U.S. DEPARTMENT OF THE INTERIOR
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Principal facts for gravity profiles collected near the Osgood Mountains and the Slumbering Hills, north-central Nevada

by

V. J. S. Grauch[1] and Robert P. Kucks[1]

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ABSTRACT

This report presents principal facts for gravity stations collected along profiles near the Osgood Mountains and Slumbering Hills, north-central Nevada. These include (1) data collected near the Osgood Mountains by U. S. Geological Survey (USGS) personnel in the years 1989, 1990, and 1993; and (2) data released to the USGS by Battle Mountain Gold (now Battle Mountain Exploration) that were collected in 1989 near the Osgood Mountains and the Slumbering Hills.

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INTRODUCTION

This report presents principal facts for gravity stations collected along profiles in the Getchell trend area, Osgood Mountains, north-central Nevada. These include (1) data collected near the Osgood Mountains by U. S. Geological Survey (USGS) personnel in the years 1989, 1990, and 1993; and (2) data released to the USGS by Battle Mountain Gold (now Battle Mountain Exploration) that were collected in 1989 near the Osgood Mountains and the Slumbering Hills. The gravity data collected by the USGS were intended to supplement studies related to the USGS Getchell trend airborne geophysics demonstration project, which was most active during the years 1988-1992. The Getchell gold trend is located on the east side of the Osgood Mountains and was originally so-named due to the north-northeast alignment of five sedimentary-hosted disseminated gold deposits (often called Carlin-type deposits): Preble, Pinson, Mag, Getchell, and Twin Creeks mines (Figure 1). The airborne demonstration project was designed to employ a diverse set of geophysical and remote-sensing techniques to test the application of integrated and comprehensive airborne geophysical surveying for mineral exploration or assessment in covered terranes. Using a diversity of data-acquisition techniques helps optimize constraints on subsurface interpretations as opposed to using only one technique.

A desire for further diversity of techniques in the Getchell trend demonstration project led the USGS to acquire gravity data to complement the airborne geophysical data. Gravity methods are designed to determine variations in the Earth's gravity field that are due to differences in bulk densities of the rocks in the subsurface. In the Getchell trend area, the most significant density differences occur at basin-and-range faults that juxtapose low-density alluvium against moderate- to high-density bedrock. Thus, gravity data can provide excellent guides for detecting and defining these types of faults in this area.

Prior to the initiation of the Getchell trend demonstration project, gravity data acquisition had been limited. During the project, gravity data were collected along profiles selected to match several individual flight lines in the airborne aeromagnetic/electromagnetic survey. These lines were flown specifically to span longer distances on either side of the main survey area (Grauch and Bankey, 1994). Acquiring gravity data at a spacing to give coverage comparable to the

coverage of the airborne data would have been prohibitively expensive. The profiles collected for Battle Mountain Gold were part of the company's exploration program.

Ground-based electrical, magnetic, and gravity data collected before the airborne surveys were flown are presented in Abrams and others (1984), Heran and Smith (1984), Heran and McCafferty (1986), and Hoover and others (1984; 1986). The gravity data reported in Abrams and others (1984) are partly superseded by the profile data presented here (discussed below).

The Getchell digital airborne geophysical data were originally released through the U.S. Department of Commerce's National Geophysical Data Center in February, 1989. Digital grids of many of these data sets are contained in Grauch and others (1993), along with interpretative grids and descriptions of the survey specifications and data files. Other publications related to the airborne geophysical demonstration project include Hoover and others (1991), who reviewed preliminary results of all the airborne surveys; Pitkin, (1991, gamma-ray data); Grauch and Bankey, (1991, aeromagnetic data); and Pierce and Hoover (1991, electromagnetic data). Maps at 1:100,000 scale and brief discussions of the aeromagnetic and electromagnetic data are presented in Grauch and Bankey (1994) and Wojniak and others (1994), respectively. Further discussions of the data are contained in Grauch and others (1991), Wojniak and Hoover (1991), and Grauch and Hoover (1993).

DATA COLLECTION

Gravity measurements were acquired along profiles IP (Iron Point), FMG (FirstMiss Gold), and OC (Osgood Creek) by the USGS in 1989; along profile SR (south regional) by the USGS in 1990 and 1993; and along profiles LB1, LB2, LB3, FM2, and FM3 by Mining Geophysical Surveys for Battle Mountain Gold Company in 1989. Locations of these profiles are shown in Figures 2 and 3. Data descriptions for the profiles collected by the USGS and those collected by Mining Geophysical Surveys are described separately below.

USGS Profiles

Data for profiles IP, FMG, and OC were acquired using LaCoste-Romberg gravity meter G-2 in 1989. Data for profile SR were collected in 1990 using LaCoste-Romberg gravity meter G-550 and in 1993 using LaCoste-Romberg gravity meter G-191. The hiatus in data collection of profile SR was caused by equipment failure and scheduling difficulties.

Locations along all profiles were surveyed using a Hewlett-Packard total station. The profile lines were initially planned to match as closely as possible the location and orientation (about N58°W) of the extra-long flight lines in the airborne/electromagnetic survey (Grauch and Bankey, 1994). Reference positions along the profiles were determined by triangulation from points with known control, such as benchmarks, section corners, and surveyed drill-hole locations. The locations of individual stations were determined by turning horizontal and vertical angles from a reference point. Back-surveying the locations of stations was not attempted because of the considerable logistical difficulties involved and because the flat terrain of the area lessened the need for the accurate positioning that is usually required for terrain corrections during gravity data reduction. Distances between stations were generally 305 m (1000 feet).

The gravity stations were referenced to the U.S. Department of Defense base station ACIC0474-1 at Winnemucca, Nevada (figure 4), which is part of the International Gravity Standardization Net, 1971 (International Association of Geodesy, 1974). An additional temporary base, tied to the primary base, was set for convenience of operation. Linear meter-drift was calculated by making repeat observations at the primary or temporary base.

Profile FMG is generally located along a portion of the same profile as reported in Abrams and others (1984; stations 112-132). Comparison of gravity data from the two different periods of data collection at nearly coincident stations show differences as much as 0.5 mGal, which can present some difficulties in data processing and interpretation. These differences may be caused by inaccuracies in the locations of the stations collected by Abrams and others; they located these stations by inspection of 1:24,000-scale topographic maps and by distance estimates made in reference to power poles along the road (G. Abrams, oral commun., 1993). Therefore, the more recently acquired data are judged to supersede the earlier data along the extent of the FMG profile because the positions of the more recent data were measured more accurately.

Company Profiles

Profiles LB1, LB2, and LB3 near Lone Butte, profiles FM2 and FM3 near Iron Point (figure 2), and profiles SH1 and SH2 near the Slumbering Hills (figure 3) were collected by Mining Geophysical Company in 1989 using LaCoste-Romberg gravity meter G-849. Location maps and original records of meter readings, including station elevation and location, were obtained by the USGS from Battle Mountain Gold Company in 1990. Information on how the station positions and elevations were determined was not available.

The gravity stations were referenced to the U.S. Department of Defense base station ACIC0474-1 at Winnemucca, Nevada (figure 4), which is part of the International Gravity Standardization Net, 1971 (International Association of Geodesy, 1974). An additional temporary base, tied to the primary base, was set for convenience of operation. Linear meter-drift was calculated by making repeat observations at the primary or temporary base.

