WBS: 1.2.21.3.3
QA: Q/A

**Civilian Radioactive Waste Management System
Management & Operating Contractor**

**Data Qualification Report:
Topographic Grid
Revision 00**

TDR-NBS-GS-000004

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Prepared for:

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Data Qualification Report: Topographic Grid

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Attachment II: Mismatches Between Topographic Grid and Survey Data (1 page plus cover)

Data Qualification Report: Topographic Grid

Executive Summary

The data set considered here is the topographic grid used in the Geologic Framework Model (GFM). The grid has been used in each version of the GFM, and was extracted from GFM3.1 (MO9901MWDGFM31.000, file name "topography.2grd"). The grid was given a unique DTN (MO0002SPATOP00.001). A Technical Assessment method was used to evaluate these data to determine the adequacy of the grid for use in three-dimensional modeling. The topographic grid was compared to qualified borehole collar survey data (DTN: MO9906GPS98410.000) and the mismatches documented. An acceptance window was established for the topographic grid based on the needs of the data users. The grid was determined to be within the acceptance window, and was determined to be adequate for its intended use in three-dimensional spatial modeling and is recommended to be Qualified.

1. SCOPE

The scope of this activity was to evaluate the topographic grid data used in the GFM. This qualification activity was performed in accordance with *Data Qualification Plan: Topographic Grid* (DI: TDP-NBS-GS-0000029, MOL.20000209.0302). That document describes the scope, objectives, methods, QA procedures, and criteria for this activity.

2. QUALIFICATIONS OF TEAM MEMBERS

Robert W. Clayton

Ph.D. in Geological Sciences, 8 years professional experience using grids and performing three-dimensional modeling in subsurface exploration, including 6 years on the Yucca Mountain Project. Was not associated with acquisition of the topographic data.

William P. Zelinski

M.S. in Geology, 25 years professional experience in Geology and three-dimensional modeling including 6 years on the Yucca Mountain Project. Was not associated with acquisition of the topographic data.

3. DATA TO BE QUALIFIED

The topographic grid to be qualified is part of the Geologic Framework Model (GFM3.1; non-Q pending qualification of data; DTN: MO9901MWDGFM31.000). The origin of the grid is

uncertain. It was developed in approximately 1994 by the Technical Data Management contractor at the time, EG&G, using standard industry procedures, but was undocumented. The objective of this activity, then, is to determine the adequacy of the grid for use in three-dimensional modeling.

The borehole collar survey data were retrieved from the Technical Data Management System (TDMS; DTN: MO9906GPS98410.000). The data were downloaded electronically to avoid transcription errors. The data are included in Attachment I to this report.

[Note: The "collar" is the top of steel pipe that is inserted into a borehole to prevent collapse. It is the common datum for downhole measurements, and is usually within 1-3 feet of the ground surface for boreholes at Yucca Mountain.]

4. EVALUATION CRITERIA

To be adequate for use in three-dimensional modeling, the topographic grid elevations must be sufficiently accurate when compared to known, surveyed, Q elevations. In addition, the surveyed elevations must be sufficiently dispersed across the site area to provide a valid comparison. The surveyed borehole collar elevations provide a suitable test case because they are widely scattered across most of the site area.

To determine the tolerance required, users of borehole data were queried, and the tightest tolerance required by a user for near-surface data was determined to be plus or minus 10 feet (15 feet at depth; *Data Qualification Plan: Borehole Stratigraphic Contacts*, Attachment I). The topographic grid was required to be within 10 feet of surveyed locations to be acceptable.

5. METHODOLOGY

The borehole collar survey elevations were compared to the elevation of the topographic grid at the same locations, using existing functions in EARTHVISION software (Qualified; CSCI: 30035 V4.0). The mismatches were then calculated, and are documented in Attachment II. The survey elevations for all boreholes used as input to GFM3.1 were used in the analysis.

The results in Attachment II show that the mismatch was greater than the tolerance for only one borehole, SD-12 (11 feet). The reason for this mismatch is the location of the borehole on top of a narrow ridge. Because the topographic grid nodes are 100 feet apart, a narrow ridge like the one at SD-12 can not be completely defined. In this case, then, the grid was determined to be adequate.

