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Principal facts for gravity stations in the proposed

Middle Judith Wilderness, Montana



by

OCYT

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M. Dean Kleinkopf

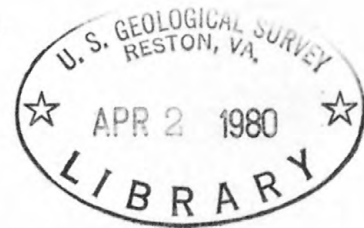
Introduction

A gravity survey was done in the northeast part of the White Sulphur Springs 1⁰x2⁰ quadrangle as part of the mineral resource evaluation of the proposed Middle Judith Wilderness (fig. 1).

Data Collection

During the summer of 1979, 148 stations were metered, using LaCoste-Romberg¹ gravity meter G-235 and Worden gravity meter E-134. The stations were referenced to the International Gravity Station Net 1971 (IGSN-71), established by the Defense Mapping Agency Aerospace Center (1974) at base stations 1233-0 in White Sulphur Springs, Montana and 1201-0 in Stanford, Montana. Secondary base stations were established at Neihart, Sapphire, and Dry Wolf camp ground. Base station descriptions are included at the end of this report. An additional 158 stations from previous work (Kleinkopf, Witkind and Keefer, 1972) were used to construct a Bouguer gravity map for the study. These stations were referenced to gravity base station WA-124 in Great Falls, Montana. Principal facts for this data set are on file at the Gravity Library, NOAA, Boulder, Colorado.

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¹Use of brand names in this report is for descriptive purposes only, and in no way constitutes endorsement by the U.S. Geological Survey.

Elevation Control

Station elevations were obtained from survey benchmarks, spot elevations, and contour interpolations on U.S. Geological Survey topographic maps at a scale of 1:24,000. Elevation accuracy is estimated to vary from 0.2 meter for benchmarks to 6.1 meters for contour interpolations. The maximum resultant error of the Bouguer anomaly is estimated to be less than two mgal (milligals).

Data Reduction

The gravity values were reduced by means of two digital computer programs written by D. Dansereau and R. H. Godson of the U.S. Geological Survey (unpublished). Gravity meter readings were reduced to observed gravity values using the IGSN-71 datum. The Geodetic Reference System, 1967 formula (International Association of Geodesy, 1967) was used for the latitude correction. Average rock densities of 2.50 and 2.67 g/cm³ were used to compute the Bouguer anomaly. Terrain corrections were computed by digital computer (R. H. Godson, unpublished) from station points to a distance of 167 km at 15-second intervals. The corrections ranged from 1.2 mgal for a station near the Judith Range Station to 16.0 mgal for a station southeast of Yogo Peak. In addition, corrections were made for tidal effects, curvature, and linear instrument drift. The principal facts for the gravity stations are included in Table 1.

Explanations of headings on table 1:

station identification

proj Project name.

sta - id Gravity station number.

locations

latitude North latitude in degrees, minutes,
and hundredths of minutes.

longitude West longitude in degrees, minutes,
and hundredths of minutes.

ele Station elevation.

st State where station is located: Montana.

gravity

observed Observed gravity in milligals.

theoretical Theoretical gravity in milligals.

corrections

terrain Terrain correction in milligals.

Bouguer Bouguer correction in milligals.

curv Curvature correction in milligals.

special Not used.

anomalies

free-air Free-air anomaly in milligals.

complete Bouguer Complete Bouguer anomaly in milligals for
assumed average densities of 2.67 g/cm^3 and
 2.50 g/cm^3 .

References

- Defense Mapping Agency Aerospace Center, 1974, World Relative Gravity Reference Network, North America, Part 2: DMAAC Reference Publication 25, with supplement updating gravity values to the International Gravity Standardization Net 1971, 1635 p.
- International Association of Geodesy, 1967, Geodetic Reference System, 1967, International Association of Geodesy Special Publication 3, 74 p.
- Kleinkopf, M. D., Witkind, I. J., and Keefer, W. R., 1972, Aeromagnetic, Bouguer gravity, and generalized geologic maps of the central part of the Little Belt Mountains, Montana: U.S. Geological Survey Geophysical Investigation GP-837.

