GRAVITY SURVEY OF THE SOUTHWESTERN PART OF THE SOUTHERN UTAH GEOTHERMAL BELT

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ABSTRACT

During 1979, a gravity survey covering an area of 6,200 km² was made over the southwestern part of the southern Utah geothermal belt. The objective of the gravity survey is to delineate the geologic structures and assist in the understanding of the geothermal potential of the area.

A total of 726 new gravity stations together with 205 existing gravity stations, are reduced to give: (1) a complete Bouguer gravity anomaly map, and (2) a fourth-order residual gravity anomaly map; both maps have a 2-mgal contour interval. The complete Bouguer gravity anomaly map shows an east-trending regional gravity belt with a total relief of about 70 mgal which crosses the central portion of the survey area. The gravity belt is attributed to a crustal lateral density variation of 0.1 gm/cc from a depth of 5 to 15 km.

The complete Bouguer gravity anomaly map assists in the interpretation of the prominent local geologic features. The major mapped faults of the survey area, excluding the Washington fault, have a significant gravity expression. These include the Hurricane fault, the Beaver Dam Wash fault, and the Gunlock fault. Associated with the gravity low to the west of the Hurricane fault is a gravity high that corresponds with the Paleozoic rocks exposed along the Virgin anticline. Two other exposures of Paleozoic rocks, the Beaver Dam Mountains and Square Top Mountain, also have gravity highs associated

with them. The geologic structure of the Bull Valley district is understood better using the fourth-order residual gravity anomaly map. The Magotsu graben is defined by a gravity low with the more prominent faults of the Bull valley district along its margins. Associated with the Pine Valley Mountains is a large gravity low which is not fully understood partially due to the limited gravity data available.

Three two-dimensional gravity profiles are interpreted: a north-trending profile provides an interpretation of the regional geology and the crust and the other two profiles, which trend east-west, provide an interpretation of the prominent near-surface structural features. The two detailed profiles indicate the following approximate vertical displacements of the major high-angle faults in the study area: Hurricane fault (3,000 m); Beaver Dam Wash fault (2,000 m); Gunlock fault (500 m), which is a northward extension of the Grand Wash fault; Magotsu fault (1,400 m), which forms the eastern margin of the Magotsu graben; and a fault (2,000 m) along the western margin of the Magotsu graben.

Geothermal potential is suggested by the presence of two hot springs, Veyo Hot Springs and La Verkin Hot Springs, and extensive Cenozoic faulting and volcanism. The interpretation of the gravity data assists in delineating the geological structure and other characteristics of the survey area and indicates how these characteristics relate to the geothermal potential of the area. The thermal source for both of the hot springs is believed to be structurally controlled by the high-angle faults adjacent to the hot springs.

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INTRODUCTION

Location and Objective

The survey area lies in southwestern Utah in the transition zone between the Basin and Range and the Colorado Plateau provinces (Figure 1). The area exhibits extensive faulting, several episodes of Cenozoic volcanism, and contains two hot springs, the Veyo Hot Springs and the La Verkin Hot Springs. Therefore, the region may have a geothermal potential. The objective of the gravity survey is to delineate the geologic structures and assist in the understanding of the geothermal potential of the area. Gravity data collected during the survey are plotted along with existing gravity data (Hardman, 1967; Pe, 1980) to produce two gravity anomaly maps to aid in the geologic interpretation: 1) a complete Bouguer gravity anomaly map and 2) a fourth-order residual gravity anomaly map. Three profiles are selected to understand better: 1) the regional gravity trends; 2) the major north-trending geologic structural features; and 3) the geologic structure of the Bull Valley district -- an area of extensive Tertiary volcanism. The survey is part of an investigation program of the University of Utah in the evaluation of the geothermal resources of southwestern Utah.

The survey area, which extends from lat $37^{\circ}00'N$ to $37^{\circ}37.5'N$ and from long $113^{\circ}07.5'W$ to $114^{\circ}00'W$, comprises approximately 6,200 km². The area encompasses most of Washington County, Utah, and is bounded

Figure 1. Map of Utah showing location of the study area.

on the east by the area immediately east of the Hurricane Cliffs, on the south and west by the Arizona and Nevada state lines, respectively, and on the north, approximately, by the Iron County border.

Previous Work

Early geologic reconnaissance in southwestern Utah was conducted by Dutton (1880) and Huntington et al. (1903). Interest in the Virgin oil field and related areas prompted the first detailed regional examination of the geology of southwestern Utah, which was made by Dobbin (1939). His regional study covered most of the southern portion of Washington County. Reber (1952) studied the Precambrian through Mesozoic age stratigraphy and structure of the south central and northern Beaver Dam Mountains and the associated Precambrian exposures along the western side of the Beaver Dam Mountains.

Cook (1952) studied the Pine Valley Mountains and later published a comprehensive map of Washington County (Cook, 1960). Blank (1959) made the first detailed study of the Tertiary volcanics and structure of the Bull Valley district. Mackin (1960) expanded the scope of Blank's investigation and studied the Tertiary volcanic rocks of the greater southwestern Utah region.

Anderson et al. (1975), McKee (1971), Hausel and Nash (1977), Hamblin (1965, 1970), and Best and Hamblin (1978) studied the petrology and chronology of the Cenozoic rocks in the survey area. A recent comprehensive study by Rowley et al. (1979) and the expanded overview of Memoir 152 by the Geologic Society of America (GSA) offer

a tectonic model that explains the geologic processes involved in the evolution of southwestern Utah.

The tectonic history has been studied by Stokes (1976, 1979) and Stokes and Heylman (1965). Stewart (1971, 1978) and Armstrong (1968, 1972) summarized the structure and tectonism of the Basin and Range province.

Geophysical studies in the survey area have been limited to regional studies. Chapman et al. (1978) and Bodell (1980) conducted regional heat flow studies which encompassed southwestern Utah. Using seismic and magnetic data, Shuey et al. (1973) interpreted the boundary between the Basin and Range and the Colorado Plateau provinces to lie 50 km to the east of the physiographic boundary designated by Fenneman (1931). Smith and Sbar (1974) identified the Intermountain Seismic Belt (ISB) and a secondary seismic zone which trends easterly through the survey area. Cook and Hardman (1967) made a gravity survey over the Hurricane fault zone which covers the eastern border of Washington County. Montgomery (1973) compiled a regional gravity map of western Utah with sparse coverage in southwestern Utah. Pe (1980) made a gravity survey of the Escalante Desert area with good coverage and some overlap along the northern border of the survey area.

Topography

The more prominent topographic features of the study area are: the Pine Valley Mountains, with a maximum elevation at about 3,150 m; the Beaver Dam Mountains, at about 2,360 m; the western portion of the

Figure 2. Topographic map of the study area.

Kolob Terrace, at about 3,100 m; and the Bull Valley Mountains, at about 2,230 m (Figure 2). In sharp topographic contrast are: the St. George Basin, at an elevation of about 850 m; and the region west of the Beaver Dam Mountains, at about 730 m, for a total topographic relief of more than 2,400 m. Only a small portion of Washington County, namely the area near the town of Enterprise, lies in the Great Basin.

GEOLOGY

General Statement

The survey area (Figure 3) lies in the transition zone between the Basin and Range and the Colorado Plateau provinces. A 6,000-m-thick sequence of sedimentary rocks deposited in the Cordilleran geosyncline (Stokes, 1979) overlies Precambrian metamorphic rocks. The sequence was deformed during two episodes of faulting. Subsequent Cenozoic volcanism and Tertiary intrusions combine to complete the geologic setting.

The Paleozoic stratigraphic units consist generally of carbonate rocks and are overlain by Jurassic and Triassic sandstones. Carbonate rocks again dominated during Cretaceous time and into early Tertiary times (Cook, 1960; Stokes, 1979). During Miocene time, a large amount of volcanic activity of calc-alkalic composition (Hausel and Nash, 1977) occurred in and adjacent to the Bull Valley district (Blank, 1959; Cook, 1960). Contemporaneous with this was the emplacement of the Pine Valley laccolith and related intrusions of quartz monzonite composition (Cook, 1960). Following an hiatus of several million years, volcanism comprised of basalts and basaltic andesites began and has continued to the present, the most recent occurring near Snow Canyon with cinder cones as young as 1,000 yr old (McKee, 1971; Hausel and Nash, 1977; Hamblin, 1980, personal communication).

Figure 3. Generalized geologic map of the study area (adapted from Hintze, 1963).

EXPLANATION

Sedimentary rocks

Cenozoic

Alluvium

Tertiary Sedimentary Rocks

Mesozoic

Mesozoic Sedimentary Rocks

Paleozoic

Paleozoic Sedimentary Rocks

Igneous rocks

Cenozoic

Quaternary Basalt

Tertiary Volcanics

Tertiary Intrusive Rocks

Hot Springs

Fault concealed, inferred by geology

Fault concealed inferred by gravity ball on downthrown side

Fault exposed

Thrust fault, saw teeth on upper plate

Gravity profile

Contact

Figure 3. Continued

Hot Springs

- a Veyo Hot Springs
- b La Verkin Hot Springs

Faults

- 1 Hurricane fault
- 2 Washington fault
- 3 Gunlock fault
- 4 Beaver Dam Wash fault

Structural Features

Structural features in the survey area can be divided into two major trends: those trending northeasterly, which are associated with the Sevier and Laramide orogenies; and those trending north, which are associated with igneous activity and faulting of Miocene-Pliocene age (Cook, 1960; Armstrong, 1968, 1972; Rowley et al., 1979). The northeast-trending Virgin anticline, which is abruptly truncated by the Hurricane fault north of Touquerville with axial exposure of Paleozoic rocks, is of Sevier origin, as is the Castle Cliff thrust sheet, although the latter is dated as early Tertiary in age (Rowley et al., 1979). The northeasterly trending, broad, shallow syncline upon which the Pine Valley Mountains laccolith rests is believed to be Laramide in age (Averitt, 1964; Kurie, 1966). The southwesterly continuation of the Delemar-Iron Springs igneous belt, known as the Bull Valley-Big Mountain arch, is believed to be composed of quartz monzonite intruded during Miocene time in a syncline which was formed during the Laramide orogeny. This interpretation is supported by structural and aeromagnetic data (Blank, 1959).

The collapse of the broad, upwarped Basin and Range province has resulted in normal and possibly listric, normal faulting which is manifest in the survey area in several major north-trending faults (Stewart, 1978; Best and Hamblin, 1978). These faults, which include the Hurricane fault, the Washington fault, the northern continuation of the Grand Wash fault, the Jackson Wash fault, and the Beaver Dam Wash fault, are normal faults, with downthrow on the west that result in east-dipping blocks. Concurrent with the listric, normal faulting

(Cook, 1960). A gravity high also lies over Mineral Mountain where both Paleozoic rocks and quartz monzonite are exposed.

A gravity high in the northwest portion of the survey area and a related gravity low to the southeast are referred to by Pe (1980) as the Enterprise Reservoir gravity high and were attributed to a horst and graben type of structure. There is little relief on the complete Bouguer gravity anomaly map over the Pine Valley Mountains possibly due to the sparsity of data. The two gravity lows associated with Pine Valley and the New Harmony area are attributed to the lower density alluvium fill in the respective basins.

The two detailed profiles indicated the following approximate vertical displacement of the major high-angle faults in the study area: Hurricane fault (3,000 m); Beaver Dan Wash fault (2,000 m); Gunlock fault (500 m); Magotsu fault (1,400 m); and a fault at the western margin of the newly designated Magotsu graben of undetermined trend (2,000 m).

The interpretative geologic cross section along profile C-C', which extends across the Bull Valley district, clarified the transition between the highly faulted and tilted units on the west to the flat-lying stratigraphic beds on the east. The eastern third of profile C-C' appeared to be dominated by a thrust sheet of Paleozoic age overlain by undifferentiated Tertiary volcanics. The first of two minor gravity highs were attributed to a faulted segment at the easternmost extent of the thrust sheet. Profile C-C' further indicated three normal faults which define a series of east-tilted blocks to the east of the thrust sheet, beyond which are flat-lying stratigraphic

Hot Springs

Two systems of hot springs are observed in the survey area: one, the Veyo Hot Springs, is located along the Santa Clara River approximately 1.5 km east of the town of Veyo; and the other, the La Verkin Hot Springs, is located along the Virgin River where it intersects the Hurricane fault midway between the towns of La Verkin and Hurricane (Figure 2). Both hot springs are developed commercially. The Veyo Hot Springs are capped and feed a private swimming pool which prevents the accurate measurement of its output (about 2.0 m³/min) and its temperature (about 38°C).

La Verkin Hot Springs issue from many vents along the Virgin River for a distance of about 600 m. The discharges, which are heavily mineralized, vary from 42°C to 55°C in temperature, and flow at an estimated rate of 20.0 m³/min (unpublished data, Bureau of Reclamation, 1980).

DATA ACQUISITION, REDUCTION, AND COMPILATION

A total of 726 new gravity stations were taken by the author in southwestern Utah during the summer of 1979 using LaCoste and Romberg gravity meter G-264 with a precision capability of 0.001 mgal. Also, 169 additional stations taken previously by Hardman (1964) along the eastern portion of the survey area and 36 stations taken previously by Pe (1980) along the northern portion were used. Thus, the data from a total of 931 stations are used in the study.

Pe (1980) used the same gravity meter, and a comparison of the gravity readings of the reoccupied stations showed that the variations are within the maximum earth tidal effects (about 0.3 mgal). The author reoccupied 41 of Hardman's stations and a comparison shows a mean difference of 0.34 mgal and a standard deviation of 0.30 mgal in the gravity values. Subtracting a uniform value of 0.3 mgal reduces the difference between Hardman's data and the author's data, however, because this difference is within the margin of error in the survey, Hardman's original values are used without correction. It was also noted that the stations of Hardman that are used in the comparison are generally located in the high-relief areas in the vicinity of the Hurricane Cliffs where good vertical and horizontal control are not always available.

The new gravity data are reduced to simple Bouguer gravity anomaly values (Carter and Cook, 1978). Terrain corrections are

computed for both the new stations and those of Hardman out to a radial distance of 167 km from each station using a U.S. Geological Survey (U.S.G.S.) computer program that was modified for the UNIVAC 1108 at the University of Utah by Serpa (1980).

A topographic relief of more than 2,000 m in the survey area results in several terrain corrections greater than 10 mgal and many in the 3 to 5-mgal range. Based on the results of a study of this problem by Gabbert and Serpa (1979, personal communication), it is decided to use terrain corrections computed by hand out to a radial distance of 0.895 km (i.e. out to and including zone F of Hammers' (1938) zone chart) from each station in all situations where the total computed-terrain correction (out to 167 km) exceeds 3.0 mgal, and combine the hand-computed terrain correction to the machine-computed terrain correction from 0.895 km out to 167 km. Additional gravity stations with machine-computed terrain corrections of less than 3.0 mgal are also terrain corrected by hand out to 0.895 km in situations where it is thought that the topographic features might have an effect that is overlooked through the nature of the computer program. The justification for this procedure is that for station locations with proximal high topographic relief and/or large (greater than 3.0 mgal) terrain corrections, the data base used by the terrain-correction program is not capable of adequately representing the terrain immediately surrounding the station location and consequently for these stations a sufficiently accurate terrain correction is not obtained. Hence, hand-computed terrain corrections to 0.895 km are made for these "borderline" stations.

Pe's stations, which were compiled in a like manner, are combined with the new stations and Hardman's and together are plotted according to latitude and longitude; and the reduced gravity anomaly values are hand contoured with a 2-mgal contour interval to give the resulting complete Bouguer gravity anomaly contour map (Figure 4). The principal facts of all gravity stations used in this report are given in Appendix A.

An attempt is made to remove the regional gradient from the complete Bouguer gravity anomaly values. A polynomial fitting program written by Montgomery (1973) is used to fit polynomial surfaces of orders one through ten to the original data. A polynomial fitting approach is selected as it is the only technique available for non-gridded data. Data distribution and the difficulties involved with gridding data places other techniques outside the scope of this study.

The root-mean-square error between the polynomial surface and the original data is plotted versus the order of polynomial for orders one through ten (Figure 5). Because a distinct break in the generated curve occurs at the fourth order, the fourth-order polynomial surface is used as an appropriate order to generate a residual gravity map. The fourth-order polynomial surface, which is machine-contour-plotted with a program by Montgomery (1973), is shown as a map (with 10-mgal contour interval) in Figure 6. The polynomial surface appears to approximate sufficiently the regional trend except for minor irregularities in the contours along the borders created by edge effects. The fourth-order polynomial surface is removed from the

Figure 4. Complete Bouguer gravity anomaly map of the study area.
Contour interval is 2 mgal.

No. of Area Designated in Fig. 4	Name of Gravity Anomaly
1	Virgin anticline gravity high
2	Hurricane fault gravity low
3	Southeastern extent of Virgin anticline gravity high
4	Beaver Dam Mountains gravity high
5	Beaver Dam Wash gravity low
6	Square Top Mountain gravity high
7	Magotsu graben gravity low
8	Enterprise Reservoir gravity high
9	Enterprise Reservoir trough gravity low
10	Bull Valley - Big Mountain arch gravity high
11	Pine Valley gravity low
12	New Harmony gravity low
13	Harmony Mountain gravity high
14	Cedar Valley gravity low

Figure 5. Plot of the root-mean-square error for the complete Bouguer gravity anomaly polynomial surface vs. order of polynomial. Arrow shows the order of polynomial selected for further analysis.

Figure 6. Fourth-order polynomial surface gravity anomaly map.
Contour interval is 10 mgal.

data and the residual values are plotted and contoured (with a 2-mgal contour interval) to give a fourth-order polynomial map shown on Figure 7.

Figure 7. Fourth-order residual gravity anomaly map.
Contour interval is 2 mgal.

No. of Area Designated in Fig. 7	Name of Gravity Anomaly
1	Beaver Dam Wash gravity low
2	Square Top Mountain gravity high
3	Gunlock-Shebit-Cedar Pocket fault system
4	Magotsu graben gravity low
5	Mineral Mountains gravity high
6	Western portion of Enterprise Reservoir gravity low

GEOLOGICAL AND GEOPHYSICAL CONTROL

Density measurements are taken on 65 hand samples collected in the survey area in the manner described in Appendix B and are used in the modeling of the interpretative geologic cross sections. A summary of the density measurements used in this study is listed in Table 1. The wells in the survey area are generally located in exposures of Paleozoic rocks or sufficiently removed from the profiles so as to render them not useful in this study.

Vertical and horizontal control is obtained from U.S.G.S. topographic quadrangle maps and leveling lines. Horizontal control is believed to be (1) good with the U.S.G.S. 7 1/2-minute topographic maps, with possible error introduced in relocation of dirt roads subsequent to the drafting of the topographic maps and (2) fair where only U.S.G.S. 15-minute quadrangle maps are available. A foot traverse, which was taken through the Pine Valley Mountains where only a 15-minute topographic quadrangle map is available, possibly results in a mislocation of up to ± 0.10 km in latitudes (where gravity changes by about 0.78 mgal/km) with a corresponding error of 0.08 mgal in the gravity anomaly value. Horizontal location error elsewhere is assumed to be half that in the Pine Valley Mountains, with a corresponding error of 0.04 mgal. Elevation control in flat-lying regions is assumed to be within ± 2.0 m but up to ± 5.0 m in high-relief areas for respective errors of ± 0.4 mgal and ± 1.0 mgal.

Table 1. Summary of average densities used in this study based on laboratory measurements by the author.*

Lithologic Unit	Age	Wet Density (gm/cc)
Alluvium	Cenozoic	2.0**
Volcanics - vesicular basalt	Cenozoic	2.0-2.1
Volcanics - massive basalt	Cenozoic	2.5-2.55
Volcanics - except basalt	Upper Tertiary	2.25
Volcanics - except basalt	Lower Tertiary	2.5
Sedimentary rocks - basically limestone	Tertiary and Cretaceous	2.6
Sedimentary rocks - basically sandstone	Jurassic and Upper Triassic	2.4-2.45
Sedimentary rocks	Lower Triassic and Paleozoic	2.7
Metamorphic rocks	Precambrian	2.7***

* All density measurements were made by the author from rock samples collected in the survey area except as otherwise indicated. Detailed information concerning the rock type, location, and dry and wet densities of the rock samples is given in Appendix B.

** Density value given by Telford (1976).

*** Density used in modeling, for rocks of Lower Triassic and Paleozoic age.

Maximum diurnal variation of 0.15 mgal is possible because loops were closed every 6 hours. All loops are tied to either the St. George or the Enterprise gravity base station in the Utah Gravity Base Station Network (Cook et al., 1971). Terrain-correction values are determined based on a procedure developed by Serpa (1980) and Gabbert (1980); and although the terrain corrections may not be "absolute", they are perfectly repeatable and assumed correct.

Instrument and operator errors together are assumed to be within 0.005 mgal as demonstrated by repeated readings of the gravity meter at a station over a short period of time (5-10 min). Hence, values of 0.6 mgal in low-relief areas and 1.2 mgal in high-relief areas are believed to be the maximum errors in this study.

INTERPRETATION

Regional Gravity Features

The total relief of the complete Bouguer gravity anomaly contour map (Figure 4) is over 80 mgal, with a high of -127 mgal in the southwest corner to a low of -209 mgal in the northwest corner. The more apparent features include the gravity anomalies associated with the Virgin anticline and the Hurricane fault system trending north and a pervasive east-striking belt of gravity contours with a total relief of about 70 mgal dominating many local features.

In addition to the east-striking belt of gravity contours, there is also a north-striking regional gravity trend of lesser degree. It manifests itself as offsetting gravity contours across the Hurricane fault and possibly across the Washington and Gunlock faults in a step-like fashion (Figure 4). This may be due in part to the transition from the Basin and Range province to the Colorado Plateau province.

The eastward-trending gravity contours with pronounced regional gradient have in the past been attributed to a thinning of the crust to the south associated with the margin of the Great Basin, directly causing an increase in gravity due to the decrease in depth of the Moho (Montgomery, 1973). However, when the values of (1) the total gravity anomaly, Δg_T (namely 55 mgal) and (2) the maximum horizontal gradient, U_{xz} (namely 2.45 mgal/km) are considered, it is found that the maximum

depth (d_0) to the top of the body producing this gravity anomaly, by using the following formula (Bott and Smith, 1958; Bancroft, 1960) for a two-dimensional body, is

$$d_0 = ((3\sqrt{3})/8) (\Delta g_T / U_{XZ}) = 14.6 \text{ km}$$

or approximately 15 km. This depth is far less than the depth of the Moho in the Basin and Range province, which is 25-30 km, and much less than the depth of the Moho under the Colorado Plateau province, which is up to 45 km.

