Gravity data and interpretation of detailed gravity profiles in the Livermore Valley area, California

By

Andrew Griscom, Carter W. Roberts,

and

Kenneth D. Holden

U.S. Geological Survey

Open-file Report 79-549

Report includes text. 1 table, 2 figures, and 4 plates

Contents

Illustrations

Table

Introduction

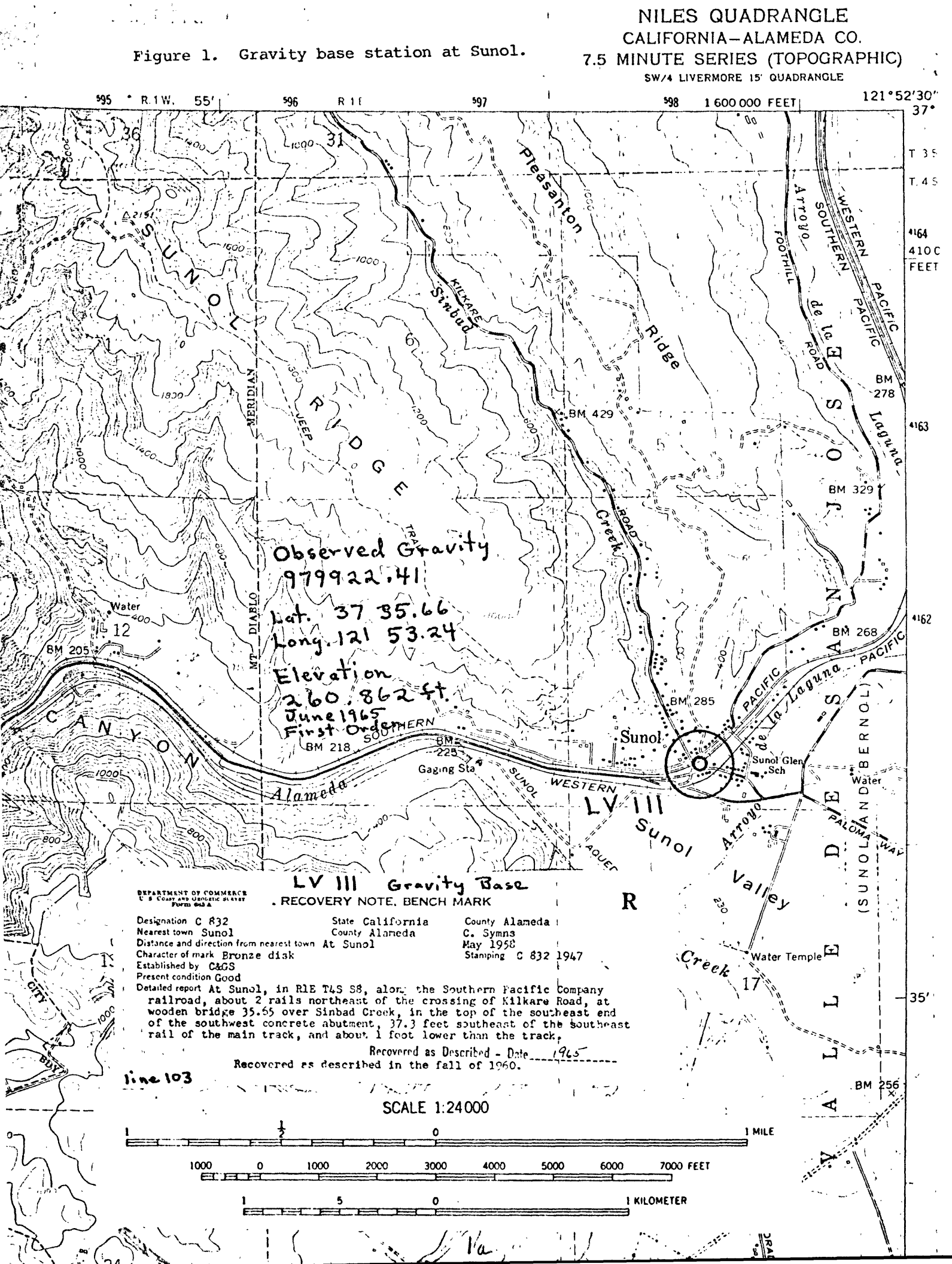
While surveying gravity stations for a gravity map of the Livermore Valley area, California, (Holden, 1976) a series of detailed gravity profiles were collected along traverses crossing the proposed traces of possible faults. These profiles were incorporated into the gravity map and are shown as solid heavy lines or closely spaced dots. The present report releases all available gravity data acquired by the U.S. Geological Survey in the Livermore Valley area with the exception of those data already released by Robbins and others (1974). This report also describes the detailed gravity profiles and provides a brief interpretation of the possible significance of the data.

Gravity data

The new gravity data for the Livermore area are listed in table 1. These data were collected and reduced by Holden and Roberts, and together with the older data (Robbins and others, 1974) are available as a contour map, scale 1:62,000, of the Livermore Valley area (Holden, 1976).

The new data were surveyed with LaCoste and Romberg gravity meters and are referenced to the primary base station "A" of the U.S. Geological Survey in Menlo Park using an observed gravity of 979,958.74 mgal (Robbins, 1971). A local field base at Sunol was used for some of the new data and is described in figure 1. This local base is bench mark C832 (gravity station LV 111) on the abutment of the Southern Pacific Railway bridge and has an observed gravity of 979,922.41 mgal. In general the observed gravity values are accurate to $\pm$0.05 mgal or better; the observed gravity for the gravity stations along the detailed profiles probably in general have standard deviations of $\pm$0.02 mgal

Figure 1. Gravity base station at Sunol.



relative to adjacent stations. Station elevations along the gravity profiles are accurate to 0.03 m (0.1 ft), implying errors of less than 0.01 mgal in the Bouguer anomaly; larger errors are present in the Bouguer gravity values for the regional gravity survey due to elevation uncertainty, locally as great as 1 m. An accuracy code for each gravity station is listed in column 2 of table 1. This code is described in Oliver and others (1969).

Terrain corrections for topography beyond a radius of 0.59 km were performed according to the method of Plouff (1966, 1977) using the digital terrain model described by Robbins, Oliver and Plouff (1973). Inner zone terrain corrections out to a radius of 0.59 km were computed manually. The largest errors in the terrain corrections of stations along the detailed profiles are probably in the A and B zones (outer radius of 68 m) as a result of railway embankments and other local topographic features. The A and B corrections were calculated from measurements made in the field according to methods described by Robbins and Oliver (1970) and may be in error by as much as $\pm$0.02 mgal, although relative error between adjacent stations of the profiles is probably less.

Four detailed gravity profiles are mentioned in this report. The Sunol and Hetch Hetchy profiles are located on plate 1, which includes parts of the Niles and La Costa Canyon quadrangles, scale 1:24,000. The Sunol profile is not discussed further in this report. The Radum and Camp Parks profiles are located on plate 2, which includes parts of the Dublin and Livermore quadrangles, scale 1:24,000.

Interpretation of gravity profiles

General comments

Detailed gravity profiles across areas of unconsolidated sediments are used in order to search for locations of relatively abrupt density changes in near-surface materials. Such density changes may be caused by the

juxtaposition of different materials as a result of faulting and also may be caused by other natural processes such as lateral variations in sedimentary materials (buried conglomerate lenses) or buried relief on older eroded sediments beneath younger alluvium. In addition it is possible that unconsolidated material may have its density increased at a fault either by local consolidation or by cementation due to groundwater movement of carbonate or silica along the fault.

Detailed gravity profiles measured elsewhere in California and Oregon have demonstrated local gravity anomalies at faults in unconsolidated sediments. Local gravity highs and inflections on gradients have been observed across normal faults at Surprise Valley, California (Griscom and Conradi, 1976) and at Alvord Valley, Oregon (Griscom and Conradi, 1975). Similar features have been observed across strike-slip faults such as the Calaveras fault near Hollister, California (Robbins, 1975, and oral communication, 1975), and the Silver Creek fault north of San Jose, California (R. H. Chapman, written communication, 1976). The local gravity anomalies on these profiles may be gravity highs, 0.1-1.0 mgal in amplitude and 200-400 m wide, or may be local steep gradients at gravity steps, 0.1-2.0 mgal in amplitude. Commonly the local gravity highs are 0.1 to 0.2 mgal in amplitude. To give an idea of the sediment volumes involved in producing such anomalies, a horizontal slab of sediments having a density 0.2 g/cm^3 greater than adjacent material must be approximately 12 m thick in order to produce an anomaly of 0.1 mgal.

Because of ambiguity it is nearly impossible to prove that local gravity anomalies on detailed profiles across unconsolidated sediments are definitely related to faulting. Several closely spaced profiles will be necessary. Even if the same local gravity features are present on each profile and even if the features are colinear and located along a proposed fault trace, then the relationship, though rather compelling, is still not proven. In general detailed gravity

profiles are only one piece of evidence which must be evaluated in conjunction with all other evidence when searching for proposed faults in unconsolidated sediments.