Table 1.-- BOUGUER GRAVITY DATA

page

Middle Judith Wilderness Gravity Survey

Brickey 1979

Meter ID: e-134

Date: 10/24/79

STATION		L O C A T I O N S				G R A V I T Y		C O R R E C T I O N S			A N O M A L I E S		
IDENTIFICATION	LATITUDE	LONGITUDE	ELE	ST	OBSERVED	THEORETICAL	TERRAIN	BOUGUER	CURV	SPECIAL	FREE AIR	COMPLETE-BOUGUER	SPEC
proj	sta-id	deg min	deg min	(in ft)							d1=2.67	d2=2.50	FIELDS
North :	Jud1	46 56.50	-110 29.42	7099.0	mt	980212.46	980794.68	4.68	-242.13	-1.51	0.00	85.05	-153.91 -138.70
North :	Jud2	46 55.22	-110 28.95	6234.0	mt	980258.78	980792.75	5.80	-212.62	-1.51	0.00	52.02	-156.31 -143.04
North :	Jud3	46 55.12	-110 26.68	5878.0	mt	980278.23	980792.60	7.86	-200.48	-1.49	0.00	38.18	-155.93 -143.57
North :	Jud4	46 54.94	-110 25.61	5771.0	mt	980284.35	980792.33	7.38	-196.83	-1.48	0.00	34.51	-156.42 -144.27
North :	Jud5	46 54.47	-110 23.53	5588.0	mt	980292.99	980791.63	5.65	-190.59	-1.47	0.00	26.66	-159.75 -147.88
North :	Jud6	46 53.07	-110 22.29	5427.0	mt	980304.47	980789.52	3.41	-185.10	-1.46	0.00	25.12	-158.02 -146.36
North :	Jud7	46 51.25	-110 17.75	5210.0	mt	980325.44	980786.77	1.24	-177.70	-1.43	0.00	28.44	-149.45 -138.13
North :	Jud8	46 51.05	-110 19.75	5202.0	mt	980323.87	980786.48	2.68	-177.43	-1.43	0.00	26.42	-149.76 -138.54
North :	Jud9	46 51.33	-110 19.09	5260.0	mt	980320.98	980786.90	1.54	-179.40	-1.44	0.00	28.56	-150.74 -139.32
North :	Jud10	46 49.43	-110 19.22	6132.0	mt	980263.62	980784.03	3.97	-209.14	-1.50	0.00	55.99	-150.68 -137.52
North :	Jud11	46 47.91	-110 20.32	6485.0	mt	980243.79	980781.74	3.74	-221.18	-1.51	0.00	71.62	-147.33 -133.39
North :	Jud12	46 47.63	-110 22.01	6646.0	mt	980234.39	980781.33	3.42	-226.68	-1.52	0.00	77.77	-147.00 -132.69
North :	Jud13	46 47.62	-110 23.40	6976.0	mt	980211.17	980781.31	5.07	-237.93	-1.52	0.00	85.57	-148.80 -133.88
North :	Jud14	46 45.42	-110 26.88	7444.0	mt	980180.54	980777.99	6.74	-253.89	-1.50	0.00	102.22	-146.44 -130.60
North :	Jud15	46 46.54	-110 25.74	7331.0	mt	980186.56	980779.68	7.76	-250.04	-1.51	0.00	95.94	-147.85 -132.32
North :	Jud16	46 44.92	-110 27.74	6979.0	mt	980211.83	980777.24	2.79	-238.03	-1.52	0.00	90.58	-146.18 -131.11
North :	Jud17	46 43.89	-110 28.25	6642.0	mt	980232.41	980775.70	2.04	-226.54	-1.52	0.00	81.05	-144.96 -130.57
North :	Jud18	46 43.82	-110 30.74	6787.0	mt	980220.06	980775.59	3.64	-231.49	-1.52	0.00	82.43	-146.93 -132.33
North :	Jud19	46 43.64	-110 32.63	7363.0	mt	980186.02	980775.31	3.15	-251.13	-1.51	0.00	102.78	-146.71 -130.83
North :	Jud20	46 45.14	-110 35.22	7409.0	mt	980182.86	980777.58	3.17	-252.70	-1.50	0.00	101.67	-149.36 -133.38
North :	Jud21	46 46.29	-110 33.76	7972.0	mt	980147.45	980779.30	8.09	-271.90	-1.47	0.00	117.43	-147.86 -130.97
North :	Jud22	46 46.30	-110 32.57	7977.0	mt	980144.62	980779.32	11.48	-272.07	-1.47	0.00	115.04	-147.02 -130.34
North :	Jud23	46 50.69	-110 20.34	5095.0	mt	980324.40	980785.93	5.08	-173.78	-1.42	0.00	17.44	-152.68 -141.85
North :	Jud24	46 50.50	-110 21.46	5154.0	mt	980317.27	980785.65	6.13	-175.79	-1.43	0.00	16.14	-154.94 -144.05
North :	Jud25	46 50.22	-110 23.13	5237.0	mt	980312.39	980785.23	8.42	-178.62	-1.44	0.00	19.48	-152.16 -141.23
North :	Jud26	46 50.19	-110 23.67	5263.0	mt	980309.43	980785.18	8.69	-179.51	-1.44	0.00	19.01	-153.25 -142.28
North :	Jud27	46 50.21	-110 25.18	5345.0	mt	980304.35	980785.21	8.04	-182.30	-1.45	0.00	21.61	-154.10 -142.92
North :	Jud28	46 50.35	-110 26.82	5439.0	mt	980299.10	980785.42	8.47	-185.51	-1.46	0.00	24.98	-153.52 -142.15
North :	Jud29	46 50.45	-110 27.71	5552.0	mt	980294.50	980785.57	5.23	-189.36	-1.47	0.00	30.84	-154.76 -142.94
North :	Jud30	46 50.65	-110 29.24	5729.0	mt	980284.71	980785.88	4.23	-195.40	-1.48	0.00	37.39	-155.26 -143.00
North :	Jud31	46 50.46	-110 28.39	5588.0	mt	980291.99	980785.59	5.19	-190.59	-1.47	0.00	31.70	-155.17 -143.27
North :	Jud32	46 50.28	-110 22.62	5232.0	mt	980313.89	980785.31	6.61	-178.45	-1.44	0.00	20.42	-152.86 -141.82
North :	Jud24	46 50.50	-110 21.46	5154.0	mt	980317.05	980785.65	6.13	-175.79	-1.43	0.00	15.92	-155.17 -144.28
North :	Jud33	46 55.19	-110 29.77	6350.0	mt	980252.76	980792.71	5.81	-216.58	-1.51	0.00	56.94	-155.34 -141.82
North :	Jud34	46 51.77	-110 20.52	5714.0	mt	980293.28	980787.55	2.27	-194.89	-1.48	0.00	42.86	-151.24 -138.88
North :	Jud35	46 51.51	-110 22.87	6200.0	mt	980259.74	980787.16	3.14	-211.46	-1.51	0.00	55.38	-154.45 -141.09
North :	Jud36	46 51.95	-110 23.16	6120.0	mt	980258.81	980787.83	2.46	-208.74	-1.50	0.00	46.27	-161.51 -148.28
North :	Jud37	46 51.82	-110 24.10	6502.0	mt	980241.99	980787.63	7.11	-221.76	-1.51	0.00	65.53	-150.63 -136.87
North :	Jud38	46 55.35	-110 30.34	6515.0	mt	980243.00	980792.95	6.47	-222.21	-1.51	0.00	62.45	-154.80 -140.97
North :	Jud39	46 55.12	-110 31.42	6915.0	mt	980218.39	980792.60	7.22	-235.85	-1.52	0.00	75.77	-154.38 -139.73

Table 1.-- BOUGUER GRAVITY DATA --Continued

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Middle Judith Wilderness Gravity Survey
 Grickey 1979
 Meter ID: e-134 Date: 10/24/79

