

Final Technical Report

Collaborative Research

(Tennessee Division of Geology and Vanderbilt University): Gravity Survey in the New Madrid Seismic Zone, 7/1/92 to 6/30/95

NEHRP Program Element I, Objective 3.2

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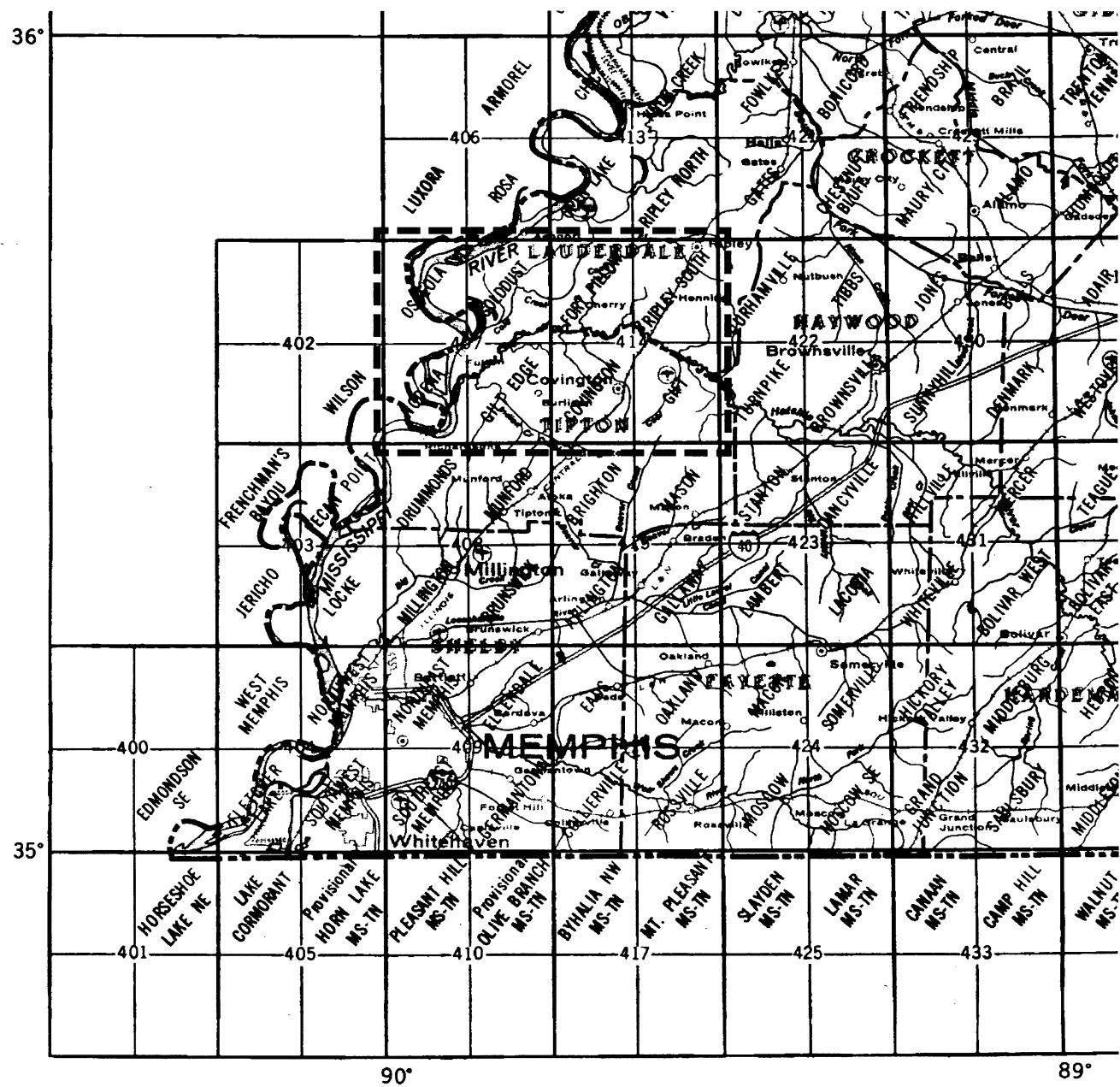
Investigations

We have performed a gravity survey of all of five and parts of three 7.5-minute quadrangles near the Mississippi River, north of Latitude 35.5 degrees and west of Longitude 89.5 degrees in Lauderdale and Tipton counties, Tennessee (Figure 1). We also filled gaps in present coverage north of Latitude 35.75 degrees near the Mississippi River. Former coverage included all of the area of the Mississippi Valley Graben (MVG) north of Latitude 35.75 degrees (over fifty 7.5- minute quadrangles); some of this work was published and some is in preparation.

This project has resulted in coverage of all of the area of the MVG in Tennessee. The 1.5 km station spacing is about the same as the one mile spacing between flight lines in existing aeromagnetic maps. The eight quadrangle area of new coverage includes the edge of the MVG where it crosses the Mississippi River, the Chickasaw Bluffs lineament (a likely fault parallel to and close to the edge of the MVG) and other lineaments relating to that feature, and the magnetic high marking the Covington pluton, one of several plutons believed to be related to the edge of the MVG.

The gaps in former coverage were in areas that were difficult to approach, because they were in large farms, swampy areas, or isolated by such river-related features as sloughs or chutes. Reelfoot Lake (tectonically sunk during the 1811 earthquake) is mostly a large swamp accessible only by boat, and many of the areas near the Mississippi river can be best (or only) approached by boat. Gaps were important because they tended to be in areas of land subsidence (such as Reelfoot Lake), or were near suspected faults (such as straight reaches of rivers).

Figure 1. Location of the Gravity Survey



The completed survey consists of more than 250 new stations, plus more than 70 reoccupations of old stations (Figure 2). There were already about 20 stations in each quadrangle (for which we had full original records). We also customarily reoccupied one or more old stations during each loop to check for bad loops. For fill-in surveys more reoccupations were needed.

There were four base stations in or near the project survey areas. Gravity stations were occupied using loops and data was reduced in the usual manner. Observed gravity was better than 0.3 mgal standard deviation. Relatively low relief made it possible for standard deviation of Bouguer anomaly to be near the same low value.

Results

Background

Gravity surveys have been made in the project area by Vanderbilt University since 1967 (Smith, 1967). This survey was incorporated into the regional survey of West Tennessee supported by the U. S. Geological Survey (USGS). Station spacing for this survey was about two miles (15-20 stations in each 7.5-minute quadrangle). Vanderbilt surveyed the area of West Tennessee west of 89 degrees Longitude and University of Kentucky (G. R. Keller, now at the University of Texas-El Paso) surveyed West Tennessee from 88-89 degrees Longitude. A regional map (Hildebrand and others, 1977) published by USGS and a map of West Tennessee (Stearns, Keller, and Templeton, 1980) published by the Tennessee Division of Geology resulted from this survey.