ELEVATION CONTROL FOR THE USGS DATA

The station elevations for the USGS data were obtained by turning vertical angles from known control using the HP total station. Known control points were primarily referenced to accurately surveyed elevation points on 1:24,000-scale topographic maps. Using this technique, elevations may have errors generally within 2 feet (60 cm) from the known control points depending on climatic conditions. However, errors in the estimation of terrain corrections give rise to the greatest uncertainty in Bouguer anomaly values. Computer-generated terrain corrections for flat areas, as is the case for most of the stations in this report, are generally negligible. Where the stations are located within more moderate relief near the Osgood Mountains, the terrain was digitized from 1:24,000 scale topographic maps. The error in elevation from these maps is 10 feet (3 m), half the contour interval.

DATA REDUCTION

Computer programs existing at the USGS were used to obtain principal facts and terrain-corrected gravity values from all the profile data. A program written by M. Webring and R. Wahl (USGS, unpub. program, 1983) was used to reduce data from the IP, FMG, and OC profiles. An updated version of this program, written by M. Webring (unpub. program, 1996), was used to reduce data from the rest of the profiles. These programs reduced the gravity meter-readings to observed-gravity values by calculating and correcting for earth-tide and linear meter-drift, and computed free-air and Bouguer anomalies using the vertical gradient and curvature equations given by Cordell and others (1982) and in the computer program BOUGUER (Godson, 1988). The theoretical gravity value was calculated using the 1967 formula of the Geodetic Reference System (International Association of Geodesy, 1971).

Outer-zone and some inner-zone terrain corrections were computed using a program that corrects for the gravity effects of terrain from a radius of 0.865 km to a radius 166.7 km away from each station using the method of Plouff (1977). These computed terrain corrections use mean-elevation data digitized on a 15-second grid for corrections from 0.865 to 5 km, 1-minute terrain data for corrections from 5 to 21 km, and 3-minute terrain data for corrections from 21 to 166.7 km. A density of 2.67 g/cm^3 was used to calculate terrain corrections, giving the corrections and gravity anomaly values listed in Appendix A.

For stations along profiles IP, FMG, and OC near steep topography, inner-zone (0 to 0.865 km) corrections were calculated using the method of M. Webring (USGS, unpublished, 1984). This method incorporates the minimum-curvature gridding algorithm of Briggs (1974) to define the topographic surface close to the station using hand-digitized data and calculates the gravity effects of small cylindrical sections of the Hammer zones using the method of Olivier and Simard (1981).

DIGITAL FILE DESCRIPTIONS

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TABLE 1. FILE DESCRIPTIONS

FILE NAME	FILE TYPE	DESCRIPTION
----data files-----		
profiles.lis	ascii text	Listing of principal facts in 80-column format with labeled columns; the same as Appendix A.
profiles.pos	UNIX binary, sequential post file (see below for description of format)	Station identifier, longitude (degrees), latitude (degrees), and six channels of principal facts (see below) for all profile data.
profiles.asc	ascii post file (see below for description of format)	Same as profiles.bin but in ascii Fortran format (a8, 8g16.8).
-----figures-----		
fig1.eps fig2.eps fig3.eps fig4.eps	encapsulated postscript	Figures 1, 2, 3, and 4 in encapsulated postscript, no preview.
fig1.tif fig2.tif fig3.tif fig4.tif	tagged image file format	Figures 1, 2, 3, and 4 in ".tif" bitmap format (binary)
fig1.prn fig2.prn fig3.prn fig4.prn	postscript print files	Figures 1, 2, 3, and 4 in a format to print on 300 dpi postscript printers.
----text--------		
readme.txt	ascii text	Text describing digital files.
text.txt	ascii text	A file containing the text of this report, without figures or Appendix A.
text.prn	postscript print file	A print file of the text of this report, without figures, for 300 dpi postscript printers.

POST FILE FORMAT

USGS post file format consists of an eight-character station identifier, followed by eight real numbers, called channels. The channels for the post files associated with this report are described below.

CHANNEL	DESCRIPTION
1	Longitude in decimal degrees (west longitudes are negative)
2	Latitude in decimal degrees
3	Station altitude in meters above sea level
4	Observed gravity in mGal with a constant value of 980,000 mGal removed
5	Inner-zone terrain correction (zones A-F), in mGal
6	Outer-zone terrain correction (zones G-X), in mGal
7	Free-air gravity anomaly, in mGal
8	Complete (terrain-corrected) Bouguer anomaly, reduced using a density of 2.67 g/cc, in mGal

ACKNOWLEDGMENTS

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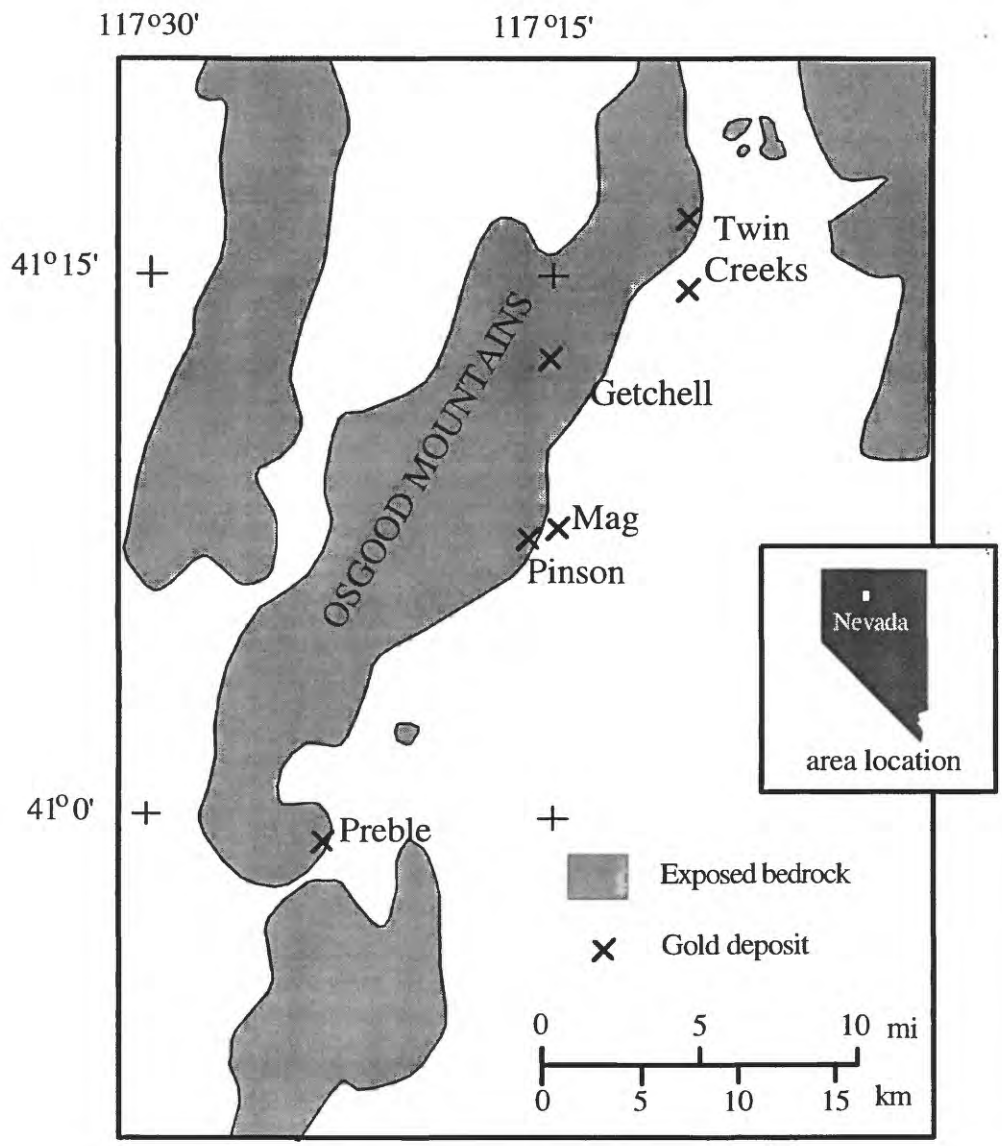

Figure 1. Location of Getchell gold trend.