STATION		L O C A T I O N S				G R A V I T Y		C O R R E C T I O N S			A N O M A L I E S			
IDENTIFICATION	LATITUDE	LONGITUDE	ELE	ST	OBSERVED	THEORETICAL	TERRAIN	BOUGUER	CURV	SPECIAL	FREE AIR	COMPLETE-BOUGUER	SPEC	
proj	sta-id	deg min	deg min	(in ft)							d1=2.67	d2=2.50	FIELDS	
North	Jud40	46 52.87	-110 23.92	5635.0	mt	980289.24	980789.22	4.45	-192.19	-1.47	0.00	29.74	-159.48	-147.43
North	Jud41	46 52.72	-110 21.30	5341.0	mt	980311.12	980780.99	2.96	-182.17	-1.45	0.00	24.22	-156.44	-144.94
North	Jud42	46 48.19	-110 23.13	6668.0	mt	980231.44	980782.16	4.23	-227.43	-1.52	0.00	76.05	-148.67	-134.36
North	Jud43	46 48.79	-110 22.09	6666.0	mt	980232.27	980783.07	4.63	-227.36	-1.52	0.00	75.79	-148.46	-134.18
North	Jud44	46 49.08	-110 20.79	6482.0	mt	980244.78	980783.51	4.65	-221.08	-1.51	0.00	70.57	-147.38	-133.50
North	Jud45	46 46.22	-110 36.45	8052.0	mt	980142.61	980779.20	5.84	-274.63	-1.47	0.00	120.20	-150.06	-132.85
North	Jud46	46 47.22	-110 35.45	8081.0	mt	980140.48	980780.70	7.25	-275.62	-1.46	0.00	119.29	-150.54	-133.36
North	Jud47	46 48.28	-110 32.46	8211.0	mt	980131.07	980782.30	10.23	-280.05	-1.45	0.00	120.49	-150.78	-133.51
North	Jud48	46 48.38	-110 33.43	8014.0	mt	980142.01	980782.45	9.07	-273.33	-1.47	0.00	112.78	-152.96	-136.04
North	Jud49	46 46.23	-110 35.55	8082.0	mt	980138.93	980779.22	7.52	-275.65	-1.46	0.00	119.32	-150.27	-133.11
North	Jud50	46 48.73	-110 38.70	7988.0	mt	980148.57	980782.98	7.44	-272.45	-1.47	0.00	116.37	-150.11	-133.14
North	Jud51	46 50.88	-110 37.54	8031.0	mt	980142.09	980786.22	8.65	-273.91	-1.47	0.00	111.49	-155.24	-138.26
North	Jud52	46 51.02	-110 37.06	8165.0	mt	980138.21	980786.43	12.14	-270.48	-1.46	0.00	119.19	-148.61	-131.56
North	Jud53	46 50.21	-110 36.39	7527.0	mt	980177.26	980785.21	9.99	-256.72	-1.50	0.00	99.52	-148.71	-132.91
North	Jud54	46 46.08	-110 29.56	6068.0	mt	980265.76	980778.99	4.25	-206.96	-1.50	0.00	57.17	-147.04	-134.04
North	Jud55	46 46.27	-110 28.77	5926.0	mt	980213.79	980779.27	4.99	-202.12	-1.49	0.00	51.57	-147.05	-134.40
North	Jud56	46 46.65	-110 27.78	5896.0	mt	980274.96	980779.85	4.15	-201.10	-1.49	0.00	49.35	-149.08	-136.45
North	Jud57	46 47.14	-110 26.61	5942.0	mt	980274.78	980780.59	3.82	-202.66	-1.49	0.00	52.76	-147.58	-134.83
North	Jud58	46 47.53	-110 25.87	5770.0	mt	980282.28	980781.17	5.13	-196.80	-1.48	0.00	43.51	-149.64	-137.34
North	Jud59	46 48.05	-110 25.11	5510.0	mt	980297.08	980781.95	6.85	-187.93	-1.46	0.00	33.09	-149.45	-137.83
North	Jud60	46 48.58	-110 23.94	5410.0	mt	980302.60	980782.76	8.41	-184.52	-1.45	0.00	28.42	-149.15	-137.84
North	Jud61	46 49.24	-110 26.69	7066.0	mt	980201.16	980783.75	8.69	-241.00	-1.51	0.00	81.56	-152.24	-137.36
North	Jud62	46 48.33	-110 29.70	7866.0	mt	980153.86	980782.38	9.03	-268.29	-1.48	0.00	110.80	-149.94	-133.33
North	Jud63	46 49.37	-110 30.30	7230.0	mt	980194.51	980783.95	8.10	-246.59	-1.51	0.00	90.13	-149.87	-134.59
North	Jud64	46 49.49	-110 32.67	7550.0	mt	980170.85	980784.13	11.43	-257.51	-1.50	0.00	96.36	-151.22	-135.45
North	Jud65	46 51.99	-110 28.05	7178.0	mt	980196.31	980787.89	7.79	-244.82	-1.51	0.00	83.11	-155.43	-140.25
North	Jud66	46 52.53	-110 27.09	7160.0	mt	980200.86	980788.70	5.36	-244.21	-1.51	0.00	85.15	-155.21	-139.90
North	Jud67	46 53.45	-110 25.42	6925.0	mt	980213.92	980790.09	7.26	-236.19	-1.52	0.00	74.75	-155.70	-141.02
North	Jud68	46 54.14	-110 24.64	7200.0	mt	980195.27	980791.13	11.56	-245.57	-1.51	0.00	80.90	-154.62	-139.63
North	Jud69	46 54.29	-110 27.77	7770.0	mt	980159.05	980791.35	12.30	-265.01	-1.49	0.00	97.99	-156.20	-140.02
North	Jud70	46 53.52	-110 29.51	8153.0	mt	980136.57	980790.20	11.68	-278.07	-1.46	0.00	112.65	-155.20	-138.15
North	Jud71	46 54.39	-110 29.57	7555.0	mt	980176.94	980791.50	8.08	-257.68	-1.50	0.00	95.54	-155.56	-139.57
North	Jud72	46 52.27	-110 29.84	7896.0	mt	980149.50	980783.31	15.07	-269.31	-1.48	0.00	103.33	-152.39	-136.11
North	Jud73	46 53.44	-110 31.11	7886.0	mt	980150.10	980790.07	16.00	-260.97	-1.48	0.00	101.22	-153.22	-137.02
North	Jud74	46 54.55	-110 32.44	8382.0	mt	980122.56	980791.74	15.31	-285.89	-1.43	0.00	118.60	-153.41	-136.09
North	Jud75	46 52.48	-110 31.81	7622.0	mt	980166.93	980788.63	13.16	-259.96	-1.49	0.00	94.70	-153.60	-137.79
North	Jud76	46 54.09	-110 33.80	7691.0	mt	980168.44	980791.05	9.58	-262.32	-1.49	0.00	100.27	-153.96	-137.78
North	Jud77	46 52.53	-110 35.34	7990.0	mt	980149.07	980788.70	7.57	-272.52	-1.47	0.00	111.33	-155.08	-138.12
North	Jud78	46 52.70	-110 36.95	8150.0	mt	980136.32	980788.96	9.70	-277.97	-1.46	0.00	113.36	-156.37	-139.20
North	Jud79	46 50.70	-110 35.59	7634.0	mt	980168.47	980785.95	7.68	-260.37	-1.49	0.00	100.05	-154.14	-137.96

Table 1. -- BOUGUER GRAVITY DATA -- CONTINUED

Page

Middle Judith Wilderness Gravity Survey
Brickey 1979
Meter ID: e-134 Date: 10/24/79
and G-135

