	12	2	36	18	74
15	235	22.815	40.1	35	-58	2	36	18	74
16	236	21.900	43.6	36	-8	2	36	18	74
17	237	22.708	44.6	37	-28	2	36	18	74
18	238	23.641	44.7	38	8	2	36	18	74
19	239	24.619	46.6	39	13	2	36	18	74
20	240	25.474	47.5	40	9	2	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 8 TEAM 4
 SHOT POINT 3
 SHOT TIME: 200: 8:31: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	261	6.099	206.1	61	13	3	36	18	74
2	262	6.621	215.9	62	8	3	36	18	74
3	263	7.675	222.8	63	9	3	36	18	74
4	264	8.856	222.3	64	10	3	36	18	74
5	265	10.189	219.6	65	7	1	36	18	74
6	266	11.611	221.7	66	7	1	36	18	74
7	267	12.513	222.8	67	-25	3	36	18	74
8	268	13.630	222.7	68	3	1	36	18	74
9	269	15.402	223.5	69	8	1	36	18	74
10	270	16.403	221.1	70	20	1	36	18	74
11	271	17.502	220.1	71	-16	2	36	18	74
12	272	18.528	218.3	72	16	1	36	18	74
13	273	19.604	219.5	73	-3	3	36	18	74
14	274			74	--		36	18	74
15	275	20.623	221.8	75	17	2	36	18	74
16	276	21.792	223.5	76	-15	3	36	18	74
17	277	22.957	225.9	77	6	2	36	18	74
18	278	24.146	227.0	78	5	2	36	18	74
19	279	25.295	227.3	79	8	2	36	18	74
20	280	26.383	228.0	80	18		36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 8 TEAM 3
 SHOT POINT 3
 SHOT TIME: 200: 8:31: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	241	49.019	45.8	41	6	2	36	18	54
2	242	47.357	46.5	42	0	2	36	18	54
3	243	46.218	47.1	43	-41	2	36	18	54
4	244	45.093	47.6	44	-37	2	36	18	54
5	245	43.958	48.1	45	3	2	36	18	54
6	246	42.810	48.7	46	-113	2	36	18	54
7	247	41.258	48.8	47	99	2	36	18	54
8	248	39.902	48.8	48	46	2	36	18	54
9	249	38.692	49.4	49	6	2	36	18	54
10	250	37.743	50.6	50	-7	2	36	18	54
11	251	36.573	51.6	51	17	3	36	18	54
12	252	35.421	52.7	52	-16	2	36	18	54
13	253	34.320	53.7	53	7	2	36	18	74
14	254	33.299	54.8	54	-26	2	36	18	74
15	255	32.131	56.1	55	13	2	36	18	74
16	256	30.974	56.2	56	-6	2	36	18	74
17	257			57	-17		36	18	74
18	258			58	-11		36	18	74
19	259	27.065	53.4	59	-2	2	36	18	74
20	260	25.728	49.4	60	-12	2	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 8 TEAM 5
 SHOT POINT 3
 SHOT TIME: 200: 8:31: 0.014

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	281	81.956	193.8	81	-50	2	36	18	54
2	282	48.540	229.7	82	-10	2	36	18	54
3	283	48.533	250.5	83	42	2	36	18	54
4	284	5.413	202.3	84	30	1	36	18	74
5	285	5.199	201.4	85	-14	3	36	18	74
6	286	4.987	201.6	86	3		36	18	74
7	287	5.389	200.3	87	14	3	36	18	74
8	288	5.234	199.6	88	34	3	36	18	74
9	289	5.388	197.7	89	20	1	36	18	74
10	290	4.284	197.0	90	38	3	36	18	74
11	291	3.493	192.5	91	9	3	36	18	74
12	292	2.624	185.6	92	34		36	18	74
13	293	1.701	176.5	93	26	3	36	18	74
14	294	1.083	141.3	94	19	3	36	18	74
15	295	0.028	159.8	95	29	3	36	18	74
16	296	0.913	49.9	96	-46	3	36	18	74
17	297	2.102	56.8	97	16	3	36	18	74
18	298	3.364	54.6	98	-16	3	36	18	74
19	299	5.046	51.7	99	15	3	36	18	74
20	300	6.120	45.3	100	11	3	36	18	74

