International Seismological Centre

Earth Sciences Observatory

Leonard, Oklahoma

SEISMOGRAM READINGS

Station Abbreviation: TUL

Geographical Location: 35° 54' 38" N. latitude
95° 47' 33" W. longitude

Altitude: 256.4 meters (841 feet)

Geology: 1128 meters (3700 feet) of Pennsylvanian and Mississippian sandstones and limestones above basement granite.

Instruments: Three short period Benioff N', E', Z'.
Free period of pendulum 1.0 sec.
Free period of galvanometer 0.2 sec.

Three long period Press-Ewing N, E, Z.
Free period of pendulum 25 sec.
Free period of galvanometer 90 sec.

Interpretation:

First column gives the date.

Second column: Earthquake phase (P, S, PP, PS, PKP, etc.)

Third column: Seismograph on which the reading is made, N', E', and Z' indicate short period seismographs, N, E, and Z indicate long period seismographs.

Fourth column: Greenwich mean time in hours, minutes and seconds.

Fifth column: USCGS epicenter determination, Tulsa magnitudes and other remarks.

Magnitudes are computed from maximum trace amplitudes of surface waves as recorded on long period vertical seismograph.

JERSEY PRODUCTION RESEARCH COMPANY

Tulsa, Oklahoma

JUL 20 1983

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LEONARD OBSERVATORY
Seismogram Readings
January 1963

1	iP	Z'	04 12 12.8	6.9N, 73.1W, h=151, H=04 05 27.5
	i	Z'	14 13 09.5	
	iS	E'	14 22 15.0	
1	e(Lg)	Z'	05 29 31	
	i	Z'	05 29 36.8	
1	e(Lg)	Z'	05 48 38	
	i	Z'	05 49 10.5	
1	eL	Z	14 37	20.8N, 144.6E, h=43, H=13 48 06.5
				M=5.1 (Tul)
1	eP	Z'	16 40 41	
	epP	Z'	41 13	
1	ePKP	Z'	19 56 04	40.2S, 81.3E, h=33, H=19 35 55.1
	e	Z	20 19 00	M=5.9 (Tul)
	eSS	N	20 24 00	
	eLQ	N	20 49	
	eLR	Z	20 59	
1	i(P)	Z'	22 35 02.8	
1	iP	Z'	23 47 23.0	56.5N, 157.7W, h=50, H=23 39 05.6
	i(pP)	Z	23 47 41	M=6.0 (Tul)
	eS	NE	23 54 02	
	esS	NE	23 54 32	
	iSS	N	23 57 45	
	eL	Z	00 00 30	
2	iP	Z'	00 58 38.0	17.5N, 82.7W, h=33, H=00 56 49.1
2	eP	Z'	01 23 42	4.6S, 105.9W, h=33, H=01 15 50.6
	e	Z'	01 24 50	M=4.6 (Tul)
	eS	E	01 30 55	
	eL	Z	01 36	
2	e(P)	Z'	06 50 15	
2	iP	Z'	09 59 10.5	10.0N, 84.8W, h=151, H=09 53 36.7
	eL	Z	10 09	M=4.1 (Tul)
2	ePKP	Z'	15 15 04	4.1S, 135.2E, h=33, H=14 56 05.4
	ePS	E	15 26 48	M=5.8 (Tul)
	eSS	E	15 34 00	
	eL	Z	15 55	
2	eP	Z'	16 08 48	52.9S, 118.2W, h=33, H=15 55 47.9
	eL	Z	16 41	M=5.6 (Tul)

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3	e(S)	NE	03 30 40	29.7N, 130.1E, h=33, H=03 05 03.5
	eL	Z	03 57	M=5.4 (Tul)
3	eL	Z	07 28	12.9S, 166.0E, h=74, H=06 35 28.2
				M=4.9 (Tul)
3	ePKP	Z'	09 58 31	5.3S, 151.5E, h=74, H=09 39 46.8
	ePS	E	10 08 36	M=5.9 (Tul)
	ePKKP	Z'	10 09 18	
	eSS	E	10 14 30	
	eSSS	E	10 18 50	
	eL	Z	10 31	
4	eP	Z'	00 35 14	1.2N, 27.7W, h=33, H=00 23 55.1
	eL	Z	00 57	M=5.3 (Tul)
4	eP	Z'	05 55 57	29.7N, 142.2E, h=33, H=05 42 35.3
	eL	Z	06 35	M=4.8 (Tul)
4	eSKS	E	12 41 30	4.7S, 154.0E, h=69, H=12 16 38.0
	eSP	EZ	12 44 55	M=6.2 (Tul)
	eL	Z	13 04	
4	iP	Z'	21 23 54.0	6.9N, 73.1W, h=160, H=21 17 10.0
5	iP	Z'	00 02 01.0	46.5N, 153.7E, h=33, H=23 50 09.1
5	eP	Z'	07 00 18	65.2N, 148.0W, h=33, H=06 52 26.6
5	eP	Z'	07 17 12	46.8N, 153.7E, h=33, H=07 05 22.3
5	eP	Z'	11 42 17	
5	ePS	N	13 32 32	17.8S, 167.9E, h=33, H=13 04 48.1
	eSS	N	13 38 32	M=5.5 (Tul)
	eL	Z	13 53	
5	iPKP	Z'	13 36 05.2	10.0S, 124.0E, H=33, H=13 16 43.0
5	iP	Z'	17 51 57.8	7.0S, 72.1W, h=544, H=17 43 35.1
	i(pP)	Z'	17 52 43.2	
	iS	E'	17 57 45.0	
6	eP	Z'	04 44 09	23.6N, 108.6W, h=33, H=04 40 14
	eL	N	04 48 16	M=
	eLg	Z'	04 49 00	
	eL	Z	04 49 30	
6	iP	Z'	06 25 00.7	1.8S, 80.7W, h=51, H=06 17 28.0
	eS	NE	06 31 07	M=4.6 (Tul)
	eSS	E	06 34 10	
	eL	Z	06 36	

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6	iP	Z'	07 41 44.4	46.8N, 153.6E, h=33, H=07 29 54.3
	eL	N	08 12	(M=4.3 (Tul))
6	eP	Z'	10 03 10	Near
	i(Pg)	Z'	10 03 37.0	
	i(Sg)	Z'	10 05 17.5	
	i(Sg)	E'	10 05 29.5	
6	iP	Z'	17 33 43.0	62.7N, 151.1W, h=116, H=17 25 53.8
6	eP	Z'	18 11 23	44.7N, 112.0W, h=33, H=18 07 47.8
	e(Lg)	Z'	18 15 47	M=
	eL	Z	18 17	
6	iP	Z'	21 32 37.7	47.4N, 155.9E, h=33, H=21 20 56.5
	eL	Z	22 04	M=4.8 (Tul)
6	iP	Z'	22 40 35.4	15.2N, 60.8W, h=72, H=22 33 27.1
7	eL	Z	05 24	
7	eL	Z	07 15	6.4S, 154.7E, h=80, H=06 24 49.2 M=5.3 (Tul)
7	ePP	N	12 09 30	0.6N, 126.7E, h=42, H=11 48 22.7
	eSKKS	N	12 16 10	M=5.9 (Tul)
	eSS	N	12 26 26	
	eL	Z	12 48	
7	eL	Z	20 14	17.5S, 167.7E, h=19, H=19 19 34.1 M=4.5 (Tul)
9	eL	Z	02 51	28.9S, 177.4W, h=71, H=02 02 38.5 M=4.6 (Tul)
9	eSKS	E'	03 37 13	18.6N, 145.4E, h=192, H=03 13 26.4
9	eL	Z	19 22	3.3S, 29.4E, h=33, H=18 22 33.4 M=5.1 (Tul)
10	i(Pm)	Z'	03 14 53.6	Local
	i(Pg)	Z'	13 14 57.7	
	e(Sn)	E'	13 15 17	
10	iP	Z'	05 23 03.7	18.8N, 106.3W, h=33, H=05 18 36.9
	eS	N	05 26 32	M=4.0 (Tul)
	eL	Z	05 29 30	
11	iP	Z'	16 48 55.0	7.5N, 82.5W, h=33, H=06 42 41.8
11	iP	Z'	12 24 36.0	45.0S, 75.7W, h=33, H=12 12 16J
	eS	N	12 35 45	(M=5.4 (Tul))
	eL	N	12 52	

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11	eP	Z'	14 41 26	12.6N, 88.2W, h=33, H=14 36 11.0
	eS	N	14 46 00	(M=4.5 (Tul))
	eL	N	14 50	
12	iP	Z'	03 47 24.0	4.8N, 76.7W, h=102, H=03 40 34.8
12	iP	Z'	06 06 34.0	16.7N, 98.3W, h=33, H=06 02 10
12	i(P)	Z'	11 31 17.3	
	i	Z'	11 31 28.7	
12	iP	Z'	12 21 48.3	53.0N, 170.6W, h=105, H=12 12 36.5
13	eP	Z'	02 43 41	32.9N, 116.5W, h=33, H=02 39 38.7
13	eL	Z	13 45	6.5S, 149.3E, h=29, H=12 49 30.2 M=4.8 (Tul)
13	eP	Z'	16 58 53	(49.7S, 163.7E, h=33, H=16 21 13.1)
	eL	Z	17 25	Possibly two earthquakes
13	iP	Z'	17 31 33.3	32.0S, 68.7W, h=113, H=17 20 19.2
14	iP	Z'	02 25 49.5	62.2N, 150.1W, h=91, H=02 18 02.2
	epP	Z'	02 26 11	M=4.3 (Tul)
	eL	Z	02 42	
14	e(S)	E	11 46 10	21.2S, 169.3E, h=33, H=11 19 47.5
	eSS	E	11 53 30	M=5.5 (Tul)
	eL	Z	12 12	
14	iP	Z'	18 45 40.4	45.7N, 26.6E, h=132, H=18 33 25.3
15	eP	Z'	01 41 38	68.9N, 17.1W, h=33, H=01 32 20.0
	eS	E	01 49 05	M=5.3 (Tul)
	eSS	E	01 52 35	
	eL	Z	02 01	
15	eL	Z	03 24	13.4N, 145.3E, h=38, H=02 32 39.9 M=5.4 (Tul)
15	iP	Z'	03 28 03.2	
15	iP	Z'	04 51 03.0	
15	eP	Z'	05 32 28	69.0N, 16.6W, h=33, H=05 23 10.4
	eS	E	05 39 56	M=5.6 (Tul)
	eSS	E	05 43 28	
	eL	Z	05 50	
15	iP	Z'	05 43 00.0	Local
	iS	E'Z'	05 43 17.6	
15	eP	Z'	08 52 40	

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15	eL	Z	10 36	10.6S, 164.9E, h=89, H=09 47 42.9 M=4.8 (Tul)
15	eL	Z	13 20	36.7N, 102.1E, h=33, H=12 22 29.9 M=4.5 (Tul)
15	iP	Z'	13 55 53.2	11.5N, 87.8W, h=33, H=13 50 28.3
	eL	Z	14 04	M=3.5 (Tul)
15	eSKS	E	18 02 20	17.1S, 179.6W, h=276, H=17 39 19.2
	eS	N	18 03 10	
	ePS	N	18 04 50	
	eSS	N	18 09 30	
15	eP	Z'	19 39 06	20.5S, 177.9W, h=496, H=19 26 34.3
	eSKS	E	19 48 52	
	eS	N	19 49 42	
	eSS	E	19 56 24	
15	eSP	E	22 45 05	31.3S, 13.4W, h=33, H=22 17 50.9
	eSS	E	22 50 40	M=5.7 (Tul)
	eL	Z	23 06	
16	eL	Z	04 00	54.0S, 133.5W, h=33, H=03 14 05.9 M=5.0 (Tul)
16	iP	Z'	03 59 42.4	7.5N, 74.5W, h=33, H=03 52 56.1
16	iP	Z'	05 54 52.5	51.3N, 179.9W, h=38, H=05 44 52.3
	eL	Z	06 17	M=4.8 (Tul)
16	iP	Z'	06 46 55.0	54.2N, 34.9W, h=33, H=06 38 40.4
	eL	Z	07 00	M=4.7 (Tul)
16	iP	Z'	06 53 10.8	54.3N, 35.2W, h=33, H=06 44 56.8
	eL	Z	07 09	M=4.6 (Tul)
16	iP	Z'	12 40 51.3	54.4N, 35.0W, h=33, H=12 32 37.6
	eS	E	12 47 34	M=4.9 (Tul)
	eL	Z	12 55	
16	iP	Z'	15 19 41.0	24.0S, 68.2W, h=150, H=15 09 16.6
	ipP	Z'	15 20 06.3	
16	iPKP	Z'	21 28 08.6	11.1S, 111.6E, h=94, H=21 08 38.8
	i	Z'	21 28 18.8	
17	eP	Z'	03 39 08	43.6S, 83.6W, h=33, H=03 27 02
	eS	E	03 49 05	M=4.3 (Tul)
	eL	Z	04 09	
17	iP	Z'	04 03 30.7	52.3N, 152.5E, h=454, H=03 52 42.2
17	iP	Z'	04 31 06.1	10.6S, 78.7W, h=46, H=04 22 22.5

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17	iP	Z'	19 39 29.3	7.6S, 75.3W, h=201, H=19 31 12.6
17	eL	E	21 35	25.6N, 125.2E, h=140, H=20 41 14.8 (M=4.9 (Tul))
19	eP	Z'	19 33 53	16.9N, 85.0W, h=33, H=19 29 03.6
	eS	E'	19 37 29	
19	eP	Z'	19 55 48	17.0N, 85.0W, h=33, H=19 50 59.4
	eS	E'	19 59 25	M=3.4 (Tul)
	eL	Z	20 03	
20	iP	Z'	09 05 39.0	51.9N, 153.2W, h=30, h=08 56 06.2
	eL	Z	09 30	M=3.9 (Tul)
20	eP	Z'	11 02 43	50.3N, 129.4W, h=31, H=10 56 51.4
	eL	Z	11 12	M=4.3 (Tul)
20	iP	Z'	13 20 10.6	26.4N, 110.7W, h=27, H=13 16 27.0
	eL	Z	13 24 30	M=
	eLg	Z'	13 24 50	
20	eP	Z'	22 25 17	26.7N, 110.7W, h=37, H=22 21 28.7
	eLg	Z'	22 29 55	M=
	eL	Z	22 30 30	
20	eLg	Z'	22 35 05	California aftershock
	eL	Z	22 36	M=
21	iP	Z'	04 27 06.2	34.3S, 69.7W, h=183, H=04 15 50.2
	epP	Z'	04 27 38	
21	eL	Z	05 18	
21	iP	Z'	07 44 50.6	9.3N, 83.0W, h=88, H=07 38 56.9
	eL	Z	07 56	M=4.1 (Tul)
21	eL	Z	11 35	3.0S, 136.2E, h=57, H=10 53 59 M=4.8 (Tul)
21	eP	Z'	14 54 55	59.5N, 151.2W, h=67, H=14 47 05.4
	eL	Z	15 09	M=4.2 (Tul)
22	eL	Z	05 58	31.5N, 89.3E, h=33, H=04 55 16.4 M=4.7 (Tul)
22	eP	Z'	08 41 36	11.3S, 74.7W, h=33, H=08 32 33.2
22	iP	Z'	13 00 37.5	
24	iP	Z'	02 59 56.3	8.4N, 60.8W, h=66, H=02 52 09.0
	eL	Z	03 12	M=4.6 (Tul)
24	iPKP	Z'	09 47 37.2	6.0S, 112.6E, h=493, H=09 29 11.6

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24	iP	Z'	12 22 08.4	15.2S, 173.6W, h=33, H=12 09 01.2
	eSKS	E	12 32 25	M=5.4 (Tul)
	eSS	N	12 38 38	
	eL	Z	12 50	
24	e(L)	N	21 55	47.5N, 121.9W, h=33, H=21 43 13
24	ePS	E	22 57 35	8.0N, 126.8E, h=67, H=22 27 32.5
	eSS	E	23 04 10	M=6.1 (Tul)
	eL	Z	23 24	
27	eL	Z	02 10	25.6N, 128.3E, h=61, H=01 06 55.4
				M=4.9 (Tul)
27	eP	Z'	03 04 36	31.6N, 115.7W, h=33, H=03 00 38.7
	eL	Z	03 10	M=
27	eP	Z'	11 55 49	59.4N, 153.4W, h=94, H=11 47 36.3
	eL	Z	12 09	M=4.3 (Tul)
27	iP	Z'	15 28 39.5	44.3N, 114.5W, h=31, H=15 24 46.5
	eL	Z	15 33	M=
27	eL	Z	19 38	5.2S, 152.3E, h=72, H=18 46 14.6
				M=5.5 (Tul)
27	iP	Z'	19 48 44.4	41.2N, 49.8E, h=33, H=19 35 14.3
	e(pP)	Z'	19 48 58	M=5.9 (Tul)
	eS	N	19 59 10	
	eL	Z	20 20	
28	iP	Z'	02 20 59.2	10.8S, 76.7W, h=105, H=02 12 14.3
	eS	N	02 28 00	M=4.5 (Tul)
	eL	Z	02 34	
28	eP	Z'	04 17 58	43.5N, 144.6E, h=33, H=04 05 30.9
	eL	Z	04 50	M=5.0 (Tul)
28	ePP	ZZ'	12 31 31	2.6S, 149.9E, h=33, H=12 12 19.8
	e(S)	N	12 39 12	M=6.9 (Tul)
	eSP	Z	12 41 00	
	eL	Z	13 03 30	
28	iP	Z'	13 09 28.2	54.7N, 161.6E, h=33, H=13 00 50.7
	eS	E	13 16 22	M=6.7 (Tul)
	eL	Z	13(23)	
28	eL	Z	16(58)	31.2S, 177.7W, h=33, H=16 07 19
				M=5.6 (Tul)
29	eP	Z'	04 38 12	5.8N, 78.4W, h=31, H=00 33 27.0

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29	iP	Z'	09 32 39.8	49.7N, 154.9E, h=126, H=09 21 14.3
	i	Z'	09 32 48.5	M=5.3 (Tul)
	iS	N	09 42 03	
	eL	Z	09 56	
29	iP	Z'	20 43 46.2	21.5S, 68.6W, h=73, H=20 33 22.0
	eL	Z	21 05	M=4.4 (Tul)
29	eL	Z	21 58	12.9N, 143.7E, h=144, H=21 07 57.7
				M=5.2 (Tul)
30	eP	Z'	04 48 33	54.8N, 161.6W, h=33, H=04 39 56.3
	eL	Z	05 09	M=4.6 (Tul)
30	e(Lg)	Z'	05 58 03	44.9N, 110.8W, h=33, H=05 51 00.9
30	eP	Z'	10 24 42	55.6S, 28.3W, h=33, H=10 10 04.1
	ePKP	Z'	10 27 48	M=7.1 (Tul)
	ePP	ZZ'	10 28 44	
	eSKS	N	10 35 00	
	eS	N	10 36 26	
	ePS	N	10 38 04	
	eL	Z	11 02	
30	iP	Z'	23 06 55.6	39.8N, 104.6W, h=33, H=23 05 09.6
	eS	E'	23 09 22	
31	iP	Z'	03 17 48.7	63.5N, 149.4W, h=65, H=03 09 58.3
31	e	N	04 22 28	
	eL	Z	04 25	
31	ePP	Z'	05 25 02	27.9N, 126.3E, h=33, H=05 06 46.0
	e(S)	N	05 32 45	M=6.1 (Tul)
	eL	Z	05 59	
31	eP	Z'	06 08 05	
31	i(P)	Z'	16 53 26.0	

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LEONARD OBSERVATORY
Seismogram Readings
February 1963

1	i(P)	Z'	05 38 29.8	
1	e(S)	N	08 35 15	
	eL	Z	08 43	
1	iP	Z'	16 42 54.3	44.2N, 114.6W, h = 33, H = 16 38 58.3
	e(Lg)	E'	16 47 30	
1	eL	Z	17 09	
1	eL	Z	18 13	
1	eL	Z	18 55	
1	eL	Z	20 26	
1	e(S)	N	23 51 40	
	eL	Z	24 00	
2	eL	Z	04 54	
2	eL	Z	05 07	
2	iP	Z'	19 36 58.0 C	18.8N, 81.5W, h = 71, H = 19 32 15.1
	e	N	19 40 45	M = 3.8 (Tul)
	eL	Z	19 43	
2	iP	Z'	21 30 33.6 C	13.9N, 92.1W, h = 33, H = 21 52 38
	e	E	21 34 38	M = 4.1 (Tul)
	eL	Z	21 42	
3	eP	Z'	04 28 00	15.1N, 92.0W, h = 166, H = 04 23 28
	e	E'	04 31 55	M = 4.0 (Tul)
	e	N	04 32 25	
	eL	Z	04 34	
3	eL	Z	09 05	
3	iP	Z'	12 59 10.0D	7.6N, 72.1W, h = 33, H = 12 52 13.8
	eL	Z	13 11	M = 4.2 (Tul)
3	eL	Z	16 28	
3	eL	Z	23 33	
4	eL	Z	00 56	
4	e	E	01 46 30	6.3S, 149.1E, h = 36, H = 01 17 03.1
	eL	Z	02 10	M = 5.7 (Tul)
4	eL	Z	06 34	
4	eP	Z'	12 35 10	5.1N, 82.4W, h = 45, H = 12 28 38.1
	eL	Z	12 45	M = 4.4 (Tul)

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4	eL	Z	16 01	17.3S, 167.9E, h = 33, H = 15 04 05.3 M = 5.1 (Tul)
4	iP	Z'	23 32 43.6 C	48.5N, 154.9E, h = 85, H = 23 21 09.0
	iS	N	23 42 14	M = 5.2 (Tul)
	eL	Z	23 57	
5	eL	Z	05 51	19.2N, 147.1E, h = 38, H = 05 04 03.4 M = 4.7 (Tul)
5	eP	Z'	07 32 51	44.3N, 114.5W, h = 33, H = 07 29 00.3
	e(Lg)	Z'	07 37 31	
5	iP	Z'	12 17 15.5 C	53.7N, 165.4W, h = 33, H = 12 08 20.6
	eL	Z	12 34	M = 4.2 (Tul)
5	eP	Z'	17 54 28	14.2N, 94.0W, h = 33, H = 17 49 38
	eL	Z	18 00	M = 4.1 (Tul)
5	iP	Z'	20 51 09.0 D	38.4S, 73.2W, h = 41, H = 20 39 21.6
	iS	NE	21 00 55	M = 5.8 (Tul)
	i	Z	21 01 38	
	eL	Z	21 13	
6	iP	Z'	01 33 18.0	38.4S, 73.6W, h = 33, H = 01 21 29.0
	eS	E	01 43 04	M = 5.3 (Tul)
	eL	Z	01 55	
6	ePKP	Z'	02 14 52	7.9N, 119.9E, h = 306, H = 01 55 59.2
6	iP	Z'	03 34 45.3 C	6.8N, 73.2W, h = 108, H = 03 27 55.8
	eL	Z	03 58	M = 4.6 (Tul)
6	eP	Z'	06 21 23	14.9N, 95.0W, h = 33, H = 06 16 39
6	iP	Z'	07 07 57.7 C	7.4N, 82.6W, h = 61, H = 07 01 47.0
	eL	Z	07 13	M = 4.5 (Tul)
6	e	E	10 49 15	3.5S, 146.0E, h = 33, H = 10 20 25.5
	e	E	10 56 16	M = 5.9 (Tul)
	eL	Z	11 13	
6	eL	Z	21 53	56.7S, 28.8W, h = 33, H = 20 46 50.7 M = 4.7 (Tul)
6	iP	Z'	21 54 25.0 C	28.2S, 67.4W, h = 19, H = 21 43 16.3
	ePcP	Z'	21 54 40	M = 4.3 (Tul)
	eL	Z	22 26	
7	eL	Z	17 57	26.5S, 176.6W, h = 33, H = 17 08 18 M = 5.0 (Tul)

7	eP	Z'	21 19 37	Local
	iPg	Z'	21 19 41.7	
	e(S)	E'	21 20 12	
	e(Sg)	E'	21 20 24	
8	iP	Z'	00 06 27.8	Local
	iS	E'	00 06 53.0	
8	eL	Z	03 18	26.9S, 176.7W, h = 190, H = 02 29 00.4 M = 5.2 (Tul)
8	eP	Z'	04 15 43	54.2N, 33.0W, h = 33, H = 04 07 28.1
	eL	Z	04 33	M = 4.1 (Tul)
9	eL	Z	04 40	36.4N, 137.9E, h = 33, H = 03 53 06 M = 4.8 (Tul)
9	iP	Z'	08 09 54.3 D	51.2N, 179.8W, h = 33, H = 07 59 52.9
	eL	Z	08 37	M = 4.3 (Tul)
9	iP	Z'	16 17 13.0 D	43.7N, 150.6E, h = 33, H = 16 05 03.0
9	eL	Z	17 45	35.9S, 177.9E, h = 172, H = 16 55 00 M = 5.5 (Tul)
9	eL	Z	21 07	44.5N, 27.9W, h = 33, H = 20 40 20 M = 4.3 (Tul)
10	eP	Z	05 19 42.0	54.1N, 166.5W, h = 33, H = 05 10 40
10	ip	Z'	15 13 46.7 D	53.5N, 33.4W, h = 41, H = 15 05 25.3
10	eP	Z'	16 45 12.5	44.6N, 28.1W, h = 33, H = 16 36 11.1
	eL	Z	17 03	M = 4.4 (Tul)
10	iP	Z'	21 48 00.0	44.6N, 147.8E, h = 67, H = 21 35 48.7
	ipP	Z'	21 48 11.0	
11	eL	Z	13 05	15.7S, 174.7W, h = 33, H = 12 22 26 M = 4.9 (Tul)
11	eL	Z	15 31	67.6N, 146.7W, h = 33, H = 15 05 38.0
12	eP	Z'	00 45 27	36.3S, 96.9W, h = 33, H = 00 34 05.6
12	iP	Z'	08 48 07.0 D	19.0N, 107.4W, h = 33, H = 08 43 37.9
	eS	E	08 51 52	M = 4.0 (Tul)
	eL	Z	08 54 30	
12	e	E	23 29 30	17.8S, 178.6W, h = 583, H = 23 07 28.9
	e	Z	23 31 30	

13	eP	N	00 27 53	13.4N, 91.0W, h = 116, H = 00 22 51.3
	eS	E	00 31 52	M = 4.6 (Tul)
	e	NZ	00 32 08	
	eL	Z	00 35	
13	eP	NEZ	09 04 32	24.5N, 121.8E, h = 33, H = 08 50 02.0
	ePKP	NEZ	09 07 46	M = 7.5 (Tul)
	ePP	NEZ	09 09 05	
	eSKS	NE	09 15 22	
	eSP	Z	09 18 32	
	ePS	NE	09 18 48	
	eSS	NE	09 24 42	
	eL	Z	09 42	
13	eP	Z	18 28 07	9.9S, 160.8E, h = 29, H = 18 13 55.1
	ePKP	Z	18 31 02	M = 6.8 (Tul)
	ePP	ZZ'	18 32 25	
	eSKS	E	18 38 50	
	eS	N	18 40 08	
	ePS	EZ	18 41 50	
	ePKKP	Z'	18 43 58	
	e	N	18 46 08	
	eSS	E	18 48 00	
	eSSS	N	18 51 45	
	eL	Z	19 03	
14	eSKS	E	07 13 24	10.1S, 160.3E, h = 64, H = 06 48 30.3
	ePS	EZ	07 16 20	
	eSS	NE	07 22 25	
14	e(P)	Z'	07 15 13	
14	ePKP	Z'	07 23 24	7.5S, 128.3E, h = 197, H = 07 04 40.8
	iPKP	ZZ'	07 23 31.5	M = 6.6 (Tul)
	ePP	Z	07 25 45	
	e	Z'	07 26 03	
	iSKP	ZZ'	07 26 41.4	
	ePPP	Z	07 27 48	
	eSKKS	E	07 32 35	
	ePS	Z	07 35 41	
	eSS	E	07 43 16	
14	eP	Z'	08 38 23	6.2N, 82.5W, h = 33, H = 08 31 59.5
14	eP	Z'	08 58 13	11.0N, 61.3W, h = 30, H = 08 50 36.5
14	eP	Z'	12 20 20 C	0.9N, 30.0W, h = 33, H = 12 09 11.4
	iS	NE	12 29 32	M = 5.9 (Tul)
	eSS	E	12 33 48	
	eSSS	NE	12 37 20	
	eL	Z	12 41	

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14	eP	Z'	13 00 31	40.4N, 19.9E, h = 33, H = 12 48 02
14	eL	Z	18 38	
14	e(PS)	E	22 19 00	22.1S, 170.3E, h = 33, H = 21 51 12.7
	e(SS)	E	22 25 00	
14	ePKP	Z'	22 26 32	5.0S, 144.6E, h = 80, H = 22 07 54.3
	e	Z'	22 27 55	M = 6.4 (Tul)
	e	NZ	22 37 16	
	e	N	22 43 48	
	eL	Z	23 02	
15	eL	Z	00 02	
15	eL	Z	01 37	33.2S, 179.2W, h = 42, H = 00 48 51.9 M = 5.4 (Tul)
15	eL	Z	06 35	22.0S, 170.5E, h = 33, H = 05 39 57.2 M = 4.9 (Tul)
15	eL	Z	07 38	14.9S, 178.7W, h = 33, H = 06 54 51.8 M = 5.3 (Tul)
15	eL	Z	10 09	
15	eP	Z'	10 30 53.8	40.6N, 20.3E, h = 33, H = 10 18 26.3
16	eP	Z'	03 05 23	46.2N, 111.0W, h = 33, H = 03 01 40.5
	eLg	Z'	03 09 35	
16	eP	Z'	06 34 06.0	36.7N, 38.0E, h = 101, H = 06 21 13.2
16	eL	Z	08 33	15.1N, 46.5W, h = 33, H = 08 04 13.4 M = 4.4 (Tul)
16	iPKP	Z'	11 04 36.2 D	7.0S, 117.3E, h = 561, H = 10 46 22.0
	iSKP	Z'	11 07 23.0	M = 6.1 (Tul)
	eL	Z	12 08	
16	eP	Z'	21 40 51	8.5S, 80.1W, h = 33, H = 21 32 22.4
17	eP	Z'	00 11 24	54.0N, 35.1W, h = 32, H = 00 03 03.7
	eL	Z	00 25	M = 4.8 (Tul)
17	iP	Z'	03 55 04.0	17.2N, 100.8W, h = 33, H = 03 53 20.3
17	eL	Z	07 51	4.8S, 144.2E, h = 35, H = 06 53 20.3 M = 4.6 (Tul)
17	eP	Z'	08 41 29	42.1N, 37.2E, h = 33, H = 08 28 24.9