STATION IDENTIFICATION	L O C A T I O N S proj sta-ld	LATITUDE		LONGITUDE		ELEVATION (in ft)	GRAVITY OBSERVED	GRAVITY THEORETICAL	CORRECTIONS			ANOMALIES			
		deg	min	deg	min				TERRAIN	BOUGUER	CURV	SPECIAL	FREE AIR	COMPLETE-BOUGUER d1=2.67 d2=2.50	SPEC FIELDS
North :	Jud80	46	52.17	-110	33.90	7513.0	mt 980176.51	980788.16	8.37	-256.25	-1.50	0.00	94.50	-154.87	-138.99
North :	Jud81	46	53.13	-110	32.78	7465.0	mt 980182.41	980789.61	7.64	-254.61	-1.50	0.00	94.46	-154.02	-136.20
North :	Jud82	46	51.59	-110	32.48	5885.0	mt 980273.01	980787.29	7.09	-200.72	-1.49	0.00	38.92	-156.20	-143.77
North :	Jud83	46	51.11	-110	31.18	5815.0	mt 980280.38	980786.56	4.37	-198.33	-1.49	0.00	40.44	-155.00	-142.56
North :	Jud84	46	50.60	-110	31.88	5845.0	mt 980277.81	980785.80	5.11	-199.36	-1.49	0.00	41.46	-154.27	-141.81
North :	Jud85	46	50.33	-110	33.10	5920.0	mt 980272.03	980785.39	6.32	-201.91	-1.49	0.00	43.14	-153.95	-141.40
North :	Jud86	46	49.61	-110	34.50	6071.0	mt 980263.16	980784.30	6.56	-207.06	-1.50	0.00	49.54	-152.46	-139.60
North :	Jud87	46	48.57	-110	36.36	7324.0	mt 980186.77	980782.74	5.14	-249.80	-1.51	0.00	92.44	-153.73	-138.06
North :	Jud88	46	47.79	-110	34.49	7995.0	mt 980147.99	980781.56	7.11	-272.69	-1.47	0.00	117.87	-149.18	-132.18
North :	Jud89	46	47.45	-110	30.85	7557.0	mt 980172.38	980781.05	8.82	-257.75	-1.50	0.00	101.62	-148.60	-132.86
North :	Jud90	46	46.95	-110	32.67	6400.0	mt 980240.90	980780.30	8.80	-218.29	-1.51	0.00	62.19	-148.80	-135.37
North :	Jud91	46	44.92	-110	32.10	6398.0	mt 980240.87	980777.24	8.22	-218.22	-1.51	0.00	65.03	-146.48	-133.01
North :	1c1	46	44.40	-110	25.81	6462.0	mt 980244.01	980776.46	2.80	-220.40	-1.51	0.00	74.97	-144.14	-130.19
North :	1c2	46	44.28	-110	23.17	6073.0	mt 980267.21	980776.28	2.41	-207.13	-1.50	0.00	61.80	-144.42	-131.29
North :	1c3	46	44.98	-110	20.51	5723.0	mt 980286.57	980777.34	3.61	-195.20	-1.48	0.00	47.22	-145.84	-133.55
North :	1c4	46	45.34	-110	19.01	5411.0	mt 980305.29	980777.88	4.24	-184.55	-1.45	0.00	36.08	-145.69	-134.12
North :	1c5	46	45.79	-110	18.68	5358.0	mt 980307.10	980778.55	4.81	-182.75	-1.45	0.00	32.23	-147.15	-135.73
North :	1c6	46	46.74	-110	18.04	5258.0	mt 980311.46	980779.98	7.44	-179.34	-1.44	0.00	25.77	-147.57	-136.53
North :	1c7	46	47.53	-110	18.03	5196.0	mt 980316.47	980781.17	7.57	-177.22	-1.43	0.00	23.76	-147.33	-136.43
North :	1c8	46	48.70	-110	17.32	5112.0	mt 980324.40	980782.94	5.99	-174.36	-1.42	0.00	22.03	-147.76	-136.95
North :	1c9	46	49.15	-110	16.89	5060.0	mt 980330.02	980783.62	4.11	-172.58	-1.42	0.00	22.09	-147.77	-136.95
North :	1c10	46	50.33	-110	16.40	4983.0	mt 980339.21	980785.39	1.85	-169.96	-1.41	0.00	22.27	-147.27	-136.47
North :	1c11	46	51.20	-110	16.47	4975.0	mt 980340.90	980786.70	1.57	-169.68	-1.41	0.00	21.89	-147.63	-136.84
North :	1c12	46	52.98	-110	15.24	4881.0	mt 980350.31	980789.38	1.42	-166.48	-1.40	0.00	19.79	-146.66	-136.06
North :	drywolf	46	58.64	-110	30.85	5929.0	mt 980286.95	980797.90	5.93	-202.22	-1.49	0.00	46.39	-151.39	-138.80
North :	sapphire	46	53.18	-110	15.21	4894.0	mt 980350.20	980789.68	1.37	-166.92	-1.40	0.00	20.60	-146.35	-135.72
North :	1c15	46	46.98	-110	41.73	6279.0	mt 980250.66	980780.34	5.40	-214.16	-1.51	0.00	60.54	-149.72	-136.33
North :	1c16	46	48.04	-110	42.21	6453.0	mt 980241.23	980781.95	5.20	-220.09	-1.51	0.00	65.86	-150.54	-136.76
North :	1c17	46	49.66	-110	41.04	7920.0	mt 980152.66	980784.68	6.28	-270.13	-1.48	0.00	112.37	-152.95	-136.06
North :	1c18	46	48.76	-110	41.46	7731.0	mt 980162.40	980783.02	8.18	-263.68	-1.49	0.00	106.01	-150.98	-134.62
North :	1c19	46	49.57	-110	39.65	7225.0	mt 980195.28	980784.24	3.63	-246.42	-1.51	0.00	90.14	-154.17	-138.61
North :	1c20	46	49.76	-110	37.17	6890.0	mt 980215.85	980784.53	4.80	-235.00	-1.52	0.00	78.95	-152.76	-138.01
North :	1c21	46	47.54	-110	40.44	6476.0	mt 980239.25	980781.19	5.05	-220.88	-1.51	0.00	66.79	-150.54	-136.70
North :	1c22	46	46.60	-110	38.69	7200.0	mt 980193.88	980779.77	4.58	-245.57	-1.51	0.00	90.87	-151.64	-136.20
North :	1c23	46	47.96	-110	38.39	7635.0	mt 980169.38	980781.82	4.42	-260.41	-1.49	0.00	105.18	-152.30	-135.91
North :	1c24	46	47.46	-110	19.33	5400.0	mt 980302.11	980781.07	7.95	-184.18	-1.45	0.00	28.67	-149.01	-137.70
North :	1c25	46	46.83	-110	20.42	5555.0	mt 980292.07	980780.12	6.76	-189.46	-1.47	0.00	34.15	-150.02	-138.30

