South Dakota FY2017 Lidar Survey
Project Survey Report

GCT Project Number 170206

May 2017

Prime Contractor

Precision Aerial Reconnaissance
3910 Industrial Circle
Bossier City, LA 71112

Sub - Contractors

Gustin, Cothern & Tucker, Inc. (GCT)
All Field Work and Processing

Bohannon Huston, Inc. (BHI)
Professional Land Surveyor in Responsible Charge

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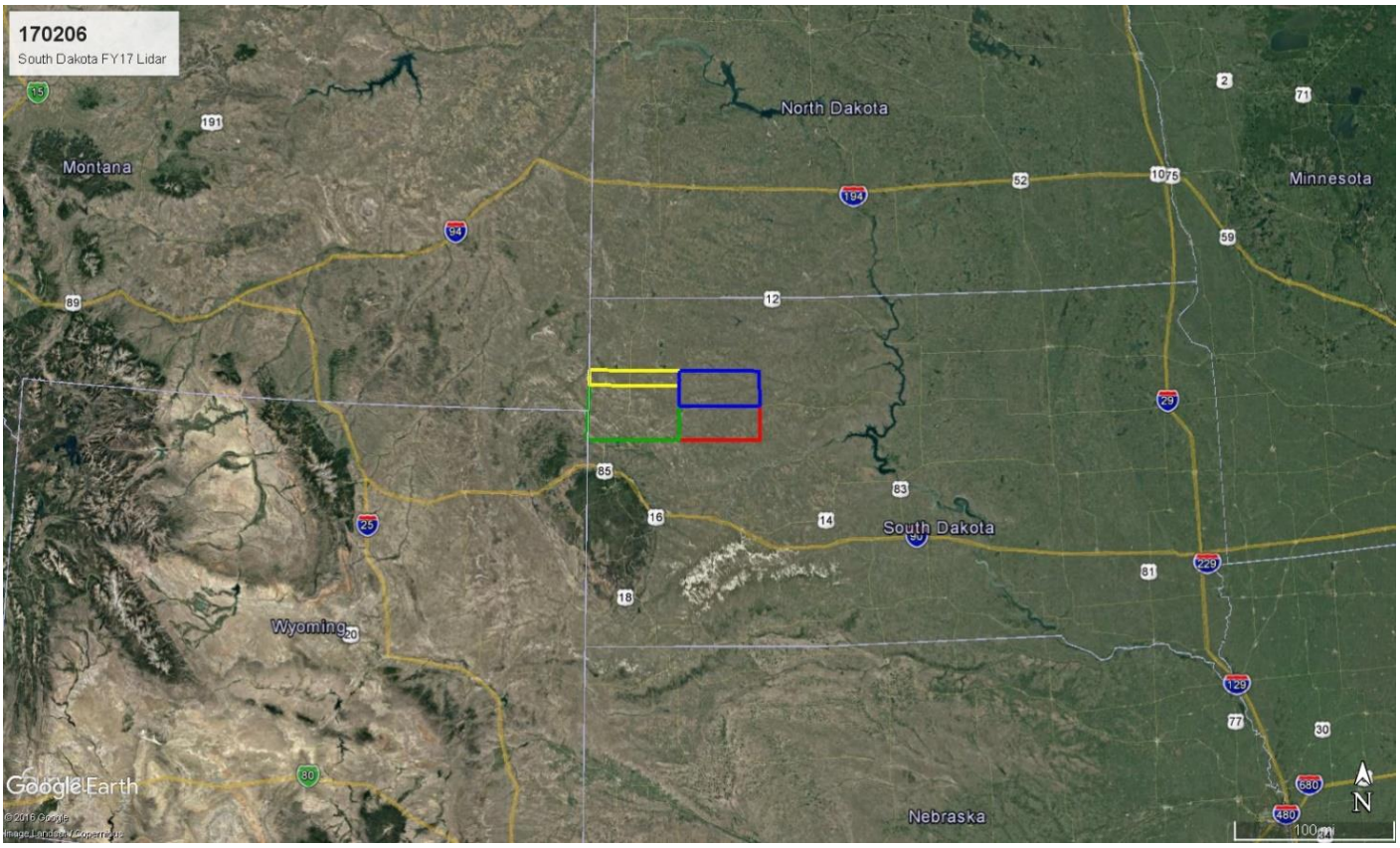
FIELD BOOKS

USGS
South Dakota Fiscal Year 2017 Lidar Survey
GCT Project Number 170206
Prime Contractor: Precision Aerial Reconnaissance
Contract No. G17PC00007
Sub-Contractor: Gustin, Cothern & Tucker, Inc. (GCT)

VICINITY MAP



INTRODUCTION & SPECIFICATIONS

The purpose of this project was to provide ground truth data which will be used to validate LiDAR data for portions of four counties (Butte, Harding, Perkins, & Meade) in South Dakota. GCT collected 356 check points (168 Control, 103 NVA, 85 VVA) in 4 different classifications spread throughout the project area. The target number of LiDAR Control Points was in excess of 180 but we were denied access to property in several instances and could not get past locked gates in several more. In some of those instances the property we were denied access to was very large which kept us from getting to as many as three points. The number of Control Points (168) still exceeds the required total.

HORIZONTAL & VERTICAL DATUMS

The Control Point Coordinate Values for this project are referenced to National Geodetic Survey (NGS) control monuments in the National Spatial Reference System (NSRS). Horizontal datum is referenced to UTM, WGS84, Zone 13 North. Vertical values represent the North American Vertical Datum of 1988 (NAVD88). GEOID 12B was used to translate the ellipsoid heights to Orthometric heights. All coordinate values and elevations are presented in Meters unless otherwise indicated.

CONTROL SURVEY

GCT used Trimble Centerpoint RTX Data Correction Service to determine coordinate values for the Survey Control Points and logged raw data at the rovers for post-processing if necessary. We also observed static data on 15 base station sites spread evenly throughout the project area. All Site Calibration Points were oberved for at least twelve (12) minutes and all LiDAR Control Points were observed for at least ten (10) minutes. A Site Calibration was performed using the data that was collected via Trimble Centerpoint RTX . Existing control throughout and surrounding the project area were evaluated against published values and OPUS solutions held as fixed control. The Site Calibration was performed using Trimble Business Center Software. The Accuracy Requirements are to meet or exceed an RMSEz of ≦ 10cm.

The Table listed on the following page is a comparison between three values (RTX, NGS, and OPUS) in both the horizontal and vertical axis. We discovered that there appears to be a discrepancy in the Easting of approximately 0.15 meters between the published horizontal values from the NGS Datasheets and the OPUS Solutions from our Base Station Observations. We speculate this systematic discrepancy is a result of monument velocity caused by techtonic movement. In order to resolve this systematic discrepancy we held to only OPUS Solutions on the horizontal side.

GCT observed, via CentePoint RTX, 36 stations for the Site Calibration. GCT observed static data on 18 of these Stations which were submitted to OPUS for solutions, 13 of which were used in the Site Calibration on the horizontal side. On the vertical side we used 28 stations. Of those 28 stations, 17 were from NGS DataSheets and 11 were from OPUS Solutions. The orthometric height for stations 73 191.00, 79 168.13, 79 182.56, HRN Harding and HRN Zeona were developed by subtracting the Ellipsoid Height from the Geoid 12B value which were published on their respective datasheets. See NGS Datasheets for clarification.

See Appendix A for Trimble RTX Site Calibration Report

See Appendix B for NGS Datasheets

See Appendix C for OPUS Datasheets

Station	Northing			Easting			Elevation		
	RTX	NGS	OPUS	RTX	NGS	OPUS	RTX	NGS	OPUS
3 PCL	4956884.173		4956884.192	655783.473		655783.615	859.716	859.620	859.649
73-191.00	5010250.639	5010250.658		722941.741	722941.891		704.018	703.945	
79-168.13	4999900.446	4999900.463		636601.604	636601.753		876.723	876.715	
79-182.56	5020922.259	5020922.281		644050.699	644050.825		898.445	898.467	
85-76.98	4974212.049	4974212.110		603965.723	603965.881		948.536	948.516	
85-87.85	4987013.049		4987013.072	614365.082		614365.204	901.730	901.859	901.852
85-107.98	5019428.070	5019428.085	5019428.089	613778.616	613778.737	613778.743	964.654	964.686	
212-43.90	4956646.708			631018.190			876.123	876.084	
212-91.15	4988471.509		4988471.513	695973.946		695974.090	866.717	866.691	866.697
212-115.65	4990475.836	4990475.857		735107.713	735107.845		789.618	789.611	
SE Cor MT	4983187.127		4983187.142	575692.120		575692.263	1028.119		1028.158
C 390	4986956.640			588121.465			970.502	970.502	
D07-1	4990946.383		4990946.396	734757.810		734757.953	785.721		785.722
D07-2	4990735.248		4990735.255	734958.530		734958.685	785.660		785.641
D 410	4956908.784		4956908.806	695355.117		695355.253	820.545	820.483	820.502
DRY	4956625.801			590455.024			1016.876	1016.840	
F 410	4962069.182			695333.359			799.531	799.517	
FAA 3D3 A	4954217.972	4954217.993		590281.605	590281.750		971.901	971.903	
GCT-SD01	4956451.754		4956451.789	614866.440		614866.612	864.648		864.630
GCT-SD02	4957128.560		4957128.575	574729.666		574729.782	977.076		977.078
GCT-SD03	5021245.313		5021245.331	580180.242		580180.371	1043.214		1043.184
GCT-SD04	5023757.368		5023757.387	647425.125		647425.254	1068.422		1068.429
GCT-SD05	5022383.606		5022383.628	693600.929		693601.094	788.110		788.119
GCT-SD06	5021319.064		5021319.091	732238.812		732238.960	728.579		728.542
HRN Harding	5024948.748	5024948.779		591307.189	591307.317		1066.072	1066.055	
HRN Zeona	5014209.800	5014209.831		692637.659	692637.795		859.013	859.052	
L 402	4992931.925			677638.942			896.243	896.230	
M 395 Reset	4960115.171		4960115.183	733096.130		733096.119	692.012	691.978	691.961
MORE	4988786.964		4988786.976	654237.147		654237.305	888.474		888.456
NONA	5007155.631		5001755.671	668297.307		668297.446	853.443		853.457
Q 369	4973793.894			585976.774			995.498	995.361	
Q 390	4977974.665			717149.170			771.006	770.990	
SCHOOL 2	4971827.587			674894.452			808.915	808.811	
TT 61 JNF	5001931.774		5001931.790	703907.772		703907.913	760.073		760.028
V 417	4975924.583			642145.344			869.006	869.000	
X 25	5002413.266			599173.173			960.426	960.354	

Green Cells represent horizontal and vertical values fixed in the Site Calibration

QUALITY CONTROL PLAN

Survey Section
Quality Control Checklist

Job# 170206 Final Delivery Date: 7-06-2017

General

[X] Received in correct format
[ ] Floppy disks labels used and signed
[ ] Fathometer Scrolls annotated with survey information
[ ] Were all #H-Records included in data file
[ ] Were field books recorded in data file
[X] Were Equipment records included
[ ] Maps stamped and signed by RLS
[X] Field Books included

Horizontal Control

[X] Datum Correct (NAD-27, NAD-83, WGS-84)
[X] Are Data Collection files on disk
[ ] Primary Traverse Adjusted (1:5000, 5" /setup)
[ ] Secondary Traverse Adjusted (1:2500, 10"/setup)
[X] Horizontal Control included
[ ] Are Traverses Stationed

Vertical Control

[X] Datum Correct (NGVD29, NAVD88)
[ ] Epoch Correct (Survey Request Form)
[X] Are PBMs included
[ ] Are TBMs included
[X] Was specified control used by contractor (example: elev/epoch)
[ ] Do levels meet accuracy requirements

Staff Gage

[ ] Were all gage readings included in data file
[ ] Spot check of W.S. interpolation performed
[ ] Gages read before and after survey

Cross Sections

[ ] Spikes checked
[ ] Are sections normal to B/L or C/L as specified
[ ] All sections included
[ ] Sections lengths checked
[ ] Gaps Checked

Miscellaneous Points

[X] Descriptions included
[X] Were all features located and included in data file.

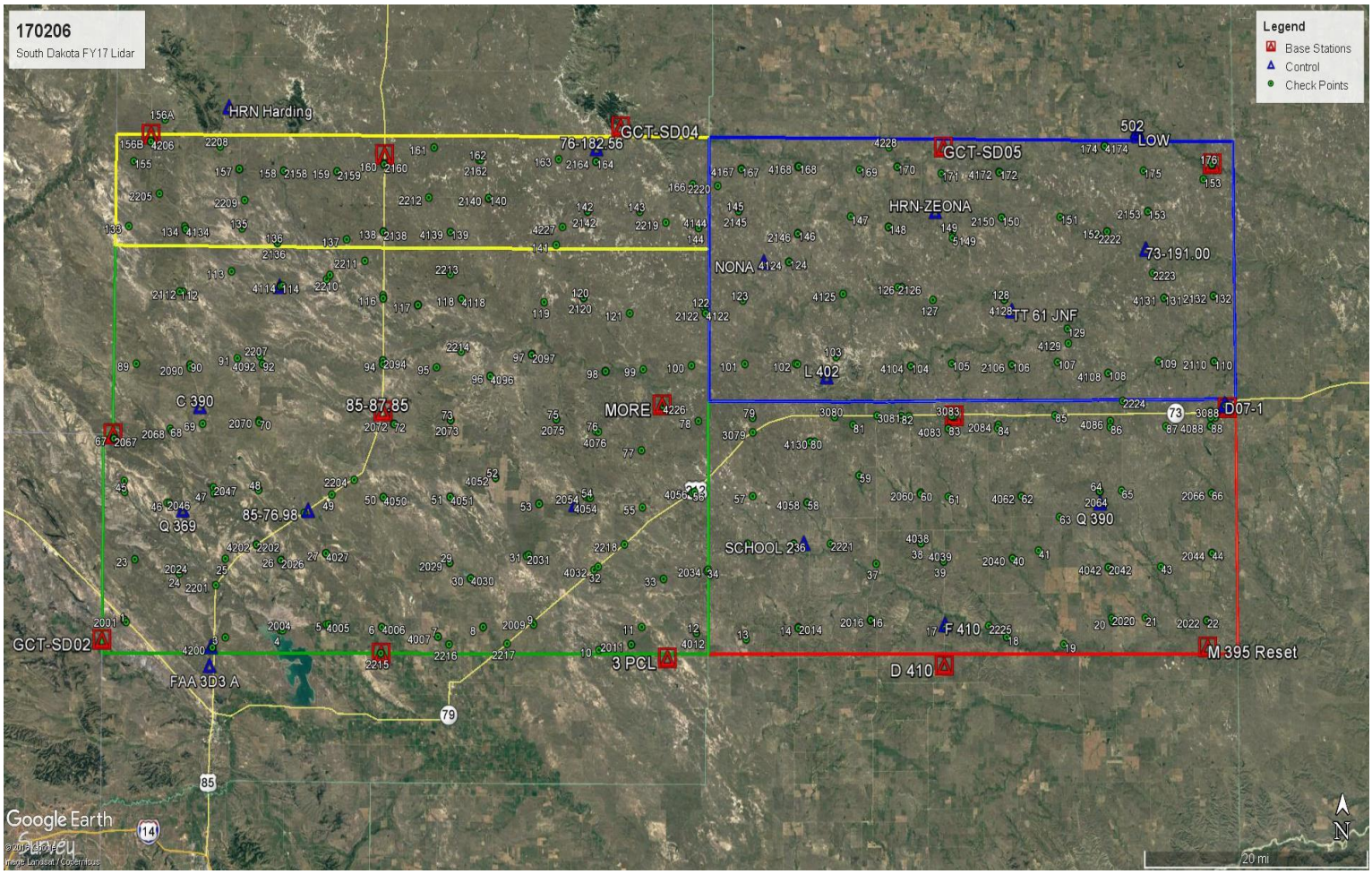
Archive

[ ] Job archived in Project Wise Date:
[ ] Job imported into EGIS Date:
[ ] Vertical Control Imported to EGIS/Archive Date:

Comments:

SURVEY AREA

The map shows the general location of the Site Calibration Control Points and the located Survey Control Points.



FINAL COORIDNATES

POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
9	636603.292	4960676.634	882.478	44° 47' 11.18466"	-103° 16' 23.55418"	865.019	NVA
32	645651.293	4968211.769	900.451	44° 51' 08.82611"	-103° 09' 24.23259"	882.711	NVA
38	691665.636	4972322.156	804.048	44° 52' 42.75120"	-102° 34' 23.89775"	785.088	NVA
56	658864.955	4977850.666	845.803	44° 56' 10.85156"	-102° 59' 11.68974"	827.757	NVA
97	635504.861	4994715.809	867.168	45° 05' 34.55810"	-103° 16' 40.63732"	849.639	NVA
101	665959.379	4994314.357	814.883	45° 04' 58.19506"	-102° 53' 28.66708"	796.642	NVA
117	619074.542	5000606.599	893.004	45° 08' 56.03584"	-103° 29' 07.00232"	875.836	NVA
120	642717.565	5002114.265	922.747	45° 09' 29.08669"	-103° 11' 03.21423"	905.085	NVA
121	649364.547	5000296.538	880.219	45° 08' 25.26169"	-103° 06' 00.88623"	862.381	NVA
122	659935.08	5001302.883	844.903	45° 08' 49.51899"	-102° 57' 56.01501"	826.809	NVA
123	665478.974	5002312.009	814.344	45° 09' 17.59910"	-102° 53' 41.10462"	796.123	NVA
124	671952.84	5007332.133	804.627	45° 11' 54.59117"	-102° 48' 38.58449"	786.264	NVA
161	620875.679	5020560.967	932.594	45° 19' 41.33269"	-103° 27' 27.08282"	915.527	NVA
2004	600728.34	4959007.429	928.237	44° 46' 38.54504"	-103° 43' 36.85253"	911.692	NVA
2016	684746.837	4962488.107	856.54	44° 47' 30.89448"	-102° 39' 51.86999"	837.768	NVA
2020	719247.653	4963488.315	757.079	44° 47' 28.17915"	-102° 13' 41.81264"	737.077	NVA
2024	585722.69	4965787.557	944.37	44° 50' 25.27998"	-103° 54' 55.36927"	928.032	NVA
2026	600268.93	4967870.427	895.938	44° 51' 25.93889"	-103° 43' 51.45557"	879.259	NVA
2029	624412.707	4968174.605	914.816	44° 51' 22.09964"	-103° 25' 31.49020"	897.638	NVA
2031	635400.13	4969295.715	949.633	44° 51' 51.21038"	-103° 17' 10.01281"	932.192	NVA
2040	704824.953	4970709.093	784.728	44° 51' 37.35177"	-102° 24' 27.03454"	765.299	NVA
2042	718586.894	4969918.639	752.964	44° 50' 57.05833"	-102° 14' 01.89427"	733.037	NVA
2044	733422.999	4972057.869	718.065	44° 51' 49.37609"	-102° 02' 43.33282"	697.62	NVA
2045	577526.63	4977333.832	982.597	44° 56' 42.78734"	-104° 01' 02.27655"	966.341	NVA
2046	583725.328	4974710.819	997.565	44° 55' 15.26602"	-103° 56' 21.02358"	981.152	NVA
2047	590364.316	4976835.568	961.009	44° 56' 21.18551"	-103° 51' 16.88494"	944.416	NVA
2048	596854.418	4976747.22	969.907	44° 56' 15.24691"	-103° 46' 20.88008"	953.205	NVA
2054	643688.818	4976994.743	860.846	44° 55' 54.75014"	-103° 10' 44.62268"	843.131	NVA
2060	691476.496	4978722.222	844.301	44° 56' 10.15803"	-102° 34' 23.79111"	825.385	NVA
2064	717089.603	4979504.374	755.581	44° 56' 08.99622"	-102° 14' 55.23284"	735.791	NVA
2068	584221.283	4983747.551	991.131	45° 00' 07.85914"	-103° 55' 52.97295"	974.595	NVA
2070	596715.67	4985426.341	1021.375	45° 00' 56.51527"	-103° 46' 21.21339"	1004.617	NVA
2072	616104.382	4985472.812	964.856	45° 00' 47.54721"	-103° 31' 35.59487"	947.782	NVA
2073	624109.68	4986215.484	951.611	45° 01' 06.72519"	-103° 25' 29.33175"	934.395	NVA
2075	639227.72	4986661.494	912.299	45° 01' 11.06650"	-103° 13' 58.43780"	894.705	NVA
2083	695983.603	4988487.759	867.469	45° 01' 21.91255"	-102° 30' 44.67298"	848.459	NVA
2084	702376.612	4987540.288	865.265	45° 00' 44.77450"	-102° 25' 54.20912"	846.056	NVA
2090	586676.369	4991842.199	1006.157	45° 04' 29.06714"	-103° 53' 55.82170"	989.506	NVA
2094	614245.827	4993481.906	892.609	45° 05' 08.09847"	-103° 32' 53.91844"	875.521	NVA
2098	646076.115	4992909.406	826.226	45° 04' 28.47441"	-103° 08' 39.13803"	808.439	NVA
2102	673180.766	4994518.904	823.347	45° 04' 58.58877"	-102° 47' 58.32820"	804.941	NVA
2106	704095.925	4995156.02	796.297	45° 04' 49.54890"	-102° 24' 24.59997"	777.025	NVA
2110	733117.301	4996329.672	770.463	45° 04' 55.26608"	-102° 02' 16.85064"	750.306	NVA
2112	585367.903	5001458.181	1006.213	45° 09' 41.20182"	-103° 54' 49.74752"	989.52	NVA
2114	599303.207	5002500.876	963.136	45° 10' 08.41783"	-103° 44' 10.83533"	946.242	NVA
2116	614101.316	5001325.932	892.056	45° 09' 22.29629"	-103° 32' 54.08566"	874.961	NVA
2126	687545.068	5004542.333	788.878	45° 10' 09.94823"	-102° 36' 48.28813"	770.088	NVA
2132	732849.618	5004633.801	739.194	45° 09' 24.32931"	-102° 02' 15.16840"	719.092	NVA
2134	585387.014	5009748.521	1017.284	45° 14' 09.80023"	-103° 54' 43.75672"	1000.523	NVA
2136	598747.756	5007951.125	933.094	45° 13' 05.27584"	-103° 44' 32.38695"	916.191	NVA
2138	613878.472	5009721.21	963.488	45° 13' 54.39464"	-103° 32' 57.38206"	946.447	NVA
2140	628846.706	5014310.494	943.968	45° 16' 13.76063"	-103° 21' 26.89504"	926.711	NVA
2142	643025.552	5012989.358	870.989	45° 15' 21.09957"	-103° 10' 37.87086"	853.36	NVA
2146	673116.603	5010957.656	850.438	45° 13' 50.96605"	-102° 47' 40.74431"	832.069	NVA
2148	686044.709	5012138.684	831.63	45° 14' 17.33331"	-102° 37' 46.74948"	812.927	NVA
2150	702213.993	5013724.873	779.188	45° 14' 52.62841"	-102° 25' 23.51445"	760.02	NVA
2158	599415.585	5017088.962	981.337	45° 18' 00.98087"	-103° 43' 55.18839"	964.474	NVA
2159	607056.788	5017172.319	964.118	45° 17' 59.63688"	-103° 38' 04.35961"	947.196	NVA
2160	613791.14	5018261.915	951.453	45° 18' 31.12162"	-103° 32' 54.33675"	934.469	NVA

POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
2164	644077.119	5019336.649	887.351	45° 18' 45.90696"	-103° 09' 43.01097"	869.763	NVA
2172	701744.675	5019473.515	765.634	45° 17' 59.21235"	-102° 25' 36.61069"	746.478	NVA
2174	716746.041	5023216.994	815.24	45° 19' 44.29098"	-102° 14' 02.67948"	795.699	NVA
2176	732229.683	5021307.453	728.333	45° 18' 24.66320"	-102° 02' 15.50434"	708.318	NVA
2200	590692.4	4956581.837	1010.063	44° 45' 24.78803"	-103° 51' 14.95110"	993.788	NVA
2201	590995.616	4964497.758	919.804	44° 49' 41.13778"	-103° 50' 56.06622"	903.358	NVA
2202	596698.695	4969754.146	905.019	44° 52' 28.74721"	-103° 46' 32.79604"	888.384	NVA
2203	603455.834	4973947.46	942.272	44° 54' 41.19038"	-103° 41' 21.81771"	925.484	NVA
2204	610516.367	4978300.677	978.91	44° 56' 58.40340"	-103° 35' 56.47867"	961.978	NVA
2205	581636.747	5013807.756	1049.156	45° 16' 22.92223"	-103° 57' 33.33240"	1032.394	NVA
2207	596570.217	4993598.461	978.773	45° 05' 21.35681"	-103° 46' 22.19799"	961.962	NVA
2210	606380.041	5004085.505	916.235	45° 10' 56.04040"	-103° 38' 45.50743"	899.247	NVA
2211	611338.718	5005992.948	920.591	45° 11' 55.07754"	-103° 34' 56.82555"	903.553	NVA
2212	620271.966	5014206.679	936.038	45° 16' 15.86801"	-103° 28' 00.35881"	918.933	NVA
2215	614853.08	4956497.978	865.695	44° 45' 09.57868"	-103° 32' 56.39868"	848.786	NVA
2216	624588.329	4957856.341	875.035	44° 45' 47.72136"	-103° 25' 32.59389"	857.879	NVA
2217	632868.868	4958155.122	876.139	44° 45' 52.03619"	-103° 19' 15.79298"	858.784	NVA
2218	649336.818	4971113.07	877.12	44° 52' 40.05554"	-103° 06' 33.33528"	859.277	NVA
2220	661523.342	5016706.08	928.301	45° 17' 07.04657"	-102° 56' 25.33614"	910.273	NVA
2222	716088.561	5011878.804	735.113	45° 13' 38.02836"	-102° 14' 50.62269"	715.519	NVA
2223	724032.908	5007314.843	710.092	45° 11' 01.37562"	-102° 08' 54.14363"	690.25	NVA
2225	701630.169	4962131.069	762.483	44° 47' 02.90913"	-102° 27' 04.71438"	743.104	NVA
3079	667306.608	4985710.21	876.81	45° 00' 18.41290"	-102° 52' 37.40109"	858.576	NVA
3080	678939.608	4987951.707	922.451	45° 01' 20.77720"	-102° 43' 43.53450"	903.928	NVA
3081	684996.61	4988281.607	923.229	45° 01' 25.86359"	-102° 39' 06.55639"	904.549	NVA
3082	689573.663	4988295.731	875.471	45° 01' 21.96874"	-102° 35' 37.56954"	856.653	NVA
3083	695629.815	4988485.876	868.756	45° 01' 22.20327"	-102° 31' 00.82656"	849.757	NVA
3087	732787.17	4990044.586	793.762	45° 01' 32.25032"	-102° 02' 42.42047"	773.559	NVA
3088	732834.577	4989213.867	777.085	45° 01' 05.30920"	-102° 02' 41.64139"	756.872	NVA
3109	733486.74	4989830.468	790.493	45° 01' 24.49275"	-102° 02' 10.85303"	770.267	NVA
3110	733459.904	4989236.87	781.797	45° 01' 05.31372"	-102° 02' 13.06945"	761.565	NVA
3132	734863.974	4990821.231	785.719	45° 01' 54.91951"	-102° 01' 06.33932"	765.461	NVA
4058	675271.404	4977036.429	814.446	44° 55' 30.60989"	-102° 46' 44.68389"	795.995	NVA
4062	705914.668	4978589.412	809.795	44° 55' 51.33881"	-102° 23' 25.89338"	790.402	NVA
4092	597024.111	4992614.871	973.687	45° 04' 49.26591"	-103° 46' 02.12378"	956.874	NVA
125	679752.716	5003503.944	782.811	45° 09' 43.62790"	-102° 42' 46.32372"	764.226	NVA
2080	676183.019	4984741.13	847.82	44° 59' 39.29683"	-102° 45' 53.44443"	829.363	NVA
156A	582191.796	5023219.456	1023.463	45° 21' 27.62567"	-103° 57' 02.23826"	1006.654	NVA
D 410	695355.258	4956908.805	820.499	44° 44' 20.09317"	-102° 31' 57.19433"	801.338	NVA
F 410	695333.5	4962069.203	799.489	44° 47' 07.19883"	-102° 31' 51.06443"	780.34	NVA
GCT-SD02	574729.803	4957128.577	977.074	44° 45' 49.14781"	-104° 03' 20.60351"	961.256	NVA
GCT-SD04	647425.263	5023757.389	1068.446	45° 21' 06.58108"	-103° 07' 04.58077"	1050.853	NVA
GCT-SD05	693601.068	5022383.629	788.115	45° 19' 41.67900"	-102° 31' 46.08610"	769.202	NVA
GCT-SD06	732238.952	5021319.088	728.569	45° 18' 25.02871"	-102° 02' 15.05962"	708.554	NVA
M 395 Reset	733096.272	4960115.193	691.954	44° 45' 23.23532"	-102° 03' 17.90688"	671.437	NVA

POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
10	646009.624	4957710.543	897.053	44° 45' 28.41505"	-103° 09' 18.76921"	879.315	VVA
162	627596.908	5019160.716	909.575	45° 18' 51.69065"	-103° 22' 19.73457"	892.371	VVA
163	638717.225	5019492.705	905.458	45° 18' 54.84872"	-103° 13' 48.89735"	888.001	VVA
4001	577908.506	4959766.678	974.879	44° 47' 13.41039"	-104° 00' 54.57311"	958.914	VVA
4005	606938.875	4959942.466	878.036	44° 47' 05.59264"	-103° 38' 53.63918"	861.304	VVA
4006	614914.918	4959794.652	893.24	44° 46' 56.34806"	-103° 32' 50.91054"	876.298	VVA
4007	622973.452	4958825.06	878.622	44° 46' 20.11019"	-103° 26' 45.18493"	861.497	VVA
4008	629405.559	4960181.692	880.059	44° 46' 59.97253"	-103° 21' 51.42179"	862.788	VVA
4011	650623.359	4958489.244	903.364	44° 45' 50.19480"	-103° 05' 48.19806"	885.487	VVA
4012	659880.061	4960225.882	866.852	44° 46' 39.20967"	-102° 58' 45.40332"	848.764	VVA
4014	674409.671	4961183.439	900.03	44° 46' 57.99404"	-102° 47' 43.58476"	881.581	VVA
4016	684745.64	4962341.995	857.224	44° 47' 26.16431"	-102° 39' 52.11532"	838.452	VVA
4018	704245.844	4960788.213	736.724	44° 46' 16.76121"	-102° 25' 07.74440"	717.24	VVA
4020	719386.305	4963006.588	763.594	44° 47' 12.43246"	-102° 13' 36.25710"	743.584	VVA
4022	732968.513	4963525.927	723.156	44° 47' 13.77479"	-102° 03' 18.09682"	702.661	VVA
4027	606666.106	4968907.958	932.188	44° 51' 56.21173"	-103° 38' 59.27140"	915.38	VVA
4030	627471.821	4966282.218	885.837	44° 50' 18.85083"	-103° 23' 13.87524"	868.599	VVA
4032	645067.651	4967792.102	913.243	44° 50' 55.66085"	-103° 09' 51.24139"	895.521	VVA
4036	673497.689	4971796.523	796.532	44° 52' 42.48787"	-102° 48' 12.00307"	778.121	VVA
4038	691676.093	4972330.509	803.554	44° 52' 43.01152"	-102° 34' 23.41015"	784.594	VVA
4039	694978.139	4970091.191	806.945	44° 51' 27.28309"	-102° 31' 56.14102"	787.863	VVA
4042	718597.755	4969909.089	752.28	44° 50' 56.73722"	-102° 14' 01.41482"	732.353	VVA
4044	733420.37	4972070.306	718.31	44° 51' 49.78170"	-102° 02' 43.43187"	697.866	VVA
4050	614749.724	4976192.07	956.954	44° 55' 47.67618"	-103° 32' 45.06965"	939.948	VVA
4051	624291.323	4976495.027	926.811	44° 55' 51.71839"	-103° 25' 29.66408"	909.604	VVA
4052	630713.886	4979091.535	932.935	44° 57' 11.68405"	-103° 20' 34.35559"	915.585	VVA
4053	637025.659	4975945.032	912.968	44° 55' 25.48129"	-103° 15' 49.49340"	895.45	VVA
4054	644121.233	4976891.271	859.197	44° 55' 51.08362"	-103° 10' 25.01117"	841.47	VVA
4056	659175.145	4977991.312	839.489	44° 56' 15.15700"	-102° 58' 57.38624"	821.437	VVA
4060	691488.21	4978508.976	840.685	44° 56' 03.24217"	-102° 34' 23.54811"	821.767	VVA
4064	717133.999	4979519.544	752.777	44° 56' 09.43847"	-102° 14' 53.18612"	732.986	VVA
4067	575897.822	4982689.814	1035.027	44° 59' 36.96756"	-104° 02' 13.69059"	1018.756	VVA
4073	624107.692	4986201.637	950.843	45° 01' 06.27787"	-103° 25' 29.43488"	933.627	VVA
4076	645251.634	4985233.387	943.038	45° 00' 20.45986"	-103° 09' 24.81651"	925.3	VVA
4079	667215.763	4987761.636	867.555	45° 01' 24.92458"	-102° 52' 39.09334"	849.318	VVA
4080	675411.814	4984715.149	844.162	44° 59' 39.14314"	-102° 46' 28.67266"	825.724	VVA
4082	688450.604	4988271.011	871.43	45° 01' 22.24607"	-102° 36' 28.87562"	852.645	VVA
4083	695243.308	4986893.016	922.451	45° 00' 31.01554"	-102° 31' 20.69670"	903.466	VVA
4083A	695959.668	4988486.826	866.635	45° 01' 21.90615"	-102° 30' 45.76693"	847.626	VVA
4086	718412.103	4988431.642	806.58	45° 00' 56.50679"	-102° 13' 41.04099"	786.825	VVA
4088	732840.957	4988155.581	762.945	45° 00' 31.05159"	-102° 02' 43.11312"	742.719	VVA
4090	586613.419	4992264.753	1006.759	45° 04' 42.78587"	-103° 53' 58.43746"	990.107	VVA
4094	614245.972	4993451.127	892.918	45° 05' 07.10127"	-103° 32' 53.93708"	875.831	VVA
4096	629630.572	4991867.174	890.369	45° 04' 06.24604"	-103° 21' 11.92677"	872.998	VVA
4097	635559.068	4994827.28	864.475	45° 05' 38.13145"	-103° 16' 38.04987"	846.945	VVA
4098	646063.386	4992872.125	825.018	45° 04' 27.27638"	-103° 08' 39.75899"	807.231	VVA
4104	689652.128	4994637.55	830.422	45° 04' 47.22847"	-102° 35' 25.36443"	811.586	VVA
4108	717956.015	4994480.028	790.794	45° 04' 12.79107"	-102° 13' 52.40852"	771.09	VVA
4110	733140.135	4996311.275	770.909	45° 04' 54.64363"	-102° 02' 15.83836"	750.751	VVA
4114	599683.754	5002566.822	970.55	45° 10' 10.36110"	-103° 43' 53.35883"	953.652	VVA
4116	614046.577	5001718.86	893.83	45° 09' 35.05731"	-103° 32' 56.26882"	876.737	VVA
4117	619089.245	5000622.518	893.677	45° 08' 56.54261"	-103° 29' 06.31558"	876.51	VVA
4118	625268.586	5001531.075	897.557	45° 09' 22.12352"	-103° 24' 22.61735"	880.288	VVA
4120	642709.125	5002084.77	922.493	45° 09' 28.13751"	-103° 11' 03.63094"	904.831	VVA
4122	660198.23	5000572.34	843.91	45° 08' 25.64516"	-102° 57' 44.81518"	825.807	VVA
4124	671902.92	5007378.817	803.531	45° 11' 56.14673"	-102° 48' 40.81293"	785.169	VVA
4126	688116.066	5004574.698	780.459	45° 10' 10.44886"	-102° 36' 22.10868"	761.652	VVA
4128	702812.505	5003369.72	734.253	45° 09' 16.78260"	-102° 25' 11.26050"	715.025	VVA
4129	712136.227	4998094.52	751.821	45° 06' 16.15811"	-102° 18' 12.75459"	732.306	VVA
4131	725730.121	5004205.816	732.349	45° 09' 18.80305"	-102° 07' 41.53160"	712.451	VVA

POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
4134_	585529.779	5009362.092	1027.367	45° 13' 57.21763"	-103° 54' 37.44924"	1010.608	VVA
4138	613906.184	5009745.016	961.472	45° 13' 55.14971"	-103° 32' 56.09192"	944.43	VVA
4139	623478.94	5009925.37	924.286	45° 13' 55.18061"	-103° 25' 37.06564"	907.097	VVA
4140	628858.831	5014303.821	943.525	45° 16' 13.53645"	-103° 21' 26.34506"	926.268	VVA
4144	658919.684	5011332.855	842.161	45° 14' 15.17125"	-102° 58' 30.97133"	824.145	VVA
4146	673123.914	5011003.084	851.499	45° 13' 52.43059"	-102° 47' 40.35236"	833.13	VVA
4148	686089.027	5012136.445	829.871	45° 14' 17.21862"	-102° 37' 44.72151"	811.166	VVA
4152	717362.219	5012355.664	705.426	45° 13' 52.05199"	-102° 13' 51.53334"	685.797	VVA
4157	593041.303	5017159.276	974.958	45° 18' 06.40388"	-103° 48' 47.76301"	958.133	VVA
4160	613797.255	5018291.6	949.296	45° 18' 32.07967"	-103° 32' 54.03148"	932.312	VVA
4164	644082.531	5019365.81	886.631	45° 18' 46.84746"	-103° 09' 42.73200"	869.044	VVA
4167	664848.893	5018880.822	864.891	45° 18' 14.69160"	-102° 53' 50.17594"	846.785	VVA
4168	673044.097	5019425.848	830.906	45° 18' 25.24175"	-102° 47' 33.44043"	812.575	VVA
4172	701698.809	5019497.699	765.525	45° 18' 00.04268"	-102° 25' 38.67916"	746.37	VVA
4174	716760.11	5023184.62	814.225	45° 19' 43.22749"	-102° 14' 02.08496"	794.683	VVA
4176	732319.668	5021267.354	726.661	45° 18' 23.25837"	-102° 02' 11.44524"	706.644	VVA
4200	590687.275	4956571.683	1010.168	44° 45' 24.46134"	-103° 51' 15.19063"	993.894	VVA
4202	596715.826	4969762.624	903.432	44° 52' 29.01354"	-103° 46' 32.00963"	886.796	VVA
4206	580221.484	5020372.11	1046.725	45° 19' 56.19428"	-103° 58' 34.44900"	1029.936	VVA
4226	654348.995	4988741.648	883.895	45° 02' 07.16966"	-103° 02' 25.60045"	865.928	VVA
4227	639490.302	5010956.261	922.894	45° 14' 17.80400"	-103° 13' 22.04720"	905.357	VVA
4228	685868.225	5022191.859	803.127	45° 19' 42.99846"	-102° 37' 41.27702"	784.446	VVA
5149	695195.825	5010983.901	794.795	45° 13' 31.02497"	-102° 30' 49.03486"	775.831	VVA
D07-1	734757.951	4990946.407	785.687	45° 01' 59.09696"	-102° 01' 10.96776"	765.432	VVA
D07-2	734958.672	4990735.272	785.626	45° 01' 52.02466"	-102° 01' 02.16197"	765.363	VVA
DRY	590455.161	4956625.818	1016.868	44° 45' 26.32122"	-103° 51' 25.71151"	1000.597	VVA
GCT-SD01	614866.578	4956451.772	864.63	44° 45' 08.07390"	-103° 32' 55.82243"	847.721	VVA
GCT-SD03	580180.377	5021245.332	1043.26	45° 20' 24.50345"	-103° 58' 35.82762"	1026.466	VVA

POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
1	578208.631	4959467.964	977.69	44° 47' 03.61307"	-104° 00' 41.08222"	961.719	Control
3	592518.028	4957901.386	1005.762	44° 46' 06.70199"	-103° 49' 51.06814"	989.424	Control
4	600401.677	4959045.769	925.672	44° 46' 39.95266"	-103° 43' 51.68500"	909.134	Control
5	607305.38	4959989.368	881.01	44° 47' 06.91447"	-103° 38' 36.92994"	864.268	Control
6	614904.768	4959790.783	894.162	44° 46' 56.22857"	-103° 32' 51.37538"	877.22	Control
7	622968.138	4958792.891	877.991	44° 46' 19.07133"	-103° 26' 45.45453"	860.866	Control
8	629396.5	4960175.198	880.647	44° 46' 59.76807"	-103° 21' 51.83979"	863.377	Control
11	652054.893	4960752.042	869.813	44° 47' 02.39656"	-103° 04' 40.68250"	851.903	Control
12	659886.534	4960208.638	866.733	44° 46' 38.64598"	-102° 58' 45.12843"	848.645	Control
13	667005.469	4959571.211	875.648	44° 46' 12.14454"	-102° 53' 22.18043"	857.4	Control
14	674432.628	4961180.508	899.814	44° 46' 57.87896"	-102° 47' 42.54450"	881.364	Control
16	684740.643	4962460.229	856.129	44° 47' 29.99752"	-102° 39' 52.18806"	837.358	Control
17	695307.608	4961641.365	812.118	44° 46' 53.37174"	-102° 31' 52.83237"	792.968	Control
18	704245.51	4960764.278	736.926	44° 46' 15.98668"	-102° 25' 07.79412"	717.442	Control
19	712456.64	4960049.871	733.402	44° 45' 44.25009"	-102° 18' 55.69821"	713.614	Control
20	719396.269	4963020.186	763.314	44° 47' 12.86161"	-102° 13' 35.78312"	743.303	Control
21	724079.365	4963671.929	714.632	44° 47' 28.72917"	-102° 10' 01.89000"	694.451	Control
22	732920.939	4963524.616	725.71	44° 47' 13.78815"	-102° 03' 20.26114"	705.216	Control
23	579274.681	4967453.105	998.676	44° 51' 21.93278"	-103° 59' 48.09297"	982.533	Control
24	585507.368	4966071.231	941.627	44° 50' 34.56464"	-103° 55' 05.00341"	925.289	Control
25	592279.83	4967852.561	935.659	44° 51' 29.24349"	-103° 49' 55.39864"	919.137	Control
26	600267.936	4967889.172	896.344	44° 51' 26.54674"	-103° 43' 51.48751"	879.664	Control
27	606689.645	4968911.491	932.015	44° 51' 56.31352"	-103° 38' 58.19638"	915.206	Control
29	624438.551	4968182.929	916.103	44° 51' 22.35308"	-103° 25' 30.30580"	898.925	Control
30	627488.672	4966264.696	886.645	44° 50' 18.27238"	-103° 23' 13.12384"	869.406	Control
31	635701.787	4969460.348	941.607	44° 51' 56.33687"	-103° 16' 56.11415"	924.157	Control
33	655025.132	4966895.985	871.028	44° 50' 19.09635"	-103° 02' 18.85383"	853.065	Control
34	661176.941	4968054.527	833.512	44° 50' 51.71158"	-102° 57' 37.49663"	815.423	Control
35	666898.839	4971643.219	813.647	44° 52' 43.19706"	-102° 53' 12.75259"	795.418	Control
36	673495.232	4971806.585	797.739	44° 52' 42.81589"	-102° 48' 12.10255"	779.328	Control
37	685329.268	4969576.626	769.715	44° 51' 19.88343"	-102° 39' 16.07725"	750.941	Control
39	694965.007	4970106.653	808.198	44° 51' 27.79662"	-102° 31' 56.71742"	789.117	Control
40	704835.276	4970707.594	784.66	44° 51' 37.29256"	-102° 24' 26.56682"	765.231	Control
41	708517.037	4971806.171	780.175	44° 52' 09.01584"	-102° 21' 37.35461"	760.621	Control
42	718824.132	4969926.552	747.601	44° 50' 57.05266"	-102° 13' 51.08672"	727.665	Control
43	726119.677	4970187.139	727.456	44° 50' 57.29765"	-102° 08' 18.71356"	707.253	Control
44	733436.704	4972070.999	717.889	44° 51' 49.78491"	-102° 02' 42.68739"	697.444	Control
45	577597.941	4975921.529	952.737	44° 55' 56.99716"	-104° 00' 59.80417"	936.498	Control
46	584070.724	4974699.943	1003.288	44° 55' 14.76697"	-103° 56' 05.27804"	986.866	Control
47	590441.976	4976100.912	940.467	44° 55' 57.34650"	-103° 51' 13.81578"	923.879	Control
48	596828.489	4976656.598	970.653	44° 56' 12.32348"	-103° 46' 22.12542"	953.952	Control
49	607351.869	4976348.123	964.474	44° 55' 56.89038"	-103° 38' 22.34797"	947.608	Control
50	614751.615	4976210.946	956.926	44° 55' 48.28660"	-103° 32' 44.96797"	939.919	Control
51	624316.156	4976481.693	927.743	44° 55' 51.27082"	-103° 25' 28.54336"	910.535	Control
52	630721.324	4979076.285	934.242	44° 57' 11.18512"	-103° 20' 34.03047"	916.892	Control
53	637025.039	4975928.671	914.239	44° 55' 24.95176"	-103° 15' 49.53764"	896.722	Control
54	644325.068	4976874.401	858.771	44° 55' 50.38839"	-103° 10' 15.73399"	841.039	Control
55	651784.337	4975848.098	844.324	44° 55' 11.55788"	-103° 04' 36.72835"	826.421	Control
57	667500.661	4977657.255	825.286	44° 55' 57.45461"	-102° 52' 38.17232"	807.04	Control
58	675279.196	4977021.966	814.872	44° 55' 30.13464"	-102° 46' 44.34676"	796.422	Control
59	682628.015	4980653.789	851.784	44° 57' 21.08184"	-102° 41' 04.65656"	833.143	Control
60	691470.997	4978515.581	840.726	44° 56' 03.47271"	-102° 34' 24.32373"	821.809	Control
61	695441.746	4978293.078	827.041	44° 55' 52.38083"	-102° 31' 23.63871"	807.999	Control
62	705900.611	4978605.977	809.652	44° 55' 51.88972"	-102° 23' 26.50971"	790.259	Control
63	711427.069	4976126.275	798.669	44° 54' 25.78146"	-102° 19' 18.38789"	779.053	Control
64	717106.69	4979509.615	754.858	44° 56' 09.14711"	-102° 14' 54.44606"	735.068	Control
65	720246.653	4979685.772	779.41	44° 56' 11.37393"	-102° 12' 31.07609"	759.516	Control
66	733185.674	4979662.787	735.615	44° 55' 55.78425"	-102° 02' 41.52248"	715.265	Control
67	575899.013	4982657.852	1035.842	44° 59' 35.93144"	-104° 02' 13.65355"	1019.571	Control

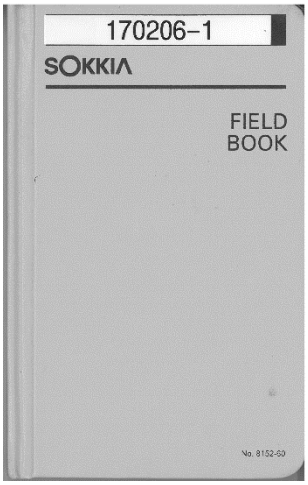
POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
68	583964.713	4984092.822	987.809	45° 00' 19.15587"	-103° 56' 04.48316"	971.276	Control
69	588612.533	4984848.607	961.579	45° 00' 41.60844"	-103° 52' 31.72848"	944.943	Control
70	596705.195	4985221.413	1020.007	45° 00' 49.88087"	-103° 46' 21.83373"	1003.25	Control
72	615966.492	4985521.154	964.88	45° 00' 49.19454"	-103° 31' 41.85240"	947.809	Control
73	624125.834	4986216.035	952.034	45° 01' 06.73286"	-103° 25' 28.59347"	934.819	Control
75	639214.238	4986665.949	912.82	45° 01' 11.22032"	-103° 13' 59.04907"	895.226	Control
76	644874.245	4985302.189	943.542	45° 00' 22.96617"	-103° 09' 41.97577"	925.813	Control
77	651471.441	4983042.708	879.781	44° 59' 04.82400"	-103° 04' 43.21892"	861.896	Control
78	659495.932	4986946.042	847.738	45° 01' 04.91364"	-102° 58' 32.55767"	829.667	Control
79	667232.343	4987543.666	867.764	45° 01' 17.85166"	-102° 52' 38.59721"	849.528	Control
80	675523.453	4984724.276	845.748	44° 59' 39.33936"	-102° 46' 23.56632"	827.308	Control
81	681571.697	4987012.65	917.531	45° 00' 47.96124"	-102° 41' 44.58018"	898.945	Control
82	688445.42	4988287.188	871.821	45° 01' 22.77481"	-102° 36' 29.09046"	853.036	Control
83	695223.066	4986904.411	921.525	45° 00' 31.40453"	-102° 31' 21.60464"	902.54	Control
84	702265.671	4987108.941	863.366	45° 00' 30.92386"	-102° 25' 59.89665"	844.161	Control
85	710454.15	4988953.198	816.422	45° 01' 22.05150"	-102° 19' 43.44226"	796.939	Control
86	718413.919	4987657.921	810.903	45° 00' 31.46029"	-102° 13' 42.16707"	791.143	Control
87	726409.247	4987966.337	774.324	45° 00' 32.42016"	-102° 07' 36.86592"	754.302	Control
88	732847.786	4988165.714	764.063	45° 00' 31.37147"	-102° 02' 42.78469"	743.836	Control
89	578865.036	4992193.811	1007.47	45° 04' 43.74914"	-103° 59' 52.82363"	990.989	Control
90	586627.062	4992256.61	1007.916	45° 04' 42.51601"	-103° 53' 57.81864"	991.262	Control
91	593375.617	4993249.034	1004.84	45° 05' 11.57982"	-103° 48' 48.54546"	988.083	Control
92	597002.317	4992617.017	974.32	45° 04' 49.34620"	-103° 46' 03.11892"	957.507	Control
94	614230.636	4993000.864	908.641	45° 04' 52.52342"	-103° 32' 55.00782"	891.556	Control
94	614230.636	4993000.864	908.641	45° 04' 52.52342"	-103° 32' 55.00782"	891.556	Control
95	621937.995	4992797.466	918.728	45° 04' 41.30371"	-103° 27' 02.76774"	901.526	Control
96	629640.015	4991860.915	891.155	45° 04' 06.03705"	-103° 21' 11.50095"	873.784	Control
98	646097.703	4992882.766	826.59	45° 04' 27.59552"	-103° 08' 38.17915"	808.803	Control
99	651451.323	4993270.959	832.937	45° 04' 36.11709"	-103° 04' 33.04195"	815.021	Control
100	658341.336	4993927.198	854.497	45° 04' 51.94150"	-102° 59' 17.35435"	836.424	Control
102	673464.039	4994472.124	827.892	45° 04' 56.82411"	-102° 47' 45.43849"	809.48	Control
103	678964.99	4995554.381	867.532	45° 05' 26.93694"	-102° 43' 32.61785"	848.984	Control
104	689663.369	4994642.944	830.897	45° 04' 47.39227"	-102° 35' 24.84337"	812.062	Control
105	695505.102	4995124.977	806.774	45° 04' 57.27574"	-102° 30' 57.21372"	787.761	Control
106	704119.23	4995171.379	797.959	45° 04' 50.02192"	-102° 24' 23.51256"	778.687	Control
106	704119.23	4995171.379	797.959	45° 04' 50.02192"	-102° 24' 23.51256"	778.687	Control
107	710659.254	4995687.166	780.032	45° 04' 59.81927"	-102° 19' 23.90991"	760.559	Control
108	717932.283	4994473.12	791.293	45° 04' 12.59376"	-102° 13' 53.50341"	771.591	Control
109	725146.618	4996197.169	744.701	45° 05' 00.26798"	-102° 08' 21.19447"	724.783	Control
110	733130.294	4996326.561	771.439	45° 04' 55.15000"	-102° 02' 16.26234"	751.281	Control
112	584862.374	5001481.09	1013.735	45° 09' 42.16363"	-103° 55' 12.88523"	997.05	Control
113	592251.533	5004194.845	991.348	45° 11' 06.74805"	-103° 49' 32.68311"	974.541	Control
114	599389.758	5002503.867	963.949	45° 10' 08.47084"	-103° 44' 06.86915"	947.054	Control
115	605923.993	5003531.084	907.158	45° 10' 38.32606"	-103° 39' 06.82254"	890.175	Control
116	614079.807	5001317.97	894.853	45° 09' 22.05087"	-103° 32' 55.07704"	877.759	Control
118	625281.601	5001531.897	897.296	45° 09' 22.14185"	-103° 24' 22.02074"	880.027	Control
119	637105.343	5001398.548	898.457	45° 09' 09.90975"	-103° 15' 20.85394"	880.925	Control
126	688117.601	5004556.726	781.439	45° 10' 09.86549"	-102° 36' 22.06283"	762.632	Control
127	692616.741	5003088.361	771.867	45° 09' 17.95478"	-102° 32' 58.17607"	752.932	Control
128	702816.745	5003389.437	734.098	45° 09' 17.41654"	-102° 25' 11.03769"	714.87	Control
129	711970.565	4999934.777	749.832	45° 07' 15.90682"	-102° 18' 17.52140"	730.327	Control
131	725740.874	5004196.855	733.066	45° 09' 18.50063"	-102° 07' 41.05432"	713.168	Control
132	732836.366	5004650.083	738.551	45° 09' 24.87199"	-102° 02' 15.74725"	718.449	Control
133	577336.53	5009584.992	1049.16	45° 14' 07.85271"	-104° 00' 53.02732"	1032.494	Control
134	585527.161	5009387.062	1027.678	45° 13' 58.02780"	-103° 54' 37.55387"	1010.919	Control
135	593625.327	5009674.802	977.254	45° 14' 03.63962"	-103° 48' 26.03378"	960.408	Control
136	598760.527	5007967.99	932.497	45° 13' 05.81580"	-103° 44' 31.78946"	915.593	Control
137	608661.736	5008638.838	946.428	45° 13' 22.29897"	-103° 36' 57.40996"	929.435	Control
138	613912.734	5009714.392	963.442	45° 13' 54.15382"	-103° 32' 55.81687"	946.4	Control

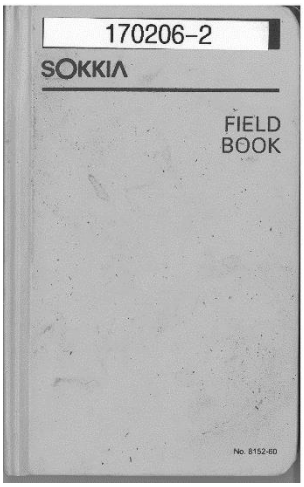
POINT NAME	EASTING (M)	NORTHING (M)	ELEV. (M)	LATITUDE	LONGITUDE	ELLIP. HEIGHT (M)	FEATURE CODE
139	623499.248	5009912.894	923.429	45° 13' 54.76363"	-103° 25' 36.14579"	906.24	Control
140	628852.229	5014351.944	941.333	45° 16' 15.09961"	-103° 21' 26.60296"	924.077	Control
141	638639.933	5008662.415	924.365	45° 13' 04.11080"	-103° 14' 03.33388"	906.843	Control
142	643042.759	5013015.983	871.199	45° 15' 21.94933"	-103° 10' 37.05417"	853.569	Control
143	650491.644	5013152.253	859.799	45° 15' 20.76675"	-103° 04' 55.32835"	841.984	Control
144	658920.039	5011323.487	841.85	45° 14' 14.86759"	-102° 58' 30.96584"	823.834	Control
145	664577.631	5013588.565	864.132	45° 15' 23.53846"	-102° 54' 08.94410"	845.996	Control
146	673097.271	5010965.254	850.357	45° 13' 51.22921"	-102° 47' 41.62071"	831.988	Control
147	680594.728	5013321.613	874.955	45° 15' 00.74640"	-102° 41' 54.97066"	856.409	Control
148	686054	5012135.964	832.025	45° 14' 17.23640"	-102° 37' 46.32734"	813.321	Control
149	695187.97	5011696.516	806.719	45° 13' 54.10377"	-102° 30' 48.38826"	787.759	Control
150	702183.261	5013726.284	779.49	45° 14' 52.70587"	-102° 25' 24.92076"	760.323	Control
151	710583.555	5014038.466	723.589	45° 14' 53.94120"	-102° 18' 59.49834"	704.155	Control
152	717340.969	5012373.071	705.593	45° 13' 52.63904"	-102° 13' 52.47936"	685.965	Control
153	731022.756	5019360.94	722.897	45° 17' 23.10267"	-102° 03' 14.12096"	702.91	Control
153	723150.953	5015065.839	764.062	45° 15' 13.24923"	-102° 09' 21.99949"	744.292	Control
155	577827.239	5017823.407	1038.272	45° 18' 34.58687"	-104° 00' 25.87304"	1021.515	Control
157	593027.904	5017189.331	976.306	45° 18' 07.38401"	-103° 48' 48.35781"	959.482	Control
158	599410.324	5017106.818	981.241	45° 18' 01.56204"	-103° 43' 55.41699"	964.378	Control
159	607045.044	5017205.712	965.261	45° 18' 00.72513"	-103° 38' 04.87274"	948.34	Control
160	613776.306	5018260.318	952.04	45° 18' 31.07854"	-103° 32' 55.01912"	935.056	Control
164	644052.42	5019336.816	888.048	45° 18' 45.93062"	-103° 09' 44.14454"	870.461	Control
166	657937.439	5016809.783	865.332	45° 17' 13.33985"	-102° 59' 09.72439"	847.388	Control
167	664837.898	5018959.814	866.677	45° 18' 17.25891"	-102° 53' 50.58587"	848.571	Control
168	673040.842	5019435.591	831.234	45° 18' 25.56012"	-102° 47' 33.57751"	812.904	Control
169	681734.072	5019295.94	812.172	45° 18' 13.13184"	-102° 40' 54.86750"	793.606	Control
170	687108.887	5019764.117	791.148	45° 18' 23.20839"	-102° 36' 47.63309"	772.424	Control
171	693433.66	5019082.92	778.557	45° 17' 54.98462"	-102° 31' 58.41017"	759.645	Control
172	701743.831	5019450.37	766.158	45° 17' 58.46396"	-102° 25' 36.68332"	747.001	Control
174	716753.81	5023195.249	815.09	45° 19' 43.57854"	-102° 14' 02.35728"	795.548	Control
175	722399.477	5020208.337	792.585	45° 18' 00.54602"	-102° 09' 48.13831"	772.868	Control
176	732223.455	5021285.993	728.381	45° 18' 23.97613"	-102° 02' 15.82618"	708.366	Control
2001	577931.575	4959758.759	976.246	44° 47' 13.14474"	-104° 00' 53.52780"	960.281	Control
2009	636477.869	4960965.806	884.749	44° 47' 20.63818"	-103° 16' 28.98015"	867.294	Control
2011	650623.458	4958501.815	904.124	44° 45' 50.60190"	-103° 05' 48.18018"	886.246	Control
2014	674450.141	4961287.749	902.94	44° 47' 01.33648"	-102° 47' 41.61588"	884.489	Control
2022	732909.138	4963524.814	725.935	44° 47' 13.80842"	-102° 03' 20.79717"	705.442	Control
2034	661351.724	4968220.208	837.636	44° 50' 56.93529"	-102° 57' 29.34966"	819.543	Control
2056	658878.119	4977827.045	845.842	44° 56' 10.07597"	-102° 59' 11.11623"	827.796	Control
2066	733204.455	4979663.585	736.565	44° 55' 55.78792"	-102° 02' 40.66544"	716.215	Control
2067	575891.01	4982661.995	1035.907	44° 59' 36.06879"	-104° 02' 14.01677"	1019.636	Control
2097	635507.196	4994714.514	867.022	45° 05' 34.51457"	-103° 16' 40.53180"	849.493	Control
2117	619048.448	5000584.694	891.84	45° 08' 55.34207"	-103° 29' 08.21570"	874.673	Control
2120	642725.412	5002112.622	922.6	45° 09' 29.02776"	-103° 11' 02.85667"	904.938	Control
2122	660186.622	5000561.621	844.303	45° 08' 25.30747"	-102° 57' 45.35871"	826.201	Control
2145	664594.138	5013587.397	864.652	45° 15' 23.48672"	-102° 54' 08.18862"	846.516	Control
2153	723178.643	5015065.484	762.499	45° 15' 13.20609"	-102° 09' 20.73123"	742.728	Control
2162	627337.488	5019152.98	909.574	45° 18' 51.60967"	-103° 22' 31.65163"	892.375	Control
2168	672890.606	5019431.873	831.381	45° 18' 25.57297"	-102° 47' 40.47628"	813.055	Control
2170	687127.82	5019775.626	791.089	45° 18' 23.56282"	-102° 36' 46.74876"	772.364	Control
2208	590215.899	5019974.236	1022.645	45° 19' 38.93208"	-103° 50' 55.62718"	1005.836	Control
2209	593902.241	5013261.538	956.979	45° 15' 59.71144"	-103° 48' 10.89575"	940.133	Control
2213	623613.43	5004590.541	902.397	45° 11' 02.28180"	-103° 25' 35.66757"	885.172	Control
2214	625425.737	4994845.271	882.395	45° 05' 45.44548"	-103° 24' 21.45901"	865.114	Control
2219	654218.507	5011884.997	856.085	45° 14' 36.81848"	-103° 02' 05.85159"	838.18	Control
2221	678739.716	4971935.883	782.945	44° 52' 42.33685"	-102° 44' 13.07756"	764.382	Control
2224	720108.681	4991016.799	787.194	45° 02' 18.29578"	-102° 12' 19.54428"	767.4	Control
156B	580204.713	5020388.75	1048.006	45° 19' 56.74031"	-103° 58' 35.20964"	1031.217	Control

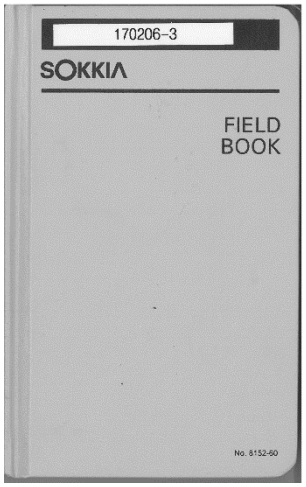
GEODATABASE COLUMN HEADERS

OBJECTID,Plot_ID,Designation,Setyear,PID,DateFnd,Proj_Name,Client,Cnty,State,Inst_Type,Inst_Agency,Srvy_Mthd,HZ_Datum,Datum_Adjust,SPC_Zone,CombScaleFact,Epoch,Latitude,Longitude,SPC_Northing,SPC_Easting,VT_Datum,Orthometric,EllipHeight,Geoid_mdl,New,Recovery,PrimeContractor,Quadrangle,RelativeAccuracies_Meters,RelativeAccuracies_Feet,X_East,Y_North,Z_Ellipsoid,Horizontal,Elevation,Horizontal_Meters,Horizontal_Feet,UTM_ScaleFactor,UTM_Northing,UTM_Easting,VerticalInfo_Meter,VerticalInfo_Feet,Epoch,Description1,Description2,Description3

FIELD BOOKS







FIELD BOOKS

EQUIPMENT, PERSONNEL & SOFTWARE

Equipment

GPS

Receiver	Part No.	Serial No.	Antenna	Antenna Part Number	Antenna Serial Number
R10 GNSS	90909-60	5434477139	Integrated		
R10 GNSS	90909-60	5413460837	Integrated		
R10 GNSS	90909-60	5652470073	Integrated		
R7 GNSS	60163-00	5014K16268	Zephyr Geodetic 2	57971-00	1441004452
R7 GNSS	60163-00	5131K22021	Zephyr Geodetic 2	57971-00	1441127110
R7 GNSS	60163-00	5131K22021	Zephyr Geodetic 2	57971-00	1441127110
5700	40406-46	0220288348	Zephyr Geodetic	41249-00	12322686
5700	40406-46	0220288379	Zephyr Geodetic	41249-00	60145286
5700	40406-46	0220288356	Zephyr Geodetic	41249-00	12677104

RTX

Trimble CenterPoint RTX (Real Time Sattelite Corrections)
For more information regarding Trimble's CenterPoint RTX please visit: http://www.trimble.com

Data Collectors

Trimble Model TSC3 - SN: RS33C67351 w/ Trimble Access v3.10
Trimble Model TSC3 - SN: RS33C67354 w/ Trimble Access v3.10
Trimble Model TSC3 - SN: RS33C67354 w/ Trimble Access v3.10

Cameras (Geo-Referenced)

IPad Mini with Theodolite App
IPad Mini with Theodolite App

Personnel

Rober Nelson, PLS (BHI)
Wayne Walker – Project Manager (GCT)
Mike Stone – Party Chief / Office Technician (GCT)
Billy Wall – Party Chief (GCT)
Chandler Walker – Survey Technician (GCT)

Software

Trimble Business Center
Trimble Access
Microsoft Streets and Trips
Google Earth Pro
Microsoft Word
Microsoft Excel
Theodolite App for IPad Mini

USGS
South Dakota Fiscal Year 2017 Lidar Survey
GCT Project Number 170206
Prime Contractor: Precision Aerial Reconnaissance
Contract No. G17PC00007
Sub-Contractor: Gustin, Cothern & Tucker, Inc. (GCT)

CERTIFICATION

All Surveying and Mapping products and related work performed for this project are in compliance with the following Manuals and related technical standards and publications:

National Geospatial Program Lidar Base Specification Version 1.2

Positional Accuracy Standards for Digital Geospatial Data (American Society for Photogrammetry and Remote Sensing, 2014)

Thank you,

Dated: 15-July-2017

By: _____

REGISTERED LAND SURVEYOR
REG. NO. 9424
ROGER DALE NELSON
SOUTH DAKOTA

Roger Nelson, CFedS, PLS
Bohannon Huston, Inc.
South Dakota PLS No.9424
Bohannon Huston, Inc. Certificate as Land Surveyor Registration # C-6096 / Exp. Date 4/30/2019

APPENDIX "A" RTX SITE CALIBRATION REPORT

Project File Data		**Coordinate System**	
Name:	70206 SD LIDAR TEST\170206_SD LIDAR_TEST.vce	Name:	World wide/UTM
Size:	186 KB	Datum:	ITRF to NAD 1983 (2011)
Modified:	7/10/2017 10:20:02 AM (UTC:-5)	Zone:	Default
Time zone:	Central Standard Time	Geoid:	GEOID12B (Conus)
		Vertical datum:	NAVD88

Site Calibration Report

Horizontal Calibration Parameters

Translation east:	0.002 m
Translation north:	-0.001 m
Rotation:	-0°00'00"
Origin easting:	647041.273 m
Origin northing:	4986380.713 m
Scale factor:	1.0000000119

Vertical Calibration Parameters

Vertical shift at origin:	0.000 m
Slope east:	-0.125 ppm
Slope north:	0.400 ppm
Origin easting:	636601.622 m
Origin northing:	4999900.439 m

Residual Differences Between GPS and Known Coordinates

Summary

	Maximum residual	Root Mean Square residual	Point
Horizontal	0.036 m	0.018 m	GCT-SD01
Vertical	0.046 m	0.021 m	GCT-SD03
Three-dimensional	0.046 m	0.030 m	GCT-SD03

Point Residual

GNSS Point		Calculated Point		Grid Point	
Point	3 PCL	**Point**	3 PCL	**Point**	3 PCL_OPUS/NGS VERT
Latitude	N44°44'54.23033"	**Easting**	655783.476 m	**Easting**	655783.476 m
Longitude	W103°01'55.35978"	**Northing**	4956884.172 m	**Northing**	4956884.167 m
Height	841.656 m	**Elevation**	859.696 m	**Elevation**	859.649 m
		Horiz. residual	0.006 m	**Type**	Horizontal
		Vert. residual	?		
Point	79-168.13	**Point**	79-168.13	**Point**	79 168.13_NGS
Latitude	N45°08'21.73645"	**Easting**	636601.622 m	**Easting**	636601.615 m
Longitude	W103°15'45.38125"	**Northing**	4999900.439 m	**Northing**	4999900.439 m
Height	859.182 m	**Elevation**	876.705 m	**Elevation**	876.715 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.010 m		
Point	79-182.56	**Point**	79-182.56	**Point**	79 182.56_NGS
Latitude	N45°19'37.28248"	**Easting**	644050.700 m	**Easting**	644050.687 m
Longitude	W103°09'42.55644"	**Northing**	5020922.258 m	**Northing**	5020922.257 m
Height	880.902 m	**Elevation**	898.452 m	**Elevation**	898.467 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.015 m		
Point	85-76.98	**Point**	85-76.98	**Point**	85 076.98_NGS
Latitude	N44°54'49.49579"	**Easting**	603965.725 m	**Easting**	603965.744 m
Longitude	W103°40'58.36761"	**Northing**	4974212.046 m	**Northing**	4974212.088 m
Height	931.740 m	**Elevation**	948.530 m	**Elevation**	948.526 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.004 m		
Point	85-107.98	**Point**	85-107.98	**Point**	85 107.98_OPUS/NGS Vert
Latitude	N45°19'08.90679"	**Easting**	613778.616 m	**Easting**	613778.743 m
Longitude	W103°32'53.94088"	**Northing**	5019428.069 m	**Northing**	5019428.089 m
Height	947.711 m	**Elevation**	964.664 m	**Elevation**	964.686 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.022 m		
Point	212-43.90	**Point**	212-43.90	**Point**	212 043.90_NGS
Latitude	N44°45'04.40084"	**Easting**	631018.193 m	**Easting**	631018.052 m
Longitude	W103°20'41.33485"	**Northing**	4956646.706 m	**Northing**	4956646.686 m
Height	858.798 m	**Elevation**	876.106 m	**Elevation**	876.084 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.022 m		

GNSS Point		Calculated Point		Grid Point	
Point	212-91.15	**Point**	212-91.15	**Point**	212 091.15_OPUS/NGS VERT
Latitude	N45°01'21.39660"	**Easting**	695973.948 m	**Easting**	695973.950 m
Longitude	W102°30'45.13018"	**Northing**	4988471.510 m	**Northing**	4988471.490 m
Height	847.685 m	**Elevation**	866.704 m	**Elevation**	866.691 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.013 m		
Point	212-115.65	**Point**	212-115.65	**Point**	212 115.65_NGS
Latitude	N45°01'43.45132"	**Easting**	735107.715 m	**Easting**	735107.704 m
Longitude	W102°00'55.79011"	**Northing**	4990475.838 m	**Northing**	4990475.833 m
Height	769.313 m	**Elevation**	789.601 m	**Elevation**	789.611 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.010 m		
Point	C 390	**Point**	C 390	**Point**	C 390_NGS
Latitude	N45°01'50.13085"	**Easting**	588121.466 m	**Easting**	588121.329 m
Longitude	W103°52'52.82266"	**Northing**	4986956.637 m	**Northing**	4986956.617 m
Height	953.875 m	**Elevation**	970.503 m	**Elevation**	970.502 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.000 m		
Point	D07-1	**Point**	D07-1	**Point**	D07-1_OPUS
Latitude	N45°01'59.09696"	**Easting**	734757.812 m	**Easting**	734757.953 m
Longitude	W102°01'10.96776"	**Northing**	4990946.386 m	**Northing**	4990946.396 m
Height	765.432 m	**Elevation**	785.705 m	**Elevation**	785.722 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.017 m		
Point	D07-2	**Point**	D07-2	**Point**	D07-2_OPUS
Latitude	N45°01'52.02466"	**Easting**	734958.533 m	**Easting**	734958.685 m
Longitude	W102°01'02.16197"	**Northing**	4990735.251 m	**Northing**	4990735.255 m
Height	765.363 m	**Elevation**	785.644 m	**Elevation**	785.641 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.003 m		
Point	D 410	**Point**	D 410	**Point**	D 410_OPUS/NGS VERT
Latitude	N44°44'20.09317"	**Easting**	695355.120 m	**Easting**	695355.113 m
Longitude	W102°31'57.19433"	**Northing**	4956908.784 m	**Northing**	4956908.784 m
Height	801.338 m	**Elevation**	820.520 m	**Elevation**	820.483 m
		Horiz. residual	0.008 m	**Type**	Horz and Vert
		Vert. residual	0.037 m		
		3D residual	0.038 m		

GNSS Point		Calculated Point		Grid Point	
Point	DRY	**Point**	DRY	**Point**	DRY_NGS
Latitude	N44°45'26.32122"	**Easting**	590455.026 m	**Easting**	590454.977 m
Longitude	W103°51'25.71151"	**Northing**	4956625.798 m	**Northing**	4956625.711 m
Height	1000.597 m	**Elevation**	1016.864 m	**Elevation**	1016.840 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.024 m		
Point	F 410	**Point**	F 410	**Point**	F 410_NGS
Latitude	N44°47'07.19883"	**Easting**	695333.362 m	**Easting**	695333.219 m
Longitude	W102°31'51.06443"	**Northing**	4962069.182 m	**Northing**	4962069.159 m
Height	780.340 m	**Elevation**	799.508 m	**Elevation**	799.517 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.009 m		
Point	FAA 3D3 A	**Point**	FAA 3D3 A	**Point**	FAA 3D3 A_NGS
Latitude	N44°44'08.38171"	**Easting**	590281.607 m	**Easting**	590281.613 m
Longitude	W103°51'35.13211"	**Northing**	4954217.969 m	**Northing**	4954217.971 m
Height	955.664 m	**Elevation**	971.888 m	**Elevation**	971.920 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.032 m		
Point	GCT-SD01	**Point**	GCT-SD01	**Point**	GCT-SD01_OPUS
Latitude	N44°45'08.07390"	**Easting**	614866.442 m	**Easting**	614866.474 m
Longitude	W103°32'55.82243"	**Northing**	4956451.752 m	**Northing**	4956451.767 m
Height	847.721 m	**Elevation**	864.633 m	**Elevation**	864.630 m
		Horiz. residual	0.036 m	**Type**	Horz and Vert
		Vert. residual	0.003 m		
		3D residual	0.036 m		
Point	GCT-SD02	**Point**	GCT-SD02	**Point**	GCT-SD02_OPUS
Latitude	N44°45'49.14781"	**Easting**	574729.668 m	**Easting**	574729.646 m
Longitude	W104°03'20.60351"	**Northing**	4957128.556 m	**Northing**	4957128.553 m
Height	961.256 m	**Elevation**	977.066 m	**Elevation**	977.078 m
		Horiz. residual	0.022 m	**Type**	Horz and Vert
		Vert. residual	-0.012 m		
		3D residual	0.025 m		
Point	GCT-SD03	**Point**	GCT-SD03	**Point**	GCT-SD03_OPUS
Latitude	N45°20'24.50345"	**Easting**	580180.242 m	**Easting**	580180.235 m
Longitude	W103°58'35.82762"	**Northing**	5021245.310 m	**Northing**	5021245.307 m
Height	1026.466 m	**Elevation**	1043.230 m	**Elevation**	1043.184 m
		Horiz. residual	0.007 m	**Type**	Horz and Vert
		Vert. residual	0.046 m		
		3D residual	0.046 m		