The maximum depth of 15 km to the top of the body producing this gravity gradient agrees with the present concept (Eaton et al., 1978) that while the regional gravity gradient in this region may be related to the thinning of the crust, it is not directly caused by it. According to Eaton et al. (1978), the regional gravity gradient may be attributed to a combination of several sources instead: simple variations in depth to the Moho; lateral variations in crustal composition; temperature variation; and differences in the phase assemblage within crustal rocks of similar bulk composition. Regardless of the specific nature of the source producing this regional gravity trend, it appears to be crustal in origin rather than due to a deeper source.

Heat flow data, though sparse in the survey area, do support this crustal model, as the northern part of the survey area has characteristic Basin and Range heat flow values (2.0 - 2.5 HFU), whereas the few samples south of the gradient have lower heat flow values (1.0 - 1.5 HFU) (Chapman et al., 1978; Blackwell, 1978; Bodell,

1980) that are more characteristic of the Colorado Plateau values. Because the thermal transition zone along the Basin and Range province margin is generally narrow (about 20 km), the heat source causing these thermal transitions must be in the crust (Blackwell, 1978).

Also supporting this model, though again qualified because of the sparsity of data, is the interpretation offered through a seismic refraction study conducted by the U.S.G.S. in 1961-1963 (Stuart et al., 1964; Smith, 1978; Prodehl, 1979). The crust-mantle boundary was contoured by Prodehl (1979), using the transition zone in which the compressional seismic velocity increases from 6.6-7.0 km/sec to 7.8 km/sec as the Moho depth rather than the classical distinctive Mohorovicic discontinuity found elsewhere. His map indicates a southerly thinning of the crust concurrent with the regional gravity gradient.

There is also supportive evidence in the studies of the focal depths of earthquakes in the Great Basin which demonstrate a concentration of earthquakes at depths of 6-15 km and an absence at greater depths (Eaton et al., 1978). This result supports the crustal heat flow model in which temperatures reach 300°C (the limiting temperature for elastic behavior) at a depth of about 15 km (Turcotte, 1974; Eaton et al., 1978). Unfortunately, earthquake focal depth data are not available in the southern portion of the survey area to compare with the postulated transition model.

Eaton et al. (1978) suggest a composite crustal model to explain this regional gravity gradient and others located along the western and northern margins of the Basin and Range province facing inward. A

lateral density contrast of 0.1 g/cc extending through the crust resulting from a sharp compositional contrast related to magmatic invasion, metamorphism, and/or possibly partial melting could explain the regional gravity variation.

Profile A-A'.-- A north-south profile (A-A', Figure 8) is chosen to allow an examination of the regional gravity gradient and help determine its source. The profile is located perpendicular to the regional east-west trend and avoids higher-frequency anomalies as the purpose of the profile is to determine the source of the regional gravity and not local anomalies.

Profile A-A' (Figure 8) is modeled using a two-dimensional gravity computation algorithm (Talwani et al., 1959) developed in the gravity modeling programs of Snow (1978). The reader is referred to Snow (1978) for a complete discussion. A simple model with a lateral density contrast of 0.1 g/cc to the north in a layer from 5 to 15 km in depth (which essentially agrees with the model indicated by Prodehl (1979)) results in a curve closely matching the observed data along the profile (Figure 8) both with respect to the values of the total anomaly size and also the approximate gravity gradient across the transition zone. No attempt is made to account for high-frequency features in the profile as they are not germane to the crustal investigation. Upon resolving the source of the regional gravity trend to be caused by an inhomogeneous crust (Figure 8), a surface representing the regional gravity trend is contoured using the fourth-order polynomial surface which is fit to the complete Bouguer gravity data (Figure 6).

Figure 8. Interpretative geologic cross section along gravity profile A-A'. The number indicates the density (in g/cc) of the layer.

Aeromagnetic data.--An aeromagnetic survey over the study area was flown by Scintrex Mineral Surveys (1972) at 2,744 m barometric elevation and with a flight-line spacing of 3.2 km. A regional gradient of about 5.6 gammas/km was removed and the resulting magnetic values were contoured by Scintrex at a 20- and 100-gamma interval (Figure 9). On the magnetic contour map, magnetic highs correlate with exposures of Tertiary quartz monzonite or Precambrian rocks; and magnetic lows correlate with Mesozoic and Cenozoic sedimentary rocks. The Cenozoic volcanics in the Bull Valley district do not have a coherent magnetic expression. Although the aeromagnetic survey was not detailed, a northeast-trending magnetic high indicates quartz monzonite along the Bull Valley-Big Mountain arch and a magnetic high corresponds with Mineral Mountain. The two magnetic highs are separated by a magnetic low. A magnetic high corresponds approximately with the upthrown block lying east of the Hurricane fault. This trend continues west across the St. George basin to the Nevada state line forming a magnetic high along the southern border of the survey area.

Local Gravity Features

Two gravity maps are used in the interpretation of local gravity features. They are the complete Bouguer gravity anomaly map (Figure 4) and the fourth-order residual gravity anomaly map (Figure 7).

Complete Bouguer Gravity Anomaly Map.--The complete Bouguer gravity anomaly map of southwestern Utah (Figure 4) shows gravity features which are as diverse as the geology of the region. The eastern border of the survey area is dominated by a northeast-trending

Figure 9. Aeromagnetic map that includes the study area (taken from Zeitz et al., 1976).

gravity high and a north-trending gravity low as indicated by the offset gravity contours. The gravity high corresponds with the Virgin anticline, which has an axial exposure of Paleozoic rocks. The gravity low corresponds with the downthrown side of the Hurricane fault indicating less dense rocks to the west of the fault with Paleozoic rocks exposed on the upthrown, eastern block. The northeast end of the Virgin anticline gravity high abuts with the Hurricane fault gravity low near Anderson Junction, in agreement with the mapped geology (Cook, 1960). The southern end of the Virgin anticline gravity high is disrupted near the town of Washington. This disruption correlates with the mapped location of the Washington fault, which otherwise has a weak gravity expression. The Virgin anticline gravity high also has a weak gravity expression in the area lying southwest of the Washington fault. Although accurate definition across the Hurricane fault is difficult due to the physical restrictions involved with procuring ample data because of the rugged topography of the Hurricane Cliffs, there appears to be at least a 20-mgal anomaly attributable to the Hurricane fault. As with most major faults in the intermountain region, the western block is downthrown with what may be reverse-drag flexure west of the fault (Hamblin, 1965).

The highest gravity anomaly values of the survey area (Figure 4) are in the southwest corner of the map with values up to -127 mgal. This correlates with the largest exposure of Paleozoic rocks in the region and a thrust sheet of Paleozoic rocks over Mesozoic rocks. The lack of data north of the gravity high prevented better determination of the structure, but further clarification is gained by the

fourth-order residual gravity map, as will be shown later. Farther north of the Paleozoic rocks is a gravity low and corresponding gravity high to the northeast. Due to the regional effect, there appears to be no closure of gravity contours around the gravity high of -163 mgal and only 4-mgal closure around the low of -172 mgal. The gravity low occurs over the alluvium of the Beaver Dam Wash and the gravity high occurs to the east, over Square Top Mountain, the most eastern portion of the Sevier thrust sheet.

The Bull Valley district and the region to the immediate east, past Veyo to the Pine Valley Mountains, has the best coverage as far as the gravity survey is concerned and also happens to be an area of pronounced Tertiary volcanic activity and numerous faults of various lateral extent and vertical displacement (Blank, 1959). A gravity low west of Veyo lies in this area of extensive faulting and volcanism. The east side of the gravity low trends northeast for about 15 km and the west side trends north for about 20 km. Both sides of the gravity low indicate faults as shown by the closely spaced gravity contours. The northward continuation of the Gunlock fault has been postulated by Cook (1960) and Montgomery (1973) and is supported by the gravity gradient on the complete Bouguer gravity anomaly map. Splaying of the Gunlock fault near Gunlock could account for the northeast-trending fault east of the gravity low, herein designated the "Magotsu fault".

In the Enterprise area, a gravity anomaly high of -181 mgal, referred to as the Enterprise Reservoir gravity high by Pe (1980), has a closure of about 10 mgal and is postulated by Pe to be due to a horst-type block in the basement structure relative to the Reservoir

trough which lies to the immediate southeast (Blank, 1959; Pe, 1980). The gravity low (with a low value of -204 mgal) associated with the Reservoir trough has a closure of 6-8 mgal and is due to lower-density sediments and volcanics which fill the depression. The gravity contours along the eastern and western borders of the Enterprise Reservoir gravity high are closely spaced, thus indicating normal high-angle faulting on both sides. Northeast of the Enterprise trough gravity low is a continuation of the gravity low into the Newcastle gravity low (Pe, 1980). The northeast trend of this gravity feature appears to be associated with the Laramide-age structure evidenced in the Iron Springs district (Blank, 1959; Pe, 1980). The Bull Valley-Big Mountain arch is believed to have a quartz monzonite core emplaced along a zone of weakness resulting from Laramide activity, with the Reservoir trough graben a consequence of this structure (Blank, 1959; Pe, 1980). The Bull Valley-Big Mountain arch manifests itself as a gravity high possibly as far southwest as Mineral Mountain and northwest across Big Mountain to at least the edge of the survey area.

Adjacent to the Pine Valley Mountains, two gravity lows occur with 4-mgal closure: 1) one within Pine Valley; and 2) the other centered within the village of New Harmony. In both areas the lows are attributed to alluvium fill in the respective basins. A more extensive arcuate gravity low encompasses the Pine Valley and New Harmony gravity lows and the northern half of the Pine Valley Mountains, but the cause of this broad anomaly is not understood. Northeast of the New Harmony gravity low is a minor gravity high corresponding with Harmony Mountain and farther northeast is the southern end of the south Cedar Valley

gravity low indicating a graben (Pe, 1980).

Fourth-Order Residual Gravity Anomaly Map:--The fourth-order residual gravity anomaly map (Figure 7) helps to clarify many of the structures. In particular several of the major faults are delineated better on the residual gravity map because the dominating effect of the regional gravity trend is removed. Most notable are the Gunlock fault, the Beaver Dam Wash fault, and the Magotsu fault.

The gravity effect of the Beaver Dam Wash fault is not readily apparent on the complete Bouguer gravity anomaly map particularly because of the lack of data along the central portion of the fault. Closure is indicated around the gravity low over the northern end of Beaver Dam Wash and the gravity high associated with the Paleozoics exposed in the Beaver Dam Mountains. The residual fourth-order gravity map also suggests some closure but shows a 20-mgal anomaly that indicates a well-defined high-angle fault with a downthrown block on the west. The extent of the gravity gradient indicates that the Beaver Dam fault extends from Square Top Mountain south to at least the Arizona state line.

The Gunlock-Shebit-Cedar Pocket fault system (Dobbin, 1939; Cook, 1960), which is referred to as the Grand Wash fault in Arizona (Montgomery, 1973; Hamblin, 1970), is not as well defined by the gravity data as the Beaver Dam Wash fault but the fault shows a closure of 6-mgal for the downthrown block on the residual gravity map (Figure 7) and an anomaly of about 12 mgal across the fault. On the complete Bouguer gravity anomaly map (Figure 4), the Gunlock-Shebit-Cedar Pocket

fault system corresponds with an offset of the generally east-trending contours.

The vertical displacement of the Grand Wash fault may be as great as 4,900 m near the mouth of the Grand Canyon but decreases to less than 500 m in Utah (Hamblin, 1970). This interpretation is substantiated by the decreasing magnitude of the gravity anomaly from south to north and the eventual disappearance of the anomaly in the Gunlock area.

Perhaps the most important feature gained by the residual gravity map (Figure 7) is the resolution of the Magotsu fault, which is indicated by the steep gravity gradient along the eastern margin of a gravity low that has a closure of 10 mgal and a length of at least 25 km. Because of recent basalt flows and alluvium cover, there is apparently no surficial, geologic expression of the Magotsu fault. Although the complete Bouguer gravity anomaly map shows a distinct trough that suggests a definite structure, the residual gravity map better defines the Magotsu fault and its extent. The trend of the Magotsu fault and the gravity low to the northwest, which indicates a graben, herein designated the "Magotsu graben", is northeast. A 12-mgal anomaly associated with the Magotsu fault, in addition to the increase of the gravity values to the northwest, suggests that the Magotsu graben is tilted east and that the Magotsu fault is normally faulted. The residual gravity map shows that the trend of the fault along the western edge of the Magotsu graben is northeast. This is not in agreement with the complete Bouguer gravity anomaly map which indicates that the fault trends north.

Two gravity highs of 2- and 4-mgal closure lie northwest of the Magotsu fault; and their locations correspond respectively to Mineral Mountain and the Paleozoic rocks exposed north of Square Top Mountain. These two gravity highs dominate the gravity expression in the immediate area. On the fourth-order residual gravity map the Enterprise Reservoir gravity high remains similar to that on the complete Bouguer gravity anomaly map, but the gravity low associated with the Reservoir trough approximates more closely the geologically mapped arcuate shape of the low-density Tertiary sediments and Quaternary basalts (Blank, 1959) and better defines the structure in the northwest corner of the survey area even with the edge-effect error introduced. A gravity low lying west of the Reservoir trough with a closure of 4 mgal coincides well with the exposure of the lower-density Tertiary sediments in this area.

Profile B-B'.--Profile B-B' (Figure 10) extends eastward across the survey area from Beaver Dam Wash on the west to Little Creek Terrace on the east for a distance of approximately 90 km. Two pronounced gravity lows, with complete Bouguer gravity anomaly values decreasing to -171 mgal and -176 mgal, occur over Beaver Dam Wash and the area lying west of the Hurricane Cliffs, respectively. The two gravity lows are separated by an extensive gravity high with complete Bouguer gravity anomaly values of about -151 to -146 mgal. Over the flat-lying Mesozoic units east of the Hurricane fault, the anomaly values are consistently about -165 mgal. In the area lying east of the Virgin anticline and starting with station RG487 (Figure 10), an assumed regional gradient of 0.61 mgal/km (corresponding with an

Figure 10. Interpretative geologic cross section along gravity profile B-B'. The number indicates the density (in g/cc) of the layer.

Figure 10. Continued.

observed regional change of gravity 13.5 mgal over 22.5 km) is removed from the observed data resulting in the adjusted data. The resulting Bouguer gravity anomaly values are therefore made to be equal at the Paleozoic outcrops exposed along the Virgin anticline and the upthrown block of the Hurricane fault. This regional effect is attributed to a combination of the east-west step-like transition between the Basin and Range and the Colorado Plateau and the north-trending regional gradient caused by the profile crossing the strike of this trend in the eastern portion of the profile. The densities used in modeling profile B-B' are listed in Table 1 except for a highly fractured and complex unit on the western edge of the Hurricane fault, which has an assumed composite density of 2.35 g/cc.

Profile B-B' is modeled using a two-dimensional program (Snow, 1978) because the geologic structure along the profile is dominated by elongate north-trending faults approximately perpendicular to the trend of the profile. Profile B-B' exhibits three major high-angle faults with the western block downthrown and its beds dipping east due to either a tilted block or reverse-drag flexure associated with listric, normal faulting (Hamblin, 1965). The westernmost fault is the Beaver Dam Wash fault with a total gravity relief of 20 mgal. Mesozoic rocks are exposed east of the fault, with alluvium covering the downthrown western block for a distance of about 5 km beyond which Tertiary volcanics crop out. Because the full gravity anomaly is not recorded within the survey area, edge effects due to the modeling procedure may distort the interpretation but this effect is probably insignificant with regards to the overall interpretation. The fault is modeled to a

best fit to extend to a depth of 2,700 m with a vertical displacement of 2,000 m.

The increase of the gravity values at the western end of profile B-B' indicate west-dipping beds in the area west of the Beaver Dam Wash fault. The model shows the Mesozoic sandstone unit exposed at the west end of the profile, but the geologic control in this area is insufficient to project the proper dip of the beds. Another interpretation of the structure is to diminish the thickness of the volcanic layer and instead explain the large gravity anomaly with deeper alluvial fill.

In the central part of profile B-B', a 7-mgal anomaly is caused by the Gunlock fault, which is modeled to a depth of 1,000 m with a total vertical displacement of 500 m. Profile B-B' crosses the Gunlock fault near the northern end of the fault. The Shebit fault, which continues to the south in alignment with the Gunlock fault, is downthrown on the east and thus opposite in sense to both the Gunlock fault to the north and the Cedar Pocket fault to the south. Accordingly, displacement of 500 m is reasonable for the Gunlock fault.

The area along profile B-B' lying between the Beaver Dam Wash fault and the Gunlock fault, while complex due to dipping beds and multiple faulting, shows a shallowing of the Mesozoic sandstone unit which is in agreement with the geologic mapping and the gravity data. In the east-central part of profile B-B', the decrease in gravity values is interpreted as caused by a thickening Mesozoic sandstone unit. There is no significant gravity signature over the Virgin anticline in profile B-B' because of the small density contrast

involved and the fact that the Paleozoic units are found at such a shallow depth (less than 1,000 m) where profile B-B' crosses the Virgin anticline (Hamblin, 1980, personal communication).

The effect of the Hurricane fault manifests itself to the immediate east of the Virgin anticline as a 15-mgal gravity anomaly. The fault is modeled as increasingly sloping units to a depth of 3,000 m with a large wedge of undetermined lithology reaching a maximum depth of 1,000 m. The wedge could be comprised of a highly faulted melange of rocks as suggested by Cook (1960) or the wedge could simply be the result of reverse-drag flexure with synthetic faulting in the downthrown block as suggested by Hamblin (1965, 1970). In profile B-B', the wedge is modeled as a combination of these features. The indicated total vertical displacement of 3,000 m for the Hurricane fault, shown in Figure 10, is in agreement with the interpretation of Cook (1960) and Hamblin and Best (1978). The flat-lying beds to the east of the Hurricane fault range from the Paleozoic unit exposed at the fault scarp along the Hurricane Cliffs to Mesozoic sandstones exposed in the mesas and plateaus lying east of the Hurricane Cliffs.

Profile C-C'.---Profile C-C' (Figure 11) extends eastward for about 45 km from north of Mineral Mountain through the southern portion of the Bull Valley Mountains to the southwestern corner of the Pine Valley Mountains. The profile, which nearly coincides with an east-west interpretative geologic cross section taken by Cook (1960), is chosen to help clarify the basic structure of the Bull Valley district and especially the structure related to the Veyo Hot Springs. A two-dimensional model is used in the interpretation of profile C-C'

Figure 11. Interpretative geologic cross section along gravity profile C-C'. The number indicates the density (in g/cc) of the layer.

because of the two-dimensional nature of the Magotsu graben as suggested by the fourth-order residual gravity map. If the structure located at the western end of the profile is instead modeled using a two and a half-dimensional or three-dimensional model, the effect would be to increase the depth of the modeled features in order to best fit the data.

For profile C-C', two sets of gravity anomaly values are modeled: the complete Bouguer gravity anomaly values, which are modeled using the same procedure as that for profiles A-A' and B-B'; and the residual gravity values, which are obtained from the fourth-order residual gravity map (Figure 11). For both sets of gravity values, there are two minor gravity highs in the Bull Valley Mountains and a large gravity low corresponding to the area immediately west of Veyo.

A comparison of the complete Bouguer gravity anomaly values with the corresponding residual gravity values is shown in Figure 11. There is good correlation in the two sets of gravity values across the profile except for differences at the extreme ends and a slight discrepancy in the center. The discrepancy at the west end is attributed to edge effects in the generation of the fourth-order polynomial surface. The eastern 16 km of the profile shows a major departure of the residual gravity values from the complete Bouguer gravity anomaly values. This behavior is thought to be a result of the eastern end of profile C-C' crossing the east-trending strike of the large regional gravity effect. The remaining portion of the profile is subparallel with the strike of the regional gravity trend and does not manifest any regional effect.

Modeling of the complete Bouguer gravity anomaly values gives a good fit (not shown in this report) with the known geology except in the region east of the Magotsu fault which is marked by flat-lying Mesozoic beds partially covered with basalt flows. Although a good fit in this region is possible by modeling a near-surface horizontal 300-m-thick sequence of 2.1-g/cc-density vesicular basalts, the model is considered geologically unreasonable (Nash, 1980, personal communication), and therefore not included in this report.

Therefore, profile C-C' is modeled to the residual gravity values in order to eliminate better the regional effect which is dominating in the area. The modeling of profile C-C' is constrained so as to correspond in so far as possible with the previously mentioned east-trending geologic cross section of Cook (1960) which extends across essentially the same area as profile C-C'.

In the western 15 km of profile C-C', the residual gravity values show a gradual increase that culminate in the first of two minor gravity highs. In modeling this area, a good fit to the residual gravity data can be obtained by raising the Paleozoic unit from a depth of 1,650 m to 1,200 m overlain by an uncertain combination of Tertiary volcanics. A possible mechanism for the west-dipping Paleozoic unit could be the thrust sheet (as mapped by Cook, 1960) which is exposed south of Mineral Mountain and at Square Top Mountain, both within several kilometers of the profile. Although modeled with a dip of less than 5°, the slope of the thrust plane could be increased and still exhibit a good fit through manipulation of the densities of the Tertiary volcanics which have not yet been mapped geologically. Cook

(1960) estimated the angle of the thrust plane to be from 5° to 25° . The gravity high at the east end of the gradually dipping block is interpreted as representing a faulted segment of the thrust sheet which is within 200 m of the surface. Along the profile, the vertical displacement of the fault to the west of the faulted segment is 1,000 m. The vertical displacement of the fault to the east of the block is undetermined because the faulted segment forms the edge of the thrust sheet.

Along profile C-C' in the area west of the Bull Valley district, the rocks are highly faulted (as is true for the entire Bull Valley district), but only the faults with substantial displacement are shown in the profile. Consequently, three faults are modeled with vertical displacements of 300 m, 2,000 m and 1,400 m, respectively, from west to east. The westernmost block formed by this faulting is depicted with flat-lying beds, whereas the two blocks to the east dip east, with all three downthrown on the west of the fault. Although the trend of the faulting was interpreted by Cook (1960) and Montgomery (1973) to continue in a northerly direction beyond the northernmost exposure of the Gunlock fault, the separate northward and northeastward trends of the gravity contours on the residual map and the complete Bouguer anomaly map indicate that the fault apparently bifurcates, with one branch extending north and the other branch bending and extending northeast. Such a northeast trend is subparallel to the Hurricane fault to the east, which also bends in a similar fashion, as well as other faults in northern Arizona (Stewart, 1971; Hamblin, 1980, personal communication).