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 3
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	941	1.158	83.4	41	-3		36	18 82	1
2	942	0.671	79.7	42	-6	3	36	18 82	0
3	943	0.308	54.0	43	-36	3	36	18 82	0
4	944	0.338	286.5	44	-52	3	36	18 82	0
5	945	0.846	276.8	45	5	3	36	18 82	0
6	946	1.335	273.9	46	-93	3	36	18 82	0
7	947	1.821	272.9	47	85	3	36	18 82	0
8	948	2.313	272.1	48	-75	3	36	18 82	1
9	949	2.794	271.4	49	0	3	36	18 82	0
10	950	3.301	271.5	50	-12	3	36	18 74	0
11	951	3.779	271.3	51	-9	1	36	18 74	0
12	952	4.263	271.3	52	-41				21/32
13	953	4.743	271.2	53	8	3	36	18 54	0
14	954	5.242	271.1	54	-22	3	36	18 54	0
15	955	5.692	274.5	55	-34	3	36	18 54	0
16	956	6.175	275.9	56	-10	3	36	18 54	0/12
17	957	6.651	276.8	57	-83	3	36	18 54	0
18	958	7.163	276.5	58	-12	3	36	18 54	0
19	959	7.640	276.4	59	-8	3	36	18 54	0
20	960	8.130	276.5	60	-8	3	36	18 54	0

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 1
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	901	20.715	266.0	1	12	3	36	18 54	0
2	902	20.202	267.5	2	-41		36	18 54	21/32
3	903	19.625	268.2	3	6	1	36	18 54	0
4	904	18.936	269.4	4	-162	1	36	18 54	0
5	905	18.402	269.9	5	46	1	36	18 54	21/32
6	906	17.820	271.7	6	8	2	36	18 54	0
7	907	17.224	272.5	7	-14	1	36	18 54	0
8	908	16.618	272.3	8	49	2	36	18 54	0
9	909	16.023	273.0	9	-8	2	36	18 54	0
10	910	15.514	273.4	10	-18		36	18 54	21/32
11	911	14.877	272.0	11	21		36	18 54	1
12	912	14.265	271.7	12	0	2	36	18 54	0
13	913	13.242	269.7	13	-21	2	36	18 54	0
14	914	12.563	269.4	14	75	2	36	18 54	0
15	915	11.920	270.0	15	-4	2	36	18 54	0
16	916	11.112	270.9	16	22	2	36	18 54	0
17	917	10.368	270.9	17	34	1	36	18 54	0
18	918	9.758	272.7	18	4	1	36	18 54	0
19	919	9.195	274.6	19	26	3	36	18 54	0
20	920	8.622	276.5	20	-22		36	18 54	17

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 2
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	921	1.587	79.5	21	0	3	36	18 74	0
2	922	2.060	82.0	22	6	3	36	18 74	0
3	923	2.503	82.8	23	7	3	36	18 74	0
4	924	2.957	86.3	24	-11	3	36	18 74	0
5	925	3.447	87.6	25	-36	3	36	18 74	0
6	926	3.962	87.9	26	4	3	36	18 74	1
7	927	4.453	88.6	27	-26	3	36	18 74	0
8	928	4.944	89.0	28	6	3	36	18 54	0
9	929	5.416	88.3	29	9	3	36	18 54	0
10	930	5.911	88.4	30	3	3	36	18 94	0
11	931	6.425	88.8	31	7	3	36	18 54	0
12	932			32	--		36	18 54	1
13	933			33	--		36	18 54	1
14	934	7.873	88.8	34	3	3	36	18 54	0
15	945	0.846	276.8	35	-29	3	36	18 54	32
16	936	8.845	89.0	36	-6	3	36	18 54	0
17	937	9.323	89.0	37	6	2	36	18 74	32
18	938	9.805	89.1	38	2	2	36	18 54	3
19	939	10.272	89.1	39	7	2	36	18 54	0
20	940			40	--		36	18 54	1