GNSS Point		Calculated Point		Grid Point	
Point	GCT-SD04	**Point**	GCT-SD04	**Point**	GCT-SD04_OPUS
Latitude	N45°21'06.58108"	**Easting**	647425.126 m	**Easting**	647425.116 m
Longitude	W103°07'04.58077"	**Northing**	5023757.367 m	**Northing**	5023757.363 m
Height	1050.853 m	**Elevation**	1068.430 m	**Elevation**	1068.429 m
		Horiz. residual	0.011 m	**Type**	Horz and Vert
		Vert. residual	0.001 m		
		3D residual	0.011 m		
Point	GCT-SD05	**Point**	GCT-SD05	**Point**	GCT-SD05_OPUS
Latitude	N45°19'41.67900"	**Easting**	693600.930 m	**Easting**	693600.954 m
Longitude	W102°31'46.08610"	**Northing**	5022383.607 m	**Northing**	5022383.603 m
Height	769.202 m	**Elevation**	788.111 m	**Elevation**	788.119 m
		Horiz. residual	0.024 m	**Type**	Horz and Vert
		Vert. residual	-0.008 m		
		3D residual	0.026 m		
Point	GCT-SD06	**Point**	GCT-SD06	**Point**	GCT-SD06_OPUS
Latitude	N45°18'25.02871"	**Easting**	732238.813 m	**Easting**	732238.960 m
Longitude	W102°02'15.05962"	**Northing**	5021319.067 m	**Northing**	5021319.091 m
Height	708.554 m	**Elevation**	728.575 m	**Elevation**	728.542 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.033 m		
Point	HRN Harding	**Point**	HRN Harding	**Point**	HRN HARDING_NGS
Latitude	N45°22'19.58973"	**Easting**	591307.189 m	**Easting**	591307.181 m
Longitude	W103°50'02.19024"	**Northing**	5024948.745 m	**Northing**	5024948.755 m
Height	1049.320 m	**Elevation**	1066.087 m	**Elevation**	1066.055 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.032 m		
Point	HRN-ZEONA	**Point**	HRN-ZEONA	**Point**	HRN ZEONA_NGS
Latitude	N45°15'18.00290"	**Easting**	692637.660 m	**Easting**	692637.655 m
Longitude	W102°32'41.72895"	**Northing**	5014209.801 m	**Northing**	5014209.807 m
Height	840.132 m	**Elevation**	859.011 m	**Elevation**	859.052 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.041 m		
Point	L 402	**Point**	L 402	**Point**	L 402_NGS
Latitude	N45°04'03.22222"	**Easting**	677638.943 m	**Easting**	677638.802 m
Longitude	W102°44'36.57405"	**Northing**	4992931.925 m	**Northing**	4992931.901 m
Height	877.729 m	**Elevation**	896.234 m	**Elevation**	896.230 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	0.004 m		

GNSS Point		Calculated Point		Grid Point	
Point	M 395 Reset	**Point**	M 395 Reset	**Point**	M 395 RESET_OPUS/NGS VERT
Latitude	N44°45'23.23532"	**Easting**	733096.134 m	**Easting**	733096.119 m
Longitude	W102°03'17.90688"	**Northing**	4960115.173 m	**Northing**	4960115.183 m
Height	671.437 m	**Elevation**	691.983 m	**Elevation**	691.978 m
		Horiz. residual	0.018 m	**Type**	Horz and Vert
		Vert. residual	0.005 m		
		3D residual	0.019 m		
Point	MORE	**Point**	MORE	**Point**	MORE_OPUS
Latitude	N45°02'08.72556"	**Easting**	654237.149 m	**Easting**	654237.166 m
Longitude	W103°02'30.65295"	**Northing**	4988786.963 m	**Northing**	4988786.953 m
Height	870.503 m	**Elevation**	888.467 m	**Elevation**	888.454 m
		Horiz. residual	0.020 m	**Type**	Horz and Vert
		Vert. residual	0.013 m		
		3D residual	0.024 m		
Point	NONA	**Point**	NONA	**Point**	NONA_OPUS
Latitude	N45°11'52.05294"	**Easting**	668297.308 m	**Easting**	668297.307 m
Longitude	W102°51'26.22533"	**Northing**	5007155.631 m	**Northing**	5007155.647 m
Height	835.176 m	**Elevation**	853.441 m	**Elevation**	853.457 m
		Horiz. residual	0.016 m	**Type**	Horz and Vert
		Vert. residual	-0.016 m		
		3D residual	0.023 m		
Point	Q 390	**Point**	Q 390	**Point**	Q 390_NGS
Latitude	N44°55'19.41477"	**Easting**	717149.173 m	**Easting**	717149.029 m
Longitude	W102°14'54.87783"	**Northing**	4977974.666 m	**Northing**	4977974.641 m
Height	751.164 m	**Elevation**	770.986 m	**Elevation**	770.991 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.005 m		
Point	SE Cor MT	**Point**	SE Cor MT	**Point**	SE Cor MT_OPUS
Latitude	N44°59'53.16131"	**Easting**	575692.121 m	**Easting**	575692.127 m
Longitude	W104°02'22.80860"	**Northing**	4983187.124 m	**Northing**	4983187.119 m
Height	1011.866 m	**Elevation**	1028.120 m	**Elevation**	1028.158 m
		Horiz. residual	0.008 m	**Type**	Horz and Vert
		Vert. residual	-0.038 m		
		3D residual	0.039 m		

GNSS Point		Calculated Point		Grid Point	
Point	TT 61 JNF	**Point**	TT 61 JNF	**Point**	TT 61 JNF_OPUS
Latitude	N45°08'29.09687"	**Easting**	703907.774 m	**Easting**	703907.773 m
Longitude	W102°24'23.25506"	**Northing**	5001931.775 m	**Northing**	5001931.766 m
Height	740.797 m	**Elevation**	760.065 m	**Elevation**	760.028 m
		Horiz. residual	0.009 m	**Type**	Horizontal
		Vert. residual	?		
		3D residual	?		
Point	V 417	**Point**	V 417	**Point**	V 417_NGS
Latitude	N44°55'21.20333"	**Easting**	642145.346 m	**Easting**	642145.206 m
Longitude	W103°11'56.08192"	**Northing**	4975924.582 m	**Northing**	4975924.561 m
Height	851.322 m	**Elevation**	868.995 m	**Elevation**	869.000 m
		Horiz. residual	?	**Type**	Vertical
		Vert. residual	-0.005 m		
		3D residual	?		
Point	X 25	**Point**	X 25	**Point**	X 25_NGS
Latitude	N45°10'05.64582"	**Easting**	599173.174 m	**Easting**	599173.037 m
Longitude	W103°44'16.84734"	**Northing**	5002413.263 m	**Northing**	5002413.242 m
Height	943.559 m	**Elevation**	960.431 m	**Elevation**	960.354 m
		Horiz. residual	?	**Type**	(Ignored)
		Vert. residual	?		
		3D residual	?		
Point	85-87.85	**Point**	85-87.85	**Point**	85 087.85_OPUS/NGS VERT
Latitude	N45°01'38.46332"	**Easting**	614365.084 m	**Easting**	614365.067 m
Longitude	W103°32'53.76499"	**Northing**	4987013.047 m	**Northing**	4987013.049 m
Height	884.677 m	**Elevation**	901.727 m	**Elevation**	901.859 m
		Horiz. residual	0.017 m	**Type**	Horizontal
		Vert. residual	?		
		3D residual	?		

APPENDIX "B" NGS DATASHEETS

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AD8982 ***********************************************************************
 AD8982  DESIGNATION -  212 043.90
 AD8982  PID         -  AD8982
 AD8982  STATE/COUNTY-  SD/BUTTE
 AD8982  COUNTRY     -  US
 AD8982  USGS QUAD   -  SCHOEPP FLAT (1978)
 AD8982
 AD8982                        *CURRENT SURVEY CONTROL
 AD8982  ______________________________________________________________________
 AD8982* NAD 83(1986) POSITION- 44 45 04.     (N) 103 20 41.     (W)    SCALED
 AD8982* NAVD 88 ORTHO HEIGHT -   876.084 (meters)     2874.29  (feet) ADJUSTED
 AD8982  ______________________________________________________________________
 AD8982  GEOID HEIGHT    -        -16.530 (meters)                     GEOID12B
 AD8982  DYNAMIC HEIGHT  -        875.869 (meters)     2873.58  (feet) COMP
 AD8982  MODELED GRAVITY -    980,341.2   (mgal)                       NAVD 88
 AD8982
 AD8982  VERT ORDER      -  FIRST     CLASS II
 AD8982
 AD8982.The horizontal coordinates were scaled from a topographic map and have
 AD8982.an estimated accuracy of +/- 6 seconds.
 AD8982.
 AD8982.The orthometric height was determined by differential leveling and
 AD8982.adjusted by the NATIONAL GEODETIC SURVEY
 AD8982.in July 1998.
 AD8982
 AD8982.Significant digits in the geoid height do not necessarily reflect accuracy.
 AD8982.GEOID12B height accuracy estimate available here.
 AD8982
 AD8982.The dynamic height is computed by dividing the NAVD 88
 AD8982.geopotential number by the normal gravity value computed on the
 AD8982.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD8982.degrees latitude (g = 980.6199 gals.).
 AD8982
 AD8982.The modeled gravity was interpolated from observed gravity values.
 AD8982
 AD8982;                    North         East     Units  Estimated Accuracy
 AD8982;SPC SD N     -   107,460.      335,230.      MT  (+/- 180 meters Scaled)
 AD8982
 AD8982_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK310566(NAD 83)
 AD8982
 AD8982                           SUPERSEDED SURVEY CONTROL
 AD8982
 AD8982.No superseded survey control is available for this station.
 AD8982
 AD8982_MARKER: DD = SURVEY DISK
 AD8982_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AD8982_STAMPING: 212-43.90 1995
 AD8982_MARK LOGO: SDDT
 AD8982_MAGNETIC: N = NO MAGNETIC MATERIAL
 AD8982_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
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AD8982+STABILITY: SURFACE MOTION
AD8982_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD8982+SATELLITE: SATELLITE OBSERVATIONS - November 16, 1995
AD8982
AD8982  HISTORY     - Date     Condition        Report By
AD8982  HISTORY     - 1995     MONUMENTED       SDDT
AD8982  HISTORY     - 19951116 GOOD             NGS
AD8982
AD8982                          STATION DESCRIPTION
AD8982
AD8982'DESCRIBED BY NATIONAL GEODETIC SURVEY 1995 (GAS)
AD8982'7.6 KM (4.70 MI) NORTHEASTERLY ALONG U.S. HIGHWAY 212 FROM THE
AD8982'JUNCTION OF STATE HIGHWAY 79 IN NEWELL, 198.0 M (649.6 FT) SOUTHWEST
AD8982'OF MILEPOST 44, 22.8 M (74.8 FT) SOUTHEAST OF THE HIGHWAY CENTERLINE,
AD8982'18.0 M (59.1 FT) NORTHEAST OF THE CENTER OF A DIRT ROAD LEADING
AD8982'SOUTHEAST, 7.6 M (24.9 FT) NORTHEAST OF A FENCE CORNER, 1.0 M (3.3 FT)
AD8982'BELOW THE LEVEL OF THE HIGHWAY, 0.3 M (1.0 FT) NORTHWEST OF A WITNESS
AD8982'POST AND FENCE, AND THE MONUMENT PROJECTS 0.1 M (0.3 FT) ABOVE THE
AD8982'GROUND SURFACE.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AD8966 ***********************************************************************
 AD8966  DESIGNATION -  212 091.15
 AD8966  PID         -  AD8966
 AD8966  STATE/COUNTY-  SD/MEADE
 AD8966  COUNTRY     -  US
 AD8966  USGS QUAD   -  MAURINE (1951)
 AD8966
 AD8966                        *CURRENT SURVEY CONTROL
 AD8966  ______________________________________________________________________
 AD8966* NAD 83(1986) POSITION- 45 01 21.37   (N) 102 30 45.09   (W)    HD_HELD1
 AD8966* NAVD 88 ORTHO HEIGHT -   866.691 (meters)     2843.47  (feet) ADJUSTED
 AD8966  ______________________________________________________________________
 AD8966  GEOID HEIGHT    -        -18.230 (meters)                     GEOID12B
 AD8966  DYNAMIC HEIGHT  -        866.505 (meters)     2842.86  (feet) COMP
 AD8966  MODELED GRAVITY -    980,371.9   (mgal)                       NAVD 88
 AD8966
 AD8966  VERT ORDER      -  FIRST     CLASS II
 AD8966
 AD8966.The horizontal coordinates were determined by differentially corrected
 AD8966.hand held GPS observations or other comparable positioning techniques
 AD8966.and have an estimated accuracy of +/- 3 meters.
 AD8966.
 AD8966.The orthometric height was determined by differential leveling and
 AD8966.adjusted by the NATIONAL GEODETIC SURVEY
 AD8966.in July 1998.
 AD8966
 AD8966.Significant digits in the geoid height do not necessarily reflect accuracy.
 AD8966.GEOID12B height accuracy estimate available here.
 AD8966
 AD8966.The dynamic height is computed by dividing the NAVD 88
 AD8966.geopotential number by the normal gravity value computed on the
 AD8966.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD8966.degrees latitude (g = 980.6199 gals.).
 AD8966
 AD8966.The modeled gravity was interpolated from observed gravity values.
 AD8966
 AD8966;                    North         East     Units  Estimated Accuracy
 AD8966;SPC SD N     -   135,226.9     402,017.1     MT  (+/- 3 meters HH1 GPS)
 AD8966
 AD8966_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK9597488471(NAD 83)
 AD8966
 AD8966                           SUPERSEDED SURVEY CONTROL
 AD8966
 AD8966.No superseded survey control is available for this station.
 AD8966
 AD8966_MARKER: Z = SEE DESCRIPTION
 AD8966_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
 AD8966_STAMPING: 212-91.15 1995
 AD8966_MARK LOGO: NGS
 AD8966_MAGNETIC: P = MARKER IS A STEEL PIPE
 AD8966_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
 AD8966+STABILITY: POSITION/ELEVATION WELL
 AD8966_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
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AD8966+SATELLITE: SATELLITE OBSERVATIONS - April 25, 1996
AD8966
AD8966  HISTORY     - Date     Condition        Report By
AD8966  HISTORY     - 1995     MONUMENTED       SDDT
AD8966  HISTORY     - 19960425 GOOD             NGS
AD8966
AD8966                          STATION DESCRIPTION
AD8966
AD8966'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (GAS)
AD8966'29.3 KM (18.20 MI) EASTERLY ALONG U.S. HIGHWAY 212 FROM THE POST
AD8966'OFFICE IN MUD BUTTE, 236.0 M (774.3 FT) EAST OF MILEPOST 91, 43.9 M
AD8966'(144.0 FT) SOUTH OF THE HIGHWAY CENTERLINE, 27.4 M (89.9 FT) SOUTH OF
AD8966'A FENCE CORNER, 0.5 M (1.6 FT) SOUTHEAST OF A METAL GUARD POST, 0.5 M
AD8966'(1.6 FT) BELOW THE LEVEL OF THE HIGHWAY, 0.4 M (1.3 FT) WEST OF A
AD8966'FENCE, AND 0.3 M (1.0 FT) NORTH OF A WITNESS POST.  NOTE--THE DATUM
AD8966'POINT IS A STAINLESS STEEL RIVET AFFIXED TO AN IRON PIPE CAP THAT IS
AD8966'ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE.  ACCESS TO THE DATUM
AD8966'POINT IS THROUGH A 5-INCH LOGO CAP AND THEN THROUGH A 4-INCH PVC CAP.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7875 ***********************************************************************
 AC7875  CBN         -  This is a Cooperative Base Network Control Station.
 AC7875  DESIGNATION -  212 115.65
 AC7875  PID         -  AC7875
 AC7875  STATE/COUNTY-  SD/MEADE
 AC7875  COUNTRY     -  US
 AC7875  USGS QUAD   -  FAITH (1983)
 AC7875
 AC7875                        *CURRENT SURVEY CONTROL
 AC7875  ______________________________________________________________________
 AC7875* NAD 83(2011) POSITION- 45 01 43.42527(N) 102 00 55.74768(W)   ADJUSTED
 AC7875* NAD 83(2011) ELLIP HT-   770.119 (meters)        (06/27/12)   ADJUSTED
 AC7875* NAD 83(2011) EPOCH    -  2010.00
 AC7875* NAVD 88 ORTHO HEIGHT -   789.611 (meters)     2590.58  (feet) ADJUSTED
 AC7875  ______________________________________________________________________
 AC7875  GEOID HEIGHT    -        -19.494 (meters)                     GEOID12B
 AC7875  NAD 83(2011) X  -   -940,097.431 (meters)                     COMP
 AC7875  NAD 83(2011) Y  - -4,416,940.320 (meters)                     COMP
 AC7875  NAD 83(2011) Z  -  4,490,150.280 (meters)                     COMP
 AC7875  LAPLACE CORR    -         -6.37  (seconds)                    DEFLEC12B
 AC7875  DYNAMIC HEIGHT  -       789.459 (meters)     2590.08  (feet) COMP
 AC7875  MODELED GRAVITY -    980,397.4   (mgal)                       NAVD 88
 AC7875
 AC7875  VERT ORDER      -  FIRST     CLASS II
 AC7875
 AC7875  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7875  Standards:
 AC7875         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7875            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AC7875  ------------------------------------------------------------------
 AC7875  NETWORK    0.49   1.02          0.23   0.16   0.52     -0.05200133
 AC7875  ------------------------------------------------------------------
 AC7875  Click here for local accuracies and other accuracy information.
 AC7875
 AC7875
 AC7875.The horizontal coordinates were established by GPS observations
 AC7875.and adjusted by the National Geodetic Survey in June 2012.
 AC7875
 AC7875.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7875.been affixed to the stable North American tectonic plate. See
 AC7875.NA2011 for more information.
 AC7875
 AC7875.The horizontal coordinates are valid at the epoch date displayed above
 AC7875.which is a decimal equivalence of Year/Month/Day.
 AC7875
 AC7875.The orthometric height was determined by differential leveling and
 AC7875.adjusted by the NATIONAL GEODETIC SURVEY
 AC7875.in July 1998.
 AC7875
 AC7875.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7875.GEOID12B height accuracy estimate available here.
 AC7875
 AC7875.The X, Y, and Z were computed from the position and the ellipsoidal ht.
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AC7875
AC7875.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7875
AC7875.The ellipsoidal height was determined by GPS observations
AC7875.and is referenced to NAD 83.
AC7875
AC7875.The dynamic height is computed by dividing the NAVD 88
AC7875.geopotential number by the normal gravity value computed on the
AC7875.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AC7875.degrees latitude (g = 980.6199 gals.).
AC7875
AC7875.The modeled gravity was interpolated from observed gravity values.
AC7875
AC7875. The following values were computed from the NAD 83(2011) position.
AC7875
AC7875;                    North          East     Units Scale Factor Converg.
AC7875;SPC SD N     -   134,812.157   441,190.851   MT  0.99993919   -1 25 35.2
AC7875;SPC SD N     -   442,296.22  1,447,473.65   sFT  0.99993919   -1 25 35.2
AC7875;UTM  13      - 4,990,475.857   735,107.845   MT  1.00027973   +2 06 44.6
AC7875;UTM  14      - 4,990,566.315   262,452.392   MT  1.00029392   -2 08 03.6
AC7875
AC7875!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7875!SPC SD N     -   0.99987927  x   0.99993919  =   0.99981847
AC7875!UTM  13      -   0.99987927  x   1.00027973  =   1.00015897
AC7875!UTM  14      -   0.99987927  x   1.00029392  =   1.00017316
AC7875
AC7875_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGK3510790475(NAD 83)
AC7875
AC7875                           SUPERSEDED SURVEY CONTROL
AC7875
AC7875  NAD 83(2007)-  45 01 43.42521(N)    102 00 55.74894(W) AD(2002.00) 0
AC7875  ELLIP H (02/10/07)  770.129  (m)                       GP(2002.00)
AC7875  ELLIP H (06/23/03)  770.121  (m)                       GP(       ) 3 1
AC7875  NAD 83(1996)-  45 01 43.42469(N)    102 00 55.74872(W) AD(       ) B
AC7875  ELLIP H (04/18/97)  770.184  (m)                       GP(       ) 4 1
AC7875  NAVD 88             789.61   (m)          2590.6    (f) LEVELING    3
AC7875  NAVD 88 (04/18/97)  789.6    (m)   GEOID96 model used   GPS OBS
AC7875
AC7875.Superseded values are not recommended for survey control.
AC7875
AC7875.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7875.See file dsdata.pdf to determine how the superseded data were derived.
AC7875
AC7875_MARKER: Z = SEE DESCRIPTION
AC7875_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7875_STAMPING: 212-115.65 1995
AC7875_MARK LOGO: NGS
AC7875_PROJECTION: FLUSH
AC7875_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7875_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AC7875+STABILITY: POSITION/ELEVATION WELL
AC7875_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7875+SATELLITE: SATELLITE OBSERVATIONS - January 16, 2013
AC7875_ROD/PIPE-DEPTH: 6.40 meters
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AC7875_SLEEVE-DEPTH  : 1.80 meters
AC7875
AC7875  HISTORY     - Date     Condition        Report By
AC7875  HISTORY     - 1995     MONUMENTED       SDDT
AC7875  HISTORY     - 19960425 GOOD             NGS
AC7875  HISTORY     - 19960925 GOOD             NGS
AC7875  HISTORY     - 20020515 GOOD             SDDT
AC7875  HISTORY     - 20130116 GOOD             INDIV
AC7875
AC7875                          STATION DESCRIPTION
AC7875
AC7875'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (GAS)
AC7875'2.5 KM (1.55 MI) EASTERLY ALONG U.S. HIGHWAY 212 FROM THE EAST
AC7875'JUNCTION OF STATE HIGHWAY 73 IN FAITH, 573.0 M (1879.9 FT) WEST OF
AC7875'MILEPOST 116, 43.5 M (142.7 FT) NORTHWEST OF THE HIGHWAY CENTERLINE,
AC7875'23.1 M (75.8 FT) NORTHEAST OF THE CENTER OF A ROAD LEADING TO THE
AC7875'FAITH AIRPORT, 0.6 M (2.0 FT) NORTH OF A METAL GUARD POST, 0.5 M (1.6
AC7875'FT) BELOW THE LEVEL OF THE HIGHWAY, 0.5 M (1.6 FT) EAST OF A FENCE
AC7875'CORNER, AND 0.5 M (1.6 FT) SOUTHEAST OF A WITNESS POST. NOTE--THE
AC7875'DATUM POINT IS A STAINLESS STEEL RIVET AFFIXED TO AN IRON PIPE CAP
AC7875'THAT IS ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE. ACCESS TO THE
AC7875'DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN THROUGH A 4-INCH PVC
AC7875'CAP.
AC7875
AC7875                          STATION RECOVERY (1996)
AC7875
AC7875'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7875'THE STATION IS LOCATED ABOUT 12.0 MI (19.3 KM) WEST-SOUTHWEST OF RED
AC7875'ELM AND 1.2 MI (1.9 KM) NORTHEAST OF FAITH, ON U.S. HIGHWAY 212.
AC7875'OWNERSHIP--THE STATE OF SOUTH DAKOTA.  TO REACH THE STATION FROM THE
AC7875'JUNCTION OF U.S. HIGHWAY 212 AND STATE HIGHWAY 73 SOUTH IN FAITH, GO
AC7875'EAST THEN NORTHEAST ON HIGHWAY 212 FOR 1.6 MI (2.6 KM) TO THE STATION
AC7875'ON THE LEFT, AT THE JUNCTION OF A PAVED ROAD LEADING TO THE AIRPORT.
AC7875'THE STATION IS A PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET
AC7875'FASTENED TO A METAL PIPE CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL
AC7875'PIPE.  LOCATED 142.2 FT (43.3 M) NORTHWEST OF THE HIGHWAY CENTERLINE,
AC7875'75.1 FT (22.9 M) NORTHEAST OF THE CENTER OF THE ROAD, 24.3 FT (7.4 M)
AC7875'NORTHWEST OF THE CENTER OF A TRACK ROAD, 23.1 FT (7.0 M) SOUTHWEST OF
AC7875'THE CENTER OF A FIELD ENTRANCE AND GATE, 2.0 FT (0.6 M) EAST-SOUTHEAST
AC7875'OF A FENCE CORNER POST, 2.0 FT (0.6 M) NORTH OF A METAL GUARD POST,
AC7875'1.9 FT (0.6 M) SOUTHEAST OF A FENCE, AND 1.5 FT (0.5 M) SOUTHEAST OF A
AC7875'WITNESS POST.  NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH
AC7875'LOGO CAP AND THEN A 4-INCH PVC CAP.
AC7875
AC7875                          STATION RECOVERY (2002)
AC7875
AC7875'RECOVERY NOTE BY SD DEPT OF TRANSP 2002 (RAH)
AC7875'RECOVERED AS DESCRIBED
AC7875
AC7875                          STATION RECOVERY (2013)
AC7875
AC7875'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2013 (JRP)
AC7875'RECOVERED IN GOOD CONDITION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU1237 ***********************************************************************
 PU1237  DESIGNATION -  3 PCL
 PU1237  PID         -  PU1237
 PU1237  STATE/COUNTY-  SD/BUTTE
 PU1237  COUNTRY     -  US
 PU1237  USGS QUAD   -  VOLUNTEER NE (1959)
 PU1237
 PU1237                        *CURRENT SURVEY CONTROL
 PU1237  ______________________________________________________________________
 PU1237* NAD 83(1986) POSITION- 44 44 54.20   (N) 103 01 55.31   (W)    HD_HELD1
 PU1237* NAVD 88 ORTHO HEIGHT -   859.620 (meters)     2820.27  (feet) ADJUSTED
 PU1237  ______________________________________________________________________
 PU1237  GEOID HEIGHT    -        -17.260 (meters)                     GEOID12B
 PU1237  DYNAMIC HEIGHT  -        859.408 (meters)     2819.57  (feet) COMP
 PU1237  MODELED GRAVITY -    980,341.5   (mgal)                       NAVD 88
 PU1237
 PU1237  VERT ORDER      -  SECOND    CLASS 0
 PU1237
 PU1237.The horizontal coordinates were determined by differentially corrected
 PU1237.hand held GPS observations or other comparable positioning techniques
 PU1237.and have an estimated accuracy of +/- 3 meters.
 PU1237.
 PU1237.The orthometric height was determined by differential leveling and
 PU1237.adjusted by the NATIONAL GEODETIC SURVEY
 PU1237.in June 1991.
 PU1237
 PU1237.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU1237.GEOID12B height accuracy estimate available here.
 PU1237
 PU1237.The dynamic height is computed by dividing the NAVD 88
 PU1237.geopotential number by the normal gravity value computed on the
 PU1237.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU1237.degrees latitude (g = 980.6199 gals.).
 PU1237
 PU1237.The modeled gravity was interpolated from observed gravity values.
 PU1237
 PU1237;                    North         East     Units  Estimated Accuracy
 PU1237;SPC SD N     -   106,178.5     359,957.4     MT  (+/- 3 meters HH1 GPS)
 PU1237
 PU1237_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK5578356884(NAD 83)
 PU1237
 PU1237                           SUPERSEDED SURVEY CONTROL
 PU1237
 PU1237  NGVD 29 (??/??/92)  859.136  (m)          2818.68   (f) ADJ UNCH    2 0
 PU1237
 PU1237.Superseded values are not recommended for survey control.
 PU1237
 PU1237.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU1237.See file dsdata.pdf to determine how the superseded data were derived.
 PU1237
 PU1237_MARKER: DD = SURVEY DISK
 PU1237_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 PU1237_STAMPING: 3 PCL 1958 ET 2819
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PU1237_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
PU1237+STABILITY: SURFACE MOTION
PU1237
PU1237  HISTORY     - Date     Condition        Report By
PU1237  HISTORY     - 1958     MONUMENTED       USGS
PU1237  HISTORY     - 1962     GOOD             CGS
PU1237  HISTORY     - UNK      SEE DESCRIPTION  USGS
PU1237
PU1237                          STATION DESCRIPTION
PU1237
PU1237'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
PU1237'12 MI W FROM FAIRPOINT.
PU1237'12.0 MILES WEST ALONG A GRAVEL ROAD FROM THE STORE AT FAIRPOINT,
PU1237'0.25 MILE WEST OF A WOODEN BRIDGE OVER A CREEK, 224 FEET SOUTH
PU1237'OF THE CENTER LINE OF THE ROAD, 35 FEET EAST OF THE CENTER
PU1237'LINE OF A ROAD SOUTH, 26 FEET EAST OF THE EAST END OF A GATE,
PU1237'5.4 FEET NORTH OF A FENCE, 0.8 FOOT NORTH OF A WITNESS POST,
PU1237'ABOUT 2 FEET HIGHER THAN THE ROAD AND IN THE TOP OF A CONCRETE
PU1237'POST PROJECTING 0.2 FOOT.
PU1237
PU1237                          STATION RECOVERY (UNK )
PU1237
PU1237'RECOVERY NOTE BY US GEOLOGICAL SURVEY UNK
PU1237'RECOVERED AS DESCRIBED.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7977 ***********************************************************************
 AC7977  CBN         -  This is a Cooperative Base Network Control Station.
 AC7977  DESIGNATION -  73 191.00

        Ellipsoid Height       minus   Geoid12B Height        =       NAVD88 Height
        684.938                        -19.007                        703.945

 AC7977  PID         -  AC7977
 AC7977  STATE/COUNTY-  SD/PERKINS
 AC7977  COUNTRY     -  US
 AC7977  USGS QUAD   -  FAITH NW (1952)
 AC7977
 AC7977                        *CURRENT SURVEY CONTROL
 AC7977  ______________________________________________________________________________
 AC7977* NAD 83(2011) POSITION- 45 12 37.61487(N) 102 09 39.30488(W)    ADJUSTED
 AC7977* NAD 83(2011) ELLIP HT-   684.938 (meters)        (06/27/12)    ADJUSTED
 AC7977* NAD 83(2011) EPOCH    -  2010.00
 AC7977* NAVD 88 ORTHO HEIGHT -   703.9   (meters)     2309.    (feet) GPS OBS
 AC7977  ______________________________________________________________________________
 AC7977  NAVD 88 orthometric height was determined with geoid model    GEOID96
 AC7977  GEOID HEIGHT    -        -18.881 (meters)                     GEOID96
 AC7977  GEOID HEIGHT    -        -19.007 (meters)                     GEOID12B
 AC7977  NAD 83(2011) X  -   -948,278.298 (meters)                     COMP
 AC7977  NAD 83(2011) Y  - -4,400,490.685 (meters)                     COMP
 AC7977  NAD 83(2011) Z  -  4,504,341.883 (meters)                     COMP
 AC7977  LAPLACE CORR    -         -5.72  (seconds)                    DEFLEC12B
 AC7977
 AC7977  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7977  Standards:
 AC7977         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7977            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AC7977  ------------------------------------------------------------------------
 AC7977  NETWORK    0.93   2.76           0.44   0.29   1.41     -0.11875457
 AC7977  ------------------------------------------------------------------------
 AC7977  Click here for local accuracies and other accuracy information.
 AC7977
 AC7977
 AC7977.The horizontal coordinates were established by GPS observations
 AC7977.and adjusted by the National Geodetic Survey in June 2012.
 AC7977
 AC7977.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7977.been affixed to the stable North American tectonic plate. See
 AC7977.NA2011 for more information.
 AC7977
 AC7977.The horizontal coordinates are valid at the epoch date displayed above
 AC7977.which is a decimal equivalence of Year/Month/Day.
 AC7977
 AC7977.The orthometric height was determined by GPS observations and a
 AC7977.high-resolution geoid model.
 AC7977
 AC7977.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7977.GEOID12B height accuracy estimate available here.
 AC7977
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AC7977.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC7977
AC7977.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7977
AC7977.The ellipsoidal height was determined by GPS observations
AC7977.and is referenced to NAD 83.
AC7977
AC7977. The following values were computed from the NAD 83(2011) position.
AC7977
AC7977;                    North         East     Units Scale Factor Converg.
AC7977;SPC SD N     -   155,294.554   430,273.160   MT  0.99994297   -1 31 45.7
AC7977;SPC SD N     -   509,495.55  1,411,654.53   sFT  0.99994297   -1 31 45.7
AC7977;UTM  13      - 5,010,250.658   722,941.891   MT  1.00021117   +2 00 56.6
AC7977
AC7977!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7977!SPC SD N     -   0.99989263  x   0.99994297  =   0.99983560
AC7977!UTM  13      -   0.99989263  x   1.00021117  =   1.00010377
AC7977
AC7977_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGL2294110250(NAD 83)
AC7977
AC7977                           SUPERSEDED SURVEY CONTROL
AC7977
AC7977  NAD 83(2007)-  45 12 37.61479(N)    102 09 39.30605(W) AD(2002.00) 0
AC7977  ELLIP H (02/10/07)  684.959  (m)                       GP(2002.00)
AC7977  ELLIP H (04/15/04)  684.953  (m)                       GP(       ) 2 1
AC7977  NAD 83(1996)-  45 12 37.61421(N)    102 09 39.30568(W) AD(       ) B
AC7977  ELLIP H (04/18/97)  685.022  (m)                       GP(       ) 4 1
AC7977
AC7977.Superseded values are not recommended for survey control.
AC7977
AC7977.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7977.See file dsdata.pdf to determine how the superseded data were derived.
AC7977
AC7977_MARKER: Z = SEE DESCRIPTION
AC7977_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7977_STAMPING: 73-191.00 1995
AC7977_MARK LOGO: NGS
AC7977_PROJECTION: FLUSH
AC7977_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7977_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AC7977_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7977+SATELLITE: SATELLITE OBSERVATIONS - September 28, 1996
AC7977_ROD/PIPE-DEPTH: 6.4  meters
AC7977_SLEEVE-DEPTH  : 1.8 meters
AC7977
AC7977  HISTORY     - Date     Condition        Report By
AC7977  HISTORY     - 1995     MONUMENTED       SDDT
AC7977  HISTORY     - 19960928 GOOD             NGS
AC7977
AC7977                           STATION DESCRIPTION
AC7977
AC7977'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7977'THE STATION IS LOCATED ABOUT 50.0 MI (80.5 KM) SOUTH OF LEMMON AND
AC7977'17.0 MI (27.4 KM) NORTHWEST OF FAITH, ON STATE HIGHWAY 73.
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AC7977'OWNERSHIP--THE STATE OF SOUTH DAKOTA. TO REACH THE STATION FROM THE
AC7977'JUNCTION OF STATE HIGHWAY 73 NORTH AND U.S. HIGHWAY 212, 3.0 MI (4.8
AC7977'KM) WEST OF FAITH, GO NORTH ON STATE HIGHWAY 73 FOR 13.0 MI (20.9 KM)
AC7977'TO A BRIDGE SPANNING THE MOREAU RIVER, CONTINUE NORTH ON STATE HIGHWAY
AC7977'73 FOR 1.0 MI (1.6 KM) TO THE STATION ON THE LEFT. THE STATION IS A
AC7977'PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET FASTENED TO A METAL PIPE
AC7977'CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE. LOCATED 26.7 M
AC7977'(87.6 FT) WEST OF THE HIGHWAY CENTERLINE, 0.4 M (1.3 FT) EAST OF A
AC7977'WITNESS POST AND FENCE, AND 0.3 M (1.0 FT) WEST OF A METAL GUARD POST.
AC7977'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN
AC7977'A 4-INCH PVC CAP.