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17	eP	Z'	17 38 51	37.7N, 113.2W, h = 33, H = 17 34 29.0
	eLg	Z'	17 41 48	
18	iP	Z'	08 20 41.8 C	41.8S, 88.5W, h = 33, H = 08 08 48
18	iP	Z'	14 23 58.2 C	36.2S, 90.4W, h = 33, H = 14 12 36.0
	eL	N	14 42	
18	eL	Z	18 50	58.2N, 32.4W, h = 33, H = 18 24 05.5 M = 4.4 (Tul)
18	eL	Z	19 29 30	57.9N, 32.2W, h = 33, H = 19 03 03 M = 4.5 (Tul)
18	eL	Z	21 26	
18	eL	Z	22 56	
19	iP	Z'	06 19 51.3	
19	eL	Z	17 42	55.3S, 28.8W, h = 33, H = 16 39 15.1 M = 5.2 (Tul)
20	eL	Z	08 34	6.3S, 154.0E, h = 37, H = 07 41 22.1 M = 5.2 (Tul)
20	eL	Z	09 50	22.3S, 170.5E, h = 33, H = 08 44 00.9 M = 4.7 (Tul)
20	eP	Z'	17 19 53	45.7S, 78.7W, h = 33, H = 17 07 32.5
	eS'	E	17 30 07	M = 5.4 (Tul)
	eL	Z	17 43	
20	eL	Z	20 47	24.6N, 122.1E, h = 33, H = 19 40 30.9 M = 5.1 (Tul)
21	eL	Z	10 14	
21	iP	Z'	13 29 20.0	20.6S, 175.1W, h = 33, H = 13 16 15.6
21	iS	N	14 52 51	20.5S, 173.9W, h = 29, H = 14 28 29
	eL	Z	15 12	M = 5.6 (Tul)
21	eP	Z'	17 27 33	32.7N, 20.9E, h = 33, H = 17 14 35.7
	eS	N	17 38 10	M = 5.6 (Tul)
	eL	Z	18 01	
21	eL	Z	21 13	32.6N, 21.0E, h = 33, H = 20 26 43.8 M = 4.6 (Tul)

22	iP	Z'	07 20 26.2 D	85.0N, 98.9E, h = 33, H = 07 10 28.0
	eS	N	07 28 30	M = 5.9 (Tul)
	e	N	07 32 25	
	eL	Z	07 28 35	
22	iP	Z'	07 33 15.4 D	84.7N, 104.3E, h = 33, H = 07 23 14
22	eP	Z'	08 11 22	17.8S, 178.8W, h = 550, H = 07 58 57.0
22	iP	Z'	09 48 06.7	21.1S, 68.1W, h = 90, H = 09 37 52.3
22	eP	Z'	14 25 22	40.6N, 20.5E, h = 33, H = 14 12 54.4
	eL	Z	15 00	M = 4.8 (Tul)
22	iP	Z'	21 19 54.5 D	18.1N, 71.3W, h = 50, H = 21 14 06.1
	eL	Z	21 27	M = 5.0 (Tul)
22	eL	Z	23 41	58.8N, 137.2W, h = 33, H = 23 19 57.7
				M = 4.0 (Tul)
23	eP	Z'	06 43 55	36.0S, 102.5W, h = 33, H = 06 32 30
	eL	Z	07 16	M = 4.3 (Tul)
23	iP	Z'	07 14 56.3 C	44.8S, 76.1W, h = 33, H = 07 02 37.9
24	iP	Z'	00 48 26.0 C	32.2S, 68.5W, h = 33, H = 00 37 01
24	eP	Z'	05 47 45	15.1S, 72.5W, h = 105, H = 05 38 20.6
	iS	E	05 56 08	M = 4.8 (Tul)
	eL	Z	06 06	
24	iP	Z'	13 38 55.0 D	14.6N, 91.4W, h = 113, H = 13 34 15.7
	iS	E	13 42 48	M = 5.3 (Tul)
	eL	Z	13 44	
	iScS	EE'	13 50 06	
24	eP	Z'	22 43 11	26.4N, 44.5W, h = 33, H = 22 35 00.0
	eS	E	22 49 45	M = 4.9 (Tul)
	eL	Z	22 56	
25	eL	Z	07 55	72.3N, 5.5E, h = 33, H = 07 23 53
				M = 4.1 (Tul)
25	iP	Z'	08 19 28.4 D	28.1S, 65.4W, h = 32, H = 08 08 20.1
	eL	Z	08 52	M = 4.2 (Tul)
25	iP	Z'	09 03 58.8	12.2N, 88.2W, h = 33, H = 08 58 40.8
	eS	E	09 08 32	M = 4.2 (Tul)
	eL	Z	09 12	
25	eL	Z	17 09	

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25	eL	Z	18 05 30	24.4N, 123.3E, h = 33, H = 17 11 02 M = 5.5 (Tul)
25	eP	Z'	18 49 02	42.8N, 109.0W, h = 33, H = 18 45 15.1
	iLg	Z'	18 51 46	
25	iP	Z'	21 45 54.0	
	iS	E'	21 46 26.2	
25	eL	Z	24 44	15.5N, 121.3E, h = 33, H = 23 45 16.8 M = 5.0 (Tul)
26	e(Lg)	Z'	07 34 31	
26	e(P)	Z'	08 19 02	
	e(Lg)	Z'	08 20 45	
26	iP	Z'	16 35 32.8 C	12.4N, 87.4W, h = 33, H = 16 30 13
26	eP	ZZ'	20 28 53	7.5S, 146.2E, h = 171, H = 20 14 08.7
	iPKP	Z'	20 32 35.2	M = 7.4 (Tul)
	ePP	Z	20 33 12	
	iPP	NEZ	20 33 44	
	iSKS	NEE'	20 39 10	
	iSKKS	EE'	20 40 28	
	i(S)	E	20 41 33	
	eSP	Z	20 42 30	
	ePKKP	Z'	20 42 50	
	iPKKP	Z'	20 43 04	
	iPS	E	20 43 19	
	eSS	E	20 49 55	
	e	E'	20 53 22	
	e	E'	20 54 43	
26	eP	Z'	23 35 09	39.1S, 73.1W, h = 33, H = 23 23 19.5
27	iP	Z'	00 22 29.6	
	iS	E	00 22 54.6	
27	eP	Z	04 44 55	6.0S, 149.4E, h = 52, H = 04 30 00.8
	ePKP	Z'	04 48 37	M = 7.2 (Tul)
	ePP	EZ	04 49 30	
	eSKS	E	04 55 40	
	eS	E	04 57 25	
	ePS	NEZ	04 59 20	
	eSS	E	05 05 28	
	eL	Z	05	
27	iP	Z'	11 10 04.7 C	14.7S, 73.3W, h = 110, H = 11 00 45.3
	ipP	Z'	11 10 32	
27	iP	Z'	16 05 37.0 C	16.9N, 100.5W, h = 33, H = 16 01 11.2

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27	eL	Z	21 20	4.6S, 152.9E, h = 100, H = 20 28 34.9 M = 5.6 (Tul)
27	eP	Z'	23 45 04	54.8N, 161.6W, h = 33, H = 23 36 20.4
28	ePKP	Z'	01 51 25	16.3S, 66.0E, h = 33, H = 01 31 13.0
	eSS	N	02 14 45	M = 6.0 (Tul)
	e	Z	02 15 30	
	eSSS	N	02 21 03	
	eL	Z	02 44	

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Earth Sciences Observatory

Leonard, Oklahoma

SEISMOGRAM READINGS

Station Abbreviation: TUL

Geographical Location: 35° 54' 38" N. latitude
95° 47' 33" W. longitude

Altitude: 256.4 meters (841 feet)

Geology: 1128 meters (3700 feet) of Pennsylvanian and Mississippian sandstones and limestones above basement granite.

Instruments: Three short period Benioff N', E', Z'.
Free period of pendulum 1.0 sec.
Free period of galvanometer 0.2 sec.

Three long period Press-Ewing N, E, Z.
Free period of pendulum 25 sec.
Free period of galvanometer 90 sec.

Interpretation:

First column gives the date.

Second column: Earthquake phase (P, S, PP, PS, PKP, etc.)

Third column: Seismograph on which the reading is made, N', E', and Z' indicate short period seismographs, N, E, and Z indicate long period seismographs.

Fourth column: Greenwich mean time in hours, minutes and seconds.

Fifth column: USCGS epicenter determination, Tulsa magnitudes and other remarks.

Magnitudes are computed from maximum trace amplitudes of surface waves as recorded on long period vertical seismograph.

JERSEY PRODUCTION RESEARCH COMPANY

Tulsa, Oklahoma

International Seismological Centre

LEONARD OBSERVATORY
Seismogram Readings
March 1963

1	eP	Z'	00 30 28	34.8N, 119.3W, h = 16, H = 00 25 57.4
	eLg	Z'	00 36 00	M = 4.3 (Tul)
	eL	Z	00 37	
1	eP	Z'	04 07 10	15.6N, 93.1W, h = 33, H = 04 02 34.1
	e	Z'	04 07 23	
	i(S)	E'	04 10 40.0	
1	iP	Z'	10 58 34.8 C	41.2N, 142.9E, h = 41, H - 10 45 55.7
	i	Z'	10 58 47.0	M = 5.3 (Tul)
	eS	E	11 09 00	
	eL	Z	11 28	
1	iP	Z'	19 25 23.0 D	1.4N, 29.6W, h = 33, H = 19 14 13.1
	eS	E	19 34 36	M = 5.5 (Tul)
	eSS	E	19 38 58	
	eL	Z	19 47	
2	iP	Z'	09 37 49.3D	46.1N, 153.1E, h = 33, H = 09 25 55.0
	e	E	09 47 36	M = 5.0 (Tul)
	eL	Z	10 08	
2	eP	Z'	22 14 03	14.8N, 94.0W, h = 33, H = 22 09 17
3	eP	Z'	02 18 48	20.4S, 69.0W, h = 110, H = 02 08 14.6
3	iP	Z'	17 31 21.9 C	36.7N, 90.1W, h = 18, H = 17 30 13.0
	iS	NZ	17 32 39	
	iL	Z	17 32 56	
4	iP	Z'	07 51 16.0D	82.9N, 7.7W, h = 33, H = 07 41 51.0
	eS	N	07 58 55	M = 5.9 (Tul)
	eSS	Z	08 03 14	
	eL	Z	08 06	
4	ePS	N	14 07 16	24.2N, 121.7E, h = 33, H = 13 38 41.0
	eSS	N	14 13 18	M = 6.3 (Tul)
	eL	Z	14 32	
4	iP	Z'	15 50 57.0 D	4.5S, 81.6W, h = 33, H = 15 43 04.0
	iS	E	15 57 18	M = 5.9 (Tul)
	iG	E	16 00 43	
	eL	N	16 02	
4	eL	Z	18 31	
4	iP	Z'	18 41 19.2 C	15.7S, 75.3W, h = 45, H = 18 31 51.9
	i	Z'	18 41 30.7	M = 4.3 (Tul)
	eL	Z	19 01	

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4	eL	Z	19 53	19.3S, 169.5E, h = 43, H = 19 04 02.9 M = 4.9 (Tul)
5	eP	Z'	02 53 52	11.0N, 90.4W, h = 33, H = 02 48 29.9
5	iP	Z'	07 12 55.3 D	4.4S, 81.5W, h = 31, H = 07 05 01.7
	e	Z'	07 14 47	M = 5.4 (Tul)
	iS	NEE'	07 19 17	
	eG	E	07 22 43	
	eL	Z	07 24	
5	eL	Z	24 23	6.3S, 149.1E, h = 19, H = 23 27 40.1 M = 4.8 (Tul)
6	iP	Z'	08 35 15.0 D	
6	eL	Z	15 46	
6	eL	Z	20 46	9.8S, 155.2E, h = 60, H = 19 50 07.5 M = 5.0 (Tul)
7	eL	Z	03 09 40	
7	iP	Z'	05 32 36.2 D	27.0S, 113,5W, h = 33, H = 05 22 01.1
	iS	E	05 41 20	M = 5.7 (Tul)
	eL	Z	05 50	
7	eP	Z'	11 52 09	27.3S, 113,0W, h = 33, H = 11 41 29.6
	eL	E	12 08 30	
7	iP	Z'	12 28 42.6 C	44.3S, 75.3W, h = 45, H = 12 16 28.5
	eS	N	12 39 00	M = 5.8 (Tul)
	eL	Z	12 53	
7	iP	Z'	13 53 14.2 C	50.8N, 178.6E, h = 33, H = 13 43 01.2
7	eP	Z'	23 58 26	44.8N, 123.4W, h = 33, H = 23 53 25.8
	i	Z'	23 58 44.3	M = 3.9 (Tul)
	eS	E	24 02 36	
	eL	Z	24 07	
8	eP	Z'	00 30 42	
	eL	Z	00 38	
8	ePS	E	03 12 12	19.2S, 169.7E, h = 33, H = 02 44 31.5
	eSS	E	03 17 55	M = 5.5 (Tul)
	eL	Z	03 33	
8	eSS	E	03 58 20	19.2S, 169.6E, h = 49, H = 03 24 57.2
	e	E	04 00 40	M = 5.8 (Tul)
	eL	Z	04 14	

8	iP	Z'	15 17 15.2 C	1.1N, 29.9W, h = 30, H = 15 06 05.3
	eS	E	15 16 28	M = 5.4 (Tul)
	eL	Z	15 38	
8	eL	Z	22 45	9.0N, 84.1W, h = 33, H = 22 26 26
				M = 4.0 (Tul)
9	eL	Z	03 53	
9	eL	Z	07 28	46.1N, 141.0E, h = 33, H = 06 44 28.2
				M = 5.2 (Tul)
9	e(P)	E'	16 27 08	
	i(Pg)	E'	16 27 15.0	
	i(S)	E'	16 28 08.2	
9	ePS	E	16 52 50	3.2S, 147.0E, h = 33, H = 16 23 44.3
	eSS	E	16 59 15	M = 5.6 (Tul)
	eL	Z	17 16	
9	ePS	E	19 25 05	3.2S, 147.1E, h = 33, H = 18 55 09.6
	eSS	E	19 31 25	M = 5.6 (Tul)
	eL	Z	19 48	
10	iP	Z'	00 07 49.0	
	iS	Z'	00 08 09.0	
10	iP	Z'	01 34 06.0 D	56.2N, 153.8W, h = 33, H = 01 26 04.1
	e	N	01 40 33	M = 5.1 (Tul)
	e	E	01 44 03	
	eL	Z	01 48	
10	e(PKP)	Z	03 11 25	24.7N, 122.1E, h = 33, H = 02 53 33.0
	ePP	ZZ'	03 12 40	M = 5.8 (Tul)
	ePS	N	03 22 02	
	eSS	N	03 28 00	
	eL	Z	03 47	
10	eP	Z'	06 09 35	14.2N, 89.5W, h = 33, H = 06 04 33
	eS	E'	06 13 20	
10	iP	Z'	11 02 50.0 C	29.9S, 71.2W, h = 70, H = 10 51 48.1
	iPcP	Z'	11 03 07.2	M = 5.5 (Tul)
	iS	EE'	11 11 52	
	eSeS	E'	11 12 44	
	eL	Z	11 24	
10	eL	Z	14 55	2.4N, 126.6E, h = 41, H = 13 51 04.3
				M = 5.0 (Tul)

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11	iP	Z'	07 40 21.2 C	38.1N, 29.3E, h = 33, H = 07 27 22.0
	eSKS	N	07 50 55	M = 5.2 (Tul)
	eSS	E	07 57 43	
	eL	Z	08 14	
11	iP	Z'	11 37 04.8 C	5.1N, 76.4W, h = 95, H = 11 30 16.0
11	iP	Z'	15 34 26.1 D	17.6N, 100.8W, h = 33, H = 15 30 07.6
	eL	N	15 39	
11	i(PKP)	Z'	19 07 03.2 C	
	eL	Z	20 12	
11	eL	Z	21 58	13.7S, 165.8E, h = 33, H = 21 05 49.1
12	iP	Z'	08 16 53.0 D	53.9N, 160.6E, h = 33, H = 08 05 49.8
13	iP	Z'	09 34 02.6	
	iPg	Z'	09 34 06.2	
	iS	E'	09 34 24	
13	iP	Z'	10 45 12.1 D	19.5N, 69.5W, h = 33, H = 10 39 19.1
14	ePS	N	08 29 38	19.0N, 120.4E, h = 51, H = 08 00 15.6
	eSS	N	08 40 43	M = 5.3 (Tul)
	eL	Z	08 57	
14	iP	Z'	18 07 14.7 C	
15	iPKP	Z'	00 34 42.7 C	8.4N, 126.4E, h = 117, H = 00 16 01.3
	ePP	Z	00 36 10	M = 6.3 (Tul)
	ePS	E	00 45 38	
	e	Z	00 46 05	
	eSS	E	00 53 22	
	eL	Z	01 13	
15	eP	Z'	04 43 46	
15	eP	Z'	05 54 54	21.7N, 45.4W, h = 33, H = 05 46 32.8
	eS	N	06 01 42	M = 4.5 (Tul)
	eL	Z	06 09	
15	i(P)	Z'	17 01 34.0	
	i(P)	Z'	17 02 05.2	
	e(S)	E'	17 03 45	
16	eL	N	06 34	

16	iP	Z'	08 56 36.3 D	46.5N 154.7E, h = 26, H = 08 44 48.3
	iS	NEE'	09 06 23	M = 7.2 (Tul)
	e	EZ	09 11 00	
	e	E	09 15 20	
	eG	E	09 17 00	
	eL	Z	09 21 00	
	eP'P'	Z'	09 23 44	
16	eL	N	22 27	20.7S, 147.6W, h = 33, H = 21 40 09.0 M = 5.1 (Tul)
17	eL	N	06 31	7.1N, 82.2W, h = 53, H = 06 18 52.4 M = 4.4 (Tul)
17	eP	Z'	08 54 00	46.0N, 155.0E, h = 35, H = 08 42 12.3
17	eL	N	11 55	37.4S, 78.2E, h = 33, H = 10 32 19.7 M = 4.5 (Tul)
17	iP	Z'	14 29 55.8 C	39.5N, 21.5E, h = 78, H = 14 17 25.9
	eL	N	15 05	M = 4.9 (Tul)
17	eL	N	20 03	64.9N, 174.9W, h = 33, H = 19 38 20.1
	eL	Z	20 09 30	M = 4.8 (Tul)
18	eL	Z	04 56	26.6S, 146.7W, h = 33, H = 04 00 41 M = 4.6 (Tul)
18	eP	Z'	09 56 10	30.7N, 42.1W, h = 33, H = 09 47 59
	eL	Z	10 10	M = 4.1 (Tul)
18	iP	Z'	10 14 34.8 D	24.1N, 5.0E, h = 0, H = 10 02 00.8
19	eP	Z'	04 38 29	
19	eL	N	14 23	
19	eL	Z	15 31	22.6S, 170.8E, h = 33, H = 14 42 01.2 M = 4.7 (Tul)
20	eP	Z'	04 55 33	19.9S, 179.1W, h = 680, H = 04 43 13.5
	eS	N	05 06 02	
	esS	N	05 10 18	
20	eP	Z'	04 58 08	19.6S, 179.3W, h = 680, H = 04 45 49.5
	eS	N	05 08 38	
	esS	N	05 12 52	
20	iP	Z'	07 16 09.3 D	46.4N, 154.6E, h = 16, H = 07 04 18.0

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20	e(Pg)	Z'	11 42 52	44.9N, 110.7W, h = 33, H = 11 38 33.1
	eLg	Z'	11 46 05	
	eL	Z	11 47	
20	e(Pg)	E'	12 37 00	44.6N, 110.5W, h = 33, H = 12 32 26.0
	eLg	Z'	12 40 00	
20	eSKKS	E	17 06 08	2.4S, 138.4E, h = 40, H = 16 38 55.8
	ePS	E	17 08 54	M = 5.6 (Tul)
	eSS	E	17 15 58	
	eL	Z	17 35	
21	iP	Z'	04 13 10.2 D	36.5N, 140.9E, h = 50, H = 04 00 11.1
	ipP	Z'	04 13 18.8	
22	iP	Z'	04 09 22.0 C	46.0N, 148.4E, h = 115, H = 03 57 23.8
22	eP	Z'	04 38 06	44.7N, 110.7W, h = 33, H = 04 34 43.3
	e(Pg)	Z'	04 39 04	
	e(S)	E'	04 41 25	
	eL	Z	04 43	
24	iPKP	Z'	02 26 29.8 C	9.7S, 120.4E, h = 33, H = 02 07 12.8
	ePP	Z	02 29 20	M = 6.4 (Tul)
	iSKP	Z'	02 30 08.8	
	ePKS	E	02 30 10	
	ePS	E	02 39 50	
	e	E	02 41 40	
	eSS	E	02 47 43	
	eL	Z	03 13	
24	iP	Z'	02 34 19.0 C	51.6N, 173.3W, h = 55, H = 02 24 43.2
	ipP	Z'	02 34 32	
24	eSS	E	10 07 20	3.2S, 146.8E, h = 33, H = 09 31 50.4
	eL	Z	10 27	M = 5.5 (Tul)
24	ePKP	Z'	10 02 06	9.0N, 125.6E, h = 51, H = 09 43 20.2
	eL	Z	10 41	M = 5.5 (Tul)
24	eSKS	N	13 08 35	34.4N, 47.9E, h = 33, H = 12 44 03.2
	ePS	N	13 11 20	M = 6.1 (Tul)
	eSS	E	13 17 00	
	eSSS	E	13 20 30	
	e	Z	13 24 35	
	eL	Z	13 33	
24	iP	Z'	21 45 15.0 D	51.8N, 178.1W, h = 57, H = 21 35 24.4
	eS	E	21 53 12	M = 5.2 (Tul)
	eL	Z	22 04	

25	eP	Z'	09 32 25	36.0N, 114.9W, h = 17, H = 09 28 44.1
	i	Z'	09 33 29.5	
	iLg	Z	09 36 49	
	eL	Z	09 38 00	
25	ePKP	Z'	20 36 21	56.3S, 149.9E, h = 39, H = 20 17 03.8
	eSS	E	20 56 46	M = 5.8 (Tul)
	eL	Z	21 19	
25	eL	Z	21 26	
25	iPKP	Z'	23 05 41.6 C	0.7N, 96.5E, h = 30, H = 22 46 16.2
	eL	Z	24 02	M = 5.8 (Tul)
26	eP	ZZ'	10 02 09	29.7S, 177.8W, h = 45, H = 09 48 19.7
	ePP	Z	10 06 22	M = 7.4 (Tul)
	iSKS	EZE'	10 12 44	
	eS	N	10 13 50	
	eSP	Z	10 15 25	
	iPKKP	Z'	10 18 23	
	eSS	N	10 20 55	
	eSSS	N	10 24 30	
	e(G)	E'	10 29 21	
	eG	N	10 30 45	
	eL	Z	10 35	
26	eP	Z'	13 39 06	29.8S, 177.9W, h = 42, H = 13 25 02.6
	ePP	Z	13 43 00	M = 6.6 (Tul)
	iSKS	NEE'	13 49 27	
	eS	N	13 50 30	
	iSP	NZ	13 52 05	
	ePKKP	Z	13 54 55	
	e(G)	E'	14 06 03	
	eL	Z	14 12	
26	iP	Z'	19 59 54.3	44.4N, 146.4E, h = 110, H = 19 47 46.0
	ipP	Z'	20 00 23.2	
26	iP	Z'	21 47 58.0 C	36.0N, 135.7E, h = 33, H = 21 34 41.1
	ePP	Z	21 51 45	M = 6.4 (Tul)
	eSKS	N	21 58 30	
	eS	N	21 59 07	
	eSS	N	22 05 35	
	eL	Z	22 20	
27	eP	Z'	07 25 41	44.3N, 110.6W, h = 33, H = 07 22 08.9
	e	Z'	07 26 31	
	eL	N	07 29 30	
27	eL	Z	09 29	51.1N, 130.1W, h = 33, H = 09 11 43.7 M = 4.0 (Tul)
27	iP	Z'	12 38 34.9	6.8N, 73.0W, h = 176, H = 12 31 51.9

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27	iP	Z'	19 00 53.3	
	iS	E'	19 01 18.8	
27	eL	Z	22 38	
28	eL	Z	00 13	
28	iP	Z'	00 24 58.2 D	66.3N, 19.6W, h = 15, H = 00 15 47.5
	eS	NE	00 32 18	M = 7.4 (Tul)
	e	E	00 35 55	
	eL	Z	00 40	
28	eP	Z'	00 35 40	66.3N, 20.2W, h = 33, H = 00 26 27
28	eP	Z'	01 08 48	66.4N, 19.6W, h = 33, H = 00 59 38.9
28	eP	Z'	06 39 06	40.9S, 84.2W, h = 33, H = 06 27 16.0
28	eP	Z'	09 58 47	49.0N, 154.9E, h = 33, H = 09 47 10.5
28	eL	Z	12 00	30.2S, 177.8W, h = 38, H = 11 12 31.3
				M = 5.4 (Tul)
28	e	N	23 53 25	29.6S, 177.5W, h = 54, H = 23 29 14.6
	e	N	23 54 36	M = 5.8 (Tul)
	e	N	24 01 35	
	eL	Z	24 17	
29	e(P)	Z'	05 17 27	13.8N, 91.8W, h = 33, H = 05 12 22
	e	Z'	05 17 36	
29	eP	Z'	07 53 12	13.4N, 91.0W, h = 33, H = 07 47 56.2
30	eP	Z'	00 40 33	51.1N, 129.4W, h = 33, H = 00 34 40.1
	eL	N	00 49	
30	eP	Z'	02 07 19	19.1S, 169.1E, h = 160, H = 01 53 28.8
	ePP	Z'E'	02 11 39	M = 6.1 (Tul)
	eSKS	EE'	02 17 42	
	eS	E	02 18 58	
	eSP	Z	02 20 48	
	ePS	E	02 21 00	
	eSPP	Z	02 21 45	
	e(P'P')	E'	02 31 43	
	eL	Z	02 42	
30	eL	Z	12 32	
30	eP	Z'	16 20 01	4.8S, 75.1W, h = 244, H = 16 12 01

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30	iP	Z'	17 04 11.7 D	44.2N, 148.0E, h = 33, H = 16 51 56.6
	e	N	17 14 16	M = 5.6 (Tul)
	e	Z	17 24 48	
	eL	Z	17 31	
30	eP	Z'	21 22 17	8.7S, 109.2W, h = 33, H = 21 13 54.1
	e	N	21 29 08	M = 4.5 (Tul)
	e	N	21 32 50	
	eL	Z	21 37	
31	iP	Z'	04 54 09.7 D	6.5S, 81.1W, h = 33, H = 04 46 00.8
	iS	N	05 00 45	M = 5.1 (Tul)
	eL	Z	05 09	
31	eP	Z'	05 44 48	29.9S, 177.7W, h = 48, H = 05 30 49.3
	iSKS	N	05 55 15	M = 6.6 (Tul)
	eS	N	05 56 18	
	ePS	EZ	05 57 50	
	eSS	N	06 03 18	
	eL	Z	06 18	
31	iP	Z'	05 59 47.2 D	10.7S, 48.5W, h = 33, H = 05 51 00.9
31	ePKP	Z'	07 26 12	6.1S, 149.0E, h = 60, H = 07 07 36.3
	eL	Z	08 01	M = 6.7 (Tul)
31	i(P)	Z'	10 18 44.4 C	
31	e(P)	Z'	13 15 08	
	eL	Z	13 31	
31	eP	E'	13 31 11.5	
	eS	E'	13 33 33.0	
31	eL	Z	14 09	
31	i(P)	Z'	18 18 46.7	
	eL	Z	18 50	
31	eP	Z'	19 36 31	30.0S, 178.0W, h = 50, H = 19 22 53.3
	e	E'Z'	19 41 04	M = 6.1 (Tul)
	e	N	19 47 12	
	e	N	19 48 22	
	e	EZ	19 49 55	
	eL	Z	20 09	
31	eL	Z	21 35	

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Earth Sciences Observatory

Leonard, Oklahoma

SEISMOGRAM READINGS

Station Abbreviation: 1JL

Geographical Location: 35° 54' 38" N. latitude
95° 47' 33" W. longitude

Altitude: 256.4 meters (841 feet)

Geology: 1128 meters (3700 feet) of Lower Pennsylvanian through Cambrian sandstones and limestones above basement granite.

Instruments: Three short period Benioff N', E', Z'.
Free period of pendulum 1.0 sec.
Free period of galvanometer 0.2 sec.

Three long period Press-Ewing N, E, Z.
Free period of pendulum 25 sec.
Free period of galvanometer 90 sec.

Interpretation:

First column gives the date.

Second column: Earthquake phase (P, S, PP, PS, PKP, etc.)

Third column: Seismograph on which the reading is made, N', E', and Z' indicate short period seismographs, N, E, and Z indicate long period seismographs.

Fourth column: Greenwich mean time in hours, minutes and seconds.

Fifth column: Direction of initial movement; C stands for compression and D for dilatation.

Sixth column: USCGS epicenter determination, Tulsa magnitudes and other remarks.

Magnitudes are computed from maximum trace amplitudes of surface waves as recorded on long period vertical seismograph.