The second largest mismatch was 10 feet at borehole NRG-7a. This borehole is located at the inflection point between a ridge and a wash, where the ability of the grid to completely define the topography is limited by the spacing of grid nodes. In this case as well, the grid was determined to be adequate.

6. RECOMMENDATION CRITERIA

The topographic grid was recommended to be qualified if it met the evaluation criteria described above.

7. EVALUATION RESULTS

The topographic grid was found to be within the required tolerance when compared to the qualified borehole collar survey elevations. The two largest mismatches at boreholes SD-12 and NRG-7a were determined to be caused by the inherent limitation of a grid to define abrupt topographic features at or smaller than the grid node spacing, and therefore the grid was determined to be adequate for use in three-dimensional modeling.

The recommendation to qualify the topographic grid is limited by the tolerance window stated (plus or minus 10 feet). Applications which require tolerance less than the tolerance window used here should evaluate the data in that context.

The topographic grid is an input to the Geologic Framework Model version GFM3.1 (DTN: MO9901MWDGFM31.000), which forms a basis for the Integrated Site Model (ISM), repository design models, and UZ and SZ flow and transport models. No impact to any models is anticipated, however, because the topographic grid is not used to determine the elevations of any subsurface rock layers except the bottom of alluvium, and was found to be adequate with no changes.

8. RECOMMENDATION TO CHANGE QUALIFICATION STATUS

The data qualification team recommends that the Technical Data Management System Data Qualification Point of Contact change the qualification status of the topographic grid to Q. The grid is identified by DTN MO0002SPATOP00.001.

9. SUPPORT INFORMATION

The topographic grid is identified by DTN MO0002SPATOP00.001 (parent DTN: MO9901MWDGFM31.000).

10. DATA QUALIFICATION PLAN

This activity was proscribed in *Data Qualification Plan: Topographic Grid* (DI: TDP-NBS-GS-000029; ACC: MOL.20000209.0302).

Signatures and Approvals

Robert W. Clayton 3/27/00
Robert W. Clayton, team chair

William P. Zelinski 3/27/00
William P. Zelinski, team member

Robert Wemheuer 03/28/00
Robert Wemheuer, Responsible Manager

Attachment I:
Borehole Collar Survey Data
(8 pages)

