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1992 CAPE MENDOCINO CALIBRATION EXPERIMENT'S SEISMIC REFRACTION PIGGYBACK

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April, 1994

PASSCAL Data Report 94-004

IRIS DATA MANAGEMENT SYSTEM

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Data Management Center
1408 NE 45th Street
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Seattle, Washington 98105

Data Report for the 1992 Cape Mendocino Calibration Experiment's Seismic Refraction Piggyback

In September of 1993, the U.S. Geological Survey detonated four shots to calibrate a seismic network near Cape Mendocino, California. Stanford University and the U.S. Geological Survey organized and deployed a refraction experiment to utilize these sound sources and to act as a pilot study for future seismic experiments in the area. The primary scientific objective of this refraction survey was to determine recording conditions in this geologically complex region, and if possible, establish crustal thickness by imaging the top of the subducting Gorda slab.

A total of 200 instruments, 60 3-component RefTeks and 140 1-component SGRs, were deployed along a 140-km-long profile sub-parallel to the coast (Figures 1 & 2, Tables 1-3). The SGRs were nominally spaced at 1 km intervals along the profile. The 3-component RefTeks were interleaved at 0.5 km intervals along the central 40 km of the profile. The radial-component of the 3-component geophone was oriented to geographic north.

The enclosed tape contains both SGR and Reftek data merged. X, Y coordinates for each station is written to the headers (see SEG-Y Appendix).