JERSEY PRODUCTION RESEARCH COMPANY

Tulsa, Oklahoma

MAR 2 1964

International Seismological Centre

LEONARD OBSERVATORY
Seismogram Readings
April 1963

1	iP	Z'	01 36 18.2 D	28.8S, 67.5W, h = 33, H = 01 25 10.5
	i	Z'	01 36 23.2	
1	eL	Z	03 14	6.0S, 149.0E, h = 64, H = 02 19 56.8
				M = 5.5 (Tul)
1	iP	Z'	04 40 50.3 C	44.8N, 141.1E, h = 225, H = 04 28 44.3
	isP	Z'	04 41 52.7	
	eS	N	04 50 46	
	eSKPP'	Z'	05 10 51	
	e	Z'	05 15 32	
1	eP	Z'	08 26 02	
	i	Z'	08 26 09.0	
	e(S)	E'	08 29 30	
1	eL	Z	09 25	29.2S, 176.6W, h = 38, H = 08 30 34.6
				M = 5.1 (Tul)
1	eL	N	10 20	
2	iP	Z'	01 04 28.8 C	6.6N, 73.2W, h = 140, H = 00 57 41.7
2	eP	Z'	04 17 57.5	55.2N, 160.3E, h = 33, H = 04 06 57.3
	eL	N	04 35	(M = 4.8(Tul))
2	eSKS	N	05 07 50	29.7S, 177.1W, h = 51, H = 04 43 30.9
	eL	N	05 31	(M = 5.5(Tul))
2	iPKP	Z'	11 55 19.0 C	5.8S, 105.0E, h = 91, H = 11 35 51.4
2	iP	Z'	16 28 07.0 D	53.2N, 171.7W, h = 142, H = 16 18 55.6
	iS	N	16 35 30	
3	eP	Z'	01 21 47.5	17.0N, 46.5W, h = 33, H = 01 13 15.5
	eL	E	01 36	(M = 4.3(Tul))
3	eP	Z'	01 44 03	4.8S, 78.4W, h = 33, H = 01 35 59.3
	eL	E	02 04	(M = 4.3(Tul))
3	iP	Z'	02 06 01.0	
3	eP	Z'	02 18 12	16.7N, 46.6W, h = 33, H = 02 09 37.3
	eL	E	02 34	(M = 4.1 (Tul))
3	eL	E	12 09	29.6S, 177.2W, h = 48, H = 11 21 49.0
				(M = 5.1(Tul))
3	eS	E	15 12 35	55.4S, 128.2W, h = 33, H = 14 47 55.5
	eSS	E	15 18 50	(M = 5.6(Tul))
	eL	N	15 29	

3	iP	Z'	16 02 29.6 D	61.1N, 148.1W, h = 78, H = 15 54 51.7
4	e(P)	Z'	02 07 23	
	e	E'	02 08 20	
	e(S)	E'	02 09 02	
4	iP	Z'	06 14 30.8 C	3.3N, 74.5W, h = 31, H = 06 07 15.3
4	e(P)	Z'	07 50 29	
	e(S)	E'	07 52 14	
4	iP	Z'	08 35 57.8 C	15.3S, 72.3W, h = 122, H = 08 26 32.8
6	eL	Z	03 49	5.1S, 145.5E, h = 57, H = 02 51 46.4 M = 4.8 (Tul)
6	eL	Z	06 25	30.3S, 177.0W, h = 33, H = 05 34 08.7 M = 4.9 (Tul)
6	eP	Z'	07 15 31	17.5S, 178.9W, h = 526, H = 07 03 06.5
6	eLg	Z'	07 53 37	36.4N, 89.8W, h = 18, H = 07 51 04.2
6	iP	Z'	08 13 39.6	36.4N, 89.7W, h = 18, H = 08 12 24.0
	iS	E'Z'	08 14 36.6	
	eLg	Z'	08 14 59	
6	e(P)	Z'	08 57 19	
	eL	Z	09 03	
6	iP	Z'	11 27 15.7 C	63.4N, 149.5W, h = 39, H = 11 19 23.3
	e	E	11 33 45	M = 5.6 (Tul)
	e(Lg)	E	11 41 00	
	eLg	E	11 42 18	
	eL	Z	11 42	
6	iP	Z'	12 15 02.5 C	63.6N, 149.5W, h = 55, H = 12 07 09.5
	eL	Z	12 33	M = 4.6 (Tul)
6	eL	Z	22 29	6.0S, 149.9E, h = 49, H = 21 35 21.2 M = 5.4 (Tul)
6	eP	Z'	23 44 50	20.0N, 109.3W, h = 44, H = 23 40 20.8
	eS	N	23 48 35	M = 3.8 (Tul)
	eL	Z	23 52	
7	iP	Z'	07 29 06.8 D	31.2N, 41.6W, h = 30, H = 07 20 52.5
7	eL	Z	08 40	
7	eL	Z	11 46	71.5N, 13.0W, h = 33, H = 11 16 03.8 M = 4.8 (Tul)

7	iP	Z'	15 36 58.8 C	53.7N, 170.1W, h = 202, H = 15 28 01.8
	epP	Z'	15 37 39	
	eS	E'	15 48 12	
7	iPKP	Z'	22 55 32.3 C	4.9S, 103.2E, h = 72, H = 22 36 03.4
	ipPKP	Z	22 55 49	M = 6.4 (Tul)
	iPP	Z	22 58 51	
	ePSKS	E	23 09 00	
	ePPS	E	23 11 45	
	eL	Z	23 44	
8	iP	Z'	00 05 58.8 C	39.6N, 104.9W, h = 33, H = 00 03 59.1
	ePg	Z'	00 06 28	
	e(S)	E'	00 07 37.5	
	e(Sg)	Z'	00 08 15	
8	iP	Z'	01 56 35.0 D	11.4N, 62.6W, h = 95, H = 01 49 18.5
8	iP	Z'	06 08 38.2 C	31.4S, 68.0W, h = 232, H = 05 57 39
8	eP	Z'	11 31 19	47.5N, 153.2E, h = 107, H = 11 19 39.4
	i(pP)	Z'	11 31 35.6	
8	iP	Z'	14 46 32.7 C	27.7N, 44.3W, h = 33, H = 14 38 27.0
	eL	Z	14 59	M = 5.5 (Tul)
9	eL	Z	02 14	71.2N, 12.7W, h = 20, H = 01 39 08.6 M = 4.4 (Tul)
9	iP	Z'	02 14 50.0 D	17.7S, 178.7W, h = 538, H = 02 02 25.1
	eSKS	E	02 24 28	
	ePPS	E	02 27 55	
	iPKKP	Z'	02 31 44.4 D	
9	eL	Z	05 30	17.8S, 168.0E, h = 35, H = 04 32 26.3 M = 4.5 (Tul)
10	iP	Z'	07 03 17.5 D	6.9N, 73.2W, h = 144, H = 06 56 33.2
10	e(PKP)	Z'	08 09 38	9.2S, 125.0E, h = 33, H = 07 50 30.2
	ePKP	Z'	08 09 47	M = 5.8 (Tul)
	ePP	E	08 13 16	
	ePS	E	08 22 10	
	eSS	E	08 30 10	
	eL	Z	08 50	
10	iP	Z'	23 15 02.2 D	16.8N, 94.1W, h = 130, H = 23 10 47.6
	e(S)	Z'	23 18 27	
	eL	Z	23 19	
11	eP	Z'	12 14 53	19.7N, 108.9W, h = 33, H = 12 10 21.5
	eS	N	12 18 35	M = 3.6 (Tul)
	eL	Z	12 21	

11	eL	Z	14 52	79.1N, 1.4E, h = 15, H = 14 19 10 M = 4.2 (Tul)
11	eS	E	17 13 28	60.2S, 18.7W, h = 33, H = 16 45 25.1
	ePS	N	17 14 26	M = 5.3 (Tul)
	eSS	N	17 20 40	
	eL	Z	17 40	
12	eL	Z	01 49	31.9N, 78.8E, h = 33, H = 00 41 27.9 M = 4.7 (Tul)
12	eSP	Z	09 10 10	39.0S, 176.7E, h = 106, H = 08 41 56.7
	eSS	N	09 16 15	M = 6.3 (Tul)
	eL	Z	09 33	
12	iP	Z'	10 56 27.0	44.9N, 141.1E, h = 214, H = 10 44 16.8
12	eP	Z'	13 47 43	51.6N, 175.0W, h = 33, H = 13 38 03.0
	eL	Z	14 07	M = 4.7 (Tul)
12	eL	Z	20 15	79.6N, 5.1E, h = 33, H = 19 47 54.8 M = 4.9 (Tul)
12	eL	Z	21 31	16.7S, 173.7W, h = 33, H = 20 48 16.7 M = 5.0 (Tul)
13	iP	Z'	02 29 07.5 D	6.2S, 67.5W, h = 125, H = 02 20 51.5
	ipP	Z	02 29 35	M = 5.9 (Tul)
	eS	N	02 35 36	
	esS	N	02 36 22	
	eSS	N	02 39 35	
	eL	Z	02 43	
13	iP	Z'	02 45 11.7 C	
13	iP	Z'	08 03 07.8 D	32.0S, 68.4W, h = 33, H = 07 51 43
13	eP	Z'	09 20 22	34.1S, 109.9W, h = 33, H = 09 09 03.2
13	iPKP	Z'	14 50 16.0	3.4S, 135.4E, h = 31, H = 14 31 21.0
	eSP	Z	15 01 55	M = 5.8 (Tul)
	eSS	N	15 08 38	
	eSSS	N	15 13 00	
	eL	Z	15 29	
13	iP	Z'	18 58 41.7 D	11.7N, 87.8W, h = 33, H = 18 53 18.0
	eL	Z	19 06	M = 3.9 (Tul)
14	eL	Z	06 26	31.4S, 177.8W, h = 33, H = 05 32 33.9 M = 5.2 (Tul)
15	iP	Z'	05 51 08.8	23.5S, 168.2W, h = 105, H = 05 40 41.1

15	iP	Z'	07 40 37.3	60.8N, 147.5W, h = 57, H = 07 32 39.3
16	eL	Z	00 22	18.3S, 173.7W, h = 33, H = 23 39 27.3 M = 4.9 (Tul)
16	eP	Z	01 45 25	0.8S, 128.0E, h = 33, H = 01 29 19.4
	ePKP	Z'	01 48 25	M = 7.8 (Tul)
	e	Z'	01 48 30	
	ePP	Z	01 50 18	
	e	Z	02 01 11	
	e	N	02 07 32	
	eL	Z	02 28	
16	ePKP	Z'	02 14 13	0.7S, 128.0E, h = 32, H = 01 55 10.9
	e	Z'	02 14 18	M = 7.7 (Tul)
	eL	Z	02 55	
16	eL	Z	10 19	0.9S, 128.5E, h = 33, H = 09 10 29.0 M = 5.2 (Tul)
16	eL	Z	13 05	1.0S, 127.6E, h = 33, H = 12 03 42.5 M = 5.3 (Tul)
16	eL	Z	14 34	
16	eL	Z	15 53	
17	eL	Z	02 04	0.6S, 128.1E, h = 89, H = 01 10 16.6 M = 5.7 (Tul)
17	eP	Z'	02 25 02	19.6S, 178.6E, h = 33, H = 02 11 26.1
	ePP	Z	02 28 15	M = 6.1 (Tul)
	eSKS	E	02 35 35	
	eL	Z	02 57	
17	eL	Z	09 12	15.7S, 174.1W, h = 124, H = 08 23 34.0 M = 4.9 (Tul)
17	eL	Z	18 12	
17	eL	Z	19 15	54.9S, 28.2W, h = 26, H = 18 24 27.6 M = 5.3 (Tul)
18	eP	Z'	04 32 15	19.4N, 109.1W, h = 33, H = 04 27 40.6
	e	Z'	04 32 25	M = 3.9 (Tul)
	eS	E	04 35 01	
	eL	Z	04 38	
18	eL	Z	23 09	1.3S, 128.8E, h = 33, H = 22 01 07.7 M = 5.0 (Tul)

19	e(P)	Z'	07 52 15	35.8N, 96.9E, h = 33, H = 07 35 23.7
	e(PKP)	Z'	07 53 03	M = 7.6 (Tul)
	e	N	07 59 23	
	eSKS	E	08 00 50	
	e(S)	Z	08 02 16	
	eL	Z	08 24	
20	eP	Z'	01 01 51	46.4N, 151.1E, h = 102, H = 00 50 00.6
20	eL	Z	02 10	1.2S, 128.9E, h = 28, H = 01 07 47.8 M = 5.2 (Tul)
20	iP	Z'	05 57 54.8 C	27.5S, 70.2W, h = 33, H = 05 46 59.5
20	eP	Z'	07 14 57.8	52.4N, 160.0E, h = 33, H = 07 03 45.1
20	iP	Z'	20 43 29.4 D	52.3N, 159.5E, h = 33, H = 20 32 16.2
	eL	Z	21 07	M = 4.8 (Tul)
21	ePS	N	05 06 55	24.1N, 122.1E, h = 33, H = 04 38 21.7
	eSS	N	05 12 54	M = 5.7 (Tul)
	eL	Z	05 33	
21	ePS	E	11 07 36	3.2S, 146.9E, h = 33, H = 10 38 30.0
	eSS	E	11 14 07	M = 5.6 (Tul)
	eL	Z	11 32	
22	eL	Z	08 13	29.9S, 177.6W, h = 33, H = 07 25 30.8 M = 4.8 (Tul)
23	eL	Z	03 33	46.9N, 103.7E, h = 33, H = 02 51 17.2 M = 5.6 (Tul)
23	eL	Z	10 56	25.7N, 99.5E, h = 33, H = 09 55 06.8 M = 5.5 (Tul)
24	eP	Z'	02 40 15	0.8S, 91.6W, h = 33, H = 02 33 10.1
	eL	Z	02 52	M = 4.1 (Tul)
24	eL	Z	14 31	27.0N, 128.8E, h = 33, H = 13 32 12.2 M = 4.7 (Tul)
24	iP	Z'	22 31 33.2	39.7N, 104.8W, h = 33, H = 22 29 35.7
	iPg	Z'	22 32 03.0	
	iS	E'	22 33 02.0	
	eLg	Z'	22 33 48	
24	iP	Z'	22 37 27.8	
	iS	E'	22 37 53.0	
25	iP	Z'	07 25 27.2 D	12.4N, 87.4W, h = 33, H = 07 20 09.2

25	iPKP	Z'	08 30 53.2 D	4.7N, 122.4E, h = 610, H = 08 12 57.2
	ipPKP	Z'	08 33 15.0	
25	eL	Z	12 04	
25	eL	Z	17 35	1.3S, 128.7E, h = 33, H = 16 35 56.2 M = 5.4 (Tul)
26	eP	Z'	05 47 11	16.6S, 73.7W, h = 23, H = 05 37 30.8
26	eP	Z'	16 54 05	18.1S, 69.0W, h = 110, H = 16 44 12.0
	epP	Z'	16 54 35	
27	eL	Z	00 42	24.1N, 122.5E, h = 33, H = 23 45 01.2 M = 4.9 (Tul)
27	eL	Z	04 10	66.7N, 19.2W, h = 33, H = 03 42 33.9 M = 4.7 (Tul)
27	eL	Z	05 02	44.8N, 110.4W, h =33, H = 04 53 50.9
27	eSKP	Z	09 05 45	0.6S, 128.4E, h = 33, H = 08 42 58
	e	Z	09 11 18	M = 5.9 (Tul)
	eSPP	Z	09 15 50	
	eSS	N	09 21 00	
	eSSS	N	09 25 40	
	eL	Z	09 38	
27	iP	Z'	11 13 50.8 D	22.8S, 68.9W, h = 100, H = 11 03 29.1
27	eL	Z	15 34	61.4N, 148.3W, h = 39, H = 15 10 10.5 M = 4.3 (Tul)
27	iP	Z'	19 40 51.0	30.3S, 70.3W, h = 59, H = 19 29 43.7
	epP	Z'	19 41 04	
28	e	N	02 29 12	1.1S, 128.6E, h = 26, H = 01 51 06.8
	eL	Z	02 51	M = 5.3 (Tul)
28	iP	Z'	05 31 02.8 D	12.1S, 78.0W, h = 50 , H = 05 22 08.0
	ipP	Z'	05 31 16	
28	eL	Z	19 04	9.8S, 160.3E, h = 30, H = 18 13 30.9 M = 4.7 (Tul)
28	eL	Z	20 19	
29	eL	Z	06 12	23.9N, 121.6E, h = 118, H = 05 03 37.2 M = 4.7 (Tul)
29	eL	Z	10 06	17.8S, 13.2W, h = 33, H = 09 21 34.2 M = 4.6 (Tul)

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29	iP	E'	14 33 58.6	
	iS	E'	14 34 20.6	
29	e(SS)	Z	15 31 00	63.9S, 159.5E, h = 33, H = 14 51 52.4
	eL	Z	15 52	M = 4.2 (Tul)
29	iP	Z'	20 39 56.0 D	17.4N, 92.7W, h = 27, H = 20 35 41.6
	eS	E'	20 43 18	M = 4.5 (Tul)
	iS	E	20 43 33	
	eL	Z	20 44 30	
29	iP	Z'	21 54 20.8 C	51.4N, 178.6E, h = 60, H = 21 44 17.1
	eS	E	22 02 32	M = 6.2 (Tul)
	iSeS	N	22 04 09	
	eG	N	22 09 31	
	eL	Z	22 16	
30	ePKP	Z'	01 17 20	0.7S, 129.0E, h = 33, H = 00 58 18.3
	e	Z'	01 17 26	M = 7.1 (Tul)
	ePP	Z	01 19 22	
	eSS	E	01 36 28	
	eSSS	E	01 40 42	
	eL	Z	01 57	
30	iP	Z'	03 36 11.0 C	51.2N, 178.6E, h = 50, H = 03 26 04.2
30	iP	Z'	06 16 09.7 C	
	e(L)	Z	06 24 35	
30	iP	Z'	07 17 59.0 C	51.6N, 178.4E, h = 64, H = 07 07 55.9
	eS	E	07 26 02	M = 5.2 (Tul)
	eL	Z	07 39	
30	eL	Z	11 16	10.6N, 94.4E, h = 60, H = 10 20 53.6
				M = 5.4 (Tul)
30	eL	Z	17 56	
30	iP	Z'	18 51 35.6 C	8.2S, 79.9W, h = 60, H = 18 43 14.0
	iS	E	18 58 23	M = 5.3 (Tul)
	eL	Z	19 06	

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Seismogram Readings

May 1963

1	iP	Z'	01 14 49.4 C	52.4N, 174.5W, h = 78, H = 01 05 17.7
1	eP	Z'	10 17 14	19.0S, 169.0E, h = 140, H = 10 03 20.0
	e	Z	10 20 15	M = 6.8 (Tul)
	ePP	ZZ'	10 21 30	
	eSKS	E	10 27 35	
	eS	E	10 28 43	
	ePS	N	10 30 00	
	ePPS	E	10 31 40	
	eSS	E	10 37 00	
	eP'P'	Z'	10 41 20	
	eL	Z	10 52	
1	e(P)	Z'	16 43 54	13.3N, 91.8W, h = 70, H = 16 38 43.4
	eL	E	16 48	
2	(eP)	Z'	01 10 38	36.7N, 89.4W, h = 18, H = 01 09 21.7
	e(P)	E'	01 10 45	
	iS	E'Z'	01 11 35.0	
	eL	E'	01 11 47	
3	eSKS	E	11 18 25	15.0S, 173.3W, h = 33, H = 10 54 43.0
	eL	Z	11 36	M = 5.1 (Tul)
3	eP	Z'	19 22 28	17.6N, 91.8W, h = 90, H = 19 18 14.5
4	iP	Z'	04 48 27.2 D	4.7N, 73.8W, h = 43, H = 04 41 18.9
4	iP	Z'	06 05 41.8 C	51.8N, 175.4W, h = 69, H = 05 56 04.1
	eL	Z	06 22	M = 4.3 (Tul)
4	eP	Z'	16 24 15.5 C	13.2N, 90.8W, h = 164, H = 16 19 28.3
	i	Z'	16 24 36.5	M = 4.0 (Tul)
	eL	Z	16 30	
4	e(P)	Z'	21 06 16	
	e(S)	E'	21 08 13	
	e(Lg)	Z'	21 08 40	
4	eS	N	21 49 02	19.0N, 108.9W, h = 33, H = 21 40 39
	eL	Z	21 52 30	M = 3.5 (Tul)
4	i(P)	Z'	22 14 49.4 C	
5	e(P)	Z'	07 11 26	
	e(S)	E'	07 12 51	
	e(Lg)	Z'	07 14 20	
5	iP	Z'	12 49 26.2 D	14.2N, 91.9W, h = 33, H = 12 44 34

5	iP	Z'	15 27 39.2 C	24.7S, 69.5W, h = 60, H = 15 17 01.9
	ipP	Z'	15 27 54.3	M = 4.9 (Tul)
	isP	Z'	15 28 01.3	
	eS	N	15 36 17	
	eL	Z	15 44	
5	eL	Z	17 54	17.5S, 173.7W, h = 33, H = 17 11 47.2
				M = 5.0 (Tul)
6	eL	Z	06 33	
6	iPKP	Z'	08 57 56.8 D	9.1S, 112.5E, h = 84, H = 08 38 33.3
	eL	Z	09 48	M = 5.4 (Tul)
7	iP	Z'	05 24 07.3 D	64.5N, 146.9W, h = 33, H = 05 16 21.3
	eL	Z	05 42	M = 4.1 (Tul)
7	iP	Z'	16 33 28.5 D	22.0S, 68.6W, h = 110, H = 16 23 11.2
	epP	Z'	16 33 56	M = 5.0 (Tul)
	iS	E	16 41 50	
	esS	E	16 42 35	
	eL	Z	16 54	
7	iP	Z'	20 03 57.0 C	
	iS	E'	20 04 18.0	
8	iP	Z'	08 59 36.7 D	54.9N, 163.9W, h = 89, H = 08 50 56.0
	iS	N	09 06 35	M = 4.7 (Tul)
	e	Z	09 10 30	
	eL	Z	09 14 30	
8	iP	Z'	10 35 09.2 C	36.6N, 141.0E, h = 53, H = 10 22 11.2
	eSKS	N	10 45 32	M = 5.9 (Tul)
	iS	E	10 46 00	
	eSS	E	10 51 48	
	eL	Z	11 05	
8	eL	Z	16 22	5.3N, 25.7E, h = 70, H = 15 24 00.3
				M = 5.4 (Tul)
9	iP	Z'	15 09 01.3 C	12.2N, 86.9W, h = 34, H = 15 03 41.0
	i	Z'	15 09 05.5	M = 5.0 (Tul)
	iS	E	15 13 32	
	e	E	15 14 20	
	eL	Z	15 15 30	
9	eP	Z'	15 11 43	12.7N, 86.6W, h = 33, H = 15 06 24
10	eL	Z	05 18	20.0S, 168.1E, h = 33, H = 04 28 41.8
				M = 5.0 (Tul)
10	eL	Z	08 25	

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30	iPKP	Z'	07 04 48.0 C	2.5S, 102.4E, h = 160, H = 06 45 36.8
	epPKP	Z'	07 05 32	M = 5.1 (Tul)
	ePP	Z	07 08 03	
	eSS	E	07 26 20	
	eL	Z	07 55	
30	iP	Z'	22 16 44.8 C	46.5N, 153.3E, h = 33, H = 22 04 52.8
	eS	E	22 26 31	M = 5.1 (Tul)
	eL	Z	22 42	

28	$ePKP_1$	Z'	02 48 51	27.5S, 66.1E, h = 33, H = 02 28 51.6
	$ePKP_2$	Z'	02 49 38	M = 5.4 (Tul)
	ePP	Z	02 53 10	
	e	Z'	02 53 25	
	eSS	E	03 15 00	
	eL	Z	03 47	
28	eL	Z	13 50	
28	ePKP	Z'	14 07 12	1.3N, 97.4E, h = 50, H = 13 47 47.7
	ePP	Z	14 10 10	M = 5.5 (Tul)
	eL	Z	15 02	
28	eL	Z	16 31	67.5N, 18.7W, h = 33, H = 16 01 24.6
				M = 4.4 (Tul)
28	iP	Z'	22 07 30.2 C	46.5N, 153.2E, h = 33, H = 21 55 38.8
	iS	N	22 17 19	M = 6.8 (Tul)
	eL	Z	22 38	
28	eP	Z'	22 36 55	46.7N, 153.4E, h = 33, H = 22 25 04.5
28	iP	Z'	23 08 57.0 C	46.4N, 153.4E, h = 33, H = 22 57 03.4
29	iP	Z'	00 05 47.8 C	46.4N, 153.5E, h = 33, H = 23 53 56.1
	i	Z'	00 05 59.2	
29	eP	Z'	02 33 40	46.4N, 153.5E, h = 33, H = 02 21 45.8
29	eP	Z'	05 50 49	46.4N, 153.3E, h = 33, H = 05 38 56.2
	eS	E	06 00 30	
29	eP	Z'	08 14 52	40.3N, 126.9W, h = 33, H = 08 09 27.6
	eS	N	08 19 28	
29	eSS	E	13 17 40	11.6N, 142.7E, h = 30, H = 12 43 47.5
	eL	Z	13 38	M = 5.1 (Tul)
29	eP	Z'	13 25 55	46.4N, 153.7E, h = 33, H = 13 14 04.2
29	eP	Z'	18 54 07	46.3N, 153.4E, h = 33, H = 18 42 14.8
30	eL	Z	02 34	11.8N, 142.5E, h = 33, H = 01 39 05.4
				M = 4.7 (Tul)
30	eL	Z	05 14	11.7N, 142.6E, h = 33, H = 04 19 17.0
				M = 4.5 (Tul)
30	iP	Z'	05 25 56.8 C	64.4N, 146.9W, h = 27 H = 05 18 09.7
	eL	Z	05 44	M = 4.5 (Tul)

10	eL	Z	11 44	
10	eL	Z	21 03	5.8S, 108.1W, h = 33, H = 20 38 56 M = 4.1 (Tul)
10	iP	Z	22 30 28 C	2.2S, 77.6W, h = 33, H = 22 22 42.2
	e	N	22 34 00	M = 6.4 (Tul)
	eS	E	22 36 45	
	eL	Z	22 43	
11	eLg	E'	03 08 50	44.9N, 110.8W, h = 33, H = 03 01 00.1
11	iP	Z'	04 56 43.8 D	15.4S, 177.1W, h = 400, H = 04 44 19.4
11	eL	Z	18 45	24.2N, 122.5E, h = 33, H = 17 49 43.0 M = 5.2 (Tul)
11	iP	Z'	19 55 41.8 D	34.9S, 108.2W, h = 33, H = 19 44 23.5
	eL	Z	20 14	M = 4.3 (Tul)
12	iP	Z'	01 19 58.2	41.8N, 136.5E, h = 307, H = 01 07 36.1
12	ePKP	Z'	10 01 56.0	57.5S, 159.4E, h = 44, H = 09 42 58.3
	eSS	E	10 21 32	M = 5.4 (Tul)
	eSSS	E	10 25 57	
	eL	Z	10 42	
12	iP	Z'	20 16 41.2 D	57.4N, 153.9W, h = 80, H = 20 08 43.0
	ipP	Z	20 16 56	M = 6.3 (Tul)
	ePP	Z	20 18 40	
	eS	N	20 22 50	
	esS	E	20 23 10	
	eL	Z	20 31	
12	iP	Z'	20 48 02.8 C	55.9N, 161.1E, h = 33, H = 20 37 12.9
13	eL	Z	11 10	
13	iP	Z'	12 48 45.5 D	14.5N, 92.9W, h = 60, H = 12 44 00.7
	eS	E	12 52 35	M = 4.9 (Tul)
	eL	Z	12 57	
13	eP	Z'	13 17 52	14.1N, 93.1W, h = 33, H = 13 12 55.6
13	eP	Z'	18 13 16.5	20.6S, 70.7W, h = 33, H = 18 03 04.4
	e	Z'	18 13 26	
13	iP	Z'	22 06 26.4	
	iS	E'	22 06 51.8	
13	eL	E	23 41	6.0S, 150.1E, h = 94, H = 22 48 10.3 M = 5.4 (Tul)
14	iP	Z'	08 13 01.7 D	10.0N, 62.0W, h = 53, H = 08 05 30.5

14	ePKP	Z'	15 27 11	5.6S, 127.8E, h = 405, H = 15 08 46.1
	i	Z'	15 29 55.7	
15	eL	E	00 06	4.1S, 152.8E, h = 58, H = 23 14 47.0 M = 5.0 (Tul)
15	iP	Z'	02 30 19.3 C	45.8S, 74.8W, h = 33, H = 02 17 53.5
15	e	E	03 21 46	3.4S, 146.8E, h = 33, H = 02 52 39.7
	e	E	03 28 15	M = 5.6 (Tul)
	eL	E	03 45	
15	eS	E	12 25 11	38.0N, 26.4W, h = 33, H = 12 08 08.8
	eL	E	12 35	M = 4.8 (Tul)
15	eP	Z'	19 43 43	
	eS	N	19 47 40	
	eL	Z	19 50	
15	e(P)	Z'	20 43 21	
	e	Z'	20 43 34.6	
	eS	E	20 47 25	
	eL	Z	20 49	
16	eL	Z	16 51	0.8S, 128.5E, h = 50, H = 15 52 18.4 M = 5.5 (Tul)
16	eP	Z'	20 47 06.2	16.8N, 99.0W, h = 33, H = 20 42 33.5
	i(S)	E'	20 51 06.8	M = 3.9 (Tul)
	eL	Z	20 53	
17	iP	Z'	04 18 39.8 C	45.3N, 150.8E, h = 33, H = 04 06 36.2
	eL	Z	04 46	M = 4.7 (Tul)
17	ePS	E	06 39 00	15.7N, 120.1E, h = 80, H = 06 09 18.2
	eSS	E	06 45 48	M = 5.4 (Tul)
	eL	Z	07 06	
17	iP	Z'	09 18 50.0 C	
17	eP	Z'	12 21 44	41.7N, 141.9E, h = 47, H = 12 09 05.6
	eS	E	12 32 14	M = 5.4 (Tul)
	eL	Z	12 51	
17	iP	Z'	14 20 21.0 C	14.1S, 74.2W, h = 51 , H = 14 11 01.5
17	eL	Z	22 33	(0.8S, 128.8E, h = 231, H = 21 31 12)
17	eL	Z	23 28	24.4S, 177.2W, h = 70, H = 22 40 06.7 M = 4.8 (Tul)
18	iP	Z'	04 15 35.2 C	29.6S, 68.3W, h = 30, H = 04 04 24.3

18	iP	Z'	05 44 35.3 C	29.6S, 68.5W, h = 29, H = 05 33 25.0
	eS	N	05 53 46	M = 4.9 (Tul)
	eL	Z	06 09	
18	ePKP	Z'	12 40 05.0	8.2S, 115.6E, h = 39, H = 12 20 31.9
	eSKP	Z	12 43 32	M = 5.5 (Tul)
	eSS	E	13 01 16	
	eSSS	E	13 06 28	
	eL	Z	13 29	
18	iP	Z'	23 58 46.4 D	49.5N, 156.2E, h = 70, H = 23 47 17.3
19	iP	Z'	01 15 31.3 C	46.5S, 75.1W, h = 33, H = 01 03 04.1
	iPP	N	01 18 52	M = 6.3 (Tul)
	e	N	01 24 50	
	iS	NZ	01 26 02	
	eL	Z	01 44	
19	iP	Z'	04 38 01.0 C	17.0N, 100.0W, h = 40 , H = 04 33 36
19	iPKP	Z'	10 07 50.7 D	4.1S, 103.1E, h = 96, H = 09 48 26.0
19	iP	Z'	10 11 58.0 D	46.0N, 14.7E, h = 33, H = 10 00 04.6
	eL	Z	10 44	M = 4.6 (Tul)
19	eL	Z	20 19	(2.3N, 128.6E, h = 166, H = 19 21 22)
19	iP	Z'	21 44 00.3 C	23.8N, 45.9W, h = 33, H = 21 35 49.6
	iS	N	21 50 37	M = 6.3 (Tul)
	e	Z	21 53 50	
	eL	Z	21 56	
19	iP	Z'	23 41 11.1 D	17.8S, 69.4W, h = 148, H = 23 31 35.7
	ipP	Z'	23 41 44.5	M = 5.4 (Tul)
	eL	Z	00 13	
20	eP	Z'	01 41 41.0	8.3N, 83.0W, h = 33, H = 01 35 32.7
	eL	Z	01 51	M = 4.4 (Tul)
20	eP	Z'	02 49 25.0	8.3N, 83.0W, h = 33, H = 02 43 16.3
	eL	Z	02 59	M = 4.4 (Tul)
20	eP	Z'	11 51 52.0 C	30.7S, 178.3W, h = 34, H = 11 38 00.9
	iPP	Z	11 56 02	M = 6.8 (Tul)
	eSKS	E	12 02 25	
	eSP	Z	12 05 08	
	ePKKP	Z'	12 08 02	
	eSS	N	12 10 33	
	eSSS	N	12 14 17	
	eL	Z	12 24	
20	eL	Z	17 43	72.1N, 126.3E, h = 33, H = 17 01 40.2
				M = 4.5 (Tul)