Table 1. -- BOUGUER GRAVITY DATA -- Continued

Middle Judith Wilderness Gravity Survey
Brickey 1979
Meter ID: G-235 Date: 10/24/79

STATION IDENTIFICATION proj sta-ld	L O C A T I O N S		ELE ST (In ft)	G R A V I T Y		C O R R E C T I O N S			A N O M A L I E S					
	LATITUDE deg min	LONGITUDE deg min		OBSERVED	THEORETICAL	TERRAIN	BOUGUER	CURV	SPECIAL	FREE AIR	COMPLETE-BOUGUER d1=2.67 d2=2.50	SPEC FIELDS		
North :	1c26	46 46.62	-110 21.67	5805.0	mt	980282.67	980779.80	4.76	-197.99	-1.48	0.00	48.56	-146.16	-133.76
North :	1c27	46 47.89	-110 15.25	5366.0	mt	980312.28	980781.72	3.85	-183.02	-1.45	0.00	35.00	-145.62	-134.12
North :	1c28	46 47.54	-110 15.85	5600.0	mt	980298.56	980781.19	3.12	-191.00	-1.47	0.00	43.80	-145.55	-133.50
North :	1c29	46 47.16	-110 17.07	5888.0	mt	980280.52	980780.62	2.65	-200.82	-1.49	0.00	53.39	-146.27	-133.56
North :	1c30	46 49.05	-110 14.66	5395.0	mt	980313.40	980783.46	1.48	-184.01	-1.45	0.00	37.10	-146.88	-135.17
North :	1c31	46 53.70	-110 16.89	5048.0	mt	980339.89	980790.46	1.47	-172.17	-1.42	0.00	23.98	-148.14	-137.18
North :	1c32	46 55.30	-110 17.60	5240.0	mt	980329.21	980792.88	2.51	-178.72	-1.44	0.00	28.93	-148.72	-137.41
North :	1c33	46 55.43	-110 19.45	5680.0	mt	980301.38	980793.07	3.13	-193.73	-1.48	0.00	42.25	-149.82	-137.59
North :	1c34	46 53.25	-110 18.76	5169.0	mt	980329.49	980789.79	1.70	-176.30	-1.43	0.00	25.63	-150.40	-139.19
North :	1c35	46 53.02	-110 17.48	5029.0	mt	980339.35	980789.44	1.49	-171.52	-1.41	0.00	22.68	-148.77	-137.86
North :	1c36	46 52.79	-110 16.29	4939.0	mt	980345.33	980789.09	1.45	-168.46	-1.40	0.00	20.54	-147.86	-137.14
North :	1c37	46 52.90	-110 19.86	5370.0	mt	980313.54	980789.26	1.67	-183.16	-1.45	0.00	29.09	-153.84	-142.20
North :	1c38	46 55.51	-110 24.38	5810.0	mt	980283.73	980793.19	7.39	-198.16	-1.48	0.00	36.70	-155.56	-143.32
North :	1c39	46 56.57	-110 28.87	6540.0	mt	980239.79	980794.79	6.65	-226.47	-1.52	0.00	69.14	-152.19	-138.10
North :	drywolf	46 58.64	-110 30.85	5929.0	mt	980286.95	980797.90	5.93	-202.22	-1.49	0.00	46.39	-151.39	-138.80
North :	1c40	46 58.04	-110 32.08	6064.0	mt	980275.11	980797.00	6.95	-206.83	-1.50	0.00	48.13	-153.24	-140.42
North :	drywolf	46 58.64	-110 30.85	5929.0	mt	980286.95	980797.90	5.93	-202.22	-1.49	0.00	46.39	-151.39	-138.80
North :	1c41	46 55.16	-110 27.80	6006.0	mt	980271.69	980792.66	6.96	-204.85	-1.50	0.00	43.60	-155.79	-143.09
North :	1c42	46 53.80	-110 23.02	5520.0	mt	980298.43	980790.62	5.39	-188.27	-1.46	0.00	26.72	-157.62	-145.89
North :	1c43	46 41.23	-110 28.26	6706.0	mt	980224.71	980771.69	1.87	-228.72	-1.52	0.00	83.37	-145.00	-130.46
North :	1c44	46 41.27	-110 24.59	6980.0	mt	980207.70	980771.74	2.80	-238.07	-1.52	0.00	92.04	-144.74	-129.66
North :	1c45	46 41.60	-110 22.85	6793.0	mt	980220.21	980772.24	2.69	-231.69	-1.52	0.00	86.49	-144.03	-129.35
North :	1c46	46 41.97	-110 21.98	6802.0	mt	980220.04	980772.80	2.26	-232.00	-1.52	0.00	86.60	-144.65	-129.92
North :	1c48	46 41.05	-110 36.79	6120.0	mt	980255.91	980771.41	1.71	-208.74	-1.50	0.00	59.79	-148.74	-135.46
North :	1c49	46 42.57	-110 36.06	6560.0	mt	980230.15	980773.70	2.44	-223.74	-1.52	0.00	73.07	-149.74	-135.56
North :	1c50	46 44.26	-110 35.35	7410.0	mt	980181.65	980776.25	4.02	-252.73	-1.50	0.00	101.88	-148.33	-122.40
North :	1c51	46 44.89	-110 33.73	7175.0	mt	980196.83	980777.20	2.79	-244.72	-1.51	0.00	94.04	-149.40	-133.90
North :	1c52	46 42.76	-110 28.10	6692.0	mt	980227.98	980773.99	1.98	-228.24	-1.52	0.00	83.02	-144.76	-120.25
North :	1c53	46 43.39	-110 33.50	6913.0	mt	980211.09	980774.94	4.51	-235.78	-1.52	0.00	85.95	-146.84	-122.02
North :	1c54	46 41.59	-110 33.88	6062.0	mt	980258.82	980772.23	5.34	-206.76	-1.50	0.00	56.43	-146.48	-133.57
North :	sapphire	46 53.18	-110 15.21	4894.0	mt	980350.20	980789.68	1.37	-166.92	-1.40	0.00	20.60	-146.35	-135.72
North :	1c55	46 57.35	-110 23.61	6600.0	mt	980249.39	980795.96	3.00	-225.11	-1.52	0.00	73.81	-149.81	-135.57
North :	1c56	46 56.18	-110 25.01	6268.0	mt	980264.43	980794.20	3.07	-213.78	-1.51	0.00	59.42	-152.80	-139.29
North :	1c57	46 59.32	-110 23.36	5480.0	mt	980320.39	980798.92	5.96	-186.91	-1.46	0.00	36.61	-145.50	-134.18
North :	1c58	46 58.90	-110 25.75	5755.0	mt	980302.48	980798.30	7.42	-196.29	-1.48	0.00	45.18	-145.17	-133.05
North :	1c59	46 58.74	-110 26.61	5880.0	mt	980297.97	980798.05	8.69	-200.55	-1.49	0.00	52.65	-140.70	-128.39
North :	1c60	46 58.71	-110 28.30	6360.0	mt	980264.56	980798.01	7.85	-216.92	-1.51	0.00	64.39	-146.19	-132.79
North :	drywolf	46 58.64	-110 30.85	5929.0	mt	980286.95	980797.90	5.93	-202.22	-1.49	0.00	46.39	-151.39	-138.80