Along profile C-C', the Magotsu fault is apparently the eastern limit of the steeply dipping faulted blocks as the sedimentary beds to the east are apparently flat-lying. In the area east of the Magotsu fault, the gravity values remain approximately constant although the area is marked with portions of several different basalt flows, some of vesicular nature, and alluvium with some exposure of Cretaceous limestone (Cook, 1960).

DISCUSSION

Regional Analysis

The survey area is located at the southern end of the Great Basin in the transition zone between the Basin and Range and Colorado Plateau provinces. Fenneman (1931) postulated that this transition is located along the Wasatch-Hurricane fault zone which has since been designated the Wasatch Line (Kay, 1951). On the basis of aeromagnetic and seismic data, Shuey et al. (1973) placed this boundary approximately 50 km east of the Wasatch Line. Cenozoic faulting and volcanism have, in general, been migrating eastward from the central part of the Basin and Range to the Colorado Plateau (Hamblin and Best, 1978; Christensen and McKee, 1978).

The geologic map of Cook (1960) shows that the stratigraphic beds are flat-lying in the eastern portion of the survey area and comprised of east-tilting blocks in the western portion. This transition occurs across a series of major north-trending normal or listric normal faults with the western block either downthrown or featuring reverse-drag flexure. Profiles B-B' (Figure 10) and C-C' (Figure 11) in the present study support Cook's geologic mapping with only a few minor discrepancies. Geophysical data indicate that there may also be a geologic transition from north to south across the survey area. The Intermountain seismic belt (ISB) (Smith and Sbar, 1974) trends south along the Wasatch-Hurricane fault zone and intersects a secondary

seismic zone trending west-southwest from Cedar City, Utah across southwestern Utah and southern Nevada. Smith and Sbar (1974) postulate that the two intersecting seismic zones form the southern and eastern boundaries of the Great Basin subplate.

A study by Prodehl (1979) of crustal refraction data taken during 1961-63 by Stuart et al. (1964) presents a crustal thickness map which includes Utah and Nevada. The crust is depicted as being thin (less than 30 km) in the central part of the Great Basin, thicker to the south (about 37 km near lat 37.5° N) and thinning again in northern Arizona (about 28 km) and thus forming a southeast-trending trough across southwestern Utah and southern Utah. Because of the sparse coverage available in Prodehl's study, it may be possible to reinterpret the trend of the trough to be in a more easterly-trending direction.

Heat flow data (Chapman et al., 1978; Blackwell, 1978; Bodell, 1980) indicate a thermal boundary trending east across the survey area that is coincident with the seismic zone denoted by Smith and Sbar (1974). The thermal transition is probably associated with the variation in crustal thickness.

The regional gravity model (Figure 8) which is construed to help resolve the cause of the pervasive east-trending regional gravity effect, supports Smith and Sbar's (1974) concept of the existence of a Great Basin subplate. Wrench faulting, back-arc spreading, the east Pacific Rise, and mantle plumes are the current theories of the origin of basin-range structure (Stewart, 1978) and are believed to explain the active tectonism in the survey area.

Local Analysis

Profiles B-B' and C-C' are in good agreement with the mapped geology of southwestern Utah (Cook, 1960). Rock density measurements and geologic mapping are the only control available for use in the gravity interpretation. The fault displacements and the thicknesses of units are interpreted in the models which, though not exact, are believed to be reasonable representations of the real structural features.

In Profile B-B', the structure is interpreted as a series of north-trending normal or listric normal faults with either downthrow or reverse-drag flexure to the west of the fault (Hamblin, 1965, 1970). Profile C-C' lies in the area of the regional gravity transition and crosses several prominent structural features. The Bull Valley district is a geologically complex region and the interpretation of profile C-C' attempts to model only those features with a significant gravity expression. The influence of the thrust sheet is seen to the west with three indicated faults lying between the eastern extent of the thrust sheet and the flat-lying stratigraphic beds more typical of the Colorado Plateau.

Geothermal Analysis

The vertical displacement of the faults along profile C-C' ranges up to 2,000 m as interpreted in the model, with the faults extending to depths of 4,000 m. It is believed that to model the faults deeper by further delineating the Paleozoic unit is beyond the resolution of the gravity data. This restriction does not limit the total depth extent

of the fault to the fault depth indicated in the model. Therefore, these faults probably continue to a greater depth (of perhaps 5 km) and are directly related to the source of the hot springs near Veyo. The Magotsu fault or the antithetic and synthetic faults associated with it are located close enough to the Veyo Hot Springs (that is, within about 2 km) to offer a conduit for hot water circulated at depth to reach the surface. The Magotsu fault is interpreted as the last major fault east of the complex Bull Valley district before observing the flat-lying stratigraphic beds typical of the Colorado Plateau, which continue east.

La Verkin Hot Springs are located at the intersection of the Virgin River and the Hurricane fault. The vertical displacement of the Hurricane fault at that point is probably 3,000 m and the depth extent of the fault is probably much greater (Cook, 1960; Best and Hamblin, 1978). The thermal source of the La Verkin Hot Springs is believed to be at depth (about 3-4 km) and structurally controlled by the Hurricane fault.

SUMMARY AND CONCLUSIONS

The gravity survey of the southwestern part of the southern Utah geothermal belt has assisted in understanding better the geologic structure and physical characteristics which govern the geothermal potential of the area. The survey area lies along the southern margin of the Great Basin in the transition zone between the Basin and Range and the Colorado Plateau provinces where extensive Cenozoic faulting and volcanism occurred.

Two gravity anomaly maps (a complete Bouguer gravity anomaly map and a fourth-order residual gravity anomaly map) were made to help clarify the geologic structure of the survey area. A north-trending profile (profile A-A') was chosen to interpret the regional gravity, and two east-trending profiles (profile B-B' and profile C-C') were chosen to interpret the local geologic structure.

On a regional basis, a geophysical boundary that trends eastward across the central part of the survey area (as postulated by Smith and Sbar (1974) from earthquake data and as inferred by heat flow data by Chapman et al., 1978; Blackwell, 1978, and Bodell, 1980), has been supported by the regional gravity model (profile A-A'). It was postulated that a crustal lateral density contrast of 0.1 gm/cc from a depth of 5 to 15 km is the source of a pervasive east-trending regional gravity anomaly belt. In addition, there is a north-trending regional gravity transition of a lesser magnitude which has been attributed to

the transition between the Basin and Range and Colorado Plateau provinces.

The more prominent structural features were shown on the complete Bouguer gravity anomaly map with further clarification gained with the fourth-order residual gravity anomaly map. The eastern part of the complete Bouguer gravity anomaly map area is dominated by a north-trending gravity low with a northeast-trending gravity high which intersects the gravity low from the southwest near Anderson Junction. The gravity low corresponds to the lower density downthrown block to the west of the Hurricane fault. The gravity high indicates the Virgin anticline which is disrupted to the southwest by a gravity feature interpreted as the Washington fault.

The gravity features in the western part of the survey area were more clearly understood using the fourth-order residual gravity anomaly map than the complete Bouguer gravity anomaly map. Among others, the gravity features indicate the Beaver Dam Wash fault, the Gunlock-Shebit-Cedar Pocket fault system, and the two faults which define the Magotsu graben. The trend of the fault on the western edge of the Magotsu graben may either trend northeast as indicated on the fourth-order residual gravity anomaly map or trend north as indicated on the complete Bouguer anomaly map. The fault to the east of the Magotsu graben is the Magotsu fault, which trends northeast. These geologic features are generally normal faults with downthrow on the west. The gravity high east of the Beaver Dam Wash fault is further accentuated because it is located over the Paleozoic rocks exposed at Square Top Mountain, the most eastern extent of the Sevier thrust sheet

theory is the possibility of reverse-drag on the downthrown block rather than a rigid east-dipping block (Hamblin, 1965, 1970).

The Hurricane fault is the most prominent feature of the Miocene-Pliocene episode of structural activity. The trend of the fault, although basically northerly, is of a rhombic or zig-zag nature and coincides with the trend of the Virgin anticline north of Touquerville (Cook, 1960). Similar rhombic or zig-zag faulting is common during the Miocene-Pliocene episode of faulting and is found elsewhere in the Basin and Range (Rowley et al., 1979; Hamblin, 1980, personal communication). With present relief of 500 m near Hurricane, Dobbin (1939) and others (Cook, 1960; Averitt, 1964; Kurie, 1966; Hamblin, 1970) believe that a vertical displacement of 2,500 m to 4,500 m has occurred over two episodes of normal faulting separated by a long inter-fault erosional period which erased the physiographic evidence of the earlier, greater dislocation.

Though not understood as well as the Hurricane fault, the maximum vertical displacement of the other major faults in the survey area, except for the Hurricane Fault, generally occurs in the south, with little or no vertical displacement in the north. Only the Beaver Dam Wash fault exhibits diagonal slip, with the western block moving down and south relative to the eastern block (Cook, 1960).

The northwesterly-trending faults of the Bull Valley district are classified with the Miocene-Pliocene episode of faulting as they cut post-Rencher formations (less than 21 m.y. old) and are believed to be due to crustal adjustment resulting from the large volume of extrusions rather than the actual forces of intrusion (Cook, 1960).

beds that are typical of the Colorado Plateau. The geologic interpretation of profile C-C' indicated that the faults in the Bull Valley district extend to a depth of at least 4,000 m and therefore may be structurally associated with a conduit for a deep-seated hot-water source responsible for the Veyo Hot Springs. Similarly, the source of the La Verkin Hot Springs is probably structurally related to the Hurricane fault.

APPENDIX A

LISTING OF PRINCIPAL FACTS OF GRAVITY DATA

Notes: 1) Units are as follows:

	<u>UNITS</u>
Latitude	degrees, minutes
Longitude	degrees, minutes
Elevation	meters
Observed gravity	milligals
Theoretical gravity*	milligals
Free-air gravity anomaly value	milligals
Simple Bouguer gravity anomaly value**	milligals
Terrain correction (T.C.)**	milligals
Terrain-corrected Bouguer gravity anomaly value	milligals

2) Coding is as follows:

RG000 Number designation of gravity station taken by Ronald Green

EH000 Number designation of gravity station taken by Elwood Hardman (1964).

WP000 Number designation of gravity station taken by Win Pe (1978).

*Theoretical gravity at mean sea level, using the International gravity formula.

**A density contrast of 2.67 g/cc was assumed for both the Bouguer and terrain corrections. Terrain-correction values were obtained for the inner zone (out to a radial distance of 0.895 km from the station) by hand using a Hammer zone chart, and for the outer zones (out to a radial distance of 166.7 km from the station) by using the terrain-correction program of Serpa (1980) on the UNIVAC 1108 digital computer, at the University of Utah.

Note: All data are referred to either the St. George base station, which has a published absolute gravity value of 979610.26 mgal, or the Enterprise base station, which has a published absolute gravity value of 979446.73 mgal (Cook et al., 1971).

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG001	37. 6.64	113.34.84	842.	979610.26	979926.57	-56.61	-150.65	1.30	-149.35
RG002	37. 7.80	113.30.85	842.	979607.82	979928.27	-60.75	-154.79	1.23	-153.56
RG003	37. 2.76	113.31.84	821.	979609.05	979920.96	-58.70	-150.39	.60	-149.79
RG004	37. .61	113.31.70	881.	979602.67	979917.87	-43.46	-141.86	.64	-141.22
RG005	37. .72	113.34.25	822.	979604.49	979918.03	-59.95	-151.78	.77	-151.01
RG006	37. 5.15	113.33.35	787.	979619.95	979924.42	-61.52	-149.50	1.00	-148.50
RG007	37. 8.88	113.40.43	902.	979604.84	979929.82	-46.56	-147.38	1.09	-146.29
RG008	37. 9.66	113.40.99	919.	979601.29	979930.95	-46.07	-148.76	1.27	-147.49
RG009	37.10.64	113.42.96	945.	979597.52	979932.36	-43.16	-148.78	1.77	-147.01
RG010	37.10.89	113.44.42	954.	979594.24	979932.72	-44.07	-150.68	3.48	-147.20
RG011	37.10.53	113.46.35	1066.	979573.85	979932.20	-29.52	-148.59	1.30	-147.29
RG012	37. 9.15	113.47.74	1181.	979547.60	979930.22	-18.23	-150.18	1.79	-148.39
RG013	37. 6.68	113.49.27	1403.	979505.83	979926.63	12.06	-144.68	2.34	-142.34
RG014	37. 5.80	113.50.03	1394.	979509.23	979925.37	14.00	-141.76	3.25	-138.51
RG015	37. 8.91	113.48.92	1300.	979521.30	979929.87	-7.40	-152.66	3.37	-149.29
RG016	37.11.61	113.46.73	998.	979584.97	979933.76	-40.84	-152.35	2.35	-150.00
RG017	37.11.95	113.47.56	1037.	979575.82	979934.25	-38.53	-154.37	2.20	-152.17
RG018	37.14.10	113.46.73	1071.	979564.85	979937.37	-41.90	-161.62	2.09	-159.53
RG019	37.34.24	113.43.11	1624.	979446.73	979966.58	-18.61	-200.11	.78	-199.33
RG020	37.40.33	113.32.89	1613.	979444.70	979975.42	-32.86	-213.14	.60	-212.54
RG021	37.38.19	113.34.54	1633.	979449.95	979972.33	-18.50	-200.96	1.19	-199.77
RG022	37.36.79	113.36.24	1661.	979442.85	979970.28	-14.80	-200.43	1.02	-199.41
RG023	37.39.71	113.35.22	1586.	979445.42	979974.54	-39.53	-216.82	.48	-216.34
RG024	37.39.80	113.36.36	1584.	979444.93	979974.65	-40.98	-217.96	.37	-217.59
RG025	37.38.91	113.35.22	1594.	979449.77	979973.37	-31.67	-209.80	.68	-209.12
RG026	37.38.86	113.31.79	1688.	979441.41	979973.30	-10.99	-199.62	1.35	-198.27
RG027	37.32.27	113.30.95	1845.	979400.24	979963.72	5.77	-200.36	1.70	-198.66
RG028	37.23.48	113.30.79	1990.	979358.60	979950.97	21.75	-200.63	4.29	-196.34
RG029	37.22.62	113.31.68	2129.	979341.09	979949.72	48.38	-189.53	9.15	-180.38
RG030	37.24.21	113.33.12	1990.	979358.83	979952.02	21.02	-201.40	3.19	-198.21
RG031	37.24.91	113.32.56	1904.	979376.34	979953.04	10.80	-201.94	2.97	-198.97
RG032	37.25.11	113.34.02	1847.	979389.80	979953.33	5.47	-200.93	2.53	-198.40

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG033	37.25.03	113.36.33	1623.	979435.02	979953.21	-17.41	-198.75	2.53	-196.22
RG034	37.25.02	113.37.88	1589.	979443.37	979953.20	-19.59	-197.11	1.83	-195.28
RG035	37.22.86	113.39.22	1542.	979454.52	979950.07	-19.70	-192.01	1.55	-190.46
RG036	37.11.40	113.37.18	1163.	979543.87	979933.45	-30.83	-160.74	1.38	-159.36
RG037	37.13.06	113.37.94	1215.	979530.84	979935.87	-30.11	-165.87	2.07	-163.80
RG039	37.16.38	113.36.36	1459.	979473.17	979940.68	-17.15	-180.23	2.30	-177.93
RG040	37.15.93	113.35.73	1475.	979468.76	979940.02	-16.11	-180.93	2.81	-178.12
RG041	37.15.64	113.36.66	1397.	979485.20	979939.60	-23.32	-179.42	2.09	-177.33
RG042	37.15.08	113.36.31	1385.	979486.02	979938.79	-25.26	-180.07	2.34	-177.73
RG038	37.15.22	113.37.20	1383.	979488.51	979938.99	-23.64	-178.20	1.63	-176.57
RG043	37.17.18	113.35.26	1646.	979433.07	979941.83	-8.83	-184.76	3.48	-181.28
RG044	37.17.90	113.34.38	1793.	979401.80	979942.87	12.39	-188.02	4.19	-183.83
RG045	37.18.80	113.33.84	1946.	979369.68	979944.18	25.88	-191.52	4.99	-186.53
RG046	37.18.91	113.32.83	2054.	979346.92	979944.34	36.55	-193.01	5.63	-187.38
RG047	37.18.60	113.32.17	2105.	979335.78	979943.89	41.47	-193.75	7.35	-186.40
RG048	37.18.03	113.31.46	1896.	979376.21	979943.05	18.40	-193.52	10.89	-182.63
RG049	37.17.16	113.31.28	1753.	979406.98	979941.80	6.02	-189.82	9.03	-180.79
RG050	37.16.64	113.31.03	1681.	979423.72	979941.06	1.30	-186.50	6.76	-179.74
RG051	37.15.04	113.31.73	1607.	979440.80	979938.73	-2.14	-181.67	3.21	-178.46
RG052	37.19.76	113.41.54	1349.	979496.61	979945.56	-32.74	-183.45	1.43	-182.02
RG053	37.19.52	113.40.75	1433.	979480.27	979945.21	-22.86	-182.94	1.18	-181.76
RG054	37.18.30	113.40.35	1404.	979486.35	979943.45	-23.85	-180.73	1.14	-179.59
RG055	37.17.59	113.39.17	1422.	979481.70	979942.43	-21.85	-180.77	1.66	-179.11
RG056	37.16.25	113.38.39	1408.	979483.63	979940.49	-22.40	-179.72	1.51	-178.21
RG057	37.16.81	113.39.09	1430.	979479.94	979941.31	-19.95	-179.80	1.35	-178.45
RG058	37.18.06	113.38.55	1474.	979471.23	979943.09	-17.08	-181.76	1.89	-179.87
RG059	37.18.99	113.38.00	1603.	979442.70	979944.45	-7.19	-186.28	2.29	-183.99
RG060	37.18.46	113.36.75	1681.	979426.05	979943.68	1.12	-186.73	2.75	-183.98
RG061	37.19.84	113.37.44	1672.	979427.34	979945.68	-2.23	-189.12	2.93	-186.19
RG062	37.20.72	113.33.29	2173.	979322.07	979946.96	45.76	-197.09	7.14	-189.95
RG063	37.20.37	113.34.52	2042.	979347.08	979946.45	30.83	-197.37	5.32	-192.05
RG064	37.20.34	113.35.63	1887.	979381.55	979946.41	17.56	-193.34	3.69	-189.65

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG065	37.20.26	113.36.37	1853.	979388.45	979946.29	14.04	-193.04	3.82	-189.22
RG066	37.20.50	113.38.18	1542.	979455.34	979946.64	-15.35	-187.70	2.17	-185.53
RG067	37. 7.38	113.32.77	879.	979601.83	979927.66	-54.65	-152.85	1.19	-151.66
RG068	37. 7.57	113.32.27	947.	979587.87	979927.93	-47.72	-153.57	1.30	-152.27
RG069	37. 9.02	113.33.97	1030.	979568.66	979930.02	-43.62	-158.68	.93	-157.75
RG070	37.10.69	113.34.13	1138.	979542.73	979932.43	-38.48	-165.66	1.26	-164.40
RG071	37.12.02	113.34.86	1276.	979511.75	979934.35	-28.77	-171.38	2.44	-168.94
RG072	37. 7.05	113.39.51	916.	979601.16	979927.17	-43.36	-145.71	.93	-144.78
RG073	37. 5.98	113.40.54	921.	979601.51	979925.62	-39.77	-142.74	.86	-141.88
RG074	37.13.09	113.35.93	1427.	979478.34	979935.91	-17.09	-176.59	2.90	-173.69
RG075	37.12.53	113.35.44	1363.	979492.24	979935.10	-22.13	-174.48	2.47	-172.01
RG076	37.32.41	113.39.97	1779.	979419.77	979963.92	4.79	-193.99	1.29	-192.70
RG077	37.36.29	113.39.63	1612.	979447.76	979969.55	-24.41	-204.52	.51	-204.01
RG078	37.32.57	113.43.60	1651.	979436.65	979964.16	-17.90	-202.44	1.64	-200.80
RG079	37.31.89	113.45.36	1738.	979419.48	979963.17	-7.26	-201.51	1.07	-200.44
RG080	37.30.28	113.46.81	1927.	979382.45	979960.82	16.28	-199.05	1.60	-197.45
RG081	37.34.24	113.47.30	1647.	979453.77	979966.58	-4.50	-188.56	2.13	-186.43
RG082	37.30.88	113.51.03	1742.	979423.01	979961.70	-1.13	-195.79	1.61	-194.18
RG083	37.35.62	113.52.97	1698.	979441.32	979968.58	-3.16	-192.94	.91	-192.03
RG084	37.35.67	113.56.12	1814.	979413.52	979968.65	4.53	-198.12	.88	-197.24
RG085	37.33.57	113.56.78	1899.	979395.09	979965.62	15.56	-196.66	.92	-195.74
RG086	37.32.85	113.56.53	1894.	979392.83	979964.56	12.85	-198.83	1.04	-197.79
RG087	37.31.50	113.57.06	1950.	979386.41	979962.59	25.61	-192.31	1.88	-190.43
RG088	37.34.87	113.57.56	1867.	979398.62	979967.49	7.34	-201.31	.83	-200.48
RG089	37.36.68	113.58.85	1815.	979409.90	979970.12	-.19	-202.98	.64	-202.34
RG090	37.37.29	114. .10	1817.	979405.98	979971.02	-4.34	-207.37	.58	-206.79
RG091	37.31.77	113.36.77	1767.	979412.44	979962.99	-5.29	-202.73	1.12	-201.61
RG092	37.31.76	113.35.23	1846.	979396.03	979962.98	2.87	-203.47	1.29	-202.18
RG093	37.34.35	113.31.75	1781.	979414.39	979966.74	-2.76	-201.77	3.36	-198.41
RG094	37.33.28	113.31.58	1819.	979406.74	979965.19	3.00	-200.31	1.96	-198.35
RG095	37.33.46	113.27.68	1925.	979376.37	979965.46	5.08	-210.07	1.84	-208.23
RG096	37.36.91	113.24.42	1888.	979406.65	979970.45	18.90	-192.10	1.20	-190.90