20	eL	Z	22 03	(2.5N, 128.8E, h = 148, H = 21 04 57)
21	iP	Z'	00 19 45.5	
	iS	Z'	00 20 11.2	
21	eS	E	01 22 35	56.0S, 123.9W, h = 33, H = 00 58 07.4
	eSS	E	01 28 52	M = 5.4 (Tul)
	eSSS	E	01 32 45	
	eL	Z	01 39	
21	ePP	Z	17 48 40	11.1S, 163.3E, h = 33, H = 17 30 15.4
	eSKS	E	17 55 02	M = 6.0 (Tul)
	ePS	E	17 58 00	
	eSS	E	18 03 58	
	eL	Z	18 19	
21	eL	Z	20 12	24.0N, 108.6W, h = 33, H = 20 03 32.0
				M = 3.7 (Tul)
22	eL	Z	03 16	11.3S, 163.2E, h = 60, H = 02 27 56.3
				M = 5.3 (Tul)
22	iP	Z'	04 29 04.7 C	17.7N, 106.0W, h = 33, H = 04 24 29.6
	iS	E	04 32 50	M = 4.9 (Tul)
	eL	Z	04 34	
22	eL	Z	09 07	
22	eL	Z	11 15	11.0S, 163.5E, h = 37, H = 10 18 27.0
				M = 4.7 (Tul)
22	iP	Z'	14 08 24.2	48.6N, 154.8E, h = 22, H = 13 56 43.0
	epP	Z'	14 08 38	M = 6.3 (Tul)
	ePP	Z	14 11 14	
	ePa	Z	14 13 02	
	e	N	14 17 10	
	eS	N	14 18 22	
	eSS	N	14 26 14	
	eL	Z	14 33	
22	e(P)	Z'	15 43 53	
	e	E'	15 45 09	
	e(Lg)	E'Z'	15 48 44	
22	eL	Z	16 43	4.3N, 127.9E, h = 58, H = 15 42 48.6
				M = 5.6 (Tul)
22	e(PKP)	Z'	22 12 19	8.2S, 115.7E, h = 33, H = 21 53 02.5
	e(PKP)	Z	22 12 28	M = 5.7 (Tul)
	ePP	Z	22 16 03	
	ePS	N	22 26 20	
	e	N	22 27 40	
	eSS	N	22 33 40	
	eL	Z	23 01	

23	eL	Z	01 52	1.6N, 126.4E, h = 33, H = 00 51 40.3 M = 4.8 (Tul)
23	eL	Z	03 22	
23	iP	Z'	03 45 55.3 C	15.0S, 176.7W, h = 279, H = 03 33 19.1
	epP	Z'	03 47 07	5.9 (Tul)
	eSKS	E	03 56 03	
	eSP	Z	03 57 44	
	eSS	E	04 02 40	
	eL	Z	04 24	
23	eP	Z'	04 05 10	1.3S, 80.7W, h = 33, H = 03 57 41.1
23	eP	Z'	06 40 31	32.9N, 115.5W, h = 14, H = 06 36 32.6
	e	E'	06 45 25	M = 3.8 (Tul)
	eL	Z	06 47 00	
23	iP	Z'	07 50 21.5 C	19.2N, 64.6W, h = 55, H = 07 43 58.0
	eL	Z	07 59 30	M = 5.1 (Tul)
23	iP	Z'	09 10 04.8 C	32.8N, 115.6W, h = 14, H = 09 06 02.6
	eLg	Z'	09 14 55	M = 4.2 (Tul)
	eL	Z	09 16 27	
23	iP	Z'	12 09 03.5 D	44.7S, 75.7W, h = 33, H = 11 56 45.6
23	eP	Z'	12 14 35	20.0N, 73.6W, h = 33, H = 12 09 11.8
23	eP	Z'	15 57 02	32.5N, 115.3W, h = 14, H = 15 53 00.2
	eLg	Z'	16 01 55	M = 4.6 (Tul)
	iL	Z	16 03 24	
23	eL	Z	16 10	6.0N, 126.1E, h = 88, H = 15 12 05.7 M = 5.3 (Tul)
23	iP	Z'	18 26 21.0 D	14.5N, 105.2W, h = 30, H = 18 21 18.3
	eS	E	18 30 31	M = 5.0 (Tul)
	eL	Z	18 32	
24	eL	Z	07 44	
24	eL	Z	09 21	
25	eP	Z'	07 52 19	
	eL	Z	07 58	
25	iP	Z'	08 07 24.3 C	23.8S, 66.6W, h = 210, H = 07 57 03.9
25	iP	Z'	08 53 35.2 C	42.7N, 144.3E, h = 80, H = 08 41 09.6
	ipP	Z'	08 53 54.0	

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25	iP	Z'	10 46 37.0 D	39.8N, 104.7W, h = 33, H = 10 44 38.1
	iPg	Z'	10 47 07.0	
	e(S)	E'	10 48 09	
	i(Sg)	E'	10 48 53	
25	eP	Z'	14 57 27	11.9N, 89.6W, h = 33, H = 14 52 12.2
	eL	Z	15 05	M = 3.7 (Tul)
25	eP	Z	16 22 34	56.8S, 25.0W, h = 29, H = 16 08 00.8
	ePP	Z	16 27 02	M = 6.0 (Tul)
	e	N	16 33 12	
	e	N	16 36 14	
	eL	Z	17 02	
25	eL	Z	20 48	31.8N, 141.3E, h = 111, H = 19 57 28.5 M = 4.8 (Tul)
26	eL	Z	00 49	19.7S, 174.3W, h = 33, H = 23 59 55.8 M = 4.8 (Tul)
26	eL	Z	02 21	
26	eL	Z	05 31	51.5N, 159.8E, h = 33, H = 04 52 23.4 M = 4.9 (Tul)
26	iP	Z'	12 53 28.2 D	16.7S, 72.2W, h = 60, H = 12 43 48.1
26	iP	Z'	19 20 41.0 C	5.5S, 81.2W, h = 33, H = 19 13 39.6
26	iP	Z'	23 17 54.3 D	55.2N, 159.9E, h = 47, H = 23 06 55.0
	eS	E	23 26 58	M = 6.0 (Tul)
	eL	Z	23 45	
27	iP	Z'	04 09 45.8 D	55.3N, 160.1E, h = 54, H = 03 58 47.9
	eS	E	04 18 48	M = 5.8 (Tul)
	eL	Z	04 36	
27	eL	Z	17 22	0.6S, 130.1E, h = 33, H = 16 20 09.6 M = 4.8 (Tul)
28	iP	Z'	08 29 30.0 C	5.8N, 71.9W, h = 33, H = 08 22 21.8
29	eL	Z	18 58	22.6S, 114.4W, h = 33, H = 18 27 19.1 M = 4.4 (Tul)
29	iP	Z'	22 46 21.2 D	14.7N, 92.1W, h = 33, H = 22 41 34
30	ePKP	Z'	07 15 29	54.2S, 143.7E, h = 33, H = 06 56 09.3
	eSKP	Z'	07 19 04	M = 6.0 (Tul)
	eSS	N	07 36 00	
	eL	Z	08 00	

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30	e	N	19 26 24	59.4S, 26.9W, h = 33, H = 18 57 53.2
	eL	Z	19 51	M = 5.0 (Tul)
30	iP	Z'	21 15 13.0	
	iS	Z'	21 15 35.2	
31	iP	Z'	04 49 14.4 D	16.5S, 69.3W, h = 136, H = 04 39 34.5
	epP	Z'	04 49 48	
31	eP	Z'	05 40 27	55.2N, 160.0E, h = 61, H = 05 29 30.4
	eL	Z	06 10 03	M = 4.6 (Tul)
31	eP	Z'	06 16 32	15.1S, 173.3W, h = 33, H = 06 03 34.9
	eSKS	N	06 27 05	M = 5.6 (Tul)
	eSS	E	06 33 10	
	eL	Z	06 45	
31	eP	Z'	21 56 08.6	11.2N, 91.2W, h = 33, H = 21 53 46
31	eP	Z'	24 11 42.0	15.1S, 173.4W, h = 33, H = 23 58 49.7
	eSKS	E	24 2216	M = 5.7 (Tul)
	eS	E	24 23 37	
	eSS	E	24 28 32	
	eL	Z	24 40	

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1	eP	Z'	00 11 42.0	15.1S, 173.4W, h = 33, H = 23 58 49.7
	eSKS	E	00 22 16	M = 5.7 (Tul)
	eS	E	00 23 37	
	eSS	E	00 28 32	
	eL	Z	00 40	
1	eL	Z	02 29	
1	ePS	E	12 55 40	15.0S, 172.4W, h = 33, H = 12 30 55.8
	eL	Z	13 12	M = 5.2 (Tul)
1	eP	Z'	21 26 46.0	15.2S, 173.5W, h = 33, H = 21 13 52.7
	iSKS	E	21 37 20	M = 5.9 (Tul)
	eS	E	21 38 40	
	eSS	E	21 43 38	
	eL	Z	21 55	
2	iP	Z'	01 20 33.2	17.7N, 94.2W, h = 164, H = 01 16 31
	iS	E'	01 23 54.2	
2	eLg	Z'	03 58 45	
	eL	Z	04 00	
2	eLg	Z'	04 12 35	
	eL	Z	04 14	
2	eS	E	10 26 35	6.1S, 154.4E, h = 49, H = 10 00 00.1
	eSP	EZ	10 28 26	M = 5.8 (Tul)
	eSS	E	10 34 10	
	eL	Z	10 52	
2	ePKP	Z'	21 22 58	58.5S, 15.6W, h = 50, H = 21 04 24.2
	ePP	Z'	21 23 47	M = 6.5 (Tul)
	iPP	Z	21 24 01	
	e	E	21 33 28	
	eSP	Z	21 33 40	
	e	E	21 34 50	
	eL	Z	21 58	
2	eP	Z'	22 26 54 C	13.8N, 90.8W, h = 68, H = 22 22 00.0
3	iP	Z'	05 26 39.1 D	16.4N, 100.3W, h = 33, H = 05 22 07.8
3	eP	Z'	07 49 07	34.2N, 138.7E, h = 43, H = 07 35 54.3
	e	N	08 00 15	M = 5.2 (Tul)
	eL	Z	08 18	
3	eP	Z'	11 31 37.0	
3	iP	Z'	11 38 58.3 C	5.3N, 72.9W, h = 21, H = 11 31 48.7
	e	N	11 40 17	M = 4.9 (Tul)
	eS	E	11 44 41	
	eScS	E'	11 49 11	
	eL	Z	11 50	

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3	iPKP	Z'	15 02 21.2 D	4.4S, 102.5E, h = 48, H = 14 42 49.5
3	e(P)	Z'	19 49 30	
	eL	Z	19 52	
3	eL	Z	20 42	
4	eP	Z'	04 31 54	
	eL	Z	04 40	
4	e	E	12 18 35	30.5S, 177.8W, h = 33, H = 11 54 09.1
	eL	Z	12 41	M = 5.5 (Tul)
4	eL	Z	13 53	30.4S, 177.6W, h = 33, H = 13 05 56.3
				M = 5.2 (Tul)
4	eL	Z	20 09	18.9N, 146.2E, h = 110, H = 19 21 56.6
				M = 5.0 (Tul)
4	iP	Z'	20 32 49.0 D	19.6N, 97.0W, h = 152, H = 20 29 02.5
4	ePKP	Z'	21 23 45	0.1S, 127.3E, h = 31, H = 21 04 42.3
	ePP	Z'	21 25 41	M = 6.4 (Tul)
	ePKS	N	21 27 05	
	eSS	N	21 42 48	
	eL	Z	22 05	
4	eP	Z'	22 24 07	39.0N, 20.6E, h = 33, H = 22 11 31.8
5	i	Z'	00 16 26.2	39.3N, 104.0W, h = 33, H = 00 13 50.6
	i	E'Z'	00 17 24.0	
	e	E	00 18 12	
5	eL	Z	01 23	33.1S, 76.7E, h = 33, H = 23 55 30.7
				M = 5.4 (Tul)
5	eL	Z	05 58	30.7S, 177.6W, h = 70, H = 05 07 03.7
				M = 5.2 (Tul)
5	eL	Z	07 00	34.6S, 81.5E, h = 33, H = 05 32 09.2
				M = 5.2 (Tul)
5	iP	Z'	09 25 04.4 C	31.2N, 142.6E, h = 33, H = 09 11 49.9
	eL	Z	10 12	M = 4.4 (Tul)
5	eL	Z	11 01	14.9S, 166.8E, h = 37, H = 10 12 09.0
				M = 5.3 (Tul)
5	eL	Z	12 12	3.6S, 149.6E, h = 33, H = 11 20 07.3
				M = 5.2 (Tul)
5	eL	Z	14 50	17.2S, 176.7W, h = 33, H = 14 17 38.1
				M = 4.6 (Tul)

24	iP	Z'	16 26 36.8	52.3N, 171.2W, h = 33, H = 16 17 15.4
	iS	E	16 34 05	M = 5.3 (Tul)
	eL	Z	16 43	
24	iPKP	Z'	19 16 18.2	4.6S, 101.8E, h = 33, H = 18 56 43.6
25	eP	Z'	08 31 59	44.3N, 129.1W, h = 31, H = 08 26 21.9
	eL	Z	08 42	M = 4.1 (Tul)
25	eP	Z'	09 45 05.5	44.3N, 129.1W, h = 32, H = 09 39 28.4
	eL	Z	09 55	M = 4.3 (Tul)
25	eP	Z'	11 49 44	8.7N, 82.9W, h = 37, H = 11 43 41.3
	eL	Z	11 58	M= 4.3 (Tul)
25	iPKP	Z'	14 51 48.0 C	8.4S, 106.5E, h = 78, H = 14 32 14.3
	e	E	15 20 00	M = 5.2 (Tul)
	eL	Z	15 45	
25	eP	Z'	15 55 15	44.0N, 110.0W, h = 33, H = 15 51 49.0
	eLg	Z'	15 58 51	
25	e(P)	Z'	16 43 58	
	e(Lg)	Z'	16 45 25	
	eL	Z	16 46	
26	eL	Z	01 14	7.1N, 82.2W, h = 33, H 00 59 08.9 M = 3.8 (Tul)
26	eL	Z	08 52	11.5N, 143.0E, h = 48, H = 07 55 41.4 M = 4.7 (Tul)
26	ePKP	Z'	10 00 28	4.6N, 126.3E, h = 33, H = 09 41 31.2
	eL	Z	10 41	M = 5.1 (Tul)
26	iP	Z'	10 38 24.2 C	35.3N, 3.7W, h = 33, H = 10 27 03.1
26	iP	Z'	14 29 53.0 C	5.9N, 72.7W, h = 33, H = 14 22 49
26	iP	Z'	17 49 00.2 D	7.1N, 82.3W, h = 20, H = 17 42 40.6
	ePP	Z	17 49 55	M = 5.7 (Tul)
	eS	E	17 54 08	
	eL	Z	17 57 30	
27	iP	Z'	07 15 15.3 D	60.5N, 140.7W, h = 29, H = 07 08 01.7
	iS	E	07 21 07	M = 5.2 (Tul)
	eLg	E'	07 28 10	
	eL	Z	07 29	
27	eL	Z	16 46	
28	e(P)	Z'	00 37 24	16.8N, 96.0W, h = 33, H = 00 33 00

10	ePKP	Z'	06 58 16	55.3S, 141.1E, h = 18, H = 06 39 04.1
	ePKP	Z'	06 58 20	M = 6.9 (Tul)
	iSKP	E	07 01 49	
	eSS	E	07 13 00	
	eSSS	N	07 18 55	
	eL	Z	07 41	
10	iP	Z'	08 04 22.7 C	51.5N, 178.5W, h = 33, H = 07 54 28.2
	eL	Z	08 27	M = 5.8 (Tul)
10	iP	Z'	10 58 13.2 D	50.9N, 160.2E, h = 33, H = 10 46 58.1
	eL	Z	11 27	M = 4.6 (Tul)
11	eL	Z	00 50	4.5S, 152.8E, h = 69, H = 23 58 44.3 M = 5.2 (Tul)
11	eL	Z	04 21	37.1N, 70.3E, h = 38, H = 03 25 40.7 M = 5.0 (Tul)
11	iP	Z'	04 23 47.7 D	59.8N, 153.0W, h = 50, H = 04 15 49.4
11	iP	Z'	13 16 29.8 C	63.1N, 151.4W, h = 31, H = 13 08 31.4
	eS	N	13 23 15	M = 5.5 (Tul)
	eL	Z	13 30	
11	iP	Z'	15 27 46.0 D	31.8N, 116.2W, h = 33, H = 15 23 42.3
	eS	N	15 31 00	M = 5.0 (Tul)
	eL	Z	15 32	
11	eL	Z	18 51	30.7N, 86.9E, h = 33, H = 18 07 24.1 M = 5.3 (Tul)
11	eP	Z'	18 41 22	4.9N, 77.5W, h = 33, H = 18 34 30.6
12	iP	Z'	12 08 55.7	
	iS	E'	12 09 15.3	
12	iP	Z'	16 39 17.0	
	iS	E'	16 39 37.0	
12	eP	Z'	22 19 21	31.6N, 116.3W, h = 33, H = 22 15 15.3
	eL	Z	22 26	M = 3.9 (Tul)
13	iP	Z'	17 10 27.5 D	33.3S, 71.3W, h = 94, H = 16 59 10.9
13	eL	Z	18 18	4.6S, 153.2E, h = 54, H = 17 26 41.1 M = 5.4 (Tul)
13	eL	Z	22 51	
14	eP	Z'	07 23 36	15.0N, 93.1W, h = 33, H = 07 18 50.8

19	e	Z'	08 43 00	37.9N, 112.5W, h = 36, H = 08 38 47.6
	e	Z	08 45 46	
19	ePKP	Z'	09 27 58.3	4.7N, 126.5E, h = 83, H = 09 09 04.0
	ePP	Z	09 29 45	M = 6.1 (Tul)
	ePPP	E	09 34 50	
	ePS	Z	09 40 45	
	eL	Z	10 08	
19	ePKP	Z'	11 06 07	25.0N, 92.1E, h = 51, H = 10 47 24.7
	eL	Z	11 45	M = 5.7 (Tul)
19	eL	Z	12 48	9.3S, 158.8E, h = 33, H = 11 58 55.0
				M = 5.1 (Tul)
19	eL	Z	18 10	63.2N, 146.3W, h = 33, H = 17 46 01.7
				M = 4.0 (Tul)
19	eP	Z	23 15 18	31.5N, 140.3E, h = 38, H = 23 01 51.3
	ePP	Z	23 19 08	M = 5.2 (Tul)
	eL	Z	23 46	
20	eP	Z'	03 39 28	12.5N, 18.9W, h = 75, H = 03 34 18.2
	eL	Z	03 48	M = 3.7 (Tul)
20	eLg	Z'	15 08 33	30.2N, 114.1W, h = 14, H = 14 59 42.6
	eL	Z	15 09	M = 3.3 (Tul)
20	iP	Z'	19 58 58.2 C	35.8N, 3.6W, h = 54, H = 19 47 41.3
	eL	Z	20 21	M = 4.6 (Tul)
20	eP	Z	23 00 07	27.9S, 176.6W, h = 41, H = 22 46 18.1
	ePP	Z	23 04 05	M = 5.9 (Tul)
	eSKS	N	23 10 35	
	eS	N	23 11 28	
	eSP	Z	23 12 52	
	e(SS)	E	23 18 15	
	eL	Z	23 35	
21	eP	Z'	03 38 13 D	10.6N, 85.9W, h = 82, H = 03 32 41.0
	eL	Z	03 49	M = 4.0 (Tul)
21	eP	Z'	04 07 22	15.2N, 91.9W, h = 218, H = 04 02 55.7
	eS	E'	04 11 37	
21	iP	Z'	13 57 07.3 C	47.9N, 130.3E, h = 33, H = 13 44 24.6
	eSKS	E	14 07 45	M = 5.2 (Tul)
	eL	Z	14 27	
21	eL	Z'	16 27	25.2N, 92.2E, h = 56, H = 15 26 31.0
				M = 5.2 (Tul)

21	eSKS	E	18 07 00	27.9S, 176.2W, h = 33, H = 17 42 35.9
	eL	Z	18 32	M = 5.2 (Tul)
21	eSKS	N	22 06 30	29.7S, 177.4W, h = 43, H = 21 42 01.0
	eL	Z	22 36	M = 5.2 (Tul)
21	eL	Z	23 50	
22	eL	Z	01 17	
22	eL	Z	05 31	6.1S, 154.4E, h = 64, H = 04 37 21.7
				M = 5.0 (Tul)
22	iP	Z'	08 47 04.8	41.1S, 90.2W, h = 33, H = 08 35 14.5
	eS	E	08 56 50	M = 4.5 (Tul)
	eL	Z	09 10	
22	i(P)	Z'	11 01 16.5	
	e(S)	E'	11 02 35	
22	eL	Z	21 38	52.9N, 121.3E, h = 33, H = 20 51 56.8
				M = 5.1 (Tul)
22	eL	Z	22 26	
23	eSKS	E	04 13 53	29.6S, 177.9W, h = 55, H = 03 49 33.9
	eL	Z	04 36	M = 5.3 (Tul)
23	eL	Z	05 56	
23	e(P)	Z'	07 53 22	
	e(S)	Z'	07 55 00	
	e(Lg)	Z'	07 55 32	
23	eL	Z	09 47	6.0S, 146.6E, h = 61, H = 08 53 09.6
				M = 5.2 (Tul)
23	eL	Z	12 15 30	21.0N, 108.2W, h = 33, H = 12 05 19
				M = 3.9 (Tul)
23	eL	Z	13 29	52.1N, 131.3W, h = 33, H = 13 11 28.6
				M = 3.9 (Tul)
24	iP	Z'	04 34 30.2 C	59.5N, 151.7W, h = 52, H = 04 26 37.9
	iS	E	04 41 00	M = 6.9 (Tul)
	eL	Z	04 49	
24	iP	Z'	05 51 38.8 D	59.4N, 151.5W, h = 57, H = 05 43 48.1
24	eL	Z	14 03	
24	eL	E	14 36	59.0N, 136.9W, h = 33, H = 14 18 29.6

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7	eP	Z'	19 36 24.8 D	8.5N, 103.1W, h = 33, H = 19 30 35.6
	e	Z	19 37 13	M = 5.5 (Tul)
	e	Z	19 39 05	
	eS	N	19 41 15	
	eL	Z	19 44	
7	eP	Z'	21 34 36	8.8N, 102.5W, h = 33, H = 21 28 48.5
	eS	N	21 39 27	M = 4.8 (Tul)
	eL	Z	21 42	
7	eP	Z'	22 50 23	15.3S, 173.2W, h = 33, H = 22 37 30.0
	e	N	22 55 36	M = 6.0 (Tul)
	e	NZ	23 00 55	
	e	E	23 02 16	
	e	E	23 07 09	
	eL	Z	23 19	
8	e	N	01 25 16	15.1S, 173.0W, h = 30, H = 01 01 51.9
	eL	Z	01 43	M = 5.4 (Tul)
8	eL	Z	05 07	22.7S, 13.7W, h = 33, H = 04 22 53.0
				M = 5.2 (Tul)
8	e(Lg)	Z'	12 02 38	
8	iP	Z'	12 52 49.4 D	6.9N, 73.0W, h = 148, H = 12 46 04.4
8	eP	Z'	13 42 48	60.4N, 153.6W, h = 176, H = 13 34 23.1
9	eL	Z	02 21	23.5S, 176.5W, h = 33, H = 01 30 32.2
				M = 4.8 (Tul)
9	iP	Z'	07 19 32.0 C	51.0N, 178.8E, h = 70, H = 07 09 28.8
9	i(P)	Z'	12 01 17.0 D	
	e(Lg)	Z'	12 02 37	
9	eL	Z	16 32	15.3S, 172.9W, h = 33, H = 15 50 31.8
				M = 4.6 (Tul)
9	iP	Z'	20 47 18.3 C	10.7N, 41.9W, h = 33, H = 20 37 51.6
	eS	E	20 54 55	M = 5.0 (Tul)
	eL	Z	21 03	
10	ePKP	Z'	04 35 45.5	55.4S, 147.4E, h = 33, H = 04 16 37.7
	iPKP	Z'	04 35 52.8 C	M = 6.2 (Tul)
	eSKP	E'	04 39 22	
	eSS	E	04 56 12	
	eSSS	E	05 01 00	
	eL	Z	05 19	
10	ePKP	Z'	05 33 31	55.2S, 146.3E, h = 33, H = 05 14 15.6

14	iP	Z'	07 27 43.8 C	16.4N, 94.6W, h = 33, H = 07 23 16
	eLg	E'	07 31 30	
14	iP	Z'	08 24 04.7 C	14.6N, 93.4W, h = 33, H = 08 19 16.6
14	eP	Z'	23 42 46	50.8N, 129.6W, h = 33, H = 23 37 48.5
	eL	Z	23 55	M = 3.6 (Tul)
15	eP	Z'	15 41 58	36.3S, 98.9W, h = 33, H = 15 30 37.7
	iS	E	15 51 20	M = 5.1 (Tul)
	eL	Z	15 58	
15	eL	Z	22 47	55.7S, 28.5W, h = 33, H = 21 47 12.1
				M = 4.7 (Tul)
16	eL	Z	05 21	
16	iP	Z'	06 31 42.0 C	16.6N, 100.3W, h = 33, H = 06 27 15
	eS	N	06 35 24	M = 4.3 (Tul)
	eL	Z	06 37	
16	eL	Z	07 50	
16	iP	Z'	09 25 48.0	50.8N, 129.5W, h = 33, H = 09 19 54.8
	eL	Z	09 34	M = 4.1 (Tul)
16	eL	Z	13 42	
17	eP	Z'	18 39 28	60.4N, 140.8W, h = 33, H = 18 32 14.5
	iS	E	18 45 19	M = 5.5 (Tul)
	eL	Z	18 52	
	eLg	E'	18 52 22	
17	eL	Z	19 25	65.8S, 179.5W, h = 33, H = 18 30 54.1
				M = 6.1 (Tul)
17	iPKP	Z'	23 21 34.6 C	4.1S, 102.2E, h = 73, H = 23 02 06.6
	ePP	Z	23 24 47	M = 5.4 (Tul)
	eSS	E	23 43 26	
	eL	Z	24 11	
18	eL	Z	04 54	29.0N, 129.9E, h = 33, H = 04 02 31.0
				M = 4.9 (Tul)
18	e(S)	E	05 48 40	
	eL	Z	05 56	
18	eP	Z'	17 00 22	19.6N, 65.6W, h = 33, H = 16 54 05.6
	eL	Z	17 10	M = 4.2 (Tul)
19	eS	N	02 40 35	23.6S, 174.9W, h = 55, H = 02 15 54.1
	eL	Z	03 00	M = 5.4 (Tul)

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5	iP	Z'	17 02 33.1	
	iS	E'	17 02 42.0	
5	eSS	E	23 34 00	3.0S, 119.5E, h = 75, H = 22 54 28.7
	e	E	23 38 40	M = 5.7 (Tul)
	eL	Z	23 58	
6	i(P)	Z'	02 48 18.7	
	i(S)	E'	02 48 55	
6	iPKP	Z'	05 37 33.8 D	19.9N, 120.2E, h = 33, H = 05 18 55.1
	i	Z'	05 37 41.0	M = 5.6 (Tul)
	ePP	Z'	05 38 40	
	e	E	05 45 22	
	e	Z	05 48 10	
	eL	Z	06 15	
6	eP	Z'	08 07 21.5	36.5N, 104.3W, h = 33, H = 08 05 36.3
	ePg	Z'	08 07 42	
	eS	E'	08 08 34	
	eLg	E	08 09 13	
6	iSKP	Z'	08 43 54.0	6.7N, 94.7E, h = 33, H = 08 21 12.2
6	eL	Z	12 20	
6	eSS	N	12 51 12	37.8S, 77.9E, h = 33, H = 12 04 14.3
	e	N	12 58 16	M = 5.7 (Tul)
	eL	Z	13 24	
7	eP	Z'	00 31 17	23.9S, 66.6W, h = 206, H = 00 20 54.4
7	eL	Z	07 05	
7	i(s)	E'	07 39 27.5	
	i(Lg)	E'	07 40 01.7	
7	eL	Z	08 45	
7	eL	Z	10 26	
7	eL	Z	12 16	(38.0N, 122.0W, h = 14, H = 12 04 39.7)
7	eL	Z	13 22	
7	eL	Z	15 34	
7	eL	Z	16 18	15.3S, 178.9W, h = 33, H = 15 34 47.8 M = 5.0 (Tul)
7	eL	Z	16 47	19.0N, 121.8E, h = 33, H = 15 49 57.4 M = 5.4 (Tul)

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Earth Sciences Observatory

Leonard, Oklahoma

SEISMOGRAM READINGS

Station Abbreviation: TUL

Geographical Location: 35° 54' 38" N. latitude
95° 47' 33" W. longitude

Altitude: 256.4 meters (841 feet)

Geology: 1128 meters (3700 feet) of Lower Pennsylvanian through Cambrian sandstones and limestones above basement granite.

Instruments: Three short period Benioff N', E', Z'.
Free period of pendulum 1.0 sec.
Free period of galvanometer 0.2 sec.

Three long period Press-Ewing N, E, Z.
Free period of pendulum 25 sec.
Free period of galvanometer 90 sec.

Interpretation:

First column gives the date.

Second column: Earthquake phase (P, S, PP, PS, PKP, etc.)

Third column: Seismograph on which the reading is made, N', E', and Z' indicate short period seismographs, N, E, and Z indicate long period seismographs.

Fourth column: Greenwich mean time in hours, minutes and seconds.

Fifth column: Direction of initial movement; C stands for compression and D for dilatation.

Sixth column: USCGS epicenter determination, Tulsa magnitudes and other remarks.

Magnitudes are computed from maximum trace amplitudes of surface waves as recorded on long period vertical seismograph.