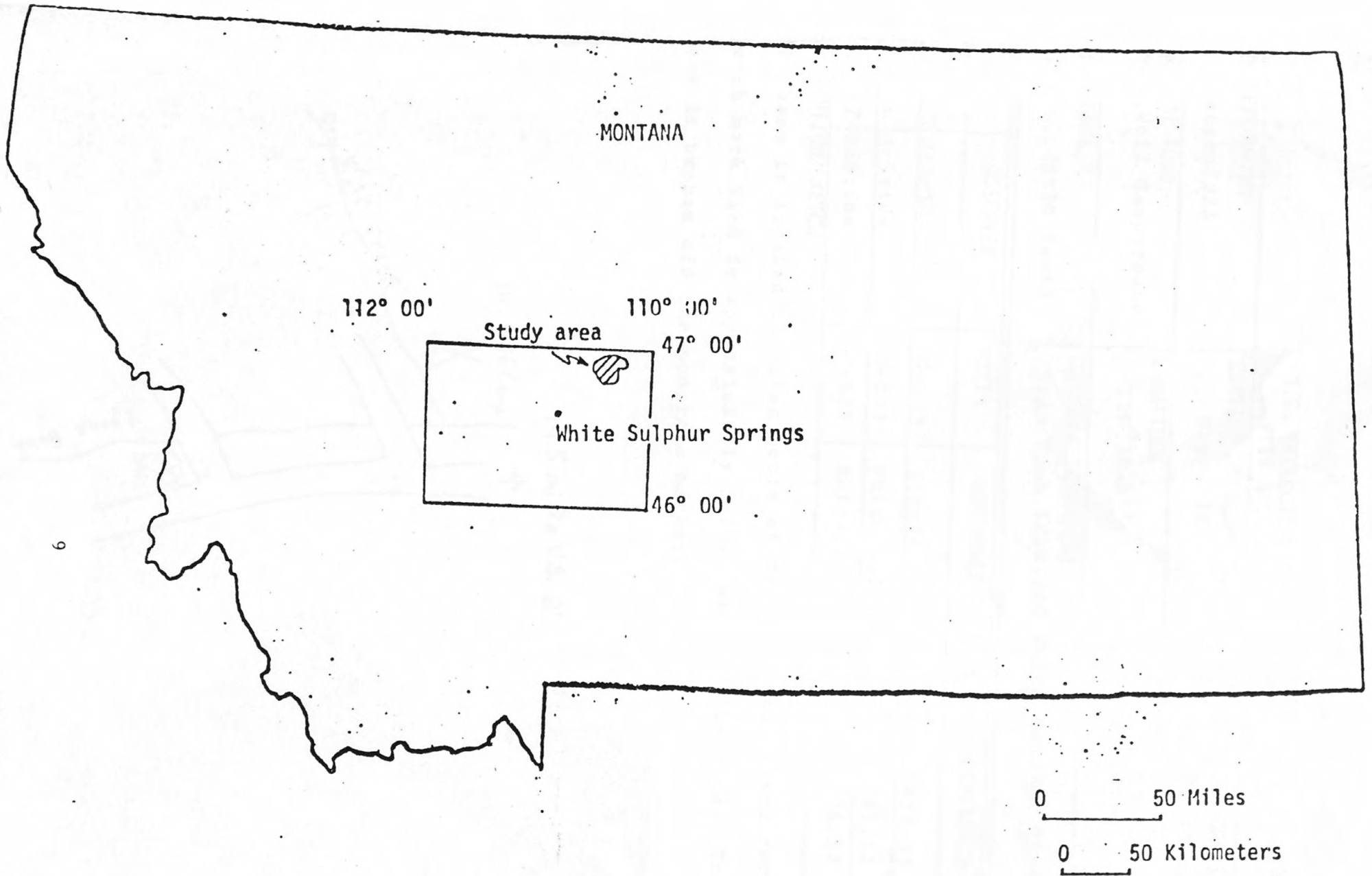


FIGURE 1

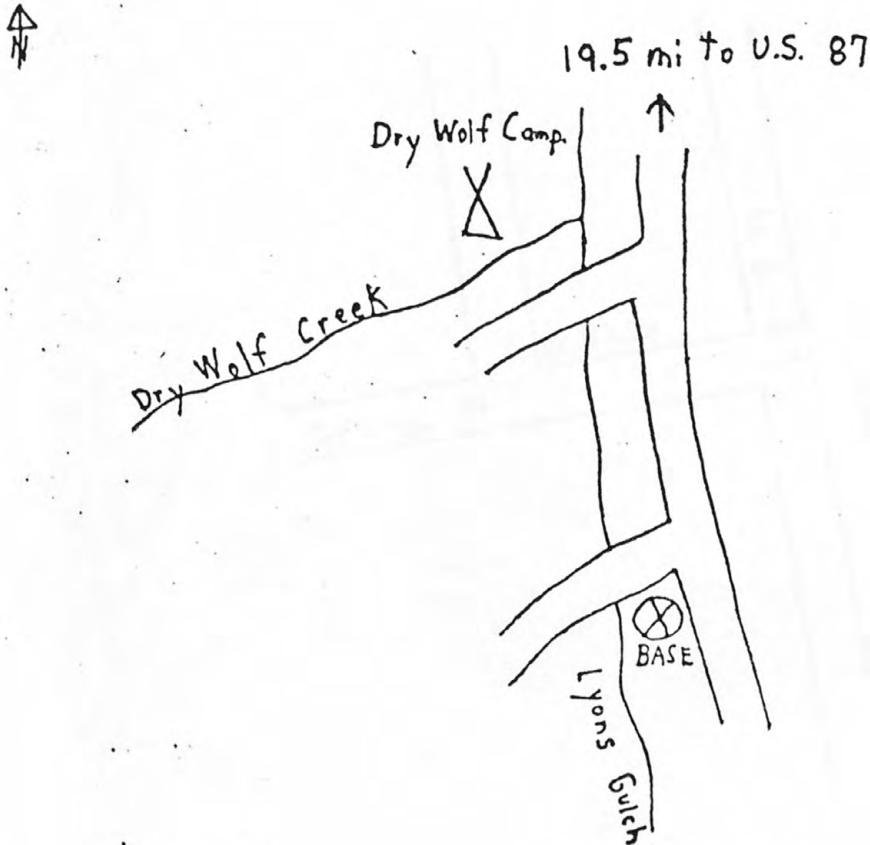
Area of gravity survey of the proposed Middle Judith Wilderness, Montana