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG097	37.36.47	113.21.46	1956.	979387.53	979969.81	21.21	-197.32	1.62	-195.70
RG098	37.36.12	113.12.94	1672.	979432.93	979969.30	-20.36	-207.22	1.51	-205.71
RG099	37.34.58	113. 9.63	1692.	979436.87	979967.08	-7.99	-197.09	3.33	-193.76
RG100	37.31.93	113.11.05	1688.	979435.93	979963.23	-6.49	-195.08	3.56	-191.52
RG101	37.34.87	113.23.94	1914.	979393.59	979967.49	16.79	-197.11	2.06	-195.05
RG102	37.32.41	113.22.21	2020.	979368.10	979963.92	27.52	-198.20	2.18	-196.02
RG103	37.30.68	113.19.31	1724.	979414.46	979961.41	-14.94	-207.59	4.37	-203.22
RG104	37.11.75	113.16.14	976.	979565.26	979933.96	-67.43	-176.52	3.12	-173.40
RG105	37. 7.36	113.11.50	1428.	979479.95	979927.62	-7.00	-166.57	1.23	-165.34
RG106	37. 3.57	113.13.73	1747.	979420.10	979922.13	36.93	-158.23	2.77	-155.46
RG107	37. 5.37	113.10.86	1645.	979438.46	979924.74	21.36	-162.46	1.86	-160.60
RG108	37. 3.58	113.11.89	1691.	979431.66	979922.15	31.35	-157.61	1.67	-155.94
RG109	37. 4.54	113.30.96	1586.	979449.54	979923.54	15.30	-161.88	1.18	-160.70
RG110	37. 4.03	113. 7.63	1494.	979466.94	979922.80	5.21	-161.75	.72	-161.03
RG111	37. 5.68	113. 7.10	1461.	979472.62	979925.19	-1.83	-165.05	.72	-164.33
RG112	37.14.72	113.12.55	1543.	979457.87	979938.27	-4.27	-176.69	2.88	-173.81
RG113	37.15.43	113.12.64	1556.	979456.66	979939.30	-2.46	-176.33	2.84	-173.49
RG114	37.17.27	113.12.07	1750.	979417.84	979941.96	15.79	-179.72	3.21	-176.51
RG115	37.18.14	113.12.07	1747.	979418.35	979943.22	14.38	-180.89	2.71	-178.18
RG116	37.19.01	113.12.07	1761.	979415.67	979944.48	14.57	-182.19	2.81	-179.38
RG117	37.20.66	113.11.77	1753.	979415.46	979946.87	9.43	-186.41	6.65	-179.76
RG118	37.20.66	113. 9.88	1667.	979434.24	979946.87	1.88	-184.43	2.31	-182.12
RG119	37.11.86	113. 9.83	1086.	979545.93	979934.12	-52.97	-174.36	1.96	-172.40
RG120	37. 9.35	113. 9.79	1538.	979455.85	979930.51	-.12	-171.96	3.66	-168.30
RG121	37. 8.50	113. 9.16	1550.	979455.36	979929.27	4.29	-168.87	1.87	-167.00
RG122	37. 8.43	113.11.23	1593.	979446.34	979929.16	8.64	-169.32	2.91	-166.41
RG123	37.12.87	113.10.89	1111.	979541.74	979935.59	-50.91	-175.09	1.96	-173.13
RG124	37.12.62	113.14.38	1114.	979543.09	979935.23	-48.44	-172.89	1.59	-171.30
RG125	37.10.90	113.46.78	1044.	979577.37	979932.73	-33.31	-149.93	1.66	-148.27
RG126	37.12.25	113.48.03	1056.	979572.05	979934.69	-36.62	-154.67	2.09	-152.58
RG127	37.13.25	113.48.25	1078.	979568.54	979936.13	-34.81	-155.31	1.76	-153.55
RG128	37.13.95	113.48.91	1107.	979564.09	979937.16	-31.44	-155.15	1.65	-153.50

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG129	37.14.23	113.49.49	1125.	979560.66	979937.56	-29.72	-155.44	1.77	-153.67
RG130	37.14.67	113.50.25	1158.	979555.47	979938.20	-25.49	-154.85	1.63	-153.22
RG131	37.15.52	113.52.24	1212.	979547.00	979939.43	-18.54	-153.93	.89	-153.04
RG132	37.15.73	113.52.57	1213.	979547.23	979939.73	-18.24	-153.77	.72	-153.05
RG133	37.16.17	113.53.16	1193.	979552.21	979940.37	-20.01	-153.32	.90	-152.42
RG134	37.16.57	113.53.59	1211.	979550.09	979940.96	-17.08	-152.44	.99	-151.45
RG135	37.18.29	113.56.29	1277.	979531.06	979943.43	-18.16	-160.91	.80	-160.11
RG136	37.18.36	113.56.96	1242.	979532.91	979943.54	-27.24	-166.07	.76	-165.31
RG137	37.18.45	113.57.52	1241.	979530.05	979943.67	-30.70	-169.36	.73	-168.63
RG138	37.18.74	113.58.28	1217.	979532.12	979944.09	-36.48	-172.45	.97	-171.48
RG139	37.18.61	113.59.85	1068.	979564.78	979943.91	-49.44	-168.83	1.94	-166.89
RG140	37.20.25	113.59.53	1103.	979558.06	979946.28	-47.72	-171.02	2.20	-168.82
RG141	37.19.54	113.57.17	1295.	979519.15	979945.24	-26.53	-171.21	1.17	-170.04
RG142	37.20.73	113.57.10	1203.	979542.23	979946.98	-33.49	-167.92	2.99	-164.93
RG143	37.20.58	113.55.73	1426.	979499.79	979946.76	-7.05	-166.35	1.89	-164.46
RG144	37.19.56	113.55.98	1322.	979522.48	979945.27	-14.76	-162.52	1.45	-161.07
RG145	37.17.43	113.57.96	1232.	979530.29	979942.20	-31.62	-169.33	.81	-168.52
RG146	37.16.40	113.57.82	1208.	979536.14	979940.71	-31.90	-166.85	.92	-165.93
RG147	37.17.88	113.55.53	1241.	979543.80	979942.84	-15.92	-154.65	1.06	-153.59
RG148	37.17.25	113.54.50	1238.	979546.24	979941.94	-13.53	-151.92	1.68	-150.24
RG149	37.18.28	114. .49	1166.	979548.08	979943.42	-35.56	-165.84	.91	-164.93
RG150	37.19.14	114. 1.45	1218.	979539.88	979944.66	-28.91	-165.01	.84	-164.17
RG151	37.19.80	114. 1.97	1286.	979528.68	979945.62	-20.11	-163.81	.77	-163.04
RG152	37.17.05	114. 1.49	1169.	979552.36	979941.64	-28.56	-159.18	.56	-158.62
RG153	37.16.27	114. 3.42	1172.	979556.19	979940.52	-22.76	-153.69	.48	-153.21
RG154	37.17.61	114. 4.06	1238.	979541.09	979942.45	-19.20	-157.59	.67	-156.92
RG155	37.18.14	114. 3.01	1234.	979540.94	979943.22	-21.62	-159.46	.71	-158.75
RG156	37.16.04	113.52.30	1224.	979545.54	979940.18	-16.99	-153.74	.66	-153.08
RG157	37.17.20	113.51.63	1275.	979531.18	979941.86	-17.13	-159.64	.74	-158.90
RG158	37.18.24	113.52.09	1328.	979520.30	979943.36	-13.15	-161.58	1.10	-160.48
RG159	37.18.94	113.52.71	1462.	979493.80	979944.38	.63	-162.76	1.92	-160.84
RG160	37.18.33	113.50.86	1339.	979513.38	979943.49	-16.90	-166.53	.94	-165.59

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG161	37.19.56	113.51.37	1485.	979483.87	979945.27	-3.15	-169.09	1.59	-167.50
RG162	37.17.81	113.49.84	1248.	979528.70	979942.75	-28.87	-168.35	1.18	-167.17
RG163	37.17.48	113.50.22	1333.	979512.61	979942.27	-18.25	-167.22	1.12	-166.10
RG164	37.18.07	113.50.54	1376.	979505.13	979943.11	-13.30	-167.08	1.28	-165.80
RG165	37.17.66	113.50.54	1343.	979512.50	979942.53	-15.60	-165.67	.95	-164.72
RG166	37.17.14	113.45.80	1111.	979550.54	979941.77	-48.39	-172.53	2.03	-170.50
RG167	37.16.54	113.46.10	1096.	979554.39	979940.91	-48.38	-170.82	1.94	-168.88
RG168	37.16.87	113.47.86	1193.	979536.84	979941.40	-36.41	-169.72	.92	-168.80
RG169	37.17.55	113.47.48	1200.	979532.94	979942.37	-39.22	-173.28	1.16	-172.12
RG170	37.17.62	113.48.80	1238.	979528.87	979942.47	-31.62	-169.93	.94	-168.99
RG171	37.18.09	113.49.00	1254.	979525.54	979943.14	-30.64	-170.76	1.36	-169.40
RG172	37.18.88	113.48.17	1395.	979491.86	979944.30	-21.83	-177.76	1.09	-176.67
RG173	37.18.64	113.47.17	1316.	979507.18	979943.95	-30.80	-177.81	.93	-176.88
RG174	37.19.14	113.45.99	1230.	979520.30	979944.66	-44.73	-182.19	1.50	-180.69
RG175	37.19.14	113.45.33	1212.	979523.31	979944.66	-47.36	-182.78	1.78	-181.00
RG176	37.20.43	113.45.40	1369.	979488.05	979946.54	-36.07	-189.03	1.09	-187.94
RG177	37.20.40	113.46.04	1316.	979501.83	979946.50	-38.52	-185.59	1.27	-184.32
RG178	37.20.65	113.46.91	1347.	979499.47	979946.86	-31.65	-182.19	1.57	-180.62
RG179	37.20.30	113.46.82	1317.	979504.32	979946.34	-35.50	-182.70	1.65	-181.05
RG180	37.20.53	113.47.67	1395.	979492.65	979946.68	-23.42	-179.35	1.87	-177.48
RG181	37.21.05	113.47.40	1379.	979495.27	979947.45	-26.56	-180.68	2.02	-178.66
RG182	37.20.97	113.46.09	1415.	979481.49	979947.32	-29.20	-187.31	1.15	-186.16
RG183	37.21.34	113.45.72	1395.	979484.66	979947.87	-32.60	-188.53	1.26	-187.27
RG184	37.21.81	113.45.31	1429.	979478.33	979948.54	-29.35	-188.99	1.05	-187.94
RG185	37.22.32	113.46.11	1488.	979472.45	979949.27	-17.53	-183.84	1.19	-182.65
RG186	37.21.35	113.44.79	1392.	979483.39	979947.88	-34.92	-190.47	1.01	-189.46
RG187	37.20.20	113.43.81	1271.	979509.30	979946.20	-44.58	-186.65	1.35	-185.30
RG188	37.18.94	113.40.63	1401.	979485.93	979944.38	-26.06	-182.63	1.19	-181.44
RG189	37.18.28	113.41.75	1398.	979488.02	979943.42	-24.04	-180.24	1.00	-179.24
RG190	37.17.28	113.42.90	1364.	979496.34	979941.98	-24.82	-177.20	1.04	-176.16
RG191	37.16.46	113.42.12	1325.	979504.33	979940.80	-27.59	-175.65	1.61	-174.04
RG192	37.16.85	113.44.19	1251.	979521.12	979941.37	-34.23	-174.01	1.51	-172.50

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG193	37.20.71	113.39.64	1422.	979482.16	979946.95	-25.91	-184.83	1.93	-182.90
RG194	37.21.07	113.39.25	1440.	979477.94	979947.48	-25.20	-186.10	1.95	-184.15
RG195	37.20.90	113.37.75	1570.	979448.72	979947.23	-13.91	-189.39	2.55	-186.84
RG196	37.21.56	113.37.98	1532.	979455.73	979948.17	-19.79	-190.95	2.43	-188.52
RG197	37.20.70	113.40.73	1389.	979488.81	979946.94	-29.40	-184.65	1.91	-182.74
RG198	37.21.50	113.40.49	1477.	979469.23	979948.09	-23.04	-188.09	1.30	-186.79
RG199	37.20.28	113.41.54	1363.	979493.96	979946.32	-31.82	-184.10	1.26	-182.84
RG200	37.20.22	113.42.34	1350.	979495.92	979946.23	-33.72	-184.57	1.08	-183.49
RG201	37.19.79	113.42.35	1329.	979500.62	979945.61	-34.98	-183.45	1.15	-182.30
RG202	37.18.19	113.44.91	1145.	979539.84	979943.29	-50.16	-178.09	2.24	-175.85
RG203	37.18.78	113.43.99	1190.	979530.21	979944.15	-46.82	-179.76	2.05	-177.71
RG204	37.20.78	113.42.87	1239.	979517.23	979947.05	-47.47	-185.92	2.60	-183.32
RG205	37.21.59	113.42.89	1281.	979506.43	979948.22	-46.36	-189.55	2.10	-187.45
RG206	37.22.29	113.43.08	1319.	979497.41	979949.23	-44.74	-192.15	1.62	-190.53
RG207	37.21.95	113.41.76	1324.	979499.86	979948.74	-40.29	-188.24	2.21	-186.03
RG208	37.21.35	113.41.58	1404.	979484.98	979947.88	-29.76	-186.61	1.22	-185.39
RG209	37.28.91	113.13.24	1569.	979457.02	979958.84	-17.80	-193.07	3.34	-189.73
RG210	37.30.36	113.12.25	1641.	979444.82	979960.94	-9.79	-193.14	3.17	-189.97
RG211	37.29.27	113.12.28	1916.	979388.96	979959.36	20.77	-193.30	4.22	-189.08
RG212	37.28.93	113.14.54	1567.	979453.96	979958.87	-21.25	-196.39	2.38	-194.01
RG213	37.28.92	113.15.29	1594.	979448.55	979958.85	-18.28	-196.44	2.15	-194.29
RG214	37.29.81	113.14.09	1617.	979447.53	979960.15	-13.63	-194.32	2.30	-192.02
RG215	37.30.30	113.13.49	1628.	979447.10	979960.85	-11.28	-193.23	2.42	-190.81
RG216	37.28.93	113.16.25	1611.	979442.99	979958.87	-18.58	-198.66	2.15	-196.51
RG217	37.28.94	113.17.35	1624.	979437.53	979958.88	-20.20	-201.67	2.43	-199.24
RG218	37.28.75	113.18.50	1617.	979434.79	979958.61	-24.74	-205.46	3.39	-202.07
RG219	37.29.38	113.18.44	1652.	979427.19	979959.52	-22.53	-207.14	2.90	-204.24
RG220	37.28.67	113.19.12	1631.	979429.52	979958.49	-25.56	-207.85	4.24	-203.61
RG221	37.28.16	113.18.27	1597.	979441.02	979957.74	-23.84	-202.32	3.83	-198.49
RG222	37.28.06	113.17.35	1579.	979449.07	979957.60	-21.30	-197.73	2.86	-194.87
RG223	37.27.13	113.13.98	1526.	979463.43	979956.25	-22.25	-192.52	2.98	-189.54
RG224	37.26.51	113.14.28	1496.	979467.96	979955.36	-25.75	-192.92	3.05	-189.87

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG225	37.25.95	113.14.51	1465.	979472.87	979954.55	-29.72	-193.38	3.26	-190.12
RG226	37.25.40	113.14.92	1447.	979476.52	979953.76	-30.83	-192.48	3.35	-189.13
RG227	37.24.61	113.14.29	1492.	979468.80	979952.60	-23.37	-190.10	3.03	-187.07
RG228	37.28.44	113.13.76	1548.	979459.37	979958.16	-21.15	-194.11	2.82	-191.29
RG229	37.15.45	113.19.80	1124.	979540.61	979939.33	-51.73	-177.38	2.13	-175.25
RG230	37.15.36	113.26.84	1167.	979535.63	979939.20	-43.50	-173.88	8.93	-164.95
RG231	37.16.28	113.23.16	1344.	979491.40	979940.53	-34.52	-184.65	4.23	-180.42
RG232	37.15.84	113.24.98	1328.	979490.99	979939.89	-38.98	-187.42	7.17	-180.25
RG233	37.18.56	113.25.71	1750.	979403.89	979943.83	.16	-195.42	8.60	-186.82
RG234	37.19.06	113.26.65	1932.	979368.20	979944.56	19.79	-196.08	13.60	-182.48
RG235	37.26.30	113.35.11	1783.	979403.36	979955.07	-1.55	-200.77	3.15	-197.62
RG236	37.25.88	113.36.36	1678.	979424.55	979954.45	-12.10	-199.60	3.03	-196.57
RG237	37.26.57	113.35.78	1762.	979409.14	979955.44	-2.63	-199.50	3.12	-196.38
RG238	37.26.06	113.32.58	1940.	979366.61	979954.72	10.58	-206.21	4.86	-201.35
RG239	37.25.30	113.31.09	2088.	979338.52	979953.61	29.23	-204.09	3.06	-201.03
RG240	37.26.86	113.30.90	2121.	979331.18	979955.85	29.99	-207.07	2.97	-204.10
RG241	37.26.56	113.30.71	2138.	979327.83	979955.43	32.23	-206.70	2.71	-203.99
RG242	37.23.02	113.29.51	2012.	979354.63	979950.30	25.13	-199.66	5.65	-194.01
RG243	37.23.03	113.28.94	2019.	979350.84	979950.31	23.67	-201.98	6.58	-195.40
RG244	37.22.51	113.27.21	2111.	979329.12	979949.55	30.94	-204.93	11.63	-193.30
RG245	37.22.63	113.27.92	2071.	979338.70	979949.73	27.91	-203.46	9.04	-194.42
RG246	37.23.95	113.30.63	1986.	979359.39	979951.64	20.74	-201.23	3.94	-197.29
RG247	37.23.43	113.31.77	2015.	979353.99	979950.89	25.03	-200.18	4.43	-195.75
RG248	37.24.12	113.32.03	2009.	979354.25	979951.88	22.22	-202.23	3.56	-198.67
RG249	37.25.02	113.30.29	2140.	979327.51	979953.20	34.61	-204.49	3.25	-201.24
RG250	37.28.14	113.28.59	2051.	979346.34	979957.71	21.65	-207.58	4.73	-202.85
RG251	37.27.32	113.31.41	2171.	979321.73	979956.52	35.20	-207.41	2.80	-204.61
RG252	37.27.97	113.31.46	2157.	979327.09	979957.47	35.19	-205.82	2.64	-203.18
RG253	37.28.14	113.30.27	2217.	979311.99	979957.71	38.29	-209.40	2.92	-206.48
RG254	37.25.27	113.29.83	2123.	979331.35	979953.56	32.82	-204.37	3.12	-201.25
RG255	37.26.06	113.29.37	2111.	979333.42	979954.72	30.07	-205.80	3.15	-202.65
RG256	37.26.74	113.28.87	2112.	979333.91	979955.70	29.87	-206.10	2.85	-203.25

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG257	37.27.20	113.28.73	2132.	979329.10	979956.35	30.70	-207.55	2.68	-204.87
RG258	37.27.18	113.27.58	2143.	979339.13	979956.32	44.05	-195.39	3.21	-192.18
RG259	37.26.34	113.27.98	2126.	979331.07	979955.12	32.02	-205.55	3.35	-202.20
RG260	37.26.71	113.26.95	2146.	979325.34	979955.65	31.88	-207.90	4.96	-202.94
RG261	37.24.22	113.34.32	1816.	979395.58	979952.03	3.86	-199.03	3.55	-195.48
RG262	37.24.21	113.33.54	1859.	979386.05	979952.02	7.80	-199.97	3.77	-196.20
RG263	37.24.15	113.35.54	1706.	979417.45	979951.93	-8.12	-198.72	3.46	-195.26
RG264	37.23.96	113.35.92	1680.	979423.43	979951.66	-9.77	-197.51	3.01	-194.50
RG265	37.24.04	113.36.79	1590.	979441.32	979951.77	-19.84	-197.49	2.80	-194.69
RG266	37.23.28	113.37.44	1540.	979453.22	979950.68	-22.27	-194.34	2.77	-191.57
RG267	37.22.35	113.37.65	1554.	979451.21	979949.32	-18.69	-192.29	2.54	-189.75
RG268	37.22.55	113.38.35	1486.	979465.25	979949.61	-25.82	-191.86	2.60	-189.26
RG269	37.23.29	113.38.52	1547.	979452.68	979950.70	-20.66	-193.52	1.71	-191.81
RG270	37.24.16	113.38.52	1591.	979442.32	979951.95	-18.73	-196.49	1.48	-195.01
RG271	37.24.16	113.39.61	1499.	979464.03	979951.95	-25.23	-192.77	1.83	-190.94
RG272	37.25.02	113.38.52	1597.	979442.78	979953.20	-17.45	-195.95	1.64	-194.31
RG273	37.25.69	113.38.68	1646.	979432.36	979954.17	-13.89	-197.81	2.21	-195.60
RG274	37.25.88	113.39.60	1607.	979441.02	979954.45	-17.55	-197.12	2.37	-194.75
RG275	37.28.54	113.38.53	1722.	979419.66	979958.30	-7.40	-199.77	1.86	-197.91
RG276	37. 6.61	113.34.09	853.	979607.62	979926.53	-55.63	-150.97	1.11	-149.86
RG277	37. 5.19	113.33.35	782.	979619.93	979924.48	-63.19	-150.59	1.11	-149.48
RG278	37. 3.58	113.32.66	795.	979613.84	979922.15	-63.09	-151.88	.70	-151.18
RG279	37. 3.14	113.33.55	817.	979609.84	979921.52	-59.69	-150.94	.62	-150.32
RG280	37. 1.59	113.36.11	788.	979615.85	979919.27	-60.36	-148.37	.86	-147.51
RG281	37. 1.80	113.37.50	756.	979622.08	979919.58	-64.14	-148.64	1.25	-147.39
RG282	37. 1.55	113.36.72	778.	979618.41	979919.22	-60.58	-147.56	.82	-146.74
RG283	37. 1.01	113.35.89	794.	979612.78	979918.44	-60.72	-149.42	.87	-148.55
RG284	37. 1.71	113.36.07	792.	979614.40	979919.45	-60.68	-149.17	.88	-148.29
RG285	37. 2.03	113.33.69	837.	979602.98	979919.91	-58.55	-152.12	.65	-151.47
RG286	37. 3.34	113.38.02	804.	979618.88	979921.81	-54.89	-144.71	.99	-143.72
RG287	37. 3.10	113.39.06	799.	979620.02	979921.46	-55.01	-144.25	1.15	-143.10
RG288	37. 2.82	113.40.64	863.	979608.30	979921.05	-46.47	-142.89	1.11	-141.78