JERSEY PRODUCTION RESEARCH COMPANY

Tulsa, Oklahoma

MAY 4 1964

International Seismological Centre

LEONARD OBSERVATORY
Seismogram Readings
July 1963

1	eL	Z	05 10	17.4S, 167.6E, h = 42, H = 04 03 42.9 M = 4.5 (Tul)
1	eI	Z	10 53	
1	eL	Z	18 51	20.8S, 169.2E, h = 33, H = 17 53 12 M = 4.5 (Tul)
1	iPKP	Z'	20 39 06.2C	4.7S, 103.7E, h = 91, H = 20 19 40.6
1	eL	Z	22 12	37.0N, 96.1E, h = 33, H = 21 10 28.5 M = 4.7 (Tul)
1	iP	Z'	22 51 44.3D	46.5N, 153.6E, h = 69, H = 22 39 57.8
	ipP	Z'	22 51 55.7	
2	eL	Z	01 14	43.9N, 85.2E, h = 39, H = 00 15 22.4 M = 4.7 (Tul)
2	eP	Z'	03 00 42	2.4S, 77.8W, h = 33, H = 02 52 53.0
	eL	Z	03 11	M = 4.6 (Tul)
2	eL	Z	06 40	30.7N, 114.2W, h = 33, H = 06 30 13.8 M = 3.6 (Tul)
2	iP	Z'	08 04 53.8C	39.8N, 104.7W, h = 15, H = 08 02 54.1
	iPg	Z'	08 05 24.0	
	i(Sg)	Z'	08 07 08	
2	iPKP	Z'	10 05 59.6C	7.8S, 109.0E, h = 117, H = 09 46 35.8
2	iP	Z'	18 11 31.3D	9.0N, 83.0W, h = 64, H = 18 05 33.7
	eL	Z'	18 20	M = 3.8 (Tul)
2	iP	Z'	22 05 42.2D	10.9N, 87.5W, h = 130, H = 22 00 19
	eL	Z	22 13	M = 3.7 (Tul)
3	iP	Z'	09 18 15.2D	14.6N, 92.8W, h = 72, H = 09 13 30.7
	eLg	Z'	09 22 09	
3	eL	Z	19 24	22.9S, 175.6W, h = 33, H = 18 36 19.6 M = 4.6 (Tul)
4	iP	Z'	01 48 20.4	12.8N, 88.7W, h = 55, H = 01 43 20.8
4	eL	Z	04 34	
4	iP	Z'	08 10 21.3C	7.5N, 76.9W, h = 41, H = 08 03 47.6

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4	eP	Z'	11 11 35.8D	26.3S, 177.7W, h = 158, H = 10 58 13.2
	ePP	Z	11 16 35	M = 6.3 (Tul)
	iSKS	E'	11 21 58	
	iSKS	N	11 22 02	
	iS	N	11 22 58	
	ePS	N	11 24 10	
	eSS	N	11 29 50	
	eL	Z	11 44	
4	eL	Z	15 03	22.9S, 175.6W, h = 33, H = 14 16 51.1
				M = 4.9 (Tul)
4	eP	Z'	23 09 17.5D	18.5S, 12.6W, h = 33, H = 22 56 15.7
	ePP	Z'	23 13 26	M = 5.4 (Tul)
	eS	N	23 20 50	
	eSS	N	23 27 20	
	eL	Z	23 40	
5	iP	Z'	05 57 06.2D	11.6S, 77.5W, h = 55, H = 05 48 13.4
	iS	E	06 04 15	M = 5.1 (Tul)
	eScS	E	06 06 48	
	eL	Z	06 13	
5	eP	Z'	14 46 01D	12.8N, 88.9W, h = 85, H = 14 40 54.7
	eS	Z	14 50 36	M = 3.7 (Tul)
	eL	Z	14 54	
5	i(P)	Z'	21 05 32.2C	
6	eL	N	15 49	
6	eL	Z	18 44	11.6N, 142.7E, h = 26, H = 17 49 54.5
				M = 4.7 (Tul)
7	eL	Z	01 24	42.2S, 84.4E, h = 33, H = 00 01 13.3
				M = 5.0 (Tul)
7	eL	Z	15 41	
7	iP	Z'	19 23 50.3C	39.6N, 111.9W, h = 33, H = 19 20 42.3
	iPg	Z'	19 24 48.8	
	e	Z	19 26 44	
	eSg	Z'	19 27 38	
	eL	Z	19 28	
8	eL	Z	00 35 50	57.0N, 134.5W, h = 28, H = 00 15 05.9
				M = 3.8 (Tul)
8	iP	Z'	01 19 04.0	
	i(pP)	Z'	01 19 47.7	
	e(L)	Z	01 27 44	
8	eP	Z'	04 24 22	40.8N, 125.8W, h = 33, H = 04 19 08.4
	eS	N	04 28 50	M = 3.9 (Tul)
	eL	Z	04 33	

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8	eP	Z'	11 17 15	0.3N, 17.8W, h = 33, H = 11 05 07.5
	eS	E	11 27 17	M = 5.0 (Tul)
	eL	Z	11 42	
8	i(P)	Z'	11 28 27.2C	
8	eL	Z	14 37	57.4N, 154.0W, h = 30, H = 14 12 30.5
				M = 3.9 (Tul)
8	iP	Z'	16 15 29.0C	36.6N, 28.0E, h = 30, H = 16 02 26.8
	eL	Z	16 56	M = 4.6 (Tul)
8	iP	Z'	17 57 44.0C	65.8N, 153.9W, h = 33, H = 17 49 30.9
	eS	E	18 04 20	M = 5.4 (Tul)
	eL	Z	18 11	
	eLg	Z'	18 13 10	
8	iP	Z'	21 09 41.0D	6.8N, 73.0W, h = 166, H = 21 02 56.9
8	iP	Z'	23 52 50.3	37.0N, 90.5W, h = 25, H = 23 51 42.9
	iS	E'	23 53 33.5	
	i	Z	23 53 52.5	
9	eP	Z'	03 16 29	46.3N, 153.7E, h = 33, H = 03 04 37.4
	eS	E	03 26 14	M = 4.6 (Tul)
	eL	Z	03 48	
9	iP	Z'	04 25 30.0D	15.2N, 94.0W, h = 33, H = 04 20 50.6
9	eL	Z	05 01	22.0N, 145.7E, h = 33, H = 04 09 28.6
				M = 4.6 (Tul)
9	eP	Z'	09 30 37	8.5N, 83.0W, h = 31, H = 09 24 33.3
	eS	N	09 35 36	M = 5.6 (Tul)
	eL	Z	09 39	
9	iP	Z'	19 07 20.8D	29.1S, 68.1W, h = 33, H = 18 56 12.6
	eS	E	19 16 28	M = 4.2 (Tul)
	eL	Z	19 25	
9	eP	Z'	20 28 34	40.1N, 111.3W, h = 33, H = 20 25 28.8
	e	Z'	20 29 20	
	i(Lg)	Z'	20 32 29	
	eL	Z	20 33	
10	eP	Z'	03 26 38	46.3N, 153.4E, h = 33, H = 03 14 41.8
	iS	E	03 36 21	M = 5.0 (Tul)
	eL	Z	03 52	
10	eL	Z	05 21	29.7S, 177.2W, h = 33, H = 04 29 25.1
				M = 4.9 (Tul)

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10	eP	Z'	05 34 49.0	46.3N, 152.9E, h = 33, H = 05 22 57.1
	iS	E	05 44 36	M = 6.1 (Tul)
	eSS	E	05 49 20	
	eL	Z	06 00	
10	iP	Z'	09 58 27.0D	13.4N, 44.9W, h = 37, H = 09 49 29.6
	eS	E	10 05 43	M = 5.0 (Tul)
	eL	Z	10 13	
10	e	Z'	18 36 55	39.9N, 111.4W, h = 33, H = 18 32 50.6
	e(Lg)	Z'	18 39 31	
10	eL	Z	19 29	
11	eP	Z'	07 09 16.8	16.8N, 91.3W, h = 33, H = 07 14 49.8
	eS	E'	07 12 45	
11	iP	Z'	13 24 39.2D	16.6N, 99.1W, h = 33, H = 13 20 13.1
	eS	Z	13 28 25	M = 3.7 (Tul)
	eL	Z	13 33	
12	eL	Z	03 43	
12	iPKP	Z'	05 57 32.0C	6.1S, 106.2E, h = 133, H = 05 38 11.2
	epPKP	Z'	05 58 04	
12	iP	Z'	06 50 38D	7.0N, 73.2W, h = 127, H = 06 43 51.5
12	eL	Z	12 41	50.2N, 129.7W, h = 33, H = 12 23 27.5 M = 3.7 (Tul)
12	eL	Z	13 10	50.4N, 129.0W, h = 33, H = 12 52 41.4 M = 3.5 (Tul)
12	eS	N	14 14 20	50.3N, 129.6W, h = 33, H = 14 03 38.3
	eL	Z	14 19	M = 4.3 (Tul)
12	iS	E	15 49 45	46.8N, 153.6E, h = 33, H = 15 28 08.5
	eSS	N	15 54 56	M = 5.3 (Tul)
	eL	Z	16 05	
13	eL	Z	00 32	5.5S, 153.3E, h = 56, H = 23 51 16.0 M = 5.1 (Tul)
13	iP	Z'	07 37 24.2	31.8S, 71.0W, h = 102, H = 07 26 15.3
	ipP	Z'	07 37 48.8	
13	iP	Z'	14 10 39.2D	44.3N, 148.8E, h = 33, H = 13 58 25.7
	ipP	Z'	14 10 53	M = 4.5 (Tul)
	eL	Z	14 41	
13	eL	Z	15 01	24.3N, 122.3E, h = 33, H = 14 06 23.7 M = 5.2 (Tul)

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14	eSKS	N	00 26 52	30.5S, 177.2W, h = 33, H = 00 02 22.8
	eS	N	00 27 52	M = 5.8 (Tul)
	eSP	Z	00 29 20	
	eL	Z	00 53	
14	eL	Z	04 49	30.5S, 177.3W, h = 50, H = 03 59 12.4 M = 5.3 (Tul)
14	iP	Z'	05 49 12.2D	10.4N, 62.6W, h = 24, H = 05 41 43.0
	iPa	Z	05 50 44	M = 6.4 (Tul)
	eS	N	05 55 00	
	eL	Z	06 00 30	
14	iP	Z'	05 58 44.7D	
14	iP	Z'	06 47 37.7D	10.4N, 62.5W, h = 43, H = 06 40 09.6
14	iS	Z'	08 08 23.0	Local Earthquake
14	iP	Z'	08 11 00.2	Local Earthquake
	iS	Z'	08 11 26.0	
14	iP	Z'	09 19 43.2D	31.7S, 69.1W, h = 110, H = 09 08 32.7
14	eSKS	N	14 52 45	30.2S, 177.4W, h = 42, H = 14 28 22.1
	eS	N	14 53 50	M = 5.7 (Tul)
	eSP	Z	14 55 15.	
	eL	Z	15 20	
15	eP	Z'	06 38 09.0	51.8N, 176.8W, h = 33, H = 06 28 21.7
15	eP	Z'	08 43 34.5	61.7N, 134.9W, h = 33, H = 08 36 40.7
15	iP	Z'	08 51 58.0C	55.6N, 162.0E, h = 60, H = 08 41 07.5
	eL	Z	09 22	M = 4.4 (Tul)
15	eL	Z	15 05	
16	eL	Z	08 41	15.4S, 173.5W, h = 33, H = 07 59 52.3 M = 4.7 (Tul)
16	iP	Z'	18 40 26.2C	43.1N, 41.5E, h = 33, H = 18 27 18.4
	ePP	Z	18 44 06	M = 6.5 (Tul)
	iSKS	N	18 51 04	
	ePS	N	18 52 36	
	eL	Z	19 10	
17	iPKP	Z'	07 21 30.5C	7.5S, 107.2E, h = 41, H = 07 01 57.1
17	eP	Z'	10 45 00D	25.4S, 111.6W, h = 33, H = 10 34 36.9
17	eL	Z	12 41	43.1N, 41.5E, h = 33, H = 11 57 06.7 M = 5.1 (Tul)
17	eL	Z	21 58	

18	eP	Z'	00 09 51	49.1N, 128.9W, h = 33, H = 00 04 05.3
	eS	N	00 14 35	M = 4.4 (Tul)
	eL	Z	00 18	
18	ePP	Z'	05 17 16	61.0S, 22.3W, h = 33, H = 04 58 09.2
	iPP	Z'	05 17 34.5	M = 5.6 (Tul)
	eSKS	E	05 23 27	
	eSP	N	05 27 10	
	eL	Z	05 52	
18	iP	Z'	05 35 02.9C	18.5S, 69.3W, h = 72, H = 05 25 04.3
18	eP	Z'	11 25 20	22.5S, 67.0W, h = 258, H = 11 15 11.3
19	eL	Z	04 41	7.1N, 33.6W, h = 33, H = 04 12 10.3 M = 4.3 (Tul)
19	iP	Z'	05 57 08.0C	43.4N, 8.2E, h = 33, H = 05 45 28.0
	eS	E	06 06 45	
19	iP	Z'	05 57 45.3C	43.3N, 8.1E, h = 33, H = 05 46 05.8
	eS	E	06 07 22	M = 6.0 (Tul)
	eL	Z	06 21	
19	iP	Z'	09 13 42.0C	36.3N, 141.0E, h = 70, H = 09 00 44.8
	e	E	09 24 30	M = 4.7 (Tul)
	eL	Z	09 47	
20	eP	Z'	00 18 41.2	65.2N, 133.7W, h = 33, H = 00 11 35.0
	iLg	E	00 31 08	M = 5.3 (Tul)
	eL	Z	00 32	
20	ePKP	Z'	06 55 28.0	57.6S, 148.5E, h = 33, H = 06 36 10.8
	ePP	Z	06 57 48.	M = 6.4 (Tul)
	ePKS	E'	06 58 55	
	eSS	N	07 15 44	
	e	Z	07 16 20	
	e	N	07 20 38	
	eL	Z	07 38	
20	eL	Z	15 40	68.8N, 4.6W, h = 49, H = 15 07 58.2 M = 4.3 (Tul)
21	eP	Z'	06 56 02.5C	17.8N, 46.5W, h = 33, H = 06 47 32.2
	eS	E	07 03 00	M = 4.7 (Tul)
	eL	Z	07 09	
21	eL	Z	15 47	9.7N, 122.3E, h = 54, H = 14 45 07.1 M = 4.9 (Tul)
22	eP	Z'	00 21 48	13.6N, 89.9W, h = 34, H = 00 16 33.1
22	ePKP	Z'	00 48 20	6.1S, 48.9E, h = 59, H = 00 29 14.9
	ePP	Z	00 48 40	M = 6.0 (Tul)
	eSKKS	E	00 55 45	
	eS	N	00 56 30	
	eSP	Z	00 58 12	
	ePS	E	00 58 32	
	eSS	N	01 04 28	
	eL	Z	01 24	

22	eL	N	14 44	
23	iP	Z'	06 30 27.0C	41.5N, 141.9E, h = 91, H = 06 17 51.5
	ipP	Z'	06 30 46.6	M = 4.9 (Tul)
	eS	E	06 41 32	
	eL	Z	07 00	
24	eL	Z	00 15	
24	i(P)	Z'	04 46 05.6C	
24	eL	Z	11 45	
24	eSP	E	12 00 46	24.6N, 122.0E, h = 33, H = 11 32 17.7
	eSS	E	12 06 49	M = 6.0 (Tul)
	eL	Z	12 26	
24	eL	Z	17 41	6.4S, 147.8E, h = 55, H = 16 46 38.4
				M = 5.0 (Tul)
24	eSP	E	19 32 33	9.0S, 158.2E, h = 33, H = 19 04 32.5
	eL	Z	19 54	M = 5.4 (Tul)
24	eL	Z	22 39	9.7S, 154.4E, h = 16, H = 21 47 54.1
				M = 5.0 (Tul)
25	eL	Z	00 56	
25	iP	Z'	07 11 07.0C	6.8N, 73.0W, h = 152, H = 07 04 21.9
	iS	N	07 16 31	M = 4.2 (Tul)
	ePcS	N	07 19 11	
	iScS	E'	07 21 08.5	
	eL	Z	07 30	
26	iP	Z'	04 29 43.5D	42.1N, 21.5E, h = 33, H = 04 17 16.7
	iS	E	04 40 02	M = 6.4 (Tul)
	eL	Z	05 02	
26	eP	Z'	08 43 24.0	18.7N, 107.1W, h = 33, H = 08 38 51
	eL	Z	08 50	M = 3.3 (Tul)
26	iP	Z'	09 38 28.3C	39.6N, 15.2E, h = 337, H = 09 26 46.4
26	eLg	Z'	13 48 44	28.5N, 112.0W, h = 33, H = 13 40 29.5
	eL	Z	13 49 30	
26	iP	Z'	22 16 46.0	
	iS	E'	22 17 09.3	
26	eP	Z'	23 28 27	23.4S, 72.3W, h = 33, H = 23 18 04
26	iP	Z'	23 57 03.5D	9.7S, 78.5W, h = 62, H = 23 48 26.5
	iS	E	24 04 00	M = 4.8 (Tul)
	eL	Z	24 12	
27	iP	Z'	06 10 03.2C	43.5N, 8.4E, h = 33, H = 05 58 23.4
	eL	Z	06 34	M = 3.9 (Tul)

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27	iP	Z'	06 32 37.6D	43.9N, 128.3W, h = 33, H = 06 27 03.0
	eS	N	06 37 14	M = 4.7 (Tul)
	eL	Z	06 40	
27	iP	Z'	09 26 24.5D	18.4N, 105.7W, h = 33, H = 09 21 57
	eL	Z	09 33	M = 4.0 (Tul)
27	eP	Z'	20 13 02.	
27	eL	Z	23 40	
28	e(S)	E	07 36 44	29.8S, 177.6W, h = 33, H = 07 12 17.1
	eL	Z	08 04	M = 5.6 (Tul)
28	iPKP	Z'	08 14 59.4D	11.3S, 112.1E, h = 21, H = 07 55 21.9
	eL	Z	09 05	M = 5.5 (Tul)
28	iP	Z'	12 22 41.0C	52.6N, 158.9E, h = 33, H = 12 11 27.9
28	e(P)	Z'	13 20 40	
	e(P)	Z'	13 21 06	
	e(S)	E'	13 22 06	
	eLg	Z'	13 22 52	
28	eL	Z	13 52	72.0N, 0.0, H = 33, H = 13 25 18.1
				M = 5.1 (Tul)
28	eL	Z	15 21	
28	eL	Z	17 23	4.9S, 152.7E, h = 69, H = 16 32 25.0
				M = 5.2 (Tul)
28	iP	Z'	19 03 27.7C	46.6N, 153.1E, h = 33, H = 18 51 36.7
	eS	E	19 13 13	M = 5.0 (Tul)
	eSS	E	19 18 15	
	eL	Z	19 29	
29	eL	Z	01 12	
29	ePKP	Z'	05 50 51	6.7S, 107.1E, h = 85, H = 05 31 26.1
29	eL	Z	07 05	27.8N, 55.6E, h = 37, H = 06 10 22.6
				M = 5.0 (Tul)
29	eL	Z	08 22	
29	iP	Z'	10 47 57.6D	34.1S, 70.4W, h = 33, H = 10 36 26
29	eL	Z	13 10	79.3N, 0.6W, h = 33, H = 12 43 12.6
29	eP	Z	20 27 58	30.2S, 177.3W, h = 39, H = 20 14 07.3
	eSKS	E'	20 38 32	M = 7.1 (Tul)
	eS	N	20 39 32	
	eL	Z	21 05	

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29	eSKS	E'	20 41 04	29.7S, 177.0W, h = 33, H = 20 16 36.9
	eS	N	20 42 04	
29	iP	Z'	23 02 42.8C	10.3N, 62.6W, h = 39, H = 22 55 14.1
30	eL	Z	03 48	30.0S, 177.2W, h = 40, H = 02 57 31.6 M = 5.2 (Tul)
30	eSKS	E	04 51 52	30.2S, 177.3W, h = 17, H = 04 27 25.0
	ePS	E	04 54 30	M = 5.4 (Tul)
	eL	Z	05 22	
30	eSKS	N	06 10 20	29.6S, 177.3W, h = 33, H = 05 45 53.3
	eS	N	06 11 19	M = 6.8 (Tul)
	ePS	E	06 12 50	
	eSS	N	06 18 18	
	eL	Z	06 37	
30	eP	Z'	06 38 56	34.0N, 116.3W, h = 14, H = 06 34 54.8
	eLg	Z'	06 43 40	
30	iP	Z'	07 03 41.6	51.7N, 158.1E, h = 33, H = 06 52 22.7
30	e(P)	Z'	08 33 00	
30	eP	Z'	12 31 07	11.4N, 87.3W, h = 33, H = 12 25 39.3
	i	Z'	12 31 09.0	
30	eP	Z'	13 08 13	29.2S, 112.1W, h = 33, H = 12 57 25.3
	eS	N	13 17 09	M = 5.1 (Tul)
	eSS	N	13 21 35	
	eL	Z	13 26	
30	ePKP	Z'	14 09 46	55.9S, 27.5W, h = 33, H = 13 51 57.8
	ePP	Z'	14 10 28	M = 5.8 (Tul)
	e	N	14 14 48	
	ePS	N	14 20 05	
	eL	Z	14 43	
30	eL	Z	15 11	29.5S, 177.1W, h = 33, H = 14 23 13.7 M = 5.5 (Tul)
30	eL	Z	15 55	29.9S, 177.4W, h = 76, H = 15 04 38.7 M = 6.1 (Tul)
30	iSKP	Z'	23 53 01.2	7.3S, 128.9E, h = 143, H = 23 30 59.0
31	eSKS	N	02 08 40	29.8S, 177.2W, h = 65, H = 01 44 18.8
	eS	N	02 09 40	M = 5.6 (Tul)
	eL	Z	02 35	
31	eL	Z	07 56	
31	eL	Z	16 26	

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1	eP	Z'	04 09 56	14.1N, 92.3W, h = 33, H = 04 05 04.3
1	i(P)	Z'	10 30 19.6D	
1	iP	Z'	10 55 55.7C	55.3N, 161.8E, h = 50, H = 10 45 02.7
	eL	Z	11 19	M = 4.8 (Tul)
1	eL	Z	13 45	
1	eL	Z	15 09	58.3N, 151.9W, h = 40, H = 14 46 39.8
				M = 4.6 (Tul)
1	eS	N	15 46 15	29.8S, 177.2W, h = 59, H = 15 20 55.9
	eL	Z	16 11	M = 5.4 (Tul)
2	iP	Z'	06 29 05.3C	
	eL	Z	06 36 30	
2	iP	Z'	09 15 35.0D	56.2N, 36.1W, h = 41, H = 09 07 18.0
	iPcP	Z'	09 17 13.8	M = 5.1 (Tul)
	eS	N	09 22 12	
	eL	Z	09 29	
2	eP	Z'	09 22 02.5	56.3N, 34.5W, h = 33, H = 09 13 46.8
	iPcP	Z'	09 23 41.3	M = 5.3 (Tul)
	eS	N	09 28 32	
	eL	Z	09 36	
2	eL	Z	13 12	57.5N, 38.5W, h = 33, H = 12 49 35
				M = 4.6 (Tul)
2	eL	Z	20 25	6.0N, 125.1E, h = 118, H = 19 26 26.0
				M = 5.2 (Tul)
2	iP	Z'	00 39 08.0	37.0N, 88.8W, h = 18, H = 00 37 50.3
	iS	E'	00 40 17.0	
3	eP	Z'	01 18 22	8.8S, 108.3W, h = 33, H = 01 09 56
	eL	Z	01 34	M = 4.6 (Tul)
3	eSP	Z	04 15 00	7.6S, 156.8E, h = 402, H = 03 48 06.4
	eL	Z	04 43	M = 5.2 (Tul)
3	iP	Z'	10 31 49.4D	7.7N, 35.8W, h = 33, H = 10 21 36.6
	ePP	Z	10 35 42	M = 7.2 (Tul)
	eS	E	10 40 04	
	eSS	E	10 44 00	
	eL	Z	10 49	
	eP'P'	Z'	11 01 05	
3	iP	Z'	10 44 39.3D	7.8N, 35.9W, h = 33, H = 10 34 25.7

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3	eS	E	16 47 00	52.0N, 174.3W, h = 33, H = 16 29 35.8
	eL	Z	17 03	M = 4.7 (Tul)
3	eS	E	20 27 56	1.4N, 28.2W, h = 33, H = 20 07 19.9
	eL	Z	20 40	M = 5.2 (Tul)
3	eL	Z	21 13	30.7S, 178.3W, h = 37, H = 20 26 04.1
				M = 5.2 (Tul)
4	eP	Z'	02 25 51	42.6S, 83.4W, h = 33, H = 02 13 50.6
4	ePKP	Z'	07 28 04.5	9.4S, 114.2E, h = 117, H = 07 08 47.1
	epPKP	Z'	07 28 29	M = 5.0 (Tul)
	e	Z'	07 31 40	
	eL	Z	08 16	
4	eL	Z	10 05	22.6S, 173.4E, h = 72, H = 09 13 17.8
				M = 4.8 (Tul)
4	eP	Z'	11 56 22.3	35.7N, 140.1E, h = 68, H = 11 43 20.3
4	iP	Z'	12 15 06.0C	4.1S, 80.9W, h = 34, H = 12 07 24.4
	eS	N	12 21 35	M = 4.8 (Tul)
4	eP	Z'	13 36 04.5	22.8S, 112.6W, h = 33, H = 13 25 52
	eL	Z	13 57	M = 4.3 (Tul)
5	eP	Z'	00 06 42	17.5S, 179.1W, h = 515, H = 23 54 14.0
	epP	Z'	00 08 44	M = 5.4 (Tul)
	eSKP	E	00 16 28	
	eSP	Z	00 18 30	
	e	E	00 20 48	
	e	E	00 21 47	
	eSS	E	00 23 40	
	esSS	E	00 26 48	
	eL	Z	00 42	
5	eP	Z'	02 53 03	17.2N, 99.8W, h = 33, H = 02 48 41.5
5	iP	Z'	08 55 40.0C	9.9S, 79.0W, h = 31, H = 08 46 59.7
5	eSKP	Z	16 01 40	60.7S, 154.3E, h = 33, H = 15 39 07.0
	e	E	16 14 38	M = 5.8 (Tul)
	eSS	E	16 17 40	
	eSSS	E	16 22 52	
	eL	Z	16 40	
6	e(P)	Z'	01 47 20.7	
6	iP	Z'	09 40 12.4D	38.1S, 72.3W, h = 96, H = 09 28 30.0
6	eP	Z'	13 44 55	57.0N, 33.6W, h = 33, H = 13 36 35.6
	iS	N	13 51 43	M = 5.5 (Tul)
	eL	Z	13 57 30	

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7	e(P)	Z'	04 45 21.0	
7	iP	Z'	04 45 36.3C	54.0N, 142.1E, h = 33, H = 04 33 42.7
	eS	E	04 54 30	M = 4.8 (Tul)
	eSS	E	04 58 55	
	eL	Z	05 16	
7	eP	Z'	07 27 32.6	7.5N, 37.2W, h = 33, H = 07 17 25.8
	eS	E	07 35 52	M = 4.8 (Tul)
	eL	Z	07 45	
7	iP	Z'	18 41 44.8D	13.6N, 90.9W, h = 67, H = 18 36 46.6
	eS	N	18 45 54	M = 4.7 (Tul)
	eL	Z	18 48	
8	iP	Z'	02 25 32.0D	54.2N, 168.1E, h = 33, H = 02 14 54.4
	eS	N	02 34 12	M = 5.9 (Tul)
	eL	Z	02 47	
8	iP	Z'	11 09 42.0C	35.9S, 103.6W, h = 33, H = 10 58 23.1
	eS	E	11 19 05	
8	ePP	Z	11 35 25	5.8S, 151.0E, h = 48, H = 11 16 11.2
	eS	E	11 42 47	M = 6.3 (Tul)
	ePS	E	11 44 25	
	eL	Z	12 08	
9	iP	Z'	01 22 28.7D	14.2N, 92.3W, h = 33, H = 01 17 37.8
	eS	N	01 26 40	M = 3.6 (Tul)
	eL	Z	01 27	
9	iP	Z'	06 17 19.8C	44.5N, 11.9E, h = 33, H = 06 05 32.2
	eL	Z	06 47	M = 5.0 (Tul)
9	e(P)	Z'	08 53 24.0	
9	eL	N	08 53 40	
9	iP	Z'	08 53 46.6C	50.6N, 157.2E, h = 33, H = 08 42 21.1
9	iP	Z'	14 49 58.2C	15.3S, 175.7W, h = 33, H = 14 36 45.9
	eS	N	15 00 27	M = 6.3 (Tul)
	eSS	N	15 06 36	
	eL	Z	15 17 30	
9	eL	Z	22 35	
9	eL	Z	23 53	
10	eL	Z	03 22	15.6S, 175.0W, h = 33, H = 02 36 40 M = 4.6 (Tul)
10	eL	Z	05 33	21.8N, 53.3E, H = 46, H = 04 27 33.5

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10	eSKS	N	18 31 23	54.4S, 132.8W, h = 33, H = 18 07 26.2
	ePS	N	18 33 25	(M = 4.8 (Tul))
	eSS	N	18 38 46	
	eL	N	18 54	
11	ePKS	Z	01 57 00	60.5S, 154.9E, h = 33, H = 01 34 22.2
	eSS	N	02 13 22	M = 5.6 (Tul)
	eL	Z	02 36	
11	iP	Z'	07 50 12.8D	38.8N, 140.9E, h = 45, H = 07 37 20.4
11	iP	Z'	10 14 50.0D	38.1S, 73.1W, h = 60, H = 10 03 05.1
	ipP	Z'	10 14 57.0	
12	iP	Z'	01 16 47.6C	32.5S, 71.1W, h = 92, H = 01 05 34.1
12	eL	Z	11 36	
12	eP	Z'	13 13 28.5	2.1N, 90.4W, h = 33, H = 13 06 46.1
	eS	E	13 19 00	M = 4.3 (Tul)
	eL	Z	13 25	
12	eL	Z	19 36	25.3N, 62.7E, h = 33, H = 18 29 38.8
				M = 5.3 (Tul)
12	eL	Z	21 47	21.9S, 175.7W, h = 33, H = 20 59 08.0
				M = 5.0 (Tul)
13	iP	Z'	03 34 58.6D	55.0N, 156.4W, h = 33, H = 03 26 45.4
	eL	Z	03 48	M = 4.5 (Tul)
13	eS	N	07 16 18	19.1S, 173.9W, h = 28, H = 06 52 06.1
	eL	Z	07 36	M = 5.0 (Tul)
13	eL	Z	13 58	76.2N, 6.4E, h = 33, H = 13 28 02.2
				M = 5.0 (Tul)
13	eS	Z	22 05 56	19.3S, 173.7W, h = 33, H = 21 52 37.4
	eSKS	N	22 16 17	M = 5.6 (Tul)
	iS	E	22 16 50	
	eL	Z	22 36	
14	eL	Z	02 43	
14	eS	N	03 11 15	21.4S, 175.2W, h = 33, H = 02 46 44.1
	eL	Z	03 31	M = 5.4 (Tul)
14	eL	Z	04 24	4.9S, 152.3E, h = 62, H = 03 32 33.5
				M = 5.3 (Tul)
14	iP	Z'	09 08 07.8C	18.4N, 104.6W, h = 33, H = 19 03 45.5
	eS	E	09 11 47	M = 3.8 (Tul)
	eL	Z	09 15	
14	eL	Z	14 18	83.6N, 4.6W, h = 33, H = 13 46 02.0
				M = 4.2 (Tul)

14	iP	Z'	14 42 53.7D	22.3S, 68.7W, h = 120, H = 14 32 38.7
14	eL	Z	17 10	24.1N, 122.4E, h = 28, H = 16 18 18.0 M = 4.7 (Tul)
14	i(P)	Z'	18 58 13.3	Local Earthquake
	i(S)	E'	18 59 10.2	
	e(Lg)	E'	18 59 32	
14	iPKP	Z'	19 02 50.0C	3.4S, 135.4E, h = 33, H = 18 43 55.5
	eL	N	19 35	
15	iP	Z'	06 24 25.8C	37.9N, 141.6E, h = 59, H = 06 11 34.6
	ePP	Z	06 25 55	M = 6.3 (Tul)
	eSKS	N	06 34 50	
	iS	E	06 35 11	
	eSS	E	06 41 06	
	eL	Z	06 54	
15	iP	Z'	14 44 38C	10.0S, 78.6W, h = 80, H = 14 36 01.2
16	i(P)	Z'	02 44 27.8	
16	eL	Z	23 49	12.8S, 14.5W, h = 33, H = 23 06 24.6 M = 5.0 (Tul)
16	iPKP	Z'	23 39 15.2D	48.9S, 122.8E, h = 33, H = 23 19 31.1
	i	Z'	23 39 24.5	M = 5.3 (Tul)
	eL	Z	24 34	
17	eP	Z	11 26 28	30.6N, 130.9E, h = 33, H = 11 12 41.2
	ePP	Z	11 30 36	M = 6.5 (Tul)
	eSKS	N	11 37 04	
	iS	N	11 38 02	
	eSP	Z	11 39 34	
	eL	Z	12 06	
17	iP	Z'	11 38 26.0C	17.7N, 94.3W, h = 163, H = 11 34 23.4
	i(S)	E'	11 41 44	
17	iP	Z'	22 23 38.1C	32.1N, 40.9W, h = 33, H = 22 15 22.0
	eL	Z	22 37	M = 4.4 (Tul)
18	e(P)	Z'	05 07 18	
	eLg	Z'	05 07 47	
18	iP	Z'	07 22 45.0	35.9N, 139.2E, h = 153, H = 07 09 51.6
18	eL	Z	16 24	19.5N, 45.4W, h = 33, H = 15 58 14.3 M = 4.1 (Tul)
18	iP	Z'	18 53 (05)D	50.3N, 176.9W, h = 33, H = 18 43 16.1
	eS	E	19 01 10	M = 5.2 (Tul)
	eL	Z	19 13	
18	eL	Z	21 07	32.1S, 178.1W, h = 33, H = 20 27 41.9 M = 5.5 (Tul)