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
U-25 Seismic #20	3357.000	140.00	593171.938	747172.875	Q
U-25 Seismic #21	3524.580	140.00	569427.625	746906.312	Q
U-25 Seismic #22	2947.370	140.00	581268.500	718335.000	Q
U-25 Seismic #23	3215.660	140.00	580246.688	741126.062	Q
U-25 Seismic #24	3554.120	140.00	580907.250	769057.312	Q
U-25 TC #1	3753.740	30.00	612897.750	756483.875	Q
U-25 TC #2	3753.790	30.00	612899.125	756486.312	Q
U-25 TC #3	3763.620	45.00	613080.188	756807.188	Q
U-25 TC #4	3764.700	45.00	613095.625	756861.188	Q
U-25 TC #5	3762.790	0.00	613077.750	756795.250	Q
U-25 TCi #1	3790.120	5.00	613452.750	756777.062	Q
U-25 TCi #2	3790.110	5.00	613451.125	756779.250	Q
U-25 TCi #3	3790.050	5.00	613436.438	756783.000	Q
U-25 TCi #4	3790.110	5.00	613438.750	756784.375	Q
U-26 Seismic #1	3847.750	140.00	629834.125	746151.312	Q
U-29 Seismic #1	3877.830	142.00	585139.938	791869.125	Q
U-30 Seismic #1	4754.400	142.00	604819.938	837368.812	Q
U-30 Seismic #2	4751.880	140.00	604800.625	837375.375	Q
U-5 Seismic #1	3868.360	140.00	668101.062	749607.375	Q
U-5 Seismic #2	3867.050	140.00	668123.188	749624.438	Q
UE-1 m	4478.130	514.00	657843.125	825408.688	Q
UE-1 n	4483.230	5.00	657761.875	825330.250	Q
UE-1 o	4480.070	5.00	657757.000	825418.688	Q
UE-1 p	4231.960	782.00	662294.250	826268.812	Q
UE-16 b	4894.060	361.00	646345.000	839498.000	Q
UE-16 c	4726.530	144.00	644558.875	844957.688	Q
UE-16 d	4685.820	2321.00	646567.812	844877.312	Q
UE-16 f	4651.450	1479.00	648842.125	832352.938	Q
UE-17 a	4696.630	1214.00	645992.500	846138.062	Q
UE-17 b	4783.340	256.50	646471.500	849216.250	Q
UE-17 c	4833.450	586.00	650048.000	857444.438	Q
UE-17 d	4680.730	398.00	647789.188	847189.000	Q
UE-17 e	4934.250	3000.00	646448.812	853205.000	Q
UE-17 f	4929.900	100.00	646032.375	853321.625	Q
UE-17 g	4929.750	104.00	646515.312	853291.750	Q
UE-17 SI #1	4931.860	110.00	646487.750	853331.250	Q
UE-17 SI #10	4931.880	84.50	646489.062	853338.000	Q
UE-17 SI #11	4931.840	82.50	646486.562	853324.188	Q
UE-17 SI #11a	4931.790	60.00	646485.875	853320.312	Q
UE-17 SI #12	4931.880	77.50	646480.938	853332.312	Q
UE-17 SI #13	4931.880	84.50	646489.688	853342.000	Q
UE-17 SI #14	4931.890	80.00	646498.562	853329.188	Q
UE-17 SI #15	4931.890	77.50	646476.812	853333.062	Q
UE-17 SI #16	4931.290	84.00	646495.438	853374.438	Q
UE-17 SI #2	4931.880	92.50	646488.125	853333.125	Q
UE-17 SI #3	4931.840	115.00	646489.750	853330.812	Q
UE-17 SI #4	4931.890	92.50	646485.812	853331.438	Q
UE-17 SI #5	4931.880	83.50	646488.438	853335.062	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
UE-17 SI #6	4931.870	80.00	646491.750	853330.438	Q
UE-17 SI #7	4931.850	82.50	646487.062	853327.188	Q
UE-17 SI #8	4931.880	77.50	646484.500	853328.938	Q
UE-17 SI #8a	4931.870	60.00	646478.812	853324.812	Q
UE-17 SI #9	4931.880	80.00	646483.812	853331.812	Q
UE-17 TH #1	4931.980	80.00	646479.188	853343.438	Q
UE-17 TH #2	4931.980	80.00	646477.938	853345.188	Q
UE-17 TH #3	4931.840	80.00	646478.812	853349.188	Q
UE-17 TH #4	4931.770	80.00	646491.750	853352.625	Q