Soon after (1979-1982) more detailed surveys were made in the area working outward from the area of Reelfoot Lake in the northwest corner of Tennessee. A detailed gravity map was published by the Tennessee Division of Geology of the area close to Reelfoot Lake (Stearns, 1980). Surveys supported by the US Nuclear Regulatory Commission were published in NUREG documents (Keller, 1980; Stearns, 1986 and 1987).

These surveys used a variety of bases, and had sufficient data problems that Stearns judged that a thorough editing and possible recalculation was warranted. This task was carried on along with limited field work, including surveys of several quadrangles to square up the survey area. Once the editing job was completed, a project to make maps of the large area began with G. R. Keller at the University of Texas-El Paso, who had surveyed the area east of 89 degrees Longitude in 1978.

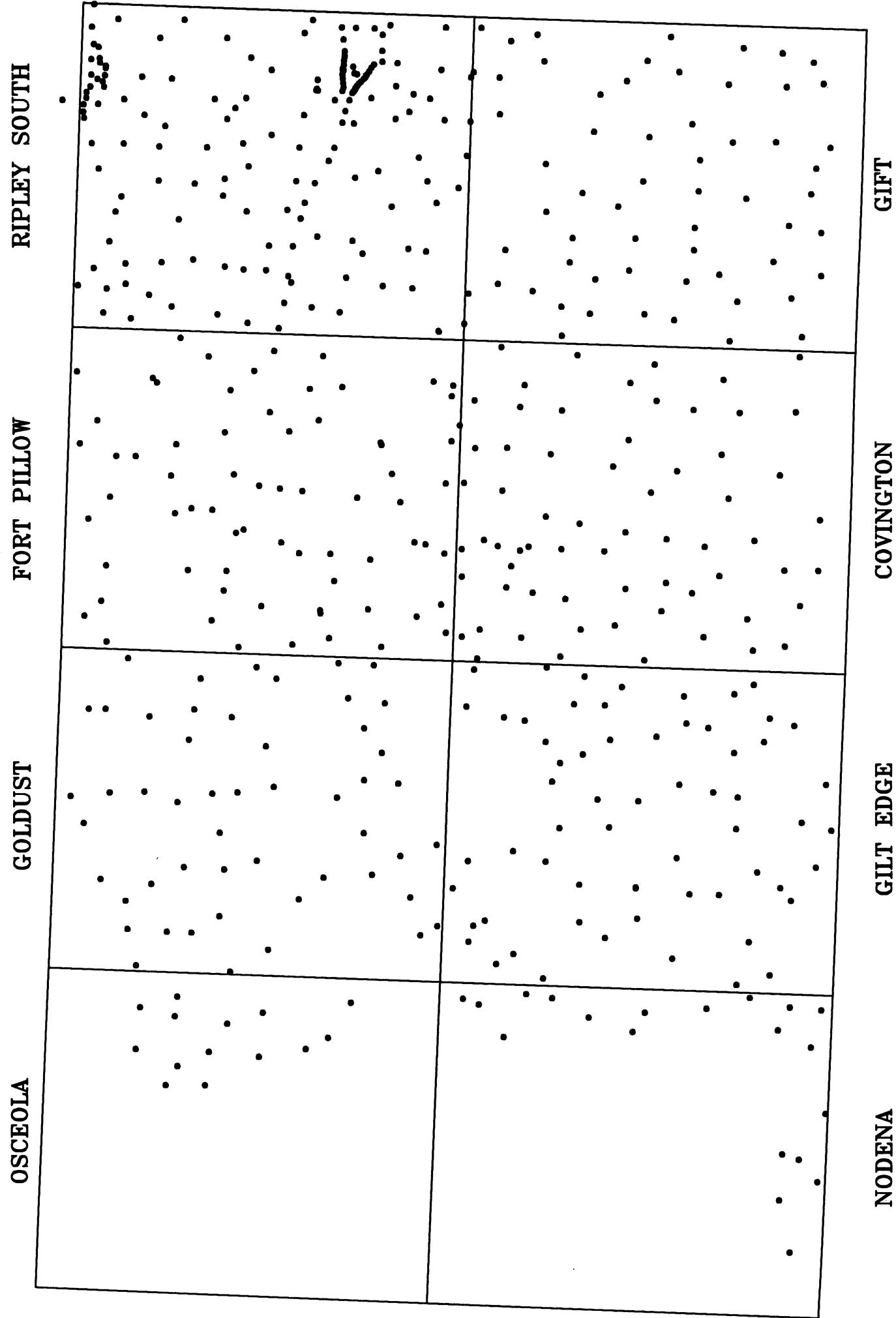
Recent Work

During this project we completed surveys in thirteen 7.5-minute quadrangles near the Covington Pluton. These quadrangles now have stations spaced about 1 mile apart. In seven quadrangles the survey began with only ten to twenty stations that were surveyed in the 1960s and 70s. The seven quads are:

Covington
Fort Pillow
Gift
Gilt Edge
Golddust
Nodena
Osceola

Most new stations were surveyed in these seven quadrangles.

Figure 2. Location of Gravity Stations



In six quadrangles only a few stations were needed in each to fill in gaps. Gaps occurred where access is difficult, so it took longer per station. We filled gaps in the following:

Fowlkes
Gates
Knob Creek
Open Lake
Ripley North
Ripley South

A total of 334 stations were occupied. Of these, 73 were reoccupations; 261 new stations were surveyed. Field work and initial computer reduction of data was done by Stearns, Vanderbilt University students Amy Reesman and Clay Manley, and Middle Tennessee State University student Russ Staggs. Editing of the gravity stations in the newly-surveyed area was done based on reoccupation comparisons, and by recognition of problem stations from anomalous contours on the maps. The source of most problems was error in measuring or entering elevations or locations.

Field maps, field sheets, and computer files are all stored at Vanderbilt University.