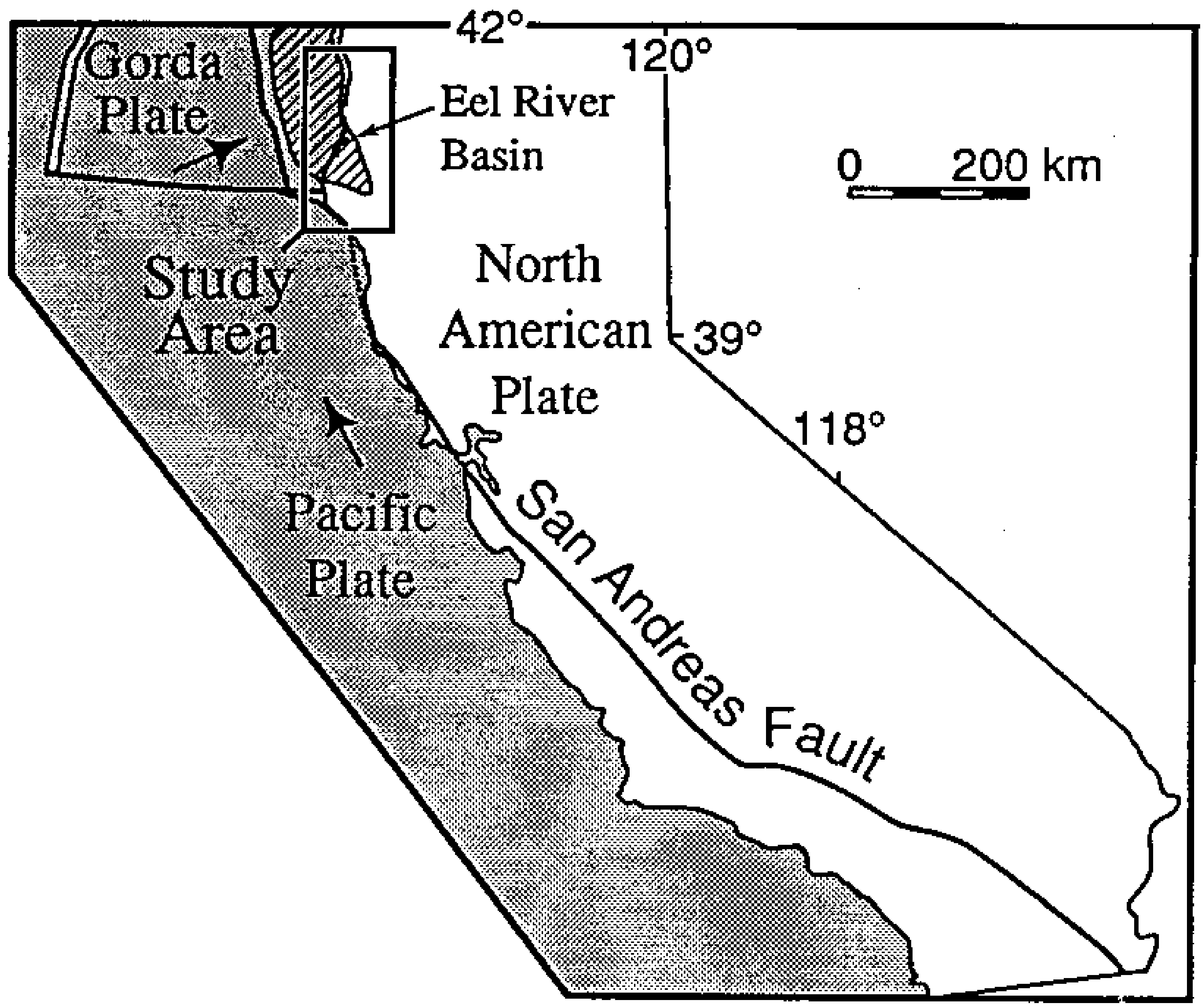

Figure 1: Map of California showing the location of the Mendocino Calibration Experiment's Seismic Refraction Piggyback. Large arrows show the plate motion relative to North America.