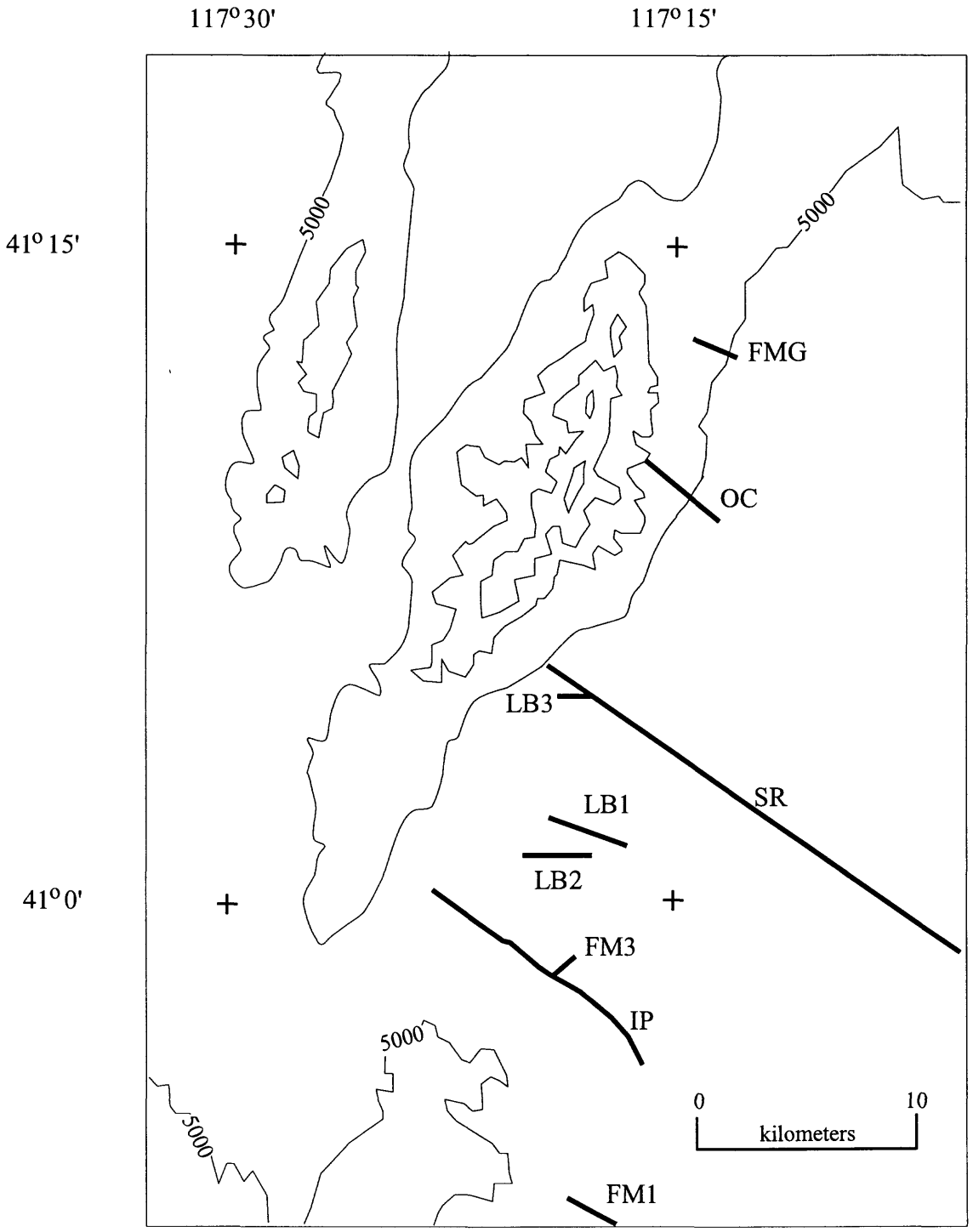

Figure 2. Location of gravity profiles in the Osgood Mountains area shown with topographic contours. Contour interval = 1000 feet.

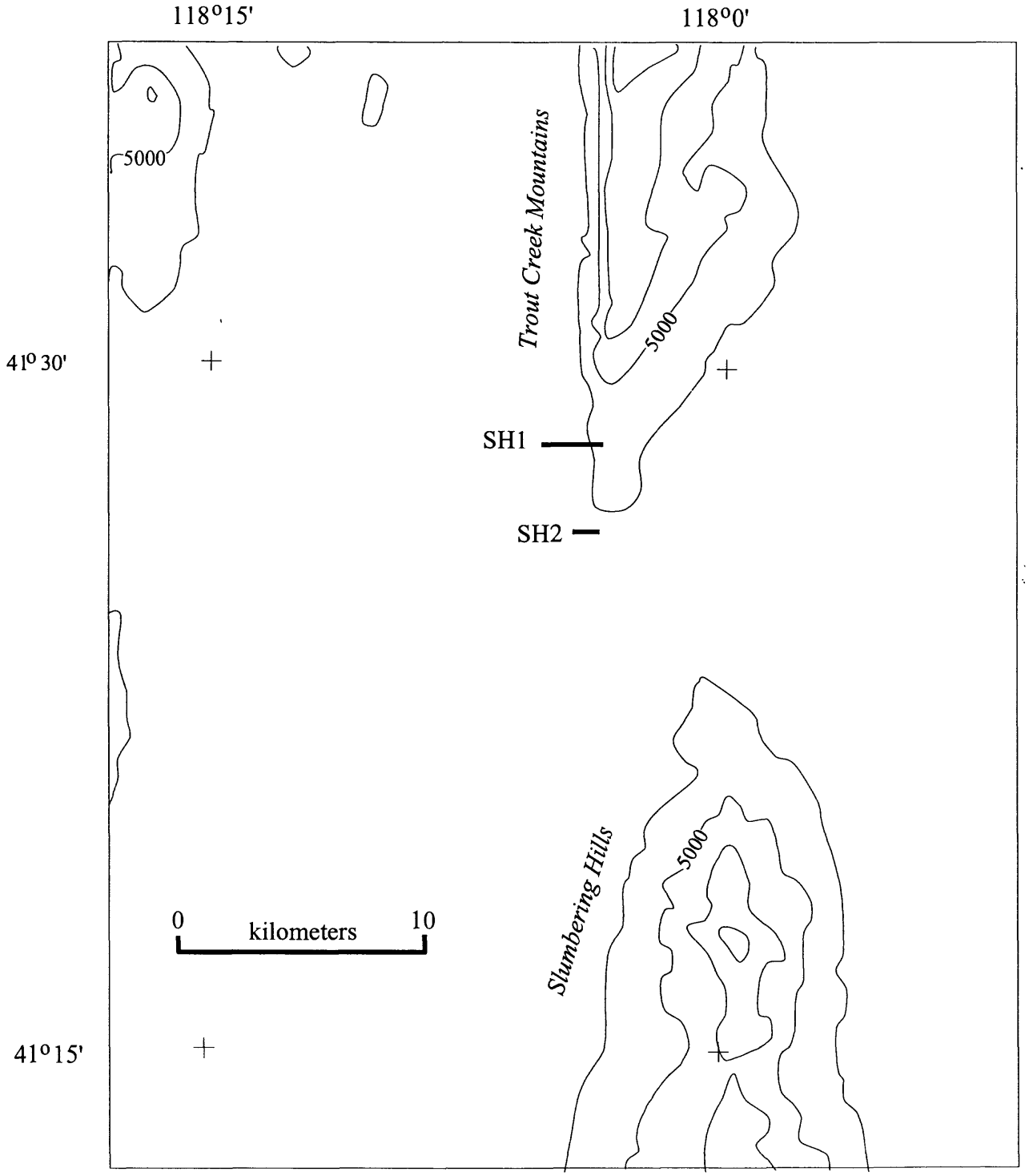

Figure 3. Location of gravity profiles in the Slumbering Hills area shown with topographic contours. Contour interval=500 feet.