References Cited

- Hildebrand, T. C., Stearns, R. G., and others, 1977, Bouguer gravity map of the Northern Mississippi Embayment, parts of Missouri, Arkansas, Tennessee, Kentucky and Illinois, U. S. Geological Survey Open File, Map No. 77-228.
- Keller, G. R. and others, 1980, Bouguer gravity anomaly map of the east-central Midcontinent of the United States, U.S. Nuclear Regulatory Commission, NUREG/CR-1663, 12 p. with map, scale 1:1,000,000.
- Smith, J. R., 1967, The Covington Pluton, unpublished Master's Thesis, Vanderbilt University, Nashville, Tennessee.
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- Stearns, R. G., 1980, Gravity anomaly map of the Reelfoot Lake Area, Tennessee (including a portion of southwest Missouri), Tennessee Division of Geology, scale 1:62,500.
- Stearns, R. G., 1986, Post-Eocene fault near east edge of Reelfoot Rift in Lauderdale County, Tennessee, (with S. L. Wilson and S. J. Naval), U. S. Nuclear Regulatory Commission, NUREG/CR-4702, 36 p.
- Stearns, R. G., 1986, One-dimensional gravity calculation and paleozoic structure and plutons at Reelfoot Scarp, (with S. L. Wilson), U. S. Nuclear Regulatory Commission, NUREG/CR-4703, 43 p.
- Stearns, R. G., 1987, An integrated geological, geophysical and geochemical investigation of the major fractures on the east side of the New Madrid Earthquake Zone, (with A. L. Reesman), U. S. Nuclear Regulatory Commission, NUREG/CR-4936, 27 p., May.

Open-File Report

Contour map of simple Bouguer gravity anomaly for the area encompassing the Covington, Fort Pillow, Gift, Gilt Edge, Golddust, Nodena, Osceola, and Ripley South quadrangles (Figure 3).

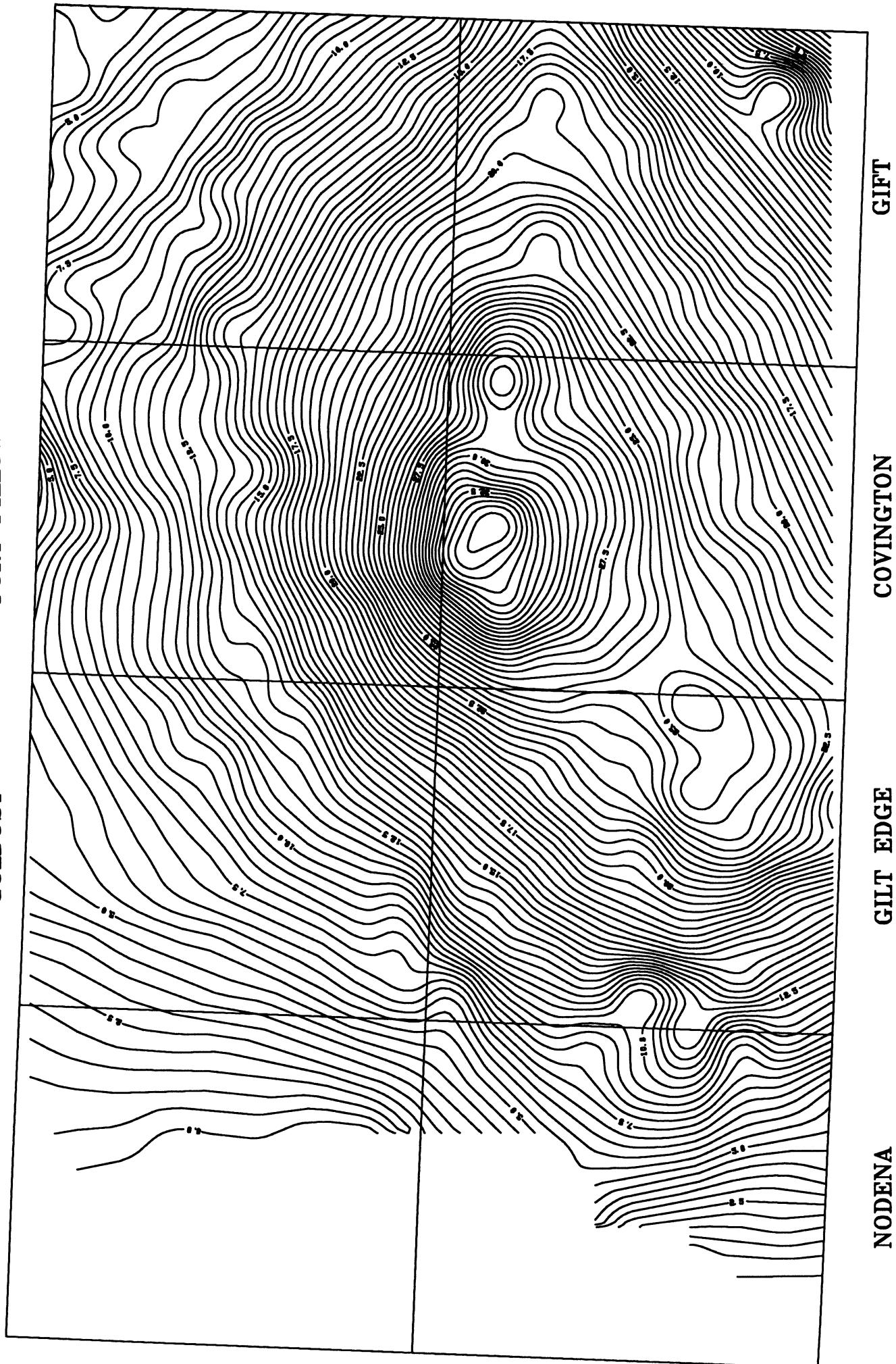
Listing of Principal Facts

Paper listing of principal facts at gravity stations for each of the eight 7.5-minute quadrangles with statistics of reoccupations.

Floppy Disk of Principal Facts

Floppy disk containing the principal facts at gravity stations in the Covington, Fort Pillow, Gift, Gilt Edge, Golddust, Nodena, Osceola, and Ripley South quadrangles, in ASCII symbols. The file name is STATIONS.TXT.