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7949 ***********************************************************************
 AC7949  CBN         -  This is a Cooperative Base Network Control Station.
 AC7949  DESIGNATION -  79 168.13

        Ellipsoid Height       minus   Geoid12B Height        =       NAVD88 Height
        859.978                        -16.737                        876.715

 AC7949  PID         -  AC7949
 AC7949  STATE/COUNTY-  SD/BUTTE
 AC7949  COUNTRY     -  US
 AC7949  USGS QUAD   -  GRANGER CREEK (1977)
 AC7949
 AC7949                        *CURRENT SURVEY CONTROL
 AC7949  ______________________________________________________________________
 AC7949* NAD 83(2011) POSITION- 45 08 21.71084(N) 103 15 45.33764(W)   ADJUSTED
 AC7949* NAD 83(2011) ELLIP HT-   859.978 (meters)        (06/27/12)   ADJUSTED
 AC7949* NAD 83(2011) EPOCH   -  2010.00
 AC7949* NAVD 88 ORTHO HEIGHT -   876.7   (meters)     2876.    (feet) GPS OBS
 AC7949  ______________________________________________________________________
 AC7949  NAVD 88 orthometric height was determined with geoid model    GEOID96
 AC7949  GEOID HEIGHT    -        -16.578 (meters)                     GEOID96
 AC7949  GEOID HEIGHT    -        -16.737 (meters)                     GEOID12B
 AC7949  NAD 83(2011) X  - -1,034,023.764 (meters)                     COMP
 AC7949  NAD 83(2011) Y  - -4,387,019.487 (meters)                     COMP
 AC7949  NAD 83(2011) Z  -  4,498,896.303 (meters)                     COMP
 AC7949  LAPLACE CORR    -         -4.48  (seconds)                    DEFLEC12B
 AC7949
 AC7949  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7949  Standards:
 AC7949         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7949            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AC7949  ------------------------------------------------------------------
 AC7949  NETWORK    1.35   4.06           0.63   0.43   2.07     -0.12162969
 AC7949  ------------------------------------------------------------------
 AC7949  Click here for local accuracies and other accuracy information.
 AC7949
 AC7949
 AC7949.The horizontal coordinates were established by GPS observations
 AC7949.and adjusted by the National Geodetic Survey in June 2012.
 AC7949
 AC7949.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7949.been affixed to the stable North American tectonic plate. See
 AC7949.NA2011 for more information.
 AC7949
 AC7949.The horizontal coordinates are valid at the epoch date displayed above
 AC7949.which is a decimal equivalence of Year/Month/Day.
 AC7949
 AC7949.The orthometric height was determined by GPS observations and a
 AC7949.high-resolution geoid model.
 AC7949
 AC7949.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7949.GEOID12B height accuracy estimate available here.
 AC7949
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AC7949.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC7949
AC7949.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7949
AC7949.The ellipsoidal height was determined by GPS observations
AC7949.and is referenced to NAD 83.
AC7949
AC7949. The following values were computed from the NAD 83(2011) position.
AC7949
AC7949;                     North         East     Units Scale Factor Converg.
AC7949;SPC SD N     -   150,299.681   343,463.961   MT  0.99994029   -2 18 32.6
AC7949;SPC SD N     -   493,108.20  1,126,848.01   sFT  0.99994029   -2 18 32.6
AC7949;UTM  13      - 4,999,900.463   636,601.753   MT  0.99982944   +1 13 54.1
AC7949
AC7949!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7949!SPC SD N     -   0.99986519  x   0.99994029  =   0.99980549
AC7949!UTM  13      -   0.99986519  x   0.99982944  =   0.99969465
AC7949
AC7949_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK3660199900(NAD 83)
AC7949
AC7949                           SUPERSEDED SURVEY CONTROL
AC7949
AC7949  NAD 83(2007)-  45 08 21.71076(N)    103 15 45.33874(W) AD(2002.00) 0
AC7949  ELLIP H (02/10/07)  860.013  (m)                       GP(2002.00)
AC7949  ELLIP H (04/15/04)  860.015  (m)                       GP(       ) 2 1
AC7949  NAD 83(1996)-  45 08 21.71005(N)    103 15 45.33817(W) AD(       ) B
AC7949  ELLIP H (04/18/97)  860.085  (m)                       GP(       ) 4 1
AC7949
AC7949.Superseded values are not recommended for survey control.
AC7949
AC7949.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7949.See file dsdata.pdf to determine how the superseded data were derived.
AC7949
AC7949_MARKER: Z = SEE DESCRIPTION
AC7949_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7949_STAMPING: 79-168.13 1995
AC7949_MARK LOGO: NGS
AC7949_PROJECTION: FLUSH
AC7949_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7949_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AC7949_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7949+SATELLITE: SATELLITE OBSERVATIONS - September 27, 1996
AC7949_ROD/PIPE-DEPTH: 12.8 meters
AC7949_SLEEVE-DEPTH  : 1.8 meters
AC7949
AC7949  HISTORY     - Date     Condition        Report By
AC7949  HISTORY     - 1995     MONUMENTED       SDDT
AC7949  HISTORY     - 19960927 GOOD             NGS
AC7949
AC7949                            STATION DESCRIPTION
AC7949
AC7949'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7949'THE STATION IS LOCATED ABOUT 31.0 MI (49.9 KM) SOUTH-SOUTHWEST OF
AC7949'REVA, 15.0 MI (24.1 KM) NORTHEAST OF CASTLE ROCK, AND 2.0 MI (3.2 KM)
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AC7949'NORTH OF HOOVER, ON STATE HIGHWAY 79. OWNERSHIP--THE STATE OF SOUTH
AC7949'DAKOTA. TO REACH THE STATION FROM THE JUNCTION OF STATE HIGHWAYS 168
AC7949'WEST AND 79 NORTH, NORTH OF CASTLE ROCK, GO NORTH ON STATE HIGHWAY 79
AC7949'FOR 17.75 MI (28.57 KM) TO THE STATION ON THE RIGHT. THE STATION IS A
AC7949'PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET FASTENED TO A METAL PIPE
AC7949'CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE. LOCATED 74.0 FT
AC7949'(22.6 M) EAST OF THE HIGHWAY CENTER, 20.0 FT (6.1 M) NORTHEAST OF THE
AC7949'CENTER OF A FIELD ENTRANCE ROAD, 1.0 FT (0.3 M) NORTHWEST OF A WITNESS
AC7949'POST AND FENCE AND 1.0 FT (0.3 M) SOUTHEAST OF A METAL GUARD POST.
AC7949'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN
AC7949'A 4-INCH PVC CAP.

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7969 ***********************************************************************
 AC7969  CBN         -  This is a Cooperative Base Network Control Station.
 AC7969  DESIGNATION -  79 182.56

        Ellipsoid Height       minus   Geoid12B Height        =       NAVD88 Height
        881.707                        -16.760                        898.467

 AC7969  PID         -  AC7969
 AC7969  STATE/COUNTY-  SD/HARDING
 AC7969  COUNTRY     -  US
 AC7969  USGS QUAD   -  IRISH BUTTE (1993)
 AC7969
 AC7969                        *CURRENT SURVEY CONTROL
 AC7969  ______________________________________________________________________
 AC7969* NAD 83(2011) POSITION- 45 19 37.25673(N) 103 09 42.51309(W)   ADJUSTED
 AC7969* NAD 83(2011) ELLIP HT-   881.707 (meters)        (06/27/12)   ADJUSTED
 AC7969* NAD 83(2011) EPOCH   -  2010.00
 AC7969* NAVD 88 ORTHO HEIGHT -   898.4   (meters)     2948.    (feet) GPS OBS
 AC7969  ______________________________________________________________________
 AC7969  NAVD 88 orthometric height was determined with geoid model    GEOID96
 AC7969  GEOID HEIGHT    -        -16.610 (meters)                     GEOID96
 AC7969  GEOID HEIGHT    -        -16.760 (meters)                     GEOID12B
 AC7969  NAD 83(2011) X  - -1,022,936.846 (meters)                     COMP
 AC7969  NAD 83(2011) Y  - -4,374,426.913 (meters)                     COMP
 AC7969  NAD 83(2011) Z  -  4,513,600.244 (meters)                     COMP
 AC7969  LAPLACE CORR    -         -5.28  (seconds)                    DEFLEC12B
 AC7969
 AC7969  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7969  Standards:
 AC7969         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7969            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AC7969  ------------------------------------------------------------------
 AC7969  NETWORK    1.30   3.86           0.60   0.43   1.97     -0.07994208
 AC7969  ------------------------------------------------------------------
 AC7969  Click here for local accuracies and other accuracy information.
 AC7969
 AC7969
 AC7969.The horizontal coordinates were established by GPS observations
 AC7969.and adjusted by the National Geodetic Survey in June 2012.
 AC7969
 AC7969.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7969.been affixed to the stable North American tectonic plate. See
 AC7969.NA2011 for more information.
 AC7969
 AC7969.The horizontal coordinates are valid at the epoch date displayed above
 AC7969.which is a decimal equivalence of Year/Month/Day.
 AC7969
 AC7969.The orthometric height was determined by GPS observations and a
 AC7969.high-resolution geoid model.
 AC7969
 AC7969.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7969.GEOID12B height accuracy estimate available here.
 AC7969
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AC7969.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC7969
AC7969.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7969
AC7969.The ellipsoidal height was determined by GPS observations
AC7969.and is referenced to NAD 83.
AC7969
AC7969. The following values were computed from the NAD 83(2011) position.
AC7969
AC7969;                    North         East     Units Scale Factor Converg.
AC7969;SPC SD N     -   170,823.099   352,198.760   MT  0.99995068   -2 14 15.8
AC7969;SPC SD N     -   560,442.12  1,155,505.43   sFT  0.99995068   -2 14 15.8
AC7969;UTM  13      - 5,020,922.281   644,050.825   MT  0.99985514   +1 18 26.7
AC7969
AC7969!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7969!SPC SD N     -   0.99986178  x   0.99995068  =   0.99981247
AC7969!UTM  13      -   0.99986178  x   0.99985514  =   0.99971694
AC7969
AC7969_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFL4405020922(NAD 83)
AC7969
AC7969                           SUPERSEDED SURVEY CONTROL
AC7969
AC7969  NAD 83(2007)-  45 19 37.25662(N)    103 09 42.51421(W) AD(2002.00) 0
AC7969  ELLIP H (02/10/07)  881.736  (m)                       GP(2002.00)
AC7969  ELLIP H (04/15/04)  881.741  (m)                       GP(       ) 2 1
AC7969  NAD 83(1996)-  45 19 37.25597(N)    103 09 42.51374(W) AD(       ) B
AC7969  ELLIP H (04/18/97)  881.812  (m)                       GP(       ) 4 1
AC7969
AC7969.Superseded values are not recommended for survey control.
AC7969
AC7969.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7969.See file dsdata.pdf to determine how the superseded data were derived.
AC7969
AC7969_MARKER: Z = SEE DESCRIPTION
AC7969_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7969_STAMPING: 79-182.56 1995
AC7969_MARK LOGO: NGS
AC7969_PROJECTION: FLUSH
AC7969_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7969_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AC7969_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7969+SATELLITE: SATELLITE OBSERVATIONS - September 28, 1996
AC7969_ROD/PIPE-DEPTH: 12.8 meters
AC7969_SLEEVE-DEPTH  : 1.8 meters
AC7969
AC7969  HISTORY     - Date     Condition        Report By
AC7969  HISTORY     - 1995     MONUMENTED       SDDT
AC7969  HISTORY     - 19960928 GOOD             NGS
AC7969
AC7969                           STATION DESCRIPTION
AC7969
AC7969'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7969'THE STATION IS LOCATED ABOUT 25.0 MI (40.2 KM) SOUTHEAST OF BUFFALO
AC7969'AND 16.0 MI (25.7 KM) NORTH OF HOOVER, ON STATE HIGHWAY 79.
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AC7969'OWNERSHIP--THE STATE OF SOUTH DAKOTA. TO REACH THE STATION FROM THE
AC7969'JUNCTION OF STATE HIGHWAYS 79 NORTH AND 168 WEST ON THE NORTH SIDE OF
AC7969'CASTLE ROCK, GO NORTH ON STATE HIGHWAY 79 FOR 32.25 MI (51.90 KM) TO
AC7969'THE JUNCTION OF A COUNTY ROAD AND THE STATION ON THE RIGHT. THE
AC7969'STATION IS A PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET FASTENED TO
AC7969'A METAL PIPE CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE.
AC7969'LOCATED 22.6 M (74.1 FT) EAST FROM HIGHWAY CENTERLINE, 17.0 M (55.8
AC7969'FT) SOUTHWEST OF WEST CORNER OF A CATTLE GUARD, 15.9 M (52.2 FT) SOUTH
AC7969'OF THE CENTER OF A FIELD ENTRANCE ROAD, 14.0 M (45.9 FT) SOUTHWEST OF
AC7969'A FENCE CORNER, 1.0 FT (0.3 M) WEST OF WITNESS POST AND FENCE, AND 0.8
AC7969'M (2.6 FT) EAST OF A METAL GUARD POST. NOTE--ACCESS TO THE DATUM POINT
AC7969'IS THROUGH A 5-INCH LOGO CAP AND THEN A 4-INCH PVC CAP.

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7960 ***********************************************************************
 AC7960  CBN         -  This is a Cooperative Base Network Control Station.
 AC7960  DESIGNATION -  85 076.98
 AC7960  PID         -  AC7960
 AC7960  STATE/COUNTY-  SD/BUTTE
 AC7960  COUNTRY     -  US
 AC7960  USGS QUAD   -  TWO TOP BUTTE WEST (1965)
 AC7960
 AC7960                        *CURRENT SURVEY CONTROL
 AC7960  ______________________________________________________________________
 AC7960* NAD 83(2011) POSITION- 44 54 49.47163(N) 103 40 58.32258(W)   ADJUSTED
 AC7960* NAD 83(2011) ELLIP HT-   932.499 (meters)        (06/27/12)   ADJUSTED
 AC7960* NAD 83(2011) EPOCH   -  2010.00
 AC7960* NAVD 88 ORTHO HEIGHT -   948.516 (meters)     3111.92  (feet) ADJUSTED
 AC7960  ______________________________________________________________________
 AC7960  GEOID HEIGHT    -        -16.012 (meters)                     GEOID12B
 AC7960  NAD 83(2011) X  - -1,070,383.765 (meters)                     COMP
 AC7960  NAD 83(2011) Y  - -4,396,603.747 (meters)                     COMP
 AC7960  NAD 83(2011) Z  -  4,481,223.424 (meters)                     COMP
 AC7960  LAPLACE CORR    -         -3.16  (seconds)                    DEFLEC12B
 AC7960  DYNAMIC HEIGHT  -        948.278 (meters)     3111.14  (feet) COMP
 AC7960  MODELED GRAVITY -    980,334.1   (mgal)                       NAVD 88
 AC7960
 AC7960  VERT ORDER      -  FIRST     CLASS II
 AC7960
 AC7960  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7960  Standards:
 AC7960         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7960            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AC7960  ------------------------------------------------------------------
 AC7960  NETWORK    0.99   2.94          0.46   0.32   1.50     -0.10857403
 AC7960  ------------------------------------------------------------------
 AC7960  Click here for local accuracies and other accuracy information.
 AC7960
 AC7960
 AC7960.The horizontal coordinates were established by GPS observations
 AC7960.and adjusted by the National Geodetic Survey in June 2012.
 AC7960
 AC7960.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7960.been affixed to the stable North American tectonic plate. See
 AC7960.NA2011 for more information.
 AC7960
 AC7960.The horizontal coordinates are valid at the epoch date displayed above
 AC7960.which is a decimal equivalence of Year/Month/Day.
 AC7960
 AC7960.The orthometric height was determined by differential leveling and
 AC7960.adjusted by the NATIONAL GEODETIC SURVEY
 AC7960.in April 2000.
 AC7960
 AC7960.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7960.GEOID12B height accuracy estimate available here.
 AC7960
 AC7960.The X, Y, and Z were computed from the position and the ellipsoidal ht.
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AC7960
AC7960.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7960
AC7960.The ellipsoidal height was determined by GPS observations
AC7960.and is referenced to NAD 83.
AC7960
AC7960.The dynamic height is computed by dividing the NAVD 88
AC7960.geopotential number by the normal gravity value computed on the
AC7960.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AC7960.degrees latitude (g = 980.6199 gals.).
AC7960
AC7960.The modeled gravity was interpolated from observed gravity values.
AC7960
AC7960. The following values were computed from the NAD 83(2011) position.
AC7960
AC7960;                    North          East     Units Scale Factor Converg.
AC7960;SPC SD N     -   126,670.736   309,299.364   MT  0.99994198   -2 36 23.4
AC7960;SPC SD N     -   415,585.57  1,014,759.66   sFT  0.99994198   -2 36 23.4
AC7960;UTM  13      - 4,974,212.110   603,965.881   MT  0.99973291   +0 55 48.1
AC7960
AC7960!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7960!SPC SD N     -   0.99985382  x   0.99994198  =   0.99979580
AC7960!UTM  13      -   0.99985382  x   0.99973291  =   0.99958677
AC7960
AC7960_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK0396574212(NAD 83)
AC7960
AC7960                           SUPERSEDED SURVEY CONTROL
AC7960
AC7960  NAD 83(2007)-  44 54 49.47149(N)    103 40 58.32372(W) AD(2002.00) 0
AC7960  ELLIP H (02/10/07)  932.528  (m)                       GP(2002.00)
AC7960  ELLIP H (04/15/04)  932.524  (m)                       GP(       ) 2 1
AC7960  NAD 83(1996)-  44 54 49.47079(N)    103 40 58.32358(W) AD(       ) B
AC7960  ELLIP H (04/18/97)  932.589  (m)                       GP(       ) 4 1
AC7960  NAVD 88 (04/18/97)  948.5    (m)  GEOID96 model used   GPS OBS
AC7960
AC7960.Superseded values are not recommended for survey control.
AC7960
AC7960.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7960.See file dsdata.pdf to determine how the superseded data were derived.
AC7960
AC7960_MARKER: Z = SEE DESCRIPTION
AC7960_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7960_STAMPING: 85-76.98 1995
AC7960_MARK LOGO: NGS
AC7960_PROJECTION: FLUSH
AC7960_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7960_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AC7960+STABILITY: POSITION/ELEVATION WELL
AC7960_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7960+SATELLITE: SATELLITE OBSERVATIONS - September 20, 1998
AC7960_ROD/PIPE-DEPTH: 12.8 meters
AC7960_SLEEVE-DEPTH  : 2.0 meters
AC7960
AC7960  HISTORY     - Date     Condition        Report By
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AC7960  HISTORY     - 1995     MONUMENTED       SDDT
AC7960  HISTORY     - 19960927 GOOD             NGS
AC7960  HISTORY     - 19980920 GOOD             NGS
AC7960
AC7960                          STATION DESCRIPTION
AC7960
AC7960'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7960'THE STATION IS LOCATED ABOUT 22.0 MI (35.4 KM) NORTH OF BELLE FOURCHE,
AC7960'ON U.S. HIGHWAY 85.  OWNERSHIP--THE STATE OF SOUTH DAKOTA.  TO REACH
AC7960'THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 85 AND 212 AT THE NORTH
AC7960'EDGE OF BELLE FOURCHE, GO NORTH ON U.S. HIGHWAY 85 FOR 12.0 MI (19.3
AC7960'KM) TO A GRAVELED ROAD ON THE LEFT LEADING TO ALBION AND CAMP CROOK,
AC7960'CONTINUE NORTH ON HIGHWAY 85 FOR 9.2 MI (14.8 KM) TO THE STATION ON
AC7960'THE RIGHT.  THE STATION IS A PUNCH POINT ON TOP OF A STAINLESS STEEL
AC7960'RIVET FASTENED TO A METAL PIPE CAP ATTACHED TO A 1 1/2-INCH GALVANIZED
AC7960'STEEL PIPE.  LOCATED 30.3 M (99.4 FT) SOUTHEAST OF THE HIGHWAY
AC7960'CENTERLINE, 6.5 M (21.3 FT) SOUTHWEST OF THE CENTER OF A FIELD
AC7960'ENTRANCE ROAD, 0.4 M (1.3 FT) NORTHWEST OF A WITNESS POST AND FENCE,
AC7960'AND 0.3 M (1.0 FT) SOUTHEAST OF A METAL GUARD POST. NOTE--ACCESS TO
AC7960'THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN A 4-INCH PVC
AC7960'CAP.
AC7960
AC7960                          STATION RECOVERY (1998)
AC7960
AC7960'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1998 (GAS)
AC7960'32.8 KM (20.40 MI) NORTHERLY ALONG U.S. HIGHWAY 85 FROM THE JUNCTION
AC7960'OF U.S. HIGHWAY 212 IN BELLE FOURCHE, 38.4 M (126.0 FT) WEST OF
AC7960'MILEPOST 77, 30.3 M (99.4 FT) SOUTHEAST OF THE HIGHWAY CENTERLINE, 6.5
AC7960'M (21.3 FT) SOUTHWEST OF THE CENTER OF A FIELD ENTRANCE, 0.4 M (1.3
AC7960'FT) NORTHWEST OF A WITNESS POST AND THE CENTER 1 OF 3 BRACED FENCE
AC7960'POSTS, AND 0.3 M (1.0 FT) SOUTHEAST OF A METAL GUARD POST.
AC7960'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN
AC7960'THROUGH A 4-INCH PVC CAP.  THE DATUM POINT IS A STAINLESS STEEL RIVET
AC7960'AFFIXED TO A METAL PIPE CAP THAT IS ATTACHED TO A 1 1/2-INCH
AC7960'GALVANIZED STEEL PIPE.  THE MONUMENT IS ON HIGHWAY RIGHT-OF-WAY.  THE
AC7960'MONUMENT IS A COOPERATIVE BASE NETWORK CONTROL STATION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AI0164 ***********************************************************************
 AI0164  DESIGNATION -  85 087.85
 AI0164  PID         -  AI0164
 AI0164  STATE/COUNTY-  SD/BUTTE
 AI0164  COUNTRY     -  US
 AI0164  USGS QUAD   -  ANTELOPE CREEK EAST (1973)
 AI0164
 AI0164                        *CURRENT SURVEY CONTROL
 AI0164  ______________________________________________________________________
 AI0164* NAD 83(1986) POSITION- 45 01 38.43   (N) 103 32 53.72   (W)    HD_HELD1
 AI0164* NAVD 88 ORTHO HEIGHT -   901.859 (meters)     2958.85  (feet) ADJUSTED
 AI0164  ______________________________________________________________________
 AI0164  GEOID HEIGHT    -        -16.269 (meters)                     GEOID12B
 AI0164  DYNAMIC HEIGHT  -        901.648 (meters)     2958.16  (feet) COMP
 AI0164  MODELED GRAVITY -    980,352.0   (mgal)                       NAVD 88
 AI0164
 AI0164  VERT ORDER      -  FIRST     CLASS II
 AI0164
 AI0164.The horizontal coordinates were determined by differentially corrected
 AI0164.hand held GPS observations or other comparable positioning techniques
 AI0164.and have an estimated accuracy of +/- 3 meters.
 AI0164.
 AI0164.The orthometric height was determined by differential leveling and
 AI0164.adjusted by the NATIONAL GEODETIC SURVEY
 AI0164.in April 2000.
 AI0164
 AI0164.Significant digits in the geoid height do not necessarily reflect accuracy.
 AI0164.GEOID12B height accuracy estimate available here.
 AI0164
 AI0164.The dynamic height is computed by dividing the NAVD 88
 AI0164.geopotential number by the normal gravity value computed on the
 AI0164.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AI0164.degrees latitude (g = 980.6199 gals.).
 AI0164
 AI0164.The modeled gravity was interpolated from observed gravity values.
 AI0164
 AI0164;                    North         East     Units  Estimated Accuracy
 AI0164;SPC SD N     -   138,807.8     320,470.9     MT  (+/- 3 meters HH1 GPS)
 AI0164
 AI0164_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK1436587012(NAD 83)
 AI0164
 AI0164                           SUPERSEDED SURVEY CONTROL
 AI0164
 AI0164.No superseded survey control is available for this station.
 AI0164
 AI0164_MARKER: DD = SURVEY DISK
 AI0164_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AI0164_STAMPING: 85-87.85 1997
 AI0164_MARK LOGO: SDSM
 AI0164_MAGNETIC: N = NO MAGNETIC MATERIAL
 AI0164_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AI0164+STABILITY: SURFACE MOTION
 AI0164_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
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AI0164+SATELLITE: SATELLITE OBSERVATIONS - September 28, 1998
AI0164
AI0164  HISTORY     - Date     Condition        Report By
AI0164  HISTORY     - 1997     MONUMENTED       SDDT
AI0164  HISTORY     - 19980928 GOOD             NGS
AI0164
AI0164                          STATION DESCRIPTION
AI0164
AI0164'DESCRIBED BY NATIONAL GEODETIC SURVEY 1998 (GAS)
AI0164'27.0 KM (16.75 MI) SOUTHERLY ALONG U.S. HIGHWAY 85 FROM THE JUNCTION
AI0164'OF COUNTY ROAD 732 IN REDIG, 285.0 M (935.0 FT) SOUTH OF MILEPOST 88,
AI0164'74.5 M (244.4 FT) NORTHEAST OF THE NORTHEAST CORNER OF A HIGHWAY
AI0164'BRIDGE SPANNING BATTLE CREEK, 29.9 M (98.1 FT) EAST OF THE HIGHWAY
AI0164'CENTERLINE, 6.0 M (19.7 FT) NORTH OF THE CENTER OF A FIELD ENTRANCE,
AI0164'2.9 M (9.5 FT) SOUTH OF THE NORTH END OF 3 BRACED FENCE POSTS, 1.0 M
AI0164'(3.3 FT) BELOW THE LEVEL OF THE HIGHWAY, 0.4 M (1.3 FT) WEST OF A
AI0164'WITNESS POST AND FENCE, AND THE MONUMENT IS FLUSH WITH THE GROUND
AI0164'SURFACE.  NOTE--THE MONUMENT IS ON HIGHWAY RIGHT-OF-WAY.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7857 ***********************************************************************
 AC7857  CBN         -  This is a Cooperative Base Network Control Station.
 AC7857  DESIGNATION -  85 107.98
 AC7857  PID         -  AC7857
 AC7857  STATE/COUNTY-  SD/HARDING
 AC7857  COUNTRY     -  US
 AC7857  USGS QUAD   -  REDIG (1973)
 AC7857
 AC7857                        *CURRENT SURVEY CONTROL
 AC7857  ______________________________________________________________________
 AC7857* NAD 83(2011) POSITION- 45 19 08.88092(N) 103 32 53.89739(W)   ADJUSTED
 AC7857* NAD 83(2011) ELLIP HT-   948.523 (meters)        (06/27/12)   ADJUSTED
 AC7857* NAD 83(2011) EPOCH    -  2010.00
 AC7857* NAVD 88 ORTHO HEIGHT -   964.686 (meters)     3164.97  (feet) ADJUSTED
 AC7857  ______________________________________________________________________
 AC7857  GEOID HEIGHT    -        -16.166 (meters)                     GEOID12B
 AC7857  NAD 83(2011) X  - -1,052,578.531 (meters)                     COMP
 AC7857  NAD 83(2011) Y  - -4,368,078.435 (meters)                     COMP
 AC7857  NAD 83(2011) Z  -  4,513,031.737 (meters)                     COMP
 AC7857  LAPLACE CORR    -         -2.92  (seconds)                    DEFLEC12B
 AC7857  DYNAMIC HEIGHT  -       964.492 (meters)     3164.34  (feet) COMP
 AC7857  MODELED GRAVITY -    980,381.6   (mgal)                       NAVD 88
 AC7857
 AC7857  VERT ORDER      -  FIRST     CLASS II
 AC7857
 AC7857  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7857  Standards:
 AC7857         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7857            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 AC7857  ------------------------------------------------------------------
 AC7857  NETWORK    1.37   4.04          0.64   0.44   2.06     -0.08172037
 AC7857  ------------------------------------------------------------------
 AC7857  Click here for local accuracies and other accuracy information.
 AC7857
 AC7857
 AC7857.The horizontal coordinates were established by GPS observations
 AC7857.and adjusted by the National Geodetic Survey in June 2012.
 AC7857
 AC7857.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7857.been affixed to the stable North American tectonic plate. See
 AC7857.NA2011 for more information.
 AC7857
 AC7857.The horizontal coordinates are valid at the epoch date displayed above
 AC7857.which is a decimal equivalence of Year/Month/Day.
 AC7857
 AC7857.The orthometric height was determined by differential leveling and
 AC7857.adjusted by the NATIONAL GEODETIC SURVEY
 AC7857.in April 2000.
 AC7857
 AC7857.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7857.GEOID12B height accuracy estimate available here.
 AC7857
 AC7857.The X, Y, and Z were computed from the position and the ellipsoidal ht.
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AC7857
AC7857.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7857
AC7857.The ellipsoidal height was determined by GPS observations
AC7857.and is referenced to NAD 83.
AC7857
AC7857.The dynamic height is computed by dividing the NAVD 88
AC7857.geopotential number by the normal gravity value computed on the
AC7857.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AC7857.degrees latitude (g = 980.6199 gals.).
AC7857
AC7857.The modeled gravity was interpolated from observed gravity values.
AC7857
AC7857. The following values were computed from the NAD 83(2011) position.
AC7857
AC7857;                    North          East     Units Scale Factor Converg.
AC7857;SPC SD N     -   171,203.276   321,887.804   MT  0.99995003   -2 30 40.6
AC7857;SPC SD N     -   561,689.41  1,056,060.24   sFT  0.99995003   -2 30 40.6
AC7857;UTM  13      - 5,019,428.085   613,778.737   MT  0.99975917   +1 01 56.3
AC7857
AC7857!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7857!SPC SD N     -   0.99985131  x   0.99995003  =   0.99980135
AC7857!UTM  13      -   0.99985131  x   0.99975917  =   0.99961052
AC7857
AC7857_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFL1377819428(NAD 83)
AC7857
AC7857                           SUPERSEDED SURVEY CONTROL
AC7857
AC7857  NAD 83(2007)-  45 19 08.88083(N)    103 32 53.89850(W) AD(2002.00) 0
AC7857  ELLIP H (02/10/07)  948.557  (m)                       GP(2002.00)
AC7857  ELLIP H (04/15/04)  948.561  (m)                       GP(       ) 2 1
AC7857  NAD 83(1996)-  45 19 08.88011(N)    103 32 53.89794(W) AD(       ) B
AC7857  ELLIP H (04/18/97)  948.632  (m)                       GP(       ) 4 1
AC7857  NAVD 88 (04/18/97)  964.7    (m)  GEOID96 model used   GPS OBS
AC7857
AC7857.Superseded values are not recommended for survey control.
AC7857
AC7857.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7857.See file dsdata.pdf to determine how the superseded data were derived.
AC7857
AC7857_MARKER: Z = SEE DESCRIPTION
AC7857_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7857_STAMPING: 85-107.98 1995
AC7857_MARK LOGO: NGS
AC7857_PROJECTION: FLUSH
AC7857_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7857_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AC7857+STABILITY: POSITION/ELEVATION WELL
AC7857_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7857+SATELLITE: SATELLITE OBSERVATIONS - September 28, 1998
AC7857_ROD/PIPE-DEPTH: 12.9 meters
AC7857_SLEEVE-DEPTH  : 2.0 meters
AC7857
AC7857  HISTORY     - Date     Condition        Report By
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AC7857  HISTORY     - 1995     MONUMENTED       SDDT
AC7857  HISTORY     - 19960924 GOOD             NGS
AC7857  HISTORY     - 19980928 GOOD             NGS
AC7857
AC7857                          STATION DESCRIPTION
AC7857
AC7857'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7857'THE STATION IS LOCATED ABOUT 20.0 MI (32.2 KM) SOUTH OF BUFFALO AND
AC7857'3.0 MI (4.8 KM) NORTH FROM REDIG, ON U.S. HIGHWAY 85.  OWNERSHIP--THE
AC7857'STATE OF SOUTH DAKOTA.  TO REACH THE STATION FROM THE JUNCTION OF U.S.
AC7857'HIGHWAY 85 AND STATE HIGHWAY 20, 2.0 MI (3.2 KM) SOUTH OF BUFFALO, GO
AC7857'SOUTH ON U.S. HIGHWAY 85 FOR 17.6 MI (28.3 KM) TO THE STATION ON THE
AC7857'LEFT.  THE STATION IS A PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET
AC7857'FASTENED TO A METAL PIPE CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL
AC7857'PIPE.  LOCATED 43.3 M (142.1 FT) SOUTHEAST OF MILEPOST 108, 29.6 M
AC7857'(97.1 FT) EAST OF THE HIGHWAY CENTERLINE, 6.7 M (22.0 FT) SOUTH OF THE
AC7857'CENTER OF A GRAVELED FIELD ENTRANCE ROAD, 0.4 M (1.3 FT) EAST OF A
AC7857'METAL GUARD POST, AND 0.4 M (1.3 FT) WEST OF A WITNESS POST AND FENCE.
AC7857'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP AND THEN
AC7857'THROUGH A 4-INCH PVC CAP.
AC7857
AC7857                          STATION RECOVERY (1998)
AC7857
AC7857'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1998 (GAS)
AC7857'5.3 KM (3.30 MI) NORTHERLY ALONG U.S. HIGHWAY 85 FROM THE JUNCTION OF
AC7857'COUNTY ROAD 732 IN REDIG, 43.3 M (142.1 FT) SOUTHEAST OF MILEPOST 108,
AC7857'29.6 M (97.1 FT) EAST OF THE HIGHWAY CENTERLINE, 6.6 M (21.7 FT) NORTH
AC7857'OF THE CENTER OF A FIELD ENTRANCE, 0.6 M (2.0 FT) WEST OF A WITNESS
AC7857'POST AND FENCE, 0.3 M (1.0 FT) EAST OF A METAL GUARD POST, AND 0.3 M
AC7857'(1.0 FT) BELOW THE LEVEL OF THE HIGHWAY.  NOTE--THE DATUM POINT IS A
AC7857'STAINLESS STEEL RIVET AFFIXED TO A METAL PIPE CAP THAT IS ATTACHED TO
AC7857'A 1 1/2-INCH GALVANIZED STEEL PIPE.  ACCESS TO THE DATUM POINT IS
AC7857'THROUGH A 5-INCH LOGO CAP AND THEN THROUGH A 4-INCH PVC CAP.  THE
AC7857'MONUMENT IS ON HIGHWAY RIGHT-OF-WAY.  THE MONUMENT IS A COOPERATIVE
AC7857'BASE NETWORK CONTROL STATION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PV0443 ***********************************************************************
 PV0443  DESIGNATION -  BOUNDARY MON SE CORNER MT
 PV0443  PID         -  PV0443
 PV0443  STATE/COUNTY-  SD/BUTTE
 PV0443  COUNTRY     -  US
 PV0443  USGS QUAD   -  GRAVEL DRAW (1984)
 PV0443
 PV0443                        *CURRENT SURVEY CONTROL
 PV0443  ______________________________________________________________________
 PV0443* NAD 83(1996) POSITION- 44 59 53.16884(N) 104 02 22.79355(W)   ADJUSTED
 PV0443* NAVD 88 ORTHO HEIGHT -  1027.5   (meters)     3371.    (feet) VERTCON
 PV0443  ______________________________________________________________________
 PV0443  GEOID HEIGHT    -        -15.477 (meters)                     GEOID12B
 PV0443  LAPLACE CORR    -         -7.71  (seconds)                    DEFLEC12B
 PV0443  HORZ ORDER      -  SECOND
 PV0443
 PV0443.The horizontal coordinates were established by classical geodetic methods
 PV0443.and adjusted by the National Geodetic Survey in January 1998.
 PV0443.
 PV0443.The NAVD 88 height was computed by applying the VERTCON shift value to
 PV0443.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
 PV0443
 PV0443.Significant digits in the geoid height do not necessarily reflect accuracy.
 PV0443.GEOID12B height accuracy estimate available here.
 PV0443
 PV0443.Photographs are available for this station.
 PV0443
 PV0443.The Laplace correction was computed from DEFLEC12B derived deflections.
 PV0443
 PV0443. The following values were computed from the NAD 83(1996) position.
 PV0443
 PV0443;                    North         East     Units Scale Factor Converg.
 PV0443;SPC MT       -    98,154.703 1,030,196.195   MT  1.00000114   +3 59 39.3
 PV0443;SPC MT       -   322,029.87  3,379,908.78   iFT  1.00000114   +3 59 39.3
 PV0443;SPC SD N     -   137,376.769   281,626.116   MT  0.99993954   -2 51 32.5
 PV0443;SPC SD N     -   450,710.28    923,968.35   sFT  0.99993954   -2 51 32.5
 PV0443;SPC WY E     -   500,271.488   288,857.913   MT  1.00003455   +0 47 49.0
 PV0443;SPC WY E     - 1,641,307.37    947,694.67   sFT  1.00003455   +0 47 49.0
 PV0443;UTM  13      - 4,983,188.155   575,691.602   MT  0.99967045   +0 40 44.6
 PV0443
 PV0443!             -  Elev Factor  x  Scale Factor =   Combined Factor
 PV0443!SPC MT       -   0.99984135  x   1.00000114  =   0.99984249
 PV0443!SPC SD N     -   0.99984135  x   0.99993954  =   0.99978090
 PV0443!SPC WY E     -   0.99984135  x   1.00003455  =   0.99987590
 PV0443!UTM  13      -   0.99984135  x   0.99967045  =   0.99951185
 PV0443
 PV0443_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEK7569183188(NAD 83)
 PV0443
 PV0443                          SUPERSEDED SURVEY CONTROL
 PV0443
 PV0443  NAD 83(1993)-  44 59 53.16507(N)    104 02 22.78871(W) AD(       ) 2
 PV0443  NAD 83(1986)-  44 59 53.15453(N)    104 02 22.78297(W) AD(       ) 2
 PV0443  NAD 27      -  44 59 53.19000(N)    104 02 21.01000(W) AD(       ) 2
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PV0443  USSD        -  44 59 53.73900(N)    104 02 20.68100(W) AD(       ) 3
PV0443  NGVD 29 (07/19/86) 1027.0    (m)         3369.     (f) VERT ANG
PV0443
PV0443.Superseded values are not recommended for survey control.
PV0443
PV0443.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
PV0443.See file dsdata.pdf to determine how the superseded data were derived.
PV0443
PV0443_MARKER: V = STONE MONUMENT
PV0443_SETTING: 0 = UNSPECIFIED SETTING
PV0443_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
PV0443_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
PV0443+SATELLITE: SATELLITE OBSERVATIONS - August 22, 2011
PV0443
PV0443  HISTORY     - Date     Condition        Report By
PV0443  HISTORY     - 1912     MONUMENTED       CGS
PV0443  HISTORY     - 20110822 GOOD             GEOCAC
PV0443
PV0443                          STATION DESCRIPTION
PV0443
PV0443'DESCRIBED BY COAST AND GEODETIC SURVEY 1912 (EHP)
PV0443'GRANITE POST 11 INCHES SQUARE, PROJECTING ABOUT 2-1/2 FEET
PV0443'ABOVE GROUND, 271.66 METERS (891.3 FEET) N 63 DEG 41 MIN E.
PV0443'FROM STATION SOUTHEAST CORNER MONTANA, BOUNDARY
PV0443'MONUMENT ECCENTRIC.
PV0443
PV0443                          STATION RECOVERY (2011)
PV0443
PV0443'RECOVERY NOTE BY GEOCACHING 2011 (MEL)
PV0443'IN 1993 A CONCRETE PAD, INFORMATION PLAQUE AND CATTLE ENCLOSURE WERE
PV0443'PLACE AT THE CORNERSTONE.  AT THE SAME TIME THREE REFERENCE OBJECTS,
PV0443'BLM CADASTRAL SURVEY DISKS SET IN NEAR FLUSH CONCRETE POSTS, WERE
PV0443'PLACE THIRTY THREE FT EAST, SOUTH AND NORTHWEST OF THE CORNER.
PV0443'STAMPING READS MONTANA (OR SOUTH DAKOTA) '33.0 FT. TO COR.' 19'93' AND
PV0443''RM' AT THE TAIL OF A DIRECTIONAL ARROW.
PV0443'ENCLOSURE REQUIRED AND RECEIVED A SMALL AMOUNT OF REPAIR. BE PREPARED
PV0443'TO CLIMB OVER A HEAVY WIRE STOCK PANEL TO OCCUPY THIS STATION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0319 ***********************************************************************
 QT0319  DESIGNATION -  C 390
 QT0319  PID         -  QT0319
 QT0319  STATE/COUNTY-  SD/BUTTE
 QT0319  COUNTRY     -  US
 QT0319  USGS QUAD   -  GREASEWOOD DRAW (1977)
 QT0319
 QT0319                        *CURRENT SURVEY CONTROL
 QT0319  ______________________________________________________________________
 QT0319* NAD 83(1986) POSITION- 45 01 50.     (N) 103 52 46.     (W)    SCALED
 QT0319* NAVD 88 ORTHO HEIGHT -   970.502 (meters)     3184.06  (feet) ADJUSTED
 QT0319  ______________________________________________________________________
 QT0319  GEOID HEIGHT    -        -15.852 (meters)                     GEOID12B
 QT0319  DYNAMIC HEIGHT  -        970.248 (meters)     3183.22  (feet) COMP
 QT0319  MODELED GRAVITY -    980,322.1   (mgal)                       NAVD 88
 QT0319
 QT0319  VERT ORDER      -  SECOND    CLASS 0
 QT0319
 QT0319.The horizontal coordinates were scaled from a topographic map and have
 QT0319.an estimated accuracy of +/- 6 seconds.
 QT0319.
 QT0319.The orthometric height was determined by differential leveling and
 QT0319.adjusted by the NATIONAL GEODETIC SURVEY
 QT0319.in June 1991.
 QT0319
 QT0319.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0319.GEOID12B height accuracy estimate available here.
 QT0319
 QT0319.The dynamic height is computed by dividing the NAVD 88
 QT0319.geopotential number by the normal gravity value computed on the
 QT0319.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QT0319.degrees latitude (g = 980.6199 gals.).
 QT0319
 QT0319.The modeled gravity was interpolated from observed gravity values.
 QT0319
 QT0319;                    North         East     Units  Estimated Accuracy
 QT0319;SPC SD N     -   140,360.      294,420.      MT  (+/- 180 meters Scaled)
 QT0319
 QT0319_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEK882869(NAD 83)
 QT0319
 QT0319                           SUPERSEDED SURVEY CONTROL
 QT0319
 QT0319  NGVD 29 (??/??/92)  970.005  (m)          3182.42   (f) ADJ UNCH    2 0
 QT0319
 QT0319.Superseded values are not recommended for survey control.
 QT0319
 QT0319.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 QT0319.See file dsdata.pdf to determine how the superseded data were derived.
 QT0319
 QT0319_MARKER: DB = BENCH MARK DISK
 QT0319_SETTING: 46 = COPPER-CLAD STEEL ROD W/O SLEEVE (10 FT.+)
 QT0319_STAMPING: C 390 1962
 QT0319_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
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QT0319
QT0319  HISTORY     - Date     Condition        Report By
QT0319  HISTORY     - 1962     MONUMENTED       CGS
QT0319  HISTORY     - 1968     GOOD             DOD
QT0319
QT0319                          STATION DESCRIPTION
QT0319
QT0319'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
QT0319'26.2 MI N FROM BELLE FOURCHE.
QT0319'ABOUT 12.45 MILES NORTH ALONG U.S. HIGHWAY 85 FROM THE CHICAGO
QT0319'AND NORTH WESTERN RAILWAY STATION AT BELLE FOURCHE, THENCE
QT0319'13.75 MILES NORTH ALONG A GRAVELED ROAD, IN SECTION 4, T 12 N,
QT0319'R 2 E, 58 FEET SOUTHWEST OF THE CENTER LINE OF THE ROAD, 5 FEET
QT0319'WEST OF A TELEPHONE POLE, 2 FEET NORTHEAST OF A FENCE, 1.7 FEET
QT0319'SOUTHEAST OF A METAL WITNESS POST, ABOUT 4 FEET BELOW THE LEVEL
QT0319'OF THE ROAD, AND ON THE TOP OF A 5/8-INCH COPPER COATED ROD THAT
QT0319'IS DRIVEN TO A DEPTH OF 16 FEET AND IS ENCASED IN A 6-INCH TILE
QT0319'WHICH PROJECTS 8 INCHES.
QT0319
QT0319                          STATION RECOVERY (1968)
QT0319
QT0319'RECOVERY NOTE BY US DEPARTMENT OF DEFENSE 1968
QT0319'RECOVERED IN GOOD CONDITION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU0990 ***********************************************************************
 PU0990  DESIGNATION -  D 410
 PU0990  PID         -  PU0990
 PU0990  STATE/COUNTY-  SD/MEADE
 PU0990  COUNTRY     -  US
 PU0990  USGS QUAD   -  REDOWL (1959)
 PU0990
 PU0990                        *CURRENT SURVEY CONTROL
 PU0990  ______________________________________________________________________
 PU0990* NAD 83(1986) POSITION- 44 44 20.06   (N) 102 31 57.15   (W)    HD_HELD1
 PU0990* NAVD 88 ORTHO HEIGHT -   820.483 (meters)     2691.87  (feet) ADJUSTED
 PU0990  ______________________________________________________________________
 PU0990  GEOID HEIGHT    -        -18.398 (meters)                     GEOID12B
 PU0990  DYNAMIC HEIGHT  -        820.288 (meters)     2691.23  (feet) COMP
 PU0990  MODELED GRAVITY -    980,351.9   (mgal)                       NAVD 88
 PU0990
 PU0990  VERT ORDER      -  SECOND    CLASS 0
 PU0990
 PU0990.The horizontal coordinates were determined by differentially corrected
 PU0990.hand held GPS observations or other comparable positioning techniques
 PU0990.and have an estimated accuracy of +/- 3 meters.
 PU0990.
 PU0990.The orthometric height was determined by differential leveling and
 PU0990.adjusted by the NATIONAL GEODETIC SURVEY
 PU0990.in June 1991.
 PU0990
 PU0990.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU0990.GEOID12B height accuracy estimate available here.
 PU0990
 PU0990.The dynamic height is computed by dividing the NAVD 88
 PU0990.geopotential number by the normal gravity value computed on the
 PU0990.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU0990.degrees latitude (g = 980.6199 gals.).
 PU0990
 PU0990.The modeled gravity was interpolated from observed gravity values.
 PU0990
 PU0990;                    North         East     Units  Estimated Accuracy
 PU0990;SPC SD N     -   103,766.1     399,454.3     MT  (+/- 3 meters HH1 GPS)
 PU0990
 PU0990_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK9535556908(NAD 83)
 PU0990
 PU0990                           SUPERSEDED SURVEY CONTROL
 PU0990
 PU0990  NGVD 29 (??/??/92)  820.017  (m)          2690.34   (f) ADJ UNCH    2 0
 PU0990
 PU0990.Superseded values are not recommended for survey control.
 PU0990
 PU0990.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU0990.See file dsdata.pdf to determine how the superseded data were derived.
 PU0990
 PU0990_MARKER: DB = BENCH MARK DISK
 PU0990_SETTING: 66 = SET IN ROCK OUTCROP
 PU0990_STAMPING: D 410 1962
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PU0990_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
PU0990+STABILITY: POSITION/ELEVATION WELL
PU0990
PU0990  HISTORY     - Date     Condition        Report By
PU0990  HISTORY     - 1962     MONUMENTED       CGS
PU0990
PU0990                          STATION DESCRIPTION
PU0990
PU0990'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
PU0990'4.1 MI NE FROM RED OWL.
PU0990'1.75 MILES NORTH ALONG A ROAD FROM THE STORE AT RED OWL, THENCE
PU0990'1.0 MILE EAST, THENCE 1.35 MILES NORTH ALONG ROADS, 0.5 MILE
PU0990'SOUTH OF A GROUP OF FARM BUILDINGS, IN THE TOP OF A LEDGE OF
PU0990'A FLAT ROCK OUTCROP, 32 FEET EAST OF THE CENTER LINE OF THE
PU0990'ROAD, 29.0 FEET WEST OF A FENCE, 3.0 FEET NORTHEAST OF A
PU0990'WITNESS POST AND ABOUT 3 FEET HIGHER THAN THE ROAD.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU1766 ***********************************************************************
 PU1766  DESIGNATION -  DRY
 PU1766  PID         -  PU1766
 PU1766  STATE/COUNTY-  SD/BUTTE
 PU1766  COUNTRY     -  US
 PU1766  USGS QUAD   -  MUD BUTTES (1980)
 PU1766
 PU1766                        *CURRENT SURVEY CONTROL
 PU1766 ______________________________________________________________________
 PU1766* NAD 83(1996) POSITION- 44 45 26.29306(N) 103 51 25.66959(W)   ADJUSTED
 PU1766* NAVD 88 ORTHO HEIGHT -  1016.840 (meters)     3336.08  (feet) ADJUSTED
 PU1766 ______________________________________________________________________
 PU1766  GEOID HEIGHT    -        -15.492 (meters)                    GEOID12B
 PU1766  LAPLACE CORR    -         -4.28  (seconds)                   DEFLEC12B
 PU1766  DYNAMIC HEIGHT  -       1016.565 (meters)     3335.18  (feet) COMP
 PU1766  MODELED GRAVITY -    980,311.0   (mgal)                      NAVD 88
 PU1766
 PU1766  HORZ ORDER      -  SECOND
 PU1766  VERT ORDER      -  FIRST     CLASS II
 PU1766
 PU1766.The horizontal coordinates were established by classical geodetic methods
 PU1766.and adjusted by the National Geodetic Survey in January 1998.
 PU1766.
 PU1766.The orthometric height was determined by differential leveling and
 PU1766.adjusted by the NATIONAL GEODETIC SURVEY
 PU1766.in April 2000.
 PU1766
 PU1766.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU1766.GEOID12B height accuracy estimate available here.
 PU1766
 PU1766.The Laplace correction was computed from DEFLEC12B derived deflections.
 PU1766
 PU1766.The dynamic height is computed by dividing the NAVD 88
 PU1766.geopotential number by the normal gravity value computed on the
 PU1766.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU1766.degrees latitude (g = 980.6199 gals.).
 PU1766
 PU1766.The modeled gravity was interpolated from observed gravity values.
 PU1766
 PU1766. The following values were computed from the NAD 83(1996) position.
 PU1766
 PU1766;                    North         East     Units Scale Factor Converg.
 PU1766;SPC SD N     -   109,947.153   294,726.456   MT  0.99995220   -2 43 47.4
 PU1766;SPC SD N     -   360,718.28    966,948.38    sFT  0.99995220   -2 43 47.4
 PU1766;UTM  13      - 4,956,625.733   590,455.114   MT  0.99970061   +0 48 17.1
 PU1766
 PU1766!             -  Elev Factor  x  Scale Factor =   Combined Factor
 PU1766!SPC SD N     -   0.99984302  x   0.99995220  =   0.99979523
 PU1766!UTM  13      -   0.99984302  x   0.99970061  =   0.99954368
 PU1766
 PU1766:                Primary Azimuth Mark                     Grid Az
 PU1766:SPC SD N     -  DRY AZ MK                                140 30 34.7
 PU1766:UTM  13      -  DRY AZ MK                                136 58 30.2
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PU1766
PU1766_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEK9045556625(NAD 83)
PU1766
PU1766|----------------------------------------------------------------------|
PU1766| PID    Reference Object                    Distance      Geod. Az   |
PU1766|                                                          dddmmss.s  |
PU1766| PU1765 DRY RM 1                            10.349 METERS 13523      |
PU1766| PU1764 DRY AZ MK                                         1374647.3  |
PU1766| PU1767 DRY RM 2                            11.772 METERS 32719      |
PU1766|----------------------------------------------------------------------|
PU1766
PU1766                          SUPERSEDED SURVEY CONTROL
PU1766
PU1766  NAD 83(1993)-  44 45 26.28828(N)    103 51 25.67054(W) AD(       ) 2
PU1766  NAD 83(1986)-  44 45 26.28192(N)    103 51 25.66435(W) AD(       ) 2
PU1766  NAD 27      -  44 45 26.33580(N)    103 51 23.92740(W) AD(       ) 2
PU1766  NAVD 88 (06/15/91) 1016.823  (m)          3336.03   (f) SUPERSEDED  1 2
PU1766  NGVD 29 (??/??/92) 1016.344  (m)          3334.46   (f) ADJ UNCH    1 2
PU1766  NGVD 29            1016.34   (m)          3334.4    (f) LEVELING    3
PU1766
PU1766.Superseded values are not recommended for survey control.
PU1766
PU1766.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
PU1766.See file dsdata.pdf to determine how the superseded data were derived.
PU1766
PU1766_MARKER: DS = TRIANGULATION STATION DISK
PU1766_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
PU1766_STAMPING: DRY 1950
PU1766_MARK LOGO: CGS
PU1766_MAGNETIC: N = NO MAGNETIC MATERIAL
PU1766_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
PU1766+STABILITY: SURFACE MOTION
PU1766_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
PU1766+SATELLITE: SATELLITE OBSERVATIONS - August 22, 2011
PU1766
PU1766  HISTORY     - Date     Condition        Report By
PU1766  HISTORY     - 1950     MONUMENTED       CGS
PU1766  HISTORY     - 1962     GOOD             CGS
PU1766  HISTORY     - 1962     GOOD             CGS
PU1766  HISTORY     - 1978     GOOD             NGS
PU1766  HISTORY     - 1984     GOOD             LOCENG
PU1766  HISTORY     - 19980920 GOOD             NGS
PU1766  HISTORY     - 20110822 GOOD             GEOCAC
PU1766
PU1766                          STATION DESCRIPTION
PU1766
PU1766'DESCRIBED BY COAST AND GEODETIC SURVEY 1950 (VRS)
PU1766'THE STATION IS LOCATED ABOUT 6.0 MILES NORTH OF BELLE FOURCHE,
PU1766'0.2 MILE WEST OF U.S. HIGHWAY NO. 85, 21 FEET EAST OF THE
PU1766'CENTER OF A GRADED DIRT ROAD, 5 FEET NORTHWEST OF A WITNESS
PU1766'POST, AND 4.5 FEET WEST OF A WIRE FENCE.
PU1766'
PU1766'TO REACH FROM THE JUNCTION OF U.S. HIGHWAYS NO. 212 AND 85,
PU1766'AT THE NORTH EDGE OF BELLE FOURCHE.  GO NORTH ON U.S. NO. 85
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PU1766'FOR 5.1 MILES TO THE AZIMUTH MARK ON THE RIGHT AS DESCRIBED.
PU1766'CONTINUE NORTH ON U.S. NO. 85 FOR 0.2 MILE TO A SIDE ROAD
PU1766'LEFT. TURN LEFT AND GO WEST ON A GRADED DIRT ROAD FOR 0.2
PU1766'MILE TO THE STATION ON THE RIGHT AS DESCRIBED.
PU1766'
PU1766'THE STATION MARK PROJECTS 4 INCHES, AND THE DISK IS STAMPED
PU1766'DRY 1950.
PU1766'
PU1766'REFERENCE MARK NO. 1 IS 20 FEET EAST OF THE CENTER OF THE ROAD,
PU1766'AND 2.5 FEET WEST OF A WIRE FENCE. IT PROJECTS 6 INCHES, AND
PU1766'THE DISK IS STAMPED DRY NO 1 1950.
PU1766'
PU1766'REFERENCE MARK NO. 2 IS 43 FEET EAST OF THE CENTER OF THE ROAD,
PU1766'AND 1.4 FEET WEST OF A WIRE FENCE. IT PROJECTS 6 INCHES, AND THE
PU1766'DISK IS STAMPED DRY NO 2 1950.
PU1766'
PU1766'THE AZIMUTH MARK IS 42 FEET EAST OF THE CENTER OF U.S. HIGHWAY
PU1766'NO. 85, 3 FEET NORTH OF A WITNESS POST, AND 1 FOOT WEST OF A
PU1766'WIRE FENCE. IT PROJECTS 4 INCHES, AND THE DISK IS STAMPED DRY
PU1766'1950.
PU1766'
PU1766'ALL MARKS ARE STANDARD DISKS SET IN THE TOPS OF 12-INCH CONCRETE
PU1766'CYLINDERS.
PU1766
PU1766   STATION RECOVERY (1962)
PU1766
PU1766'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962 (JKR)
PU1766'STATION MARK, REFERENCE MARKS NOS. 1 AND 2 AND THE AZIMUTH
PU1766'MARK WERE RECOVERED AND FOUND TO BE IN GOOD CONDITION. THE
PU1766'DISTANCE TO REFERENCE MARK NO. 1 WAS VERIFIED. THE DIRECTION
PU1766'TO REFERENCE MARK NO. 1 MISSED THE PREVIOUS DIRECTION 1 MINUTE
PU1766'59 SECONDS. THE DISTANCE AND DIRECTION TO REFERENCE MARK NO. 2
PU1766'WERE VERIFIED. THE DIRECTION TO THE AZIMUTH MARK WAS VERIFIED.
PU1766'
PU1766'FOLLOWING IS A NEW DESCRIPTION--
PU1766'
PU1766'THE STATION IS 6 MILES NORTH OF BELLE FOURCHE, 0.25 MILES WEST
PU1766'OF U.S. HIGHWAY 85 AND ON THE NORTHEAST RIGHT-OF-WAY OF A
PU1766'DIRT ROAD.
PU1766'
PU1766'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 212 AND
PU1766'85 AT THE NORTH EDGE OF BELLE FOURCHE, GO NORTH ON HIGHWAY 85
PU1766'FOR 5.0 MILES TO THE TOP OF A HILL AND A DIRT ROAD ON THE
PU1766'LEFT. TURN LEFT AND GO WEST ON THE DIRT ROAD FOR 0.25 MILE TO
PU1766'THE STATION ON THE RIGHT.
PU1766'
PU1766'STATION MARK IS A STANDARD DISK STAMPED DRY 1950, SET IN A
PU1766'ROUND CONCRETE POST WHICH PROJECTS 2 INCHES. IT IS 27 FEET
PU1766'NORTHEAST OF THE CENTER OF THE DIRT ROAD, 7.5 FEET SOUTH OF A
PU1766'METAL WITNESS POST AND 5 FEET SOUTHWEST OF A FENCE.
PU1766'THE UNDERGROUND MARK WAS NOT INSPECTED BY THIS PARTY.
PU1766'
PU1766'REFERENCE MARK NO. 1, A STANDARD DISK STAMPED DRY NO 1 1950, IS
PU1766'SET IN A ROUND CONCRETE POST WHICH PROJECTS 4 INCHES. IT IS