Hetch Hetchy gravity profile

The Hetch Hetchy profile is located on plate 1. The individual gravity stations are situated on the concrete foundations at the base of transmission line towers, the elevations being provided by San Francisco Water Department. The gravity profile is illustrated in plate 3.

The data are too widely spaced to provide suitable detailed gravity information for indicating small features. The steep gravity gradient between stations LV195 and HH894 coincides with the trace of the Calaveras fault as mapped by Hall (1958). Hall's map indicates that the Calaveras fault in the vicinity of the gravity profile has a thick section of relatively dense sandstones and shales of Cretaceous age overlain by a thin cover of Pliocene and Quaternary sediments west of the fault, and a thick section of lower density Tertiary and Quaternary rocks and sediments east of the fault. The steep gravity gradient between HH887 and HH881 coincides with the Magee Peaks fault of Hall (1958). Gravity station HH875 seems to indicate a local high relative to adjacent stations but more closely spaced data are needed to show that this local feature is not merely an error.

Radum gravity profile

The Radum profile is located on plate 2. The individual stations are situated on the Southern Pacific Railroad track for which accurate elevations are available. The gravity profile is illustrated in plate 4. A constant small elevation error in the data reduction causes the stations from RW16 to RW50 to be about 0.4 mgal too high and explains the abrupt discontinuity in the profile between stations RW15 and RW16.

Several local gravity features are present on this profile and need further investigation because of the possibility that they are caused by faults. A local gravity high between RW35 and RW38 is associated with a low topographic ridge on the southeast side of the tracks. If this ridge is buried by the younger alluvium at the tracks, then the density contrast between the sediments of the ridge and those of the alluvium may cause the high, but other interpretations are equally possible, including a fault near station RW39. This possible fault lies on the northwest extension of the Verona fault as mapped by Herd (1977). The locally steepened gravity gradient between stations RW13 and RW16 (after correcting for the reduction error) may also represent a fault. A near-surface density contrast must either be causing a local high near station RW9 and RW10 or possibly indicates a fault contact at the local steep gradient near station RW8. The steep gradient between stations RE15 and RE18 may also indicate a fault. A local anomaly seems to be present near station RE20 but the profile should be extended to the east for better definition of the feature.

Camp Parks gravity profile

The Camp Parks profile is located on plate 2. Elevations were leveled to an accuracy of 0.03 m along a road. The gravity profile is illustrated in figure 2. The profile indicates two small gravity highs: one in the vicinity of station CP17 and another near stations CP11 and CP12. These gravity features are close to the easternmost and westernmost of the three fault traces mapped by Herd (1978) as the Pleasanton fault zone. These small gravity highs may be part of a broader gravity high extending from approximately CP08 to CP22. An alternative interpretation to the one above (faults at the small gravity highs) is a fault on the steep gradient at CP19 and CP20. More extensive data are needed to determine the most likely interpretation.

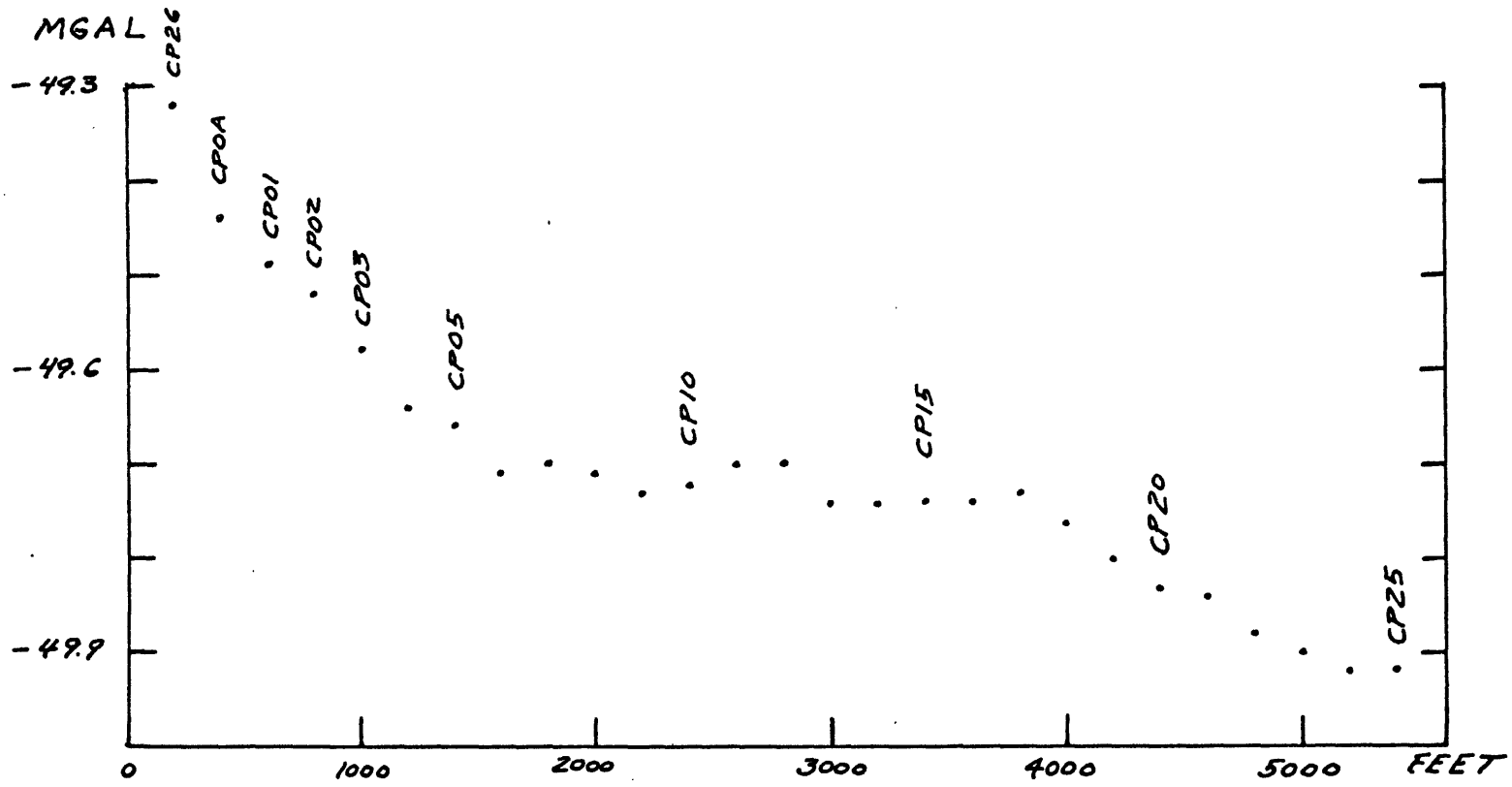


Figure 2. CAMP PARKS GRAVITY PROFILE

References

Griscom, Andrew, and Conradi, Arthur, Jr., 1975, Principal facts and preliminary interpretation for gravity and continuous truck-mounted magnetometer profiles in the Alvord Valley, Oregon: U.S. Geological Survey, Open-file Report 75-293, 20 p., 18 plates, 9 tables.

Griscom, Andrew, and Conradi, Arthur, Jr., 1976, Principal facts and preliminary interpretation for gravity profiles and continuous magnetometer profiles in Surprise Valley, California: U.S. Geological Survey, Open-file Report 76-260, 20 p., 14 figures, 1 table.

Hall, C. A., Jr., 1958, Geology and paleontology of the Pleasanton area, Alameda and Contra Costa Counties, California: University of California Publications in Geological Sciences, v. 34, no. 1, p. 1-90.

Herd, Darrell G., 1977, Geologic map of the Las Positas, Greenville, and Verona faults, eastern Alameda County, California: U.S. Geological Survey open-file report 77-689, scale 1:24,000, 24 p.

Herd, Darrell G., 1978, Map of Quaternary faulting along the northern Calaveras fault zone: U.S. Geological Survey, Open-file report 78-307, scale 1:24,000.

Holden, K. D., 1976, Complete Bouguer anomaly map of the Livermore Valley area, California: U.S. Geological Survey Open-File Map 76-761, scale 1:62,500.

Oliver, H. W., Griscom, Andrew, Robbins, S. L. and Hanna, W. F., 1969, USGS gravity in California, Part IV: U.S. Geological Survey Interagency Report, 57 p., 13 p. tables, 677 punch cards.

Plouff, Donald, 1966, Digital terrain corrections based on geographic coordinates (abstract): Geophysics, v. 31, p. 1208.

Plouff, Donald, 1977, Preliminary documentation for a FORTRAN program to compute gravity terrain corrections based on topography digitized on a geographic grid: U.S. Geological Survey Open-file Report 77-535, 45 p.

Robbins, S. L., 1971, USGS gravity data in California, Part XXII - Base station network used in east-central California: U.S. Geological Survey Interagency Report, 95 p., 1 plate.

Robbins, S. L., 1975, Detailed gravity profiles across the Calaveras fault near Hollister, California (abstract): EOS, Transactions, American Geophysical Union, v. 56, no. 12, p. 1067.

Robbins, S. L., and Oliver, H. W., 1970, On making inner-zone terrain corrections to gravity data: U.S. Geological Survey Interagency Report, 16 p.