DKDAT FIELD DATA TABLE

EXPERIMENT 20 MORRO BAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 4
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	961	31.414	89.5	61	0	2	36	18 54	0
2	962	32.242	89.6	62	-2		36	18 54	12
3	963	33.033	89.5	63	-2	2	36	18 54	0
4	964	34.154	89.5	64	-5	2	36	18 54	0
5	965	34.834	89.5	65	-14	2	36	18 54	0
6	966	35.652	89.6	66	-25		36	18 54	17
7	967	36.467	89.6	67	-52	2	36	18 54	0
8	968	37.268	89.7	68	-29	2	36	18 54	0
9	969	38.085	89.7	69	-6	2	36	18 54	0
10	970	38.896	89.7	70	-2	2	36	18 54	0
11	971	39.688	89.7	71	-54	2	36	18 54	0
12	972	40.498	89.7	72	3	2	36	18 54	0
13	973	41.362	92.0	73	-12	2	36	18 54	0
14	974	42.166	91.9	74	-18	2	36	18 54	0
15	975	42.972	91.9	75	0	2	36	18 54	0
16	976	43.778	91.8	76	-9	2	36	18 54	0
17	977	44.590	91.8	77	-14	2	36	18 54	0
18	978	45.381	91.8	78	-2	2	36	18 54	0
19	979	46.209	91.7	79	-14	2	36	18 54	0
20	980	47.000	91.7	80	2	2	36	18 54	0

DN DAT FIELD DATA TABLE

EXPERIMENT 20 MORRO RAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 5
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	981	20.946	89.5	81	-29	1	36	18	54 0
2	982	21.449	89.5	82	-58		36	18	54 1
3	983	21.935	89.5	83	9	1	36	18	54 12
4	984	22.391	89.4	84	9	1	36	18	54 12
5	985	22.868	89.4	85	-61	1	36	18	54 12
6	986	23.603	89.4	86	3	3	36	18	54 17
7	987	23.864	89.5	87	7	1	36	18	54 12
8	988	24.119	89.5	88	23	1	36	18	54 12
9	989	24.560	89.5	89	10	1	36	18	54 12
10	990	25.251	89.3	90	-3	2	36	18	54 12
11	991	25.798	89.6	91	5	2	36	18	54 0
12	992	26.266	89.6	92	7	2	36	18	54 0
13	993	26.765	89.6	93	-20	2	36	18	54 0
14	994	27.238	89.6	94	22	2	36	18	54 1
15	995	27.720	89.6	95	27	2	36	18	54 0
16	996	28.233	89.7	96	10	2	36	18	54 0
17	997	28.637	90.0	97	-49	2	36	18	54 0
18	998	1.131	0.6	98	-3	3	36	18	94 0
19	999	1.666	0.4	99	6	3	36	18	94 0/34
20	1000	0.605	1.2	100	9	3	36	18	94 0/34

DN DAT FIELD DATA TABLE

EXPERIMENT 20 MORRO RAY, CALIFORNIA
 SHOT NUMBER 9 TEAM 6
 SHOT POINT 8
 SHOT TIME: 141: 8: 0: 0.010

LOC	DIST(KM)	AZIM	UNIT	CHRON	CHAN	C1	C2	C3	TAPE
									GRADE
1	1001	12.871	89.4	101	20	1	36	18	54 0
2	1002	13.236	89.4	102	7	2	36	18	54 21/32
3	1003	13.742	89.4	103	23	1	36	18	54 0
4	1004	14.046	89.4	104	-3	1	36	18	54 0
5	1005	14.447	89.4	105	12	1	36	18	54 0
6	1006	14.867	89.5	106	-21	2	36	18	54 21/32
7	1007	12.312	89.3	107	-101	1	36	18	54 0
8	1008	15.640	89.5	108	5	2	36	18	54 21/32
9	1009	11.779	89.3	109	4	1	36	18	54 0
10	1010	16.401	89.5	110	25	1	36	18	54 0
11	1011	17.118	89.6	111	-2	2	36	18	54 1
12	1012	17.511	89.5	112	-23	2	36	18	54 21/32
13	1013	17.926	89.5	113	-5	3	36	18	54 1/
14	1014	18.325	89.5	114	-4	1	36	18	54 0
15	1015	18.726	89.5	115	-12	1	36	18	54 0/34
16	1016	19.117	89.5	116	3	1	36	18	54 0
17	1017	19.523	89.5	117	-23	1	36	18	54 0
18	1018	19.923	89.5	118	-18	1	36	18	54 0
19	1019	20.326	89.5	119	-5	1	36	18	54 0
20	1020	11.253	89.2	120	0	1	36	18	54 0