GRAVITY BASE STATION

LATITUDE	STATION DESIGNATION
40° 54.23'N (1)	
LONGITUDE	
117° 48.21'W (1)	WINNEMUCCA
ELEVATION	**COUNTRY/STATE**
1310 METERS (1)	USA/Nevada

REFERENCE CODE NUMBERS	ADOPTED GRAVITY VALUE	
DOD 0474-1 IGB 15607 J	g= 979810.48 mgals	
	ESTIMATED ACCURACY	DATE
	± 0.1 mgals	MONTH/YEAR July 1973

DESCRIPTION AND/OR SKETCH

The station is at the Winnemucca Municipal Airport, (4 miles west of town), at south wall of Air Service Building on concrete sidewalk, 1.0 meter east of phone booth, 1.0 meter west of door, against the wall. Site is monumented with a "USAF Gravity Station" disc. (1)

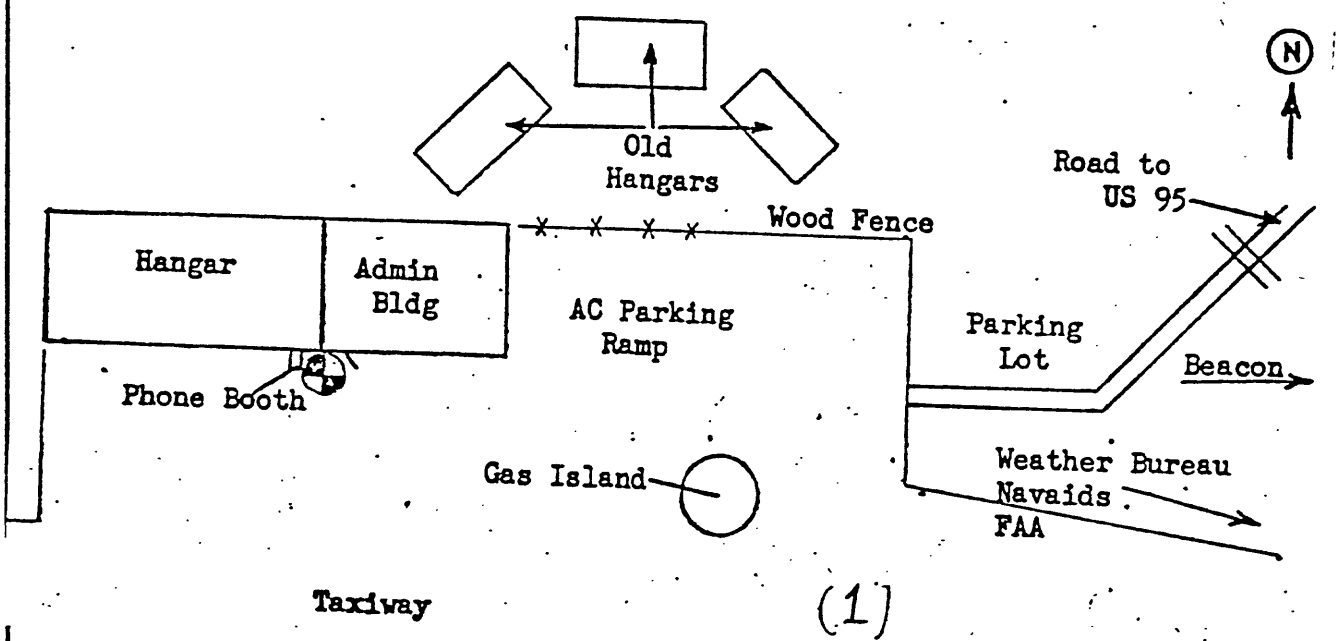

Figure 4. Description of gravity base station at Winnemucca airport.

REFERENCE SOURCE

(1) 0345

AC FORM 8342/ GD-11 APR 79 PREVIOUS EDITIONS WILL BE USED

Appendix A. Listing of Gravity principal facts

Gravity profiles: IP,OC,FMG,SR; LB,FM,SH

terrain correction Hammer zones: inner =a-f outer=g-o .

station	latitude		longitude		elev.	observed gravity -900,000	terrain inner	terrain outer	free-air anomaly	Bouguer anomaly
	deg	min	deg	min	meter	mGal	mGal	mGal	mGal	2.67 gm/cc
ip-1	40	57.41	-117	17.14	1335.33	79822.57	.00	.00	-19.93	-170.67
ip-2	40	57.53	-117	17.35	1335.18	79822.96	.00	.02	-19.76	-170.47
ip-3	40	57.63	-117	17.53	1334.99	79823.10	.00	.03	-19.83	-170.51
ip-4	40	57.71	-117	17.67	1334.87	79823.46	.00	.05	-19.63	-170.27
ip-5	40	57.77	-117	17.79	1334.69	79824.11	.00	.06	-19.12	-169.74
ip-6	40	57.85	-117	17.93	1334.48	79825.22	.01	.08	-18.20	-168.76
ip-7	40	57.93	-117	18.07	1334.20	79826.61	.02	.10	-17.01	-167.51
ip-8	40	58.02	-117	18.23	1334.08	79828.80	.03	.13	-15.00	-165.44
ip-9	40	58.10	-117	18.43	1333.41	79831.99	.10	.16	-12.13	-162.40
ip-10	40	58.19	-117	18.65	1333.99	79833.57	.33	.19	-10.51	-160.58
ip-11	40	58.30	-117	18.82	1336.49	79833.85	.62	.20	-9.62	-159.67
ip-12	40	58.35	-117	19.00	1397.60	79823.15	1.08	.14	-1.55	-158.07
ip-13	40	56.33	-117	16.04	1337.31	79815.94	.00	-.04	-24.34	-175.34
ip-17	40	56.98	-117	16.63	1336.94	79819.96	.00	-.02	-21.40	-172.35
ip-14	40	56.46	-117	16.17	1337.55	79816.75	.01	-.04	-23.65	-174.67
ip-15	40	56.62	-117	16.32	1337.07	79818.03	.01	-.03	-22.75	-173.71
ip-16	40	56.75	-117	16.45	1336.76	79818.94	.00	-.03	-22.13	-173.07
ip-18	40	57.12	-117	16.81	1336.49	79820.60	.00	-.01	-21.11	-171.99
ip-19	40	57.24	-117	16.92	1337.37	79821.94	.00	-.01	-19.68	-170.66
ip-22	40	59.46	-117	21.34	1333.01	79839.85	.02	.19	-6.43	-156.70
ip-21	40	59.38	-117	21.19	1329.60	79840.92	.03	.20	-6.29	-156.16
ip-20	40	59.29	-117	21.01	1328.50	79841.22	.04	.19	-6.19	-155.94
ip-23	40	59.56	-117	21.56	1329.63	79840.44	.04	.23	-7.03	-156.86
ip-24	40	59.66	-117	21.75	1329.54	79839.14	.07	.26	-8.50	-158.27
ip-25	40	59.74	-117	21.92	1343.25	79835.05	.02	.24	-8.49	-159.86
ip-26	40	59.82	-117	22.11	1345.60	79833.61	.04	.27	-9.32	-160.91
ip-27	40	59.91	-117	22.29	1357.00	79831.71	.05	.28	-7.84	-160.69
ip-28	40	59.99	-117	22.47	1372.12	79830.07	.08	.29	-4.94	-159.44
ip-29	41	.09	-117	22.66	1388.03	79829.04	.14	.30	-1.21	-157.44
ip-30	41	.18	-117	22.83	1402.63	79828.08	.34	.32	2.20	-155.45
ip-31	41	.26	-117	23.03	1428.17	79823.85	.35	.34	5.73	-154.76
ip-32	41	.34	-117	23.19	1456.24	79818.82	.56	.39	9.23	-154.15
ip-33	40	59.20	-117	20.82	1340.11	79838.78	.01	.15	-4.92	-156.04
ip-34	40	59.11	-117	20.62	1352.40	79835.93	.02	.12	-3.84	-156.37
ip-35	40	59.02	-117	20.43	1365.84	79833.11	.06	.11	-2.38	-156.39
ip-36	40	58.93	-117	20.24	1380.50	79829.91	.09	.12	-.93	-156.54
ip-37	40	58.84	-117	20.06	1395.71	79826.58	.17	.14	.57	-156.65
ip-38	40	58.75	-117	19.88	1382.45	79829.03	.21	.11	-.94	-156.66
ip-39	40	58.66	-117	19.69	1399.79	79825.57	.06	.15	1.08	-156.70
ip-40	40	58.57	-117	19.51	1408.18	79823.54	.07	.18	1.77	-156.91
ip-41	40	58.49	-117	19.35	1407.20	79823.51	.10	.17	1.56	-156.99
ip-42	40	58.39	-117	19.12	1418.48	79820.14	.43	.22	1.82	-157.62
oc-1	41	9.10	-117	14.20	1518.24	79813.85	.07	1.29	10.30	-159.64
oc-2	41	9.05	-117	14.11	1511.26	79814.90	.06	1.21	9.27	-159.97
oc-3	41	9.01	-117	14.03	1503.06	79816.35	.06	1.16	8.25	-160.12
oc-4	41	8.96	-117	13.94	1492.97	79818.14	.06	1.10	7.00	-160.29
oc-5	41	8.91	-117	13.84	1484.86	79819.49	.05	1.03	5.93	-160.54
oc-6	41	8.87	-117	13.75	1478.31	79820.50	.05	.98	4.98	-160.80
oc-7	41	8.82	-117	13.67	1470.26	79821.65	.04	.92	3.72	-161.23
oc-8	41	8.77	-117	13.58	1463.10	79822.64	.04	.87	2.58	-161.62
oc-9	41	8.73	-117	13.50	1457.89	79823.39	.05	.83	1.78	-161.86