UE-17 TH #5	4931.800	80.00	646492.000	853354.562	Q
UE-22 ARMY #1	3153.350	1945.00	684772.938	670903.125	Q
UE-25 a #1	3935.350	2501.00	566349.875	764901.000	Q
UE-25 a #3	4548.900	2530.00	602940.688	769318.938	Q
UE-25 a #4	4102.040	500.00	564471.875	767972.375	Q
UE-25 a #5	4060.570	487.00	564755.188	766956.438	Q
UE-25 a #6	4053.270	500.00	564500.875	765899.875	Q
UE-25 a #7	4005.580	1002.00	565468.312	766250.000	Q
UE-25 b #1	3939.280	4003.00	566416.188	765244.312	Q
UE-25 c #1	3708.490	3000.00	569680.562	757096.750	Q
UE-25 c #2	3714.090	3000.00	569633.938	756849.625	Q
UE-25 c #3	3714.410	3000.00	569554.938	756910.875	Q
UE-25 h #1	3407.590	400.00	574462.312	748352.688	Q
UE-25 J-11	3443.060	1329.00	611768.000	740968.750	Q
UE-25 J-11Prime	3441.940	220.00	611821.812	740890.938	Q
UE-25 J-12	3129.840	1139.00	581012.062	733508.250	Q
UE-25 J-13	3317.400	3498.00	579647.938	749202.000	Q
UE-25 JF #3	3098.420	1298.00	581179.438	730875.375	Q
UE-25 NRG #2	3800.370	294.00	569162.438	765763.750	Q
UE-25 NRG #2a	3780.550	266.00	569001.062	765699.938	Q
UE-25 NRG #2b	3801.400	330.00	569214.562	765765.250	Q
UE-25 NRG #2c	3801.170	151.00	569189.750	765771.688	Q
UE-25 NRG #2d	3792.050	170.20	569132.312	765825.125	Q
UE-25 NRG #3	3823.330	330.00	568316.125	766250.625	Q
UE-25 NRG #4	4099.480	726.00	566820.000	767080.188	Q
UE-25 NRG #5	4106.660	1350.00	564769.875	767889.625	Q
UE-25 ONC #1	3815.110	1540.00	568092.875	759257.250	Q
UE-25 p #1	3654.530	5923.00	571484.438	756172.562	Q
UE-25 RF #1	3688.600	145.00	570890.125	762190.562	Q
UE-25 RF #13	3671.030	0.00	570720.119	765500.041	Q
UE-25 RF #2	3657.850	52.00	570335.125	758800.812	Q
UE-25 RF #3b	3661.370	111.00	571066.062	765695.750	Q
UE-25 RF #4	3637.060	306.00	572063.312	762091.625	Q
UE-25 RF #7	3756.080	150.00	571171.062	768804.750	Q
UE-25 RF #7a	3756.500	153.00	570268.812	768768.750	Q
UE-25 RF #8	3785.700	128.00	568790.188	765631.375	Q
UE-25 SPT #1	3945.900	0.00	566219.312	765089.875	Q
UE-25 SRS #307r	3661.000	0.00	570958.000	756207.000	Q
UE-25 SRS #311	3356.000	0.00	577865.000	755087.000	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
UE-25 UZ #16	4000.480	1696.20	564857.500	760535.125	Q
UE-25 UZ #4	3940.050	411.00	566140.125	768715.688	Q
UE-25 UZ #5	3952.830	405.00	566136.125	768593.125	Q
UE-25 UZN #1	3995.430	50.00	565224.438	769329.750	Q
UE-25 UZN #10	4038.710	99.00	564744.562	769869.312	Q
UE-25 UZN #12	3908.250	50.00	566695.188	768651.500	Q
UE-25 UZN #13	3821.470	65.00	568255.188	768025.438	Q
UE-25 UZN #14	3824.380	55.00	568233.062	767968.000	Q
UE-25 UZN #18	4018.900	61.00	565246.625	766472.812	Q
UE-25 UZN #19	4025.490	40.00	564570.812	763689.562	Q
UE-25 UZN #2	3947.070	50.00	566113.688	768606.375	Q
UE-25 UZN #20	4027.360	41.00	564579.438	763760.625	Q
UE-25 UZN #21	4027.980	42.00	564591.375	763806.812	Q
UE-25 UZN #22	4029.300	95.00	564604.875	763881.062	Q
UE-25 UZN #23	4043.760	35.00	564545.688	763973.750	Q
UE-25 UZN #28	3958.920	26.00	565319.812	763092.062	Q
UE-25 UZN #29	3973.360	35.00	565173.312	762613.812	Q