U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Montana/USA		STATION DESIGNATION Dry Wolf		OBSERVED GRAVITY 980286.95 mgals
NEAREST TOWN Dry Wolf Campground		LONGITUDE 110° 30.85'		LATITUDE 46° 58.64'
ELEVATION 1807 m. (5929 feet)		TOPOGRAPHIC MAP(S) Yogo Peak 1/24,000 White Sulphur Springs 2°		
DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE
9/14/79	McBride	G-235	Stanford DOD	980422.55
9/6/79	McBride	G-235	White Sulphur Spr	980291.11
8/17/79	McBride	G-235	Neihart	980286.52

DESCRIPTION/SKETCH

The base is located .2 miles south of Dry Wolf Campground turn-off.
Bench mark X188 is approximately 5 feet west of the road. The bench
mark is broken off the concrete marker.



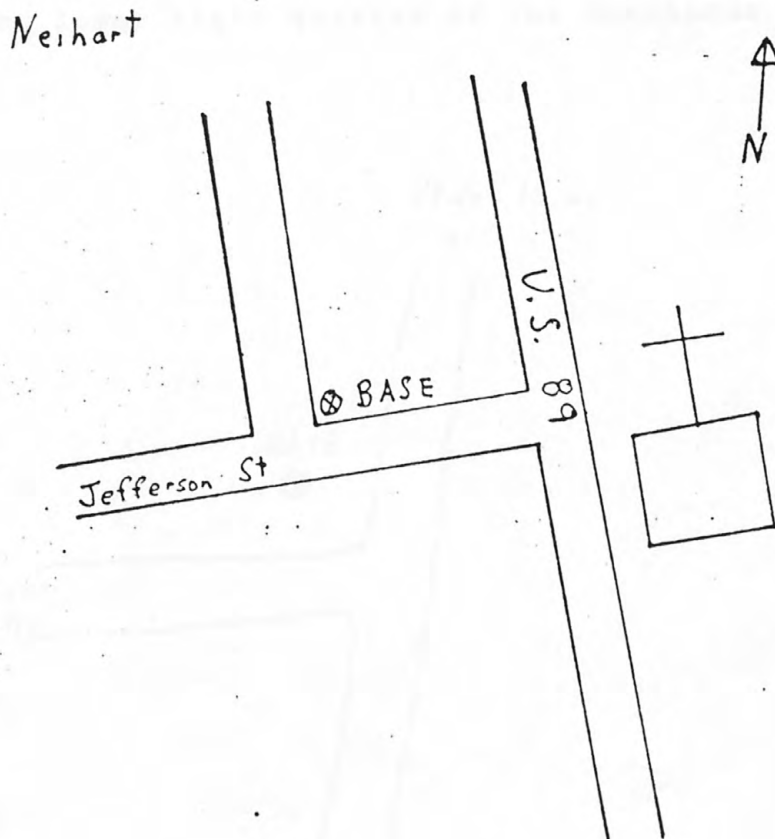
MDK 12/1/78

U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Montana/USA		STATION DESIGNATION Neihart		OBSERVED GRAVITY 980286.52 mgals
NEAREST TOWN Neihart		LONGITUDE 110°43.97'		LATITUDE 46°55.85'
ELEVATION 1717.8 m (5635 feet)		TOPOGRAPHIC MAP(S) Neihart 1/24,000 White Sulphur Springs 2°		
DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE
6/28/77	Kleinkopf	E-134	White Sulphur Springs DOD	980291.11
9/12/79	McBride	G-235	White Sulphur Springs DOD	980291.11

DESCRIPTION/SKETCH

Base is at USA & GS Bench Mark 129 in Neihart one block west of highway 89 near Jefferson Street. As of 1979, the brass marker is no longer there, but the concrete post remains.

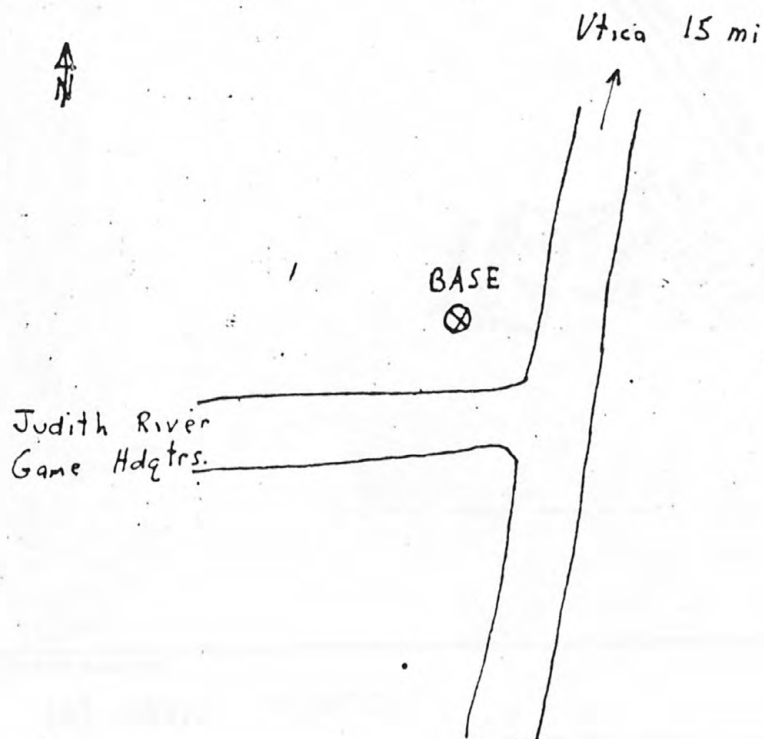


U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Montana/USA		STATION DESIGNATION Sapphire		OBSERVED GRAVITY 980350.20 mgals
NEAREST TOWN Utica		LONGITUDE 110°15.21'		LATITUDE 46°53.18'
ELEVATION 1492 m. (4894 feet)		TOPOGRAPHIC MAP(S) Woodhurst 1/24,000 White Sulphur Springs 2°		
DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE
9/7/79	McBride	G-235	White Sulphur Springs DOD	980291.11
9/14/79	McBride	G-235	Stanford	980422.55

DESCRIPTION/SKETCH .