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19	eL	Z	05 15	32.0S, 177.9W, h = 33, H = 04 24 00.4 M = 5.2 (Tul)
20	ePKP	Z'	07 13 05.5C	6.9S, 103.0E, h = 61, H = 06 53 28
20	eP	Z'	09 30 02	16.0N, 92.4W, h = 193, H = 09 25 38.9
	eS	E'	09 33 36	
20	eP	Z'	13 26 49	4.1N, 76.5W, h = 59, H = 13 19 50.3
20	eP	Z'	16 01 04	41.2N, 142.7E, h = 50, H = 15 48 12.2
	eS	E	16 11 23	M = 5.3 (Tul)
	eL	Z	16 30	
21	iP	Z'	03 45 29.6C	14.3N, 72.5W, h = 33, H = 03 39 22.6
	eS	N	03 50 25	M = 4.6 (Tul)
	eL	Z	03 54	
21	iPKP	Z'	10 36 14.5D	8.3S, 108.8E, h = 225, H = 10 17 01
21	eP	Z'	17 38 10	20.2N, 108.6W, h = 33, H = 17 33 45.8
	eS	N	17 41 53	M = 3.7 (Tul)
	eL	Z	17 44	
21	iP	Z'	18 14 12.3D	49.0N, 158.2E, h = 33, H = 18 02 44.4
22	iP	Z'	04 06 25.5C	63.2N, 148.5W, h = 101, H = 03 58 43.2
	epP	Z'	04 06 49	
22	eL	Z	06 06	
22	iP	Z'	09 32 28.2C	42.0N, 126.2W, h = 33, H = 09 27 09.3
	eS	N	09 36 57	M = 5.1 (Tul)
	eL	Z	09 39 30	
22	e(P)	Z'	18 11 36	Galapagos Islands region
	eS	E	18 17 48	M = 4.5 (Tul)
	e	E	18 20 52	
	eL	Z	18 27	
22	e(P)	Z'	18 26 22	3.8S, 104.2W, h = 33, H = 18 18 49.3
	eS	E	18 32 37	M = 4.8 (Tul)
	e	E	18 35 40	
	eL	Z	18 41	
22	e(PKP)	Z'	20 11 05	9.4S, 158.0E, h = 33, H = 19 52 25.0
	eSKS	E	20 17 28	M = 6.8 (Tul)
	eS	N	20 19 00	
	ePS	EZ	20 20 35	
	eSS	E	20 26 47	
	eL	Z	20 42	
22	iP	Z'	23 27 15.7D	4.3N, 76.4W, h = 100, H = 23 20 21.1
23	eL	Z	04 12	

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23	eL	Z	08 15	
23	eS	E	13 29 47	52.4N, 159.6E, h = 33, H = 13 09 25.3
	eL	Z	13 48	M = 5.1 (Tul)
24	iP	Z'	01 52 05.0C	22.4S, 68.5W, h = 66, H = 01 41 40.5
	ipP	Z'	01 52 27.0	
24	eL	Z	10 21	19.3N, 108.8W, h = 33, H = 10 10 15.1
				M = 3.8 (Tul)
25	iP	Z'	02 31 57.8C	38.7N, 148.8E, h = 134, H = 02 20 12.7
25	iP	Z'	06 25 01.5C	38.9N, 38.4E, h = 33, H = 06 11 43.3
	eL	Z	07 00	M = 5.0 (Tul)
25	iP	Z'	12 30 34.2C	17.5S, 178.8W, h = 565, H = 12 18 12.5
	epP	Z'	12 32 40	(M = 7.1 (Tul))
	esP	Z	12 33 40	
	ePP	Z'	12 34 30	
	iSKS	E	12 40 16	
	iS	N	12 41 02	
	iPS	E	12 43 17	
	iPKKP	Z'	12 47 31	
	eSS	Z'	12 47 32	
	e	N	12 53 25	
	eScSScS	E	12 54 55	
	eP'P'	Z'	12 55 38	
	eG	E	12 58 10	
	eSKPPKS	E'	13 01 47	
	e	Z'	13 19 00	
26	iP	Z'	01 48 04.0C	
26	eL	Z'	02 57	
26	iPKP	Z'	06 02 14.7C	6.8S, 105.6E, h = 33, H = 05 42 20.3
	e	Z'	06 02 22	M = 5.1 (Tul)
	eL	Z	07 04	
26	eL	Z	19 16	19.8N, 155.6W, h = 5, H = 18 49 19
				M = 4.3 (Tul)
27	eL	Z	01 32	31.6N, 116.2W, h = 14, H = 01 20 54.6
				M = 3.6 (Tul)
27	e(P)	Z'	02 34 12	17.5N, 92.6W, h = 180, H = 02 29 51.4
27	eP	Z'	03 35 58.5	45.9S, 75.3W, h = 33, H = 03 23 32.6
	eS	E	03 46 13	M = 5.5 (Tul)
	eSS	E	03 51 42	
	eL	Z	04 02	
27	iP	Z'	05 57 20.2D	44.1N, 129.5W, h = 33, H = 05 51 37.4
	eL	Z	06 04	M = 4.0 (Tul)

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27	eL	Z	08 07 30	
27	eL	E	16 57	
27	eP	Z'	23 45 11	16.1N, 96.9W, h = 38, H = 23 40 42.9
	eS	N	23 48 57	M = 4.2 (Tul)
	eLg	E'	23 49 10	
	eL	Z	23 54	
28	iP	Z'	02 44 48.4D	16.3N, 96.9W, h = 33, H = 02 40 21.3
28	iP	Z'	06 01 00.7C	12.6N, 87.2W, h = 115, H = 05 55 51
28	eL	Z	13 50	61.9S, 164.5E, h = 33, H = 12 48 22.1
				M = 5.4 (Tul)
28	e	E	17 18 55	39.1S, 91.8W, h = 33, H = 16 57 46.2
	eL	Z	17 37	M = 4.8 (Tul)
29	eL	Z	05 27	
29	eP	Z'	09 07 53.6	39.6N, 74.2E, h = 31, H = 08 53 48.4
	ePKP	Z'	09 11 16	M = 6.5 (Tul)
	ePP	Z	09 12 00	
	ePPP	Z	09 14 22	
	eSKS	N	09 18 32	
	eS	E	09 19 38	
	eSP	Z	09 21 18	
	eSS	N	09 27 42	
	eL	Z	09 42	
29	iP	Z'	15 38 45.9D	7.1S, 81.6W, h = 23, H = 15 30 31.4
	eS	E	15 45 03	M = 6.5 (Tul)
	iS	E	15 45 25	
	eL	Z	15 52	
29	iP	Z'	21 10 38.0C	15.5S, 172.9W, h = 33, H = 20 57 31.5
	eS	E	21 21 00	M = 5.8 (Tul)
	ePS	E	21 22 22	
	eSS	E	21 27 15	
	eSSS	E	21 30 35	
	eL	Z	21 39	
29	eL	Z	23 22	
30	iPKP	Z'	00 36 12.2C	7.8S, 108.6E, h = 33, H = 00 16 36.3
	eL	Z	01 29	M = 5.1 (Tul)
30	iP	Z'	00 53 36.0D	23.3S, 66.3W, h = 239, H = 00 43 19.0
30	eL	Z	05 36	44.8N, 80.1E, h = 33, H = 04 46 25.0
				M = 4.9 (Tul)
30	eL	Z	07 47	71.6N, 4.7W, h = 33, H = 07 16 04.0
				M = 4.1 (Tul)

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30	eS	N	14 16 36	23.4S, 175.4W, h = 33, H = 13 51 51.6
	eL	Z	14 39	M = 5.2 (Tul)
31	iP	Z'	10 40 00.2D	15.9S, 74.4W, h = 53, H = 10 30 30.1
31	iP	Z'	13 14 08.0C	11.9N, 87.0W, h = 48, H = 13 08 46.3
	eL	Z	13 23	M = 3.7 (Tul)

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1	eL	Z	48	
1	iP	Z'	11 17 42.2C	5.4N, 82.4W, h = 61, H = 11 11 13.7
	eS	N	11 23 00	M = 4.3 (Tul)
	eL	Z	11 28	
1	eL	Z	15 41	50.2N, 129.4W, h = 33, H = 15 23 57.4
				M = 3.6 (Tul)
1	iP	Z'	23 02 59.5D	11.3N, 85.5W, h = 120, H = 22 57 34.4
	eL	Z	23 13	M = 4.1 (Tul)
2	eL	Z	00 02	1.0N, 28.4W, h = 33, H = 23 28 08.4
				M = 4.4 (Tul)
2	eP	Z'	02 31 02.5	24.3N, 108.6W, h = 33, H = 02 27 14.4
	eLg	E'	02 35 43	M = 4.3 (Tul)
	eL	Z	02 36	
2	iP	Z'	04 19 33.6D	14.1S, 76.4W, h = 41, H = 04 10 18.4
2	eL	N	11 40 00	Gulf of California ?
2	eP	Z'	11 56 05	45.4N, 150.9E, h = 33, H = 11 44 00.2
2	eL	N	13 19 00	26.2N, 109.5W, h = 33, H = 13 10 43.3
				M = 4.0 (Tul)
2	eP	Z'	13 23 28	29.1N, 109.3W, h = 33, H = 13 20 00
	eL	N	13 28 00	M = 3.9 (Tul)
2	eP	Z'	13 33 30	50.5N, 129.4W, h = 33, H = 13 27 37.4
	eL	N	13 40 00	(M = 4.7 (Tul))
2	iP	Z'	13 35 54.5	50.4N, 129.1W, h = 33, H = 13 30 03.8
	eL	N	13 45 18	(M = 4.5 (Tul))
2	eL	N	13 49 34	25.7N, 109.7W, h = 33, H = 13 40 57.9
				M = 3.9 (Tul)
2	iP	Z'	14 14 26.2D	25.7N, 109.5W, h = 33, H = 14 10 44.7
	iS	N	14 17 28	M = 5.4 (Tul)
	eL	Z	14 19	
2	eP	Z'	21 31 11	20.9N, 72.0W, h = 33, H = 21 25 40.1
	eL	Z	21 44	M = 3.7 (Tul)
2	eP	Z'	23 57 03	45.4N, 150.8E, h = 33, H = 23 45 00.1
	eL	Z	24 25	M = 5.1 (Tul)
3	eL	Z	05 09	60.3S, 152.0E, h = 33, H = 03 49 42
				M = 4.6 (Tul)

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3	eP	Z'	05 41 42	45.4N, 150.9E, h = 33, H = 05 29 39.5
3	iP	Z'	06 21 40.7D	51.9N, 173.5W, h = 50, H = 06 12 06.9
	eL	Z	06 43	M = 4.1 (Tul)
3	eL	Z	09 40	62.8N, 25.2W, h = 33, H = 09 13 33.1
				M = 4.7 (Tul)
3	iP	Z'	18 44 27.7C	6.9N, 73.1W, h = 143, H = 18 37 42.6
4	iP	Z'	05 18 39.0D	31.6N, 5.3E, h = 38, H = 05 06 47.0
	eL	Z	05 38	M = 5.5 (Tul)
4	iP	Z'	13 39 21.8D	71.4N, 73.3W, h = 33, H = 13 32 12.3
	ePa	Z	13 40 41	M = 7.1 (Tul)
	eS	N	13 45 03	
	eLg1	E	13 47 00	
	eL	Z	13 49	
	eLg2	E	13 51 28	
4	e(Lg)	Z	21 37 13	71.5N, 72.8W, h = 33, H = 21 20 18.5
	eL	Z	21 42	M = 4.4 (Tul)
4	iP	Z'	21 48 21.5C	71.6N, 73.5W, h = 33, H = 21 41 00.6
	eL	Z	22 03	M = 4.4 (Tul)
5	iP	Z'	10 00 13.3C	
5	eP	Z'	11 42 20	50.3N, 129.1W, h = 33, H = 11 36 31.6
	eL	Z	11 50	M = 4.4 (Tul)
5	iP	Z'	23 47 34.7D	18.6N, 106.8W, h = 33, H = 23 43 05.3
	eL	Z	23 54	M = 4.0 (Tul)
6	e(P)	Z'	01 53 30	71.5N, 73.0W, h = 33, H = 01 46 13.3
	eL	Z	02 08	M = 4.8 (Tul)
6	iP	Z'	06 17 20.0C	36.4N, 103.6E, h = 33, H = 06 03 52.1
	eS	N	06 28 37	M = 5.6 (Tul)
	eL	Z	06 51	
6	eL	Z	14 16	2.2N, 83.2W, h = 33, H = 13 57 42.5
				M = 4.2 (Tul)
6	iP	Z'	20 37 38.0D	50.1N, 129.5W, h = 31, H = 20 31 46.1
	eS	E	20 42 25	
	eL	Z	20 46	
6	iP	Z'	21 05 54.5C	53.9N, 165.6W, h = 33, H = 20 56 59.9
	eL	Z	21 28	
7	eP	Z'	01 30 20	36.4N, 130.6E, h = 33, H = 01 16 55.1
	eS	E	01 41 38	
	eSS	E	01 48 16	
	eL	Z	02 03	

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7	e(P)	Z'	03 21 13	
7	iP	Z'	07 25 42.8C	45.4N, 150.8E, h = 33, H = 07 13 39.9
	eS	E	07 35 38	
	eSS	E	07 40 56	
	eL	Z	07 54	
7	eSKS	E	09 13 35	11.7S, 13.6W, h = 33, H = 08 50 57.5
	eS	E	09 14 33	M =
	ePS	E	09 15 58	
	eL	Z	09 33 30	
7	eL	Z	10 59	
7	iP	Z'	12 54 57.4C	54.0N, 160.3E, h = 110, H = 12 44 01.1
	eS	E	13 03 58	
	eSS	E	13 08 36	
	eL	Z	13 17	
7	eL	Z	13 49	
7	eL	Z	16 15	
7	eL	Z	18 22	
7	eL	Z	20 26	3.0S, 130.4E, h = 33, H = 19 26 29.3
8	eSKS	E	01 11 49	28.1S, 176.8W, h = 57, H = 00 47 27.7
	eSP	Z	01 14 15	
	eSS	E	01 19 32	
	eL	Z	01 34	
8	eL	Z	03 02	
8	eP	Z'	05 33 55.3	12.3N, 87.9W, h = 31, H = 05 28 37.8
8	eP	Z'	09 17 36.8	36.2S, 100.5W, h = 33, H = 09 06 16.0
	eL	Z	09 40	
8	eS	E	17 30 50	19.6N, 109.4W, h = 33, H = 17 22 30
	eL	Z	17 34	
8	iP	Z'	20 03 13.0C	23.6S, 179.8E, h = 550, H = 19 50 29.8
	e	Z	20 06 03	
	ePP	Z'	20 07 20	
	ePPP	E	20 10 00	
	iSKS	E	20 13 02	
	eS	N	20 14 04	
	ePS	E	20 16 40.	
	esS	N	20 17 35	
	e	E	20 18 47	
	eSS	N	20 21 05	
	e	N	20 23 57	
	e	E	20 25 08	

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9	ePKP	Z'	03 04 18.0	4.4S, 152.7E, h = 34, H = 02 45 45.0
	ePP	Z	03 04 44	
	eSKS	E	03 10 52	
	eS	E	03 11 55	
	ePS	E	03 14 17	
	ePKKP	Z'	03 15 23	
	eP'P'	Z'	03 23 14	
	eL	Z	03 38	
10	ePS	E	01 37 16	14.0S, 166.2E, h = 64, H = 01 09 47.0
	e	Z	01 38 10	
	eSS	E	01 43 15	
	eL	Z	01 58	
10	e(S)	E'	08 23 01	
	e(Lg)	Z'	08 23 35	
10	eL	Z	11 36	
10	iP	Z'	17 09 37.6C	53.8N, 159.9W, h = 33, H = 17 01 07.3
	eL	Z	17 29	
10	e	E	19 38 48	19.0S, 175.8E, h = 30, H = 19 14 26.8
	e	E	19 41 18	
	e	E	19 43 36	
	eL	Z	20 00 30	
10	eP	Z'	19 42 31.5	28.9N, 104.0W, h = 33, H = 19 40 08
	eLg	E	19 45 05	
11	eL	Z	00 59 30	3.4S, 131.4E, h = 64, H = 23 56 26.2
11	iP	Z'	01 00 34.3C	12.3N, 59.5W, h = 33, H = 00 52 58.7
	ipP	Z'	01 00 58.8	
11	eP	Z'	02 12 39.0	44.3N, 114.7W, h = 15, H = 02 08 44.7
	i	Z'	02 12 42.0	
	iLg	E	02 17 37	
	eL	Z	02 19	
11	ePKP	Z'	09 18 39.3	3.5S, 131.2E, h = 33, H = 08 59 37.6
	eL	Z	10 03	
11	iP	Z'	09 53 20.8D	16.8N, 95.1W, h = 129, H = 09 49 05
11	ePg	Z'	12 03 29.0	33.2N, 110.7W, h = 33, H = 11 59 41.2
	eL	Z	02 07 40	
11	eL	Z	23 19	33.1S, 178.2W, h = 21, H = 22 20 26.6
12	iP	Z'	02 39 06.8D	22.0S, 67.6W, h = 160, H = 02 28 53.2
	epP	Z'	02 39 34	
12	eSKS	E	03 36 40	22.5S, 170.7E, h = 54, H = 03 11 53.9
	eL	Z	04 02	

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12	iP	Z'	06 27 47.5C	44.2N, 114.8W, h = 33, H = 06 23 51.7
	eLg	Z'	06 32 47	
	eL	Z	06 34 50	
12	iP	Z'	08 32 13.2C	34.9N, 32.2E, h = 55, H = 08 18 57.9
12	eP	Z'	13 20 31.5	7.7N, 35.9W, h = 33, H = 13 10 17.9
13	iP	Z'	10 54 28.2D	29.1N, 125.6W, h = 33, H = 10 51 56.6
	ePg	Z'	10 55 18	
	eS	N	10 57 16	
	eLg	Z	10 57 38	
	eL	Z	10 58 30	
13	i(P)	Z'	11 18 28.0	
	eLg	Z'	11 21 27	
	eL	Z	11 22	
13	eP	Z'	17 03 51.0	Nevada, Underground nuclear explosion
	ePg	Z'	17 05 06	
	eLg	Z	17 08 40	
	eL	Z	17 09	
13	eL	Z	22 02	
13	iP	Z'	23 12 23.3C	53.0N, 175.0W, h = 220, H = 23 02 07.2
14	eL	Z	00 22	31.3S, 179.3W, h = 16, H = 23 33 32.9
14	eL	Z	01 15	3.5S, 131.2E, h = 33, H = 00 15 45.2
14	eP	Z'	03 55 30.8	33.3N, 118.6W, h = 14, H = 03 51 13.6
	e(S)	N	04 01 05	
	eL	Z	04 03	
14	eSS	N	04 25 20.	31.4S, 179.0W, h = 33, H = 03 52 16.9
	eL	Z	04 40	
14	iP	Z'	09 48 29.0C	15.0N, 91.0W, h = 130, H = 09 43 52
14	i(P)	Z'	16 02 00	44.2N, 114.8W, h = 33, H = 15 58 03.8
	iLg	Z'	16 06 54	
	eL	Z	16 08	
14	iP	Z'	16 28 31.2D	33.6S, 126.7W, h = 33, H = 16 16 51.8
14	eP	Z'	19 51 01	36.7N, 121.8W, h = 15, H = 19 46 15.8
	eL	Z	19 58	
14	eL	Z	20 41	36.7N, 122.0W, h = 15, H = 20 28 08.5

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15	iP	Z	01 00 46D	10.3S, 165.6E, h = 43, H = 00 46 54.1
	eP	Z'	01 00 56.8	
	ePP	Z'	01 04 58	
	eSKS	E	01 11 28	
	iPS	E	01 14 12	
	e	Z'	01 17 15	
	e	E	01 19 00	
	iSS	E	01 20 03	
	eL	Z	01 34	
15	eL	Z	09 30	5.9S, 146.7E, h = 89, H = 08 26 08.7
15	iPKP	Z'	09 29 13.2C	7.2S, 106.5E, h = 33, H = 09 09 38
15	eL	Z	11 46	17.15, 173.8E, h = 33, H = 10 59 47.7
15	eL	Z	12 34	
15	eL	Z	15 40	
15	eL	Z	22 30	63.2N, 152.0W, h = 122, H = 22 03 49.5
16	eL	Z	16 48	78.6N, 6.7E, h = 33, H = 16 14 45.0
16	eSKS	E	20 30 12	13.4S, 166.5E, h = 28, H = 20 05 21.9
	ePS	E	20 33 00	
	e	Z	20 33 55	
	eSS	E	20 38 46	
	eL	Z	20 54	
17	iP	Z'	00 28 48.8D	50.5N, 129.3W, h = 33, H = 00 22 59
17	iP	Z'	06 03 17.4D	10.6S, 78.2W, h = 61, H = 05 54 33.7
	eS	E	06 10 22	
	eL	Z	06 19	
17	iP	Z'	07 42 03.4C	1.5S, 77.9W, h = 178, H = 07 34 38.7
17	eP	Z'	19 34 09	10.1S, 165.3E, h = 17, H = 19 20 08.2
	ePP	Z'	19 38 21	
17	iP	Z'	20 45 10.5C	43.4S, 74.7W, h = 33, H = 20 32 58.1
17	iPKP	Z'	21 33 04.4D	6.7S, 105.3E, h = 33, H = 21 13 28
18	eL	Z	07 44	
18	iP	Z'	17 11 02.0D	40.9N, 29.2E, h = 33, H = 16 58 12.5
	eS	N	17 21 35	
19	eP	Z'	06 04 17	22.5S, 67.5W, h = 233, H = 05 54 08.0
19	eP	Z'	16 58 29	47.1N, 27.4W, h = 33, H = 16 49 29.9

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20	eP	Z'	03 13 27	76.5N, 7.9E, h = 33, H = 03 03 32.9
	eL	Z	03 31	
20	iP	Z'	04 09 29.2D	11.3S, 77.6W, h = 33, H = 04 00 31.1
	epP	Z'	04 09 52	
20	i(P)	Z'	07 22 26.2	
	i(S)	E'	07 22 46.2	
	eLg	Z	07 23 01	
20	iP	Z'	07 35 23.8	21.5S, 68.3W, h = 125, H = 07 25 11.8
20	eP	Z'	14 52 03	21.5S, 68.0W, h = 155, H = 14 14 22.6
	eS	E	14 59 52	
	e	E	15 00 43	
20	iP	Z'	22 21 16.2D	17.8S, 68.8W, h = 171, H = 22 11 32.2
	ipP	Z'	22 21 55.0	
	esP	Z'	22 22 12.7	
	eS	N	22 29 10	
	esS	N	22 30 17	
	eL	Z	22 43	
21	i(P)	Z'	01 03 49.0C	
22	iP	Z'	02 58 32.3D	52.5N, 174.9W, h = 105, H = 02 49 03.4
	epP	Z'	02 59 00.5	
	eS	E	03 06 10	
22	eP	Z'	03 10 08	19.3S, 175.9E, h = 28, H = 02 56 24.3
	eSKS	E	03 20 53	
	eL	Z	03 43	
22	eP	Z'	19 35 41	19.2S, 175E, h = 24, H = 19 21 57.1
	e	E	19 47 22	
	e	E	19 48 40	
	eL	Z	20 08	
23	ePKP	Z'	06 59 49.5	16.6S, 28.6E, h = 33, H = 06 40 36.5
	e	E	07 13 10	
	eL	Z	07 45	
23	iPKP	Z'	09 21 00.5	16.6S, 28.8E, h = 33, H = 09 01 56.8
	e	E	09 24 18	
	e	E	09 33 02	
	e	E	09 34 35	
	e	E	09 40 30	
	eL	Z	10 01	
23	eP	Z'	14 45 57	33.7N, 117.0W, h = 14, H = 14 41 51.5
	eLg	Z'	14 51 02.5	
23	iP	Z'	17 12 35.0C	51.3N, 179.2W, h = 33, H = 17 02 36.6
	ipP	Z'	17 12 44.0	
	eL	Z	17 34	

24	eL	Z	03 02	41.0N, 29.0E, h = 33, H = 02 10 44.9
24	iP	Z'	05 37 47.0C	17.8N, 100.9W, h = 33, H = 05 33 31.0
24	eP	Z'	06 39 42	44.9N, 111.0W, h = 33, H = 06 35 52.1
	eLg	Z'	06 43 45	
24	eP	Z'	07 17 15	17.4N, 105.6W, h = 33, H = 07 12 40
	eL	Z	07 24	
24	iP	Z'	08 40 58.7	28.6S, 68.4W, h = 94, H = 08 30 01.6
	epP	Z'	08 41 28	
24	eL	Z	10 13	16.6S, 28.7E, h = 33, H = 09 13 38
24	iP	Z'	16 38 57.6C	10.6S, 78.0W, h = 80, H = 16 30 16.0
	eS	E	16 45 40	
	iS	E	16 46 00	
	eL	Z	16 55	
25	eP	Z'	00 52 19	16.5N, 86.6W, h = 33, H = 00 47 38.0
	e	Z'	00 52 22	
	eS	E'	00 56 10	
	eL	E	00 58	
25	eP	Z'	01 14 19	16.6N, 87.1W, h = 33, H = 01 09 39.7
	e	Z'	01 14 22	
	eS	E	01 18 12	
	eL	E	01 20	
25	iPKP	Z'	07 22 57.7D	16.7S, 28.7E, h = 33, H = 07 03 54.6
	e	E	07 36 30	
	eSS	E	07 42 40	
	eL	E	08 03	
25	e(P)	Z'	08 47 35	
25	e(L)	E	09 47 00	
26	eP	Z'	04 28 22	56.5N, 153.4W, h = 33, H = 04 20 21.5
	eS	E	04 34 48	
	eL	Z	04 44	
26	iP	Z'	05 37 58.3D	50.0N, 176.9W, h = 33, H = 05 28 07.3
	eS	E	05 45 58	
	eL	Z	06 02	
26	eP	Z'	06 48 43	56.6N, 153.2W, h = 33, H = 06 40 43.5
27	iP	Z'	10 11 25.2C	10.8N, 62.2W, h = 104, H = 10 04 04.7
27	eL	Z	11 15	17.1S, 174.6E, h = 33, H = 10 28 04.1
27	eL	Z	11 12	17.2S, 174.7E, h = 33, H = 11 25 53.6
28	ePKP	Z'	00 53 34	49.8S, 125.9E, h = 33, H = 00 33 55.1
	i	Z'	00 53 38.6	

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28	eL	E	04 14	14.3S, 13.7W, h = 33, H = 03 30 48.8
28	iP	Z'	05 30 44.1C	10.2N, 86.0W, h = 33, H = 05 25 03.2
28	eSKS	E	07 21 20	31.5S, 179.5E, h = 457, H = 06 58 12.7
	eSS	E	07 30 10	
28	iPKP	Z'	19 01 57.0D	3.5S, 102.0E, h = 29, H = 18 42 25.2
29	eP	Z'	00 08 49	28.3N, 112.0W, h = 33, H = 00 00 34
	eL	Z	00 10	
29	eL	Z	03 55	62.0S, 163.5E, h = 33, H = 02 55 05
29	e	E	20 05 30	6.0N, 125.3E, h = 117, H = 19 35 01.6
	e	E	20 12 46	
	eL	Z	20 33	
29	iP	Z'	22 29 13.3C	36.1N, 18.0E, h = 47, H = 22 16 38.6
29	eP	Z'	22 48 50	14.4N, 91.9W, h = 61, H = 22 44 02.9
	e	Z'	22 48 59	
	eS	E	22 52 54	
	eL	Z	22 58	
29	eP	Z'	23 10 12	14.3N, 92.0W, h = 33, H = 23 05 22.5
29	eP	Z'	23 13 10	14.5N, 92.0W, h = 42, H = 23 08 20.8
30	eP	Z'	02 38 07	14.3N, 92.1W, h = 33, H = 02 33 14.8
30	eP	Z'	03 10 28	14.1N, 91.9W, h = 86, H = 03 05 38.1
	eL	E	03 14 30	
30	iP	Z'	03 53 28.2C	7.3N, 76.9W, h = 33, H = 03 46 51.3
	eL	Z	04 03	
30	eLg	Z'	06 43 47	28.2N, 111.3W, h = 33, H = 06 35 44.3
	eL	E	06 45 30	
30	iP	Z'	09 20 37.6	38.0N, 111.0W, h = 33, H = 09 17 42.2
	iPg	Z'	09 21 28.0	
	eLg	Z'	09 24 10	
	eL	Z	09 25	
30	eL	Z	10 01	

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Earth Sciences Observatory

Leonard, Oklahoma

SEISMOGRAM READINGS

Station Abbreviation: TUL

Geographical Location: 35° 54' 38" N. latitude
95° 47' 33" W. longitude

Altitude: 256.4 meters (841 feet)

Geology: 1128 meters (3700 feet) of Lower Pennsylvanian through Cambrian sandstones and limestones above basement granite.

Instruments: Two short-period Benioffs, E', Z'.
Free period of pendulums 1.0 sec.
Free period of galvanometers: 0.2 sec. to October 23, 1963
0.75 sec. after October 23, 1963

Three long-period Press-Ewings: N, E, Z
Free period of pendulums: 25 sec. to late October 1963
30 sec. after October 21 (N)
30 sec. after October 28 (Z)
30 sec. after October 29 (E)
Free period of galvanometers: 90 sec. to September 6, 1963
100 sec. after September 6, 1963

Interpretation:

First column gives the date.

Second column: Earthquake phase (P, S, PP, PS, PKP, etc.)

Third column: Seismograph on which the reading is made, N', E', and Z' indicate short period seismographs; N, E, and Z indicate long period seismographs.

Fourth column: Greenwich mean time in hours, minutes and seconds.

Fifth column: Direction of initial movement; C stands for compression and D for dilatation.

Sixth column: USCGS epicenter determination, Tulsa magnitudes and other remarks.

Magnitudes are computed from maximum trace amplitudes of surface waves as recorded on long period vertical seismograph.