UE-25 UZN #3	3940.820	15.00	566119.438	768631.438	Q
UE-25 UZN #30	3959.530	35.00	565232.875	762048.188	Q
UE-25 UZN #39	3768.220	125.00	617277.750	755133.062	Q
UE-25 UZN #4	3942.510	30.00	566127.125	768664.375	Q
UE-25 UZN #5	3943.530	50.00	566134.188	768690.188	Q
UE-25 UZN #56	3960.250	60.00	565480.125	760394.688	Q
UE-25 UZN #6	3938.770	45.00	566136.812	768706.500	Q
UE-25 UZN #60	3893.040	35.00	566567.125	759757.938	Q
UE-25 UZN #63	3942.210	60.00	566169.625	768837.250	Q
UE-25 UZN #7	3939.870	45.00	566141.375	768724.938	Q
UE-25 UZN #8	3938.340	45.00	566146.625	768743.812	Q
UE-25 UZN #85	3337.060	80.00	577568.250	750715.812	Q
UE-25 UZN #9	3941.130	40.00	566156.062	768782.375	Q
UE-25 UZN #97	3959.030	60.00	565320.625	763094.562	Q
UE-25 UZNC #1	3928.610	5.00	566159.000	764671.500	Q
UE-25 UZNC #2	3928.710	5.00	566157.312	764669.562	Q
UE-25 WT #12	3525.760	1308.00	567011.812	739726.688	Q
UE-25 WT #13	3385.860	1154.00	578842.250	756885.188	Q
UE-25 WT #14	3529.670	1310.00	575210.188	761651.375	Q
UE-25 WT #15	3552.560	1360.00	579806.250	766117.000	Q
UE-25 WT #16	3971.260	1709.00	570395.125	774420.188	Q
UE-25 WT #17	3687.090	1450.00	566212.000	748421.500	Q
UE-25 WT #18	4384.000	2043.00	564854.625	771167.250	Q
UE-25 WT #3	3379.230	1142.00	573385.188	745995.562	Q
UE-25 WT #4	3835.680	1580.00	568038.312	768511.938	Q
UE-25 WT #5	3558.030	1330.00	574249.750	761826.688	Q
UE-25 WT #6	4313.270	1258.00	564523.625	780576.125	Q
UE-29 a #1	3984.200	215.00	585575.250	797730.000	Q
UE-29 a #2	3984.640	1383.00	585547.500	797745.750	Q
UE-29 UZN #91	3949.340	94.00	585341.375	797275.812	Q
UE-29 UZN #92	3670.680	120.00	583559.000	778010.125	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
Unknow Unknown	0.000	0.00	562368.688	760709.312	Q
US-25 #10	3722.990	50.00	570113.438	762251.000	Q
US-25 #11	3722.910	52.00	570109.188	762227.375	Q
US-25 #12	3687.790	52.00	570894.250	762189.312	Q
US-25 #13	3686.990	52.00	570891.312	762168.312	Q
US-25 #14	3653.100	50.00	571675.000	762137.250	Q
US-25 #15	3653.870	50.00	571671.875	762106.125	Q
US-25 #16	3619.340	50.00	572452.812	762048.688	Q
US-25 #17	3575.270	50.00	573629.375	761985.562	Q
US-25 #19	3498.600	50.00	576242.625	761747.125	Q
US-25 #20	3485.000	50.00	577174.688	761613.375	Q
US-25 #21	3842.000	50.00	578542.938	761629.125	Q
US-25 #3	3620.000	52.00	572455.000	762075.000	Q
US-25 #4	3800.040	50.00	567853.438	762458.312	Q
US-25 #5	3799.210	52.00	567853.438	762433.000	Q
US-25 #6	3782.770	52.00	568551.750	762378.562	Q
US-25 #7	3782.820	52.00	568551.250	762355.125	Q
US-25 #8	3756.330	52.00	569332.188	762317.438	Q
US-25 #9	3757.870	50.00	569328.625	762284.250	Q
USW G-1	4350.150	6000.00	561001.062	770501.625	Q
USW G-2	5097.270	6602.00	560503.938	778825.938	Q
USW G-3	4856.090	5031.00	558483.312	752779.625	Q
USW G-4	4166.130	3001.00	563081.750	765807.500	Q
USW GA-1	5186.950	551.00	559246.812	779367.188	Q
USW GU-3	4856.700	5031.00	558501.625	752690.000	Q
USW H-1	4274.190	600.00	562388.438	770254.812	Q
USW H-3	4866.470	4000.00	558451.875	756542.000	Q
USW H-4	4096.170	4004.00	563911.375	761644.500	Q