oc-10	41	9.15	-117	14.29	1527.93	79812.05	.12	1.37	11.41	-159.48
oc-11	41	9.20	-117	14.39	1538.23	79810.39	.24	1.46	12.85	-158.99
oc-12	41	9.24	-117	14.47	1547.41	79808.79	.19	1.54	14.02	-158.82
oc-13	41	9.29	-117	14.56	1558.99	79806.72	.18	1.63	15.45	-158.61
oc-14	41	9.33	-117	14.65	1566.82	79805.39	.21	1.74	16.47	-158.33
oc-15	41	9.38	-117	14.74	1577.52	79803.43	.22	1.84	17.74	-158.15
oc-16	41	9.43	-117	14.83	1587.61	79801.55	.16	1.96	18.89	-158.07
oc-17	41	9.47	-117	14.92	1598.28	79799.76	.17	2.09	20.33	-157.68
oc-18	41	9.52	-117	15.01	1609.44	79797.98	.17	2.23	21.92	-157.21
oc-19	41	9.57	-117	15.10	1620.16	79796.29	.19	2.38	23.46	-156.70
oc-20	41	9.58	-117	15.12	1623.06	79795.67	.20	2.41	23.72	-156.73
oc-21	41	9.59	-117	15.15	1627.48	79794.87	.19	2.45	24.27	-156.65
oc-22	41	9.60	-117	15.17	1631.69	79794.17	.19	2.48	24.85	-156.51
oc-23	41	9.62	-117	15.19	1635.34	79793.46	.23	2.51	25.24	-156.46
oc-24	41	9.64	-117	15.24	1642.57	79792.26	.25	2.59	26.24	-156.17
oc-25	41	9.66	-117	15.28	1654.73	79789.92	.34	2.65	27.62	-156.01
oc-26	41	9.69	-117	15.33	1668.02	79787.26	.46	2.72	29.01	-155.92
oc-27	41	9.71	-117	15.37	1676.03	79785.78	.63	2.78	29.97	-155.62
oc-28	41	9.76	-117	15.46	1673.38	79786.29	.42	2.93	29.59	-155.77
oc-29	41	9.81	-117	15.54	1682.95	79784.21	.55	3.06	30.38	-155.79
oc-30	41	9.86	-117	15.63	1701.82	79780.54	.66	3.19	32.46	-155.59
oc-31	41	9.91	-117	15.71	1724.68	79776.28	1.23	3.32	35.17	-154.74
oc-32	41	9.97	-117	15.81	1786.46	79764.24	1.65	3.57	42.09	-154.08
oc-33	41	10.02	-117	15.89	1833.31	79754.93	1.74	3.92	47.15	-153.83
fmg-1	41	12.75	-117	13.82	1573.93	79816.53	.06	.95	24.69	-151.84
fmg-2	41	12.77	-117	13.87	1576.55	79816.17	.07	.98	25.11	-151.68
fmg-3	41	12.78	-117	13.91	1579.53	79815.82	.06	.99	25.67	-151.46
fmg-4	41	12.79	-117	13.96	1583.31	79815.25	.06	1.01	26.25	-151.28
fmg-5	41	12.81	-117	14.00	1587.79	79814.44	.07	1.03	26.79	-151.21
fmg-6	41	12.82	-117	14.05	1593.86	79813.03	.07	1.05	27.24	-151.43
fmg-7	41	12.83	-117	14.09	1597.70	79812.39	.07	1.07	27.76	-151.31
fmg-8	41	12.84	-117	14.14	1601.39	79811.44	.08	1.10	27.94	-151.51
fmg-9	41	12.86	-117	14.19	1605.32	79810.82	.11	1.12	28.50	-151.34
fmg-10	41	12.87	-117	14.23	1608.83	79810.23	.14	1.14	28.98	-151.21
fmg-11	41	12.88	-117	14.27	1613.12	79809.46	.13	1.16	29.51	-151.14
fmg-12	41	12.74	-117	13.78	1571.21	79816.86	.06	.93	24.20	-152.05
fmg-13	41	12.73	-117	13.73	1568.62	79817.32	.06	.91	23.88	-152.10
fmg-14	41	12.72	-117	13.69	1565.15	79817.96	.06	.90	23.46	-152.14
fmg-15	41	12.70	-117	13.64	1561.55	79818.57	.06	.88	22.99	-152.23
fmg-16	41	12.69	-117	13.60	1558.81	79819.04	.06	.87	22.63	-152.29
fmg-17	41	12.68	-117	13.55	1555.52	79819.60	.07	.85	22.19	-152.37
fmg-18	41	12.67	-117	13.51	1552.96	79819.97	.08	.83	21.79	-152.49
fmg-19	41	12.65	-117	13.46	1550.21	79820.44	.07	.82	21.44	-152.55
fmg-20	41	12.64	-117	13.41	1547.41	79820.82	.07	.80	20.97	-152.73
fmg-21	41	12.63	-117	13.37	1544.48	79820.96	.06	.79	20.22	-153.17
fmg-22	41	12.62	-117	13.33	1542.17	79821.04	.05	.77	19.61	-153.56
fmg-23	41	12.60	-117	13.24	1535.58	79822.01	.05	.75	18.57	-153.87
fmg-24	41	12.57	-117	13.14	1529.61	79822.79	.03	.71	17.56	-154.27
fmg-25	41	12.55	-117	13.05	1524.52	79823.51	.02	.69	16.74	-154.55
fmg-26	41	12.53	-117	12.96	1520.95	79824.00	.01	.66	16.16	-154.77
fmg-27	41	12.51	-117	12.87	1516.11	79824.80	.03	.64	15.49	-154.89
SR-1	41	5.43	-117	19.29	1539.24	79809.40	.42	1.69	17.81	-153.74
SR-2	41	5.34	-117	19.10	1503.70	79816.60	.16	1.52	14.18	-153.80
SR-3	41	5.26	-117	18.92	1489.22	79819.61	.23	1.36	12.85	-153.60
SR-4	41	5.08	-117	18.55	1443.01	79828.26	.07	1.12	7.51	-154.14
SR-5	41	4.99	-117	18.37	1426.10	79831.16	.09	1.03	5.33	-154.49
SR-6	41	4.92	-117	18.22	1415.06	79833.19	.05	.97	4.06	-154.62
SR-7	41	5.17	-117	18.74	1463.10	79824.32	.14	1.24	9.63	-154.09
SR-8	41	4.84	-117	18.03	1405.55	79834.46	.03	.88	2.52	-155.21
SR-9	41	4.75	-117	17.85	1398.33	79835.36	.05	.79	1.33	-155.66
SR-10	41	4.66	-117	17.66	1392.42	79836.08	.11	.72	.36	-155.97