Robbins, S. L., Oliver, H. W., Holden, K. D., and Farewell, R. C., 1974, Principal facts, accuracies, and sources for 3046 gravity stations on the San Jose 1° x 2° quadrangle, California: U.S. Geological Survey Report, 106 p.; available from National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia, NTIS-PB-232728/AS.

Robbins, S. L., Oliver, H. W., and Plouff, Donald, 1973, Magnetic tape containing average elevations of topography in California and adjacent regions for areas of 1x1 minute and 3x3 minutes in size: U.S. Geological Survey Report, 31 p., tape; available from National Technical Information Service, U.S. Department of Commerce, Springfield, Virginia, NTIS-PB-219-794.

TABLE 1. LIVERMORE-SUNOL AREA, *GRAVITY STATIONS*

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND	TERRAIN TOTAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
LIV 1	F43	37	36.38	122	1.14	101.0	979955.35	-4.85	0.02D	1.37	-6.97	-6.83
LIV 2	F43	37	35.67	122	0.33	74.0	979954.16	-7.55	0.04D	1.50	-8.61	-8.54
LIV 3	D53	37	35.14	121	59.28	528.0	979920.11	1.88	1.63D	3.61	-12.74	-11.81
LIV 4	F43	37	32.66	122	0.77	39.0	979948.68	-11.95	0.01D	0.78	-12.52	-12.48
LIV 5	V43	37	31.81	122	0.06	62.0	979943.79	-13.44	0.41D	1.20	-14.38	-14.32
LIV 6	D43	37	30.64	122	0.25	10.0	979946.92	-13.51	0.05D	0.84	-13.02	-13.05
LIV 7	D43	37	31.31	121	58.44	32.0	979942.26	-17.06	0.00D	0.88	-17.29	-17.27
LIV 8	B13	37	31.36	121	57.38	39.6	979936.63	-22.05	0.00D	1.03	-22.39	-22.37
LIV 9	G63	37	34.24	121	55.99	737.0	979899.71	2.45	0.41D	1.98	-21.02	-19.53
LIV10	G63	37	34.81	121	55.21	1185.0	979871.01	15.06	1.01D	3.70	-22.14	-19.77
LIV11	G63	37	35.21	121	56.45	1190.0	979871.04	14.95	1.08D	5.03	-21.09	-18.80
LIV12	D43	37	39.76	122	1.53	1072.0	979893.96	20.19	0.49D	2.72	-14.10	-11.91
LIV13	V43	37	38.26	122	0.18	1243.0	979880.34	24.83	0.71D	3.33	-14.74	-12.22
LIV14	P43	37	39.36	122	0.19	1495.0	979863.43	30.02	1.40D	5.31	-16.25	-13.30
LIV15	G63	37	38.04	121	59.24	1432.0	979866.21	28.80	0.34D	3.16	-17.45	-14.51
LIV16	E33	37	41.78	122	1.41	332.0	979939.12	-7.21	0.18D	1.61	-17.07	-16.44
LIV17	F43	37	42.39	122	0.48	515.0	979923.36	-6.64	0.70D	1.88	-22.55	-21.53
LIV18	G63	37	42.76	121	58.30	1134.0	979875.79	3.48	1.16D	3.10	-32.56	-30.27
LIV19	V43	37	30.62	121	56.94	24.0	979934.91	-24.16	0.02D	1.13	-23.86	-23.88
LIV20	V43	37	29.91	121	56.20	49.0	979928.27	-27.43	0.06D	1.35	-27.77	-27.75
LIV21	G63	37	29.71	121	54.61	288.0	979909.96	-22.96	0.19D	2.53	-30.38	-29.91
LIV22	D43	37	30.40	121	55.14	192.0	979917.40	-25.56	0.06D	1.96	-30.23	-29.94
LIV23	G63	37	31.25	121	55.00	320.0	979913.67	-18.48	0.07D	2.01	-27.53	-26.95
LIV24	B23	37	32.09	121	57.72	55.0	979938.18	-20.12	0.02D	1.00	-21.02	-20.96
LIV25	B23	37	32.66	121	58.75	48.0	979944.23	-15.55	0.25D	1.13	-16.08	-16.05
LIV26	G63	37	31.71	121	53.93	1273.0	979856.26	13.08	1.01D	4.78	-26.08	-23.58
LIV27	G63	37	31.17	121	52.22	1676.0	979832.24	27.75	0.89D	5.10	-24.96	-21.61
LIV28	T63	37	32.34	121	53.72	724.0	979890.94	-4.79	1.95D	4.07	-25.72	-24.38
LIV29	F43	37	32.02	121	56.94	133.0	979929.36	-21.49	0.07D	1.16	-24.92	-24.70
LIV30	F43	37	31.91	121	55.91	215.0	979922.15	-20.84	0.03D	1.31	-26.95	-26.56
LIV31	F43	37	32.34	121	55.08	381.0	979914.49	-13.50	0.38D	2.03	-24.63	-23.92
LIV32	G63	37	33.44	121	53.33	574.0	979904.73	-6.71	0.46D	1.96	-24.57	-23.43
LIV33	T63	37	32.31	121	52.58	948.0	979877.94	3.32	1.37D	3.39	-26.01	-24.14
LIV34	T63	37	35.10	121	53.93	730.0	979896.05	-3.13	0.90D	2.60	-25.74	-24.30
LIV35	T63	37	33.90	121	52.73	343.0	979919.33	-14.50	0.20D	1.67	-24.68	-24.03
LIV36	D43	37	36.66	121	53.74	429.0	979909.87	-19.89	1.86D	4.71	-29.99	-29.35
LIV37	B53	37	37.41	121	54.43	716.0	979894.74	-9.11	2.04D	5.13	-28.71	-27.46
LIV38	B13	37	35.91	121	54.08	225.6	979926.77	-21.02	1.12D	4.42	-24.39	-24.17
LIV39	B13	37	36.44	121	52.58	328.0	979910.41	-28.51	0.19D	1.53	-38.31	-37.69
LIV40	T63	37	38.55	121	53.97	387.0	979905.73	-30.73	0.25D	2.44	-41.65	-40.96
LIV41	V43	37	39.86	121	53.19	332.0	979905.80	-37.73	0.01D	0.87	-48.33	-47.66
LIV42	G63	37	39.76	121	55.71	1463.0	979849.51	12.51	1.54D	5.93	-32.04	-29.21
LIV43	V43	37	41.12	121	55.94	562.0	979904.43	-19.30	0.49D	1.68	-37.02	-35.90
LIV44	T63	37	42.66	121	56.97	650.0	979901.08	-16.62	0.35D	1.41	-37.66	-36.32
LIV45	F43	37	42.70	121	53.45	356.0	979906.84	-38.56	0.01D	0.64	-50.22	-49.48
LIV46	T63	37	43.16	121	54.82	489.0	979899.22	-34.35	0.75D	1.48	-49.76	-48.78
LIV47	G63	37	33.47	121	55.39	716.0	979896.14	-1.99	0.40D	1.94	-24.77	-23.32
LIV48	G63	37	33.99	121	54.43	903.0	979885.25	3.96	0.97D	2.77	-24.44	-22.64
LIV49	T63	37	34.24	121	53.58	358.0	979919.77	-13.15	0.35D	1.78	-23.74	-23.07
LIV50	V43	37	35.91	121	52.18	544.0	979894.98	-22.86	1.37D	2.59	-39.06	-38.02