USW H-5	4851.350	4000.00	558908.438	766634.125	Q
USW H-6	4270.790	4002.00	554074.938	763299.438	Q
USW NC-EWDP-01DX	2635.240	n/a	523221.160	713168.750	Q
USW NC-EWDP-01S	2635.370	n/a	523231.170	713154.470	Q
USW NC-EWDP-02D	2628.650	n/a	559178.310	695524.310	Q
USW NC-EWDP-03D	2619.190	n/a	537968.090	703079.660	Q
USW NC-EWDP-03S	2619.030	n/a	537957.360	703081.330	Q
USW NC-EWDP-05S	2753.780	n/a	585219.640	698929.010	Q
USW NC-EWDP-09S	2615.850	n/a	530658.530	708229.720	Q
USW NC-EWDP-09SX	2615.860	n/a	530654.850	708224.850	Q
USW NC-WASHBURN-1X	2701.690	n/a	571395.780	696791.480	Q
USW NRG-6	4092.120	1100.00	564187.000	766726.500	Q
USW NRG-7a	4207.170	1513.00	562984.000	768880.125	Q
USW SD-12	4342.820	2166.30	561605.625	761956.562	Q
USW SD-7	4472.000	2675.10	561240.250	758949.875	Q
USW SD-9	4272.640	2223.00	561818.000	767998.500	Q
USW Seismic-1	5101.780	200.00	560432.562	778958.812	Q
USW Seismic-10	5171.210	200.00	559604.688	780502.250	Q
USW Seismic-11	5179.400	200.00	559513.500	780677.312	Q
USW Seismic-12	5185.200	200.00	559419.688	780851.438	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
USW Seismic-13	5085.570	200.00	560645.812	778560.750	Q
USW Seismic-14	5076.100	200.00	560740.750	778383.250	Q
USW Seismic-15	5063.910	200.00	560834.062	778209.062	Q
USW Seismic-16	5051.360	200.00	560928.875	778033.250	Q
USW Seismic-17	5039.540	200.00	561023.938	777856.625	Q
USW Seismic-18	5027.610	200.00	561118.000	777681.250	Q
USW Seismic-19	5014.410	200.00	561211.625	777504.375	Q
USW Seismic-2	5106.740	200.00	560362.625	779090.562	Q
USW Seismic-3	5111.460	200.00	560268.312	779266.625	Q
USW Seismic-4	5114.020	200.00	560173.000	779442.625	Q
USW Seismic-5	5121.310	200.00	560079.500	779619.125	Q
USW Seismic-7	5141.700	200.00	559891.312	779972.000	Q
USW Seismic-8	5153.020	200.00	559796.438	780147.625	Q
USW Seismic-9	5161.690	200.00	559702.125	780320.500	Q
USW SR-1	3051.310	0.00	559339.062	721817.875	Q
USW SR-2	3051.150	0.00	559333.312	721809.688	Q
USW SR-3	3046.650	0.00	559246.625	721823.000	Q
USW SRS-1	2663.000	201.30	498514.000	717226.000	Q
USW SRS-11	2998.000	202.30	522693.000	737205.000	Q
USW SRS-13	3062.310	0.00	528364.688	740508.500	Q
USW SRS-201	3173.000	200.00	534016.000	743815.000	Q
USW SRS-203	3364.000	152.00	539831.000	747042.000	Q
USW SRS-207	3782.000	194.20	550960.000	753855.000	Q
USW SRS-208.5a	4244.000	0.00	556764.000	757559.000	Q
USW SRS-208.5b	4244.000	0.00	556764.000	757559.000	Q
USW SRS-211a	4160.000	0.00	555676.000	762157.000	Q
USW SRS-211b	4160.000	0.00	555676.000	762157.000	Q
USW SRS-3	2670.000	202.40	503010.000	721851.000	Q
USW SRS-300	3703.000	201.70	538298.000	766510.000	Q
USW SRS-302a	4160.000	0.00	555676.000	762157.000	Q
USW SRS-302b	4160.000	0.00	555676.000	762157.000	Q
USW SRS-5	2736.000	200.00	507380.000	726590.000	Q
USW SRS-7	2954.000	0.00	511921.000	730880.000	Q
USW SRS-9	2939.000	0.00	517012.000	733911.000	Q
USW UNK-2	3925.910	0.00	553793.812	755580.062	Q
USW UZ-1	4424.730	1270.00	560221.562	771277.375	Q
USW UZ-13	4816.110	430.00	558489.312	751953.062	Q