SR-11	41	4.55	-117	17.43	1382.24	79836.90	.07	.63	-1.79	-157.11
SR-12	41	4.01	-117	16.31	1345.69	79830.03	.00	.34	-19.13	-170.70
SR-12R	41	4.01	-117	16.31	1345.69	79830.00	.00	.34	-19.16	-170.73
SR-13	41	4.10	-117	16.49	1349.47	79830.94	.00	.38	-17.19	-169.14
SR-14	41	4.18	-117	16.68	1351.48	79832.57	.01	.43	-15.06	-167.18
SR-15	41	4.27	-117	16.87	1355.81	79834.13	.01	.48	-12.30	-164.85
SR-16	41	4.35	-117	17.05	1361.45	79835.84	.01	.52	-8.97	-162.12
SR-17	41	4.44	-117	17.24	1368.70	79837.52	.02	.58	-5.19	-159.08
SR-18	41	4.46	-117	17.28	1370.66	79837.84	.02	.59	-4.29	-158.40
SR-19	41	4.49	-117	17.33	1375.81	79837.29	.05	.60	-3.30	-157.94
SR-20	41	4.51	-117	17.38	1380.81	79836.65	.08	.61	-2.43	-157.59
SR-21	41	4.53	-117	17.42	1383.40	79836.51	.09	.62	-1.80	-157.23
SR-22	41	3.92	-117	16.12	1343.28	79828.94	.00	.30	-20.83	-172.17
SR-23	41	3.84	-117	15.94	1341.33	79828.13	.00	.27	-22.12	-173.27
SR-24	41	3.75	-117	15.75	1339.63	79827.28	.00	.24	-23.36	-174.35
SR-25	41	3.66	-117	15.57	1339.32	79826.35	.00	.21	-24.25	-175.23
SR-26	41	3.58	-117	15.38	1339.69	79825.45	.00	.17	-24.92	-175.98
SR-27	41	3.49	-117	15.20	1339.08	79824.99	.00	.15	-25.43	-176.45
SR-28	41	3.40	-117	15.01	1338.80	79824.51	.00	.12	-25.86	-176.88
SR-29	41	3.32	-117	14.83	1340.08	79824.02	.00	.10	-25.84	-177.02
SR-30	41	3.23	-117	14.64	1340.78	79823.72	.00	.09	-25.79	-177.05
SR-31	41	3.15	-117	14.46	1340.88	79823.50	.00	.07	-25.86	-177.16
SR-32	41	3.06	-117	14.27	1340.66	79823.55	.00	.05	-25.74	-177.03
SR-33	41	2.97	-117	14.09	1340.54	79823.52	.00	.03	-25.67	-176.97
SR-34	41	2.89	-117	13.90	1340.39	79823.22	.00	.02	-25.90	-177.19
SR-35	41	2.80	-117	13.71	1340.39	79822.96	.00	.01	-26.03	-177.33
SR-36	41	2.71	-117	13.53	1340.54	79822.67	.00	.00	-26.14	-177.47
SR-37	41	2.62	-117	13.35	1341.15	79822.65	.01	-.01	-25.83	-177.23
SR-38	41	2.54	-117	13.16	1341.52	79822.98	.01	-.02	-25.27	-176.72
SR-39	41	2.45	-117	12.97	1341.42	79823.00	.01	-.03	-25.15	-176.59
SR-40	41	2.36	-117	12.79	1341.55	79822.96	.01	-.04	-25.01	-176.48
SR-41	41	2.29	-117	12.62	1341.46	79822.66	.01	-.04	-25.23	-176.70
SR-42	41	2.21	-117	12.43	1341.46	79822.50	.01	-.05	-25.28	-176.75
SR-43	41	2.12	-117	12.25	1341.97	79822.65	.01	-.05	-24.83	-176.36
SR-44	41	2.03	-117	12.06	1342.22	79822.94	.01	-.06	-24.33	-175.90
SR-45	41	1.95	-117	11.88	1342.22	79823.26	.01	-.06	-23.89	-175.46
SR-46	41	1.86	-117	11.69	1342.86	79823.69	.01	-.07	-23.13	-174.78
SR-47	41	1.77	-117	11.51	1342.92	79824.13	.01	-.07	-22.54	-174.20
SR-48	41	1.69	-117	11.32	1343.89	79824.50	.01	-.07	-21.75	-173.52
SR-49	41	1.60	-117	11.13	1344.87	79824.76	.02	-.08	-21.05	-172.93
SR-50	41	1.51	-117	10.95	1344.29	79825.37	.07	-.08	-20.49	-172.25
SR-51	41	1.43	-117	10.76	1344.23	79826.12	.08	-.08	-19.64	-171.38
SR-52	41	1.34	-117	10.57	1344.63	79826.76	.08	-.09	-18.74	-170.54
SR-53	41	1.25	-117	10.39	1345.27	79827.16	.06	-.09	-18.01	-169.90
SR-54	41	1.17	-117	10.22	1345.66	79827.81	.07	-.09	-17.12	-169.04
SR-55	41	1.08	-117	10.02	1347.52	79828.06	.07	-.10	-16.16	-168.30
SR-56	41	.99	-117	9.84	1348.53	79828.58	.07	-.10	-15.19	-167.45
SR-56R	41	1.00	-117	9.84	1348.53	79828.54	.05	-.10	-15.25	-167.53
SR-57	41	.91	-117	9.65	1348.74	79829.02	.06	-.10	-14.57	-166.86
SR-58	41	.83	-117	9.47	1346.85	79829.49	.05	-.10	-14.56	-166.65
SR-59	41	.74	-117	9.28	1347.86	79829.31	.03	-.10	-14.30	-166.52
SR-60	41	.65	-117	9.10	1347.86	79829.38	.03	-.10	-14.09	-166.31
SR-61	41	.57	-117	8.91	1349.11	79829.16	.01	-.11	-13.81	-166.20
SR-62	41	.48	-117	8.73	1349.17	79828.77	.01	-.11	-14.04	-166.44
SR-63	41	.39	-117	8.54	1348.10	79828.49	.03	-.11	-14.52	-166.78
SR-64	41	.31	-117	8.36	1351.91	79827.07	.01	-.11	-14.65	-167.35
SR-65	41	.23	-117	8.18	1351.91	79826.37	.01	-.11	-15.23	-167.93
SR-66	41	.14	-117	7.99	1351.54	79825.67	.01	-.11	-15.91	-168.57
SR-67	40	59.61	-117	6.87	1357.76	79825.05	.00	-.11	-13.82	-167.19
SR-68	40	59.70	-117	7.06	1356.06	79825.16	.00	-.11	-14.36	-167.55
SR-69	40	59.79	-117	7.24	1355.51	79824.63	.00	-.11	-15.20	-168.32