PU1766'22 FEET NORTH OF THE CENTER OF THE DIRT ROAD AND 3 FEET
PU1766'SOUTH OF THE FENCE.
PU1766'
PU1766'REFERENCE MARK NO. 2, A STANDARD DISK STAMPED DRY NO 2 1950,
PU1766'IS SET IN A ROUND CONCRETE POST WHICH PROJECTS 8 INCHES. IT
PU1766'IS 46 FEET NORTHWEST OF THE CENTER OF THE DIRT ROAD AND 1.5
PU1766'FEET SOUTHEAST OF THE FENCE.
PU1766'
PU1766'AZIMUTH MARK, A STANDARD DISK STAMPED DRY 1950, IS SET IN A
PU1766'ROUND CONCRETE POST WHICH PROJECTS 4 INCHES. IT IS 43 FEET
PU1766'EAST OF THE CENTER OF HIGHWAY 85, 10.6 FEET EAST OF A
PU1766'TELEPHONE POLE, 10 FEET NORTH OF A T-FENCE CORNER, 1 FOOT
PU1766'WEST OF A FENCE AND 1 FOOT EAST OF A METAL WITNESS POST.
PU1766'
PU1766'TO REACH THE AZIMUTH MARK FROM THE STATION, GO EAST ON THE
PU1766'DIRT ROAD FOR 0.25 MILE TO U.S. HIGHWAY 85. TURN RIGHT AND
PU1766'GO SOUTH ON HIGHWAY 85 FOR 0.2 MILE TO THE AZIMITH MARK ON
PU1766'THE LEFT.
PU1766'
PU1766'NOTE--REFERENCE MARKS WERE MEASURED PULLING 5 KG. TAPE TENSION.
PU1766
PU1766 STATION RECOVERY (1962)
PU1766
PU1766'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962
PU1766'6.4 MI N FROM BELLE FOURCHE.
PU1766'ABOUT 6.1 MILES NORTH ALONG U.S. HIGHWAY 85 FROM THE CHICAGO
PU1766'AND NORTH WESTERN RAILWAY STATION AT BELLE FOURCHE, THENCE 0.3
PU1766'MILE WEST ALONG A GRAVELED ROAD, ON THE INSIDE OF A CURVE IN
PU1766'SECTION 10, T 9 N, R 2 E, 21 FEET NORTHEAST OF THE CENTER LINE OF
PU1766'THE ROAD, 5 FEET SOUTHWEST OF A FENCE, 1.1 FEET NORTH OF A METAL
PU1766'WITNESS POST, ABOUT LEVEL WITH THE ROAD, AND SET IN THE TOP OF A
PU1766'CONCRETE POST PROJECTING 1-INCH.
PU1766
PU1766 STATION RECOVERY (1978)
PU1766
PU1766'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1978 (CLN)
PU1766'STATION MARK, RM 1, RM 2 AND AZIMUTH MARK WERE RECOVERED IN GOOD
PU1766'CONDITION.
PU1766'
PU1766'STATION WAS NOT OCCUPIED AT THIS TIME
PU1766'
PU1766'THE STATION IS LOCATED ABOUT 6 MILES NORTH OF BELLE FOURCHE, 0.2 MILE
PU1766'WEST OF U.S. HIGHWAY 85.
PU1766'
PU1766'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 212 AND 85 AT
PU1766'THE NORTH EDGE OF BELLE FOURCHE, GO NORTH U.S. HIGHWAY 85 FOR 4.9
PU1766'MILE TO AZIMUTH MARK ABOUT 300 FEET TO THE RIGHT. CONTINUE NORTH ON
PU1766'HIGHWAY FOR 0.15 MILE TO SIDE ROAD LEFT, TURN LEFT, GO WEST ON GRAVEL
PU1766'ROAD FOR 0.2 MILE TO CATTLE GUARD AND STATION ON RIGHT.
PU1766'
PU1766'THE STATION IS A STANDARD NATIONAL GEODETIC SURVEY DISK STAMPED
PU1766'---DRY 1950---SET INTO THE TOP OF A ROUND CONCRETE MONUMENT 30 CM
PU1766'(12 INCHES) IN DIAMETER PROJECTING 5 CM (2 INCHES) ABOVE THE GROUND
PU1766'LOCATED 14.9 METERS (49 FEET) NW FROM CENTER OF CATTLE GUARD, 6.1

PU1766'METERS (20 FEET) SE FROM POWER POLE, AND 3.23 METERS (10.6 FEET) SE
PU1766'FROM WITNESS POST.
PU1766'
PU1766'THE UNDERGROUND MARK IS A STANDARD NATIONAL GEODETIC SURVEY DISK
PU1766'STAMPED---DRY 1950---.
PU1766'
PU1766'REFERENCE MARK NO. 1 IS A STANDARD NATIONAL GEODETIC SURVEY DISK
PU1766'STAMPED---DRY NO 1 1950---SET INTO THE TOP OF A ROUND CONCRETE
PU1766'MONUMENT 30 CM (12 INCHES) IN DIAMETER PROJECTING 5 CM (2 INCHES)
PU1766'ABOVE THE GROUND LOCATED 16.5 METERS (54 FEET) SE FROM POWER LINE
PU1766'POLE, 13.26 METERS (43.5 FEET) SE FROM WITNESS SIGN NAILED TO FENCE
PU1766'POST, 6.7 METERS (22 FEET) NNW FROM CENTER OF CATTLE GUARD, 1.98
PU1766'METERS (6.5 FEET) WSW FROM FENCE CORNER, AND IS LEVEL WITH THE
PU1766'STATION.
PU1766'
PU1766'REFERENCE MARK NO. 2 IS A STANDARD NATIONAL GEODETIC SURVEY DISK
PU1766'STAMPED---DRY NO 2 1950---SET INTO THE TOP OF A ROUND CONCRETE
PU1766'MONUMENT 30 CM (12 INCHES) IN DIAMETER PROJECTING 13 CM (5 INCHES)
PU1766'ABOVE THE GROUND LOCATED 8.5 METERS (28 FEET) NW FROM WITNESS SIGN
PU1766'NAILED TO FENCE POST, 5.5 METERS (18 FEET) NW FROM POWER LINE POLE,
PU1766'14.0 METERS (46 FEET) NW FROM CENTER ROAD, 0.46 METER (1.5 FEET) SE
PU1766'FROM FENCE, AND IS LEVEL WITH THE STATION.
PU1766'
PU1766'AZIMUTH MARK NO. 1 IS A STANDARD NATIONAL GEODETIC SURVEY DISK
PU1766'STAMPED---DRY 1950---SET INTO THE TOP OF A ROUND CONCRETE MONUMENT
PU1766'30 CM (12 INCHES) IN DIAMETER PROJECTING 10 CM (4 INCHES) ABOVE THE
PU1766'GROUND LOCATED 86.3 METERS (283 FEET) E FROM CENTER OF U.S. HIGHWAY
PU1766'85, 64.9 METERS (213 FEET) SE FROM GATE, 14.0 METERS (46 FEET) SW
PU1766'FROM POWER LINE POLE 0 1154, 2.59 METERS (8.5 FEET) N FROM FENCE
PU1766'CORNER, 0.37 METER (1.2 FEET) NE FROM WITNESS POST, AND 0.3 METER (1
PU1766'FOOT) W FROM FENCE.
PU1766
PU1766 STATION RECOVERY (1984)
PU1766
PU1766'RECOVERY NOTE BY LOCAL ENGINEER (INDIVIDUAL OR FIRM) 1984 (MLC)
PU1766'DRY 1950 RECOVERED GOOD.
PU1766'
PU1766'DRY NO 1 1950 RECOVERED GOOD.
PU1766'
PU1766'DRY NO 2 1950 RECOVERED GOOD.
PU1766'
PU1766'DISTANCE AND DIRECTION FROM NEAREST TOWN--6 MILES NORTH OF BELLE
PU1766'FOURCHE.
PU1766
PU1766 STATION RECOVERY (1998)
PU1766
PU1766'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1998 (GAS)
PU1766'8.4 KM (5.20 MI) NORTHERLY ALONG U.S. HIGHWAY 85 FROM THE JUNCTION OF
PU1766'U.S. HIGHWAY 212 IN BELLE FOURCHE, THENCE 0.4 KM (0.25 MI) WESTERLY
PU1766'ALONG A GRAVELED ROAD, 11.8 M (38.7 FT) EAST OF REFERENCE MARK 2, 10.3
PU1766'M (33.8 FT) WEST OF REFERENCE MARK 1, 9.0 M (29.5 FT) NORTHEAST OF THE
PU1766'ROAD CENTER, 1.3 M (4.3 FT) SOUTHWEST OF A WITNESS POST AND FENCE, 0.3
PU1766'M (1.0 FT) ABOVE THE LEVEL OF THE ROAD, AND THE MONUMENT PROJECTS 0.05
PU1766'M (0.16 FT) ABOVE THE GROUND SURFACE. NOTE--THE MONUMENT IS ON