Figure 3. Contour Map of Simple Bouguer Gravity Anomaly
RIPLEY SOUTH
FORT PILLOW
GOLDDUST
OSCEOLA



COVINGTON 7.5' QUADRANGLE (414 SW)

Tennessee Index Map System 35 30' to 35 37.5' and 89 37.5' to 89 45'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY (MG)	BOUGUER ANOMALY
COV'TON	35 33.77	89 38.77	336	979784.48	23.76
R-2 BASE	35 36.52	89 43.25	278	979800.17	32.08
RS1-R3	35 36.20	89 44.40	290	979793.692	26.76
RS1-R4	35 37.34	89 44.43	270	979794.225	24.47
RS1-R5	35 37.03	89 44.92	275	979792.115	23.11
RS2-R6	35 37.38	89 43.03	262	979800.20	29.91
RS2-R7	35 36.66	89 40.99	282	979802.402	34.34
RS2-R9	35 37.40	89 40.84	330	979798.047	31.81
RS2-R10	35 34.56	89 40.34	332	979789.811	27.74
RS2-R17	35 35.57	89 39.07	313	979792.092	27.44
RS2-R18	35 36.77	89 37.63	272	979798.116	29.30
RS2-R19	35 36.37	89 39.02	279	979797.087	29.26
RS3-R21	35 34.28	89 38.37	290	979788.847	24.66
RS3-R22	35 33.83	89 37.92	295	979786.232	22.98
RS4-SR2	35 36.71	89 42.29	341	979798.467	33.88
RS8-R26	35 36.01	89 43.35	288	979797.404	30.62
RS8-R27	35 35.16	89 41.70	310	979794.115	29.87
RS8-R28	35 35.81	89 41.56	288	979798.760	32.27
RS8-R29	35 35.76	89 40.10	273	979797.188	29.87
RS8-R30	35 36.60	89 39.99	300	979796.851	29.95
RS8-R31	35 36.12	89 42.28	410	979791.606	31.99
RS8-R32	35 36.44	89 42.75	312	979799.222	33.27
RS9-R33	35 35.07	89 44.17	380	979785.737	25.82
RS9-R34	35 33.83	89 44.83	411	979780.933	24.64
RS9-R35	35 31.77	89 44.52	400	979778.271	24.25
RS9-R36	35 30.24	89 43.89	296	979778.989	20.92
RS9-R37	35 30.59	89 42.62	310	979778.271	20.50
RS9-R38	35 31.82	89 41.97	372	979777.910	22.09
RS9-R39	35 32.46	89 42.82	370	979780.531	23.73
RS9-R40	35 33.47	89 43.02	382	979783.015	25.50
RS9-R41	35 33.82	89 40.92	329	979787.089	25.89
RS9-R1	35 36.28	89 42.38	360	979796.257	33.41
RS13-R69	3532.51	89 38.23	308	979781.362	20.78
RS13-R72	3531.11	89 38.93	374	979772.409	17.77
RS13-R73	3530.26	89 40.53	341	979773.385	17.98
RS13-R74	3532.50	89 39.98	380	979777.924	21.67
RS14-R75	3537.00	89 44.25	271	979795.380	26.17

CM-03-01	3535.31	89 37.76	322	979789.904	26.164
CM-03-02	35 36.30	89 38.50	273	979797.545	29.46
CM-03-03	35 37.25	89 38.90	269	979797.082	27.398
CM-03-04	35 37.21	89 40.02	269	979800.298	30.671
CM-03-05	35 37.40	89 42.39	256	979803.369	32.691
CM-03-06	35 35.38	89 43.47	321	979792.748	28.849
CM-03-07	35 35.44	89 44.81	303	979790.728	25.664
CM-03-08	35 34.42	89 44.05	392	979784.531	26.257
CM-03-09	35 34.24	89 43.19	377	979785.522	26.605
CM-03-10	35 34.67	89 42.33	354	979788.597	27.689
CM-03-11	35 35.49	89 42.31	292	979796.672	30.877
CM-03-12	35 34.28	89 39.71	325	979788.404	26.323
AR-03-01	35 33.49	89 42.00	394	979781.741	24.913
AR-03-02	35 34.28	89 41.87	373	979786.508	27.295
AR-03-03	35 33.54	89 43.68	381	979782.870	25.191
AR-03-04	35 32.72	89 44.25	354	979782.732	24.603
AR-03-05	35 31.90	89 43.80	388	979778.113	23.191
AR-03-06	35 32.97	89 43.24	395	979780.450	24.423
AR-03-07	35 33.34	89 40.40	348	979782.970	23.598
AR-03-08	35 32.76	89 42.15	394	979779.312	23.524
AR-03-09	35 32.34	89 41.00	378	979777.736	21.588
AR-03-10	35 31.23	89 42.64	314	979779.972	21.567
AR-03-11	35 30.91	89 43.45	379	979774.873	20.822
AR-03-12	35 31.17	89 44.40	385	979776.852	22.790
AR-03-13	35 30.59	89 41.43	337	979775.089	18.975
AR-03-14	35 30.21	89 39.31	407	979767.160	15.785
AR-03-15	35 31.38	89 40.42	367	979775.158	19.718
AR-03-16	35 31.07	89 37.64	348	979772.604	16.466
AR-03-17	35 30.34	89 38.25	353	979770.287	15.489
AR-03-18	35 32.18	89 38.99	327	979779.653	20.675
AR-03-19	35 33.06	89 38.96	320	979783.318	22.666
RUS-7-01	3536.98	89 42.16	273	979803.995	34.936
RS157-02	35 30.07	89 43.13	310	979776.565	19.574

FORT PILLOW 7.5' QUADRANGLE (414 NW)

Tennessee Index Map System 35 37.5' to 35 45' and 89 37.5' to 89 45'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY
				(MG)	
RS-02-R8	35 37.75	89 40.87	271	979801.88	31.60
RS-2-R20	35 37.69	89 38.82	268	979796.20	25.88
RS-4-SR3	35 38.10	89 42.31	266	979799.20	28.12
RS-5-SR4	35 37.52	89 39.50	269	979797.79	27.72
RS-5-SR5	35 37.67	89 38.57	267	979795.66	25.26
RS-5-SR8	35 40.42	89 38.76	309	979789.55	17.74
RS-5-SR9	35 40.50	89 41.16	268	979791.49	17.06
RS5-SR10	35 40.87	89 42.38	280	979789.37	15.18
RS10-R43	35 39.89	89 44.57	290	979787.88	15.72
RS10-R44	35 40.52	89 42.62	292	979789.05	16.10
RS10-R45	35 41.60	89 42.11	289	979787.82	13.13
RS10-R46	35 41.90	89 43.09	249	979789.98	12.47
RS10-R47	35 44.57	89 41.98	247	979787.82	6.37
RS10-R48	35 44.08	89 40.49	321	979784.68	8.37
RS10-R49	35 42.02	89 39.85	340	979784.51	12.28
RS10-R50	35 41.13	89 37.90	288	979789.55	15.47
MM-06-01	35 42.15	89 44.25	241	979789.86	11.51
MM-06-02	35 44.58	89 44.25	252	979788.13	6.96
MM-06-03	35 44.88	89 38.54	315	979785.89	8.07
MM-06-04	35 43.35	89 38.73	330	979785.59	10.86
SW-16-01	35 41.94	89 38.85	363	979784.10	13.29
SW-16-02	35 41.17	89 39.34	310	979788.16	15.34
SW-16-03	35 40.23	89 39.49	319	979789.12	18.12
SW-16-05	35 40.07	89 44.00	289	979788.58	15.99
SW-16-06	35 41.33	89 41.07	278	979789.51	14.44
SW-16-07	35 41.82	89 40.83	285	979788.59	13.24
MG-09-01	35 40.93	89 41.12	279	979789.89	15.55
MG-09-02	35 42.21	89 41.67	280	979788.04	11.94
MG-09-03	35 42.61	89 41.65	330	979784.15	10.48
MG-09-04	35 43.02	89 40.91	300	979786.68	10.62
MG-09-05	35 42.94	89 40.17	290	979787.81	11.26
MG-09-06	35 43.71	89 40.48	309	979785.80	9.30
MG-09-07	35 44.17	89 41.45	372	979779.86	6.47
MG-09-08	35 44.78	89 40.23	430	979776.26	5.48
MG-09-09	35 44.46	89 39.67	328	979784.71	8.27