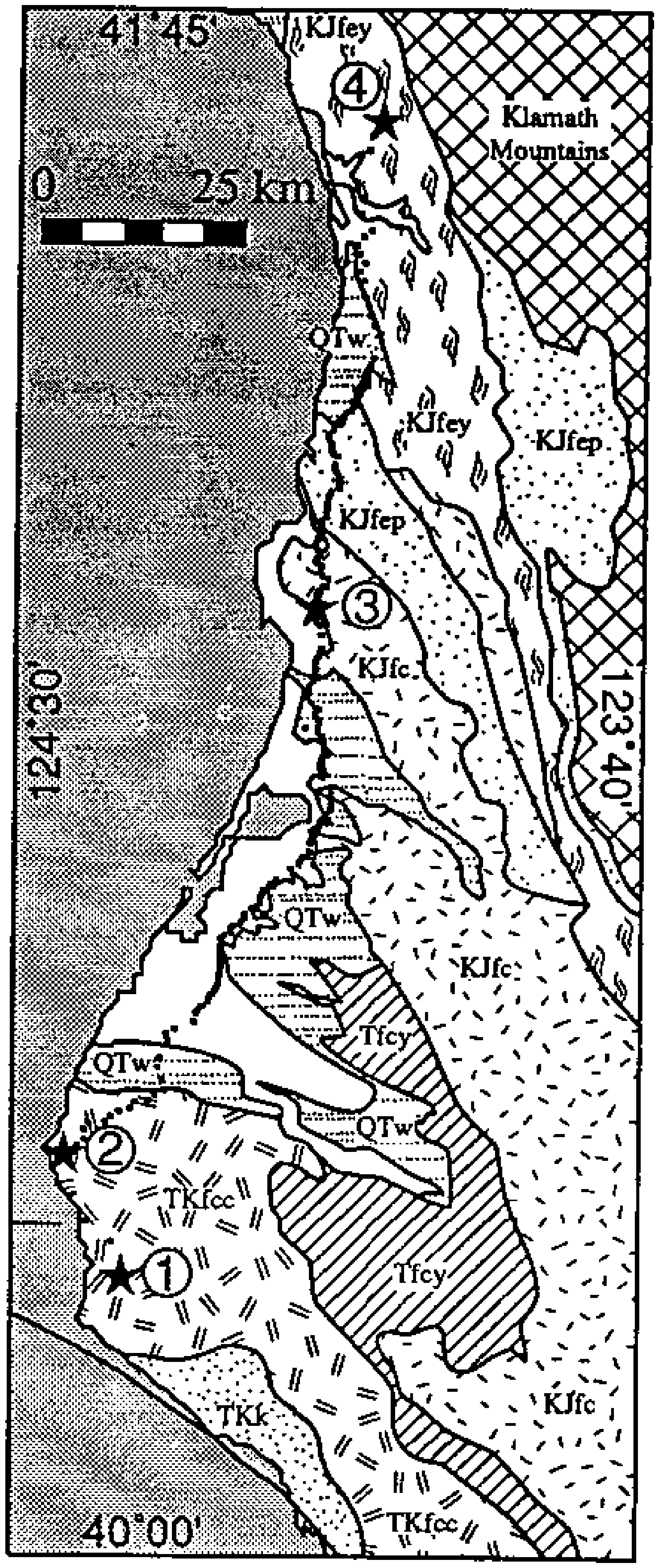

Figure 2: Map showing the locations for the seismometers (small squares) and the shotpoints (numbered stars). Rock units: KJfep, Pickett Peak terrane– Eastern belt, Franciscan Complex; KJfey, Yolla Bolly terrane–Eastern belt, Franciscan Complex; KJfc, Central belt, Franciscan Complex; TKfcc, Coastal terrane–Coastal belt, Franciscan Complex; Tfcy, Yager terrane–Coastal belt, Franciscan Complex; TKk, King Range terrane, QTw, Wildcat Group and correlative units. Geology adapted after Clarke [1992, AAPG Bull., 76, 199-224].

Table 1: Tape FFID Numbers to Shotpoints

Tape FFID	Description
1	Vertical Component-shotpoint #1
2	Vertical Component-shotpoint #2
3	Vertical Component-shotpoint #3
4	Vertical Component-shotpoint #4
21	Radial Component-shotpoint #1
22	Radial Component-shotpoint #2
23	Radial Component-shotpoint #3
24	Radial Component-shotpoint #4
31	Transverse Component-shotpoint #1
32	Transverse Component-shotpoint #2
33	Transverse Component-shotpoint #3
34	Transverse Component-shotpoint #4

Table 2: Vertical–Component
Tape Channel Number to Site Location Number

channel	Site
1	10000
2	10010
3	10020
4	10030
5	10040
6	10050
7	10060
8	10070
9	10080
10	10090
11	10100
12	10110
13	10120
14	10130
15	10140
16	10150
17	10160
18	10180
19	10190
20	10200
21	10220
22	10230
23	10240
24	10250
25	10260
26	10270
27	10280
28	10290
29	10295
30	10300
31	10305
32	10310
33	10315
34	10320
35	10325
36	10330
37	10335
38	10340
39	10345
40	10350
41	10355
42	10360
43	10365
44	10375
45	10380
46	10385
47	10390
48	10395
49	10400
50	10410
51	10415
52	10420
53	10430
54	10435
55	10440
56	10445
57	10450
58	10455
59	10460
60	10465
61	10475
62	10480
63	10485
64	10490
65	10495
66	10500
67	10505
68	10510
69	10515
70	10520
71	10525
72	10530
73	10535
74	10540
75	10550
76	10555
77	10560
78	10565
79	10570
80	10580
81	10585
82	10590
83	10595

Table 2: Vertical–Component
Tape Channel Number to Site Location Number

84	10600
85	10605
86	10610
87	10615
88	10620
89	10625
90	10630
91	10635
92	10640
93	10645
94	10650
95	10655
96	10660
97	10665
98	10670
99	10675
100	10680
101	10685
102	10695
103	10700
104	10705
105	10710
106	10715
107	10720
108	10730
109	10740
110	10745
111	10750
112	10755
113	10760
114	10765
115	10770
116	10775
117	10780
118	10785
119	10790
120	10795
121	10800
122	10805
123	10810
124	10815
125	10820