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PU1766'PROPERTY OWNED BY TOM DAVIS, HC 64, BOX 38, BELLE FOURCHE, SD 57717.
PU1766
PU1766                          STATION RECOVERY (2011)
PU1766
PU1766'RECOVERY NOTE BY GEOCACHING 2011 (MEL)
PU1766'RM 1, RM 2 AND AZ ALSO FOUND.  AZ IS ABOUT TEN FT ABOVE THE CURRENT
PU1766'ROAD.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU0982 ***********************************************************************
 PU0982  DESIGNATION -  F 410
 PU0982  PID         -  PU0982
 PU0982  STATE/COUNTY-  SD/MEADE
 PU0982  COUNTRY     -  US
 PU0982  USGS QUAD   -  OPAL WEST SE (1983)
 PU0982
 PU0982                        *CURRENT SURVEY CONTROL
 PU0982  ______________________________________________________________________
 PU0982* NAD 83(1986) POSITION- 44 47 08.     (N) 102 31 52.     (W)    SCALED
 PU0982* NAVD 88 ORTHO HEIGHT -   799.517 (meters)     2623.08   (feet) ADJUSTED
 PU0982  ______________________________________________________________________
 PU0982  GEOID HEIGHT    -        -18.383 (meters)                      GEOID12B
 PU0982  DYNAMIC HEIGHT  -        799.336 (meters)     2622.49   (feet) COMP
 PU0982  MODELED GRAVITY -    980,364.0   (mgal)                        NAVD 88
 PU0982
 PU0982  VERT ORDER      -  SECOND    CLASS 0
 PU0982
 PU0982.The horizontal coordinates were scaled from a topographic map and have
 PU0982.an estimated accuracy of +/- 6 seconds.
 PU0982.
 PU0982.The orthometric height was determined by differential leveling and
 PU0982.adjusted by the NATIONAL GEODETIC SURVEY
 PU0982.in June 1991.
 PU0982
 PU0982.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU0982.GEOID12B height accuracy estimate available here.
 PU0982
 PU0982.The dynamic height is computed by dividing the NAVD 88
 PU0982.geopotential number by the normal gravity value computed on the
 PU0982.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU0982.degrees latitude (g = 980.6199 gals.).
 PU0982
 PU0982.The modeled gravity was interpolated from observed gravity values.
 PU0982
 PU0982;                    North         East     Units  Estimated Accuracy
 PU0982;SPC SD N     -   108,940.      399,730.      MT  (+/- 180 meters Scaled)
 PU0982
 PU0982_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK953620(NAD 83)
 PU0982
 PU0982                           SUPERSEDED SURVEY CONTROL
 PU0982
 PU0982  NGVD 29 (??/??/92)  799.056  (m)          2621.57   (f) ADJ UNCH    2 0
 PU0982
 PU0982.Superseded values are not recommended for survey control.
 PU0982
 PU0982.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU0982.See file dsdata.pdf to determine how the superseded data were derived.
 PU0982
 PU0982_MARKER: DB = BENCH MARK DISK
 PU0982_SETTING: 66 = SET IN ROCK OUTCROP
 PU0982_STAMPING: F 410 1962
 PU0982_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
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PU0982+STABILITY: POSITION/ELEVATION WELL
PU0982
PU0982  HISTORY     - Date     Condition        Report By
PU0982  HISTORY     - 1962     MONUMENTED       CGS
PU0982
PU0982                          STATION DESCRIPTION
PU0982
PU0982'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
PU0982'7.5 MI N FROM RED OWL.
PU0982'1.75 MILES NORTH ALONG A ROAD FROM THE STORE AT RED OWL, THENCE
PU0982'1.0 MILE EAST AND 4.75 MILES NORTH ALONG ROADS, AT A SUMMIT,
PU0982'IN THE TOP OF A LARGE FLAT OUTCROP PROJECTING ABOUT 1 FOOT,
PU0982'27 FEET EAST OF THE CENTER LINE OF THE ROAD, 22.1 FEET NORTH
PU0982'OF A WITNESS POST, 24.6 FEET WEST OF A FENCE AND ABOUT 1 FOOT
PU0982'HIGHER THAN THE ROAD.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU2652 ***********************************************************************
 PU2652  PACS        -  This is a Primary Airport Control Station.
 PU2652  DESIGNATION -  FAA 3D3 A
 PU2652  PID         -  PU2652
 PU2652  STATE/COUNTY-  SD/BUTTE
 PU2652  COUNTRY     -  US
 PU2652  USGS QUAD   -  BELLE FOURCHE (1979)
 PU2652
 PU2652                        *CURRENT SURVEY CONTROL
 PU2652  ______________________________________________________________________
 PU2652* NAD 83(2011) POSITION- 44 44 08.35639(N) 103 51 35.08765(W)   ADJUSTED
 PU2652* NAD 83(2011) ELLIP HT-   956.440 (meters)        (06/27/12)   ADJUSTED
 PU2652* NAD 83(2011) EPOCH   -  2010.00
 PU2652* NAVD 88 ORTHO HEIGHT -   971.903 (meters)     3188.65  (feet) ADJUSTED
 PU2652  ______________________________________________________________________
 PU2652  GEOID HEIGHT    -        -15.451 (meters)                     GEOID12B
 PU2652  NAD 83(2011) X  - -1,087,298.014 (meters)                     COMP
 PU2652  NAD 83(2011) Y  - -4,406,841.867 (meters)                     COMP
 PU2652  NAD 83(2011) Z  -  4,467,201.422 (meters)                     COMP
 PU2652  LAPLACE CORR    -         -4.46  (seconds)                    DEFLEC12B
 PU2652  DYNAMIC HEIGHT  -       971.636 (meters)     3187.78  (feet) COMP
 PU2652  MODELED GRAVITY -    980,309.9   (mgal)                       NAVD 88
 PU2652
 PU2652  VERT ORDER      -  FIRST     CLASS II
 PU2652
 PU2652  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 PU2652  Standards:
 PU2652         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 PU2652            Horiz  Ellip          SD_N   SD_E   SD_h      (unitless)
 PU2652  ------------------------------------------------------------------
 PU2652  NETWORK    0.99   2.94          0.46   0.32   1.50     -0.10488330
 PU2652  ------------------------------------------------------------------
 PU2652  Click here for local accuracies and other accuracy information.
 PU2652
 PU2652
 PU2652.This mark is at Belle Fourche Airport (EFC)
 PU2652
 PU2652.The horizontal coordinates were established by GPS observations
 PU2652.and adjusted by the National Geodetic Survey in June 2012.
 PU2652
 PU2652.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 PU2652.been affixed to the stable North American tectonic plate. See
 PU2652.NA2011 for more information.
 PU2652
 PU2652.The horizontal coordinates are valid at the epoch date displayed above
 PU2652.which is a decimal equivalence of Year/Month/Day.
 PU2652
 PU2652.The orthometric height was determined by differential leveling and
 PU2652.adjusted by the NATIONAL GEODETIC SURVEY
 PU2652.in April 2000.
 PU2652
 PU2652.No vertical observational check was made to the station.
 PU2652
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PU2652.Significant digits in the geoid height do not necessarily reflect accuracy.
PU2652.GEOID12B height accuracy estimate available here.
PU2652
PU2652.The X, Y, and Z were computed from the position and the ellipsoidal ht.
PU2652
PU2652.The Laplace correction was computed from DEFLEC12B derived deflections.
PU2652
PU2652.The ellipsoidal height was determined by GPS observations
PU2652.and is referenced to NAD 83.
PU2652
PU2652.The dynamic height is computed by dividing the NAVD 88
PU2652.geopotential number by the normal gravity value computed on the
PU2652.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
PU2652.degrees latitude (g = 980.6199 gals.).
PU2652
PU2652.The modeled gravity was interpolated from observed gravity values.
PU2652
PU2652. The following values were computed from the NAD 83(2011) position.
PU2652
PU2652;                    North         East     Units Scale Factor Converg.
PU2652;SPC SD N     -   107,554.075   294,404.907   MT  0.99995420   -2 43 54.1
PU2652;SPC SD N     -   352,866.99    965,893.43   sFT  0.99995420   -2 43 54.1
PU2652;UTM  13      - 4,954,217.993   590,281.750   MT  0.99970023   +0 48 09.4
PU2652
PU2652!             -  Elev Factor  x  Scale Factor =   Combined Factor
PU2652!SPC SD N     -   0.99985006  x   0.99995420  =   0.99980427
PU2652!UTM  13      -   0.99985006  x   0.99970023  =   0.99955034
PU2652
PU2652:                Primary Azimuth Mark                    Grid Az
PU2652:SPC SD N     -  FAA 3D3 B                               316 51 28.7
PU2652:UTM  13      -  FAA 3D3 B                               313 19 25.2
PU2652
PU2652_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEK9028154217(NAD 83)
PU2652
PU2652|-----------------------------------------------------------------------|
PU2652| PID    Reference Object                    Distance      Geod. Az   |
PU2652|                                                          dddmmss.s |
PU2652| PU2653 FAA 3D3 B                          APPROX. 0.6 KM 3140734.6 |
PU2652|-----------------------------------------------------------------------|
PU2652
PU2652                          SUPERSEDED SURVEY CONTROL
PU2652
PU2652  NAD 83(2007)-  44 44 08.35626(N)    103 51 35.08878(W) AD(2002.00) 0
PU2652  ELLIP H (02/10/07)  956.468  (m)                       GP(2002.00)
PU2652  ELLIP H (04/15/04)  956.463  (m)                       GP(       ) 2 1
PU2652  NAD 83(1996)-  44 44 08.35556(N)    103 51 35.08863(W) AD(       ) B
PU2652  ELLIP H (04/18/97)  956.528  (m)                       GP(       ) 4 1
PU2652  NAD 83(1993)-  44 44 08.34954(N)    103 51 35.09111(W) AD(       ) 1
PU2652  NAD 83(1986)-  44 44 08.34409(N)    103 51 35.07978(W) AD(       ) 1
PU2652  NAVD 88 (04/18/97)  971.85   (m)  GEOID96 model used   GPS OBS
PU2652  NGVD 29 (02/28/92)  971.52   (m)  GEOID90 model used   GPS OBS
PU2652
PU2652.Superseded values are not recommended for survey control.
PU2652
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PU2652.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
PU2652.See file dsdata.pdf to determine how the superseded data were derived.
PU2652
PU2652_MARKER: F = FLANGE-ENCASED ROD
PU2652_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
PU2652_STAMPING: FAA 3D3 A 1991
PU2652_MARK LOGO: NGS
PU2652_PROJECTION: FLUSH
PU2652_MAGNETIC: I = MARKER IS A STEEL ROD
PU2652_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
PU2652_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
PU2652+SATELLITE: SATELLITE OBSERVATIONS - June 13, 2010
PU2652_ROD/PIPE-DEPTH: 3.4  meters
PU2652_SLEEVE-DEPTH  : 0.9 meters
PU2652
PU2652  HISTORY     - Date     Condition        Report By
PU2652  HISTORY     - 1991     MONUMENTED       NGS
PU2652  HISTORY     - 19911001 GOOD             USFS
PU2652  HISTORY     - 19960524 GOOD             NGS
PU2652  HISTORY     - 19980920 GOOD             NGS
PU2652  HISTORY     - 20100613 GOOD             WOOLPT
PU2652
PU2652                          STATION DESCRIPTION
PU2652
PU2652'DESCRIBED BY NATIONAL GEODETIC SURVEY 1991
PU2652'THE STATION IS LOCATED ABOUT 5.6 KM (3.5 MI) NORTH OF BELLE FOURCHE,
PU2652'AT THE BELLE FOURCHE MUNICIPAL AIRPORT.  OWNERSHIP--CITY OF BELLE
PU2652'FOURCHE, CITY HALL, 606 6TH AVENUE, BELLE FOURCHE, SD 57717. AIRPORT
PU2652'MANAGER IS LYN SMEENK, PHONE 605-892-6345, OR JIM MCDANIELS AT
PU2652'AIRPORT, PHONE 605-892-6125.
PU2652'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAYS 212 WEST AND
PU2652'85 NORTH, LOCATED ON THE NORTH SIDE OF BELLE FOURCHE, GO NORTH ON
PU2652'HIGHWAY 85 FOR 5.95 KM (3.70 MI) TO THE AIRPORT ENTRANCE ROAD ON THE
PU2652'LEFT. TURN LEFT, WEST, ON AIRPORT ENTRANCE ROAD FOR 0.40 KM
PU2652'(0.25 MI) TO A BLACTOP THEN GRAVEL ROAD ON THE RIGHT.  TURN RIGHT,
PU2652'NORTH, ON BLACKTOP THEN GRAVEL ROAD FOR 0.32 KM (0.20 MI) TO THE WIND
PU2652'SOCK AND THE STATION ON THE LEFT.
PU2652'THE STATION IS LOCATED 45.3 M (148.6 FT) WEST FROM A UTILITY POLE,
PU2652'15.2 M (49.9 FT) SOUTH-SOUTHEAST FROM THE WIND SOCK, 1.8 M (5.9 FT)
PU2652'WEST FROM A FIBERGLASS WITNESS POST, 1.6 M (5.2 FT) WEST FROM THE WEST
PU2652'END OF A RED AND BLACK WIND SOCK MARKER AND 1.2 M (3.9 FT) EAST FROM
PU2652'THE EAST END OF AN ORANGE AND BLACK WIND SOCK MARKER.
PU2652
PU2652                          STATION RECOVERY (1991)
PU2652
PU2652'RECOVERY NOTE BY US FOREST SERVICE 1991
PU2652'RECOVERED IN GOOD CONDITION.
PU2652
PU2652                          STATION RECOVERY (1996)
PU2652
PU2652'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (DFC)
PU2652'THE STATION IS LOCATED ABOUT 5.6 KM (3.45 MI) NORTH OF BELLE FOURCHE,
PU2652'AT THE BELLE FOURCHE MUNICIPAL AIRPORT.  OWNERSHIP--CITY OF BELLE
PU2652'FOURCHE, CITY HALL, 606 6TH AVENUE, BELLE FOURCHE SD 57717.  AIRPORT
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PU2652'MANAGER IS LYN SMEENK, PHONE 605-892-6345.  TO REACH THE STATION FROM
PU2652'THE JUNCTION OF U.S. HIGHWAYS 212 WEST AND 85 NORTH ON THE NORTH SIDE
PU2652'OF BELLE FOURCHE, GO NORTH ON HIGHWAY 85 FOR 5.95 KM (3.70 MI) TO THE
PU2652'AIRPORT ENTRANCE ROAD ON THE LEFT, TURN LEFT AND GO WEST ON THE
PU2652'AIRPORT ENTRANCE ROAD FOR 0.40 KM (0.25 MI) TO A BLACKTOP ROAD ON THE
PU2652'RIGHT, TURN RIGHT AND GO NORTH ON THE BLACKTOP THEN GRAVEL ROAD FOR
PU2652'0.32 KM (0.20 MI) TO THE WIND SOCK AND THE STATION ON THE LEFT. THE
PU2652'STATION IS LOCATED 45.1 M (148.0 FT) WEST OF A UTILITY POLE, 15.1 M
PU2652'(49.5 FT) SOUTH-SOUTHEAST OF THE WIND SOCK, 1.6 M (5.2 FT) EAST OF A
PU2652'WITNESS POST, 1.6 M (5.2 FT) WEST OF A METAL POST, AND 1.2 M (3.9 FT)
PU2652'EAST OF A METAL POST.  THIS STATION WAS USED AS AN AREA NAVIGATION
PU2652'APPROACH PRIMARY AIRPORT CONTROL STATION.  NOTE--ACCESS TO THE DATUM
PU2652'POINT IS THROUGH A 5-INCH LOGO CAP.
PU2652
PU2652                          STATION RECOVERY (1998)
PU2652
PU2652'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1998 (GAS)
PU2652'5.9 KM (3.65 MI) NORTHERLY ALONG U.S. HIGHWAY 85 FROM THE JUNCTION OF
PU2652'U.S. HIGHWAY 212 IN BELLE FOURCHE, THENCE 0.3 KM (0.20 MI) WESTERLY
PU2652'ALONG A PAVED ROAD LEADING WEST TO THE BELLE FOURCHE MUNICIPAL
PU2652'AIRPORT, THENCE 0.3 KM (0.20 MI) NORTHERLY ALONG A GRAVELED ROAD, 67.0
PU2652'M (219.8 FT) WEST OF THE ROAD CENTER, 45.1 M (148.0 FT) WEST OF A
PU2652'UTILITY POLE WITH 3 GUY WIRES, 15.1 M (49.5 FT) SOUTH OF A WIND SOCK,
PU2652'1.6 M (5.2 FT) EAST OF A WITNESS POST, AND 0.4 M (1.3 FT) BELOW THE
PU2652'LEVEL OF THE ROAD.  NOTE--ACCESS TO THE DATUM POINT IS THROUGH A
PU2652'5-INCH LOGO CAP.  THE SLEEVE DEPTH DOES NOT MEET THE SPECIFICATIONS
PU2652'FOR A CLASS A MARK.  THE MONUMENT IS ON PROPERTY OWNED BY THE BELLE
PU2652'FOURCHE MUNICIPAL AIRPORT, 606 6TH AVENUE, BELLE FOURCHE, SD 57717,
PU2652'TELEPHONE NUMBER (605) 892-6345.  THE MONUMENT IS A FEDERAL BASE
PU2652'NETWORK AND A PRIMARY AIRPORT CONTROL STATION.
PU2652
PU2652                          STATION RECOVERY (2010)
PU2652
PU2652'RECOVERY NOTE BY WOOLPERT CONSULTANTS 2010 (BRC)
PU2652'RECOVERED AS DESCRIBED
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC7999 ***********************************************************************
 AC7999  CBN         -  This is a Cooperative Base Network Control Station.
 AC7999  DESIGNATION -  HRN HARDING

        Ellipsoid Height       minus   Geoid12B Height        =       NAVD88 Height
        1050.073                       -15.982                        1066.055

 AC7999  PID         -  AC7999
 AC7999  STATE/COUNTY-  SD/HARDING
 AC7999  COUNTRY     -  US
 AC7999  USGS QUAD   -  HELLS CANYON (1993)
 AC7999
 AC7999                        *CURRENT SURVEY CONTROL
 AC7999  ______________________________________________________________________________
 AC7999* NAD 83(2011) POSITION- 45 22 19.56449(N) 103 50 02.14613(W)   ADJUSTED
 AC7999* NAD 83(2011) ELLIP HT-  1050.073 (meters)        (06/27/12)   ADJUSTED
 AC7999* NAD 83(2011) EPOCH   -  2010.00
 AC7999* NAVD 88 ORTHO HEIGHT -  1066.0   (meters)     3497.    (feet) GPS OBS
 AC7999  ______________________________________________________________________________
 AC7999  NAVD 88 orthometric height was determined with geoid model    GEOID96
 AC7999  GEOID HEIGHT    -        -15.828 (meters)                     GEOID96
 AC7999  GEOID HEIGHT    -        -15.982 (meters)                     GEOID12B
 AC7999  NAD 83(2011) X  - -1,073,356.248 (meters)                     COMP
 AC7999  NAD 83(2011) Y  - -4,358,779.523 (meters)                     COMP
 AC7999  NAD 83(2011) Z  -  4,517,241.999 (meters)                     COMP
 AC7999  LAPLACE CORR    -         -1.38  (seconds)                    DEFLEC12B
 AC7999
 AC7999  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC7999  Standards:
 AC7999         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC7999            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AC7999  ------------------------------------------------------------------------
 AC7999  NETWORK    1.39   4.02           0.65   0.44   2.05     -0.09018234
 AC7999  ------------------------------------------------------------------------
 AC7999  Click here for local accuracies and other accuracy information.
 AC7999
 AC7999
 AC7999.The horizontal coordinates were established by GPS observations
 AC7999.and adjusted by the National Geodetic Survey in June 2012.
 AC7999
 AC7999.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC7999.been affixed to the stable North American tectonic plate. See
 AC7999.NA2011 for more information.
 AC7999
 AC7999.The horizontal coordinates are valid at the epoch date displayed above
 AC7999.which is a decimal equivalence of Year/Month/Day.
 AC7999
 AC7999.The orthometric height was determined by GPS observations and a
 AC7999.high-resolution geoid model.
 AC7999
 AC7999.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC7999.GEOID12B height accuracy estimate available here.
 AC7999
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AC7999.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC7999
AC7999.The Laplace correction was computed from DEFLEC12B derived deflections.
AC7999
AC7999.The ellipsoidal height was determined by GPS observations
AC7999.and is referenced to NAD 83.
AC7999
AC7999. The following values were computed from the NAD 83(2011) position.
AC7999
AC7999;                     North         East     Units Scale Factor Converg.
AC7999;SPC SD N     -   178,103.827   299,795.644   MT  0.99995477   -2 42 48.3
AC7999;SPC SD N     -   584,328.97    983,579.54   sFT  0.99995477   -2 42 48.3
AC7999;UTM  13      - 5,024,948.779   591,307.317   MT  0.99970250   +0 49 47.8
AC7999
AC7999!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC7999!SPC SD N     -   0.99983540  x   0.99995477  =   0.99979017
AC7999!UTM  13      -   0.99983540  x   0.99970250  =   0.99953795
AC7999
AC7999_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEL9130724948(NAD 83)
AC7999
AC7999                           SUPERSEDED SURVEY CONTROL
AC7999
AC7999  NAD 83(2007)-  45 22 19.56439(N)    103 50 02.14724(W) AD(2002.00) 0
AC7999  ELLIP H (02/10/07) 1050.107  (m)                       GP(2002.00)
AC7999  ELLIP H (04/15/04) 1050.107  (m)                       GP(       ) 2 1
AC7999  NAD 83(1996)-  45 22 19.56368(N)    103 50 02.14666(W) AD(       ) B
AC7999  ELLIP H (04/18/97) 1050.180  (m)                       GP(       ) 4 1
AC7999
AC7999.Superseded values are not recommended for survey control.
AC7999
AC7999.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC7999.See file dsdata.pdf to determine how the superseded data were derived.
AC7999
AC7999_MARKER: Z = SEE DESCRIPTION
AC7999_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC7999_STAMPING: HRN-HARDING 1995
AC7999_MARK LOGO: NGS
AC7999_PROJECTION: RECESSED 17 CENTIMETERS
AC7999_MAGNETIC: P = MARKER IS A STEEL PIPE
AC7999_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AC7999_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC7999+SATELLITE: SATELLITE OBSERVATIONS - September 08, 1996
AC7999_ROD/PIPE-DEPTH: 12.8 meters
AC7999_SLEEVE-DEPTH  : 1.8 meters
AC7999
AC7999  HISTORY     - Date     Condition        Report By
AC7999  HISTORY     - 1995     MONUMENTED       SDDT
AC7999  HISTORY     - 19960908 GOOD             NGS
AC7999
AC7999                            STATION DESCRIPTION
AC7999
AC7999'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC7999'THE STATION IS LOCATED ABOUT 21.0 MI (33.8 KM) SOUTHWEST OF BUFFALO,
AC7999'16.0 MI (25.7 KM) NORTHWEST OF REDIG, 15.0 MI (24.1 KM) SOUTHEAST OF
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AC7999'CAMP CROOK, AND 2.0 MI (3.2 KM) SOUTH OF HARDING, ON COUNTY ROAD 897.
AC7999'OWNERSHIP--HARDING COUNTY. TO REACH THE STATION FROM THE JUNCTION OF
AC7999'U.S. HIGHWAY 85 NORTH AND STATE HIGHWAY 20 IN BUFFALO, GO WEST ON
AC7999'STATE HIGHWAY 20 FOR 15.95 MI (25.67 KM) TO THE JUNCTION OF COUNTY
AC7999'ROAD 897 LEFT, TURN LEFT AND GO SOUTH ON COUNTY ROAD 897 FOR 14.9 MI
AC7999'(24.0 KM) TO THE STATION ON THE LEFT. THE STATION IS A PUNCH POINT ON
AC7999'TOP OF A STAINLESS STEEL RIVET FASTENED TO A METAL PIPE CAP ATTACHED
AC7999'TO A 1 1/2-INCH GALVANIZED STEEL PIPE. LOCATED 48.0 FT (14.6 M) EAST
AC7999'OF THE ROAD CENTER, 47.0 FT (14.3 M) SOUTHEAST OF THE CENTER OF THE
AC7999'EAST END OF A CATTLE GUARD, 31.9 FT (9.7 M) SOUTHWEST OF THE CENTER OF
AC7999'THE SOUTH END OF A CULVERT UNDER A FIELD ENTRANCE ROAD, 3.0 FT (0.9 M)
AC7999'WEST OF THE FIELD ENTRANCE, 2.2 FT (0.7 M) WEST OF A WITNESS POST, AND
AC7999'1.4 FT (0.4 M) EAST OF A METAL GUARD POST. NOTE--ACCESS TO THE DATUM
AC7999'POINT IS THROUGH A 5-INCH LOGO CAP AND THEN A 4-INCH PVC CAP.

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 AC8017 ***********************************************************************
 AC8017  CBN         -  This is a Cooperative Base Network Control Station.
 AC8017  DESIGNATION -  HRN ZEONA

        Ellipsoid Height       minus   Geoid12B Height        =       NAVD88 Height
        840.967                        -18.085                        859.052

 AC8017  PID         -  AC8017
 AC8017  STATE/COUNTY-  SD/PERKINS
 AC8017  COUNTRY     -  US
 AC8017  USGS QUAD   -  RABBIT BUTTE (1983)
 AC8017
 AC8017                        *CURRENT SURVEY CONTROL
 AC8017  ______________________________________________________________________
 AC8017* NAD 83(2011) POSITION- 45 15 17.97724(N) 102 32 41.68572(W)   ADJUSTED
 AC8017* NAD 83(2011) ELLIP HT-   840.967 (meters)         (06/27/12)   ADJUSTED
 AC8017* NAD 83(2011) EPOCH    -  2010.00
 AC8017* NAVD 88 ORTHO HEIGHT -   859.0    (meters)      2818.     (feet) GPS OBS
 AC8017  ______________________________________________________________________
 AC8017  NAVD 88 orthometric height was determined with geoid model    GEOID96
 AC8017  GEOID HEIGHT    -        -17.959 (meters)                     GEOID96
 AC8017  GEOID HEIGHT    -        -18.085 (meters)                     GEOID12B
 AC8017  NAD 83(2011) X  -   -977,009.092 (meters)                     COMP
 AC8017  NAD 83(2011) Y  - -4,390,712.551 (meters)                     COMP
 AC8017  NAD 83(2011) Z  -  4,507,939.417 (meters)                     COMP
 AC8017  LAPLACE CORR    -         -5.49  (seconds)                    DEFLEC12B
 AC8017
 AC8017  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 AC8017  Standards:
 AC8017         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 AC8017            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 AC8017  ------------------------------------------------------------------
 AC8017  NETWORK    0.91   2.65           0.42   0.30   1.35     -0.10521478
 AC8017  ------------------------------------------------------------------
 AC8017  Click here for local accuracies and other accuracy information.
 AC8017
 AC8017
 AC8017.The horizontal coordinates were established by GPS observations
 AC8017.and adjusted by the National Geodetic Survey in June 2012.
 AC8017
 AC8017.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 AC8017.been affixed to the stable North American tectonic plate. See
 AC8017.NA2011 for more information.
 AC8017
 AC8017.The horizontal coordinates are valid at the epoch date displayed above
 AC8017.which is a decimal equivalence of Year/Month/Day.
 AC8017
 AC8017.The orthometric height was determined by GPS observations and a
 AC8017.high-resolution geoid model.
 AC8017
 AC8017.Significant digits in the geoid height do not necessarily reflect accuracy.
 AC8017.GEOID12B height accuracy estimate available here.
 AC8017
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AC8017.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC8017
AC8017.The Laplace correction was computed from DEFLEC12B derived deflections.
AC8017
AC8017.The ellipsoidal height was determined by GPS observations
AC8017.and is referenced to NAD 83.
AC8017
AC8017. The following values were computed from the NAD 83(2011) position.
AC8017
AC8017;                    North         East     Units Scale Factor Converg.
AC8017;SPC SD N     -   161,118.975   400,277.513   MT  0.99994542   -1 48 04.1
AC8017;SPC SD N     -   528,604.50  1,313,243.81   sFT  0.99994542   -1 48 04.1
AC8017;UTM  13      - 5,014,209.831   692,637.795   MT  1.00005630   +1 44 39.3
AC8017
AC8017!             -  Elev Factor  x  Scale Factor =   Combined Factor
AC8017!SPC SD N     -   0.99986817  x   0.99994542  =   0.99981360
AC8017!UTM  13      -   0.99986817  x   1.00005630  =   0.99992446
AC8017
AC8017_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFL9263714209(NAD 83)
AC8017
AC8017                           SUPERSEDED SURVEY CONTROL
AC8017
AC8017  NAD 83(2007)-  45 15 17.97715(N)    102 32 41.68690(W) AD(2002.00) 0
AC8017  ELLIP H (02/10/07)  840.989  (m)                       GP(2002.00)
AC8017  ELLIP H (04/15/04)  840.984  (m)                       GP(       ) 2 1
AC8017  NAD 83(1996)-  45 15 17.97655(N)    102 32 41.68649(W) AD(       ) B
AC8017  ELLIP H (04/18/97)  841.054  (m)                       GP(       ) 4 1
AC8017
AC8017.Superseded values are not recommended for survey control.
AC8017
AC8017.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AC8017.See file dsdata.pdf to determine how the superseded data were derived.
AC8017
AC8017_MARKER: Z = SEE DESCRIPTION
AC8017_SETTING: 57 = GALVANIZED STEEL PIPE IN SLEEVE (10 FT.+)
AC8017_STAMPING: HRN-ZEONA 1995
AC8017_MARK LOGO: NGS
AC8017_PROJECTION: FLUSH
AC8017_MAGNETIC: P = MARKER IS A STEEL PIPE
AC8017_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AC8017_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AC8017+SATELLITE: SATELLITE OBSERVATIONS - August 03, 1996
AC8017_ROD/PIPE-DEPTH: 6.4  meters
AC8017_SLEEVE-DEPTH  : 1.8 meters
AC8017
AC8017  HISTORY     - Date     Condition        Report By
AC8017  HISTORY     - 1995     MONUMENTED       SDDT
AC8017  HISTORY     - 19960803 GOOD             NGS
AC8017
AC8017                            STATION DESCRIPTION
AC8017
AC8017'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (DFC)
AC8017'THE STATION IS LOCATED ABOUT 32.2 KM (20.00 MI) SOUTH-SOUTHWEST OF
AC8017'BISON, 27.4 KM (17.00 MI) EAST-NORTHEAST OF ZEONA, AT THE JUNCTION OF
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AC8017'COUNTY ROADS 9A AND 13. OWNERSHIP--PERKINS COUNTY. TO REACH THE
AC8017'STATION FROM THE JUNCTION OF STATE HIGHWAYS 20 AND 75, 14.5 KM (9.00
AC8017'MI) WEST OF BISON, GO EAST ON STATE HIGHWAY 20 FOR 6.4 KM (3.95 MI) TO
AC8017'THE JUNCTION OF COUNTY ROAD 9A (BIXBY ROAD) ON THE RIGHT, TURN RIGHT
AC8017'AND GO SOUTH ON COUNTY ROAD 9A FOR 32.2 KM (20.00 MI) TO THE JUNCTION
AC8017'OF COUNTY ROAD 13 AND THE STATION ON THE RIGHT. THE STATION IS A
AC8017'PUNCH POINT ON TOP OF A STAINLESS STEEL RIVET FASTENED TO A METAL PIPE
AC8017'CAP ATTACHED TO A 1 1/2-INCH GALVANIZED STEEL PIPE. LOCATED 38.3 M
AC8017'(125.7 FT) NORTHWEST OF THE MOST NORTHWESTERLY OF 2 BRACES FENCE
AC8017'POSTS, 35.0 M (114.8 FT) SOUTHEAST OF THE MOST EASTERLY OF 2 BRACED
AC8017'FENCE POSTS, 15.0 M (49.2 FT) SOUTHWEST OF THE CENTERLINE OF COUNTY
AC8017'ROAD 9A, 0.7 M (2.3 FT) NORTHEAST OF A FENCE, 0.5 M (1.6 FT) SOUTHWEST
AC8017'OF A METAL GUARD POST, 0.4 M (1.3 FT) NORTHEAST OF A WITNESS POST, AND
AC8017'0.2 M (0.7 FT) ABOVE THE LEVEL OF THE ROAD. NOTE--ACCESS TO THE DATUM
AC8017'POINT IS THROUGH A 5-INCH LOGO CAP AND THEN A 4-INCH PVC CAP.