CM-01-01	35 41.50	89 38.38	355	979784.707	14.115
CM-01-02	35 42.38	89 38.08	378	979782.704	12.234
CM-01-03	35 42.93	89 37.67	384	979781.803	10.908
CM-01-04	35 43.43	89 38.63	290	979787.917	10.672
AR-01-01	35 42.92	89 41.78	316	979783.940	8.982
AR-01-02	35 41.74	89 42.19	316	979785.973	12.700
AR-01-03	35 40.08	89 43.93	302	979786.831	15.088
AR-01-04	35 40.59	89 44.75	333	979783.772	13.160
AR-01-05	35 39.44	89 41.27	266	979794.623	21.64
AR-01-06	35 38.79	89 40.69	255	979795.817	23.097
AR-01-07	35 39.03	89 39.97	266	979794.153	21.750
CM-02-01	35 40.19	89 37.98	270	979792.106	18.288
CM-02-02	35 39.80	89 38.69	300	979791.317	19.854
CM-02-03	35 40.79	89 39.78	349	979785.121	15.183
AR-02-01	35 42.64	89 43.10	247	979789.095	10.400
AR-02-02	35 41.94	89 43.55	240	979790.114	11.999
AR-02-03	35 37.99	89 37.31	265	979793.887	22.907
AR-02-04	35 38.05	89 38.49	267	979795.329	24.384
AR-02-05	35 37.67	89 39.88	270	979799.350	29.127
AR-02-06	35 37.65	89 44.35	278	979793.442	23.727
AR-02-07	35 37.76	89 43.70	265	979796.313	25.662
AR-02-08	35 38.22	89 44.00	242	979795.714	23.028
CM-08-10	35 44.20	89 43.06	245	979788.452	7.409
CM-08-11	35 44.27	89 43.89	248	979788.560	7.597
AR-08-01	35 44.14	89 44.83	252	979787.948	7.411
RS152-03	35 38.88	89 44.73	238	979792.673	18.805
RS152-04	35 39.16	89 43.87	270	979791.200	18.851
RS152-05	35 39.83	89 43.24	278	979790.496	17.670
RUS-3-01	35 39.92	89 42.61	250	979793.249	18.617
RUS-3-02	35 39.15	89 42.71	246	979795.416	21.642
RUS-3-03	35 38.61	89 41.34	244	979798.083	24.960
RUS-3-04	35 39.01	89 40.02	245	979797.035	23.402
RS-153-1	35 41.21	89 43.88	241	979790.421	13.408
RS-153-2	35 41.62	89 44.85	243	979789.669	12.191
RUS-7-02	35 37.73	89 42.51	255	979801.461	30.254
RUS-7-03	35 38.31	89 42.27	263	979798.238	26.683

GIFT 7.5' QUADRANGLE (414 SE)

Tennessee Index Map System 35 30' to 35 37.5' 89 30' to 89 37.5'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY (MG)
RS2-R11	35 34.38	89 35.76	300	979785.129	21.40
RS2-R12	35 34.28	89 35.01	280	979785.176	20.39
RS2-R13	35 35.32	89 33.99	271	979787.633	20.82
RS2-R14	35 35.14	89 32.55	268	979785.964	19.23
RS2-R15	35 35.52	89 35.62	269	979790.318	23.10
RS2-R16	35 35.65	89 36.65	275	979793.013	25.97
RS3-R23	35 33.49	89 36.87	340	979780.720	20.60
RS3-R24	35 33.16	89 34.72	300	979779.197	17.20
RS3-R25	35 33.55	89 31.11	270	979776.875	12.53
RS11-R53	35 37.48	89 31.28	275	979784.953	15.30
RS12-R63	35 33.10	89 33.13	285	979777.796	14.99
RS12-R64	35 31.67	89 32.65	320	979769.496	10.83
RS12-R65	35 31.00	89 30.79	330	979763.130	6.01
RS12-R66	35 30.63	89 32.74	400	979759.842	7.45
RS12-R67	35 31.37	89 34.60	319	979771.751	13.45
RS12-R68	35 32.30	89 36.40	318	979777.558	17.87
RS13-R70	35 30.32	89 36.44	352	979768.432	13.60
RS13-R71	35 31.04	89 37.17	340	979772.586	16.01
AR-05-01	35 34.16	89 30.88	270	979779.270	14.052
AR-05-02	35 34.54	89 31.36	270	979782.224	16.465
AR-05-03	35 35.04	89 31.69	268	979785.155	18.563
AR-05-04	35 36.04	89 33.34	268	979788.159	20.141
AR-05-05	35 35.48	89 35.05	270	979789.906	22.806
AR-05-06	35 36.00	89 34.46	270	979790.403	22.562
AR-05-07	35 36.76	89 35.38	269	979791.093	22.108
AR-05-08	35 36.88	89 36.17	270	979793.667	24.571
AR-05-09	35 37.44	89 36.42	271	979793.631	23.796
AR-05-10	35 36.21	89 36.31	271	979794.078	25.997
AR-05-11	35 35.02	89 35.99	281	979788.731	22.947
AR-05-12	35 35.62	89 37.32	298	979793.344	27.724
AR-05-13	35 35.10	89 36.79	300	979789.212	24.452
AR-05-14	35 34.06	89 36.76	321	979783.864	21.846
CM-06-01	35 34.63	89 34.28	272	979786.061	20.293
CM-06-02	35 34.17	89 33.67	274	979783.452	18.460
CM-06-03	35 34.08	89 32.63	271	979782.738	17.694