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND	TERRAIN TOTAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
LIV51	T63	37	38.40	121	51.47	604.0	979888.60	-27.23	0.17D	1.12	-46.97	-45.71
LIV52	B13	37	35.83	121	51.43	323.0	979909.67	-28.84	0.45D	1.63	-38.37	-37.76
LIV53	G63	37	37.07	121	50.81	607.0	979889.26	-24.35	0.27D	1.35	-43.96	-42.72
LIV54	G63	37	35.01	121	50.03	726.0	979886.68	-12.74	1.43D	2.97	-34.83	-33.43
LIV55	G63	37	35.44	121	51.92	568.0	979893.32	-21.59	0.95D	2.24	-38.97	-37.86
LIV56	G633	37	44.56	122	0.15	1761.0	979835.81	19.85	1.02D	7.26	-33.63	-30.23
LIV57	F433	37	44.19	121	58.91	1719.0	979832.32	12.95	1.81D	7.32	-39.03	-35.72
LIV58	T633	37	43.87	121	59.19	1654.0	979841.58	16.56	0.85D	5.62	-34.88	-31.60
LIV59	G633	37	43.18	121	59.71	1032.0	979886.58	4.07	1.11D	2.69	-28.86	-26.76
LIV60	G633	37	41.44	122	0.26	1051.0	979891.17	12.98	1.10D	3.17	-20.13	-18.02
LIV61	G633	37	41.13	121	59.05	1258.0	979876.05	17.78	0.40D	2.64	-23.00	-20.40
LIV62	G633	37	41.59	121	58.55	1132.0	979879.37	8.58	2.26D	4.15	-26.35	-24.12
LIV63	B333	37	41.70	121	56.84	442.0	979915.14	-20.73	0.43D	1.72	-34.28	-33.42
LIV64	T633	37	41.62	121	55.96	430.0	979910.82	-26.06	0.27D	1.27	-39.64	-38.78
LIV65	G633	37	41.48	121	55.44	345.0	979911.67	-32.99	0.04D	1.02	-43.88	-43.19
LIV66	B233	37	34.61	121	51.82	273.1	979914.45	-27.00	0.23D	1.68	-34.75	-34.26
LIV67	G633	37	35.68	121	49.10	613.0	979896.50	-14.53	0.42D	1.56	-34.14	-32.89
LIV68	G633	37	35.12	121	51.00	672.0	979886.37	-18.30	0.44D	1.86	-39.65	-38.29
LIV69	G633	37	37.05	121	50.28	898.0	979871.96	-14.26	1.28D	2.80	-42.46	-40.66
LIV70	G633	37	37.70	121	49.83	1289.0	979845.01	-5.37	1.78D	4.76	-45.09	-42.57
LIV71	G633	37	37.81	121	49.67	1228.0	979849.28	-7.00	1.57D	4.17	-45.21	-42.78
LIV72	V433	37	37.86	121	50.20	1264.0	979846.04	-6.93	1.59D	4.54	-46.01	-43.52
LIV73	G633	37	38.15	121	50.32	1105.0	979857.01	-11.34	1.45D	3.50	-45.98	-43.77
LIV74	G633	37	38.34	121	50.46	1005.0	979863.71	-14.32	0.99D	2.67	-46.34	-44.30
LIV75	G633	37	37.79	121	50.64	1104.0	979856.40	-11.51	1.43D	3.60	-46.01	-43.82
LIV76	G633	37	37.34	121	49.56	1284.0	979846.35	-3.98	1.61D	4.67	-43.62	-41.10
LIV77	T633	37	37.25	121	49.37	1241.0	979850.97	-3.27	0.88D	3.68	-42.42	-39.92
LIV78	T633	37	34.46	121	51.05	315.0	979909.25	-28.03	0.13D	1.87	-37.05	-36.47
LIV79	C633	37	34.63	121	51.39	280.0	979911.54	-29.28	0.34D	1.94	-37.01	-36.52
LIV80	G633	37	34.60	121	50.69	562.0	979894.28	-19.98	0.97D	2.25	-37.13	-36.04
LIV81	C833	37	34.60	121	50.63	485.0	979900.16	-21.33	0.20D	1.49	-36.59	-35.62
LIV82	D533	37	35.05	121	47.34	521.0	979912.32	-6.45	0.16D	2.12	-22.32	-21.31
LIV83	B233	37	34.78	121	48.24	509.7	979910.45	-8.98	0.05D	1.81	-24.77	-23.77
LIV84	P533	37	34.03	121	48.00	597.1	979907.76	-2.37	0.44D	3.38	-19.61	-18.51
LIV85	G633	37	34.33	121	49.15	736.0	979888.31	-9.19	0.49D	2.16	-32.45	-30.97
LIV86	B133	37	34.18	121	46.98	928.6	979891.02	11.87	0.32D	2.64	-17.55	-15.67
LIV87	G633	37	32.70	121	46.59	1954.0	979824.63	44.06	1.41D	5.43	-17.90	-13.96
LIV88	G633	37	32.00	121	45.52	3024.0	979751.95	73.01	2.57D	12.21	-18.97	-13.11
LIV89	F633	37	32.01	121	44.49	3270.0	979735.16	79.33	3.62D	14.08	-19.22	-12.95
LIV90	E 33	37	33.05	121	58.12	82.0	979940.18	-16.97	0.11D	1.09	-18.72	-18.61
LIV91	D533	37	33.71	121	57.29	112.0	979939.78	-15.51	0.07D	1.51	-17.87	-17.72
LIV92	B133	37	34.66	121	58.34	96.2	979945.18	-12.98	0.42D	2.07	-14.23	-14.15
LIV93	B133	37	35.07	121	57.86	141.1	979939.15	-15.38	2.44D	4.94	-15.31	-15.32
LIV94	B133	37	35.87	121	56.72	160.6	979935.50	-18.36	1.42D	5.39	-18.52	-18.51
LIV95	E 33	37	36.52	121	56.64	403.0	979919.03	-12.97	3.95D	8.06	-18.83	-18.46
LIV96	E 33	37	36.89	121	56.45	626.0	979906.98	-4.58	2.26D	5.73	-20.46	-19.45
LIV97	E 33	37	37.31	121	56.58	803.0	979897.50	1.98	2.08D	5.07	-20.68	-19.24
LIV98	F433	37	38.70	121	57.94	1217.0	979877.65	19.05	0.41D	2.27	-20.68	-18.15
LIV99	D533	37	39.16	121	58.96	716.0	979909.29	2.91	1.22D	3.81	-18.01	-16.67
LV100	E 33	37	40.87	122	0.92	417.0	979933.20	-3.81	0.54D	2.19	-16.02	-15.24

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
LV101	D433	37	32.74	121	51.39	356.0	979913.06	-17.87	0.24D	3.35	-26.82	-26.25
LV102	B133	37	32.15	121	51.11	342.4	979913.00	-18.35	0.44D	4.47	-25.71	-25.24
LV103	F433	37	31.84	121	51.10	376.0	979911.10	-16.64	1.30D	5.64	-23.99	-23.52
LV104	D433	37	31.22	121	50.81	533.0	979900.30	-11.78	2.22D	7.05	-23.13	-22.41
LV105	D433	37	30.68	121	50.28	791.4	979886.84	-0.14	1.25D	4.68	-22.78	-21.34
LV106	T533	37	30.36	121	47.92	775.0	979889.82	1.77	0.66D	5.55	-19.43	-18.08
LV107	T533	37	30.02	121	46.55	971.0	979875.81	6.69	0.62D	6.44	-20.39	-18.66
LV108	T533	37	30.24	121	49.15	467.0	979910.30	-6.56	0.74D	5.34	-17.35	-16.66
LV109	G533	37	32.58	121	49.42	1263.0	979863.43	18.05	1.43D	3.79	-21.75	-19.22
LV110	G533	37	33.09	121	50.48	1287.0	979851.13	7.26	1.46D	4.65	-32.51	-29.98
LV111	B133	37	35.66	121	53.24	260.9	979922.41	-21.71	0.16D	1.70	-29.02	-28.56
LV112	V533	37	34.82	121	51.81	433.0	979902.61	-24.08	0.84D	2.04	-36.99	-36.17
LV113	P434	37	35.71	121	51.77	306.0	979910.49	-29.45	0.21D	1.40	-38.62	-38.03
LV114	T633	37	36.58	121	51.04	479.0	979898.57	-26.36	0.05D	1.06	-41.85	-40.86
LV115	D433	37	36.61	121	49.37	588.0	979894.40	-20.33	0.25D	1.41	-39.22	-38.02
LV116	T633	37	36.33	121	46.89	1168.0	979863.75	3.98	0.51D	2.46	-33.87	-31.46
LV117	B133	37	37.19	121	45.18	580.1	979895.73	-20.58	0.25D	2.20	-38.41	-37.28
LV118	T633	37	36.63	121	45.78	1391.0	979848.85	9.62	0.57D	3.25	-35.13	-32.28
LV119	Q533	37	38.24	121	44.41	650.0	979890.82	-20.45	0.75D	1.99	-40.91	-39.60
LV120	F433	37	37.66	121	44.16	1109.0	979862.85	-4.41	0.88D	2.60	-40.09	-37.82
LV121	F433	37	39.39	121	44.91	586.0	979895.46	-23.50	0.04D	0.86	-42.88	-41.65
LV122	D433	37	38.75	121	47.28	447.9	979899.65	-31.36	0.02D	0.84	-45.99	-45.06
LV123	B134	37	39.12	121	48.27	422.0	979900.66	-33.33	0.02D	0.76	-47.15	-46.27
LV124	F434	37	39.24	121	48.55	415.0	979901.47	-33.36	0.03D	0.76	-46.94	-46.07
LV125	F434	37	39.34	121	49.19	428.0	979901.42	-32.33	0.02D	0.77	-46.34	-45.45
LV126	D334	37	39.35	121	48.25	420.0	979900.47	-34.05	0.02D	0.72	-47.84	-46.96
LV127	F434	37	39.95	121	48.28	411.0	979901.18	-35.06	0.02D	0.65	-48.60	-47.74
LV128	P334	37	39.75	121	48.28	416.0	979900.70	-34.78	0.04D	0.69	-48.46	-47.59
LV129	F434	37	39.36	121	47.69	440.0	979898.57	-34.07	0.02D	0.72	-48.55	-47.63
LV130	F434	37	39.36	121	46.92	482.0	979896.13	-32.57	0.04D	0.75	-48.47	-47.46
LV131	F434	37	40.37	121	46.76	475.0	979897.74	-33.09	0.01D	0.63	-48.86	-47.86
LV132	F434	37	40.18	121	46.77	481.0	979896.96	-33.02	0.02D	0.65	-48.98	-47.96
LV133	F434	37	40.80	121	44.83	535.0	979899.29	-26.52	0.02D	0.64	-44.36	-43.22
LV134	D434	37	41.38	121	44.75	530.0	979898.73	-28.37	0.02D	0.59	-46.08	-44.96
LV135	B234	37	41.04	121	45.86	491.4	979899.12	-31.12	0.01D	0.59	-47.51	-46.46
LV136	F434	37	41.09	121	48.80	410.0	979903.15	-34.83	0.01D	0.58	-48.41	-47.54
LV137	F434	37	41.17	121	50.19	365.0	979905.15	-37.18	0.05D	0.65	-49.13	-48.37
LV138	F434	37	41.15	121	50.83	355.0	979905.41	-37.83	0.03D	0.63	-49.46	-48.72
LV139	F434	37	40.92	121	50.96	367.0	979904.65	-37.13	0.01D	0.62	-49.19	-48.42
LV140	F434	37	40.92	121	51.28	362.0	979904.91	-37.34	0.01D	0.62	-49.23	-48.47
LV141	F434	37	40.92	121	51.69	353.0	979905.19	-37.90	0.01D	0.62	-49.47	-48.73
LV142	F434	37	41.29	121	51.69	354.0	979905.02	-38.53	0.01D	0.61	-50.15	-49.41
LV143	F434	37	40.92	121	52.21	350.0	979905.20	-38.18	0.05D	0.67	-49.60	-48.87
LV144	F434	37	40.57	121	52.37	343.0	979905.45	-38.08	0.01D	0.66	-49.27	-48.55
LV145	B134	37	39.33	121	49.55	438.0	979901.28	-31.51	0.14D	0.95	-45.69	-44.78
LV146	B134	37	39.88	121	50.45	424.8	979901.61	-33.23	0.06D	0.77	-47.13	-46.25
LV147	B133	37	35.44	121	57.34	122.3	979940.05	-16.78	0.87D	4.45	-16.55	-16.57
LV148	B133	37	36.03	121	52.55	267.9	979914.61	-29.39	0.14D	1.49	-37.15	-36.66
LV149	V433	37	40.24	121	51.47	359.0	979904.77	-36.76	0.02D	0.67	-48.49	-47.74
LV150	D433	37	41.55	121	53.08	340.0	979905.43	-39.81	0.25D	0.89	-50.66	-49.97