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG289	37. 2.31	113.42.46	1026.	979575.41	979920.30	-28.20	-142.88	1.23	-141.65
RG290	37. 1.97	113.44.18	1255.	979527.99	979919.83	-4.59	-144.82	1.99	-142.83
RG291	37. 1.44	113.42.43	1062.	979557.38	979919.05	-34.06	-152.69	1.70	-150.99
RG292	37. 2.73	113.45.01	1333.	979513.16	979920.91	3.47	-145.44	2.40	-143.04
RG293	37. 3.39	113.46.22	1447.	979490.69	979921.87	15.22	-146.43	3.33	-143.10
RG294	37. 2.16	113.46.15	1544.	979464.91	979920.10	21.41	-151.18	7.38	-143.80
RG295	37. 3.59	113.46.55	1361.	979509.14	979922.16	6.96	-145.12	2.46	-142.66
RG296	37. 4.18	113.46.30	1390.	979504.16	979923.02	10.16	-145.19	3.02	-142.17
RG297	37. 4.85	113.46.16	1355.	979511.78	979923.99	5.89	-145.51	3.97	-141.54
RG298	37. 5.45	113.45.92	1293.	979525.67	979924.85	-0.18	-144.66	2.69	-141.97
RG299	37. 7.00	113.35.40	862.	979606.66	979927.09	-54.43	-150.75	1.14	-149.61
RG300	37. 7.61	113.38.24	840.	979615.03	979927.99	-53.64	-147.54	1.06	-146.48
RG301	37. 7.98	113.39.21	847.	979616.68	979928.52	-50.36	-145.04	1.14	-143.90
RG302	37. 8.49	113.40.10	888.	979608.66	979929.26	-46.42	-145.70	1.11	-144.59
RG303	37. 9.41	113.41.27	920.	979601.59	979930.59	-44.94	-147.80	1.16	-146.64
RG304	37. 9.60	113.41.59	925.	979600.73	979930.86	-44.75	-148.09	1.21	-146.88
RG305	37.10.16	113.42.39	913.	979603.27	979931.66	-46.48	-148.56	1.74	-146.82
RG306	37.10.96	113.45.68	978.	979590.58	979932.83	-40.32	-149.65	2.40	-147.25
RG307	37.11.40	113.46.05	981.	979589.38	979933.45	-41.20	-150.87	5.09	-145.78
RG308	37. 7.38	113.37.37	844.	979611.51	979927.66	-55.79	-150.07	1.00	-149.07
RG309	37. 7.46	113.36.36	874.	979605.23	979927.77	-52.86	-150.51	1.05	-149.46
RG310	37.10.06	113.46.63	1088.	979568.65	979931.52	-27.26	-148.79	1.39	-147.41
RG311	37. 8.04	113.48.98	1301.	979522.24	979928.62	-5.02	-150.36	3.57	-146.79
RG312	37. 5.80	113.50.03	1394.	979509.31	979925.37	14.08	-141.67	3.27	-138.40
RG313	37. 5.10	113.51.32	1295.	979530.66	979924.34	5.89	-138.80	3.18	-135.62
RG314	37. .03	113.54.80	794.	979609.77	979917.02	-62.33	-151.02	1.27	-149.75
RG315	36.58.15	113.55.20	683.	979612.87	979914.32	-90.66	-166.99	1.19	-165.80
RG316	37. 1.57	113.54.37	922.	979598.79	979919.24	-36.02	-139.01	1.38	-137.63
RG317	37. 5.52	113.51.65	1352.	979523.10	979924.95	15.49	-135.63	3.31	-132.32
RG318	37. 6.49	113.51.69	1628.	979464.22	979926.37	40.22	-141.70	6.33	-135.37
RG319	37. 5.47	113.50.54	1357.	979516.34	979924.88	10.11	-141.49	3.24	-138.25
RG320	37. 4.47	113.49.95	1473.	979494.45	979923.45	25.69	-138.96	3.51	-135.45

STAT.	LATITUDE		LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG321	37.	4.43	113.49.42	1580.	979471.29	979923.38	35.61	-140.99	5.71	-135.28
RG322	37.	6.18	113.49.58	1439.	979499.21	979925.91	17.35	-143.44	2.37	-141.07
RG323	37.	5.73	113.48.87	1556.	979475.55	979925.26	30.38	-143.46	3.71	-139.75
RG324	37.	5.16	113.48.28	1683.	979447.12	979924.43	42.18	-145.93	6.07	-139.86
RG325	37.	4.60	113.48.11	1771.	979423.29	979923.62	46.15	-151.74	9.61	-142.13
RG326	37.	3.87	113.41.07	865.	979608.45	979922.56	-47.26	-143.89	1.71	-142.18
RG327	37.	3.59	113.42.24	928.	979593.76	979922.16	-41.99	-145.70	2.98	-142.72
RG328	37.	4.09	113.42.90	987.	979584.98	979922.88	-33.43	-143.68	1.26	-142.42
RG329	37.	3.99	113.43.85	1076.	979566.40	979922.74	-24.31	-144.54	2.21	-142.33
RG330	37.	3.84	113.44.62	1181.	979553.64	979922.52	-4.31	-136.32	1.62	-134.70
RG331	37.	3.97	113.45.09	1245.	979534.55	979922.71	-3.93	-143.06	1.89	-141.17
RG332	37.	4.39	113.45.34	1253.	979533.87	979923.32	-2.87	-142.85	2.00	-140.85
RG333	37.	3.90	113.45.65	1336.	979515.78	979922.61	5.53	-143.79	2.57	-141.22
RG334	37.	3.89	113.46.60	1373.	979507.23	979922.59	8.47	-145.01	2.93	-142.08
RG335	37.	4.21	113.47.88	1536.	979475.87	979923.06	26.87	-144.79	5.98	-138.81
RG336	37.	4.00	113.47.53	1468.	979489.30	979922.76	19.44	-144.56	5.63	-138.93
RG337	37.	1.19	113.46.27	1523.	979465.61	979918.69	16.85	-153.32	7.94	-145.38
RG338	37.	1.16	113.45.23	1375.	979501.42	979918.64	6.99	-146.62	3.14	-143.48
RG339	37.	.58	113.46.03	1504.	979469.27	979917.83	15.63	-152.45	6.64	-145.81
RG340	37.	.09	113.46.17	1462.	979472.64	979917.12	6.54	-156.78	11.83	-144.95
RG341	37.	.07	113.45.67	1467.	979475.35	979917.09	11.07	-152.89	6.87	-146.02
RG342	37.	.40	113.44.79	1370.	979499.64	979917.57	4.87	-148.23	3.53	-144.70
RG343	37.	3.13	113.47.26	1419.	979497.70	979921.50	14.05	-144.50	3.35	-141.15
RG344	37.	1.82	113.46.82	1214.	979533.45	979919.60	-11.42	-147.12	5.54	-141.58
RG345	37.	1.23	113.46.90	1156.	979542.98	979918.74	-18.99	-148.18	5.41	-142.77
RG346	37.	6.09	113.46.12	1317.	979520.80	979925.78	1.36	-145.78	2.80	-142.98
RG347	37.	6.73	113.45.84	1244.	979536.62	979926.70	-6.22	-145.22	2.60	-142.62
RG348	37.	7.36	113.45.79	1143.	979556.93	979927.62	-17.97	-145.70	1.34	-144.36
RG349	37.	8.15	113.45.73	1069.	979568.76	979928.76	-30.04	-149.52	1.52	-148.00
RG350	37.	9.10	113.46.63	1131.	979558.72	979930.14	-22.46	-148.82	1.36	-147.46
RG351	37.	10.64	113.47.35	1084.	979567.69	979932.36	-30.01	-151.19	1.78	-149.41
RG352	37.	10.47	113.48.06	1116.	979561.26	979932.11	-26.59	-151.25	2.63	-148.62

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG353	37.11.13	113.48.24	1193.	979544.51	979933.07	-20.32	-153.66	3.04	-150.62
RG354	37.12.04	113.48.87	1163.	979551.87	979934.38	-23.48	-153.49	2.92	-150.57
RG355	37.11.82	113.51.86	1519.	979486.70	979934.06	21.25	-148.44	3.76	-144.68
RG356	37.11.92	113.51.18	1448.	979498.62	979934.21	11.20	-150.59	2.62	-147.97
RG357	37.12.37	113.50.61	1403.	979508.05	979934.87	6.05	-150.69	2.29	-148.40
RG358	37.13.22	113.50.49	1340.	979517.53	979936.09	-4.98	-154.74	1.51	-153.23
RG359	37.13.86	113.50.77	1301.	979527.15	979937.02	-8.33	-153.74	1.00	-152.74
RG360	37.14.09	113.50.30	1250.	979535.58	979937.36	-16.14	-155.78	1.71	-154.07
RG361	37. 2.34	113.47.67	1403.	979498.59	979920.35	11.19	-145.59	4.21	-141.38
RG362	37. 1.72	113.48.13	1439.	979491.19	979919.46	15.88	-144.95	3.77	-141.18
RG363	37. 1.32	113.48.49	1347.	979510.09	979918.88	6.77	-143.71	4.35	-139.36
RG364	37. .81	113.49.13	1262.	979526.34	979918.15	-2.40	-143.40	4.07	-139.33
RG365	37. .66	113.49.89	1207.	979538.09	979917.95	-7.28	-142.19	3.98	-138.21
RG366	37. .83	113.51.01	1108.	979557.80	979918.18	-18.56	-142.34	3.07	-139.27
RG367	37. .05	113.50.71	1184.	979537.95	979917.05	-13.69	-146.01	5.39	-140.62
RG368	37. .80	113.51.00	1108.	979557.56	979918.15	-18.77	-142.55	3.01	-139.54
RG369	37. 1.30	113.51.55	1044.	979573.78	979918.85	-22.91	-139.57	3.94	-135.64
RG370	37. 1.61	113.52.09	1035.	979574.85	979919.30	-24.92	-140.63	2.96	-137.67
RG371	37. 6.84	113.50.07	1469.	979498.30	979926.86	24.90	-139.30	3.48	-135.82
RG372	37.21.96	113.43.72	1398.	979481.12	979948.76	-36.38	-192.54	1.43	-191.11
RG373	37.22.46	113.44.25	1422.	979478.21	979949.48	-32.39	-191.31	1.39	-189.92
RG374	37.22.78	113.44.42	1439.	979475.40	979949.95	-30.40	-191.23	1.42	-189.81
RG375	37.23.11	113.44.66	1479.	979468.23	979950.43	-25.92	-191.14	1.41	-189.73
RG376	37.23.18	113.45.53	1459.	979478.23	979950.53	-22.04	-185.08	1.85	-183.23
RG377	37.23.70	113.45.30	1564.	979455.63	979951.29	-13.13	-187.86	1.43	-186.43
RG378	37.23.99	113.45.52	1616.	979445.69	979951.70	-7.22	-187.84	2.09	-185.75
RG379	37.24.24	113.45.95	1615.	979447.95	979952.06	-5.69	-186.17	1.80	-184.37
RG380	37.24.87	113.46.63	1560.	979460.93	979952.98	-10.75	-185.03	3.16	-181.87
RG381	37.25.84	113.47.20	1699.	979433.37	979954.40	3.36	-186.52	1.49	-185.03
RG382	37.25.30	113.47.26	1622.	979451.98	979953.61	-0.94	-182.25	2.19	-180.06
RG383	37.25.36	113.47.93	1662.	979444.45	979953.70	3.57	-182.12	3.24	-178.88
RG384	37.25.94	113.48.87	1834.	979410.71	979954.54	22.13	-182.81	2.75	-180.06

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG385	37.27.24	113.49.73	1665.	979448.73	979956.41	5.99	-180.01	1.89	-178.12
RG386	37.26.46	113.49.62	1771.	979425.15	979955.28	16.45	-181.47	2.28	-179.19
RG387	37.27.50	113.50.53	1739.	979433.35	979956.78	13.09	-181.19	1.79	-179.40
RG388	37.27.12	113.51.08	1702.	979441.94	979956.23	10.84	-179.32	2.79	-176.53
RG389	37.26.91	113.51.06	1768.	979429.55	979955.93	19.07	-178.44	1.44	-177.00
RG390	37.26.76	113.51.29	1729.	979436.87	979955.73	14.84	-178.41	1.76	-176.65
RG391	37.26.57	113.52.13	1777.	979426.94	979955.44	19.96	-178.64	2.02	-176.62
RG392	37.26.76	113.53.26	1818.	979418.14	979955.73	23.39	-179.75	3.78	-175.97
RG393	37.27.36	113.54.01	1898.	979401.25	979956.58	30.48	-181.65	2.63	-179.02
RG394	37.27.34	113.54.67	1932.	979394.05	979956.55	33.84	-182.10	3.04	-179.06
RG395	37.27.66	113.55.83	2054.	979369.65	979957.02	46.59	-182.98	4.35	-178.63
RG396	37.27.49	113.56.34	2074.	979363.22	979956.77	46.53	-185.25	6.01	-179.24
RG397	37.27.83	113.55.21	2049.	979371.25	979957.27	46.35	-182.64	3.44	-179.20
RG398	37.27.89	113.54.47	2045.	979371.78	979957.35	45.57	-182.97	3.50	-179.47
RG399	37.28.06	113.53.59	2042.	979372.41	979957.60	45.01	-183.19	3.37	-179.82
RG400	37.28.50	113.53.27	1907.	979400.59	979958.24	30.98	-182.17	2.15	-180.02
RG401	37.28.96	113.53.42	1858.	979410.84	979958.91	25.23	-182.37	3.97	-178.40
RG402	37.29.69	113.52.75	1809.	979419.26	979959.98	17.62	-184.56	1.63	-182.93
RG403	37.29.94	113.51.91	1780.	979420.79	979960.34	9.86	-189.09	1.29	-187.80
RG404	37.29.38	113.51.73	1780.	979423.16	979959.52	12.94	-185.97	1.70	-184.27
RG405	37.30.23	113.51.83	1769.	979420.80	979960.75	5.88	-191.77	1.29	-190.48
RG406	37.29.85	113.50.49	1783.	979416.24	979960.21	6.19	-193.03	1.83	-191.20
RG407	37.29.11	113.50.43	1835.	979410.66	979959.13	17.76	-187.28	1.28	-186.00
RG408	37.28.49	113.49.64	1852.	979405.69	979958.23	19.06	-187.92	2.97	-184.95
RG409	37.27.85	113.49.62	1699.	979439.70	979957.30	6.78	-183.10	2.60	-180.50
RG410	37.19.73	113.46.64	1279.	979511.10	979945.52	-39.75	-182.66	1.53	-181.13
RG411	37.21.05	113.47.82	1406.	979492.05	979947.45	-21.50	-178.62	2.53	-176.09
RG412	37.21.48	113.48.48	1469.	979480.63	979948.05	-14.05	-178.22	4.31	-173.91
RG413	37.21.94	113.48.99	1665.	979440.85	979948.73	5.97	-180.10	1.87	-178.23
RG414	37.22.23	113.49.43	1722.	979430.93	979949.15	13.22	-179.22	2.12	-177.10
RG415	37.22.71	113.50.20	1830.	979410.51	979949.85	25.39	-179.10	3.26	-175.84
RG416	37.22.85	113.49.60	1692.	979437.88	979950.05	10.05	-179.05	3.88	-175.17

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG417	37.22.97	113.50.76	1797.	979417.80	979950.23	22.06	-178.72	2.99	-175.73
RG418	37.22.89	113.51.34	1708.	979439.48	979950.11	16.57	-174.33	2.91	-171.42
RG419	37.23.72	113.52.91	1434.	979498.09	979951.32	-10.68	-170.93	4.60	-166.33
RG420	37.23.43	113.53.54	1401.	979506.89	979950.89	-11.61	-168.18	4.09	-164.09
RG421	37.23.16	113.54.57	1356.	979516.35	979950.51	-15.78	-167.28	3.94	-163.34
RG422	37.22.57	113.55.39	1315.	979523.95	979949.64	-19.82	-166.79	3.18	-163.61
RG423	37.22.15	113.56.25	1274.	979531.89	979949.03	-23.97	-166.34	3.23	-163.11
RG424	37.21.60	113.56.50	1304.	979525.37	979948.23	-20.48	-166.19	2.35	-163.84
RG425	37.19.36	113.59.47	1087.	979558.92	979944.98	-50.74	-172.16	2.20	-169.96
RG426	37.21.10	113.59.40	1129.	979554.12	979947.52	-45.09	-171.21	2.63	-168.58
RG427	37.21.60	113.58.68	1257.	979533.15	979948.23	-27.09	-167.59	2.10	-165.49
RG428	37.23.64	113.57.95	1494.	979485.90	979951.20	-4.41	-171.30	1.82	-169.48
RG429	37.22.06	113.57.86	1332.	979521.59	979948.90	-16.27	-165.11	2.02	-163.09
RG430	37.22.54	113.57.78	1401.	979506.91	979949.59	-10.48	-166.99	1.49	-165.50
RG431	37.23.01	113.57.66	1457.	979496.72	979950.28	-3.96	-166.76	1.61	-165.15
RG432	37.23.31	113.57.47	1440.	979498.91	979950.73	-7.38	-168.31	1.77	-166.53
RG433	37.23.71	113.58.46	1415.	979500.59	979951.30	-14.08	-172.19	2.11	-170.08
RG434	37.24.11	113.58.45	1480.	979483.66	979951.87	-11.55	-176.91	3.03	-173.88
RG435	37.24.41	113.58.95	1507.	979476.45	979952.31	-10.73	-179.16	3.15	-176.01
RG436	37.24.80	113.59.16	1494.	979476.59	979952.87	-15.11	-182.11	3.80	-178.31
RG437	37.25.07	113.59.19	1542.	979465.45	979953.27	-11.88	-184.23	4.41	-179.82
RG438	37.25.51	113.59.14	1566.	979460.00	979953.91	-10.63	-185.63	5.62	-180.01
RG439	37.26.09	113.59.39	1472.	979482.37	979954.76	-18.08	-182.59	3.32	-179.27
RG440	37.26.28	113.58.74	1657.	979446.29	979955.04	2.65	-182.53	3.81	-178.72
RG441	37.26.28	113.57.72	1879.	979399.84	979955.04	24.68	-185.30	6.07	-179.23
RG442	37.26.46	113.57.39	1820.	979414.55	979955.28	20.80	-182.53	3.13	-179.40
RG443	37.26.06	113.56.80	1884.	979400.73	979954.72	27.49	-183.06	5.51	-177.55
RG444	37.26.82	113.56.41	1979.	979382.00	979955.79	36.85	-184.27	4.10	-180.17
RG445	37.25.83	113.55.84	1789.	979422.70	979954.38	20.44	-179.49	3.45	-176.04
RG446	37.25.48	113.55.45	1747.	979431.19	979953.87	16.28	-178.88	4.15	-174.73
RG447	37.25.17	113.54.66	1818.	979417.78	979953.42	25.43	-177.74	2.99	-174.75
RG448	37.24.34	113.57.48	1476.	979487.09	979952.20	-9.67	-174.59	2.70	-171.89

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG449	37.23.32	113.51.11	1807.	979416.47	979950.73	23.51	-178.47	3.60	-174.87
RG450	37.23.83	113.51.26	1764.	979425.50	979951.48	18.34	-178.76	3.52	-175.24
RG451	37.24.24	113.51.76	1568.	979468.85	979952.06	.63	-174.57	3.89	-170.68
RG452	37.24.56	113.51.89	1506.	979480.08	979952.52	-7.79	-176.05	5.00	-171.05
RG453	37.24.71	113.52.88	1688.	979443.98	979952.75	12.14	-176.49	3.01	-173.48
RG454	37.25.13	113.54.28	1781.	979425.55	979953.36	21.69	-177.29	2.72	-174.58
RG455	37.25.40	113.53.30	1732.	979436.52	979953.76	17.21	-176.32	2.05	-174.27
RG456	37.25.46	113.52.62	1699.	979445.43	979953.84	15.98	-173.91	1.68	-172.23
RG457	37.25.62	113.50.51	1690.	979440.09	979954.08	7.38	-181.41	2.59	-178.82
RG458	37.26.63	113.59.99	1577.	979464.71	979955.53	-4.06	-180.32	1.65	-178.67
RG459	37.26.83	113.58.96	1579.	979463.61	979955.80	-4.96	-181.40	2.90	-178.51
RG460	37.27.45	113.58.64	1671.	979445.22	979956.71	4.14	-182.57	2.91	-179.66
RG461	37.28.01	113.58.98	1767.	979427.39	979957.53	15.03	-182.38	3.29	-179.09
RG462	37.28.60	113.59.35	1932.	979392.88	979958.38	30.84	-185.10	3.26	-181.84
RG463	37.28.64	113.58.42	1952.	979389.39	979958.45	33.21	-184.87	4.80	-180.07
RG464	37.28.99	113.57.50	2035.	979371.94	979958.96	41.02	-186.40	3.48	-182.92
RG465	37.29.45	113.57.23	1992.	979381.34	979959.63	36.58	-186.07	4.16	-181.91
RG466	37.29.79	113.57.55	1962.	979389.17	979960.12	34.42	-184.79	2.61	-182.18
RG467	37.30.09	113.57.80	1978.	979385.70	979960.55	35.42	-185.56	2.12	-183.44
RG468	37.30.24	113.58.23	1967.	979386.51	979960.77	32.81	-187.02	1.87	-185.15
RG469	37.29.82	113.56.39	2079.	979364.62	979960.16	46.13	-186.23	3.08	-183.15
RG470	37.29.93	113.55.40	1986.	979383.97	979960.32	36.54	-185.39	2.63	-182.76
RG471	37.30.34	113.54.56	1864.	979407.52	979960.91	21.88	-186.43	2.73	-183.70
RG472	37.30.30	113.53.71	1802.	979419.34	979960.85	14.67	-186.73	2.23	-184.50
RG473	37.26.76	114. .38	1579.	979464.45	979955.73	-4.04	-180.47	1.60	-178.87
RG474	37.26.94	114. .83	1519.	979476.00	979955.97	-11.36	-181.05	1.82	-179.23
RG475	37.27.42	114. 1.15	1601.	979460.07	979956.67	-2.60	-181.46	1.89	-179.59
RG476	37.26.35	114. .35	1648.	979448.55	979955.13	1.90	-182.23	3.54	-178.69
RG477	37.25.64	114. .60	1582.	979460.66	979954.10	-5.36	-182.10	3.02	-179.08
RG478	37.22.12	113.59.74	1158.	979549.48	979948.98	-42.27	-171.63	3.70	-167.93
RG479	37.22.79	114. .11	1180.	979542.79	979949.96	-43.16	-174.97	4.86	-170.11
RG480	37.23.45	114. .41	1216.	979534.17	979950.92	-41.45	-177.35	3.66	-173.70