USW UZ-14	4425.400	2207.00	560141.562	771309.812	Q
USW UZ-6	4925.170	1887.00	558325.000	759730.188	Q
USW UZ-6s	4949.160	519.00	558050.688	759909.312	Q
USW UZ-7	4169.130	207.00	562911.625	760837.000	Q
USW UZ-7a	4228.280	770.00	562269.812	760692.750	Q
USW UZ-8	4226.730	57.00	562293.750	760763.188	Q
USW UZ-N11	5221.790	84.40	559020.938	780573.938	Q
USW UZ-N15	5107.810	59.90	559551.750	778090.562	Q
USW UZ-N16	5114.980	60.00	559626.000	778150.812	Q
USW UZ-N17	5125.750	59.82	559995.125	778224.125	Q
USW UZ-N24	4226.520	75.00	562054.438	768005.625	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
USW UZ-N25	4333.990	59.00	561219.125	768430.438	Q
USW UZ-N26	4383.810	35.00	561023.250	768757.375	Q
USW UZ-N27	4857.270	202.42	558871.750	771569.375	Q
USW UZ-N31	4151.840	192.60	562751.938	764245.625	Q
USW UZ-N32	4156.180	207.40	562799.625	764302.625	Q
USW UZ-N33	4329.160	75.00	561192.188	770070.125	Q
USW UZ-N34	4321.120	84.10	561251.375	770158.750	Q
USW UZ-N35	4245.370	175.00	562309.938	762264.000	Q
USW UZ-N36	4640.370	59.82	563582.688	773899.500	Q
USW UZ-N37	4121.120	271.33	563713.500	767499.125	Q
USW UZ-N38	4146.890	89.40	563343.875	767466.312	Q
USW UZ-N40	4079.700	35.00	564221.438	766176.188	Q
USW UZ-N41	4117.810	37.00	563521.062	765867.750	Q
USW UZ-N42	4179.300	40.00	562858.625	765729.125	Q
USW UZ-N43	4149.500	45.00	563263.625	765997.500	Q
USW UZ-N44	4161.700	36.00	563139.500	766192.938	Q
USW UZ-N45	4130.200	45.00	563429.250	765977.250	Q
USW UZ-N46	4500.660	99.00	559747.938	772262.188	Q
USW UZ-N47	4480.410	86.00	559783.750	771967.562	Q
USW UZ-N48	4211.080	35.00	562413.812	760835.938	Q
USW UZ-N49	4228.250	36.00	562322.062	760861.438	Q
USW UZ-N50	4172.770	20.00	562911.938	760776.938	Q
USW UZ-N51	4168.620	20.00	562909.562	760861.750	Q
USW UZ-N52	4171.850	25.00	562908.938	760894.938	Q
USW UZ-N53	4053.860	234.70	564237.250	760096.250	Q
USW UZ-N54	4044.070	244.72	564262.188	760271.938	Q
USW UZ-N55	4070.600	255.30	564248.250	760502.875	Q
USW UZ-N57	4183.660	118.90	560829.812	755164.500	Q
USW UZ-N58	4179.230	118.80	560862.188	755240.375	Q
USW UZ-N59	4177.710	118.80	560888.375	755321.250	Q
USW UZ-N61	4182.170	118.90	560893.938	755375.938	Q
USW UZ-N62	4881.950	60.00	558302.688	757125.188	Q
USW UZ-N64	4789.380	60.04	559435.500	765728.125	Q
USW UZ-N65	4372.320	50.00	562537.625	758627.312	Q
USW UZ-N66	4357.940	50.00	561881.688	758433.875	Q
USW UZ-N67	3918.220	25.00	563799.250	753635.562	Q
USW UZ-N68	3923.250	55.00	564006.125	753963.688	Q
USW UZ-N69	3916.960	35.00	564402.000	754462.500	Q
USW UZ-N70	4541.820	35.00	560165.000	769250.750	Q
USW UZ-N71	4924.660	52.00	558405.938	761025.688	Q
USW UZ-N72	4864.400	30.00	558645.938	761071.625	Q
USW UZ-N73	4781.620	30.00	558945.562	761052.938	Q
USW UZ-N74	4903.280	37.00	558560.125	761361.938	Q
USW UZ-N75	4798.650	37.00	559076.000	761462.250	Q
USW UZ-N76	4795.530	40.00	559067.438	761356.875	Q
USW UZ-N77	3902.950	50.00	554397.312	755526.875	Q
USW UZ-N78	4182.020	30.00	556262.688	757558.438	Q
USW UZ-N79	4154.410	32.00	556334.125	757733.688	Q