JERSEY PRODUCTION RESEARCH COMPANY

Tulsa, Oklahoma

International Seismological Centre

LEONARD OBSERVATORY
Seismogram Readings
October 1963

1	iP	Z'	02 50 13.7 D	6.8N, 73.1W, h = 132, H = 02 43 27.1
1	eP	Z'	10 36 15	10.2N, 84.5W, h = 46, H - 10 30 31.6
	eL	Z	10 46	
2	eP	Z'	06 00 17	20.8S, 174.1W, h = 33, H = 05 47 05.5
	eSKS	E	06 10 53	
	eL	Z	06 33	
3	iP	Z'	01 27 07.7 C	18.3N, 105.6W, h = 33, H - 01 23 40.6
	eS	E	01 30 52	
	eL	Z	01 33	
3	e(P)	Z'	05 35 25	10.1N, 62.5W, h = 62, H = 05 27 58.5
	e(P)	Z'	05 35 38	
3	ePP	Z	16 07 15	58.5S, 25.1W, h = 54, H = 15 48 17.2
	ePS	E	16 16 55	
	eL	Z	16 45	
3	eP	Z'	23 38 15	32.2N, 131.6E, h = 33, H = 23 24 34.7
	ePP	Z'	23 42 14	
	eS	E	23 49 42	
	eSS	E	23 56 35	
	eL	Z	24 16	
4	eSKS	E	03 11 18	20.7S, 174.0W, h = 33, H = 02 47 32.1
	eL	Z	03 31	
4	eL	Z	07 30	49.0N, 131.9W, h = 33, H = 07 14 53.2
4	iP	Z'	08 39 21.8 D	16.1N, 96.8W, h = 41, H = 08 34 53
	eS	E	08 43 10	
4	eL	Z	14 43	18.1N, 60.1E, h = 33, H = 13 29 44.6
4	eLg	Z'	17 58 07	30.2N, 114.3W, h = 14, H = 17 49 11.7
	eL	Z	17 59	
4	eL	Z	21 26	30.0N, 114.3W, h = 14, H = 21 15 24.6
4	eLg	Z'	21 28 14	30.1N, 114.3W, h = 14, H = 21 19 11.5
	eL	Z	21 29	
5	iP	Z'	02 08 25.0 D	16.0S, 173,2W, h = 79, H = o1 55 35.2
	eS	E	02 18 55	
	eL	Z	12 38	
5	iP	Z'	02 36 18.0 D	

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5	iP	Z'	04 34 52.7 D	43.9N, 144.4E, h = 33, H = 04 22 26
5	eL	Z	06 00	15.9S, 173.2W, h = 33, H = 05 15 32.4
5	iP	Z'	08 25 17.2	
5	eL	Z	12 11	47.4N, 128.6W, h = 33, H = 11 15 56.7
5	eSS	E	15 34 00	11.6N, 42.8E, h = 33, H = 14 57 47.4
	eL	E	16 00	
6	iP	Z'	15 12 05.2 D	22.0S, 69.4W, h = 33, H = 15 01 42.1
6	iP	Z'	17 26 55.8 D	33.9S, 70.0W, h = 101, H = 17 15 33.9
7	iP	Z'	04 05 19.4 C	11.6N, 86.9W, h = 50, H = 03 59 54.1
	eL	Z	04 14	
7	eP	Z'	05 39 48	19.8N, 109.1W, h = 33, H = 05 35 16.7
	eS	E	05 43 32	
	eL	Z	05 46	
7	ePKP	Z'	11 35 58	12.1S, 65.4E, h = 33, H = 11 16 06.0
7	iP	Z'	12 52 55.8 C	12.9S, 76.8W, h = 69, H = 12 43 53.6
	eS	E	13 00 16	
	eL	Z	13 12	
7	epP	Z'	13 29 12	23.6S, 179.9E, h = 550, H = 13 14 24.6
	ePP	Z	13 31 17	
	eSKS	E	13 36 52	
	eS	N	13 37 58	
	eL	Z	13 55	
7	e	E	23 59 20	42.7N, 110.5E, h = 33, H = 23 34 26.6
	eL	E	24 21	
8	eP	Z'	00 29 53	15.1S, 173.2W, h = 33, H = 00 17 01.1
	eS	E	00 40 25	
	eSS	E	00 46 45	
	eL	Z	00 58	
8	iP	Z'	06 32 58.0 C	6.6S, 71.6W, h = 557, H = 06 25 08.0
8	eP	Z'	08 27 55	22.7S, 113.0W, h = 33, H = 08 17 46.8
8	eP	Z'	10 39 57	29.0S, 70.3W, h = 71, H = 10 28 56.5
	iP	Z'	10 40 15.0 C	
8	iP	Z'	11 04 09.0 D	76.5N, 86.5E, h = 25, H = 10 53 12

9	eS	E	02 20 31	
	eL	E	02 38	
9	eP	Z'	03 30 06.5	53.8N, 170.5W, h = 250, H = 03 21 11.1
9	eL	E	04 02	
9	eL	E	05 56	18.6S, 173.7W, h = 33, H = 05 13 26.9
9	eP	Z'	08 04 15.5	
	eL	E	08 21	
9	eP	Z'	10 29 02	
	e	E	10 47 15	
	eL	Z	11 01	
11	e(P)	Z'	08 56 02	
11	eP	Z'	09 55 45	18.0N, 105.6W, h = 33, H = 09 51 16.5
	eS	E	09 59 33	
	eL	E	10 00 30	
11	eP	Z'	10 21 40.3	17.8N, 105.9W, h = 33, H = 10 17 07.6
	eS	E	10 25 26	
	eL	E	10 26 20	
	eLg	E'	10 28 47	
11	eL	E	11 05	
12	eP	Z'	03 02 32	
	eLg	Z'	03 06 14	
12	iP	Z'	11 39 07.3 C	48.8N, 149.0E, h = 40, H = 11 26 57.9
	eS	E	11 49 11	
	eSS	E	11 54 30	
	ePKKP	Z'	11 57 49	
	eL	Z	12 02	
12	e(P)	Z'	12 11 58	
12	eP	Z'	12 14 28	44.4N, 149.6E, h = 40, H = 12 02 18.8
	e	Z'	12 14 41	
12	eP	Z'	12 44 54	44.7N, 149.6E, h = 40, H = 12 32 35.8
12	eP	Z'	13 19 16	44.5N, 149.4E, h = 50, H = 13 07 07.9
12	eP	Z'	19 00 43	44.7N, 149.4E, h = 50, H = 18 48 35.5
12	eP	Z'	20 09 22	44.6N, 149.4E. h = 50, H = 19 57 00.2
12	e(P)	Z'	22 28 01	
	e(Lg)	E'	22 31 15	

13	eP	Z'	01 38 45	44.4N, 149.3E, h = 33, H = 01 26 34.3
13	eP	Z'	04 18 04	44.4N, 149.2E, h = 30, H = 04 05 50.1
13	iP	Z'	05 15 59.0 C	9.8N, 84.1W, h = 63, H = 05 10 12.5
13	iP	Z'	05 30 02.7 C	44.8N, 149.5 E, h = 60, H = 05 17 57.1
	eS	E	05 40 08	
	ePKKP	Z'	05 48 43	
13	iP	Z'	05 54 08.3	46.5N, 151.6E, h = 55, H = 05 42 14.2
13	eP	Z'	06 17 25	45.9N, 151.9E, h = 55, H = 06 05 29.5
13	eP	Z'	06 21 06	45.3N, 151.3E, h = 60, H = 06 09 02.2
13	iP	Z'	06 24 29.0 D	45.1N, 149.7E, h = 40, H = 06 12 21.7
13	e(P)	Z'	06 26 01	
13	eP	Z'	06 35 51	45.4N, 150.8E, h = 40, H = 06 23 38.2
13	eP	Z'	06 59 04	45.3N, 147.5E, h = 55, H = 06 46 54.0
13	eP	Z'	07 00 23	45.5N, 151.8E, h = 55, H = 06 48 26.3
13	iP	Z'	07 08 27.0 C	
13	iP	Z'	07 15 25.4 C	45.5N, 150.6E, h = 50, H = 07 03 23.8
13	eP	Z'	07 31 12	45.0N, 151.5E, h = 40, H = 07 19 11.1
13	eP	Z'	07 33 22	
13	eP	Z'	07 45 14	
13	eP	Z'	07 47 41	46.5N, 151.8E, h = 45, H = 07 35 44.7
13	eP	Z'	07 48 53	
13	eP	Z'	08 00 29	45.7N, 149.6E, h = 30, H = 07 48 22.8
	e	Z'	08 00 43	
13	eP	Z'	08 11 16	
13	eP	Z'	08 19 28	
13	eP	Z'	08 23 32	44.5N, 151.6E, h = 60, H = 08 11 32.0
13	eP	Z'	08 31 31	45.3N, 151.7E, h = 60, H = 08 11 32.0
13	eP	Z'	08 42 53	

13	e(P)	Z'	08 46 30	44.5N, 150.9E, h = 33, H = 08 34 40.0
	e	Z'	08 46 48	
13	eP	Z'	08 47 15	
13	eP	Z'	08 47 39	
13	eP	Z'	08 49 16	45.2N, 149.9E, h = 50, H = 08 37 11.4
13	eP	Z'	08 51 50	45.6N, 148.0E, h = 40, H = 08 39 46.7
13	eP	Z'	09 06 19	
13	eP	Z'	09 22 27	44.2N, 149.5E, h = 40, H = 09 10 15.4
	e	Z'	09 22 38	
13	iP	Z'	09 28 33.8 C	44.6N, 149.6E, h = 50, H = 09 16 25.9
13	eP	Z'	09 34 47	44.9N, 151.0E, h = 50, H = 09 22 44.6
13	iP	Z'	09 35 01.0 D	
13	eP	Z'	09 40 28	
13	eP	Z'	09 57 13	44.1N, 150.0E, h = 45, H = 09 44 51.6
13	eP	Z'	10 04 08	42.0N, 149.5E, h = 45, H = 09 51 50.4
13	eP	Z'	10 18 32	44.2N, 150.2E, h = 45, H = 10 06 23.8
13	eP	Z'	10 22 37	44.5N, 149.6E, h = 45, H = 10 10 28.2
13	eP	Z'	10 26 56	
	e	Z'	10 27 18	
13	eP	Z'	10 41 47	
13	iP	Z'	10 46 05.0 C	44.4N, 150.3E, h = 45, H = 10 33 57.3
13	iP	Z'	10 46 17.8 C	
13	eP	Z'	10 59 24	45.4N, 151.8E, h = 40, H = 10 47 13.7
13	eP	Z'	11 27 44	44.9N, 151.1E, h = 45, H = 11 15 40.4
13	eP	Z'	11 35 02	44.9N, 150.7E, h = 55, H = 11 22 58.6
	e	Z'	11 35 16	
13	eP	Z'	12 17 55	45.0N, 150.8E, h = 25, H = 12 05 48.3
	e	Z'	12 18 03	
13	eP	Z'	12 32 56	44.8N, 149.6E, h = 45, H = 12 20 46.9

13	eP	Z'	12 41 39	45.9N, 151.8E, h = 30, H = 12 29 39.2
13	eP	Z'	12 46 31	44.6N, 149.3E, h = 25, H = 12 34 18.7
13	eP	Z'	12 54 21	44.4N, 149.4E, h = 55, H = 12 42 13.0
13	eP	Z'	13 06 10	44.6N, 149.3E, h = 25, H = 12 53 56.9
	e	Z'	13 06 22	
13	iP	Z'	13 10 26.7 D	45.0N, 150.1E, h = 50, H = 12 58 21.6
13	eP	Z'	13 33 09	44.5N, 140.3E, h = 60, H = 13 21 00.3
13	iP	Z'	13 48 57.6	44.9N, 150.4E, h = 50, H = 13 36 53.3
13	iP	Z'	13 53 52.0	44.5N, 149.8E, h = 50, H = 13 41 44.8
13	eP	Z'	13 55 27	44.4N, 151.2E, h = 50, H = 13 43 25.3
13	eP	Z'	14 06 27	44.9N, 151.7E, h = 50, H = 13 54 24.8
	e	Z'	14 06 40	
13	eP	Z'	14 16 02	45.3N, 151.0E, h = 25, H = 14 03 56.3
13	eP	Z'	14 26 48	45.0N, 150.2E, h = 40, H = 14 14 42.9
13	iP	Z'	14 38 19.6 D	44.5N, 149.5E, h = 50, H = 14 26 11.9
13	iP	Z'	14 54 34.5 C	17.6N, 100.8W, h = 88, H - 14 50 20
13	iP	Z'	16 11 56.2 C	45.6N, 150.5E, h = 35, H - 15 59 52.9
	iS	E	16 21 51	
	eSS	E	16 27 10	
13	eP	Z'	16 29 47	45.5N, 149.4E, h = 40, H = 16 17 41.5
13	iP	Z'	16 41 05.2 C	44.9N, 150.3E, h = 40, H = 16 28 58.2
13	iP	Z'	16 49 31.7 C	18.4N, 103.1W, h = 50, H = 16 45 18.8
13	eP	Z'	17 01 48	44.5N, 150.4E, h = 40, H = 16 49 41.2
13	eP	Z'	17 38 02	44.5N, 150.8E, h = 45, H = 17 25 55.4
13	eP	Z'	17 43 29	44.3N, 149.2E, h = 45, H - 17 31 18.7
	i	Z'	17 43 42.0	
13	e(Lg)	Z'	18 03 02	43.2N, 111.3W, h = 33, H = 17 55 47.7
13	eP	Z'	18 23 04	44.0N, 150.0E, h = 45, H = 18 10 55.2
13	eP	Z'	18 25 52	44.2N, 149.4E, h = 55, H = 18 13 44.6

13	iP	Z'	18 26 00.5	45.2N, 150.8E, h = 45, H = 18 14 57.5
13	eP	Z'	19 23 33	44.2N, 144,7E, h = 25, H = 19 11 20.5
13	eP	Z'	19 39 36	45.7N, 151.7E, h = 45, H = 19 27 38.2
13	eP	Z'	20 39 38	45.6N, 151.7E, h = 30, H = 20 27 38.2
13	eP	Z'	22 02 11.5	46.1N, 151.8E, h = 45, H = 21 50 02.4
13	iP	Z'	22 07 00.7 D	44.7N, 152.1E, h = 50, H = 21 55 00.8
13	eP	Z'	22 14 57	45.1N, 150.9E, h = 45, H = 22 02 58.1
14	eP	Z'	00 04 29.8	44.5N, 150.1E, h = 50, H = 23 52 22.8
	eS	E	00 14 30	
14	eP	Z'	00 15 08	45.0N, 150.9E, h = 60, H = 00 03 04.1
14	iP	Z'	04 18 06.3 C	44.9N, 150.2E, h = 50, H = 04 06 01.7
14	iP	Z'	04 23 18.5 C	44.7N, 150.6E, h = 45, H = 04 11 14.0
	i	Z'	04 23 32.0	
14	iP	Z'	04 25 07.0	44.9N, 150.7E, h = 40, H = 04 13 03.1
	eS	E	04 33 19	
14	eP	Z'	05 36 16.2	44.5N, 151.0E, h = 55, H = 05 24 12.3
14	eP	Z'	05 47 03	2.3S, 77.6W, h = 33, H = 05 39 17.1
14	iP	Z'	06 35 11.0	52.8N, 167.1W, h = 80, H - 06 26 11.7
14	eP	Z'	07 28 04.5	44.6N, 150.3E, h = 45, H = 07 15 58.0
14	iP	Z'	08 06 35.7 D	44.8N, 151.2E, h = 55, H = 07 54 33.9
14	eP	Z'	08 56 14	44.7N, 151.2E, h = 50, H = 18 43 56.6
14	eP	Z'	10 13 30	45.1N, 150.8E, h = 45, H = 10 01 27.2
14	eP	Z'	10 36 51	45.7N, 150.2E, h = 40, H = 10 24 36.9
14	eP	Z'	11 25 22	45.0N, 150.9E, h = 45, H = 11 13 19.4
14	iP	Z'	13 33 46.3 D	44.8N, 151.0E, h = 60, H = 13 21 45.2
	e	Z'	13 34 03	
	eS	E	13 43 40	
14	iPKP	Z'	18 51 39.5 D	4.2S, 103.4E, h = 33, H = 18 32 07.1
15	eP	Z'	05 08 39	44.5N, 149.6E, h = 50, H = 04 56 26.6
15	eP	Z'	05 22 55	44.3N, 151.4E, h = 45, H = 05 10 34.2

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15	iP	Z'	07 33 01.7 D	59.0N, 136.8W, h = 33, H = 07 26 09.4
	e	Z'	07 34 15	
	eLg	E'	07 45 05	
15	eP	Z'	08 12 26.5	45.0N, 151.1E, h = 40, H = 08 00 11.5
15	iP	Z'	09 14 12.8 D	45.3N, 150.2E, h = 40, H = 09 02 08.3
15	iP	Z'	09 44 13.8 D	45.2N, 150.2E, h = 40, H - 09 32 08.7
	eL	E	10 03	
15	eP	Z'	10 08 41.5 D	67.2N, 18.4W, h = 33, H = 09 59 30.1
	e	Z'	10 09 35	
	e	Z'	10 09 52	
	eS	E	10 15 08	
	eL	E	10 22	
15	iP	Z'	10 59 21.7 D	44.6N, 149.0E, h = 50, H = 10 47 12.6
15	e(Lg)	Z'	12 36 22	46.6N, 77.6W, h = 14, H = 12 28 58
	e(Lg)	Z'	12 37 22	
15	eL	E	12 37	
15	e(Lg)	Z'	14 07 04	46.3N, 77.8W, h = 14, H = 13 59 50
	e(Lg)	Z'	14 08 13	
15	eL	E	21 24	45.4N, 151.1E, h = 50, H = 20 41 30.2
15	ePKP	Z'	22 04 02.3	3.0S, 129.9E, h = 27, H = 21 44 58.0
	e	Z'	22 06 02.0	
	eSKS	E	22 11 08	
	eSS	E	22 23 05	
16	iP	Z'	01 37 02.7 D	46.1N, 151.8E, h = 45, H = 01 25 06.7
16	iP	Z'	o5 27 42.4 D	44.8N, 150.4E, h = 33, H = 05 15 36.1
	eL	E	05 49	
16	eP	Z'	08 45 41	45.6N, 151.9E, h = 45, H = 08 33 42.0
	i	Z'	08 45 53	
16	eP	Z'	10 43 00	45.2N, 150.4E, h = 45, H = 10 30 55.2
	i	Z'	10 43 12.3	
	eL	E	11 10	
16	eP	Z'	17 03 53.4 D	
	e(Lg)	Z'	17 08 41	
16	eP	Z'	22 27 53	17.7N, 62.0W, h = 67, H = 22 21 15.8
	eL	Z	22 36	
17	eP	Z'	00 47 28	45.1N, 149.6E, h = 33, H = 00 35 20.3

17	i(Pg)	Z'	05 30 33.3	
	i(S)	E'	05 31 07.2	
	e(Sg)	E'	05 31 21	
17	eP	Z'	08 23 06.0	44.3N, 149.1E, h = 45, H = 08 10 55.2
	epP	Z'	08 23 19.0	
17	eP	Z'	23 36 45.3	44.6N, 149.0E, h = 45, H = 23 24 34.4
	i	Z'	23 36 59.0	
	iS	E	23 46 47	
	eSS	E	23 52 10	
	eL	Z	24 04	
18	eP	Z'	02 11 48.8	44.5N, 149.1E, h = 45, H - 01 59 38.8
18	iP	Z'	04 13 26.2 D	44.5N, 150.4E, h = 60, H - 04 01 21.7
	eL	E	04 43	
18	eP	Z'	06 32 28	44.7N, 149.9E, h = 60, H = 06 20 21.6
	eL	E	07 00	
18	eP	Z'	08 13 01	62.6N, 146.4W, h = 51, H = 08 05 22.1
18	iP	Z'	09 05 38.0 D	44.8N, 150.2E, h = 60, H = 08 53 33.9
	eS	E	09 15 35	
	eSS	E	09 20 55	
	eL	Z	09 35	
18	iP	Z'	18 07 02.3 C	45.6N, 150.6E, h = 40, H = 07 55 00.2
18	eP	Z'	20 16 56	47.6N, 154.3 E, h = 40, H = 20 05 14.4
	eL	E	20 41	
18	eP	Z'	20 34 54	45.2N, 151.1E, h = 45, H = 21 22 52.7
18	iPKP	Z'	21 56 30.7 D	5.3S, 103.5E, h = 33, H = 21 36 55.0
19	iP	Z'	01 09 28.8 D	15.9N, 93.9W, h = 34, H = 01 04 54.1
	e	Z'	01 09 47	
19	iP	Z'	02 24 10.2 D	18.3S, 71.2W, h = 78, H = 02 14 17.4
19	eP	Z'	02 30 25.3	46.8N, 153.7E, h = 45, H = 02 18 37.9
	eS	E	02 40 11	
	eSS	E	02 45 15	
	eL	Z	03 01	
19	iP	Z'	03 26 50.2 D	46.5N, 153.9E, h = 40, H = 03 15 02.5
19	iP	Z'	03 46 09.2 C	46.6N, 153.8E, h = 33, H = 03 34 19.6
	eS	E	03 55 54	
	eL	Z	04 12	

19	iP	Z'	03 58 57.6 C	46.8N, 153.8E, h = 25, H = 03 47 07.7
19	eP	Z'	16 27 18 D	44.4N, 150.9E, h = 120, H = 16 15 21.4
	epP	Z'	27 37	
	esP	Z'	27 50	
20	eP	Z'	00 34 38.6 D	37.7S, 73.2W, h = 35, H = 00 22 53.3
	eS	E	00 44 19	
20	eP	Z'	01 05 16.5	44.7N, 150.7E, h = 25, H = 00 53 07.2
	i	Z'	01 05 24.2	
	i	Z'	01 05 35.0	
	eS	E	01 15 17	
	eSS	E	01 20 15	
20	i(P)	Z'	01 09 10.2	
20	eP	Z'	01 19 28	47.4N, 151.1E, h = 45, H = 01 07 35.0
20	iP	Z'	01 26 12.0 C	44.6N, 150.1E, h = 45, H = 01 14 05.2
20	iP	Z'	01 34 28.5 D	45.9N, 153.6E, h = 40, H = 01 22 35.1
20	eP	Z'	02 04 36	23.4S, 68.4W, h = 118, H = 01 54 12.5
20	iP	Z'	02 21 35.5 D	44.7N, 150.0E, h = 45, H = 02 09 29.4
20	iP	Z'	02 24 45.2 D	45.0N, 150.8E, h = 50, H = 02 12 43.4
20	iP	Z'	06 22 31.6 D	43.9N, 150.7E, h = 50, H = 06 10 25.0
20	iP	Z'	06 50 57.0 D	44.4N, 150.3E, h = 50, H = 06 38 51.0
20	eP	Z'	08 38 23	44.3N, 149.4E, h = 33, H = 08 26 12.3
	eL	E	09 10	
20	iP	Z'	09 22 52.0 D	44.4N, 150.0E, h = 40, H = 09 10 43.9
	eS	E	09 32 55	
20	eP	Z'	12 04 27	44.7N, 150.2E, h = 45, H = 11 52 20.7
	eS	E	12 14 25	
	eSS	E	12 18 45	
20	iP	Z'	13 12 34.5 C	24.1N, 5.1E, h = 0, H = 12 59 58.6
20	eP	Z'	13 33 16.5	45.1N, 150.5E, h = 45, H = 13 21 14.1
20	eL	E	13 40 35	31.1N, 115.6W, h = 14, H = 13 29 26.6
20	eP	Z'	17 53 37	44.2N, 149.6E, h = 45, H = 17 41 27.3
	eL	E	18 17	
20	iP	Z'	18 11 07.6 C	44.2N, 149.6E, h = 45, H = 17 58 58.7
	i	Z'	18 11 19.0	

21	eP	Z'	09 52 19	44.7N, 150.3E, h = 55, H = 09 40 14.6
21	eL	E	13 53	45.2N, 151.6E, h = 45, H = 13 09 05.4
21	iP	Z'	15 50 28.0 C	45.5N, 149.7E, h = 55, H = 15 38 24.3
21	eP	Z'	17 32 52	44.1N, 150.3E, h = 65, H = 17 20 46.0
21	iP	Z'	23 30 48.8 D	44.0N, 150.3E, h = 50, H = 23 18 41.3
21	iP	Z'	23 41 28.2 D	44.0N, 130.1E, h = 50, H = 23 29 20.7
22	iP	Z'	03 29 19.8 C	45.0N, 150.2E, h = 45, H = 03 17 15.2
	i	Z'	03 29 34.7	
	eS	E	03 39 20	
	eSS	E	03 44 38	
22	iP	Z'	03 37 47.4 C	43.9N, 150.3E, h = 50, H = 03 25 38.8
22	iP	Z'	04 39 14.0 D	51.0N, 179.4E, h = 55, H = 04 29 11.7
	e	Z'	04 39 24.0	
22	iP	Z'	10 30 21.7 C	44.2N, 150.3E, h = 50, H = 10 18 14.5
23	eP	Z'	00 18 11	45.7N, 151.6E, h = 20, H = 00 06 09.0
23	iP	Z'	04 35 17.0 C	31.4S, 68.7W,h = 110, H = 04 24 06.2
	ipP	Z'	04 35 44.5	
	isP	Z'	04 35 57.0	
23	e	E	08 24 00	12.0S, 166.5E, h = 107, H = 07 56 12.3
	eL	E	08 44	
23	iP	Z	09 59 42.8 D	41.2N, 144.2E, h = 50, H = 09 47 08.1
	epP	Z'	09 59 56	
	eL	E	10 29	
23	eL	E	12 01	
23	eP	Z'	20 33 36	19.4N, 155.5W, h = 5, H = 20 24 05.5
24	eP	Z'	01 18 32	44.5N, 150.3E, h = 45, H = 01 06 25.9
	e	Z'	01 18 46	
	eS	E	01 28 33	
	eSS	E	01 33 50	
	eL	E	01 50	
24	iP	Z'	06 51 09.8 D	4.3N, 78.4W, h = 38, H = 06 44 18.5
	e	Z'	06 53 41	
	eL	E	06 59	

24	iPKP	Z'	07 45 55.7 C	4.9S, 102.9E, h = 50, H = 07 26 23.9
	i	Z'	07 46 09	
	ePS	E	07 59 30	
	ePPS	E	08 02 10	
	eL	E	08 29	
25	i(P)	Z'	02 16 21	
25	eP	Z'	06 12 27	52.0N, 174.8E, h = 70, H = 06 02 06.6
25	iP	Z'	10 30 02.0 C	45.3N, 150.2E, h = 40, H = 10 17 57.1
25	eSS	E	20 32 30	12.3N, 144.5E, h = 29, H = 19 58 58.3
	eL	E	20 48	
26	iP	Z'	04 07 45.5 D	44.5N, 150.1E, h = 55, H = 03 55 39.7
	e	Z'	04 08 02	
	eS	E	04 17 45	
	eSS	E	04 23 10	
	eL	E	36	
26	eP	Z'	05 13 41.0	43.7N, 150.5E, h = 40, H = 05 01 31.5
26	iP	Z'	06 11 50.6 D	44.5N, 149.8E, h = 60, H = 05 59 44.2
	epP	Z'	06 12 05	
26	eP	Z'	07 34 20.2	51.2N, 177.5W, h = 33, H - 07 24 28.7
	eL	08 00		
26	iP	Z'	11 33 54.2 D	44.7N, 149.7E, h = 55, H = 11 21 47.6
	eL	E	12 02	
26	iP	Z'	11 44 01.2 C	44.6N, 149.8E, h = 55, H = 11 31 53.0
26	iP	Z'	12 46 37.6 C	15.8S, 170.0W, h = 115, H = 12 33 50.1
26	iP	Z'	17 04 15.5 D	
26	eSKS	E	23 06 35	5.2S, 152.0E, h = 73, H = 22 41 29.8
	ePS	E	23 10 05	
	eL	E	23 33	
27	iP	Z'	00 11 05.6 D	43.8N, 151.2E, h = 33, H = 23 58 57.8
	eL	E	00 44	
27	eP	Z'	01 41 19	29.5S, 101.2W, h = 33, H = 01 30 32
27	eL	E	11 26	22.8S, 175.2W, h = 35, H = 10 38 49
27	e	Z'	14 59 17	Imperial County, California
	e	Z'	15 00 23	Probably three shocks
	e	E	15 02 02	
	e	Z'	15 02 13.2	

	e	E	15 03 20	
	e	E	15 08 40	
27	eL	E	16 15	33.9S, 15.3W, h = 33, H - 15 26 19
27	eL	E	19 10	29.3S, 176.1W, h = 33, H - 18 24 42.9
27	iP	Z'	20 17 44.8 D	44.5N, 150.1E, h = 50, H = 20 05 38.1
	epP	Z'	20 18 00	
28	iP	Z'	02 30 18.0 D	14.8N, 90.8W, h = 33, H = 02 25 08
28	eP	Z'	02 59 40	13.6S, 76.9W, h = 38, H = 02 50 30.1
28	eP	Z'	08 08 39.5	24.3S, 176.0W, h = 33, H = 07 55 12.3
	eSKS	E	08 19 17	
	eL	E	08 41	
28	iP	Z'	12 14 29.0 C	52.8N, 159.8E, h = 33, H = 12 03 19.8
	eS	E	12 23 44	
	eSS	E	12 28 25	
	eL	E	12 34	
28	iP	Z'	19 27 23.7 C	42.8S, 73.7W, h = 30, H = 19 15 12.5
28	eP	Z'	20 49 04 D	44.8N, 149.6E, h = 45, H = 20 36 56.0
	eL	E	21 17	
28	iP	Z'	21 59 51.2 D	49.9N, 154.7E, h = 105, H = 21 48 24.1
29	iP	Z'	07 06 48.5 C	40.4N, 124.7W, h = 38, H = 07 01 42.7
	eL	E	07 13	
29	iP	Z'	15 59 (49) C	24.8S, 68.6W, h = 67, H = 15 49 10.3
	i	Z'	16 00 (15)	No minute marks
29	eL	E	21 13	26.2S, 177.8W, h = 49, H = 20 22 15.7
29	eL	E	23 06	24.4S, 176.1W, h = 33, H = 22 22 37.7
30	iP	Z'	01 25 38.6 C	4.8S, 77.9W, h = 20, H = 01 17 31.1
30	iP	Z'	05 15 53.6	
	i	Z'	05 15 58.8	
31	eP	Z'	03 31 01	21.8S, 175.0W, h = 33, H = 03 17 42.0
	eSKS	E	03 41 32	
	eL	E	04 05	
31	iP	Z'	19 33 04.0	18.2N, 102.0W, h = 33, H = 19 28 46.9