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG481	37.23.89	114. .80	1254.	979525.81	979951.56	-38.69	-178.85	3.48	-175.37
RG482	37.24.55	114. 1.53	1435.	979489.89	979952.52	-19.79	-180.15	2.00	-178.15
RG483	37. 6.64	113.33.58	863.	979605.32	979926.57	-55.06	-151.45	.94	-150.51
RG484	37. 6.94	113.33.22	869.	979604.03	979927.02	-54.91	-151.98	1.08	-150.90
RG485	37. 7.29	113.32.37	869.	979603.85	979927.52	-55.59	-152.66	1.06	-151.60
RG486	37. 7.45	113.31.84	855.	979604.73	979927.75	-59.18	-154.72	1.12	-153.60
RG487	37. 7.63	113.31.37	859.	979605.59	979928.02	-57.37	-153.35	1.09	-152.26
RG488	37. 7.82	113.30.43	852.	979606.26	979928.30	-59.24	-154.40	1.15	-153.25
RG489	37. 7.82	113.30.09	850.	979606.70	979928.30	-59.17	-154.19	1.16	-153.03
RG490	37. 7.84	113.29.63	865.	979603.55	979928.32	-57.93	-154.55	1.15	-153.40
RG491	37. 7.87	113.28.12	864.	979604.20	979928.37	-57.51	-154.07	1.08	-152.99
RG492	37. 7.96	113.28.80	853.	979606.30	979928.49	-59.02	-154.32	1.19	-153.13
RG493	37. 7.92	113.28.76	853.	979605.98	979928.44	-59.28	-154.58	1.18	-153.40
RG494	37. 8.19	113.28.40	896.	979595.68	979928.81	-56.78	-156.85	1.10	-155.75
RG495	37. 8.31	113.28.09	928.	979590.77	979928.99	-51.90	-155.58	1.33	-154.25
RG496	37. 8.60	113.27.44	900.	979597.15	979929.41	-54.51	-155.09	1.15	-153.94
RG497	37. 8.96	113.26.82	907.	979593.45	979929.95	-56.67	-158.00	1.26	-156.74
RG498	37. 9.42	113.26.38	942.	979584.95	979930.61	-54.92	-160.20	1.28	-158.92
RG499	37. 9.74	113.25.85	957.	979581.05	979931.05	-54.64	-161.59	1.28	-160.31
RG500	37. 9.97	113.24.52	882.	979595.47	979931.38	-63.61	-162.21	2.01	-160.20
RG501	37. 9.98	113.25.11	910.	979591.87	979931.40	-58.76	-160.43	1.76	-158.67
RG502	37.10.06	113.24.02	867.	979597.20	979931.52	-66.71	-163.61	2.24	-161.37
RG503	37. 9.98	113.22.72	877.	979594.70	979931.40	-66.09	-164.08	1.61	-162.47
RG504	37.10.15	113.21.97	903.	979582.92	979931.64	-69.92	-170.88	1.48	-169.40
RG505	37.10.59	113.19.24	976.	979561.41	979932.29	-69.61	-178.70	1.40	-177.30
RG506	37.10.60	113.18.54	980.	979559.49	979932.30	-70.50	-179.96	1.35	-178.61
RG507	37.10.60	113.17.98	984.	979559.06	979932.30	-69.61	-179.55	1.43	-178.12
RG508	37.10.60	113.17.47	984.	979561.22	979932.30	-67.55	-177.46	1.66	-175.80
RG509	37.10.60	113.17.12	991.	979562.77	979932.30	-63.84	-174.53	2.14	-172.39
RG510	37.11.40	113.16.63	976.	979564.07	979933.45	-68.20	-177.26	2.18	-175.08
RG511	37. 9.70	113.16.87	1224.	979515.27	979930.98	-38.07	-174.82	4.75	-170.07
RG512	37. 9.48	113.16.21	1213.	979524.16	979930.68	-32.07	-167.66	1.09	-166.57

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG513	37. 8.88	113.16.06	1230.	979521.86	979929.82	-28.24	-165.74	.91	-164.83
RG514	37. 8.33	113.15.69	1245.	979519.06	979929.02	-25.63	-164.80	.85	-163.95
RG515	37. 7.61	113.12.59	1375.	979490.55	979927.99	-13.23	-166.85	1.20	-165.65
RG516	37. 7.16	113.10.58	1417.	979481.34	979927.34	-8.71	-167.05	1.76	-165.29
RG517	37. 7.03	113. 9.38	1425.	979480.35	979927.14	-7.15	-166.35	1.30	-165.05
RG518	37. 6.30	113. 8.16	1443.	979476.22	979926.09	-4.50	-165.78	1.04	-164.74
RG519	37. 7.95	113.13.91	1335.	979498.71	979928.48	-17.79	-166.97	.96	-166.01
RG520	37. 8.38	113.14.90	1272.	979512.44	979929.09	-24.14	-166.28	.93	-165.35
RG521	37.10.14	113.30.87	937.	979582.05	979931.63	-60.53	-165.20	2.19	-163.01
RG522	37. 9.16	113.30.56	935.	979585.77	979930.23	-55.98	-160.44	1.33	-159.11
RG523	37. 7.33	113.34.30	973.	979581.70	979927.58	-45.64	-154.36	.87	-153.49
RG524	37. 8.21	113.33.77	990.	979578.11	979928.84	-45.13	-155.79	.89	-154.90
RG525	37.12.99	113.34.25	1322.	979500.09	979935.77	-27.84	-175.52	2.66	-172.86
RG526	37.13.71	113.34.01	1444.	979474.23	979936.80	-17.02	-178.36	2.69	-175.67
RG527	37.14.30	113.32.86	1539.	979455.55	979937.66	-7.11	-179.12	2.64	-176.48
RG528	37.15.54	113.31.51	1619.	979436.22	979939.45	-3.68	-184.57	4.96	-179.61
RG529	37.15.92	113.30.94	1634.	979432.41	979940.02	-3.25	-185.88	5.02	-180.86
RG530	37.14.51	113.30.88	1473.	979466.50	979937.79	-16.97	-181.55	3.32	-178.23
RG531	37. 6.85	113.26.37	865.	979598.90	979926.87	-61.13	-157.76	1.04	-156.72
RG532	37. 7.61	113.22.26	907.	979581.46	979927.99	-66.51	-167.91	1.14	-166.77
RG533	37. 8.44	113.22.88	896.	979584.41	979929.18	-68.23	-168.37	1.13	-167.24
RG534	37. 9.90	113.25.59	960.	979580.52	979931.28	-54.47	-161.76	1.33	-160.43
RG535	37.13.15	113.23.06	988.	979574.55	979935.98	-56.40	-166.86	2.68	-164.18
RG536	37.10.10	113.40.45	940.	979596.90	979931.57	-44.59	-149.63	1.51	-148.12
RG537	37.11.71	113.38.72	991.	979582.93	979933.91	-45.28	-155.98	3.09	-152.89
RG538	37.10.92	113.41.48	976.	979589.09	979932.77	-42.49	-151.55	2.01	-149.54
RG539	37. 8.34	113.36.18	944.	979590.76	979929.03	-46.97	-152.45	.99	-151.46
RG540	37. .31	113.36.21	977.	979578.09	979917.44	-37.89	-147.05	2.11	-144.94
RG541	37.10.27	113.37.06	1101.	979558.36	979931.82	-33.62	-156.68	1.37	-155.31
RG542	37. 9.65	113.36.49	1021.	979572.21	979930.93	-43.62	-157.72	1.13	-156.59
RG543	37.12.07	113.37.49	1157.	979544.69	979934.43	-32.60	-161.92	1.39	-160.53
RG544	37.13.87	113.37.97	1247.	979520.55	979937.04	-31.79	-171.09	2.18	-168.91

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG545	37.14.48	113.38.12	1311.	979507.33	979937.92	-26.14	-172.59	1.83	-170.76
RG546	37.14.85	113.37.57	1370.	979494.26	979938.47	-21.41	-174.51	1.57	-172.94
RG547	37.15.16	113.37.77	1377.	979491.06	979938.90	-22.97	-176.82	1.53	-175.29
RG548	37.15.67	113.38.03	1390.	979487.54	979939.65	-23.01	-178.39	1.46	-176.93
RG549	37.17.18	113.39.37	1427.	979480.37	979941.83	-21.06	-180.53	1.34	-179.19
RG550	37.18.11	113.40.04	1408.	979484.63	979943.17	-24.08	-181.40	1.22	-180.18
RG551	37.18.66	113.40.42	1397.	979486.96	979943.98	-25.84	-181.98	1.22	-180.76
RG552	37.19.87	113.40.41	1385.	979490.73	979945.72	-27.49	-182.29	1.80	-180.49
RG553	37.19.22	113.41.19	1408.	979483.80	979944.77	-26.61	-183.90	1.22	-182.68
RG554	37.20.05	113.41.16	1358.	979494.66	979945.98	-32.10	-183.91	1.50	-182.41
RG555	37.20.66	113.41.52	1391.	979487.32	979946.87	-30.17	-185.65	1.15	-184.50
RG556	37.20.97	113.41.26	1417.	979482.51	979947.32	-27.62	-185.93	1.18	-184.75
RG557	37.21.74	113.40.16	1489.	979466.62	979948.44	-22.24	-188.66	1.37	-187.29
RG558	37.22.35	113.39.55	1507.	979462.89	979949.32	-21.40	-189.79	1.59	-188.20
RG559	37.23.46	113.38.79	1559.	979450.63	979950.94	-19.19	-193.40	1.56	-191.84
RG560	37.24.59	113.37.99	1570.	979447.43	979952.57	-20.73	-196.14	1.81	-194.33
RG561	37.25.44	113.37.82	1610.	979438.55	979953.81	-18.53	-198.41	1.87	-196.54
RG562	37.25.95	113.37.70	1631.	979434.45	979954.55	-16.70	-198.99	2.07	-196.92
RG563	37.26.31	113.37.69	1651.	979429.84	979955.08	-15.62	-200.15	2.11	-198.04
RG564	37.27.12	113.37.25	1709.	979419.48	979956.23	-9.27	-200.28	2.60	-197.68
RG565	37.27.59	113.37.80	1750.	979412.54	979956.91	-4.47	-199.98	1.77	-198.21
RG566	37.30.26	113.38.00	1798.	979406.30	979960.80	.46	-200.49	1.95	-198.54
RG567	37.28.07	113.37.93	1763.	979410.46	979957.62	-3.02	-200.06	1.53	-198.53
RG568	37.28.78	113.37.64	1789.	979406.95	979958.66	.43	-199.50	1.45	-198.05
RG569	37.29.29	113.37.73	1775.	979410.77	979959.39	-.91	-199.24	1.42	-197.82
RG570	37.29.83	113.37.82	1782.	979408.75	979960.18	-1.65	-200.73	1.44	-199.29
RG571	37.30.69	113.37.97	1804.	979405.75	979961.42	.88	-200.65	2.09	-198.56
RG572	37.31.07	113.38.13	1824.	979404.27	979961.97	5.07	-198.72	1.83	-196.89
RG573	37.31.70	113.38.80	1873.	979397.82	979962.89	12.93	-196.37	1.83	-194.54
RG574	37.32.20	113.39.39	1836.	979408.20	979963.62	11.11	-194.03	1.31	-192.72
RG575	37.32.61	113.40.95	1723.	979429.62	979964.21	-2.86	-195.41	1.24	-194.17
RG576	37.33.34	113.41.30	1686.	979438.57	979965.28	-6.37	-194.79	1.28	-193.51

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG577	37.33.98	113.41.55	1661.	979442.50	979966.21	-11.18	-196.77	.80	-195.97
RG578	37.36.30	113.59.24	1810.	979410.32	979969.57	-.72	-202.97	.70	-202.27
RG579	37.36.34	114. .82	1838.	979402.24	979969.62	-.20	-205.58	.61	-204.97
RG580	37.35.73	114. .97	1856.	979399.02	979968.74	2.92	-204.44	.70	-203.74
RG581	37.35.95	114. 2.38	1873.	979394.45	979969.06	3.38	-205.92	.73	-205.19
RG582	37.36.83	114. 2.03	1862.	979395.59	979970.34	-.24	-208.28	.67	-207.61
RG583	37.35.40	114. 2.81	1885.	979390.91	979968.26	4.32	-206.30	.83	-205.47
RG584	37.36.28	114. 3.09	1877.	979390.88	979969.54	.47	-209.24	.77	-208.47
RG585	37.35.45	114. 4.94	1860.	979395.59	979968.33	1.21	-206.62	.86	-205.76
RG586	37.34.55	114. 5.25	1866.	979394.83	979967.03	3.54	-204.94	1.02	-203.92
RG587	37.33.41	114. 5.87	1806.	979400.38	979965.38	-7.60	-209.44	1.34	-208.10
RG588	37.31.79	114. 6.49	1757.	979406.70	979963.02	-14.16	-210.48	.85	-209.63
RG589	37.31.16	114. 5.00	1601.	979444.30	979962.10	-23.80	-202.68	1.23	-201.45
RG590	37.30.91	114. 4.87	1601.	979446.37	979961.74	-21.37	-200.26	1.07	-199.19
RG591	37.30.41	114. 4.25	1522.	979465.59	979961.01	-25.69	-195.78	2.27	-193.51
RG592	37.29.66	114. 3.63	1487.	979477.88	979959.94	-23.23	-189.37	4.04	-185.33
RG593	37.29.04	114. 3.40	1473.	979483.94	979959.02	-20.40	-185.05	2.38	-182.67
RG594	37.28.29	114. 2.91	1454.	979483.08	979957.94	-26.29	-188.72	2.49	-186.23
RG595	37.27.93	114. 2.15	1447.	979491.09	979957.41	-19.72	-181.43	2.34	-179.09
RG597	37.32.05	113.41.67	1773.	979417.38	979963.40	1.04	-197.06	.91	-196.15
RG596	37.32.55	113.42.15	1726.	979427.16	979964.13	-4.41	-197.26	.80	-196.46
RG598	37.30.76	113.39.22	2203.	979324.13	979961.52	42.57	-203.65	9.68	-193.97
RG599	37.31.31	113.39.73	2015.	979368.63	979962.32	28.05	-197.09	4.04	-193.05
RG600	37.31.78	113.39.68	1939.	979384.32	979963.01	19.82	-196.91	2.04	-194.87
RG601	37.34.99	113.59.75	1868.	979393.02	979967.67	1.66	-207.03	.78	-206.25
RG602	37.34.44	114. .21	1880.	979392.11	979966.87	5.40	-204.68	.89	-203.79
RG603	37.34.02	114. .65	1864.	979393.57	979966.27	2.66	-205.68	.95	-204.73
RG604	37.33.74	114. 1.24	1828.	979400.09	979965.86	-1.70	-205.95	.77	-205.18
RG605	37.32.63	114. 1.02	1863.	979392.41	979964.24	3.07	-205.11	1.53	-203.58
RG606	37.32.13	114. 1.48	1864.	979391.34	979963.52	3.09	-205.22	2.14	-203.08
RG607	37.31.87	114. 2.12	1766.	979413.74	979963.14	-4.32	-201.70	1.21	-200.49
RG608	37.31.38	114. 1.38	1681.	979434.77	979962.42	-8.91	-196.75	1.37	-195.38

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG609	37.35.47	113.58.98	1826.	979404.02	979968.36	-.92	-204.94	.73	-204.21
RG610	37.33.64	113.42.93	1643.	979441.47	979965.72	-17.08	-200.73	.78	-199.95
RG611	37.32.98	113.42.94	1666.	979435.98	979964.76	-14.74	-200.88	.91	-199.97
RG612	37.31.73	113.42.88	1690.	979432.17	979962.93	-9.20	-198.06	1.80	-196.26
RG613	37.31.26	113.42.61	1708.	979430.27	979962.25	-4.96	-195.80	2.08	-193.72
RG614	37.30.36	113.42.89	1791.	979408.33	979960.94	.09	-200.05	1.93	-198.12
RG615	37.29.58	113.43.89	1904.	979389.05	979959.82	16.92	-195.89	1.68	-194.21
RG616	37.28.55	113.43.62	1932.	979384.76	979958.32	22.59	-193.28	2.66	-190.62
RG617	37.28.66	113.42.53	2002.	979369.26	979958.48	28.57	-195.14	2.28	-192.86
RG618	37.28.65	113.42.04	2039.	979359.32	979958.46	30.12	-197.74	3.01	-194.73
RG619	37.28.91	113.44.82	1926.	979386.89	979958.84	22.51	-192.75	2.46	-190.29
RG620	37.28.32	113.44.97	2042.	979361.11	979957.98	33.33	-194.87	3.73	-191.14
RG621	37.27.76	113.45.18	1947.	979380.20	979957.16	23.89	-193.69	3.59	-190.10
RG622	37.28.85	113.45.67	1859.	979398.86	979958.75	13.88	-193.89	2.11	-191.78
RG623	37.32.75	113.44.58	1755.	979413.91	979964.42	-9.01	-205.10	.82	-204.28
RG624	37.34.29	113.43.11	1644.	979441.98	979966.65	-17.30	-201.02	.60	-200.42
RG625	37.25.14	114. 1.73	1376.	979501.92	979953.37	-26.87	-180.61	1.68	-178.93
RG626	37.25.05	114. 2.98	1615.	979453.90	979953.24	-1.11	-181.52	4.49	-177.03
RG627	37.24.38	114. 2.86	1409.	979496.95	979952.27	-20.48	-177.94	2.40	-175.54
RG628	37. 3.86	113.53.29	1125.	979566.97	979922.55	-8.40	-134.12	2.28	-131.84
RG629	37. 4.03	113.54.41	1124.	979569.36	979922.80	-6.55	-132.17	1.90	-130.27
RG630	37. 4.56	113.55.08	1120.	979572.12	979923.57	-5.68	-130.89	2.24	-128.65
RG631	37. 5.13	113.55.27	1154.	979566.11	979924.39	-2.08	-131.06	2.89	-128.17
RG632	37. 5.54	113.56.37	1168.	979564.84	979924.98	.38	-130.17	1.81	-128.36
RG633	37. 5.58	113.57.65	1081.	979583.69	979925.05	-7.82	-128.60	1.52	-127.08
RG634	37. 6.19	113.58.68	1035.	979591.73	979925.93	-14.77	-130.44	1.38	-129.06
RG635	37. 6.84	113.59.28	1003.	979595.23	979926.86	-22.18	-134.23	1.20	-133.03
RG636	37. 7.32	114. .61	938.	979603.02	979927.56	-35.03	-139.87	.86	-139.01
RG637	37. 7.84	114. .88	899.	979610.18	979928.32	-40.66	-141.14	.90	-140.24
RG638	37. 8.33	114. 1.41	847.	979622.53	979929.02	-45.01	-139.69	1.26	-138.43
RG639	37. 8.30	114. 2.19	963.	979599.41	979928.98	-32.53	-140.09	1.22	-138.87
RG640	37. 9.09	114. 2.27	989.	979596.09	979930.12	-28.90	-139.39	1.16	-138.23

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG641	37. 9.77	114. 2.97	1008.	979594.45	979931.09	-25.48	-138.15	.88	-137.27
RG642	37.10.72	114. 3.71	1032.	979594.07	979932.48	-19.83	-135.19	.44	-134.75
RG643	37. 9.83	114. 3.64	1016.	979593.70	979931.18	-24.07	-137.56	.43	-137.13
RG644	37. 9.76	114. 4.53	1033.	979590.88	979931.08	-21.52	-136.92	.37	-136.55
RG645	37. 8.01	114. .40	953.	979598.81	979928.57	-35.54	-142.08	.88	-141.20
RG646	37. 6.59	114. .30	924.	979607.74	979926.50	-33.47	-136.78	.91	-135.87
RG647	37. 5.99	114. .69	910.	979608.02	979925.64	-36.94	-138.58	1.22	-137.36
RG648	37. 5.40	114. 1.72	831.	979619.35	979924.78	-48.83	-141.75	.69	-141.06
RG649	37. 5.14	114. 2.60	886.	979607.03	979924.41	-43.85	-142.90	.52	-142.38
RG650	37. 4.75	114. 3.12	881.	979607.23	979923.84	-44.59	-143.09	.47	-142.62
RG651	37. 7.15	113.59.90	967.	979599.61	979927.32	-29.16	-137.27	.95	-136.32
RG652	37.34.63	113.50.24	1678.	979451.84	979967.14	2.59	-184.94	1.04	-183.90
RG653	37.34.38	113.50.77	1691.	979448.52	979966.79	3.57	-185.39	.96	-184.43
RG654	37.33.84	113.51.27	1735.	979438.40	979966.01	7.87	-186.03	.87	-185.16
RG655	37.32.75	113.50.74	1736.	979440.14	979964.42	11.30	-182.64	1.42	-181.22
RG656	37.25.63	113.49.47	1807.	979415.45	979954.09	18.85	-183.03	2.08	-180.95
RG657	37.25.61	113.50.01	1735.	979431.15	979954.06	12.57	-181.33	3.12	-178.21
RG658	37.33.91	113.46.31	1642.	979440.58	979966.12	-18.74	-202.26	2.03	-200.23
RG659	37.32.14	113.46.46	1802.	979412.07	979963.54	4.71	-196.69	1.83	-194.86
RG660	37.31.13	113.48.35	2106.	979340.30	979962.06	28.19	-207.17	3.51	-203.66
RG661	37.30.98	113.46.67	1837.	979402.88	979961.84	8.03	-197.28	1.93	-195.35
RG662	37.31.31	113.45.94	1805.	979407.10	979962.32	1.90	-199.84	1.20	-198.64
RG663	37. 6.31	113.36.70	814.	979617.10	979926.10	-57.86	-148.80	1.40	-147.40
RG664	37. 4.86	113.35.76	785.	979622.00	979924.01	-59.62	-147.39	.97	-146.42
RG665	37. 3.82	113.34.32	957.	979580.70	979922.49	-46.54	-153.46	3.68	-149.78
RG666	37. 2.38	113.34.24	944.	979580.65	979920.41	-48.45	-153.94	1.58	-152.36
RG667	37. 5.35	113.36.04	786.	979621.01	979924.71	-61.03	-148.90	1.24	-147.66
RG668	37.30.87	113.37.37	1773.	979410.15	979961.68	-4.29	-202.45	1.53	-200.92
RG669	37.30.88	113.36.52	1795.	979405.95	979961.70	-1.82	-202.40	1.25	-201.15
RG670	37.32.43	113.36.14	1783.	979412.51	979963.95	-1.19	-200.45	1.29	-199.16
RG671	37.33.32	113.36.70	1727.	979426.80	979965.25	-5.50	-198.49	1.83	-196.66
RG672	37.33.99	113.37.27	1685.	979436.84	979966.23	-9.42	-197.70	2.00	-195.70