126	10825
127	10830
128	10835
129	10840
130	10845
131	10850
132	10855
133	10860
134	10865
135	10870
136	10875
137	10880
138	10885
139	10890
140	10895
141	10900
142	10905
143	10910
144	10915
145	10920
146	10925
147	10930
148	10935
149	10940
150	10945
151	10955
152	10960
153	10965
154	10970
155	10975
156	10980
157	10985
158	10990
159	10995
160	11000
161	11005
162	11010
163	11015
164	11020
165	11030
166	11040
167	11050

Table 2: Vertical–Component
Tape Channel Number to Site Location Number

168	11060
169	11070
170	11080
171	11100
172	11110
173	11120
174	11130
175	11140
176	11150
177	11160
178	11170
179	11180
180	11190
181	11200
182	11210
183	11220
184	11230
185	11250
186	11270
187	11280
188	11290
189	11330
190	11350
191	11360
192	11370

Table 3: Horizontal–Components
Tape Channel Number to Site Location Number

Channel	Site
1	10295
2	10305
3	10315
4	10325
5	10335
6	10345
7	10355
8	10365
9	10375
10	10385
11	10395
12	10415
13	10435
14	10445
15	10455
16	10465
17	10475
18	10485
19	10495
20	10505
21	10515
22	10525
23	10535
24	10555
25	10565
26	10585
27	10595
28	10605
29	10615
30	10625
31	10635
32	10645
33	10655
34	10665
35	10675
36	10685
37	10695
38	10705
39	10715
40	10745
41	10755
42	10765
43	10775
44	10785
45	10795
46	10805
47	10815
48	10825
49	10835
50	10845
51	10855
52	10865
53	10875
54	10885
55	10895
56	10905
57	10915
58	10925
59	10935
60	10945
61	10955
62	10965
63	10975
64	10985
65	10995
66	11005
67	11015

Appendix: SEG-Y Output

- IBM Real: 4-byte IBM Floating Point SEG-Y.

Summary Of SEG-Y Header Use

Bytes 1-4, trace sequence number within line
- Output from TRACENO

Bytes 5-8, trace sequence number within reel
- Used on output

Bytes 9-12, original field record number
- Output from FFID

Bytes 13-16, trace number within the original field record (channel)
- Output from CHAN

Bytes 17-20, energy source point number
- Output from SIN

Bytes 29-30, trace identification code
- Output from TRC_TYPE

Bytes 37-40, distance from source to receiver
- Output from OFFSET

Bytes 41-44, receiver group elevation
- Output from REC_ELEV

Bytes 45-48, surface elevation at source
- Output from SOU_ELEV

Bytes 49-52, source depth below surface
- Output from DEPTH

Bytes 69-70, scalar for bytes 41-68
- Used on output, always -1000

Bytes 71-72, scalar for bytes 73-88
- Used on output, always -1000

Bytes 73-76, source X coordinate
- Output from SOU_X

Bytes 77-80, source Y coordinate

- Output from SOU_Y

Bytes 81-84, receiver X coordinate
- Output from REC_X

Bytes 85-88, receiver Y coordinate
- Output from REC_Y

Bytes 89-90, coordinates units - to database
- Output from database (IUNITSz)

Bytes 99-100, source static correction
- Output from SOU_STAT

Bytes 101-102, receiver static correction
- Output from REC_STAT

Bytes 103-104, total static applied
- Output from TOT_STAT

Bytes 115-116, number of samples in this trace
- Output from global variable NUMSMPz

Bytes 117-118, sample interval in this trace
- Output from global variable SAMPRATz

Bytes 119-120, gain type of instruments
- Output from database (IGAINXz)

Bytes 121-122, instrument gain constant
- Output from database (PREAMPz)

Bytes 123-124, instrument early gain
- Output from database (EARLYGz)

Bytes 157-158, year recorded - to database
- Output from database (IDATRECz)

Bytes 181-240, optional use

- Used on input