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND MGAL	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
LV151	F433	37	41.66	121	52.63	345.0	979905.46	-39.47	0.01D	0.62	-50.77	-50.05
LV152	F433	37	42.87	121	52.25	393.0	979906.79	-35.38	0.03D	0.66	-48.29	-47.47
LV153	V333	37	42.24	121	52.66	354.0	979905.86	-39.07	0.06D	0.66	-50.63	-49.90
LV154	T433	37	42.45	121	52.31	361.0	979906.20	-38.37	0.02D	0.63	-50.21	-49.45
LV155	G533	37	43.98	121	52.79	681.0	979892.07	-24.63	0.60D	1.43	-46.72	-45.31
LV156	G533	37	43.28	121	52.70	640.0	979891.33	-28.20	1.00D	1.91	-48.39	-47.10
LV157	F433	37	42.95	121	52.96	390.0	979906.25	-36.32	0.03D	0.65	-49.14	-48.32
LV158	T533	37	42.99	121	50.97	524.0	979900.68	-29.34	0.14D	0.81	-46.63	-45.53
LV159	T533	37	44.82	121	50.01	699.0	979901.34	-14.89	0.40D	1.25	-37.78	-36.32
LV160	D433	37	42.89	121	48.37	473.0	979904.69	-29.99	0.63D	1.35	-44.98	-44.03
LV161	D533	37	43.75	121	48.48	540.0	979907.98	-21.64	0.45D	1.26	-39.03	-37.92
LV162	F433	37	43.34	121	47.20	563.0	979902.29	-24.57	0.07D	0.68	-43.34	-42.14
LV163	F433	37	43.41	121	45.03	507.0	979906.75	-25.49	0.01D	0.55	-42.45	-41.37
LV164	F433	37	45.19	121	46.12	604.0	979911.06	-14.64	0.02D	0.75	-34.75	-33.47
LV165	F433	37	45.46	121	47.47	693.0	979903.53	-14.19	0.30D	1.04	-37.08	-35.62
LV166	F433	37	45.49	121	47.97	728.0	979901.44	-13.04	0.04D	0.76	-37.41	-35.86
LV167	F433	37	45.31	121	48.71	722.0	979900.65	-14.12	0.15D	0.95	-38.10	-36.57
LV168	B133	37	44.71	121	48.77	648.3	979903.36	-17.48	0.18D	1.07	-38.80	-37.44
LV169	T633	37	35.68	121	58.24	1012.0	979888.61	15.12	0.20D	2.96	-16.85	-14.82
LV170	G633	37	35.79	121	58.57	970.0	979891.44	13.84	0.29D	2.73	-16.91	-14.96
LV171	G633	37	36.47	121	58.40	1315.0	979869.53	23.39	0.96D	4.23	-17.76	-15.14
LV172	T633	37	36.45	121	57.51	1445.0	979857.81	23.92	0.88D	5.05	-20.89	-18.04
LV173	T633	37	37.21	121	57.77	1682.0	979846.35	33.65	0.56D	4.73	-19.64	-16.25
LV174	G633	37	37.58	121	57.60	1852.0	979834.35	37.10	1.18D	6.56	-20.22	-16.57
LV175	G633	37	37.42	121	58.40	1600.0	979852.35	31.63	0.83D	4.59	-18.98	-15.76
LV176	G633	37	37.11	121	58.61	1424.0	979864.16	27.34	0.80D	4.16	-17.64	-14.77
LV177	B133	37	34.77	121	58.92	64.0	979950.18	-11.17	0.24D	1.97	-11.42	-11.40
LV178	Q633	37	38.13	121	55.16	905.0	979886.28	-0.84	1.77D	4.72	-27.36	-25.67
LV179	B133	37	36.73	121	52.51	277.8	979913.67	-30.41	0.14D	1.68	-38.32	-37.82
LV180	B133	37	39.59	121	52.39	352.2	979905.35	-35.89	0.06D	0.85	-47.21	-46.49
LV181	V133	37	39.77	121	51.38	378.5	979904.07	-34.96	0.05D	0.77	-47.26	-46.48
LV182	B133	37	39.89	121	52.02	361.8	979904.44	-36.34	0.21D	0.92	-47.91	-47.18
LV183	F433	37	40.61	121	52.76	335.0	979905.73	-38.61	0.01D	0.71	-49.47	-48.78
LV184	F433	37	40.34	121	53.39	330.0	979905.97	-38.45	0.01D	0.83	-49.02	-48.35
LV185	D433	37	35.97	121	45.24	1458.0	979851.83	19.87	0.32D	2.70	-27.73	-24.70
LV186	D533	37	35.44	121	45.17	1630.0	979842.23	27.21	1.30D	4.81	-24.22	-20.94
LV187	G533	37	34.83	121	44.98	1287.0	979869.37	22.98	0.76D	3.07	-18.37	-15.73
LV188	F433	37	34.48	121	43.15	2017.0	979820.31	43.08	0.92D	5.88	-20.60	-16.55
LV189	F433	37	33.45	121	42.10	2426.0	979796.33	59.05	1.25D	7.54	-17.04	-12.20
LV190	G533	37	32.44	121	41.37	2966.0	979762.51	77.48	1.63D	9.49	-15.22	-9.32
LV191	D633	37	36.52	121	44.66	859.0	979883.31	-5.80	0.79D	2.88	-32.57	-30.87
LV192	N333	37	33.86	121	58.91	63.9	979946.63	-13.40	0.01D	1.02	-14.58	-14.51
LV193	D433	37	33.16	121	59.71	54.0	979946.77	-13.17	0.01D	0.84	-14.19	-14.13
LV194	T635	37	35.92	121	48.13	686.0	979893.04	-11.46	0.45D	1.64	-33.50	-32.10
LV195	P535	37	33.87	121	52.44	338.0	979918.93	-15.32	0.30D	1.82	-25.18	-24.55
LV196	P535	37	33.72	121	52.57	481.1	979910.34	-10.23	0.34D	1.78	-25.07	-24.12
LV197		37	40.26	121	50.96	367.5	979904.37	-36.39	0.15	0.80	-48.28	-47.52
LV198	A633	37	37.96	121	52.10	384.0	979902.73	-33.15	0.11D	1.21	-45.20	-44.43
LV199	A633	37	38.46	121	52.16	414.0	979901.29	-32.49	0.04D	0.99	-45.80	-44.95
LV200	A633	37	39.24	121	51.15	503.0	979896.69	-29.86	0.07D	0.86	-46.37	-45.32