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG673	37.34.52	113.36.86	1728.	979429.73	979966.98	-3.94	-197.06	1.06	-196.00
RG674	37.35.43	113.36.31	1748.	979430.38	979968.30	1.52	-193.81	1.79	-192.02
RG675	37.30.71	113.33.41	1988.	979365.43	979961.45	17.44	-204.70	1.85	-202.85
RG676	37.30.30	113.32.83	2030.	979354.62	979960.85	20.21	-206.63	1.80	-204.83
RG677	37.31.18	113.33.65	1990.	979364.12	979962.13	16.20	-206.22	1.84	-204.38
RG678	37.32.34	113.33.39	2018.	979363.02	979963.83	21.97	-203.54	2.28	-201.26
RG679	37.33.16	113.33.52	1976.	979373.30	979965.02	18.17	-202.68	1.63	-201.05
RG680	37.31.75	113.28.40	2067.	979354.34	979962.96	29.38	-201.65	2.11	-199.54
RG681	37.30.59	113.28.47	1983.	979365.59	979961.27	16.18	-205.38	2.44	-202.94
RG682	37.21.58	113.40.73	1446.	979475.38	979948.20	-26.51	-188.12	1.50	-186.62
RG683	37.21.96	113.40.38	1572.	979444.46	979948.76	-19.14	-194.82	2.30	-192.52
RG684	37.22.56	113.41.02	1399.	979483.58	979949.62	-34.31	-190.65	2.02	-188.63
RG685	37.23.18	113.40.90	1376.	979489.07	979950.53	-36.78	-190.56	2.42	-188.14
RG686	37.27.05	113.26.20	2187.	979314.59	979956.12	33.34	-211.04	7.11	-203.93
RG687	37.26.95	113.25.12	2286.	979295.86	979955.98	45.32	-210.12	8.59	-201.53
RG688	37.26.84	113.24.34	2394.	979272.86	979955.82	55.88	-211.66	8.48	-203.18
RG689	37.26.71	113.24.10	2408.	979270.09	979955.65	57.51	-211.56	8.66	-202.90
RG690	37.25.88	113.23.23	2600.	979230.35	979954.45	78.23	-212.30	9.21	-203.09
RG691	37.25.72	113.24.03	2783.	979191.41	979954.22	95.96	-215.01	12.44	-202.57
RG692	37.25.42	113.25.15	2576.	979239.35	979953.78	80.38	-207.43	7.94	-199.49
RG693	37.26.39	113.26.36	2192.	979318.05	979955.18	39.35	-205.61	6.80	-198.81
RG694	37.22.11	113.41.04	1433.	979477.20	979948.97	-29.68	-189.77	1.61	-188.16
RG695	37.21.85	113.40.87	1447.	979475.42	979948.59	-26.57	-188.29	1.48	-186.81
RG696	37.23.78	113.41.39	1430.	979474.22	979951.41	-36.05	-195.79	1.65	-194.14
RG697	37.24.82	113.41.71	1562.	979448.08	979952.91	-22.77	-197.33	1.45	-195.88
RG698	37.25.17	113.41.83	1622.	979437.19	979953.42	-15.74	-196.97	1.90	-195.07
RG699	37.23.13	113.41.03	1377.	979487.23	979950.46	-38.36	-192.21	2.40	-189.81
RG700	37.20.15	113.16.53	1248.	979514.15	979946.13	-47.00	-186.40	4.21	-182.19
RG701	37.20.19	113.18.11	1381.	979487.24	979946.19	-32.85	-187.15	3.44	-183.71
RG702	37.20.65	113.18.81	1482.	979465.56	979946.86	-23.98	-189.58	3.39	-186.19
RG703	37.21.51	113.19.72	1591.	979425.38	979948.10	-31.73	-209.52	6.94	-202.58
RG704	37.21.84	113.20.06	1631.	979430.27	979948.58	-15.08	-197.30	6.26	-191.04

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
RG705	37.22.00	113.20.74	1818.	979392.10	979948.81	4.26	-198.87	6.99	-191.88
RG706	37.23.13	113.21.13	1853.	979384.70	979950.46	6.12	-200.97	7.96	-193.01
RG707	37.15.67	113.22.17	1189.	979531.12	979939.65	-41.69	-174.52	3.65	-170.87
RG708	37.16.19	113.22.52	1280.	979509.58	979940.41	-35.78	-178.83	3.52	-175.31
RG709	37.16.83	113.23.44	1390.	979478.45	979941.34	33.98	-189.29	4.84	-184.45
RG710	37.17.53	113.24.66	1527.	979452.70	979942.34	-18.50	-189.11	6.39	-182.72
RG711	37.18.05	113.25.40	1656.	979425.19	979943.09	-6.96	-191.98	7.76	-184.22
RG712	37.18.56	113.25.55	1764.	979401.09	979943.83	1.68	-195.46	7.85	-187.61
RG713	37.18.66	113.26.20	1819.	979390.30	979943.98	7.67	-195.60	9.53	-186.07
RG714	37.19.06	113.26.88	1954.	979356.20	979944.56	14.57	-203.76	14.14	-189.62
RG715	37.10.12	113.39.79	931.	979598.34	979931.60	-46.10	-150.09	1.60	-148.49
RG716	37.10.09	113.41.28	935.	979597.62	979931.56	-45.27	-149.80	1.44	-148.36
RG717	37.18.98	113.41.72	1597.	979432.98	979944.44	-18.68	-197.12	9.33	-187.79
RG718	37.19.40	113.41.47	1380.	979490.04	979945.04	-29.10	-183.32	1.30	-182.02
RG719	37.19.15	113.40.93	1411.	979483.48	979944.67	-25.70	-183.40	1.13	-182.27
RG720	37.18.62	113.40.76	1395.	979487.67	979943.91	-25.64	-181.56	1.16	-180.40
RG721	37.18.44	113.41.16	1384.	979489.37	979943.66	-27.26	-181.89	1.18	-180.71
RG722	37.18.39	113.41.30	1379.	979489.84	979943.59	-28.13	-182.25	1.19	-181.06
RG723	37.18.35	113.41.88	1379.	979491.52	979943.52	-26.38	-180.50	1.02	-179.48
RG724	37.18.40	113.42.30	1379.	979493.37	979943.59	-24.79	-178.84	1.02	-177.82
RG725	37.17.45	113.41.82	1373.	979495.56	979942.23	-23.02	-176.42	1.03	-175.39
RG726	37.17.83	113.41.76	1378.	979494.16	979942.77	-23.27	-177.29	1.06	-176.23
EH396	37. 6.08	113. 8.18	1451.	979474.69	979925.76	1.59	-165.61	1.06	-164.55
EH409	37. 4.45	113. 8.43	1582.	979453.02	979923.40	22.63	-159.19	.88	-158.31
EH411	37. 4.81	113.11.30	1650.	979435.73	979923.92	25.98	-163.52	4.07	-159.45
EA411	37. 5.81	113.11.15	1652.	979434.91	979925.37	24.19	-165.47	4.84	-160.63
EH412	37. 3.90	113.11.29	1670.	979435.44	979922.59	32.94	-158.71	1.41	-157.30
EA412	37. 4.10	113.10.59	1641.	979440.28	979922.88	28.65	-159.79	1.13	-158.66
EH417	37. 5.50	113.16.20	1391.	979487.85	979924.91	-3.03	-163.48	1.38	-162.10
EA419	37. 2.39	113.16.38	1405.	979486.26	979920.41	4.39	-157.69	1.96	-155.73
EH420	37. .48	113.15.10	1366.	979497.03	979917.67	5.58	-152.02	.90	-151.12
EH421	37. .30	113.16.45	1372.	979494.14	979917.41	4.84	-153.46	1.21	-152.25

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
EH422	37. .06	113.17.33	1394.	979487.16	979917.05	5.07	-155.71	4.06	-151.65
EH431	37. 5.10	113.29.93	812.	979608.49	979924.33	-60.52	-156.17	.89	-155.28
EH432	37. 3.71	113.29.10	847.	979601.92	979922.32	-54.08	-153.71	.77	-152.94
EH433	37. 3.14	113.27.72	920.	979584.03	979921.50	-48.56	-156.39	.59	-155.80
EA433	37. 1.88	113.26.50	930.	979584.80	979919.68	-43.16	-152.02	.94	-151.08
EH440	37. 5.46	113.18.64	1038.	979548.30	979924.85	-51.26	-172.28	3.50	-168.78
EH441	37. 4.67	113.18.60	1085.	979541.45	979923.72	-42.58	-168.83	2.69	-166.14
EH442	37. 4.07	113.18.49	1093.	979537.98	979922.84	-42.82	-169.91	2.60	-167.31
EH443	37. 2.91	113.18.33	1075.	979541.41	979921.16	-43.07	-168.22	2.63	-165.59
EH444	37. 2.14	113.18.33	1044.	979550.98	979920.05	-41.98	-163.66	2.55	-161.11
EH445	37. 1.22	113.18.26	1038.	979553.76	979918.72	-39.85	-160.81	2.21	-158.60
EH600	37. 5.81	113.27.98	892.	979595.80	979925.37	-49.60	-154.18	.78	-153.40
EH602	37. 2.53	113.29.13	861.	979596.87	979920.61	-53.18	-154.36	.66	-153.70
EH603	37. 1.80	113.28.54	890.	979590.23	979919.56	-49.84	-154.26	.57	-153.69
EH604	37. .64	113.28.29	860.	979592.37	979917.90	-55.44	-156.45	.78	-155.67
EH605	37. 1.40	113.29.79	878.	979594.87	979918.98	-48.37	-151.43	.52	-150.91
EH606	37. .13	113.27.99	860.	979593.67	979917.16	-53.40	-154.41	.74	-153.67
EH607	37. 2.46	113.30.57	880.	979595.55	979920.51	-48.57	-151.86	.45	-151.41
EH738	37. 5.76	113.31.31	791.	979618.39	979925.29	-57.97	-151.31	.93	-150.38
EH739	37. 5.32	113.30.48	800.	979613.70	979924.65	-59.20	-153.56	.88	-152.68
EH740	37. 3.96	113.30.73	813.	979610.53	979922.68	-56.36	-152.19	.84	-151.35
EH741	37. 4.89	113.30.48	805.	979611.14	979924.04	-59.64	-154.55	.82	-153.73
EH742	37. 4.89	113.31.25	803.	979616.31	979924.04	-55.04	-149.74	.78	-148.96
EH743	37. 4.45	113.31.50	805.	979614.55	979923.40	-55.69	-150.56	.81	-149.75
EH745	37. 3.91	113.30.20	814.	979610.01	979922.61	-56.63	-152.52	.95	-151.57
EH746	37. 3.66	113.31.27	812.	979610.26	979922.24	-56.49	-152.21	.78	-151.43
EH747	37. 3.68	113.31.82	809.	979609.96	979922.27	-57.75	-153.13	.65	-152.48
EH748	37. 2.76	113.31.82	821.	979609.07	979920.95	-53.82	-150.47	.60	-149.87
EH752	37. .91	113.24.72	910.	979583.92	979918.28	-48.85	-155.45	.82	-154.63
EH348	37.10.60	113.17.98	984.	979558.88	979932.29	-64.94	-179.86	1.67	-178.19
EA348	37.10.80	113.17.00	995.	979561.53	979932.37	-59.00	-175.22	2.32	-172.90
EH352	37. 9.77	113.23.67	845.	979600.34	979931.08	-65.07	-164.48	2.04	-162.44

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
EH354	37.12.24	113.23.69	916.	979588.71	979934.66	-58.56	-165.85	3.12	-162.73
EH360	37.12.20	113.11.26	1082.	979517.84	979934.60	-48.01	-173.91	1.89	-172.02
EH361	37.12.36	113.12.60	1084.	979548.02	979934.84	-47.51	-173.61	2.11	-171.50
EH394	37. 6.84	113.10.49	1405.	979483.89	979926.85	-4.59	-166.61	1.44	-165.17
EA394	37. 7.00	113. 9.88	1418.	979481.12	979927.09	-3.67	-167.11	1.49	-165.62
EB394	37. 7.11	113. 9.60	1417.	979481.16	979927.24	-3.87	-167.28	1.42	-165.86
EH395	37. 6.53	113. 8.70	1443.	979475.96	979926.40	-.23	-166.54	1.22	-165.32
EH414	37. 6.65	113.14.00	1322.	979502.07	979926.57	-11.81	-164.52	.96	-163.56
EH415	37. 7.91	113.15.30	1256.	979515.74	979928.41	-20.29	-165.63	.84	-164.79
EA415	37. 6.22	113.12.35	1376.	979490.67	979925.96	-5.77	-164.58	1.30	-163.28
EB415	37. 6.30	113.11.73	1390.	979488.31	979926.08	-4.02	-164.36	1.36	-163.00
EA416	37. 8.72	113.15.88	1230.	979521.23	979929.58	-23.79	-166.29	.97	-165.32
EH426	37.10.01	113.24.32	878.	979595.41	979931.43	-60.19	-163.27	2.35	-160.92
EH429	37. 6.96	113.29.97	800.	979614.96	979927.02	-60.23	-154.62	1.24	-153.38
EH430	37. 5.88	113.29.95	811.	979611.31	979925.47	-59.03	-154.61	.99	-153.62
EH436	37. 9.35	113.18.00	1000.	979556.84	979930.49	-60.11	-176.87	1.50	-175.37
EA436	37. 9.36	113.17.43	1002.	979559.51	979930.51	-56.81	-173.81	3.01	-170.80
EH437	37. 8.26	113.19.09	1004.	979553.17	979928.91	-60.97	-178.18	1.24	-176.94
EA437	37. 8.38	113.18.02	1020.	979553.92	979929.08	-55.50	-174.48	2.42	-172.06
EH438	37. 7.36	113.18.55	1008.	979558.17	979927.61	-53.55	-171.16	2.42	-168.74
EH439	37. 6.53	113.18.55	1037.	979550.20	979926.40	-51.38	-172.23	2.65	-169.58
EH699	37. 9.12	113.21.82	892.	979583.39	979930.16	-66.80	-171.39	1.55	-169.84
EH713	37. 9.15	113.23.35	869.	979594.94	979930.20	-62.37	-164.40	1.39	-163.01
EH714	37.10.92	113.21.97	896.	979588.60	979932.75	-62.68	-167.82	1.86	-165.96
EH721	37. 8.23	113.26.98	844.	979605.59	979928.86	-57.89	-157.20	1.52	-155.68
EH732	37. 7.80	113.30.85	842.	979607.88	979928.25	-55.83	-154.83	1.23	-153.60
EH733	37. 7.30	113.30.22	814.	979612.41	979927.52	-58.95	-154.90	1.21	-153.69
EH734	37. 7.14	113.30.77	820.	979611.89	979927.29	-57.53	-154.11	1.11	-153.00
EH736	37. 6.19	113.29.95	802.	979618.62	979925.91	-58.98	-153.58	1.13	-152.45
EH737	37. 6.20	113.30.50	797.	979615.46	979925.93	-59.76	-153.75	1.02	-152.73
EC335	37.14.19	113.27.19	1316.	979497.87	979937.49	-28.63	-180.71	2.67	-178.04
ED335	37.14.26	113.29.24	1370.	979488.14	979937.59	-21.72	-179.88	3.01	-176.87

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
EH337	37.15.96	113.17.69	1084.	979541.71	979940.05	-59.12	-185.20	2.66	-182.54
EH338	37.15.57	113.17.18	1034.	979552.48	979939.48	-62.92	-183.51	3.16	-180.35
EH339	37.14.36	113.16.81	1016.	979554.46	979937.73	-64.94	-183.44	2.38	-181.06
EH356	37.14.25	113.21.64	1055.	979558.84	979937.58	-48.46	-171.09	2.58	-168.51
EH357	37.14.93	113.20.64	1090.	979550.59	979938.57	-46.88	-173.62	2.24	-171.38
EH359	37.16.52	113.18.78	1145.	979535.39	979940.87	-47.16	-180.15	2.73	-177.42
EH363	37.13.10	113.15.15	1145.	979536.76	979935.91	-41.03	-173.96	1.92	-172.04
EA364	37.13.18	113. 9.85	1106.	979541.34	979936.02	-48.41	-177.04	2.58	-174.46
EH365	37.13.94	113. 9.33	1124.	979537.10	979937.12	-48.29	-178.90	3.62	-175.28
EH366	37.14.22	113. 9.00	1123.	979536.14	979937.53	-50.03	-180.50	5.25	-175.25
EA366	37.15.13	113. 8.24	1168.	979527.80	979938.84	-45.67	-181.22	4.30	-176.92
EH374	37.18.94	113. 8.57	1628.	979438.98	979944.37	1.73	-185.21	2.87	-182.34
EH375	37.19.88	113. 9.31	1654.	979435.80	979945.73	5.38	-184.52	2.20	-182.32
EH376	37.19.88	113.10.98	1691.	979430.03	979945.73	10.99	-183.04	1.78	-181.26
EH377	37.18.19	113.11.94	1747.	979418.34	979943.27	18.87	-181.36	2.60	-178.76
EH700	37.17.02	113.18.20	1155.	979531.84	979941.59	-48.43	-182.51	2.69	-179.82
EH701	37.17.73	113.17.86	1180.	979526.84	979942.62	-46.83	-183.68	3.00	-180.68
EH702	37.18.59	113.17.70	1204.	979522.70	979943.86	-44.88	-184.39	3.57	-180.82
EH703	37.19.35	113.17.15	1248.	979513.98	979944.95	-40.96	-185.45	3.32	-182.13
EB307	37.26.51	113.15.30	1483.	979467.84	979955.34	-25.14	-195.87	2.89	-192.98
EH328	37.24.70	113.14.30	1481.	979468.82	979952.72	-22.02	-192.56	3.11	-189.45
EH330	37.26.13	113.14.43	1479.	979470.77	979954.80	-22.72	-193.06	3.16	-189.90
EH704	37.20.07	113.16.72	1251.	979513.03	979946.00	-42.10	-186.90	3.89	-183.01
EH705	37.20.84	113.16.15	1250.	979511.51	979947.12	-45.14	-189.80	5.56	-184.24
EH706	37.21.61	113.15.72	1289.	979503.56	979948.23	-41.95	-191.05	5.10	-185.95
EH707	37.22.34	113.15.29	1308.	979498.89	979949.30	-41.86	-193.06	5.79	-187.27
EH708	37.23.16	113.14.65	1384.	979483.34	979950.49	-35.29	-194.94	5.10	-189.84
EH709	37.24.03	113.14.30	1439.	979475.56	979951.74	-27.29	-193.12	3.85	-189.27
EH710	37.24.84	113.13.88	1448.	979477.01	979952.92	-24.11	-191.00	5.45	-185.55
EH279	37.33.48	113.11.24	1676.	979437.16	979965.47	-6.33	-198.66	2.35	-196.31
EH280	37.32.82	113.10.66	1689.	979437.21	979964.51	-1.17	-195.00	3.24	-191.76
EH281	37.33.48	113.10.25	1679.	979437.39	979965.47	-5.07	-197.77	3.39	-194.38

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
EH288	37.33.71	113.12.41	1707.	979430.05	979965.80	-4.27	-200.05	1.88	-198.17
EA289	37.32.61	113.14.62	1953.	979380.51	979964.20	23.68	-199.60	2.55	-197.05
EB289	37.31.80	113.14.42	1855.	979398.44	979963.02	12.70	-199.67	2.28	-197.39
EC289	37.31.18	113.14.46	1806.	979408.91	979962.12	8.84	-198.00	2.88	-195.12
EH290	37.33.48	113.12.68	1725.	979426.02	979965.47	-2.43	-200.20	1.84	-198.36
EH291	37.32.44	113.12.14	1668.	979438.77	979963.95	-5.66	-197.10	2.39	-194.71
EB292	37.31.12	113.12.90	1636.	979446.62	979960.84	-6.91	-195.00	2.71	-192.29
EH293	37.31.36	113.11.51	1685.	979436.80	979962.38	-.78	-194.13	3.09	-191.04
EH297	37.33.46	113.27.67	1925.	979388.28	979965.45	21.86	-198.39	1.83	-196.56
EA297	37.31.93	113.28.47	2076.	979353.05	979963.21	35.42	-201.71	1.89	-199.82
EB297	37.31.96	113.26.95	2167.	979329.95	979963.26	40.20	-207.06	3.43	-203.63
EH298	37.33.09	113.28.76	2010.	979370.44	979964.91	30.60	-199.09	1.63	-197.46
EA298	37.32.71	113.29.88	1903.	979389.69	979964.35	17.29	-200.40	1.67	-198.73
EC298	37.32.40	113.32.00	1845.	979399.80	979963.90	9.99	-201.22	2.19	-199.03
EG298	37.30.17	113.29.39	1929.	979376.46	979960.65	15.87	-204.76	2.73	-202.03
EH299	37.32.87	113.24.36	1929.	979386.23	979964.59	21.88	-198.81	3.55	-195.26
EH300	37.32.44	113.23.28	1961.	979378.39	979963.95	24.46	-199.78	3.56	-196.22
EH301	37.32.44	113.22.75	2005.	979371.32	979963.95	30.84	-198.33	2.60	-195.73
EH303	37.32.45	113.20.76	1909.	979386.84	979963.97	16.90	-201.54	3.11	-198.43
EH304	37.31.52	113.19.77	1783.	979406.87	979962.62	-.57	-204.93	3.88	-201.05
EH306	37.30.26	113.19.21	1716.	979414.44	979960.78	-12.04	-208.83	3.32	-205.51
EA306	37.30.68	113.18.24	1812.	979395.64	979961.39	-1.63	-209.22	2.65	-206.57
EC306	37.31.99	113.18.46	2185.	979324.16	979963.30	39.92	-209.35	6.90	-202.45
EB306	37.32.70	113.17.73	2359.	979289.73	979964.34	58.35	-210.46	9.00	-201.46
EA307	37.27.93	113.16.25	1579.	979449.37	979957.40	-15.86	-197.38	2.36	-195.02
EH331	37.27.78	113.13.32	1563.	979459.88	979957.18	-10.22	-189.89	3.86	-186.03
EA332	37.28.82	113.14.53	1566.	979454.55	979958.70	-15.94	-196.03	2.34	-193.69
EH588	37.33.48	113.11.84	1690.	979435.27	979965.47	-3.70	-197.67	2.02	-195.65
EH589	37.32.41	113.15.45	2067.	979355.23	979963.91	33.97	-202.10	4.87	-197.23
EH592	37.33.07	113.16.57	2248.	979318.69	979964.87	52.34	-203.99	5.00	-198.99
EH613	37.32.30	113.11.37	1676.	979437.87	979963.75	-3.80	-196.17	2.80	-193.37
EH162	37.36.63	113.22.31	1949.	979390.62	979970.03	26.83	-196.04	1.48	-194.56