The base is benchmark Z182, which is located on top of a large rock about 1.5 feet high and 3 feet in diameter. It is found about 100 feet north of the road to Judith River Game Headquarters. The benchmark is on the lower right quarter of the Woodhurst Mountain topographic map.

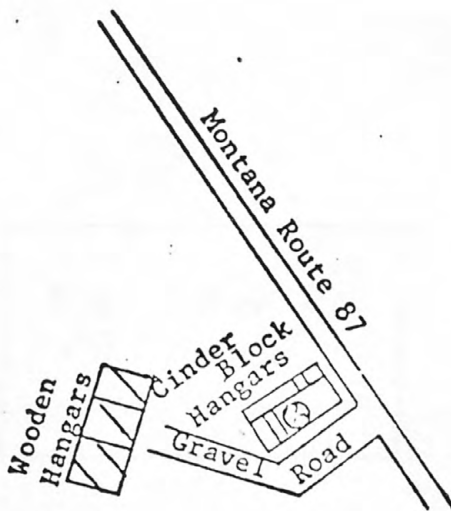


GRAVITY BASE STATION

LATITUDE $47^{\circ} 08.75' N$ (1)	STATION DESIGNATION <p style="text-align: center;">STANFORD</p>	
LONGITUDE $110^{\circ} 13.50' W$ (1)		
ELEVATION 1306.1 METERS (1)	COUNTRY/STATE USA/Montana	
REFERENCE CODE NUMBERS		ADOPTED GRAVITY VALUE
ACIC 1201-0		$g = 980\ 436.25$ mgals
IGC 15670T		
	ESTIMATED ACCURACY ± 0.1 mgals	DATE MONTH/YEAR Aug/1968

DESCRIPTION AND/OR SKETCH

Station is located at Stanford Airport, and is at the intersection of inset walk inside the cinder block hangar, eight inches from north and east walk, on the earth floor. (1)



REFERENCE SOURCE

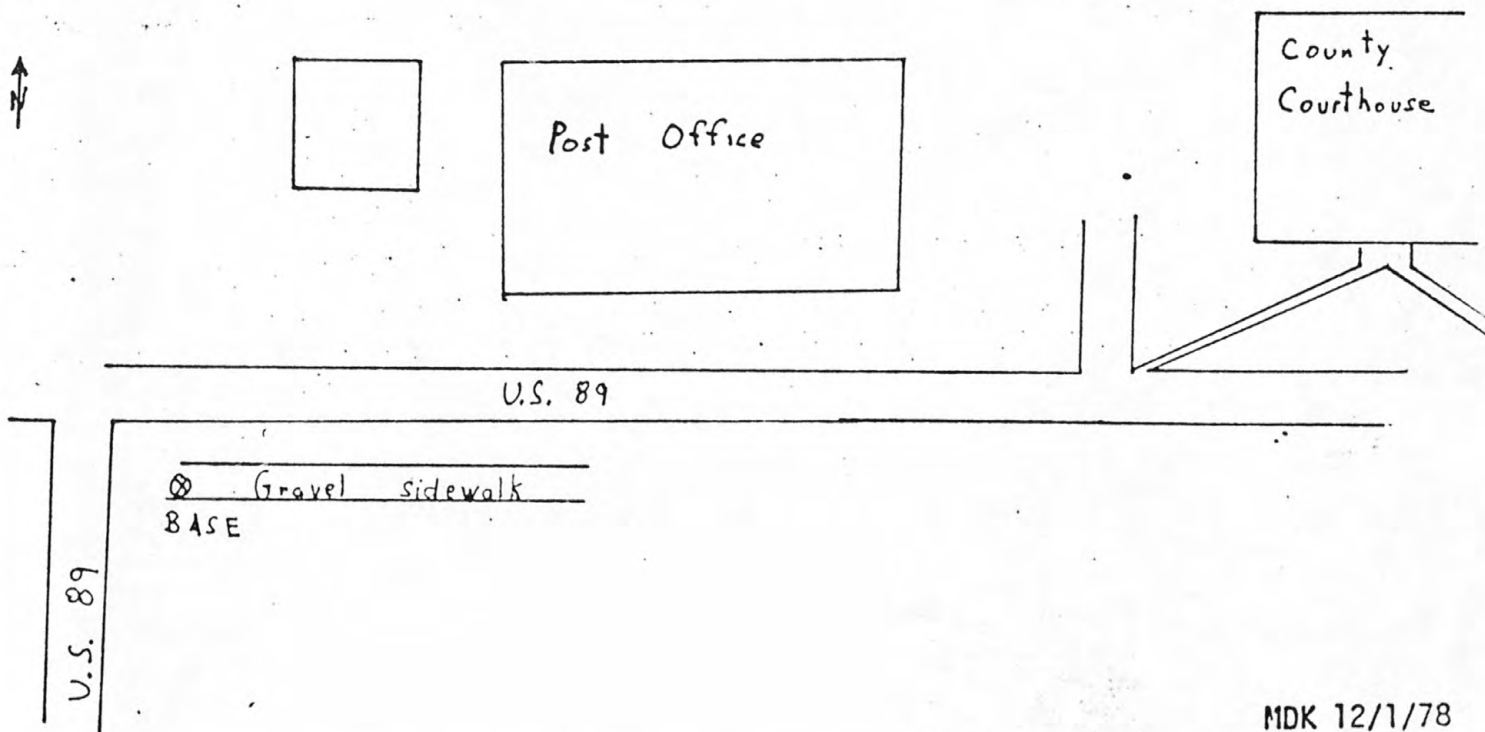
(1) 01355 (2) 05100

U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Montana/USA		STATION DESIGNATION White Sulphur Springs DOD		OBSERVED GRAVITY 980291.11 mgals
NEAREST TOWN White Sulphur Springs		LONGITUDE 110°54.00'		LATITUDE 46°33.00'
ELEVATION 1526.7 meters		TOPOGRAPHIC MAP(S) White Sulphur Springs 2°		
DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE
			DOD 1233-0	
			IGB 15660 J	

DESCRIPTION/SKETCH

Station is located approximately 400 feet west of the U.S. Post Office in White Sulphur Springs, Montana, three feet south of Montana State Highway Survey Bench Mark. The B.M. is a standard disk stamped "Montana State Road Elev. 5008.97", and placed on top of a concrete post, four feet above the ground. The post is marked "FA SS 49 (7)".



MDK 12/1/78

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