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
LV201	A633	37	33.99	121	41.16	830.0	979892.84	4.69	0.52D	6.41	-17.55	-16.14
LV202	A633	37	36.06	121	41.28	1325.0	979864.63	20.03	0.70D	2.71	-22.99	-20.25
LV203	P433	37	44.40	121	54.77	426.0	979909.64	-31.64	0.07D	0.73	-45.63	-44.74
LV204	P433	37	44.68	121	55.81	423.0	979908.63	-33.35	0.11D	0.82	-47.14	-46.26
LV205	P333	37	44.25	121	55.46	403.0	979909.07	-34.17	0.10D	0.78	-47.31	-46.47
LV206	P333	37	43.86	121	55.71	361.0	979911.30	-35.32	0.01D	0.72	-47.07	-46.32
LV207	P333	37	43.45	121	56.14	382.0	979911.32	-32.73	0.01D	0.84	-45.09	-44.30
LV208	A633	37	43.95	121	50.15	569.0	979905.58	-21.61	0.24D	1.10	-40.16	-38.98
LV209	T533	37	42.35	121	43.75	525.0	979903.76	-25.24	0.00D	0.58	-42.80	-41.68
LV210	F533	37	42.60	121	42.65	547.0	979908.58	-18.71	0.00D	0.62	-36.98	-35.82
LV211	F433	37	43.62	121	43.37	530.0	979914.67	-15.71	0.00D	0.58	-33.43	-32.30
LV212	F433	37	44.92	121	44.75	607.0	979913.90	-11.13	0.01D	0.71	-31.38	-30.09
LV213	F433	37	45.08	121	44.75	643.0	979912.61	-9.26	0.04D	0.78	-30.68	-29.32
LV214	F433	37	43.03	121	42.88	540.0	979910.91	-17.67	0.00D	0.59	-35.73	-34.58
LV215	F433	37	43.67	121	42.58	555.0	979915.32	-12.78	0.01D	0.72	-31.22	-30.05
LV216	Q533	37	44.82	121	42.52	610.0	979919.59	-5.00	0.16D	1.19	-24.87	-23.61
LV217	N233	37	43.30	121	41.71	637.6	979910.77	-9.02	0.74D	1.57	-29.47	-28.17
LV218	N233	37	44.79	121	39.28	715.2	979919.55	4.90	0.67D	1.54	-18.25	-16.78
LV219	I333	37	44.32	121	40.16	731.0	979916.93	5.90	0.37D	1.27	-18.07	-16.54
LV220	F433	37	45.11	121	40.59	761.0	979917.01	6.20	0.16D	0.96	-19.12	-17.50
LV221	N233	37	39.59	121	40.14	831.9	979898.77	2.66	0.16D	1.35	-24.71	-22.97
LV222	N233	37	38.76	121	37.64	1281.6	979866.41	13.80	0.93D	3.10	-27.32	-24.71
LV223	N233	37	37.88	121	42.40	743.6	979897.88	-4.06	0.16D	1.69	-28.05	-26.52
LV224		37	34.23	121	56.59	475.0	979914.85	-7.05	1.67	3.41	-20.04	-19.21
LV225		37	33.90	121	55.76	641.0	979904.13	-1.68	0.18	1.63	-22.19	-20.88
LV226	G53	37	35.68	121	49.54	618.0	979895.85	-14.71	0.19D	1.32	-34.73	-33.45
HH826	P333	37	38.10	121	45.47	505.0	979897.27	-27.43	0.10D	1.31	-43.56	-42.53
HH843	P333	37	37.27	121	47.08	790.3	979879.10	-17.57	0.33D	1.40	-43.46	-41.81
HH862	P333	37	36.30	121	48.77	654.6	979892.36	-15.65	0.62D	1.66	-36.60	-35.26
HH865	P333	37	36.18	121	48.98	628.1	979893.85	-16.49	0.25D	1.29	-36.89	-35.59
HH866	P333	37	36.11	121	49.11	592.5	979896.33	-17.24	0.10D	1.15	-36.55	-35.32
HH868	P333	37	36.02	121	49.26	614.0	979894.92	-16.50	0.24D	1.30	-36.40	-35.13
HH870	P333	37	35.92	121	49.45	577.4	979897.44	-17.29	0.17D	1.24	-35.99	-34.80
HH871	P333	37	35.86	121	49.57	543.6	979899.64	-18.17	0.14D	1.21	-35.74	-34.62
HH873	P333	37	35.78	121	49.76	506.8	979901.87	-19.29	0.14D	1.21	-35.58	-34.54
HH875	P333	37	35.72	121	49.95	506.4	979902.21	-18.90	0.05D	1.12	-35.27	-34.23
HH877	P333	37	35.63	121	50.18	493.6	979902.00	-20.19	0.18D	1.25	-35.98	-34.98
HH879	P333	37	35.55	121	50.38	466.7	979903.46	-21.14	0.07D	1.15	-36.11	-35.15
HH881	P333	37	35.48	121	50.57	450.2	979903.98	-22.07	0.04D	1.13	-36.49	-35.57
HH884	P333	37	35.36	121	50.88	559.3	979895.28	-20.34	0.27D	1.37	-38.29	-37.14
HH887	P333	37	35.27	121	51.11	614.2	979890.33	-19.99	0.31D	1.57	-39.63	-38.38
HH888	P333	37	35.23	121	51.24	527.6	979895.57	-22.84	0.26D	1.38	-39.68	-38.61
HH891	P333	37	35.05	121	51.39	483.6	979898.72	-23.56	0.07D	1.21	-39.05	-38.06
HH892	P333	37	34.94	121	51.49	449.5	979901.33	-24.00	0.14D	1.31	-38.21	-37.31
HH894	P333	37	34.84	121	51.58	453.0	979901.22	-23.64	0.29D	1.49	-37.79	-36.89
HH899	P333	37	34.48	121	51.90	259.8	979917.72	-24.78	0.04D	1.54	-32.21	-31.74
HH900	P333	37	34.37	121	51.99	259.1	979919.72	-22.69	0.05D	1.57	-30.07	-29.60
HH902	P333	37	34.27	121	52.09	269.5	979921.13	-20.16	0.02D	1.52	-27.95	-27.45
HH912	P335	37	33.55	121	52.72	505.6	979909.59	-8.43	0.32D	1.79	-24.10	-23.10
CPOA		37	42.59	121	54.54	342.5	979908.22	-38.28	0.01	0.67	-49.44	-48.73

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND MGAL	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
CP01		37	42.68	121	54.54	345.1	979908.15	-38.24	0.01	0.67	-49.49	-48.77
CP02		37	42.68	121	54.50	348.1	979907.95	-38.15	0.01	0.66	-49.52	-48.79
CP03		37	42.68	121	54.45	349.9	979907.79	-38.15	0.00	0.65	-49.58	-48.85
CP04		37	42.68	121	54.41	351.2	979907.66	-38.15	0.00	0.65	-49.64	-48.91
CP05		37	42.68	121	54.36	352.8	979907.54	-38.12	0.00	0.64	-49.66	-48.93
CP06		37	42.68	121	54.32	353.9	979907.43	-38.13	0.00	0.64	-49.71	-48.97
CP07		37	42.68	121	54.28	355.2	979907.36	-38.08	0.00	0.64	-49.70	-48.96
CP08		37	42.68	121	54.23	355.9	979907.31	-38.06	0.00	0.64	-49.71	-48.97
CP09		37	42.68	121	54.19	358.6	979907.14	-37.98	0.00	0.64	-49.73	-48.98
CP10		37	42.68	121	54.14	356.7	979907.26	-38.04	0.00	0.64	-49.72	-48.98
CP11		37	42.68	121	54.10	353.8	979907.45	-38.12	0.00	0.64	-49.70	-48.96
CP12		37	42.68	121	54.05	350.7	979907.64	-38.22	0.00	0.64	-49.70	-48.97
CP13		37	42.68	121	54.01	349.6	979907.66	-38.30	0.00	0.64	-49.74	-49.02
CP14		37	42.68	121	53.97	348.0	979907.76	-38.35	0.00	0.64	-49.74	-49.01
CP15		37	42.68	121	53.92	347.6	979907.78	-38.37	0.00	0.63	-49.74	-49.02
CP16		37	42.68	121	53.88	349.2	979907.69	-38.31	0.00	0.63	-49.74	-49.01
CP17		37	42.67	121	53.88	350.3	979907.62	-38.26	0.00	0.63	-49.73	-49.00
CP18		37	42.67	121	53.83	348.9	979907.68	-38.34	0.00	0.63	-49.76	-49.03
CP19		37	42.67	121	53.79	349.5	979907.60	-38.36	0.00	0.63	-49.80	-49.07
CP20		37	42.67	121	53.75	350.2	979907.53	-38.36	0.00	0.63	-49.83	-49.10
CP21		37	42.67	121	53.72	350.6	979907.50	-38.36	0.00	0.63	-49.84	-49.11
CP22		37	42.67	121	53.69	351.4	979907.41	-38.37	0.00	0.63	-49.88	-49.15
CP23		37	42.67	121	53.65	352.8	979907.31	-38.34	0.00	0.63	-49.90	-49.16
CP24		37	42.67	121	53.61	354.2	979907.20	-38.32	0.00	0.63	-49.92	-49.19
CP26		37	42.68	121	54.60	343.3	979908.43	-38.13	0.00	0.66	-49.32	-48.61
RE01		37	40.21	121	51.44	361.6	979904.66	-36.58	0.02	0.68	-48.40	-47.64
RE02		37	40.21	121	51.38	363.0	979904.62	-36.49	0.02	0.68	-48.35	-47.60
RE03		37	40.22	121	51.32	364.4	979904.58	-36.41	0.02	0.68	-48.33	-47.57
RE04		37	40.23	121	51.26	365.8	979904.50	-36.38	0.02	0.67	-48.34	-47.58
RE05		37	40.25	121	51.20	367.2	979904.44	-36.33	0.02	0.67	-48.35	-47.58
RE06		37	40.25	121	51.14	368.6	979904.39	-36.25	0.02	0.67	-48.31	-47.54
RE07		37	40.25	121	51.08	370.0	979904.35	-36.16	0.02	0.67	-48.27	-47.50
RE09		37	40.27	121	50.90	371.0	979904.25	-36.20	0.03	0.68	-48.33	-47.56
RE10		37	40.27	121	50.84	371.5	979904.25	-36.15	0.03	0.68	-48.30	-47.52
RE11		37	40.28	121	50.78	372.0	979904.24	-36.13	0.03	0.68	-48.29	-47.52
RE12		37	40.29	121	50.71	372.5	979904.27	-36.06	0.03	0.68	-48.25	-47.47
RE13		37	40.30	121	50.65	373.0	979904.26	-36.04	0.02	0.67	-48.25	-47.48
RE14		37	40.31	121	50.59	373.5	979904.34	-35.93	0.02	0.67	-48.16	-47.38
RE15		37	40.32	121	50.53	374.0	979904.41	-35.83	0.02	0.67	-48.07	-47.29
RE16		37	40.33	121	50.45	374.5	979904.48	-35.73	0.02	0.67	-47.99	-47.21
RE17		37	40.34	121	50.38	375.0	979904.60	-35.57	0.02	0.67	-47.86	-47.07
RE18		37	40.35	121	50.31	375.0	979904.71	-35.48	0.02	0.67	-47.76	-46.98
RE19		37	40.36	121	50.25	375.0	979904.85	-35.35	0.02	0.67	-47.64	-46.85
RE20		37	40.37	121	50.17	375.0	979904.95	-35.27	0.01	0.66	-47.56	-46.78
RE21		37	40.38	121	50.10	375.0	979904.98	-35.25	0.01	0.66	-47.55	-46.77
RE22		37	40.39	121	50.03	375.0	979905.00	-35.25	0.01	0.65	-47.54	-46.76
RW01		37	40.20	121	51.50	360.2	979904.66	-36.70	0.03	0.69	-48.45	-47.71
RW02		37	40.18	121	51.55	360.2	979904.70	-36.63	0.03	0.69	-48.38	-47.63
RW03		37	40.17	121	51.59	360.2	979904.73	-36.59	0.02	0.68	-48.35	-47.60
RW04		37	40.15	121	51.64	360.2	979904.72	-36.57	0.02	0.68	-48.33	-47.58