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
EA162	37.37.11	113.21.76	1986.	979383.51	979970.73	30.40	-196.60	1.50	-195.10
EH163	37.36.68	113.22.94	1947.	979391.92	979970.11	27.41	-195.22	1.37	-193.85
EH175	37.36.33	113.25.56	1866.	979406.91	979969.59	18.09	-195.55	1.06	-194.49
EH176	37.36.06	113.26.77	1789.	979420.26	979969.20	8.02	-196.99	1.70	-195.29
EH274	37.36.12	113.10.74	1667.	979436.57	979969.29	-13.47	-204.81	1.71	-203.10
EH275	37.36.11	113. 9.60	1681.	979437.91	979969.27	-7.88	-200.86	2.46	-198.40
EH276	37.35.24	113.10.28	1669.	979440.16	979968.01	-7.85	-199.46	2.30	-197.16
EH278	37.34.37	113.10.85	1673.	979437.91	979966.75	-7.62	-199.68	2.23	-197.45
EH282	37.34.09	113. 9.88	1689.	979436.37	979966.34	-3.96	-197.76	3.25	-194.51
EH283	37.35.46	113. 9.65	1693.	979436.24	979968.33	-4.93	-199.14	2.64	-196.50
EH284	37.37.02	113. 8.99	1697.	979433.99	979970.60	-8.05	-202.76	2.17	-200.59
EA286	37.36.66	113.14.92	1718.	979425.45	979970.08	-9.67	-206.69	1.88	-204.81
EB286	37.36.12	113.14.02	1708.	979426.69	979969.29	-10.75	-206.65	1.77	-204.88
EH287	37.35.23	113.12.38	1687.	979432.30	979967.99	-10.23	-203.82	1.61	-202.21
EA287	37.35.24	113.13.62	1769.	979412.69	979968.01	-4.65	-207.38	1.73	-205.65
EH289	37.34.36	113.13.63	1772.	979417.94	979966.74	2.79	-200.26	2.04	-198.22
EH295	37.34.07	113.25.31	1860.	979402.67	979966.32	15.14	-197.77	1.98	-195.79
EH296	37.33.81	113.26.29	1878.	979398.12	979965.95	16.41	-198.49	2.03	-196.46
EE306	37.33.84	113.17.90	2503.	979260.21	979965.99	71.38	-213.45	10.10	-203.35
EF306	37.34.35	113.18.43	2443.	979279.39	979966.73	71.40	-206.75	6.99	-199.76
EG306	37.34.67	113.18.71	2404.	979284.66	979967.19	64.25	-209.57	6.13	-203.44
EH586	37.37.10	113.15.13	1718.	979424.51	979970.72	-11.07	-208.17	1.69	-206.48
EH593	37.36.11	113.12.39	1667.	979433.74	979969.27	-16.38	-207.68	1.48	-206.20
EH595	37.37.16	113.10.72	1666.	979434.23	979970.80	-17.61	-208.85	1.44	-207.41
EH596	37.37.38	113. 9.48	1686.	979433.64	979971.12	-12.39	-205.85	1.69	-204.16
EH609	37.34.55	113. 7.70	1929.	979392.84	979967.02	26.06	-194.64	4.21	-190.43
EH610	37.33.99	113. 8.94	1756.	979423.69	979966.21	4.29	-197.04	5.15	-191.89
EH611	37.35.12	113. 9.63	1686.	979428.57	979967.84	-4.08	-197.56	3.00	-194.56
EH773	37.36.11	113.11.84	1664.	979434.82	979969.27	-16.05	-207.08	1.50	-205.58
EH774	37.35.24	113.11.84	1674.	979435.44	979968.01	-10.77	-202.93	1.67	-201.26
EH818	37.37.14	113.14.60	1704.	979426.60	979970.77	-13.63	-209.06	1.42	-207.64
WP379	37.36.81	113.31.06	1731.	979431.81	979970.31	-4.34	-197.77	1.00	-196.77

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
WP380	37.36.07	113.30.66	1718.	979432.93	979969.23	-6.19	-198.15	1.39	-196.76
WP382	37.34.66	113.31.68	1767.	979419.74	979967.19	-2.09	-199.57	2.07	-197.50
WP383	37.31.23	113.30.72	1880.	979390.95	979962.21	8.90	-201.19	1.77	-199.42
WP388	37.36.25	113.37.99	1628.	979447.28	979969.49	-19.85	-201.77	.64	-201.13
WP392	37.36.29	113.39.63	1612.	979447.72	979969.55	-24.46	-204.57	.51	-204.06
WP393	37.35.10	113.40.75	1622.	979447.91	979967.81	-19.22	-200.52	.69	-199.83
WP394	37.34.52	113.41.86	1636.	979446.40	979966.98	-15.78	-198.58	.65	-197.93
WP401	37.32.23	113.44.65	1700.	979427.65	979963.66	-11.54	-201.46	1.17	-200.29
WP402	37.34.41	113.44.30	1622.	979449.70	979966.82	-16.63	-197.87	1.40	-196.47
WP403	37.35.04	113.43.05	1617.	979454.16	979967.75	-14.61	-195.29	.74	-194.55
WP404	37.36.01	113.42.77	1614.	979455.84	979969.14	-15.17	-195.55	.79	-194.76
WP405	37.36.73	113.42.63	1619.	979456.53	979970.20	-14.03	-194.95	.60	-194.35
WP406	37.37.15	113.41.53	1602.	979455.44	979970.80	-21.09	-200.08	.44	-199.64
WP407	37.37.17	113.37.97	1610.	979446.75	979970.84	-27.27	-207.17	.54	-206.63
WP525	37.34.28	113.45.27	1631.	979448.34	979966.64	-14.90	-197.19	1.38	-195.81
WP526	37.33.91	113.46.31	1642.	979448.93	979966.12	-10.40	-193.92	2.03	-191.89
WP528	37.34.47	113.48.16	1658.	979452.27	979966.91	-3.16	-188.38	3.69	-184.69
WP530	37.34.85	113.51.28	1682.	979451.10	979967.46	2.66	-185.29	1.04	-184.25
WP532	37.35.41	113.49.67	1700.	979450.03	979968.27	6.34	-183.61	.73	-182.88
WP533	37.36.75	113.48.19	1771.	979428.02	979970.22	4.47	-193.48	1.16	-192.32
WP534	37.36.88	113.46.05	1719.	979440.35	979970.41	.44	-191.65	1.05	-190.60
WP535	37.33.62	113.50.17	1683.	979452.08	979965.69	5.79	-182.56	1.59	-180.97
WP536	37.31.85	113.50.88	1714.	979429.05	979963.11	-4.98	-196.57	4.09	-192.48
WP537	37.35.63	113.52.97	1706.	979441.22	979968.59	-.83	-191.50	.82	-190.68
WP538	37.36.10	113.54.01	1719.	979436.97	979969.27	-1.91	-193.97	.98	-192.99
WP539	37.36.45	113.55.78	1797.	979413.86	979969.78	-1.26	-199.59	.75	-198.84
WP540	37.36.52	113.56.77	1825.	979409.37	979969.89	2.52	-201.36	.85	-200.51
WP541	37.36.44	113.57.84	1858.	979402.48	979969.77	6.01	-201.58	.73	-200.85
WP680	37.35.13	113.32.28	1935.	979385.00	979967.86	14.42	-201.86	4.28	-197.58
WP681	37.31.91	113.33.74	2041.	979356.16	979963.27	22.69	-205.34	3.07	-202.20
WP682	37.33.48	113.32.78	1903.	979389.14	979965.49	11.05	-201.65	1.43	-200.22
WP683	37.32.22	113.32.38	1955.	979376.74	979963.65	16.49	-202.01	1.28	-200.73

STAT.	LATITUDE	LONGITUDE	ELEV.	OBSERVED GRAVITY	THEOR. GRAVITY	FREE- AIR	SIMPLE BOUGUER	T.C.	COMPLETE BOUGUER
WP684	37.33.47	113.35.58	1950.	979384.09	979965.48	20.41	-197.51	2.63	-194.88
WP722	37.37.45	113.49.30	1895.	979401.34	979971.24	14.86	-196.89	1.41	-195.48
WP724	37.36.63	113.54.43	1728.	979433.34	979970.05	-3.59	-196.64	.87	-195.77

APPENDIX B

ROCK SAMPLE DATA AND DENSITY MEASUREMENTS

A straightforward method adapted from Carrier (1979) was used to determine the dry- and wet-rock densities of hand specimens collected in the survey area. The basic steps are as follows:

- Step 1: A rock sample is selected with as little weathering as possible, of mass usually 100-500 gm but never over 1 kg.
- Step 2: The mass of the sample is determined in air.
- Step 3: The sample is placed in an hermetically sealed vessel and evacuated of air for 6-8 hr using a vacuum oil pump at a pressure of 0.0001 mm of mercury.
- Step 4: Only water is allowed to enter the vessel theoretically saturating the sample at atmospheric pressure.
- Step 5: The saturated mass of the sample is determined while suspended in water.
- Step 6: The saturated mass of the sample is determined while suspended in air.

The volume of the rock sample is the saturated mass in air less the saturated mass in water. Hence, the following formulas for unsaturated and saturated densities, as though they are situated above and below the water table, are:

$$\rho_{\text{unsat.}} = \frac{\text{Mass}_{\text{dry in air}}}{\text{Mass}_{\text{sat. in air}} - \text{Mass}_{\text{sat. in water}}}$$

$$\rho_{\text{sat.}} = \frac{\text{Mass}_{\text{sat. in air}}}{\text{Mass}_{\text{sat. in air}} - \text{Mass}_{\text{sat. in water}}}$$

A stratigraphic column of rock units (Cook, 1960) is listed in Table 2 with the basic lithology, approximate thickness of the unit, and the average wet density determined from rock samples taken within the survey area. Unit symbols are taken from Cook (1960). Lithology abbreviations are as follows:

lst	limestone
vol	volcanic
brec	breccia
ss	sandstone
sh	shale
dol	dolomite
ves	vesicular
mas	massive
cong	conglomerate
undiff	undifferentiated

Table 2. Stratigraphic column with unit lithology, thickness, and density.

Consolidated Unit Name	Consolidated Unit Thickness (m)	Consolidated Unit Density (gm/cc)	Unit Symbol	Lithology	Unit Thickness (m)	Wet Density (gm/cc)
ves basalt	-	2.0-2.2	Qtb	ves basalt	-	2.15
mas basalt	-	2.5-2.55	Qtb	mas basalt	-	2.55
			Tvf	vol flows	max 300	2.25
upper			Tvp	tuff	max 100	2.23
Tertiary	-	2.25	Tvcm	rhyolite	max 475	2.14
volcanics	-		Tvp	latite flow	max 600	2.09
			Tvmr	vol flow	max 100	2.35
lower			Tvsc	vol brec	max 100	2.58
Tertiary	760	2.5	Tvr	tuff/brec	max 180	2.54
volcanics			Tvq	tuff/brec	max 490	2.46
			Tc	lst	145	2.65
Cretaceous			Kk	ss/cong	365	2.63
limestones	1300-1400	2.6	Ksw	ss/sh	550	2.57
			Kdt	ss/cong	300	2.57
			Kd	cong	0-30	2.60
			K	undiff	1175-1250	2.54
			Jc	ss w/sh	145-205	2.45
			Jn	ss	550-670	2.40
Mesozoic			Jk	silt	215	2.40
sandstones	1175-1390	2.4-2.45	Trmo	ss	145	2.36
			TRc	ss/silt/sh	120	2.54
			TRs	ss/cong	25	2.50
			TRm	lst	470-645	2.60
			Pk	lst	240-320	2.70
Paleozoic	-	2.7	Psc	ss	550	2.50
			Cc	lst	475	2.70
			Mr	lst	170-340	2.60
			GOD	lst/dol	670	2.80
			GP	sh	70	2.60
			GPM	ss	160	2.65

Table 3. Listing of rock samples, sample location, and calculated dry and wet densities.

Sample Number	Lithology	Unit Symbol	Location	Dry Density (gm/cc)	Wet Density (gm/cc)
TG011	Gneiss	Pg	SE SE Sec33 T42S R18W	2.56	2.60
TG010	Quartzite	Gpm	SW SW Sec27 T42S R18W	2.59	2.63
TG009	Shale	Gp	SW NE Sec34 T42S R18W	2.44	2.56
TG014	Limestone	GOD	NW SW Sec35 T42S R18W	2.62	2.67
TG008	Limestone	GOD	SW NW Sec35 T42S R18W	2.79	2.81
TG018	Limestone	Mr	NE SW Sec36 T42S R18W	2.48	2.60
TG012A	Limestone	Cc	NE NW Sec 8 T43S R18W	2.63	2.68
TG012B	Limestone	Cc	NE NW Sec 8 T43S R18W	2.65	2.67
TG007	Sandstone	Psc	NE SW Sec12 T42S R18W	2.40	2.52
TG006	Limestone	Pk	SW NE Sec12 T42S R18W	2.63	2.70
TG005	Limestone	TRm	SW NE Sec32 T41S R17W	2.58	2.62
TG001	Conglomerate	TRs	NE NW Sec32 T41S R17W	2.39	2.50
TG001	Conglomerate	TRs	NE NW Sec32 T41S R17W	2.36	2.49
TG002	Sandstone	TRc	NE SW Sec29 T41S R17W	2.27	2.46
TG003	Limestone	TRmo	NE SW Sec29 T41S R17W	2.48	2.60
TG004	Siltstone	Jk	NE NW Sec29 T41S R17W	2.28	2.41
TG048A	Sandstone	Jn	NE SE Sec 2 T42S R16W	2.38	2.50
TG050	Sandstone	Jn	NW NE Sec27 T41S R16W	2.22	2.38
TG050	Sandstone	Jn	NW NE Sec27 T41S R16W	2.24	2.39
TG048A	Sandstone	Jn	NE SE Sec 2 T42S R16W	2.39	2.50
TG048B	Sandstone	Jn	NE SE Sec 2 T42S R16W	2.11	2.37
TG015	Sandstone	Jc	NW NW Sec35 T40S R14W	2.45	2.46
TG029	Limestone	K	SW SW Sec29 T40S R17W	2.34	2.49
TG032	Limestone	K	SE SW Sec21 T30S R17W	2.57	2.59
TG047	Limestone	K	NW NW Sec28 T37S R16W	2.50	2.67
TG047	Limestone	K	NW NW Sec28 T37S R16W	2.32	2.41
TG030	Conglomerate	Kd	Ne Ne Sec32 T40S R17W	2.56	2.64
TG031	Conglomerate	Kd	NW NW Sec33 T40S R17W	2.48	2.55

Table 3. Continued.

Sample Number	Lithology	Unit Symbol	Location	Dry Density (gm/cc)	Wet Density (gm/cc)
TG017A	Ss/Conglomerate	Kdt	SE SE Sec30 T39S R13W	2.58	2.63
TG017A	Ss/Conglomerate	Kdt	SE SE Sec30 T39S R13W	2.64	2.69
TG017B	Ss/Conglomerate	Kdt	SE SE Sec30 T39S R13W	2.27	2.41
TG019	Ss/Shale	Ksw	SW SE Sec19 T39S R13W	2.46	1.57
TG018	Ss/Conglomerate	Kk	NE SW Sec19 T39S R13W	2.59	2.63
TG023	Limestone	Tc	NW SW Sec 4 T38S R13W	2.63	2.64
TG025	Limestone	Tc	SW NW Sec 4 T38S R13W	2.62	2.65
TG052	Tuff/Breccia	Tvqx	NE NW Sec22 T38S R16W	1.87	2.05
TG052	Tuff/Breccia	Tvqx	NE NW Sec22 T38S R16W	2.13	2.34
TG052	Tuff/Breccia	Tvqx	NE NW Sec22 T38S R16W	2.58	2.68
TG055	Tuff/Breccia	Tvq	NE SW Sec27 T38S R16W	2.16	2.34
TG038	Tuff/Breccia	Tvq	NW NW Sec25 T38S R18W	2.50	2.66
TG022	Tuff/Breccia	Tvq	SW SW Sec 4 T38S R13W	2.25	2.39
TG024	Tuff/Breccia	Tvq	SW NW Sec 4 T38S R13W	2.12	2.34
TG036	Tuff/Breccia	Tvq	SE NE Sec 6 T39S R17W	2.53	2.56
TG053	Tuff/Breccia	Tvr	SE NW Sec22 T38S R16W	2.49	2.65
TG021	Tuff/Breccia	Tvr	SW SW Sec 4 T38S R13W	2.35	2.42
TG046B	Vol Breccia	Tvsc	NE SW Sec12 T37S R18W	2.43	2.54
TG046A	Vol Breccia	Tvsc	NE SW Sec12 T37S R18W	2.59	2.63
TG044	Flow	Tvf	NE SE Sec14 T37S R18W	2.09	2.25
TG045	Flow	Tvf	SE NW Sec13 T37S R18W	2.50	2.59
TG058A	Latite Flow	Tvp	SW NE Sec29 T38S R14W	1.76	2.10
TG058A	Latite Flow	Tvp	SW NE Sec29 T38S R14W	1.72	2.07
TG039	Rhyolite	Tvcn	SW SW Sec24 T38S R18W	1.77	2.06
TG041	Rhyolite	Tvcn	NE SE Sec14 T38S R18W	1.99	2.23
TG040A	Flow	Tvmr	SW NW Sec24 T38S R18W	2.04	2.29
TG040B	Flow	Tvmr	SW NW Sec24 T38S R18W	2.18	2.35
TG042B	Tuff	Tvo	SE NW Sec11 T38S R18W	2.02	2.24
TG042A	Tuff	Tvo	SE NW Sec11 T38S R18W	1.97	2.22

Table 3. Continued.

Sample Number	Lithology	Unit Symbol	Location	Dry Density (gm/cc)	Wet Density (gm/cc)
TG026	Mas Basalt	Qtb	NW NW Sec18 T40S R16W	2.31	2.41
TG049	Mas Basalt	Qtb	NW SE Sec22 T41S R16W	2.58	2.63
TG049	Mas Basalt	Qtb	NW SE Sec22 T41S R16W	2.25	2.51
TG049	Mas Basalt	Qtb	NW SE Sec22 T41S R16W	2.58	2.62
TG049	Mas Basalt	Qtb	NW SE Sec22 T41S R16W	2.48	2.54
TG027	Ves Basalt	Qtb	NW NW Sec18 T40S R16W	1.86	2.19
TG027	Ves Basalt	Qtb	NW NW Sec18 T40S R16W	1.57	2.01
TG056	Basalt/Dacite	Qtd	SE SE Sec 2 T39S R16W	2.16	2.27
TG056	Basalt/Dacite	Qtd	SE SE Sec 2 T39S R16W	2.12	2.28

APPENDIX C

ERROR ANALYSIS IN THE MODELING OF THE GRAVITY PROFILES

The margin of error resulting in obtaining the complete Bouguer gravity anomaly values was determined to be ± 0.6 mgal in low-relief areas and ± 1.2 mgal in high-relief areas (see Geologic and Geophysical Control section). The designation of model units, although well defined, was somewhat arbitrary because of density variations within the model units. The model units generally involve density contrasts of 0.1 to 0.2 g/cc. Therefore, changes in the density and dimensions of the units of the survey area will result in greater variations of the model than would be found in gravity surveys with larger density contrasts. This is because the density contrast between alluvial fill and the bedrock is 0.4 to 0.5 g/cc compared to the smaller contrast found between the stratigraphic units modeled in this survey. In addition to the problem of delineating the model units is the absence of subsurface control (i.e., well data or seismic lines in the survey area) and the complex nature of the geologic structure of the survey area.

The interpretation of profile A-A' provided a regional geologic model for the crust. Only the low-frequency component of the profile was pertinent to the interpretation of profile A-A'. Therefore, high-frequency error did not affect the outcome of the regional geologic interpretation.

The control used in modeling profile B-B' was gained by setting the gravity response for the model of geologically similar areas equal and maintaining a constant unit thickness. The geologic map by Cook (1960) gave the surficial location of the modeled faults. However, the lack of detailed knowledge of the downthrown block, such as its

lithology and hence its density, limited the accuracy available in calculating the vertical displacement of the fault and the dip of the beds.

Profile C-C' posed more serious problems in resolving the geologic structure. The area west of Veyo is comprised of numerous faults and fractures of various orientations. Along profile C-C', a faulted block and three normal faults downthrown on the west, were used in the interpretation, which was constrained by Cook's (1960) geologic map. A closer approximation to the observed gravity data was obtained but the fault locations used in the model were not in compliance with the mapped geology. It is believed by the author that the model of profile C-C' for this study area is the most reasonable two-dimensional representation that can now be made with the geologic control available. It was therefore decided to model profiles B-B' and C-C' in compliance with the known geology although the error involved in doing so exceeded the maximum error possible in the gravity data.

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