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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0173 ***********************************************************************
 QT0173  DESIGNATION -  L 402
 QT0173  PID         -  QT0173
 QT0173  STATE/COUNTY-  SD/PERKINS
 QT0173  COUNTRY     -  US
 QT0173  USGS QUAD   -  CEDAR CANYON (1974)
 QT0173
 QT0173                        *CURRENT SURVEY CONTROL
 QT0173  ______________________________________________________________________
 QT0173* NAD 83(1986) POSITION- 45 04 02.     (N) 102 44 37.     (W)    SCALED
 QT0173* NAVD 88 ORTHO HEIGHT -   896.230 (meters)     2940.38  (feet) ADJUSTED
 QT0173  ______________________________________________________________________
 QT0173  GEOID HEIGHT    -        -17.716 (meters)                     GEOID12B
 QT0173  DYNAMIC HEIGHT  -        896.043 (meters)     2939.77  (feet) COMP
 QT0173  MODELED GRAVITY -    980,376.9   (mgal)                       NAVD 88
 QT0173
 QT0173  VERT ORDER      -  SECOND    CLASS 0
 QT0173
 QT0173.The horizontal coordinates were scaled from a topographic map and have
 QT0173.an estimated accuracy of +/- 6 seconds.
 QT0173.
 QT0173.The orthometric height was determined by differential leveling and
 QT0173.adjusted by the NATIONAL GEODETIC SURVEY
 QT0173.in June 1991.
 QT0173
 QT0173.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0173.GEOID12B height accuracy estimate available here.
 QT0173
 QT0173.The dynamic height is computed by dividing the NAVD 88
 QT0173.geopotential number by the normal gravity value computed on the
 QT0173.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QT0173.degrees latitude (g = 980.6199 gals.).
 QT0173
 QT0173.The modeled gravity was interpolated from observed gravity values.
 QT0173
 QT0173;                    North         East     Units  Estimated Accuracy
 QT0173;SPC SD N     -   140,770.      383,980.      MT  (+/- 180 meters Scaled)
 QT0173
 QT0173_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK776928(NAD 83)
 QT0173
 QT0173                           SUPERSEDED SURVEY CONTROL
 QT0173
 QT0173  NGVD 29 (??/??/92)  895.762  (m)          2938.85   (f) ADJ UNCH    2 0
 QT0173
 QT0173.Superseded values are not recommended for survey control.
 QT0173
 QT0173.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 QT0173.See file dsdata.pdf to determine how the superseded data were derived.
 QT0173
 QT0173_MARKER: DB = BENCH MARK DISK
 QT0173_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 QT0173_STAMPING: L 402 1962
 QT0173_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
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QT0173+STABILITY: SURFACE MOTION
QT0173
QT0173  HISTORY     - Date     Condition        Report By
QT0173  HISTORY     - 1962     MONUMENTED       CGS
QT0173
QT0173                          STATION DESCRIPTION
QT0173
QT0173'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
QT0173'10.6 MI NW FROM MAURINE.
QT0173'6.65 MILES WEST ALONG U.S. HIGHWAY 212 FROM THE STORE AT MAURINE,
QT0173'THENCE 3.95 MILES NORTH ALONG A COUNTY ROAD, 42 FEET WEST OF THE
QT0173'CENTER LINE OF THE ROAD, 2 FEET NORTH OF A TELEPHONE POLE, 2.6
QT0173'FEET SOUTH OF A WITNESS POST, ABOUT 1 FOOT LOWER THAN THE ROAD,
QT0173'AND SET IN THE TOP OF A CONCRETE POST PROJECTING 0.4 FOOT ABOVE
QT0173'THE GROUND.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU2412 ***********************************************************************
 PU2412  DESIGNATION -  M 395 RESET
 PU2412  PID         -  PU2412
 PU2412  STATE/COUNTY-  SD/MEADE
 PU2412  COUNTRY     -  US
 PU2412  USGS QUAD   -  AVANCE SE (1983)
 PU2412
 PU2412                        *CURRENT SURVEY CONTROL
 PU2412  ______________________________________________________________________
 PU2412* NAD 83(1986) POSITION- 44 45 23.20   (N) 102 03 17.86   (W)    HD_HELD1
 PU2412* NAVD 88 ORTHO HEIGHT -   691.978 (meters)     2270.26  (feet) ADJUSTED
 PU2412  ______________________________________________________________________
 PU2412  GEOID HEIGHT    -        -19.757 (meters)                     GEOID12B
 PU2412  DYNAMIC HEIGHT  -        691.826 (meters)     2269.77  (feet) COMP
 PU2412  MODELED GRAVITY -    980,375.3   (mgal)                       NAVD 88
 PU2412
 PU2412  VERT ORDER      -  FIRST     CLASS II
 PU2412
 PU2412.The horizontal coordinates were determined by differentially corrected
 PU2412.hand held GPS observations or other comparable positioning techniques
 PU2412.and have an estimated accuracy of +/- 3 meters.
 PU2412.
 PU2412.The orthometric height was determined by differential leveling and
 PU2412.adjusted by the NATIONAL GEODETIC SURVEY
 PU2412.in July 1998.
 PU2412
 PU2412.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU2412.GEOID12B height accuracy estimate available here.
 PU2412
 PU2412.The dynamic height is computed by dividing the NAVD 88
 PU2412.geopotential number by the normal gravity value computed on the
 PU2412.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU2412.degrees latitude (g = 980.6199 gals.).
 PU2412
 PU2412.The modeled gravity was interpolated from observed gravity values.
 PU2412
 PU2412;                    North         East     Units  Estimated Accuracy
 PU2412;SPC SD N     -   104,642.9     437,313.1     MT  (+/- 3 meters HH1 GPS)
 PU2412
 PU2412_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGK3309660114(NAD 83)
 PU2412
 PU2412                           SUPERSEDED SURVEY CONTROL
 PU2412
 PU2412  NGVD 29 (04/17/07)  691.53    (m)          2268.8     (f) RESET       3
 PU2412
 PU2412.Superseded values are not recommended for survey control.
 PU2412
 PU2412.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU2412.See file dsdata.pdf to determine how the superseded data were derived.
 PU2412
 PU2412_MARKER: DV = VERTICAL CONTROL DISK
 PU2412_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 PU2412_STAMPING: M 395 RESET 1988
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PU2412_MARK LOGO: NGS
PU2412_MAGNETIC: N = NO MAGNETIC MATERIAL
PU2412_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
PU2412+STABILITY: SURFACE MOTION
PU2412_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
PU2412+SATELLITE: SATELLITE OBSERVATIONS - July 11, 1996
PU2412
PU2412  HISTORY     - Date     Condition        Report By
PU2412  HISTORY     - 1988     MONUMENTED       NGS
PU2412  HISTORY     - 19960711 GOOD             NGS
PU2412
PU2412                          STATION DESCRIPTION
PU2412
PU2412'DESCRIBED BY NATIONAL GEODETIC SURVEY 1988
PU2412'15.8 KM (9.80 MI) NORTH ALONG STATE HIGHWAY 73 FROM ITS JUNCTION
PU2412'WITH STATE HIGHWAY 34 AT HOWES, AT AN APPROACH, 24.1 M (79.1 FT)
PU2412'EAST FROM THE CENTER OF 73, 6.2 M (20.3 FT) SOUTH FROM THE CENTER
PU2412'OF A GATE, 1.22 M (4.0 FT) EAST FROM A FENCE, 0.3 M (1.0 FT) EAST
PU2412'FROM A WITNESS POST, SET IN THE TOP OF A CONCRETE POST THAT
PU2412'IS FLUSH WITH THE SURFACE.
PU2412
PU2412                          STATION RECOVERY (1996)
PU2412
PU2412'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (GAS)
PU2412'15.6 KM (9.70 MI) NORTHERLY ALONG STATE HIGHWAY 73 FROM THE JUNCTION
PU2412'OF STATE HIGHWAY 34 IN HOWES, 259.0 M (849.7 FT) SOUTH OF MILEPOST
PU2412'156, 24.1 M (79.1 FT) EAST OF THE HIGHWAY CENTERLINE, 6.2 M (20.3 FT)
PU2412'SOUTH OF THE CENTER OF A GATE, 1.2 M (3.9 FT) EAST OF A FENCE, 0.5 M
PU2412'(1.6 FT) BELOW THE LEVEL OF THE HIGHWAY, 0.3 M (1.0 FT) EAST OF A
PU2412'WITNESS POST, AND THE MONUMENT IS FLUSH WITH THE GROUND SURFACE.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0500 ***********************************************************************
 QT0500  DESIGNATION -  MORE
 QT0500  PID         -  QT0500
 QT0500  STATE/COUNTY-  SD/BUTTE
 QT0500  COUNTRY     -  US
 QT0500  USGS QUAD   -  TOMATO CAN BUTTES (1978)
 QT0500
 QT0500                        *CURRENT SURVEY CONTROL
 QT0500  ______________________________________________________________________
 QT0500* NAD 83(1996) POSITION- 45 02 08.69594(N) 103 02 30.61345(W)   ADJUSTED
 QT0500* NAVD 88 ORTHO HEIGHT -   853.    (meters)     2799.    (feet) SCALED
 QT0500  ______________________________________________________________________
 QT0500  GEOID HEIGHT    -        -17.178 (meters)                    GEOID12B
 QT0500  LAPLACE CORR    -         -5.00  (seconds)                   DEFLEC12B
 QT0500  HORZ ORDER      -  THIRD
 QT0500
 QT0500.The horizontal coordinates were established by classical geodetic methods
 QT0500.and adjusted by the National Geodetic Survey in January 1998.
 QT0500.
 QT0500.The orthometric height was scaled from a topographic map.
 QT0500
 QT0500.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0500.GEOID12B height accuracy estimate available here.
 QT0500
 QT0500.The Laplace correction was computed from DEFLEC12B derived deflections.
 QT0500
 QT0500. The following values were computed from the NAD 83(1996) position.
 QT0500
 QT0500;                    North         East     Units Scale Factor Converg.
 QT0500;SPC SD N     -   138,117.496   360,380.940   MT  0.99993915   -2 09 10.2
 QT0500;SPC SD N     -   453,140.48  1,182,349.80   sFT  0.99993915   -2 09 10.2
 QT0500;UTM  13      - 4,988,786.862   654,237.199   MT  0.99989252   +1 23 08.8
 QT0500
 QT0500!             -  Elev Factor  x  Scale Factor =   Combined Factor
 QT0500!SPC SD N     -   0.99986890  x   0.99993915  =   0.99980806
 QT0500!UTM  13      -   0.99986890  x   0.99989252  =   0.99976143
 QT0500
 QT0500:                Primary Azimuth Mark                     Grid Az
 QT0500:SPC SD N     -  MORE AZ MK                               173 55 43.3
 QT0500:UTM  13      -  MORE AZ MK                               170 23 24.3
 QT0500
 QT0500_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK5423788786(NAD 83)
 QT0500
 QT0500|----------------------------------------------------------------------|
 QT0500| PID    Reference Object                    Distance      Geod. Az   |
 QT0500|                                                          dddmmss.s  |
 QT0500| CQ8614 MORE RM 1                          11.794 METERS 12316      |
 QT0500| QT0502 MORE AZ MK                        APPROX. 0.6 KM 1714633.1  |
 QT0500| CQ8615 MORE RM 2                          10.794 METERS 22220      |
 QT0500|----------------------------------------------------------------------|
 QT0500
 QT0500                       SUPERSEDED SURVEY CONTROL
 QT0500
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QT0500  NAD 83(1993)-  45 02 08.68886(N)    103 02 30.61113(W) AD(       ) 3
QT0500  NAD 83(1986)-  45 02 08.68601(N)    103 02 30.61009(W) AD(       ) 3
QT0500  NAD 27      -  45 02 08.72200(N)    103 02 28.99300(W) AD(       ) 3
QT0500
QT0500.Superseded values are not recommended for survey control.
QT0500
QT0500.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
QT0500.See file dsdata.pdf to determine how the superseded data were derived.
QT0500
QT0500_MARKER: DS = TRIANGULATION STATION DISK
QT0500_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
QT0500_STAMPING: MORE 1951
QT0500_MARK LOGO: CGS
QT0500_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
QT0500+STABILITY: SURFACE MOTION
QT0500
QT0500  HISTORY     - Date     Condition        Report By
QT0500  HISTORY     - 1952     MONUMENTED       CGS
QT0500  HISTORY     - 1973     GOOD             USGS
QT0500
QT0500                          STATION DESCRIPTION
QT0500
QT0500'DESCRIBED BY COAST AND GEODETIC SURVEY 1952 (JCM)
QT0500'THE STATION IS IN SECTION 4, T 12 N, R 9 E, ABOUT 30 MILES
QT0500'NORTHEAST OF NEWELL, 3 MILES WEST OF THE BUTTE-PERKINS COUNTY
QT0500'LINE AND 1-3/4 MILES SOUTH OF THE MOREAU RIVER.
QT0500'
QT0500'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 212
QT0500'AND STATE HIGHWAY 79 AT THE NORTH EDGE OF NEWELL, GO EAST
QT0500'ON U.S. HIGHWAY 212 FOR 3 MILES TO A SIDE ROAD ON THE LEFT
QT0500'AND SIGN ON THE RIGHT TWILIGHT, TURN LEFT (NORTH) AND FOLLOW
QT0500'THE MAIN GRAVELED ROAD FOR 16.5 MILES TO A SIDE ROAD ON THE
QT0500'RIGHT, TURN RIGHT AND FOLLOW THE MAIN ROAD FOR 14.8 MILES
QT0500'TO A SMALL SCHOOL HOUSE ON THE RIGHT, CONTINUE NORTH AND
QT0500'EAST ON THE MAIN ROAD FOR 2.5 MILES TO A CROSSROAD, TURN LEFT
QT0500'(NORTH) AND GO FOR 1.65 MILES TO A SMALL WOODEN BRIDGE,
QT0500'CONTINUE ON THE MAIN ROAD FOR 0.85 MILE TO THE AZIMUTH MARK ON
QT0500'THE LEFT AS DESCRIBED BELOW, CONTINUE ON THE MAIN ROAD
QT0500'FOR 0.35 MILE TO THE STATION MARK ON THE LEFT AS
QT0500'DESCRIBED.
QT0500'
QT0500'THE STATION MARK IS 150 FEET WEST OF THE CENTER OF THE MAIN
QT0500'ROAD.  THE MARK PROJECTS 6 INCHES AND THE DISK IS STAMPED
QT0500'MORE 1951.
QT0500'
QT0500'REFERENCE MARK 1 PROJECTS 6 INCHES AND THE DISK IS STAMPED
QT0500'MORE NO 1 1951.
QT0500'
QT0500'REFERENCE MARK 2 PROJECTS 6 INCHES AND THE DISK IS STAMPED
QT0500'MORE NO 2 1951.
QT0500'
QT0500'THE AZIMUTH MARK IS 45 FEET WEST OF THE CENTER OF THE ROAD.
QT0500'THE MARK PROJECTS 6 INCHES AND THE DISK IS STAMPED MORE 1951.
QT0500'
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QT0500'NOTE--THIS STATION WAS BUILT IN 1951 BUT WAS NOT OCCUPIED.
QT0500'
QT0500'HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.
QT0500
QT0500                          STATION RECOVERY (1973)
QT0500
QT0500'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1973 (WJC)
QT0500'TO REACH THE STATION FROM THE JCT. OF U.S. HWY. 212 AND STATE
QT0500'HWY. 79 ON THE NORTHEDGE OF NEWELL, GO EAST AND NORTHEAST
QT0500'ON U.S. HWY. 212 FOR 15.3 MI TO A GRAVEL RD. ON THE LEFT AT
QT0500'SIGN TWILIGHT RD.  TURN LEFT AND GO NORTH ON GRAVEL RD FOR 17.6
QT0500'MI TO A GRAVEL RD. NORTH.  TURN LEFT AND GO NORTH FOR 3.0 MI TO A
QT0500'TRACK RD. ON THE LEFT.  GO WEST FOR 0.1 MI TO THE TOP OF A
QT0500'HILL AND STATION.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0438 ***********************************************************************
 QT0438  DESIGNATION -  NONA
 QT0438  PID         -  QT0438
 QT0438  STATE/COUNTY-  SD/PERKINS
 QT0438  COUNTRY     -  US
 QT0438  USGS QUAD   -
 QT0438
 QT0438                        *CURRENT SURVEY CONTROL
 QT0438  ______________________________________________________________________
 QT0438* NAD 83(1996) POSITION- 45 11 52.02524(N) 102 51 26.17794(W)   ADJUSTED
 QT0438* NAVD 88 ORTHO HEIGHT -   853.    (meters)     2799.    (feet) SCALED
 QT0438  ______________________________________________________________________
 QT0438  GEOID HEIGHT    -        -17.475 (meters)                    GEOID12B
 QT0438  LAPLACE CORR    -         -5.22  (seconds)                   DEFLEC12B
 QT0438  HORZ ORDER      -  SECOND
 QT0438
 QT0438.The horizontal coordinates were established by classical geodetic methods
 QT0438.and adjusted by the National Geodetic Survey in January 1998.
 QT0438.
 QT0438.The orthometric height was scaled from a topographic map.
 QT0438
 QT0438.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0438.GEOID12B height accuracy estimate available here.
 QT0438
 QT0438.The Laplace correction was computed from DEFLEC12B derived deflections.
 QT0438
 QT0438. The following values were computed from the NAD 83(1996) position.
 QT0438
 QT0438;                    North         East     Units Scale Factor Converg.
 QT0438;SPC SD N     -   155,583.191   375,549.143   MT  0.99994238   -2 01 19.9
 QT0438;SPC SD N     -   510,442.52  1,232,114.15   sFT  0.99994238   -2 01 19.9
 QT0438;UTM  13      - 5,007,155.597   668,297.530   MT  0.99994827   +1 31 14.6
 QT0438
 QT0438!             -  Elev Factor  x  Scale Factor =   Combined Factor
 QT0438!SPC SD N     -   0.99986895  x   0.99994238  =   0.99981134
 QT0438!UTM  13      -   0.99986895  x   0.99994827  =   0.99981723
 QT0438
 QT0438:                Primary Azimuth Mark                     Grid Az
 QT0438:SPC SD N     -  NONA AZ MK                               086 50 26.9
 QT0438:UTM  13      -  NONA AZ MK                               083 17 52.4
 QT0438
 QT0438_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFL6829707155(NAD 83)
 QT0438
 QT0438|----------------------------------------------------------------------|
 QT0438| PID    Reference Object                    Distance      Geod. Az   |
 QT0438|                                                          dddmmss.s  |
 QT0438| CQ8687 NONA RM 1                            7.318 METERS 04628      |
 QT0438| CQ8686 NONA AZ MK                                        0844907.0  |
 QT0438| CQ8688 NONA RM 2                            8.388 METERS 16437      |
 QT0438|----------------------------------------------------------------------|
 QT0438
 QT0438                       SUPERSEDED SURVEY CONTROL
 QT0438
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QT0438  NAD 83(1993)-  45 11 52.01688(N)    102 51 26.17591(W) AD(       ) 2
QT0438  NAD 83(1986)-  45 11 52.01561(N)    102 51 26.17535(W) AD(       ) 2
QT0438  NAD 27      -  45 11 52.06000(N)    102 51 24.57500(W) AD(       ) 2
QT0438
QT0438.Superseded values are not recommended for survey control.
QT0438
QT0438.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
QT0438.See file dsdata.pdf to determine how the superseded data were derived.
QT0438
QT0438_MARKER: DS = TRIANGULATION STATION DISK
QT0438_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
QT0438_STAMPING: NONA 1952
QT0438_MARK LOGO: CGS
QT0438_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
QT0438+STABILITY: SURFACE MOTION
QT0438
QT0438  HISTORY     - Date     Condition        Report By
QT0438  HISTORY     - 1952     MONUMENTED       CGS
QT0438
QT0438                          STATION DESCRIPTION
QT0438
QT0438'DESCRIBED BY COAST AND GEODETIC SURVEY 1952 (JCM)
QT0438'THE STATION IS ABOUT 20 MILES SOUTH-SOUTHWEST OF STROOL, 3 MILES
QT0438'EAST OF ZEONA, IN SECTION 11, T 14 N, R 10 E, 85 YARDS SOUTH OF
QT0438'A GRADED DIRT ROAD, AND 6 FEET EAST-SOUTHEAST OF A 4 X 4 INCH
QT0438'WITNESS POST.
QT0438'
QT0438'TO REACH THE STATION FROM THE STORE AND POST OFFICE IN ZEONA,
QT0438'GO NORTH ON GRAVELED ROAD FOR 0.5 MILE TO A SIDE ROAD RIGHT,
QT0438'TURN RIGHT AND GO EAST FOR 3.0 MILES TO A WIRE GATE ON RIGHT,
QT0438'TURN RIGHT THROUGH GATE, TURN LEFT AND GO EAST FOR 0.15 MILE TO
QT0438'TOP OF KNOLL AND STATION.
QT0438'
QT0438'TO REACH THE AZIMUTH MARK FROM THE STATION, GO EAST ON MAIN ROAD
QT0438'FOR 0.5 MILE TO THE MARK ON THE LEFT.
QT0438'
QT0438'THE STATION MARK PROJECTS 3 INCHES, AND THE DISK IS STAMPED
QT0438'NONA 1952.
QT0438'
QT0438'REFERENCE MARK 1 IS 25 FEET NORTHEAST OF A 4 X 4 INCH WITNESS POST.
QT0438'THE MARK PROJECTS 5 INCHES, AND THE DISK IS STAMPED NONA NO 1 1952.
QT0438'
QT0438'REFERENCE MARK 2 IS 33 FEET SOUTH-SOUTHEAST OF A 4 X 4 INCH
QT0438'WITNESS POST.  THE MARK PROJECTS 4 INCHES, AND THE DISK IS
QT0438'STAMPED NONA NO 2 1952.
QT0438'
QT0438'THE AZIMUTH MARK IS 31 FEET NORTH OF CENTER OF A GRADED ROAD,
QT0438'3 FEET WEST-SOUTHWEST OF A 4 X 4 INCH WITNESS POST, AND 1 FOOT
QT0438'SOUTH OF A WIRE FENCE.  THE MARK PROJECTS 3 INCHES, AND THE
QT0438'DISK IS STAMPED NONA 1952.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU1825 ***********************************************************************
 PU1825  DESIGNATION -  Q 369
 PU1825  PID         -  PU1825
 PU1825  STATE/COUNTY-  SD/BUTTE
 PU1825  COUNTRY     -  US
 PU1825  USGS QUAD   -  MUD BUTTES NW (1965)
 PU1825
 PU1825                        *CURRENT SURVEY CONTROL
 PU1825  ______________________________________________________________________
 PU1825* NAD 83(1986) POSITION- 44 54 44.     (N) 103 54 38.     (W)    SCALED
 PU1825* NAVD 88 ORTHO HEIGHT -   995.361 (meters)     3265.61   (feet) ADJUSTED
 PU1825  ______________________________________________________________________
 PU1825  GEOID HEIGHT    -        -15.673 (meters)                      GEOID12B
 PU1825  DYNAMIC HEIGHT  -        995.099 (meters)     3264.75   (feet) COMP
 PU1825  MODELED GRAVITY -    980,318.9   (mgal)                        NAVD 88
 PU1825
 PU1825  VERT ORDER      -  SECOND    CLASS 0
 PU1825
 PU1825.The horizontal coordinates were scaled from a topographic map and have
 PU1825.an estimated accuracy of +/- 6 seconds.
 PU1825.
 PU1825.The orthometric height was determined by differential leveling and
 PU1825.adjusted by the NATIONAL GEODETIC SURVEY
 PU1825.in June 1991.
 PU1825
 PU1825.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU1825.GEOID12B height accuracy estimate available here.
 PU1825
 PU1825.The dynamic height is computed by dividing the NAVD 88
 PU1825.geopotential number by the normal gravity value computed on the
 PU1825.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU1825.degrees latitude (g = 980.6199 gals.).
 PU1825
 PU1825.The modeled gravity was interpolated from observed gravity values.
 PU1825
 PU1825;                    North         East     Units  Estimated Accuracy
 PU1825;SPC SD N     -   127,350.      291,330.      MT  (+/- 180 meters Scaled)
 PU1825
 PU1825_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEK859737(NAD 83)
 PU1825
 PU1825                           SUPERSEDED SURVEY CONTROL
 PU1825
 PU1825  NGVD 29 (??/??/92)  994.876  (m)          3264.02    (f) ADJ UNCH    2 0
 PU1825
 PU1825.Superseded values are not recommended for survey control.
 PU1825
 PU1825.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU1825.See file dsdata.pdf to determine how the superseded data were derived.
 PU1825
 PU1825_MARKER: DB = BENCH MARK DISK
 PU1825_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 PU1825_STAMPING: Q 369 1962
 PU1825_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
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PU1825+STABILITY: SURFACE MOTION
PU1825
PU1825  HISTORY     - Date     Condition        Report By
PU1825  HISTORY     - 1962     MONUMENTED       CGS
PU1825
PU1825                          STATION DESCRIPTION
PU1825
PU1825'DESCRIBED BY COAST AND GEODETIC SURVEY 1962
PU1825'19 MI NW FROM BELLE FOURCHE.
PU1825'ABOUT 11.7 MILES NORTH ALONG U.S. HIGHWAY 85 FROM THE CHICAGO
PU1825'AND NORTH WESTERN RAILWAY STATION AT BELLE FOURCHE, THENCE 7.3
PU1825'MILES NORTHWEST ALONG A GRAVELED ROAD, IN SECTION 18, T 11 N,
PU1825'R 1 E, 59 FEET SOUTH OF THE CENTER LINE OF THE ROAD, 12 FEET WEST
PU1825'OF A TELEPHONE POLE, 118 FEET WEST OF THE CENTER LINE OF A TRAIL
PU1825'ROAD SOUTH, 2.4 FEET SOUTH OF A METAL WITNESS POST, ABOUT 2 FEET
PU1825'BELOW THE LEVEL OF THE ROAD, AND SET IN THE TOP OF A CONCRETE
PU1825'POST PROJECTING 6 INCHES.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU0083 ***********************************************************************
 PU0083  DESIGNATION -  Q 390
 PU0083  PID         -  PU0083
 PU0083  STATE/COUNTY-  SD/MEADE
 PU0083  COUNTRY     -  US
 PU0083  USGS QUAD   -  AVANCE (1983)
 PU0083
 PU0083                        *CURRENT SURVEY CONTROL
 PU0083  ______________________________________________________________________
 PU0083* NAD 83(1986) POSITION- 44 55 18.     (N) 102 14 55.     (W)    SCALED
 PU0083* NAVD 88 ORTHO HEIGHT -   770.990 (meters)     2529.49  (feet) ADJUSTED
 PU0083  ______________________________________________________________________
 PU0083  GEOID HEIGHT    -        -19.033 (meters)                     GEOID12B
 PU0083  DYNAMIC HEIGHT  -        770.826 (meters)     2528.95  (feet) COMP
 PU0083  MODELED GRAVITY -    980,378.3   (mgal)                       NAVD 88
 PU0083
 PU0083  VERT ORDER      -  SECOND    CLASS 0
 PU0083
 PU0083.The horizontal coordinates were scaled from a topographic map and have
 PU0083.an estimated accuracy of +/- 6 seconds.
 PU0083.
 PU0083.The orthometric height was determined by differential leveling and
 PU0083.adjusted by the NATIONAL GEODETIC SURVEY
 PU0083.in June 1991.
 PU0083
 PU0083.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU0083.GEOID12B height accuracy estimate available here.
 PU0083
 PU0083.The dynamic height is computed by dividing the NAVD 88
 PU0083.geopotential number by the normal gravity value computed on the
 PU0083.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU0083.degrees latitude (g = 980.6199 gals.).
 PU0083
 PU0083.The modeled gravity was interpolated from observed gravity values.
 PU0083
 PU0083;                    North         East     Units  Estimated Accuracy
 PU0083;SPC SD N     -   123,400.      422,500.      MT  (+/- 180 meters Scaled)
 PU0083
 PU0083_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGK171779(NAD 83)
 PU0083
 PU0083                           SUPERSEDED SURVEY CONTROL
 PU0083
 PU0083  NGVD 29 (??/??/92)  770.529  (m)          2527.98   (f) ADJ UNCH    2 0
 PU0083
 PU0083.Superseded values are not recommended for survey control.
 PU0083
 PU0083.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU0083.See file dsdata.pdf to determine how the superseded data were derived.
 PU0083
 PU0083_MARKER: DB = BENCH MARK DISK
 PU0083_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 PU0083_STAMPING: Q 390 1963
 PU0083_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
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PU0083+STABILITY: SURFACE MOTION
PU0083
PU0083  HISTORY     - Date     Condition        Report By
PU0083  HISTORY     - 1963     MONUMENTED       CGS
PU0083
PU0083                          STATION DESCRIPTION
PU0083
PU0083'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
PU0083'13.8 MI E FROM OPAL.
PU0083'ABOUT 3.8 MILES EAST ALONG A GRAVELED ROAD FROM THE STORE AND
PU0083'POST OFFICE AT OPAL, THENCE 1.0 MILE NORTH ALONG A GRAVELED ROAD,
PU0083'8.0 MILES EAST ALONG A GRAVELED ROAD, THENCE 1.0 MILE NORTH ALONG
PU0083'A GRAVELED ROAD, IN SECTION 11, T 11 N, R 15 E, ON THE CREST OF
PU0083'A SMALL HILL, 48 FEET WEST OF THE CENTER LINE OF THE ROAD,
PU0083'12 FEET SOUTHEAST OF A POWER POLE, 2 FEET EAST OF A FENCE, 1.5
PU0083'FEET SOUTH OF A METAL WITNESS POST, ABOUT LEVEL WITH THE ROAD,
PU0083'AND SET IN THE TOP OF A CONCRETE POST PROJECTING 5 INCHES.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU0766 ***********************************************************************
 PU0766  DESIGNATION -  SCHOOL 2
 PU0766  PID         -  PU0766
 PU0766  STATE/COUNTY-  SD/MEADE
 PU0766  COUNTRY     -  US
 PU0766  USGS QUAD   -  FROZEN MAN CREEK (1973)
 PU0766
 PU0766                        *CURRENT SURVEY CONTROL
 PU0766  ______________________________________________________________________
 PU0766* NAD 83(1996) POSITION- 44 52 42.24541(N) 102 47 08.30049(W)   ADJUSTED
 PU0766* NAVD 88 ORTHO HEIGHT -   808.811 (meters)     2653.57  (feet) ADJUSTED
 PU0766  ______________________________________________________________________
 PU0766  GEOID HEIGHT    -        -17.678 (meters)                    GEOID12B
 PU0766  LAPLACE CORR    -         -6.01  (seconds)                   DEFLEC12B
 PU0766  DYNAMIC HEIGHT  -        808.637 (meters)     2653.00  (feet) COMP
 PU0766  MODELED GRAVITY -    980,375.4   (mgal)                      NAVD 88
 PU0766
 PU0766  HORZ ORDER      -  SECOND
 PU0766  VERT ORDER      -  SECOND    CLASS 0
 PU0766
 PU0766.The horizontal coordinates were established by classical geodetic methods
 PU0766.and adjusted by the National Geodetic Survey in January 1998.
 PU0766.
 PU0766.The orthometric height was determined by differential leveling and
 PU0766.adjusted by the NATIONAL GEODETIC SURVEY
 PU0766.in June 1991.
 PU0766
 PU0766.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU0766.GEOID12B height accuracy estimate available here.
 PU0766
 PU0766.The Laplace correction was computed from DEFLEC12B derived deflections.
 PU0766
 PU0766.The dynamic height is computed by dividing the NAVD 88
 PU0766.geopotential number by the normal gravity value computed on the
 PU0766.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU0766.degrees latitude (g = 980.6199 gals.).
 PU0766
 PU0766.The modeled gravity was interpolated from observed gravity values.
 PU0766
 PU0766. The following values were computed from the NAD 83(1996) position.
 PU0766
 PU0766;                    North         East     Units Scale Factor Converg.
 PU0766;SPC SD N     -   119,916.331   379,952.938   MT  0.99994364   -1 58 17.4
 PU0766;SPC SD N     -   393,425.50  1,246,562.26   sFT  0.99994364   -1 58 17.4
 PU0766;UTM  13      - 4,971,827.789   674,894.520   MT  0.99997614   +1 33 46.3
 PU0766
 PU0766!             -  Elev Factor  x  Scale Factor =   Combined Factor
 PU0766!SPC SD N     -   0.99987597  x   0.99994364  =   0.99981962
 PU0766!UTM  13      -   0.99987597  x   0.99997614  =   0.99985212
 PU0766
 PU0766:                Primary Azimuth Mark                     Grid Az
 PU0766:SPC SD N     -  SCHOOL 2 AZ MK                          096 35 26.6
 PU0766:UTM  13      -  SCHOOL 2 AZ MK                          093 03 22.9
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PU0766
PU0766_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK7489471827(NAD 83)
PU0766
PU0766|----------------------------------------------------------------------|
PU0766| PID    Reference Object                      Distance      Geod. Az  |
PU0766|                                                            dddmmss.s |
PU0766| PU0767 SCHOOL 2 RM 3                         29.304 METERS 00135     |
PU0766| PU0768 SCHOOL 2 AZ MK                                      0943709.2 |
PU0766| PU0765 SCHOOL 2 RM 4                         10.393 METERS 26453     |
PU0766| CQ4873 SCHOOL RM 2                                         28517     |
PU0766| PU2250 SCHOOL                                11.867 METERS 30019     |
PU0766| CQ4872 SCHOOL RM 1                                         35934     |
PU0766|----------------------------------------------------------------------|
PU0766
PU0766                          SUPERSEDED SURVEY CONTROL
PU0766
PU0766  NAD 83(1993)-  44 52 42.23782(N)    102 47 08.29962(W) AD(       ) 2
PU0766  NAD 83(1986)-  44 52 42.23608(N)    102 47 08.29904(W) AD(       ) 2
PU0766  NAD 27      -  44 52 42.28090(N)    102 47 06.69170(W) AD(       ) 2
PU0766  NGVD 29 (??/??/92)  808.345  (m)          2652.05   (f) ADJ UNCH    2 0
PU0766  NGVD 29             808.35   (m)          2652.1    (f) LEVELING    3
PU0766
PU0766.Superseded values are not recommended for survey control.
PU0766
PU0766.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
PU0766.See file dsdata.pdf to determine how the superseded data were derived.
PU0766
PU0766_MARKER: DB = BENCH MARK DISK
PU0766_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
PU0766_STAMPING: SCHOOL 2 1962
PU0766_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
PU0766+STABILITY: SURFACE MOTION
PU0766
PU0766  HISTORY     - Date     Condition        Report By
PU0766  HISTORY     - 1962     MONUMENTED       CGS
PU0766  HISTORY     - 1962     GOOD             CGS
PU0766
PU0766                           STATION DESCRIPTION
PU0766
PU0766'DESCRIBED BY COAST AND GEODETIC SURVEY 1962 (HWK)
PU0766'STATION IS LOCATED ABOUT 6 MILES EAST OF THE VILLAGE OF SULPHUR,
PU0766'ON THE SOUTH SIDE OF A GRAVELED EAST-WEST SECTION LINE AND IN
PU0766'THE NORTH CENTRAL BORDER OF SECTION 33, T 11 N, R 11 E.
PU0766'
PU0766'TO REACH THE STATION FROM THE POST OFFICE AND STORE IN
PU0766'SULPHUR, GO NORTHEAST ON A GRAVELED ROAD FOR 0.25 MILES TO
PU0766'A FORK WERE THE MAIN GRAVELED ROAD CURVES TO THE NORTH, TAKE