CM-06-04	35 37.36	89 30.25	292	979781.592	13.131
CM-06-05	35 36.28	89 30.36	270	979784.614	16.374
CM-06-06	35 36.98	89 31.38	275	979785.865	16.951
AR-06-01	35 30.18	89 30.76	389	979759.961	7.550
AR-06-02	35 31.60	89 30.60	276	979768.239	7.029
AR-06-03	35 32.34	89 30.51	273	979770.517	8.073
AR-06-04	35 31.50	89 31.37	379	979766.120	11.228
AR-06-05	35 30.80	89 31.27	373	979760.710	6.469
AR-06-06	35 30.18	89 32.45	376	979760.006	6.815
AR-06-07	35 30.89	89 33.24	351	979765.322	9.621
AR-06-08	35 32.60	89 31.36	279	979772.808	10.353
AR-06-09	35 32.49	89 32.69	288	979774.500	12.742
AR-06-10	35 30.24	89 33.94	352	979764.440	9.725
AR-06-11	35 30.97	89 33.84	314	979769.348	11.314
AR-06-12	35 30.75	89 34.74	335	979768.511	12.050
AR-06-13	35 30.01	89 34.61	347	979764.930	10.242
AR-06-14	35 30.72	89 35.74	338	979769.965	13.726
AR-06-15	35 31.27	89 36.28	311	979774.480	15.839
CM-07-01	35 33.73	89 30.31	275	979775.471	11.166
CM-07-02	35 33.27	89 32.30	276	979777.687	14.098
CM-07-03	35 33.11	89 33.86	326	979776.054	15.691
CM-07-04	35 32.20	89 34.00	342	979772.316	14.208
CM-07-05	35 31.64	89 35.45	310	979774.734	15.506
CM-07-06	35 32.42	89 37.32	369	979775.382	18.580
CM-07-07	35 32.66	89 35.79	320	979777.807	17.725
CM-07-08	35 33.16	89 35.24	283	979781.292	18.279
CM-07-09	35 33.28	89 35.97	301	979781.612	19.507
RS151-04	35 36.95	89 32.22	265	979788.081	18.585
RUS-2-01	35 36.13	89 30.97	264	979787.140	18.754
RUS-2-02	35 36.78	89 30.53	295	979783.052	15.597

GILT EDGE 7.5' QUADRANGLE (407 SE)
 Tennessee Index Map System 35 30' to 35 37.5' and 89 45' to 52.5'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY (MG)
RS6-O14	35 35.50	89 47.70	305	979784.506	19.48
RS6-O6	35 33.40	89 46.59	412	979779.223	23.41
RS7-O15	35 35.14	89 45.90	380	979782.331	22.31
RS7-O16	35 32.56	89 46.35	340	979784.278	25.54
RS7-O17	35 31.40	89 46.08	315	979782.899	24.31
RS7-O18	35 30.28	89 47.57	330	979776.656	20.57
RS7-O19	35 30.42	89 49.51	400	979768.949	16.86
RS7-O20	35 31.53	89 49.67	355	979775.018	18.65
RS7-O21	35 33.07	89 49.40	265	979783.796	19.83
RS7-O22	35 32.24	89 50.23	327	979776.874	17.81
RS7-O23	35 31.64	89 51.31	277	979776.032	14.83
RS7-O24	35 33.84	89 48.11	365	979779.928	20.86
RS-01-01	35 37.20	89 46.04	255	979790.134	19.68
RS-01-02	35 35.36	89 47.28	275	979787.413	20.79
RS-01-03	35 35.33	89 48.80	267	979784.684	17.62
RS-01-04	35 34.38	89 51.33	275	979778.128	12.90
RS-06-09	35 33.08	89 51.76	360	979769.003	10.72
RS-06-10	35 33.83	89 50.12	270	979781.870	17.12
RS-06-11	35 34.91	89 50.10	262	979782.498	15.73
RS-06-12	35 34.88	89 50.98	268	979779.719	13.36
RS-18-03	35 36.91	89 51.15	259	979779.288	9.49
CM-04-01	35 34.24	89 45.46	411	979780.762	23.884
CM-04-02	35 34.96	89 45.25	388	979783.561	24.277
CM-04-03	35 35.69	89 45.07	338	979788.204	24.882
CM-04-04	35 37.08	89 45.18	274	979791.791	22.650
CM-04-05	35 36.47	89 46.26	250	979790.309	20.598
CM-04-06	35 36.07	89 46.32	264	979789.805	21.504
CM-04-07	35 35.65	89 46.80	304	979786.371	21.067
CM-04-08	35 34.55	89 45.90	387	979781.926	23.168
CM-04-09	35 34.42	89 46.70	331	979784.905	22.974
CM-04-10	35 34.93	89 47.06	329	979784.393	21.616
CM-04-11	35 34.62	89 48.10	279	979786.255	20.921
CM-04-12	35 34.38	89 48.74	317	979782.342	19.629
CM-04-13	35 36.20	89 49.37	233	979785.048	14.703
CM-04-14	35 35.57	89 49.59	270	979782.946	15.718
RS11-O10	35 33.83	89 50.14	270	979781.852	17.105

AR-04-01	35 33.78	89 50.85	309	979777.046	14.708
AR-04-02	35 32.80	89 50.24	257	979781.909	17.850
AR-04-03	35 32.39	89 52.90	370	979768.305	11.606
AR-04-04	35 31.84	89 52.32	385	979765.435	10.418
AR-04-05	35 31.22	89 52.07	350	979767.909	11.707
AR-04-06	35 30.87	89 50.31	393	979769.281	16.126
AR-04-07	35 31.08	89 50.02	416	979766.080	14.005
AR-04-08	35 30.15	89 48.64	298	979777.377	19.552
AR-04-09	35 30.72	89 48.48	314	979778.706	21.028
CM-05-01	35 33.07	89 47.69	293	979786.394	24.109
CM-05-02	35 32.42	89 47.84	268	979787.212	24.354
CM-05-03	35 31.95	89 47.94	270	979786.277	24.209
CM-05-04	35 31.96	89 48.68	266	979785.213	22.891
CM-05-05	35 30.93	89 46.23	283	979783.785	23.950
CM-05-06	35 31.49	89 46.63	277	979785.903	24.910
CM-05-07	35 32.05	89 46.91	323	979783.946	24.913
CM-05-08	35 32.98	89 46.26	397	979780.356	24.435
CM-05-09	35 31.73	89 45.31	385	979779.305	24.446
CM-05-10	35 32.09	89 45.54	304	979785.980	25.751
CM-05-11	35 33.05	89 45.63	320	979786.162	25.524
AR-07-05	35 37.33	89 50.29	272	979780.289	10.671
AR-07-06	35 36.44	89 52.03	262	979777.277	8.328
AR-07-07	35 36.99	89 51.53	396	979768.936	7.237
RUS-5-04	35 37.06	89 49.64	244	979783.987	13.075
RS-155-1	35 36.69	89 51.02	237	979780.910	10.106
RS-155-2	35 36.12	89 51.78	236	979779.638	9.587
RS-155-7	35 35.53	89 52.33	233	979778.669	9.280