SR-70	40	59.88	-117	7.43	1352.70	79825.05	.01	-.11	-15.78	-168.58
SR-71	40	59.96	-117	7.61	1351.88	79825.01	.01	-.11	-16.19	-168.90
SR-72	41	.05	-117	7.80	1352.79	79824.95	.00	-.11	-16.11	-168.92
SR-73	40	59.53	-117	6.69	1360.26	79824.83	.01	-.12	-13.15	-166.80
SR-74	40	59.44	-117	6.50	1358.16	79825.07	.00	-.12	-13.42	-166.85
SR-75	40	59.36	-117	6.32	1359.07	79824.76	.01	-.12	-13.33	-166.85
SR-76	40	59.27	-117	6.13	1358.19	79824.82	.00	-.12	-13.41	-166.84
SR-77	40	59.18	-117	5.94	1359.13	79824.10	.00	-.12	-13.70	-167.24
SR-78	40	59.10	-117	5.76	1361.05	79823.12	.01	-.11	-13.97	-167.71
SR-79	40	59.01	-117	5.58	1361.45	79823.59	.01	-.11	-13.24	-167.02
SR-80	40	58.92	-117	5.39	1362.61	79823.77	.02	-.12	-12.57	-166.48
LB1BASE	41	1.59	-117	17.57	1332.59	79831.28	.00	.09	-18.30	-168.65
LB1500E	41	1.56	-117	17.47	1332.59	79830.48	.00	.08	-19.06	-169.42
LB11000E	41	1.53	-117	17.37	1332.59	79829.47	.00	.07	-20.03	-170.39
LB11500E	41	1.50	-117	17.26	1332.59	79828.67	.00	.07	-20.78	-171.15
LB12000E	41	1.47	-117	17.16	1332.59	79827.86	.00	.06	-21.55	-171.92
LB12500E	41	1.44	-117	17.06	1332.59	79827.30	.00	.06	-22.06	-172.44
LB13000E	41	1.41	-117	16.95	1332.59	79826.72	.00	.05	-22.60	-172.98
LB13500E	41	1.38	-117	16.85	1332.59	79826.02	.00	.05	-23.25	-173.64
LB14000E	41	1.35	-117	16.75	1332.59	79825.40	.00	.04	-23.83	-174.22
LB14500E	41	1.32	-117	16.64	1332.59	79824.70	.00	.03	-24.48	-174.89
LB15000E	41	1.29	-117	16.54	1332.59	79824.09	.00	.02	-25.05	-175.46
LB1500W	41	1.61	-117	17.67	1332.59	79832.38	.00	.09	-17.23	-167.58
LB11000W	41	1.63	-117	17.77	1332.59	79833.26	.00	.10	-16.38	-166.72
LB11500W	41	1.66	-117	17.87	1332.59	79833.85	.00	.11	-15.84	-166.17
LB12000W	41	1.68	-117	17.97	1332.59	79834.44	.00	.11	-15.28	-165.61
LB12500W	41	1.70	-117	18.08	1332.59	79835.04	.00	.12	-14.71	-165.02
LB13000W	41	1.73	-117	18.18	1332.59	79835.76	.00	.13	-14.03	-164.34
LB13500W	41	1.75	-117	18.28	1332.59	79836.63	.00	.13	-13.19	-163.50
LB14000W	41	1.77	-117	18.38	1332.59	79837.77	.00	.14	-12.08	-162.38
LB14500W	41	1.80	-117	18.48	1332.89	79839.18	.00	.15	-10.63	-160.95
LB15000W	41	1.82	-117	18.59	1333.50	79840.65	.00	.16	-9.00	-159.38
LB15500W	41	1.84	-117	18.69	1332.59	79842.35	.00	.17	-7.61	-157.87
LB16000W	41	1.87	-117	18.79	1332.59	79843.27	.00	.18	-6.73	-156.99
LB16500W	41	1.89	-117	18.90	1332.59	79844.28	.00	.19	-5.75	-156.00
LB17000W	41	1.91	-117	19.00	1333.50	79844.90	.00	.19	-4.88	-155.23
LB17500W	41	1.94	-117	19.10	1334.41	79845.07	.00	.20	-4.48	-154.92
LB18000W	41	1.96	-117	19.21	1343.25	79843.93	.00	.19	-2.92	-154.36
LB1BASE	41	1.59	-117	17.57	1332.59	79831.28	.00	.09	-18.30	-168.65
LB2BASE	41	1.12	-117	20.07	1333.50	79843.99	.00	.19	-4.61	-154.96
LB2500E	41	1.12	-117	19.95	1333.20	79844.09	.00	.18	-4.60	-154.93
LB21000E	41	1.12	-117	19.84	1332.59	79843.83	.00	.17	-5.05	-155.32
LB21500E	41	1.12	-117	19.72	1332.59	79843.29	.00	.16	-5.59	-155.87
LB22000E	41	1.12	-117	19.61	1332.59	79843.04	.00	.15	-5.84	-156.13
LB22500E	41	1.12	-117	19.50	1332.59	79842.87	.00	.15	-6.01	-156.30
LB23000E	41	1.12	-117	19.38	1332.59	79842.63	.00	.14	-6.25	-156.55
LB23500E	41	1.12	-117	19.27	1332.59	79842.54	.00	.13	-6.34	-156.65
LB24000E	41	1.12	-117	19.16	1332.89	79842.49	.00	.13	-6.30	-156.64
LB24500E	41	1.12	-117	19.04	1332.89	79842.06	.00	.12	-6.73	-157.08
LB25000E	41	1.12	-117	18.93	1332.89	79841.04	.00	.12	-7.75	-158.10
LB25500E	41	1.12	-117	18.82	1332.59	79839.51	.00	.11	-9.37	-159.70
LB26000E	41	1.12	-117	18.70	1332.59	79838.37	.00	.10	-10.51	-160.85
LB26500E	41	1.12	-117	18.59	1332.59	79837.45	.00	.10	-11.43	-161.77
LB27000E	41	1.12	-117	18.48	1332.59	79836.46	.00	.09	-12.42	-162.77
LB27500E	41	1.12	-117	18.36	1332.59	79835.56	.00	.09	-13.32	-163.67
LB28000E	41	1.12	-117	18.25	1332.59	79834.72	.00	.08	-14.16	-164.52
LB28500E	41	1.12	-117	18.14	1332.28	79834.09	.00	.08	-14.89	-165.21
LB29000E	41	1.12	-117	18.02	1332.28	79833.44	.00	.07	-15.54	-165.87
LB29500E	41	1.12	-117	17.91	1332.28	79832.83	.00	.07	-16.15	-166.48
LB210000	41	1.12	-117	17.80	1332.28	79832.13	.00	.07	-16.85	-167.18
LB2BASE	41	1.12	-117	20.07	1333.50	79843.99	.00	.19	-4.61	-154.96