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND MGAL	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
RW05		37	40.14	121	51.69	360.2	979904.64	-36.63	0.02	0.69	-48.39	-47.64
RW06		37	40.12	121	51.75	360.2	979904.59	-36.65	0.04	0.71	-48.39	-47.64
RW07		37	40.10	121	51.78	360.2	979904.65	-36.56	0.03	0.70	-48.31	-47.56
RW08		37	40.08	121	51.81	360.9	979904.65	-36.47	0.03	0.70	-48.23	-47.48
RW09		37	40.05	121	51.84	361.7	979904.63	-36.37	0.05	0.74	-48.13	-47.38
RW10		37	40.03	121	51.88	362.5	979904.60	-36.30	0.03	0.72	-48.10	-47.35
RW11		37	40.01	121	51.92	363.3	979904.49	-36.30	0.03	0.73	-48.13	-47.37
RW12		37	39.98	121	51.95	364.1	979904.42	-36.25	0.05	0.75	-48.08	-47.33
RW13		37	39.95	121	51.98	364.9	979904.32	-36.24	0.04	0.74	-48.10	-47.34
RW14		37	39.92	121	52.01	365.7	979904.22	-36.22	0.13	0.84	-48.01	-47.26
RW15		37	39.89	121	52.04	366.2	979904.10	-36.25	0.25	0.96	-47.93	-47.19
RW16	I43	37	39.87	121	52.08	370.5	979904.47	-35.44	0.08D	0.79	-47.45	-46.68
RW17	I43	37	39.85	121	52.10	370.5	979904.54	-35.34	0.09D	0.81	-47.33	-46.57
RW18	I43	37	39.83	121	52.13	370.5	979904.56	-35.29	0.06D	0.78	-47.31	-46.55
RW19	I43	37	39.81	121	52.16	370.5	979904.64	-35.19	0.03D	0.75	-47.23	-46.46
RW20	I43	37	39.78	121	52.18	370.5	979904.61	-35.17	0.03D	0.76	-47.21	-46.45
RW21	I43	37	39.76	121	52.21	370.5	979904.59	-35.16	0.04D	0.77	-47.19	-46.42
RW22	I43	37	39.73	121	52.24	370.5	979904.63	-35.08	0.04D	0.78	-47.10	-46.33
RW23	I43	37	39.71	121	52.26	369.5	979904.67	-35.10	0.04D	0.79	-47.07	-46.31
RW25	I43	37	39.66	121	52.31	365.6	979904.91	-35.16	0.03D	0.79	-46.99	-46.24
RW26	I43	37	39.64	121	52.33	363.7	979905.09	-35.13	0.03D	0.80	-46.89	-46.14
RW27	I43	37	39.62	121	52.36	361.8	979905.24	-35.13	0.04D	0.81	-46.81	-46.07
RW28	I43	37	39.59	121	52.39	359.9	979905.36	-35.14	0.04D	0.82	-46.75	-46.01
RW29	I43	37	39.57	121	52.41	357.9	979905.47	-35.19	0.04D	0.83	-46.72	-45.99
RW30	I43	37	39.55	121	52.44	356.0	979905.61	-35.20	0.04D	0.83	-46.66	-45.93
RW31	I43	37	39.52	121	52.47	354.1	979905.75	-35.20	0.04D	0.85	-46.58	-45.86
RW32	I43	37	39.50	121	52.49	352.1	979905.89	-35.22	0.04D	0.85	-46.52	-45.80
RW33	I43	37	39.48	121	52.52	350.2	979906.04	-35.21	0.05D	0.87	-46.44	-45.73
RW34	I43	37	39.45	121	52.55	348.3	979906.17	-35.22	0.06D	0.89	-46.36	-45.65
RW35	I43	37	39.43	121	52.57	346.4	979906.34	-35.20	0.06D	0.89	-46.27	-45.57
RW36	I43	37	39.41	121	52.59	344.4	979906.44	-35.26	0.06D	0.91	-46.24	-45.54
RW37	I43	37	39.38	121	52.62	342.5	979906.49	-35.34	0.07D	0.93	-46.24	-45.55
RW38	I43	37	39.36	121	52.65	340.5	979906.56	-35.43	0.07D	0.95	-46.24	-45.55
RW39	I43	37	39.34	121	52.67	338.5	979906.60	-35.55	0.06D	0.94	-46.31	-45.62
RW40	I43	37	39.32	121	52.69	336.5	979906.65	-35.66	0.05D	0.93	-46.35	-45.67
RW41	I43	37	39.29	121	52.72	334.5	979906.67	-35.79	0.05D	0.95	-46.39	-45.72
RW42	I43	37	39.26	121	52.74	333.5	979906.68	-35.83	0.05D	0.95	-46.39	-45.72
RW43	I43	37	39.25	121	52.77	333.5	979906.65	-35.84	0.05D	0.96	-46.40	-45.73
RW44	I43	37	39.21	121	52.79	333.5	979906.61	-35.82	0.05D	0.97	-46.37	-45.70
RW45	I43	37	39.18	121	52.81	333.5	979906.55	-35.84	0.05D	0.95	-46.41	-45.74
RW46	I43	37	39.16	121	52.84	333.5	979906.51	-35.85	0.04D	0.97	-46.40	-45.72
RW47	I43	37	39.13	121	52.86	333.5	979906.49	-35.83	0.04D	0.98	-46.36	-45.69
RW48	I43	37	39.10	121	52.88	333.5	979906.44	-35.83	0.05D	1.00	-46.35	-45.68
RW49	I43	37	39.08	121	52.91	333.5	979906.37	-35.87	0.05D	1.01	-46.38	-45.71
RW50	I43	37	39.05	121	52.93	334.5	979906.30	-35.81	0.05D	1.03	-46.33	-45.66
SLE01	I434	37	35.66	121	53.22	266.0	979922.26	-21.37	0.04D	1.58	-28.98	-28.49
SLE02	I434	37	35.68	121	53.20	265.6	979922.09	-21.61	0.05D	1.59	-29.19	-28.71
SLE03	I434	37	35.70	121	53.17	265.2	979921.96	-21.81	0.05D	1.58	-29.39	-28.90
SLE04	I434	37	35.73	121	53.14	264.8	979921.78	-22.07	0.07D	1.61	-29.61	-29.13
SLE05	I434	37	35.76	121	53.11	264.4	979921.57	-22.36	0.09D	1.63	-29.87	-29.39