GOLDDUST 7.5' QUADRANGLE (407 NE)

Tennessee Index Map System 35 37.5' to 35 45' and 89 37.5' to 89 45'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY (MG)
RS-18-04	35 37.67	89 49.29	281	979781.766	12.203
RS-18-05	35 38.89	89 50.04	236	979783.095	9.094
RS-18-06	35 40.83	89 51.89	245	979780.667	4.407
CS-18-11	35 42.31	89 51.55	245	979782.463	4.122
MM-05-01	35 43.53	89 51.52	248	979783.424	3.519
MM-05-02	35 44.08	89 50.37	248	979785.223	4.532
MM-05-03	35 44.71	89 48.46	251	979786.733	5.323
MM-05-04	35 43.31	89 48.29	247	979785.965	6.314
MM-05-05	35 42.50	89 50.02	245	979784.773	6.122
MM-05-06	35 42.01	89 48.28	245	979785.620	7.656
MM-05-07	35 44.43	89 46.40	247	979787.389	6.138
MM-05-08	35 42.50	89 47.04	249	979786.777	8.401
MM-05-09	35 40.84	89 48.07	249	979785.775	9.770
MM-05-10	35 39.62	89 48.27	246	979785.719	11.275
MM-05-11	35 38.45	89 47.89	293	979783.331	13.372
MM-05-12	35 39.15	89 46.63	305	979784.600	14.365
SW-16-04	35 39.69	89 45.14	295	979786.917	15.201
AR-07-01	35 39.48	89 45.94	346	979782.137	13.888
AR-07-02	35 38.79	89 47.19	258	979786.905	14.365
AR-07-03	35 39.11	89 47.84	278	979784.133	12.335
AR-07-04	35 38.36	89 49.58	440	979769.830	8.815
AR-07-08	35 37.60	89 51.19	419	979768.191	7.002
CM-08-01	35 43.34	89 52.37	247	979782.456	2.762
CM-08-02	35 42.78	89 51.55	244	979782.956	3.881
CM-08-03	35 41.79	89 51.14	243	979782.574	4.852
CM-08-04	35 43.59	89 50.86	247	979784.113	4.062
CM-08-05	35 43.11	89 50.44	249	979784.403	5.157
CM-08-06	35 44.44	89 49.08	250	979786.294	5.208
CM-08-07	35 44.11	89 46.39	246	979787.279	6.425
CM-08-08	35 43.27	89 46.53	246	979787.265	7.611
CM-08-09	35 43.72	89 45.20	250	979788.085	8.028
AR-08-02	35 42.32	89 45.61	243	979788.091	9.613
AR-08-03	35 42.42	89 46.33	248	979787.343	9.022
AR-08-04	35 41.84	89 49.19	243	979784.923	7.130
RS152-01	35 38.77	89 46.03	243	979790.029	16.618

RS152-02	35 39.01	89 45.16	242	979791.436	17.622
RS-153-3	35 41.26	89 45.30	238	979789.482	12.217
RS-153-4	35 40.87	89 45.55	245	979788.812	12.524
RUS-4-01	35 39.08	89 49.08	242	979784.306	10.393
RUS-4-02	35 37.92	89 51.42	223	979781.046	7.648
RUS-4-03	35 38.14	89 50.54	276	979778.908	8.374
RS-154-1	35 41.02	89 47.13	242	979786.909	10.227
RS-154-2	35 41.53	89 48.23	243	979785.649	8.299
RS-154-3	35 41.70	89 46.48	235	979787.635	9.563
RS-154-4	35 42.67	89 48.51	238	979786.192	6.914
RS-154-5	35 41.73	89 50.04	243	979784.245	6.609
RS-154-6	35 41.11	89 49.81	243	979784.084	7.333
RS-154-7	35 43.97	89 48.34	251	979785.975	5.621
RUS-5-01	35 41.54	89 52.44	242	979780.818	3.393
MH-03-01	35 40.28	89 50.68	242	979782.269	6.643
RUS-5-03	35 39.82	89 50.15	242	979782.819	7.850

NODENA 7.5' QUADRANGLE (407 SW)

Tennessee Index Map System 35 30' to 35 37.5' and 89 52.5' to 90 00'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY
RS-06-07	35 30.52	89 56.33	276	979762.450	2.80
RS-06-08	35 30.81	89 52.80	302	979768.411	9.89
RS-17-01	35 30.62	89 58.50	241	979761.466	-.43
RS-17-02	35 33.56	89 53.04	241	979775.776	9.68
RS-18-01	35 36.74	89 52.99	274	979774.617	5.97
RS-18-02	35 33.78	89 53.50	252	979775.182	9.43
RS-155-3	35 37.05	89 52.87	292	979772.846	4.827
RS-155-4	35 34.63	89 53.20	239	979775.793	8.047
RS-155-5	35 36.24	89 53.73	237	979775.485	5.323
RS-155-6	35 35.34	89 52.78	235	979777.813	8.814
RS-155-8	35 35.84	89 52.71	232	979777.793	7.901
RUS-6-01	35 31.02	89 53.34	320	979766.244	8.499
RUS-6-02	35 31.58	89 52.61	390	979763.955	9.609
RUS-6-03	35 30.21	89 52.84	372	979762.272	8.798
RUS-6-04	35 30.38	89 53.71	398	979758.753	6.596
RUS-6-05	35 30.84	89 56.22	250	979764.197	2.511
RUS-6-06	35 30.15	89 56.84	249	979762.235	1.472
RUS-6-07	35 30.86	89 57.30	240	979763.152	0.838
RUS-6-08	35 30.05	89 55.24	300	979761.898	4.336

OSCEOLA 7.5' QUADRANGLE (407 NW)
 Tennessee Index Map System 35 37.5' to 35 45' and 89 52.5' to 90 00'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY (MG)
RS-18-07	35 39.20	89 53.06	242	979777.633	3.550
RS-18-08	35 40.92	89 54.40	246	979777.086	0.787
RS-18-09	35 42.68	89 55.14	247	979779.109	0.347
RS-18-10	35 43.23	89 53.35	249	979781.423	2.006
RS156-01	35 42.53	89 53.07	243	979781.225	2.447
RS156-02	35 42.56	89 53.53	238	979780.921	1.801
RS156-03	35 43.28	89 54.33	248	979780.578	1.029
RS156-04	35 42.47	89 54.69	246	979779.199	0.687
RS156-05	35 41.93	89 55.11	243	979777.958	0.037
RS156-06	35 41.88	89 54.33	239	979778.977	0.888
RS156-07	35 40.03	89 54.18	241	979776.598	1.269
RS156-08	35 39.61	89 53.90	241	979776.410	1.680
RS156-09	35 40.88	89 53.37	243	979778.448	2.025
RUS-5-02	35 41.55	89 53.66	237	979779.650	1.912