PU0766'THE RIGHT FORK AND GO EAST ON A GRAVELED ROAD FOR 6.25
PU0766'MILES TO A SMALL WHITE SCHOOL HOUSE ON THE LEFT AND THE
PU0766'STATION ON THE RIGHT AS DESCRIBED.  TO REACH THE AZIMUTH MARK
PU0766'FROM THE STATION CONTINUE EAST ON THE SAME GRAVELED ROAD FOR
PU0766'0.5 MILES TO A GRADED DIRT SIDE ROAD TO THE RIGHT, TURN
PU0766'RIGHT AND GO SOUTH FOR 0.05 MILES TO THE AZIMUTH MARK ON THE
PU0766'RIGHT AS DESCRIBED.
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PU0766'
PU0766'ALL MARKS ARE STANDARD DISKS CEMENTED IN THE TOPS OF 12-INCH
PU0766'CONCRETE CYLINDERS.
PU0766'
PU0766'STATION MARK IS ABOUT 300 FEET SOUTHEAST OF A SMALL WHITE
PU0766'SCHOOL HOUSE, 49.6 FEET SOUTH OF THE CENTERLINE OF A EAST-WEST
PU0766'GRAVELED SECTION LINE ROAD, 35.5 FEET EAST OF A POWER LINE
PU0766'POLE AND 5 FEET WEST-SOUTHWEST OF A METAL WITNESS POST.  IT IS
PU0766'STAMPED--SCHOOL 2 1962 AND PROJECTS 3 INCHES.
PU0766'
PU0766'R.M. 3 IS 48.0 FEET NORTH OF THE CENTERLINE OF A GRAVELED
PU0766'EAST-WEST SECTION LINE ROAD, 1 FOOT NORTH OF A EAST-WEST
PU0766'FENCE LINE.  IT IS STAMPED--SCHOOL 2 NO 3 1962 AND IT PROJECTS
PU0766'4 INCHES.
PU0766'
PU0766'R.M. 4 IS 51.6 FEET SOUTH OF A EASTT-WEST GRAVELED SECTION
PU0766'LINE ROAD AND 1.4 FEET EAST OF A POWER LINE POLE.  IT IS
PU0766'STAMPED--SCHOOL 2 NO 4 1962 AND PROJECTS 5 INCHES.
PU0766'
PU0766'AZIMUTH MARK IS 35.0 FEET WEST OF THE CENTER LINE OF A GRADED
PU0766'DIRT ROAD, 4.6 FEET NORTH OF THE NORTH GATE POST OF A WIRE
PU0766'GATE ENTRANCE TO A PASTURE AND 1 FOOT WEST OF A NORTH-SOUTH
PU0766'FENCE LINE.  IT IS STAMPED--SCHOOL 2 1962 AND PROJECTS 6
PU0766'INCHES.
PU0766
PU0766                          STATION RECOVERY (1962)
PU0766
PU0766'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1962
PU0766'6.5 MI E FROM SULPHUR.
PU0766'6.5 MILES EAST ALONG A ROAD FROM THE STORE AT SULPHUR, 49 FEET
PU0766'SOUTH OF THE CENTER LINE OF THE ROAD, 34.1 FEET EAST OF REFERENCE
PU0766'MARK NO. 4, 4.8 FEET WEST OF A WITNESS POST, 0.5 FOOT SOUTH
PU0766'OF A FENCE, 2 FEET HIGHER THAN THE ROAD AND IN THE TOP F A
PU0766'CONCRETE POST PROJECTING 0.2 FOOT.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0422 ***********************************************************************
 QT0422  DESIGNATION -  TT 61 JNF
 QT0422  PID         -  QT0422
 QT0422  STATE/COUNTY-  SD/PERKINS
 QT0422  COUNTRY     -  US
 QT0422  USGS QUAD   -  DEEP CREEK NW (1951)
 QT0422
 QT0422                        *CURRENT SURVEY CONTROL
 QT0422  ______________________________________________________________________
 QT0422* NAD 83(1996) POSITION- 45 08 29.06654(N) 102 24 23.21229(W)   ADJUSTED
 QT0422* NAVD 88 ORTHO HEIGHT -   760.03  (+/-2cm)     2493.5   (feet) VERTCON
 QT0422  ______________________________________________________________________
 QT0422  GEOID HEIGHT    -        -18.475 (meters)                     GEOID12B
 QT0422  LAPLACE CORR    -         -5.94  (seconds)                    DEFLEC12B
 QT0422  HORZ ORDER      -  SECOND
 QT0422  VERT ORDER      -  THIRD ? (See Below)
 QT0422
 QT0422.The horizontal coordinates were established by classical geodetic methods
 QT0422.and adjusted by the National Geodetic Survey in January 1998.
 QT0422.
 QT0422.The NAVD 88 height was computed by applying the VERTCON shift value to
 QT0422.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
 QT0422
 QT0422.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0422.GEOID12B height accuracy estimate available here.
 QT0422
 QT0422.The vertical order pertains to the NGVD 29 superseded value.
 QT0422
 QT0422.The Laplace correction was computed from DEFLEC12B derived deflections.
 QT0422
 QT0422. The following values were computed from the NAD 83(1996) position.
 QT0422
 QT0422;                    North         East     Units Scale Factor Converg.
 QT0422;SPC SD N     -   148,169.480   410,765.657   MT  0.99994035   -1 42 11.3
 QT0422;SPC SD N     -   486,119.37  1,347,653.66   sFT  0.99994035   -1 42 11.3
 QT0422;UTM  13      - 5,001,931.661   703,907.907   MT  1.00011127   +1 50 20.7
 QT0422
 QT0422!             -  Elev Factor  x  Scale Factor =   Combined Factor
 QT0422!SPC SD N     -   0.99988375  x   0.99994035  =   0.99982411
 QT0422!UTM  13      -   0.99988375  x   1.00011127  =   0.99999501
 QT0422
 QT0422:                Primary Azimuth Mark                     Grid Az
 QT0422:SPC SD N     -  TT 61 JNF AZ MK                         175 10 40.0
 QT0422:UTM  13      -  TT 61 JNF AZ MK                         171 38 08.0
 QT0422
 QT0422_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TGL0390701931(NAD 83)
 QT0422
 QT0422|-----------------------------------------------------------------------|
 QT0422| PID    Reference Object                    Distance      Geod. Az   |
 QT0422|                                                          dddmmss.s |
 QT0422| CQ8884 TT 61 JNF RM 1                      7.897 METERS 00110      |
 QT0422| CQ8885 TT 61 JNF RM 2                      7.876 METERS 09148      |
 QT0422| CQ8883 TT 61 JNF AZ MK                                  1732828.7 |
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QT0422|----------------------------------------------------------------------|
QT0422
QT0422                          SUPERSEDED SURVEY CONTROL
QT0422
QT0422  NAD 83(1993)-  45 08 29.05782(N)     102 24 23.21037(W) AD(       ) 2
QT0422  NAD 83(1986)-  45 08 29.05790(N)     102 24 23.21028(W) AD(       ) 2
QT0422  NAD 27      -  45 08 29.10400(N)     102 24 21.63500(W) AD(       ) 2
QT0422  NGVD 29             759.60   (m)          2492.1    (f) LEVELING    3
QT0422
QT0422.Superseded values are not recommended for survey control.
QT0422
QT0422.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
QT0422.See file dsdata.pdf to determine how the superseded data were derived.
QT0422
QT0422_MARKER: DB = BENCH MARK DISK
QT0422_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
QT0422_STAMPING: TT 61 JNF 1948
QT0422_MARK LOGO: USGS
QT0422_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
QT0422+STABILITY: SURFACE MOTION
QT0422
QT0422  HISTORY     - Date     Condition        Report By
QT0422  HISTORY     - 1951     MONUMENTED       USGS
QT0422
QT0422                           STATION DESCRIPTION
QT0422
QT0422'DESCRIBED BY US GEOLOGICAL SURVEY 1951 (VRS)
QT0422'THE STATION IS LOCATED ABOUT 19 MILES WEST-NORTHWEST OF
QT0422'FAITH, IN PASTURE LAND, ON THE SUMMIT OF A LOW HILL, 32 FEET
QT0422'EAST OF THE CENTER OF A GRADED DIRT ROAD, AND 7 FEET NORTHEAST
QT0422'OF A WITNESS POST.
QT0422'
QT0422'TO REACH THE STATION FROM THE JUNCTION OF MAIN STREET AND
QT0422'U.S. HIGHWAY NO. 212 NEAR THE NORTH EDGE OF FAITH, GO WEST
QT0422'ON NO. 212 FOR 3.1 MILE TO THE JUNCTION WITH STATE HIGHWAY
QT0422'NO. 73.  CONTINUE WEST ON NO. 212 FOR 9.15 MILE TO A CATTLE
QT0422'GUARD ON THE LEFT AND A GRADED DIRT ROAD ON THE RIGHT. THEN
QT0422'RIGHT, NORTHERLY, FOR 5.7 MILES TO A FORK.  THEN LEFT, WESTERLY,
QT0422'FOR 3.5 MILES TO A BRIDGE.  CROSS BRIDGE, CONTINUE WESTERLY
QT0422'FOR 1.3 MILES TO A CATTLE GUARD ON THE RIGHT.  THEN RIGHT,
QT0422'NORTHERLY, FOR 1.0 MILE TO A CATTLE GUARD.  CROSS CATTLE
QT0422'GUARD, CONTINUE NORTHERLY FOR 0.1 MILE TO THE AZIMUTH MARK
QT0422'ON THE RIGHT AS DESCRIBED.  CONTINUE NORTHERLY FOR 1.0 MILE
QT0422'TO THE STATION ON THE RIGHT AS DESCRIBED.
QT0422'
QT0422'THE STATION MARK IS A STANDARD U.S. GEOLOGICAL SURVEY BENCH
QT0422'MARK DISK STAMPED TT 61 JNF 1948 SET IN THE TOP OF A 10-INCH
QT0422'SQUARE CONCRETE POST THAT PROJECTS 4 INCHES.
QT0422'
QT0422'REFERENCE MARK NO. 1 IS 32 FEET EAST OF THE CENTER OF THE
QT0422'GRADED DIRT ROAD.  IT PROJECTS 3 INCHES, AND THE DISK IS
QT0422'STAMPED TT 61 JNF USGS NO 1 1951.
QT0422'
QT0422'REFERENCE MARK NO. 2 IS 59 FEET EAST OF THE CENTER OF THE
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QT0422'ROAD, AND 31 FEET EAST OF THE WITNESS POST.  IT PROJECTS
QT0422'6 INCHES, AND THE DISK IS STAMPED TT 61 JNF USGS NO 2 1951.
QT0422'
QT0422'THE AZIMUTH MARK IS 31 FEET EAST OF THE CENTER OF THE GRADED
QT0422'DIRT ROAD.  IT PROJECTS 4 INCHES, AND THE DISK IS STAMPED
QT0422'TT 61 JNF USGS 1951.
QT0422'
QT0422'THE AZIMUTH MARK AND THE REFERENCE MARKS ARE STANDARD DISKS
QT0422'SET IN THE TOPS OF 12-INCH CONCRETE CYLINDERS.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 PU1316 ***********************************************************************
 PU1316  DESIGNATION -  V 417
 PU1316  PID         -  PU1316
 PU1316  STATE/COUNTY-  SD/BUTTE
 PU1316  COUNTRY     -  US
 PU1316  USGS QUAD   -  DEERS EARS BUTTE SOUTH (1977)
 PU1316
 PU1316                        *CURRENT SURVEY CONTROL
 PU1316  ______________________________________________________________________
 PU1316* NAD 83(1986) POSITION- 44 55 21.     (N) 103 11 55.     (W)    SCALED
 PU1316* NAVD 88 ORTHO HEIGHT -   869.000 (meters)     2851.04  (feet) ADJUSTED
 PU1316  ______________________________________________________________________
 PU1316  GEOID HEIGHT    -        -16.892 (meters)                     GEOID12B
 PU1316  DYNAMIC HEIGHT  -        868.793 (meters)     2850.37  (feet) COMP
 PU1316  MODELED GRAVITY -    980,349.5   (mgal)                       NAVD 88
 PU1316
 PU1316  VERT ORDER      -  SECOND    CLASS 0
 PU1316
 PU1316.The horizontal coordinates were scaled from a topographic map and have
 PU1316.an estimated accuracy of +/- 6 seconds.
 PU1316.
 PU1316.The orthometric height was determined by differential leveling and
 PU1316.adjusted by the NATIONAL GEODETIC SURVEY
 PU1316.in June 1991.
 PU1316
 PU1316.Significant digits in the geoid height do not necessarily reflect accuracy.
 PU1316.GEOID12B height accuracy estimate available here.
 PU1316
 PU1316.The dynamic height is computed by dividing the NAVD 88
 PU1316.geopotential number by the normal gravity value computed on the
 PU1316.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 PU1316.degrees latitude (g = 980.6199 gals.).
 PU1316
 PU1316.The modeled gravity was interpolated from observed gravity values.
 PU1316
 PU1316;                    North         East     Units  Estimated Accuracy
 PU1316;SPC SD N     -   126,020.      347,540.      MT  (+/- 180 meters Scaled)
 PU1316
 PU1316_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TFK421759(NAD 83)
 PU1316
 PU1316                           SUPERSEDED SURVEY CONTROL
 PU1316
 PU1316  NGVD 29 (??/??/92)  868.521  (m)          2849.47   (f) ADJ UNCH    2 0
 PU1316
 PU1316.Superseded values are not recommended for survey control.
 PU1316
 PU1316.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 PU1316.See file dsdata.pdf to determine how the superseded data were derived.
 PU1316
 PU1316_MARKER: DB = BENCH MARK DISK
 PU1316_SETTING: 36 = SET IN A MASSIVE STRUCTURE
 PU1316_SP_SET: BRIDGE HEADWALL
 PU1316_STAMPING: V 417 1963
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PU1316_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
PU1316
PU1316  HISTORY     - Date     Condition        Report By
PU1316  HISTORY     - 1963     MONUMENTED       CGS
PU1316
PU1316                          STATION DESCRIPTION
PU1316
PU1316'DESCRIBED BY COAST AND GEODETIC SURVEY 1963
PU1316'13.8 MI SE FROM CASTLE ROCK.
PU1316'ABOUT 0.6 MILE SOUTH ALONG STATE HIGHWAY 79 FROM THE POST OFFICE
PU1316'AT CASTLE ROCK, THENCE 6.35 MILES SOUTHEAST ALONG A GRADED
PU1316'COUNTY ROAD, THENCE 2.0 MILES SOUTH ALONG A GRADED COUNTY ROAD,
PU1316'THENCE 3.9 MILES EAST ALONG A GRADED COUNTY ROAD, SET IN THE
PU1316'TOP OF THE EAST END OF THE SOUTH CONCRETE HEADWALL OF A CONCRETE
PU1316'BRIDGE OVER AN IRRIGATION CANAL, 15.4 FEET SOUTH OF THE CENTERLINE
PU1316'OF THE ROAD, ABOUT LEVEL WITH THE ROAD, AND ABOUT 0.7 FOOT WEST
PU1316'OF THE EAST EDGE OF THE HEADWALL.
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1        National Geodetic Survey,   Retrieval Date = JULY 10, 2017
 QT0289 ***********************************************************************
 QT0289  DESIGNATION -  X 25
 QT0289  PID         -  QT0289
 QT0289  STATE/COUNTY-  SD/BUTTE
 QT0289  COUNTRY     -  US
 QT0289  USGS QUAD   -  ALKALI CREEK EAST (1978)
 QT0289
 QT0289                        *CURRENT SURVEY CONTROL
 QT0289  ______________________________________________________________________
 QT0289* NAD 83(1986) POSITION- 45 10 05.     (N) 103 44 16.     (W)    SCALED
 QT0289* NAVD 88 ORTHO HEIGHT -   960.354 (meters)     3150.76  (feet) ADJUSTED
 QT0289  ______________________________________________________________________
 QT0289  GEOID HEIGHT    -        -16.090 (meters)                     GEOID12B
 QT0289  DYNAMIC HEIGHT  -        960.131 (meters)     3150.03  (feet) COMP
 QT0289  MODELED GRAVITY -    980,351.6   (mgal)                       NAVD 88
 QT0289
 QT0289  VERT ORDER      -  FIRST     CLASS II
 QT0289
 QT0289.The horizontal coordinates were scaled from a topographic map and have
 QT0289.an estimated accuracy of +/- 6 seconds.
 QT0289.
 QT0289.The orthometric height was determined by differential leveling and
 QT0289.adjusted by the NATIONAL GEODETIC SURVEY
 QT0289.in June 1991.
 QT0289
 QT0289.Significant digits in the geoid height do not necessarily reflect accuracy.
 QT0289.GEOID12B height accuracy estimate available here.
 QT0289
 QT0289.The dynamic height is computed by dividing the NAVD 88
 QT0289.geopotential number by the normal gravity value computed on the
 QT0289.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 QT0289.degrees latitude (g = 980.6199 gals.).
 QT0289
 QT0289.The modeled gravity was interpolated from observed gravity values.
 QT0289
 QT0289;                    North         East     Units  Estimated Accuracy
 QT0289;SPC SD N     -   155,100.      306,270.      MT  (+/- 180 meters Scaled)
 QT0289
 QT0289_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TEL991023(NAD 83)
 QT0289
 QT0289                           SUPERSEDED SURVEY CONTROL
 QT0289
 QT0289  NGVD 29 (??/??/92)  959.863  (m)          3149.15   (f) ADJ UNCH    1 2
 QT0289
 QT0289.Superseded values are not recommended for survey control.
 QT0289
 QT0289.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 QT0289.See file dsdata.pdf to determine how the superseded data were derived.
 QT0289
 QT0289_MARKER: DB = BENCH MARK DISK
 QT0289_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 QT0289_STAMPING: X-25 1934
 QT0289_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
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QT0289+STABILITY: SURFACE MOTION
QT0289
QT0289  HISTORY     - Date     Condition        Report By
QT0289  HISTORY     - 1934     MONUMENTED       CGS
QT0289  HISTORY     - 1953     GOOD             CGS
QT0289
QT0289                          STATION DESCRIPTION
QT0289
QT0289'DESCRIBED BY COAST AND GEODETIC SURVEY 1934
QT0289'36.2 MI N FROM BELLE FOURCHE.
QT0289'36.2 MILES N OF AND ALONG U.S. HWY 85 70 FT S OF CENTER OF
QT0289'HIGHWAY, 75 YARDS SE OF SMALL IRON CULVERT.  A STANDARD DISK
QT0289'STAMPED X 25 1934 AND SET ON TOP OF A CONCRETE POST.
QT0289
QT0289                          STATION RECOVERY (1953)
QT0289
QT0289'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1953
QT0289'RECOVERED IN GOOD CONDITION.
```

APPENDIX "C" OPUS DATASHEETS

Shared Solution

PID: PU1237
Designation: 3 PCL
Stamping: 3 PCL 1958 ET 2819
Stability: May hold commonly subject to ground movement
Setting: Set in top of concrete monument
Mark Condition: G
Description: 217.6 feet SSE of the center line of Fair Point Rd. 30 feet East of the center line of a field entrance road South. 26.5 feet ENE of the eastern most post of a gate. 5.4 feet North of a wire fence.
Observed: 2017-05-17T14:56:00Z See Also 1962
Source: OPUS - page5 1603.24

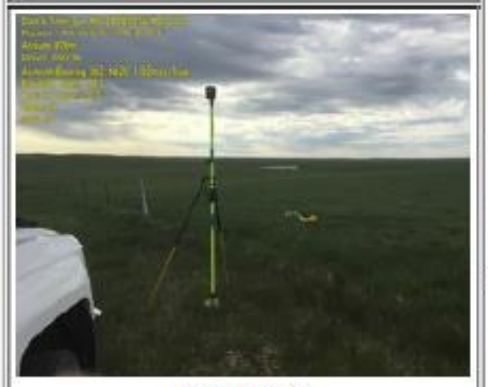
Close-up View

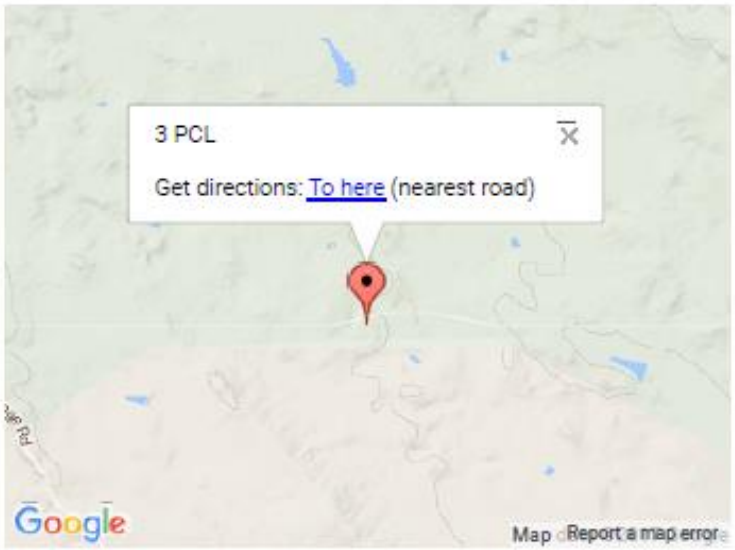
REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET PROFILE	DETAILS
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m		

			UTM 13	SPC 901(FL E)
LAT:	44° 44' 54.20458"	± 0.001 m	**NORTHING:**	4956884.189m 2506743.807m
LON:	-103° 1' 55.31617"	± 0.002 m	**EASTING:**	655783.616m -1544096.941m
ELL HT:	842.392	± 0.009 m	**CONVERGENCE:**	1.38571664° -15.90582610°
X:	-1023281.094	± 0.003 m	**POINT SCALE:**	0.99989844 1.03759373
Y:	-4421039.331	± 0.006 m	**COMBINED FACTOR:**	0.99976639 1.03745670
Z:	4468126.524	± 0.007 m		
ORTHO HT:	859.652	± 0.017 m		

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.


Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID:	AD8966
Designation:	212 091.15
Stamping:	212-91.15 1995
Stability:	Most reliable; expected to hold position well
Setting:	Galvanized steel pipe in sleeve (10FT+ or 3.048M+)
Mark Condition:	G
Description:	89.7 feet South of a fence corner, 1.3 feet west of a fence line, 1.5 feet Southeast of a guard post.
Observed:	2017-05-23T00:00:00Z See Also 1996-04-25
Source:	OPUS - page5 1603.24

Close-up View

REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET PROFILE	DETAILS
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m		

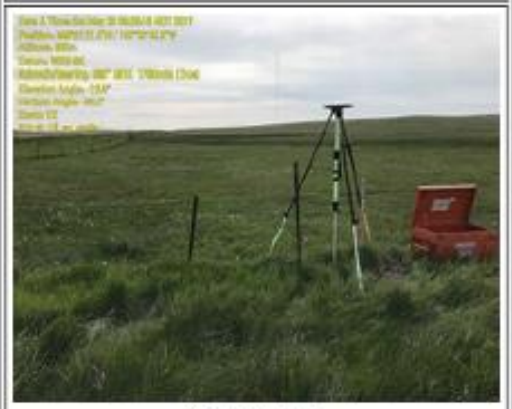
LAT:	45° 1' 21.37015"	± 0.002 m
LON:	-102° 30' 45.08680"	± 0.003 m
ELL HT:	848.467	± 0.006 m
X:	-978494.722	± 0.003 m
Y:	-4409143.242	± 0.004 m
Z:	4489724.431	± 0.005 m
ORTHO HT:	866.697	± 0.014 m

	UTM 13	**SPC** 4001(SD N)
NORTHING:	4988471.513m	135226.901m
EASTING:	695974.090m	402017.150m
CONVERGENCE:	1.76016283°	-1.77820925°
POINT SCALE:	1.00007227	0.99993924
COMBINED FACTOR:	0.99993925	0.99980624

CONTRIBUTED BY

mstone

Gustin, Cothern & Tucker, Inc.



Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: PV0443
Designation: BOUNDARY MON SE CORNER MT
Stamping:
Stability: Monuments of questionable or unknown reliability
Setting: Unspecified setting
Mark Condition: G
Description: 1265.5 feet Northeast of the center line of Albion Road, located inside of a stockade fence.
Observed: 2017-05-11T21:50:00Z See Also 2011-08-22
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	44° 59' 53.13577" ± 0.007 m	
LON:	-104° 2' 22.76390" ± 0.001 m	
ELL HT:	1012.681 ± 0.020 m	
X:	-1096147.877 ± 0.003 m	
Y:	-4383481.694 ± 0.009 m	
Z:	4487914.622 ± 0.019 m	
ORTHO HT:	1028.158 ± 0.035 m	

	UTM 13	SPC 4001(SD N)
NORTHING:	4983187.142m	137375.717m
EASTING:	575692.263m	281626.713m
CONVERGENCE:	0.67907482°	-2.85901926°
POINT SCALE:	0.99967045	0.99993954
COMBINED FACTOR:	0.99951175	0.99978080

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.

Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: PU0990
Designation: D 410
Stamping: D 410 1962
Stability: Most reliable; expected to hold position well
Setting: In rock outcrop or ledge
Mark Condition: G
Description: 32 feet East of the center line of County Hwy Mc 31b, 30 feet West of a barbed wire fence line, 3 feet Northeast of a witness post.
Observed: 2017-05-23T21:00:00Z See Also 1962
Source: OPUS - page5 1603.24

Close-up View

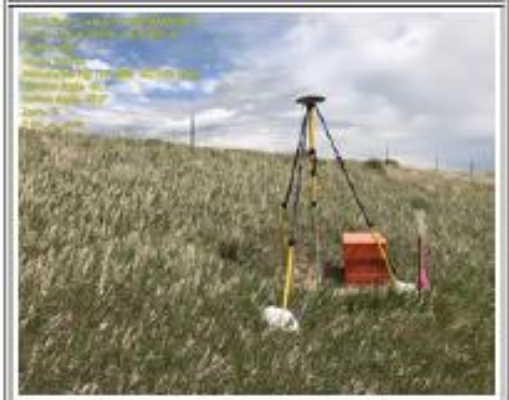
REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET	
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m	PROFILE	DETAILS

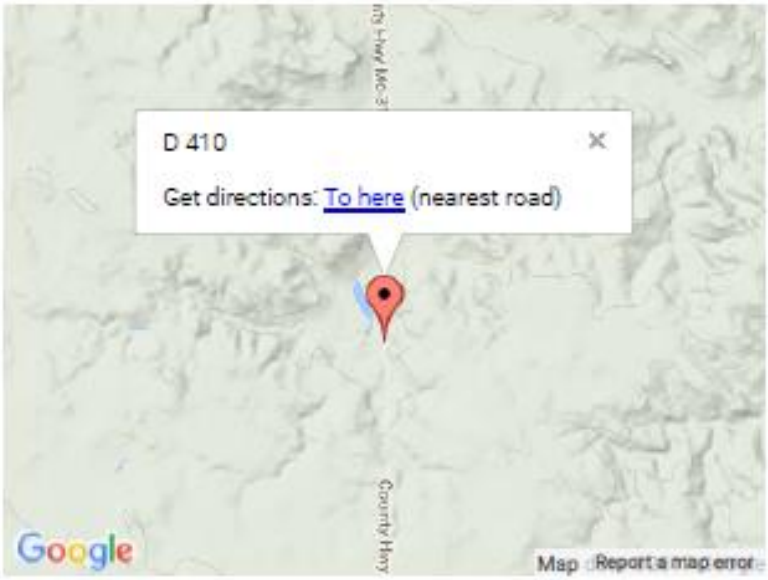
LAT:	44° 44' 20.06743" ± 0.002 m	
LON:	-102° 31' 57.15149" ± 0.002 m	
ELL HT:	802.104 ± 0.005 m	
X:	-984855.963 ± 0.003 m	
Y:	-4430488.197 ± 0.002 m	
Z:	4467349.618 ± 0.005 m	
ORTHO HT:	820.502 ± 0.012 m	

	UTM 13	SPC 4001(SD N)
NORTHING:	4956908.806m	103766.334m
EASTING:	695355.253m	399454.242m
CONVERGENCE:	1.73733480°	-1.79237674°
POINT SCALE:	1.00006932	0.99995389
COMBINED FACTOR:	0.99994356	0.99982815

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.


Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ75
Designation: D07 1
Stamping: D07-1 2017
Stability: Monuments of questionable or unknown reliability
Setting: A metal rod driven into ground. Describe below.
Description: In line with and 3 feet Northeast of a fence line, 47.5 feet Northwest of the Northwest corner of an asphalt drive at the Faith Municipal Airport, 240 feet Southwest of the Southern edge of the runway.
Observed: 2017-05-23T16:31:00Z
Source: OPUS - page5 1603.24

Close-up View

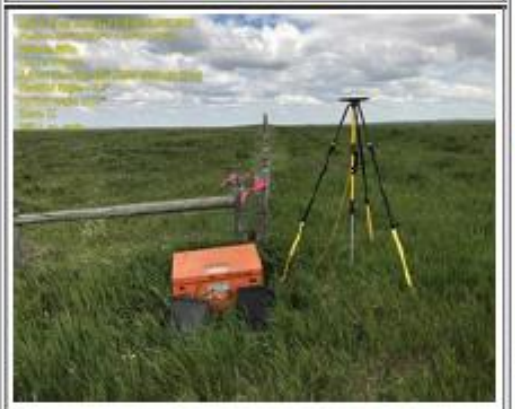
REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET PROFILE	DETAILS
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m		

LAT:	45° 1' 59.07061" ± 0.004 m	
LON:	-102° 1' 10.92486" ± 0.003 m	
ELL HT:	766.243 ± 0.004 m	
X:	-940350.695 ± 0.003 m	
Y:	-4416534.209 ± 0.002 m	
Z:	4490488.908 ± 0.005 m	
ORTHO HT:	785.722 ± 0.011 m	

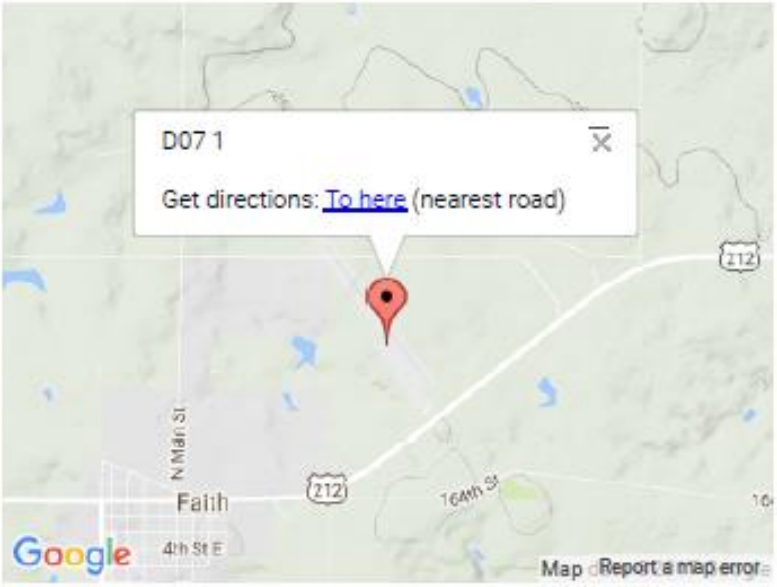
	UTM 14	**SPC** 4001(SD N)
NORTHING:	4991061.481m	135303.229m
EASTING:	262138.300m	440870.778m
CONVERGENCE:	-2.13748177°	-1.42941977°
POINT SCALE:	1.00029575	0.99993916
COMBINED FACTOR:	1.00017559	0.99981905

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ79
Designation: D07 2
Stamping: D07-2 2017
Stability: Monuments of questionable or unknown reliability
Setting: A metal rod driven into ground. Describe below.
Description: 5 feet Southeast of and in line with the Northwest edge of asphalt aircraft parking area, 185 feet Southwest of the Southwest edge of runway at Faith Municipal Airport, 430 feet West Northwest of the Southeast corner of runway
Observed: 2017-05-26T09:00:00Z
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET	
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m	PROFILE	DETAILS

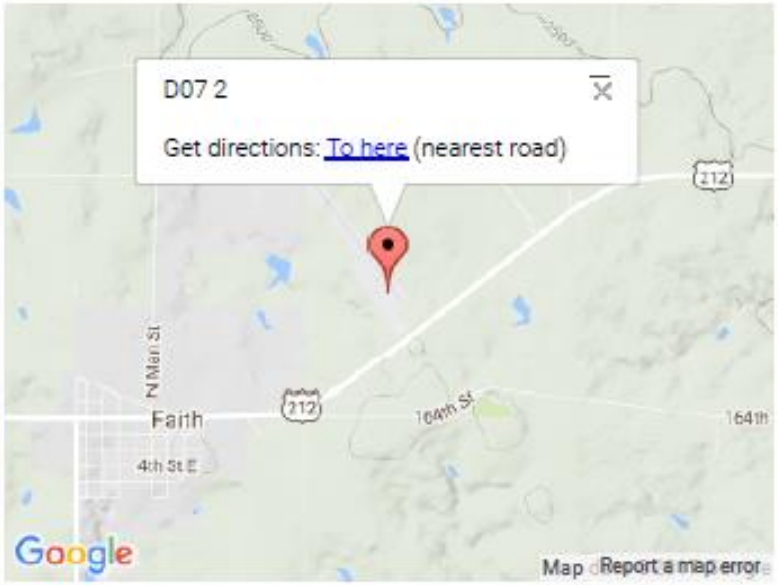
LAT:	45° 1' 51.99812" ± 0.009 m	
LON:	-102° 1' 2.11854" ± 0.005 m	
ELL HT:	766.154 ± 0.005 m	
X:	-940194.286 ± 0.005 m	
Y:	-4416725.392 ± 0.005 m	
Z:	4490334.532 ± 0.008 m	
ORTHO HT:	785.641 ± 0.011 m	

	UTM 14	**SPC** 4001(SD N)
NORTHING:	4990836.051m	135080.176m
EASTING:	262322.848m	441058.032m
CONVERGENCE:	-2.13567555°	-1.42768850°
POINT SCALE:	1.00029467	0.99993917
COMBINED FACTOR:	1.00017453	0.99981907

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.

Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ94
Designation: GCT SD01
Stamping: GCT-SD01 2017
Stability: Monuments of questionable or unknown reliability
Setting: Object driven into ground
Description: 4 feet Northwest of a barbed wire fence corner, 37 feet East of the center line of Riley Rd at the approximate center of a curve, 123 feet Southwest of the edge of Indian Creek.
Observed: 2017-05-17T15:45:00Z
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

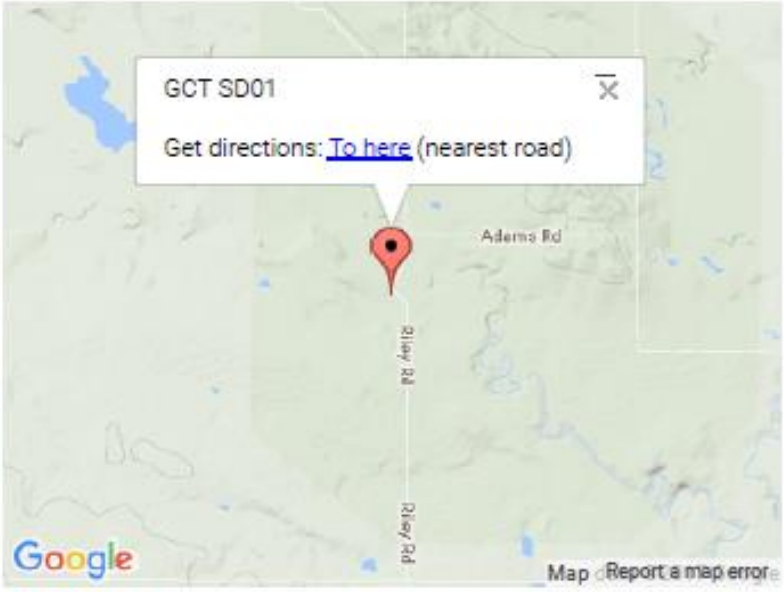
LAT:	44° 45' 8.04892" ± 0.002 m	
LON:	-103° 32' 55.77698" ± 0.001 m	
ELL HT:	848.495 ± 0.005 m	
X:	-1063046.201 ± 0.001 m	
Y:	-4411341.541 ± 0.003 m	
Z:	4468434.361 ± 0.005 m	
ORTHO HT:	864.630 ± 0.012 m	

	UTM 13	SPC 4001(SD N)
NORTHING:	4956451.789m	108268.414m
EASTING:	614866.612m	319086.224m
CONVERGENCE:	1.02179873°	-2.51164034°
POINT SCALE:	0.99976225	0.99995265
COMBINED FACTOR:	0.99962926	0.99981964

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.

Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ98
Designation: GCT SD02
Stamping: GCT-SD02 2017
Stability: Monuments of questionable or unknown reliability
Setting: A metal rod driven into ground. Describe below.
Description: 79.6 feet West Northwest of barbed wire fence corner, 49.0 feet East Southeast of a State line monument, 22.0 feet South of the center line of 3Vvv Road, 21.4 feet North of a 3 rail wood fence.
Observed: 2017-05-12T00:00:00Z
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	44° 45' 49.12236" ± 0.010 m	
LON:	-104° 3' 20.56018" ± 0.005 m	
ELL HT:	962.040 ± 0.025 m	
X:	-1101833.079 ± 0.006 m	
Y:	-4400976.568 ± 0.010 m	
Z:	4469414.744 ± 0.025 m	
ORTHO HT:	977.078 ± 0.044 m	

	UTM 13	SPC 4001(SD N)
NORTHING:	4957128.575m	111419.023m
EASTING:	574729.782m	279057.852m
CONVERGENCE:	0.66498360°	-2.87038166°
POINT SCALE:	0.99966867	0.99995164
COMBINED FACTOR:	0.99951790	0.99980083

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.

Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFR01
Designation: GCT SD03
Stamping: GCT-SD03 2017
Stability: Monuments of questionable or unknown reliability
Setting: Object driven into ground
Description: 12 feet East of a barbed wire fence, 48 feet West of the center line of South Camp Crook Road, 880 feet South of a field entrance drive.
Observed: 2017-05-13T15:02:00Z
Source: OPUS - page5 1603.24

Close-up View

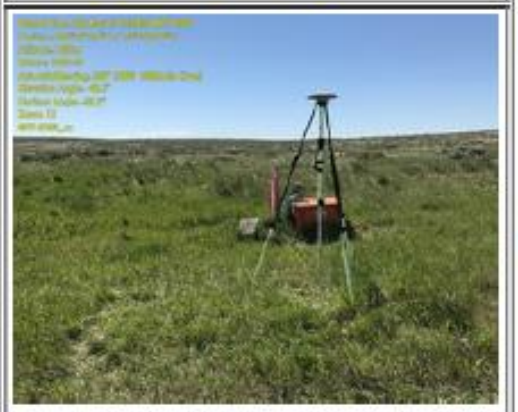
REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	45° 20' 24.47786"	± 0.008 m
LON:	-103° 58' 35.78340"	± 0.011 m
ELL HT:	1027.204	± 0.016 m
X:	-1084813.836	± 0.010 m
Y:	-4358530.998	± 0.011 m
Z:	4514728.677	± 0.013 m
ORTHO HT:	1043.184	± 0.028 m

	UTM 13	SPC 4001(SD N)
NORTHING:	5021245.331m	175094.255m
EASTING:	580180.371m	288458.129m
CONVERGENCE:	0.72797023°	-2.81439627°
POINT SCALE:	0.99967904	0.99995181
COMBINED FACTOR:	0.99951807	0.99979080

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.



Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ92
Designation: GCT SD04
Stamping: GCT-SD04 2017
Stability: Monuments of questionable or unknown reliability
Setting: Object driven into ground
Description: 22 feet South Southeast of the center line of a track road, 21.85 feet Northeast of the edge of a rock cliff, 45 feet Northwest of a 10" evergreen tree.
Observed: 2017-05-20T17:00:00Z
Source: OPUS - page5 1603.24

Close-up View

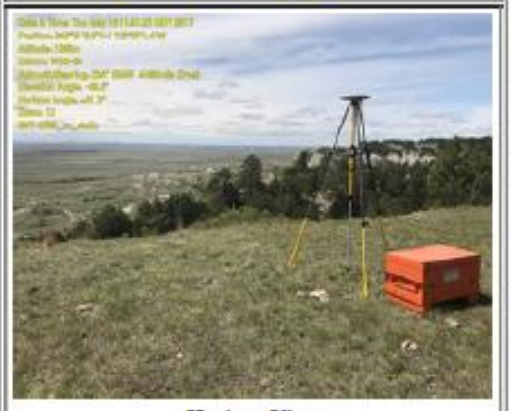
REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET PROFILE	DETAILS
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m		

LAT:	45° 21' 6.55520" ± 0.001 m	
LON:	-103° 7' 4.53731" ± 0.002 m	
ELL HT:	1051.642 ± 0.005 m	
X:	-1019168.236 ± 0.002 m	
Y:	-4373415.428 ± 0.002 m	
Z:	4515659.182 ± 0.004 m	
ORTHO HT:	1068.429 ± 0.011 m	

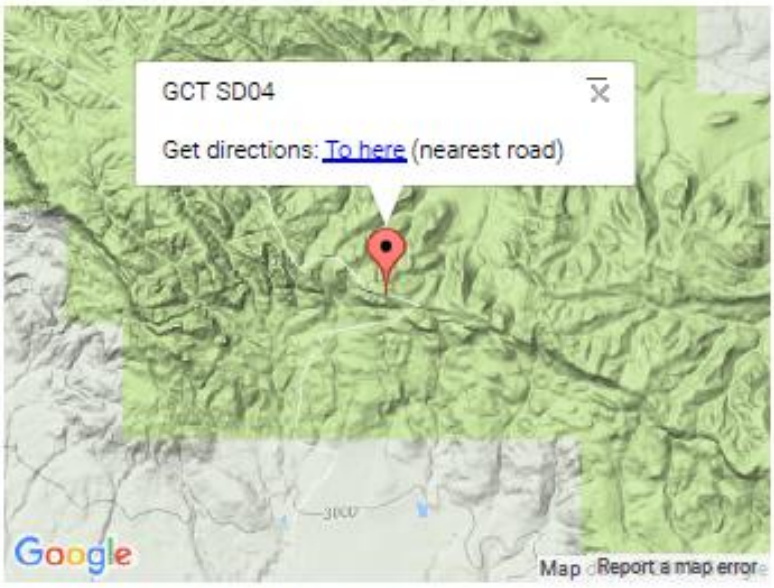
	UTM 13	**SPC** 4001(SD N)
NORTHING:	5023757.387m	173444.337m
EASTING:	647425.254m	355742.378m
CONVERGENCE:	1.33921351°	-2.20667602°
POINT SCALE:	0.99986723	0.99995286
COMBINED FACTOR:	0.99970240	0.99978802

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.



Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ91
Designation: GCT SD05
Stamping: GCT-SD05 2017
Stability: Monuments of questionable or unknown reliability
Setting: Object driven into ground
Description: 3 feet North of a barbed wire fence line, 21 feet West of the center of a gate, 186 feet South of the center line of 143rd Street.
Observed: 2017-05-21T00:00:00Z
Source: OPUS - page5 1603.24

Close-up View

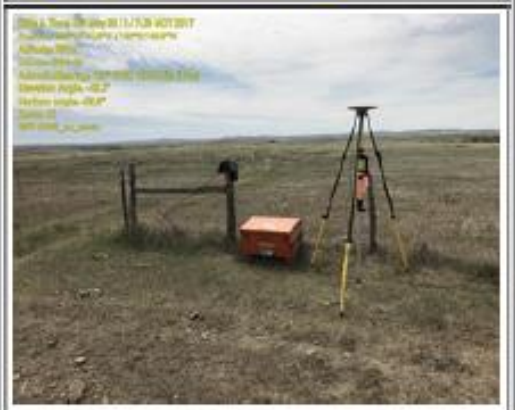
REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	45° 19' 41.65298" ± 0.003 m	
LON:	-102° 31' 46.04149" ± 0.003 m	
ELL HT:	770.005 ± 0.014 m	
X:	-974558.548 ± 0.004 m	
Y:	-4385279.168 ± 0.009 m	
Z:	4513616.238 ± 0.010 m	
ORTHO HT:	788.119 ± 0.025 m	

	UTM 13	**SPC** 4001(SD N)
NORTHING:	5022383.628m	169216.634m
EASTING:	693601.094m	401744.427m
CONVERGENCE:	1.75746128°	-1.79019258°
POINT SCALE:	1.00006087	0.99995078
COMBINED FACTOR:	0.99994016	0.99983008

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.



Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: BBFQ99
Designation: GCT SD06
Stamping: GCT-SD06 2017
Stability: Monuments of questionable or unknown reliability
Setting: Object driven into ground
Description: 118 feet North Northeast of the center line of Foster Road, 112 feet North of the North edge of a cattle guard across Foster Road, 2 feet West of a barbed wire fence line.
Observed: 2017-05-26T14:00:00Z
Source: OPUS - page5 1603.24

Close-up View

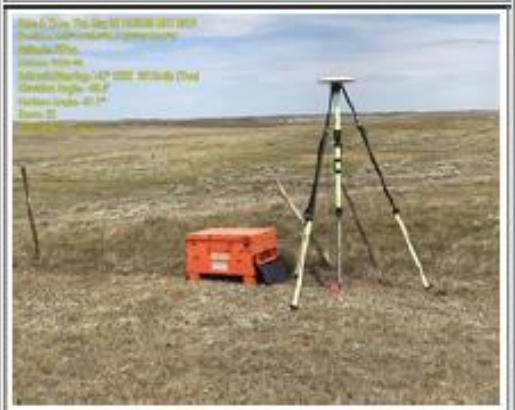
REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	45° 18' 25.00272" ± 0.002 m	
LON:	-102° 2' 15.01627" ± 0.002 m	
ELL HT:	709.320 ± 0.002 m	
X:	-937212.352 ± 0.002 m	
Y:	-4395089.099 ± 0.001 m	
Z:	4511908.956 ± 0.002 m	
ORTHO HT:	728.542 ± 0.009 m	

	UTM 14	SPC 4001(SD N)
NORTHING:	5021538.162m	165763.553m
EASTING:	261880.910m	440234.291m
CONVERGENCE:	-2.16032652°	-1.44201975°
POINT SCALE:	1.00029721	0.99994906
COMBINED FACTOR:	1.00018598	0.99983787

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.


Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: PU2412
Designation: M 395 RESET
Stamping: M 395 RESET 1988
Stability: May hold commonly subject to ground movement
Setting: Set in top of concrete monument
Mark Condition: G
Description: 79 feet East of highway center line, 20.2 feet South of the center of a gate, 4 feet East of a fence, 1 foot East of a carsonite witness post.
Observed: 2017-05-23T15:00:00Z See Also 1996-07-11
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME:	EPOCH:	SOURCE:	UNITS:	SET PROFILE	DETAILS
NAD_83(2011)	2010.0000	NAVD88 (Computed using GEOID12B)	m		

LAT:	44° 45' 23.20985"	± 0.004	m
LON:	-102° 3' 17.86468"	± 0.002	m
ELL HT:	672.204	± 0.011	m
X:	-947586.689	± 0.002	m
Y:	-4437111.031	± 0.005	m
Z:	4468642.619	± 0.011	m
ORTHO HT:	691.961	± 0.020	m

	UTM 14	SPC 4001(SD N)
NORTHING:	4960436.256m	104643.183m
EASTING:	258203.244m	437312.999m
CONVERGENCE:	-2.15202129°	-1.45437537°
POINT SCALE:	1.00031901	0.99995228
COMBINED FACTOR:	1.00021359	0.99984690

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.

Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: QT0438
Designation: NONA
Stamping: NONA 1952
Stability: May hold commonly subject to ground movement
Setting: Set in top of concrete monument
Mark Condition: G
Description: 695.8 feet East of the Southeast corner of a corral fence, 217.9 feet South of the center line of Moreau River Road, 154.8 feet Northeast of the center line of an unnamed track rd.
Observed: 2017-05-21T14:20:00Z See Also 1952
Source: OPUS - page5 1603.24

Close-up View

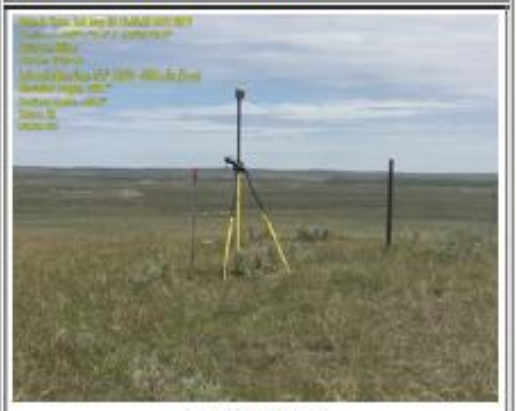
REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

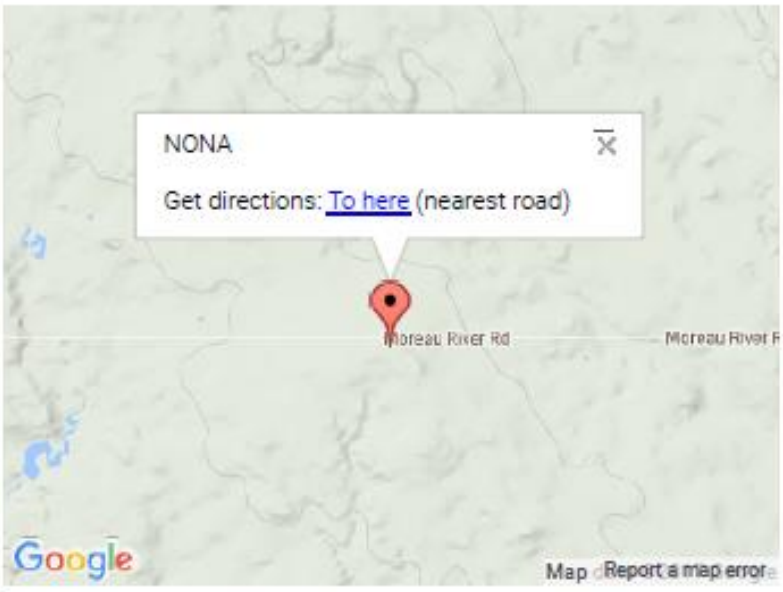
LAT:	45° 11' 52.02769" ± 0.021 m	
LON:	-102° 51' 26.18168" ± 0.008 m	
ELL HT:	835.982 ± 0.014 m	
X:	-1001935.044 ± 0.013 m	
Y:	-4389718.396 ± 0.019 m	
Z:	4503457.372 ± 0.008 m	
ORTHO HT:	853.457 ± 0.025 m	

	UTM 13	**SPC** 4001(SD N)
NORTHING:	5007155.671m	155583.269m
EASTING:	668297.446m	375549.064m
CONVERGENCE:	1.52071377°	-2.02220099°
POINT SCALE:	0.99994827	0.99994238
COMBINED FACTOR:	0.99981723	0.99981134

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.


Horizon View



The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.

Shared Solution

PID: QT0422
Designation: TT 61 JNF
Stamping: TT 61 JNF 1948
Stability: May hold commonly subject to ground movement
Setting: Set in top of concrete monument
Mark Condition: G
Description: 229.75 feet NE of power pole, 128.0 feet East Southeast of power pole, 29.7 feet East of the center line of Cottonwood Road.
Observed: 2017-05-26T16:01:00Z See Also 1951
Source: OPUS - page5 1603.24

Close-up View

REF_FRAME: NAD_83(2011)	EPOCH: 2010.0000	SOURCE: NAVD88 (Computed using GEOID12B)	UNITS: m	SET PROFILE	DETAILS

LAT:	45° 8' 29.07071" ± 0.001 m	
LON:	-102° 24' 23.21179" ± 0.002 m	
ELL HT:	741.553 ± 0.001 m	
X:	-968304.879 ± 0.002 m	
Y:	-4401741.232 ± 0.001 m	
Z:	4498972.642 ± 0.001 m	
ORTHO HT:	760.028 ± 0.009 m	

	UTM 13	**SPC** 4001(SD N)
NORTHING:	5001931.790m	148169.608m
EASTING:	703907.913m	410765.672m
CONVERGENCE:	1.83907016°	-1.70313494°
POINT SCALE:	1.00011127	0.99994035
COMBINED FACTOR:	0.99999501	0.99982411

CONTRIBUTED BY

mstone
Gustin, Cothern & Tucker, Inc.


Horizon View

The numerical values for this position solution have satisfied the quality control criteria of the National Geodetic Survey. The contributor has verified that the information submitted is accurate and complete.