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND MGAL	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
SLE06	I434	37	35.78	121	53.08	264.0	979921.38	-22.62	0.10D	1.63	-30.11	-29.63
SLE07	I434	37	35.80	121	53.06	264.0	979921.13	-22.90	0.15D	1.67	-30.35	-29.87
SLE08	I434	37	35.82	121	53.04	264.0	979920.87	-23.18	0.16D	1.68	-30.62	-30.14
~~SLE09~~	~~I434~~	~~37~~	~~35.84~~	~~121~~	~~52.80~~	~~264.0~~	~~979920.59~~	~~-23.50~~	~~0.17D~~	~~1.44~~	~~-31.18~~	~~-30.69~~
SLE10	I434	37	35.87	121	52.97	264.0	979920.30	-23.83	0.14D	1.64	-31.31	-30.83
SLE11	I434	37	35.89	121	52.95	264.0	979919.96	-24.20	0.13D	1.63	-31.69	-31.21
SLE12	I434	37	35.92	121	52.92	264.0	979919.62	-24.58	0.15D	1.65	-32.05	-31.58
SLE13	I434	37	35.94	121	52.89	265.0	979919.23	-24.90	0.15D	1.63	-32.42	-31.94
SLE14	I434	37	35.95	121	52.86	266.1	979918.79	-25.25	0.16D	1.62	-32.82	-32.34
SLE15	I434	37	35.96	121	52.82	267.1	979918.31	-25.66	0.14D	1.59	-33.30	-32.81
SLE16	I434	37	35.97	121	52.78	268.1	979917.79	-26.09	0.14D	1.57	-33.78	-33.29
SLE17	I434	37	35.98	121	52.74	269.1	979917.16	-26.64	0.18D	1.59	-34.34	-33.85
SLE18	I434	37	35.98	121	52.70	270.2	979916.43	-27.28	0.21D	1.60	-35.01	-34.52
SLE19	I434	37	35.99	121	52.66	271.2	979915.66	-27.96	0.26D	1.64	-35.69	-35.20
SLE20	I434	37	36.01	121	52.62	271.6	979914.98	-28.64	0.30D	1.67	-36.35	-35.86
SLE21	I434	37	36.02	121	52.59	272.0	979914.62	-28.97	0.33D	1.69	-36.67	-36.18
SLE22	I434	37	36.04	121	52.56	272.4	979914.31	-29.28	0.17D	1.53	-37.16	-36.66
SLE23	I434	37	36.06	121	52.54	272.8	979914.00	-29.58	0.14D	1.50	-37.51	-37.00
SLE24	I434	37	36.08	121	52.52	273.3	979914.03	-29.53	0.15D	1.50	-37.47	-36.97
SLE25		37	36.14	121	52.51	271.6	979913.92	-29.88	0.25	1.62	-37.64	-37.15
SLE26		37	36.18	121	52.50	272.1	979913.80	-30.02	0.25	1.63	-37.79	-37.29
SLE27		37	36.22	121	52.50	272.5	979913.71	-30.13	0.26	1.65	-37.89	-37.40
SLE28		37	36.26	121	52.50	273.2	979913.60	-30.23	0.22	1.63	-38.04	-37.54
SLE29		37	36.30	121	52.50	274.0	979913.53	-30.28	0.18	1.60	-38.15	-37.65
SLE30		37	36.34	121	52.50	274.8	979913.56	-30.24	0.14	1.57	-38.16	-37.66
SLE31		37	36.37	121	52.50	275.6	979913.51	-30.25	0.30	1.74	-38.03	-37.54
SLE32		37	36.41	121	52.50	276.1	979913.56	-30.22	0.31	1.76	-38.00	-37.50
SLE33		37	36.51	121	52.49	276.2	979913.61	-30.30	0.36	1.84	-38.00	-37.51
SLE34		37	36.54	121	52.49	275.8	979913.69	-30.30	0.28	1.77	-38.06	-37.56
SLE35		37	36.57	121	52.49	275.4	979913.73	-30.34	0.22	1.72	-38.13	-37.64
SLE36		37	36.60	121	52.48	274.9	979913.83	-30.34	0.16	1.66	-38.17	-37.67
SLE37		37	36.63	121	52.49	275.3	979913.89	-30.28	0.16	1.67	-38.12	-37.62
SLE38		37	36.66	121	52.50	276.3	979913.94	-30.18	0.15	1.67	-38.05	-37.55
SLE39		37	36.69	121	52.51	277.3	979913.89	-30.18	0.14	1.67	-38.08	-37.58
SLE40		37	36.73	121	52.52	278.4	979913.84	-30.19	0.15	1.70	-38.11	-37.61
SLW01		37	35.65	121	53.28	263.3	979922.70	-21.17	0.04	1.62	-28.64	-28.16
SLW02		37	35.63	121	53.33	261.6	979922.96	-21.05	0.06	1.68	-28.41	-27.94
SLW03		37	35.63	121	53.37	259.7	979923.17	-21.02	0.12	1.78	-28.22	-27.76
SLW04		37	35.63	121	53.41	257.9	979923.32	-21.03	0.09	1.79	-28.15	-27.70
SLW05		37	35.63	121	53.45	256.1	979923.55	-20.97	0.14	1.88	-27.94	-27.49
SLW06		37	35.64	121	53.49	254.3	979923.79	-20.91	0.16	1.96	-27.74	-27.30
SLW07		37	35.64	121	53.53	252.5	979924.06	-20.82	0.23	2.08	-27.47	-27.04
SLW08		37	35.64	121	53.57	250.7	979924.28	-20.77	0.25	2.15	-27.28	-26.87
SLW09		37	35.64	121	53.60	248.7	979924.52	-20.72	0.29	2.23	-27.08	-26.68
SLW10		37	35.65	121	53.64	247.4	979924.86	-20.51	0.32	2.32	-26.74	-26.34
SLW11		37	35.65	121	53.68	246.0	979925.20	-20.30	0.34	2.39	-26.41	-26.02
SLW12		37	35.66	121	53.72	244.6	979925.57	-20.08	0.39	2.51	-26.02	-25.65
SLW13		37	35.66	121	53.76	243.4	979925.70	-20.06	0.42	2.59	-25.88	-25.50
SLW14		37	35.67	121	53.80	242.0	979925.89	-20.02	0.51	2.76	-25.62	-25.26
SLW15		37	35.67	121	53.83	240.7	979925.92	-20.11	0.69	2.99	-25.44	-25.10

TABLE 1--CONTINUED

STATION	CODE	LATITUDE DEG	LATITUDE MIN	LONGITUDE DEG	LONGITUDE MIN	ELEVATION FEET	OBSERVED GRAVITY MGAL	FREE AIR (1930) MGAL	TERRAIN HAND MGAL	TERRAIN TOTAL MGAL	BOUGUER ANOMALY 2.67 MGAL	BOUGUER ANOMALY 2.50 MGAL
SLW16		37	35.68	121	53.87	239.3	979925.96	-20.21	0.83	3.20	-25.28	-24.95
SLW17		37	35.69	121	53.90	238.0	979926.12	-20.19	0.95	3.39	-25.02	-24.72
SLW18		37	35.70	121	54.02	233.0	979926.40	-20.40	1.09	3.77	-24.68	-24.40
SLW19		37	35.75	121	54.11	229.2	979926.68	-20.55	1.32	4.28	-24.19	-23.96
SLW20		37	35.76	121	54.18	227.3	979926.96	-20.46	1.17	4.27	-24.04	-23.81
SLW21		37	35.75	121	54.27	223.8	979927.28	-20.46	1.44	4.66	-23.53	-23.34
SLW22		37	35.73	121	54.36	220.3	979927.98	-20.06	1.54	4.82	-22.85	-22.67
SLW23		37	35.69	121	54.46	218.1	979928.47	-19.72	1.04	4.35	-22.91	-22.70
SLW24		37	35.67	121	54.55	220.3	979928.54	-19.41	1.14	4.50	-22.52	-22.32
SLW25		37	35.64	121	54.64	219.9	979928.69	-19.25	1.11	4.57	-22.28	-22.08
SLW26		37	35.64	121	54.74	218.6	979929.14	-18.93	0.89	4.48	-22.00	-21.80
SLW27		37	35.67	121	54.84	217.5	979929.33	-18.88	1.11	4.82	-21.57	-21.40
SLW28		37	35.70	121	54.91	216.2	979929.50	-18.88	0.89	4.67	-21.68	-21.50
SLW29		37	35.76	121	55.01	214.8	979929.75	-18.85	1.09	4.98	-21.29	-21.13
SLW30		37	35.83	121	55.10	213.6	979929.96	-18.85	0.84	4.84	-21.39	-21.23
SLW31		37	35.89	121	55.19	212.7	979930.27	-18.71	0.76	4.92	-21.14	-20.99
SLW32		37	35.93	121	55.28	211.5	979930.47	-18.68	0.69	4.98	-21.01	-20.86
SLW33		37	35.95	121	55.51	208.0	979930.40	-19.11	1.48	5.75	-20.55	-20.46