RIPLEY SOUTH 7.5' QUADRANGLE (414 NE)

Tennessee Index Map System 35 37.5' to 35 45' and 89 30' to 89 37.5'

STATION NAME	LATITUDE (DEG. MINS)	LONGITUDE (DEG. MINS)	ELEVATION (FEET)	OBSERVED GRAVITY	BOUGUER ANOMALY (MG)
RIPLEYPO	35 44.80	89 31.75	447	979773.65	3.88
RS-5-SR6	35 37.50	89 37.12	271	979794.65	24.73
RS-5-SR7	35 39.80	89 36.15	285	979789.94	17.58
RS10-R42	35 39.50	89 35.58	288	979789.71	17.95
RS10-R51	35 40.85	89 36.30	330	979785.32	14.16
RS11-R52	35 38.48	89 33.29	281	979787.26	16.54
RS11-R54	35 39.80	89 31.85	367	979778.26	10.81
RS11-R55	35 40.04	89 30.35	337	979778.31	8.73
RS11-R56	35 41.76	89 31.12	419	979773.82	6.69
RS11-R57	35 42.18	89 32.55	440	979774.02	7.56
RS11-R58	35 42.76	89 34.08	451	979774.67	8.03
RS11-R59	35 42.74	89 35.85	418	979778.22	9.63
RS11-R60	35 43.12	89 36.95	445	979777.08	9.57
RS11-R61	35 41.75	89 34.69	368	979780.23	10.06
RS11-R62	35 40.21	89 33.44	310	979784.59	13.14
SN-09-01	35 44.54	89 31.65	461	979772.20	3.63
SN-09-02	35 44.53	89 31.43	460	979772.04	3.41
SN-09-03	35 43.83	89 31.65	428	979774.66	5.11
SN-09-04	35 43.26	89 31.67	350	979779.55	6.14
SN-09-05	35 42.43	89 32.10	410	979776.19	7.56
TT-01-04	35 42.03	89 32.29	453	979772.82	7.34
SN-09-06	35 41.36	89 31.39	392	979775.63	7.45
SN-09-07	35 40.46	89 31.82	373	979777.71	9.68
SN-09-08	35 40.71	89 32.40	370	979779.18	10.61
SN-09-09	35 40.78	89 33.15	305	979784.36	11.79
SN-09-10	35 40.82	89 33.94	303	979785.20	12.45
SN-09-11	35 39.56	89 31.49	317	979781.20	11.03
SN-09-12	35 39.25	89 30.86	317	979780.32	10.65
SN-09-13	35 39.11	89 30.26	301	979780.06	9.63
SN-09-14	35 39.41	89 30.35	308	979780.06	9.62
SN-09-15	35 40.49	89 31.81	328	979780.56	9.77
SN-09-16	35 42.23	89 30.69	372	979776.86	6.21
SN-09-17	35 43.06	89 30.30	430	979773.20	4.87
SN-09-18	35 43.51	89 30.74	459	979771.81	4.58
SN-09-19	35 44.32	89 30.34	363	979778.16	4.01

SN-33-03	35 39.99	89 31.53	329	979780.55	10.55
SN-33-04	35 40.00	89 31.43	321	979780.96	10.48
SN-33-05	35 40.00	89 31.31	316	979781.24	10.45
SN-33-06	35 39.98	89 31.22	314	979781.24	10.36
SN-33-07	35 39.98	89 31.12	316	979781.12	10.36
SN-33-08	35 39.97	89 31.00	320	979780.70	10.19
SN-33-09	35 39.97	89 30.90	315	979780.98	10.18
SN-32-01	35 39.75	89 31.77	365	979778.30	10.81
SN-32-02	35 39.70	89 31.67	339	979780.08	11.10
SN-32-03	35 39.64	89 31.59	326	979781.02	11.34
SN-32-04	35 39.59	89 31.52	319	979781.44	11.42
SN-32-05	35 39.55	89 31.44	320	979781.13	11.22
SN-32-06	35 39.49	89 31.35	319	979781.10	11.21
SN-32-07	35 39.45	89 31.26	308	979781.77	11.28
SN-34-01	35 39.85	89 32.02	352	979779.59	11.18
RS-28-01	35 39.78	89 31.82	367	979778.03	10.61
RS-28-02	35 39.76	89 31.79	366	979778.01	10.56
RS-28-03	35 39.74	89 31.74	356	979778.82	10.79
RS-28-04	35 39.72	89 31.70	344	979779.63	10.93
SN-35-01	35 39.72	89 31.42	310	979781.69	10.94
SN-35-02	35 39.77	89 31.40	310	979781.69	10.87
SN-35-03	35 39.80	89 31.25	305	979781.65	10.49
WA-01-02	35 44.93	89 32.50	425	979775.15	3.86
WA-01-03	35 44.93	89 32.33	429	979775.10	4.04
WA-01-04	35 44.88	89 32.18	424	979775.28	4.00
WA-01-05	35 44.88	89 32.05	433	979774.98	4.24
WA-01-06	35 44.81	89 31.92	437	979774.50	4.10
WA-02-01	35 44.80	89 31.65	409	979776.23	4.17
WA-02-02	35 44.68	89 31.74	448	979773.63	4.07
WA-02-03	35 44.58	89 31.79	464	979772.08	3.63
WA-02-04	35 44.55	89 31.91	460	979772.49	3.84
MG-01-01	35 44.53	89 31.48	463	979772.07	3.62
MG-01-02	35 44.64	89 31.36	450	979772.87	3.49
MG-01-03	35 44.81	89 31.29	411	979775.41	3.45
MG-01-04	35 44.65	89 31.26	430	979774.62	4.02
MG-01-05	35 44.77	89 30.94	365	979778.53	3.87
MG-01-06	35 44.82	89 30.54	390	979776.68	3.45
MG-01-07	35 44.79	89 30.02	347	979779.84	4.07
RUS-1-01	35 38.28	89 35.48		979792.630	20.638
RUS-1-01	35 38.28	89 35.48		979792.726	20.733
RS151-01	35 37.70	89 33.97		979790.238	19.433
RS151-02	35 38.11	89 34.34		979791.093	19.523
RS151-03	35 37.56	89 33.21		979789.019	18.234