LB30BASE	41	4.75	-117	18.47	1417.02	79832.38	.00	.92	4.11	-154.89
LB3500W	41	4.75	-117	18.58	1423.42	79831.63	.00	.94	5.34	-154.37
LB31000W	41	4.75	-117	18.69	1427.38	79831.26	.00	.96	6.19	-153.94
LB31500W	41	4.75	-117	18.80	1426.77	79831.14	.00	1.00	5.88	-154.14
LB32000W	41	4.75	-117	18.91	1429.82	79830.38	.00	1.03	6.06	-154.27
LB3500E	41	4.75	-117	18.35	1414.58	79834.18	.00	.89	5.16	-153.60
LB31000E	41	4.75	-117	18.24	1412.75	79835.10	.00	.86	5.52	-153.07
LB31500E	41	4.75	-117	18.13	1406.96	79835.98	.00	.85	4.61	-153.33
LB32000E	41	4.75	-117	18.01	1400.25	79836.66	.00	.83	3.22	-153.99
LB32500E	41	4.75	-117	17.90	1396.29	79837.25	.00	.81	2.59	-154.20
LB33000E	41	4.75	-117	17.79	1395.37	79837.50	.00	.78	2.56	-154.16
LB30BASE	41	4.75	-117	18.47	1417.02	79832.38	.00	.92	4.11	-154.89
FM1BASE	40	53.17	-117	18.23	1344.78	79816.01	.00	.23	-17.25	-168.82
FM11500W	40	53.20	-117	18.33	1350.26	79816.36	.00	.23	-15.25	-167.44
FM12000W	40	53.24	-117	18.42	1371.30	79812.49	.00	.17	-12.69	-167.31
FM12500W	40	53.28	-117	18.52	1393.55	79808.37	.00	.14	-10.01	-167.16
FM1500W	40	53.13	-117	18.13	1344.47	79815.14	.00	.20	-18.15	-169.72
FM10	40	53.09	-117	18.04	1344.47	79814.21	.00	.18	-19.02	-170.61
FM1500E	40	53.05	-117	17.94	1342.64	79813.47	.00	.16	-20.27	-171.67
FM11000E	40	53.02	-117	17.84	1342.64	79812.34	.00	.15	-21.35	-172.77
FM11500E	40	52.99	-117	17.74	1342.64	79811.29	.00	.13	-22.36	-173.79
FM12000E	40	52.96	-117	17.64	1342.64	79810.39	.00	.12	-23.21	-174.66
FM12500E	40	52.92	-117	17.54	1342.64	79809.73	.00	.11	-23.81	-175.27
FM13000E	40	52.89	-117	17.44	1342.64	79809.18	.00	.10	-24.32	-175.78
FM13500E	40	52.86	-117	17.35	1342.64	79808.72	.00	.09	-24.73	-176.21
FM14000E	40	52.82	-117	17.25	1342.64	79808.42	.00	.08	-24.97	-176.46
FM14500E	40	52.79	-117	17.15	1342.64	79808.18	.00	.07	-25.17	-176.67
FM15000E	40	52.76	-117	17.05	1342.64	79808.01	.00	.07	-25.29	-176.79
FM15500E	40	52.73	-117	16.95	1342.64	79807.94	.00	.06	-25.32	-176.83
FM1BASE	40	53.17	-117	18.23	1344.78	79816.02	.00	.23	-17.24	-168.81
FM3BASE	40	58.47	-117	18.89	1333.20	79833.58	.00	.19	-11.16	-161.47
FM3500W	40	58.42	-117	18.98	1356.66	79830.80	.00	.13	-6.63	-159.64
FM31000W	40	58.37	-117	19.07	1415.19	79819.28	.00	.21	-.02	-159.53
FM31500W	40	58.32	-117	19.15	1410.61	79819.78	.00	.18	-.86	-159.89
FM3500E	40	58.52	-117	18.81	1333.20	79832.41	.00	.17	-12.40	-162.74
FM31000E	40	58.57	-117	18.71	1333.20	79831.77	.00	.14	-13.12	-163.48
FM31500E	40	58.62	-117	18.62	1333.20	79831.18	.00	.12	-13.78	-164.17
FM32000E	40	58.67	-117	18.54	1333.20	79830.41	.00	.10	-14.63	-165.03
FM32500E	40	58.72	-117	18.45	1333.20	79829.81	.00	.08	-15.30	-165.73
FM33000E	40	58.77	-117	18.37	1333.20	79829.11	.00	.06	-16.08	-166.52
FM3BASE	40	58.47	-117	18.89	1333.20	79833.58	.00	.19	-11.16	-161.47
SH1BASE	41	28.25	-118	4.22	1258.82	79909.31	.00	.78	-2.88	-144.24
SH1500E	41	28.25	-118	4.09	1265.83	79908.61	.00	.76	-1.42	-143.59
SH11000E	41	28.25	-118	3.96	1276.81	79906.65	.00	.71	.01	-143.44
SH11500E	41	28.25	-118	3.83	1297.23	79902.15	.00	.57	1.81	-144.08
SH12000E	41	28.25	-118	3.70	1334.41	79893.17	.00	.42	4.29	-145.93
SH12500E	41	28.25	-118	3.57	1409.09	79876.20	.00	.57	10.35	-148.11
SH1BASE	41	28.25	-118	4.22	1258.82	79909.31	.00	.78	-2.88	-144.24
SH1500W	41	28.25	-118	4.35	1258.52	79908.90	.00	.69	-3.38	-144.80
SH11000W	41	28.25	-118	4.48	1258.21	79908.52	.00	.58	-3.86	-145.35
SH11500W	41	28.25	-118	4.61	1257.91	79908.10	.00	.49	-4.37	-145.92
SH12000W	41	28.25	-118	4.74	1257.60	79907.82	.00	.39	-4.74	-146.36
SH12500W	41	28.25	-118	4.87	1257.30	79907.54	.00	.32	-5.12	-146.77
SH13000W	41	28.25	-118	5.00	1256.69	79907.06	.00	.26	-5.79	-147.43
SH13500W	41	28.25	-118	5.13	1256.39	79906.64	.00	.22	-6.30	-147.95
SH14000W	41	28.25	-118	5.26	1256.08	79906.38	.00	.18	-6.65	-148.31
SH14500W	41	28.25	-118	5.35	1255.78	79906.10	.00	.16	-7.03	-148.66
SH1BASE	41	28.25	-118	4.22	1258.82	79909.31	.00	.78	-2.88	-144.24
SH20BASE	41	26.31	-118	3.94	1266.75	79904.14	.00	.14	-2.70	-145.59
SH2500E	41	26.31	-118	3.86	1269.49	79902.92	.00	.14	-3.08	-146.28
SH21000E	41	26.31	-118	3.78	1303.32	79895.30	.00	.10	-.26	-147.31

SH21500E	41	26.31	-118	3.70	1350.87	79885.42	.00	.26	4.52	-147.71
SH22000E	41	26.31	-118	3.62	1344.17	79887.77	.00	.21	4.81	-146.72
SH2500W	41	26.31	-118	4.02	1268.88	79904.15	.00	.12	-2.03	-145.19
SH21000W	41	26.31	-118	4.10	1267.05	79904.04	.00	.12	-2.71	-145.65
SH21500W	41	26.31	-118	4.18	1260.96	79903.80	.00	.12	-4.83	-147.09
SH22000W	41	26.31	-118	4.26	1262.79	79903.24	.00	.11	-4.82	-147.30
SH22500W	41	26.31	-118	4.38	1262.79	79902.85	.00	.09	-5.21	-147.71
SH20BASE	41	26.31	-118	3.92	1266.75	79904.13	.00	.14	-2.71	-145.60