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1	iP	Z'	11 39 49.0 D	13.6N, 90.1W, h = 128, H = 11 34 55.9
	ipP	Z'	11 40 13.0	
1	iP	Z'	22 53 31.0 C	44.9N, 178.9E, h = 60, H = 22 41 23.8
2	eP	Z'	08 51 20.5	32.4N, 113.7W, h = 60, H = 22 41 23.8
	e	Z'	08 52 31	
	eLg	Z'	08 56 08	
2	iP	Z'	16 16 15.0 D	12.6S, 74.7W, h = 105, H = 16 07 13.1
2	eL	E	20 17	43.3N, 29.5W, h = 33, H = 19 51 58.6
2	eL	E	23 37	1.9S, 138.9E, h = 33, H = 22 21 20.7
3	iP	Z'	03 18 07.3 D	3.5S, 77.8W, h = 33, H = 03 10 12.7
	iS	E	03 24 32	
	eScS	E'	03 28 07	
3	iP	Z'	04 48 57.7 C	49.5N, 155.6E, h = 50, H = 04 37 25.2
3	iP	Z'	07 47 34.9 D	15.6S, 73.3W, h = 112, H = 07 38 10.7
	ipP	Z'	07 48 00.5	
4	eP	Z	01 28 22	15.1S, 167.3E, h = 154, H = 01 14 32.8
	epP	Z	01 32 42	
4	e(P)	Z	01 33 50	6.8S, 129.6E, h = 80, H = 01 17 08.9
	iPKP	Z'	01 36 11.2 C	
	iPP	Z	01 38 40	
	eSKP	Z	01 39 16	
	eSKS	E	01 43 25	
4	iP	Z'	02 12 09.0	
4	iP	Z'	02 12 58.5 C	
4	iPKP	Z'	02 32 53.3 C	6.9N, 129.5E, h = 76, H = 02 14 04.2
	i	Z'	02 33 07.8	
4	i(P)	Z'	02 36 17.2 C	
4	iPKP	Z'	02 55 38.7 C	7.0S, 129.5E, h = 129, H = 02 36 41.1
4	iP	Z'	02 58 48.2 C	
4	iP	Z'	03 38 50.4 D	15.0S, 75.8W, h = 52, H = 03 29 30.5
4	iPKP	Z'	04 02 15.6 D	6.9S, 129.8E, h = 100, H = 03 43 15.9

4	iP	Z'	04 05 31.2 D	
4	iPKP	Z'	04 42 01.0	6.8S, 129.8E, h = 80, H = 05 22 59.0
	iSKP	Z'	04 45 11.8	
4	iPKP	Z'	20 11 03.0	6.9S, 129.5E, h = 104, H = 19 52 04.0
	iSKP	Z'	20 14 13.0	
4	iSKP	Z'	22 39 15.2	6.8S, 129.8E, h = 122, H = 22 17 07.5
5	iSKP	Z'	05 38 34.7	7.3S, 129.2E, h = 141, H = 05 16 31.2
5	iPKP	Z'	06 25 20.2 C	6.9S, 129.4E, h = 94, H = 06 06 19.3
	iSKP	Z'	06 28 31.0	
5	iSKP	Z'	09 05 44.0	7.2S, 129.0E, h = 112, H = 08 43 33.8
5	iP	Z'	22 47 08.8 C	27.8N, 92.4W, h = 33, H = 22 45 03.4
6	iSKP	Z'	01 41 34.8	7.8S, 129.8E, h = 158, H = 01 19 37.4
6	ePKP	Z'	02 32 06.3	2.6S, 138.4E, h = 33, H = 02 13 16.8
	ePP	Z'	02 33 29	
6	iSKP	Z'	09 23 23.8	7.1S, 129.2E, h = 90, H = 09 01 12.0
6	iP	Z'	09 36 37.5 D	46.3N, 154.8E, h = 33, H = 09 24 49.2
6	iP	Z'	13 58 18.2 C	
6	iP	Z'	18 43 00.7 D	16.7S, 69.7W, h = 174, H = 18 33 25.9
6	iP	Z'	21 55 16.0 C	12.2N, 88.0W, h = 37, H = 21 49 58
7	eL	E	03 43	2.5S, 138.7E, h = 69, H = 02 42 57.8
7	eSKS	E	13 20 00	14.1N, 146.2E, h = 48, H = 12 55 25.6
	eL	E	13 39	
7	iP	Z'	15 41 56.8	
	iS	E'	15 42 16.2	
7	eL	Z	17 26	50.2S, 114.9W, h = 33, H = 16 45 59.8
8	iP	Z'	03 07 32.6 D	27.3S, 70.1W, h = 40, H = 02 56 40.0
8	eP	Z'	08 20 12	45.0N, 150.9E, h = 40, H = 08 08 09.2
	eL	Z	08 49	
8	eL	Z	11 14	26.7N, 110.4W, h = 33, H = 11 06 01.2

9	i(P)	Z'	01 34 48.0 D	
9	eP	Z'	01 38 42.5	
	eL	Z	01 52	
9	e(P)	Z'	02 53 30	
9	iP	Z'	02 55 00.5 D	56.8N, 34.6W, h = 33, H = 02 46 44.5
	eL	Z	03 07 30	
9	e(P)	Z'	03 11 56	
9	ePKP	Z'	05 56 49.5	5.6S, 105.5E, h = 33, H = 05 37 15.1
9	iP	Z'	08 47 45.0 D	45.6N, 150.0E, h = 45, H = 08 35 25.3
9	iP	Z'	09 03 22.5 D	45.3N, 150.8E, h = 33, H = 08 51 18.6
9	iP	Z'	11 25 32.0 D	45.6N, 150.9E, h = 40, H = 11 13 30.6
9	iP	Z'	13 06 07.8 C	0.1S, 25.1W, h = 33, H = 12 54 30.3
9	iP	Z'	21 23 33.0 C	9.0S, 71.5W, h = 600, H = 21 15 30.4
	epP	Z	21 24 43	
	e	Z	21 26 25	
	e	Z	21 28 16	
	iS	N	21 30 03	
	eL	Z	21 33	
9	iP	Z'	22 01 00.3	
9	iP	Z'	23 22 14	9.5S, 72.1W, h = 563, H = 23 14 12.6
	ipP	Z'	23 23 21	
10	iP	Z'	01 08 42.0	9.2S, 71.5W, h = 600, H = 01 00 38.8
	e	Z	01 11 28	
	e	Z	01 12 50	
	iS	N	01 15 02	
10	iP	Z'	01 44 47.5 D	9.4S, 71.3W, h = 600, H = 01 36 41.3
	epP	Z	01 46 06	
10	iP	Z'	07 23 17.5 D	12.9N, 88.5W, h = 45, H = 07 18 07.6
10	iP	Z'	09 02 14.8 C	44.5N, 149.4E, h = 45, H = 08 50 06.1
	e	Z'	09 02 26	
10	iP	Z'	11 31 28.2 C	36.5N, 25.9E, h = 34, H = 11 18 32

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1	iP	Z'	04 38 48.0 D	56.1N, 111.8E, h = 33, H = 04 26 12.8
1	iP	Z'	09 02 26.6 C	38.3S, 73.9W, h = 55, H = 08 50 42
1	iP	Z'	12 31 14.0 D	
1	iP	Z'	16 16 33.7 C	21.2S, 68.4W, h = 61, H = 16 06 14.8
2	iP	Z'	09 58 01.6 D	48.0 N, 145.2E, h = 448, H = 09 46 37.0
2	iP	Z'	11 57 22.4 C	48.1N, 154.7E, h = 50, H = 11 45 38.5
2	eP	Z'	21 05 33	80.1N, 0.6W, h = 33, H = 20 55 58.8
	eL	Z	21 20	
3	iP	Z'	00 02 13.7	51.5N, 174.0W, h = 55, H = 23 52 38.3
	ipP	Z'	02 25.8	
3	iPKP	Z'	04 37 28.0 C	4.2S, 102.9E, h = 50. H = 04 17 58.
3	iP	Z'	05 21 15.0	46.2N, 153.0E, h = 40, H = 05 09 22.0
	eL	Z	05 54	
3	eP	Z'	06 18 22	
3	eP	Z'	12 28 26.5	18.1N, 105.2W, h = 33, H = 12 23 54
3	eL	Z	17 29	2.2N, 84.5W, h = 56, H = 17 12 01.6
3	eSKS	E	21 39 48	12.2S, 166.0E, h = 32, H = 21 15 10.4
	ePS	E	21 42 32	
	eSS	E	21 48 26	
	eL	Z	22 03	
3	iP	Z'	23 14 09.6 D	22.4S, 69.3W, h = 18, H = 23 03 41.6
	eS	E	23 22 36	
	eL	Z	23 34	
4	eP	Z'	01 39 32	46.2N, 153.1E, h = 20, H = 01 27 34.1
	iS	E	01 49 18	
	eSS	E	01 54 28	
	eL	Z	02 05	
4	eP	Z'	02 55 23	45.9N, 153.2E, h = 50, H = 02 43 30.4
	eL	Z	03 28	
4	eP	Z'	03 21 25	8.3S, 83.1W, h = 33, H = 03 13 07.1

22	ePKP	Z'	00 37 30.5	5.9S, 107.9E, h = 323, H = 00 18 35.9
22	iP	Z'	11 18 04.0 C	18.5N, 100.3W, h = 120, H = 11 14 03.0
	iS	N	11 21 28	
	eL	Z	11 23	
22	eP	Z'	12 50 03	18.8S, 69.6W, h = 120, H = 12 40 10.0
22	iP	Z'	14 58 03.2 C	44.4N, 149.0E, h = 33, H = 14 45 51.7
	ipP	Z'	14 58 17.8	
	eS	E	15 08 05	
	eL	Z	15 25	
24	iP	Z'	02 04 18.6 D	
26	eP	Z'	23 03 37	16.6S, 175.2E, h = 33, H = 22 50 08.9
	eSP	Z	23 16 48	
	eSS	N	23 22 10	
	eL	Z	23 36	
27	iP	Z'	02 29 20.2 D	16.6S, 72.1W, h = 79, H = 02 19 41.9
27	iP	Z'	07 51 28.2 C	23.3S, 65.8W, h = 164, H = 07 41 01.3
28	iP	Z'	02 50 30.4 C	19.1N, 69.4W, h = 48, H = 02 44 36.3
28	iP	Z'	08 51 01.8 D	10.9N, 41.4W, h = 33, H = 08 41 31
28	iP	Z'	15 23 34.8 D	52.2N, 174.2E, h = 33, H = 15 13 11.0
	eL	Z	15 52	
28	iP	Z'	16 39 34.0 D	
28	eL	Z	20 19	12.2S, 165.9E, h = 25, H = 19 26 25.5
29	eL	Z	11 15	12.2S, 166.0E, h = 54, H = 10 21 53.0
30	ePKP	Z'	10 06 54	1.6N, 128.4E, h = 61, H = 09 47 59.0
	e	Z'	10 07 13	

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18	iP	Z'	19 11 45.0	29.1N, 114.1W, h = 14, H = 19 07 47.7
	eLg	Z'	19 16 45	
18	eL	Z	19 23	
18	eLg	Z'	19 42 25	30.0N, 113.7W, h = 14, H = 19 33 35.9
	eL	Z	19 43	
18	eL	Z	19 48	
18	eL	Z	22 00	13.4S, 166.6E, h = 51, H = 21 11 10.2
18	eP	Z'	22 04 55	31.9N, 113.3W, h = 14, H = 22 01 10
	eL	Z	22 09	
19	eP	Z'	01 15 28	31.0N, 113.7W, h = 14, H = 01 11 43.2
	eL	Z	01 20	
19	iP	Z'	02 13 23.0	44.1N, 150.2E, h = 50, H = 02 01 44.1
19	eP	Z'	08 13 45	59.7N, 140.8W, h = 33, H = 08 06 33
19	eP	Z'	08 26 56	30.9N, 113.8W, h = 14, H = 08 23 11.6
	eL	Z	08 31	
19	eLg	Z'	10 59 48	30.5N, 114.1W, h = 14, H = 10 51 13.8
19	iP	Z'	11 13 05.5	44.4N, 149.2E, h = 33, H = 11 00 54.3
	eL	Z	11 34	
19	iP	Z'	17 49 48.5 C	53.1N, 159.6E, h = 40, H = 17 38 39.7
	e	Z'	17 50 01	
	eL	Z	18 16	
19	iPKP	Z'	18 36 37.2 C	5.0S, 102.2E, h = 37, H = 18 17 02.2
	eL	Z	19 30	
19	eP	Z'	20 07 20	
	eL	Z	20 13	
19	eP	Z'	20 46 55	18.6S, 72.2W, h = 33, H = 22 36 58.0
	i	Z'	20 47 08.5	
20	eP	Z'	12 13 17	22.2S, 175.2W, h = 33, H = 11 59 58.5
	eL	Z	12 44	
20	iP	Z'	22 16 21.0	
	iS	Z'	22 16 46.5	
21	iP	Z'	21 12 59.2 D	50.3N, 156.4E, h = 80, H = 21 01 35.3
	ipP	Z'	21 13 15.0	
	eL	Z	21 35	

14	ePP	Z	04 54 16	17.5S, 167.7E, h = 33, H = 04 35 48.5
	eSKS	E	05 00 31	
	ePS	E	05 03 32	
	eSS	E	05 09 25	
	e	Z	05 10 20	
	eL	Z	05 24	
14	eP	Z'	09 10 28.5	15.1N, 93.9W, h = 33, H = 14 01 18.4
	eS	E	09 14 26	
	eL	Z	09 16	
14	eSKS	E	14 30 23	17.5S, 167.7E, h = 33, H = 14 05 35.6
	eSS	E	14 39 14	
	eL	Z	14 55	
15	iP	Z'	00 26 47.8 D	4.7S, 76.8W, h = 152, H = 00 18 52.4
15	iP	Z'	00 56 49.2	44.4N, 149.1E, h = 45, H = 00 44 38.5
	i	Z'	00 57 02.7	
15	iP	Z'	21 18 45.0 D	44.3N, 149.0E, h = 50, H = 21 36 34.0
	i	Z'	21 18 57.7	
	iS	E'	21 28 48.0	
	e	E	21 34 21	
	eL	Z	21 45 28	
15	e(P)	Z'	23 50 11	
16	iP	Z'	02 42 17.7 C	44.3N, 149.0E, h = 50, H = 02 30 07.0
	e	Z'	02 42 31	
	eL	Z	03 19	
16	iP	Z'	06 58 11.0 D	41.3S, 87.5W, h = 11, H = 06 46 15.7
	i	Z'	06 58 19.5	
16	iP	Z'	22 56 46.0 C	22.3S, 175.0W, h = 33, H = 22 43 26.4
	eS	N	23 08 02	
	eL	Z	23 32	
16	eP	Z'	23 53 19	22.1S, 175.3W, h = 33, H = 23 39 58.3
17	iP	Z'	00 58 08.0 D	7.6N, 37.4W, h = 33, H = 00 48 02.6
	iS	E	01 06 23	
	eSS	E	01 10 00	
	eL	Z	01 15	
17	iPKP	Z'	10 46 25.3 D	
18	iP	Z'	14 42 15.8 C	29.9N, 113.6W, h = 14, H = 14 38 28.9
	iS	N	14 45 22	
	i	Z	14 45 38	
	eL	Z	14 46 16	
	eLg	Z'	14 47 15	

4	iP	Z'	04 23 14.0 D	19.5N, 108.3W, h = 33, H = 04 18 46.3
	eS	E	04 26 58	
	eL	Z	04 29	
4	iP	Z'	04 29 36.4 C	7.1S, 80.4W, h = 45, H = 04 21 22.6
4	eP	Z'	08 36 10.5	46.1N, 152.9E, h = 33, H = 08 24 17.1
	eL	Z	09 08	
4	eP	Z'	16 11 03	35.5S, 102.8W, h = 33, H = 15 59 42.1
	i	Z'	16 11 27.0	
	eS	E	16 20 20	
	eL	Z	16 30	
5	eP	Z'	02 09 09.0	
	eLg	Z'	02 13 46.5	
	eL	Z	02 15	
5	eP	Z'	04 34 40	35.7S, 103.1W, h = 33, H = 04 23 22.2
	eS	E	04 44 00	
	eL	Z	04 57	
5	e(S)	Z'	06 54 10	37.2N, 87.0W, h = 33, H = 06 51 02.5
	iLg	Z'	06 54 44.2	
5	iP	Z'	11 36 24.0 C	7.4N, 77.3E, h = 33, H = 11 29 49.4
	eS	E	11 41 48	
	eL	Z	11 45	
6	iP	Z'	04 23 26.8 D	25.6S, 68.6W, h = 105, H = 04 12 48.7
	ipP	Z'	04 23 53.5	
6	iP	Z'	08 38 38.0 D	37.5N, 118.5W, h = 15, H = 08 34 23.7
	eLg	Z'	08 44 06	
	eL	Z	08 45 40	
6	eP	Z'	18 22 46	7.1S, 80.5W, h = 33, H = 18 14 32.1
	eS	E	18 29 30	
	eL	E	18 34	
7	eL	Z	11 20	20.8S, 174.0E, h = 33, H = 10 32 39.5
7	eL	Z	16 07	12.3N, 143.9E, h = 33, H = 15 17 57.3
8	iP	Z'	08 05 10.3 D	46.4N, 153.0E, h = 20, H = 07 53 15.1
	eS	E	08 14 55	
	eSS	E	08 20 10	
	eL	E	08 28	
8	eL	E	11 41	11.9S, 166.0E, h = 44, H = 10 49 19.2

9	eP	Z'	01 48 29	43.6N, 110.2W, h = 45, H = 01 45 19.4
	eLg	Z'	01 52 10	
9	iP	Z'	05 46 55.5 D	54.9N, 159.4W, h = 45, H = 05 38 29.5
	ipP	Z'	05 47 06.0	
9	iP	Z'	08 46 05.0 C	44.0N, 150.4E, h = 50, H = 08 33 57.6
9	eP	Z'	11 06 21	21.1S, 178.0W, h = 435, H = 10 53 39.4
	eSKS	E	11 16 16	
10	eL	E	02 48	5.4N, 82.5W, h = 35, H = 02 32 04.2
10	ePKP	Z'	03 49 41	6.2S, 128.1E, h = 366, H = 03 31 21.1
	e	Z'	03 49 52	
	ePP	Z'	03 51 11	
	iSKP	Z'	03 52 39.5	
	e	E	03 54 45	
	ePS	E	04 03 50	
	eSS	E	04 09 08	
	e	E	04 11 08	
10	iPKKP	Z'	07 00 16.2	58.1S, 26.4W, h = 110, H = 06 30 54.8
	i	Z'	07 00 27.8	
	eL	E	07 28	
10	iP	Z'	07 35 05.1 C	8.7S, 79.8W, h = 33, H = 07 26 36.5
10	iP	Z'	14 59 40.3 D	18.1S, 68.5W, h = 79, H = 14 49 42.6
10	iP	Z'	20 10 17.8 C	17.1N, 60.4W, h = 33, H = 20 03 13.0
	ipP	Z'	20 10 32.0	
	eL	Z	20 24	
11	eP	Z'	01 00 47	15.1S, 173.6W, h = 33, H = 00 48 48.3
	eS	E	01 11 12	
	eL	Z	01 29	
11	eP	Z'	02 43 44.5	17.8S, 178.6W, h = 537, H = 02 31 19.4
11	iP	Z'	17 18 22.2 D	51.2N, 179.3W, h = 32, H = 17 08 12.3
	eS	E	17 26 18	
	eL	Z	17 38	
11	iP	Z'	19 22 57 D	51.3N, 179.5W, h = 54, H = 19 12 59.6
12	iP	Z'	00 42 54.2 D	18.7N, 107.0W, h = 33, H = 00 38 24.6
	eS	E	00 46 39	
	eL	Z	00 50	

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10	iP	Z'	17 29 52.7 D	44.4N, 149.0E, h = 40, H = 17 17 42.7
	i	Z'	17 29 56.2	
	eS	N	17 39 57	
	eSS	E	17 45 22	
	eL	Z	17 56	
11	iP	Z'	00 22 35.8	43.8N, 149.5E, h = 55, H = 00 10 25.6
11	iPKP	Z'	00 34 02.3	7.0S, 129.5E, h = 132, H = 00 15 04.8
	iSKP	Z'	00 37 11.0	
11	iP	Z'	02 24 42.0 C	
11	iP	Z'	04 44 09.4 D	
11	iP	Z'	10 01 52.3 D	44.6N, 148.9E, h = 55, H = 09 49 43.3
	eL	Z	10 31	
11	iP	Z'	11 41 51.2 D	16.9S, 174.4W, h = 185, H = 11 29 06.4
	eS	E	11 52 08	
	eL	Z	12 07	
11	eL	Z	15 22	
11	iP	Z'	20 02 14.8 D	9.1S, 71.4W, h = 585, H = 19 54 09.4
	i		20 03 23	
11	iP	Z'	20 25 22.2 D	4.0N, 82.6W, h = 33, H = 20 18 39.7
	eS	E	20 30 45	
	eL	Z	20 34	
12	iP	Z'	07 19 (38)	35.5N, 29.7E, h = 69, H = 07 06 31.2
	eL	Z	07 53	No minute marks
12	iP	Z'	08 09 (06) D	44.2N, 149.0E, h = 45, H = 07 56 53.6
	eL	Z	08 37	No minute marks
12	iP	Z'	08 45 (27)	44.2N, 149.2E, h = 50, H = 08 33 15.9
				No minute marks
12	iP	Z'	13 12 (10) C	44.2N, 149.4E, h = 50, H = 13 00 00.7
	eL	Z	13 51	
12	eP	Z'	19 38 50	
	i	Z'	19 38 52.7	
13	iP	Z'	09 07 55.8 D	9.0N, 73.3W, h = 328, H = 09 01 41.2
14	eL	Z	01 15	30.1S, 177.4W, h = 42, H = 00 20 03.0

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12	iP	Z'	21 01 28.0 D	5.7N, 73.1W, h = 140, H = 20 54 34.8
12	iP	Z'	23 36 31.0 C	46.3N, 150.5E, h = 90, H = 23 24 36.6
	epP	Z'	23 36 54	
13	iP	Z'	04 23 51.0 C	2.7S, 78.4W, h = 109, H = 14 16 13.5
	ipP	Z'	04 24 22.0	
13	eP	Z'	05 34 47	6.9N, 77.1W, h = 33, H = 05 28 07.3
13	eP	Z'	20 02 15.0 D	14.5N, 91.9W, h = 139, H = 19 57 27.4
14	iP	Z'	00 14 31.7 C	2.3S, 61.2W, h = 36, H = 00 05 39.8
	epP	Z'	00 14 43	
	isP	Z'	00 14 50.0	
14	iP	Z'	03 56 35.7 C	45.4N, 150.1E, h = 33, H = 03 44 01.1
14	iP	Z'	07 58 53.0 D	62.7N, 149.5W, h = 95, H = 07 51 07.9
	i		07 59 22.6	
14	iP	Z'	10 33 21.0 D	5.0N, 82.6W, h = 33, H = 10 26 47.0
14	eLg	Z'	13 02 06	43.6N, 110.3W, h = 33, H = 12 55 08.6
15	iPKP	Z'	15 24 48.7 D	4.7S, 102.9E, h = 72, H = 15 05 18.4
	ipPKP	Z'	15 25 02.5	
15	iP	Z'	15 50 17.8 D	51.0N, 128.8W, h = 33, H = 15 44 22.3
15	iP	Z'	16 58 52.2 D	16.3N, 97.7W, h = 35, H = 16 54 23.6
15	iPKP	Z'	19 53 04.0 D	4.8S, 108.0E, h = 650, H = 19 34 45.5
	epPKP	Z	19 55 32	
	ePP	E	19 56 43	
	eSKS	E	19 59 15	
	iSKKP	Z'	20 04 04.0	
	e	E	20 06 30	
	e	Z'	20 07 50	
	e	E	20 12 00	
	eL	Z	20 27	
16	iPKP	Z'	02 11 01.2 D	6.4S, 105.4E, h = 64, H = 01 51 30.6
	eL	Z	03 02	
16	iPKP	Z'	02 26 12.5 D	6.2S, 105.5E, h = 33, H = 02 06 38.2
16	iPKP	Z'	03 05 07.2 D	6.2S, 105.4E, h = 55, H = 02 45 35.3
16	iPKP	Z'	03 11 43.3 C	

16	iPKP	Z'	04 36 14.6 C	6.3S, 105.5E, h = 63, H = 04 16 43.0
16	eP	Z'	06 28 37	2.2N, 88.4W, h = 34, H = 06 23 20.4
16	iP	Z'	11 21 29.0 C	45.8N, 142.6E, h = 258, H = 11 09 30.4
16	iP	Z'	14 00 41.0 C	37.1N, 20.9E, h = 15, H = 13 47 56.4
16	ePKP	Z'	14 37 44	49.1S, 127.1E, h = 33, H = 14 18 04.9
16	iPKP	Z'	16 26 08.8 D	6.5S, 105.3E, h = 46, H = 16 16 35.2
17	iP	Z'	23 31 07.1 D	52.9N, 165.4W, h = 33, H = 23 22 11.2
	ipP	Z'	23 31 19.7	
	isP	Z'	23 31 28.3	
18	iP	Z'	00 43 31.8 D	24.8S, 176.6W, h = 46, H = 00 30 02.6
	i	Z'	00 43 36.0	
	ePP	E'	00 47 35	
	esKS	E	00 53 55	
	eS	E'	00 54 53	
	iPKKP	Z'	01 00 18.5	
	eP'PKS	E	01 11 13	
	eL	Z	01 15	
18	eP	Z'	03 02 32	45.5N, 151.3E, h = 33, H = 02 50 31.0
19	eP	Z'	04 47 19	33.1S, 68.7W, h = 45, H = 04 34 51.5
	e	Z'	04 47 54	
19	iP	Z'	17 12 43.0 C	9.7S, 79.1W, h = 56, H = 17 04 07.8
	ipP	Z'	17 12 56.2	
	eS	E	17 19 40	
19	iP	Z'	20 45 31.0 C	35.2S, 68.0W, h = 32, H = 20 33 50.1
20	eP	Z'	02 44 43	
20	iP	Z'	04 21 26.8 C	45.0N, 147.4E, h = 50, H = 04 09 15.1
20	iP	Z'	06 52 37.5 D	
20	iP	Z'	09 07 43.6 D	
20	ePKP	Z'	09 16 18	7.0S, 129.3E, h = 103, H = 08 57 17.8
	eSKP	Z'	09 19 28	
20	iP	Z'	10 56 02.8 C	5.2S, 80.8W, h = 55, H = 10 48 04.2
	ipP	Z'	10 56 12.8	
20	eP	Z'	13 04 27	44.9N, 111.7W, h = 33, H = 13 00 50.7
	eLg	Z'	13 08 55	
20	iP	Z'	15 53 49.8	

20	ePKP	Z'	16 09 37	12.8S, 66.0E, h = 33, H = 15 49 44.9
20	ePKP	Z'	17 06 06	12.6S, 66.4E, h = 33, H = 16 46 14.4
20	iP	Z'	22 33 36.3 C	13.2N, 88.0W, h = 64, H = 22 28 31.2
	i	Z'	22 33 40.5	
21	eP	Z'	05 10 30.0	
21	iP	Z'	12 47 34.3 D	21.2S, 175.8W, h = 90, H = 12 34 22.7
21	iPKP	Z'	13 27 55.3 D	16.1N, 119.7E, h = 49, H = 13 09 09.6
	ePS	E	13 39 05	
22	eP	Z'	01 25 01.6	14.3N, 93.0W, h = 33, H = 01 20 11.0
	eLg	E'	01 28 49	
22	eP	Z'	01 42 24	27.9S, 67.2W, h 168, H = 01 31 35.7
22	e	Z'	02 55 23	44.4N, 114.6W, h = 33, H = 02 50 29.8
22	iP	Z'	06 08 10.2 D	35.1S, 67.9W, h = 33, H = 05 56 29.5
22	iP	Z'	23 20 39.8 C	6.9N, 73.0W, h = 153, H = 23 13 55.2
23	iP	Z'	22 40 41.2 D	12.3N, 72.8W, h = 33, H = 22 34 22.1
24	eL	E	12 06	13.1S, 166.7E, h = 61, H = 11 18 15.2
24	eL	Z	22 05	53.05, 159.5E, h = 33, H = 21 05 54.6
25	eP	Z'	00 55 11	52.3N, 158.7E, h = 80, H = 00 44 01.9
25	iP	Z'	09 09 27.8 D	52.0N, 172.1W, h = 45, H = 09 00 02.7
26	iPKP	Z'	01 50 27.0 D	5.1S, 102.3E, h = 40, H = 01 30 52
26	iP	Z'	08 08 37.2 C	76.5N, 22.4E, h = 33, H = 07 58 22.4
	eL	Z	08 33	
26	eL	Z	09 18	69.3N, 16.5W, h = 33, H = 08 48 52.1
27	eP	Z'	02 41 24	45.7N, 123.3W, h = 37, H = 02 36 22.3
27	iP	Z'	04 02 00 J	14.5N, 90.7W, h = 33, H = 03 57 10
27	iPKP	Z'	05 52 42.8 C	6.4S, 105.2E, h = 33, H = 05 33 08.0
27	iPKP	Z'	10 20 46.6	5.8S, 105.5E, h = 52, H = 10 01 15.2
	i	Z'	10 20 50.0	

28	ePS	E	06 14 09	5.1S, 153.5E, h = 70, H = 05 45 20.2
	eL	E	06 36	
28	iP	Z'	07 01 59.4 D	14.4N, 92.3W, h = 33, H = 06 57 09.9
28	eLg	Z'	08 30 10	44.8N, 110.9W, h = 33, H = 08 22 19.3
28	ePP	Z'	09 22 06	32.7S, 178.9W, h = 33, H = 09 03 52.9
	eL	E	09 52	
28	iP	Z'	12 49 22.2	18.1N, 106.3W, h = 33, H = 12 44 51
28	eP	Z'	19 21 53	18.5N, 105.8W, h = 33, H = 19 17 24.2
29	eP	Z'	03 45 53.5	18.8N, 106.2W, h = 33, H = 03 41 28
	eL	E	03 51	
29	eP	Z'	04 38 53	19.1N, 105.9W, h = 33, H = 04 34 31
	eL	E	04 44	
29	eP	Z'	06 27 14	18.6N, 105.8W, h = 33, H = 06 22 48
	eL	E	06 32	
29	iP	Z'	17 25 32.4 D	18.5S, 69.7W, h = 113, H = 17 15 39.2
	iS	E	17 33 37	
	eL	E	17 41	
30	eL	E	02 01	21.6N, 144.5E, h = 121, H = 01 15 24.5
30	eP	Z'	08 32 09	18.8N, 105.8W, h = 33, H = 08 27 45.1
30	iP	Z'	13 41 28.2 C	45.5N, 150.6E, h = 40, H = 13 29 25.3
	eS	E	13 51 23	
	eSS	E	13 56 42	
	eL	E	14 04	
30	eP	Z'	13 58 34	40.1S, 84.3W, h = 33, H = 13 46 45.9
30	iPKP	Z'	22 25 24.2	6.9N, 94.7E, h = 64, H = 22 06 07.1
31	eP	Z'	10 22 12	19.0N, 105.8W, h = 33, H = 10 17 50
31	iP	Z'	13 03 29.5	
31	eP	Z'	14 27 20.5	12.4N, 87.9W, h = 77, H = 14 22 07
31	eP	Z'	19 29 52	17.4S, 174.2W, h = 80, H = 19 16 54.9
31	iP	Z'	21 46 07.6 D	16.6N, 99.0W, h = 33, H = 21 41 42.7

*