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
USW UZ-N80	4331.230	52.00	557201.375	757635.000	Q
USW UZ-N81	4064.410	70.00	555595.375	757807.562	Q
USW UZ-N82	3974.220	40.00	554689.938	757498.750	Q
USW UZ-N83	4157.260	70.00	556349.250	760624.938	Q
USW UZ-N84	4111.470	45.00	555888.000	760717.062	Q
USW UZ-N86	4172.290	30.00	556460.500	760615.375	Q
USW UZ-N87	4111.420	45.00	555887.250	760714.250	Q
USW UZ-N88	4201.650	30.00	556551.250	760797.938	Q
USW UZ-N89	4089.460	45.00	555588.750	760611.250	Q
USW UZ-N90	4089.340	45.00	555587.438	760609.250	Q
USW UZ-N93	4924.030	40.00	558321.000	759584.062	Q
USW UZ-N94	4925.860	30.00	558236.688	759723.312	Q
USW UZ-N95	4928.700	20.00	558172.625	759898.750	Q
USW UZ-N96	4893.080	35.00	558403.375	759445.562	Q
USW UZ-N98	4223.720	75.00	562083.750	767996.500	Q
USW VH-1	3160.050	2501.00	533625.000	743356.375	Q
USW VH-2	3197.080	4000.00	526264.500	748321.062	Q
USW WT-1	3939.750	1689.00	563739.188	753942.125	Q
USW WT-10	3685.770	1412.00	553302.312	748771.562	Q
USW WT-11	3589.100	1446.00	558376.688	739071.312	Q
USW WT-2	4268.230	2060.00	561924.000	760661.562	Q
USW WT-24	4900.280	0.00	562329.905	776703.061	Q
USW WT-7	3926.240	1610.00	553891.625	755570.562	Q
U-12 g	6114.000	0.00	637708.000	881027.000	NQ
U-15 k	5168.000	857.00	677459.000	903088.000	NQ
U-20 f	6117.000	4202.00	551857.000	917825.000	NQ
UE-12 DOL	0.000	0.00	638611.375	886664.875	NQ
UE-15 d	4586.000	6001.00	682084.000	895709.000	NQ
UE-18 t	5201.000	2600.00	598394.000	865793.000	NQ
UE-18 WW #8	5695.000	5499.00	609999.000	879468.000	NQ
UE-19 c	7033.000	8489.00	601027.000	917000.000	NQ
UE-2 WW #2	4470.000	3422.00	668720.000	880000.000	NQ
UE-20 c	6283.000	4800.00	556763.000	903204.000	NQ
UE-20 PM #1	6558.000	7858.00	575885.625	921109.250	NQ
UE-20 PM #2	5586.000	8782.00	528664.812	944583.250	NQ
UE-25 NRG #1	3754.600	150.00	569800.375	765358.812	NQ
UE-25 PSF #7	3641.010	0.00	571152.000	764895.625	NQ
UE-25 PTH #1	3640.270	0.00	571198.750	764947.125	NQ
UE-25 PTH #2	3641.730	0.00	571147.438	764947.000	NQ
UE-25 PTH #3	3642.280	0.00	571098.312	764946.875	NQ
UE-25 PTH #4	3639.610	0.00	571096.375	764845.500	NQ
UE-25 PTH #5	3639.560	0.00	571147.688	764847.000	NQ
UE-25 PTH #6	3638.230	0.00	571199.000	764847.125	NQ
UE-25 RF #10	3669.700	60.00	570229.062	765307.125	NQ
UE-25 RF #11	3665.400	78.00	570433.625	765621.500	NQ
UE-25 RF #3	3657.700	151.00	571098.938	765574.562	NQ
UE-25 RF #5	3813.700	122.00	568096.625	759198.375	NQ
UE-25 RF #9	3671.700	106.00	570642.688	765945.625	NQ

Borehole Identifier	Elevation	Total depth	Easting	Northing	Qualification Status
UE-27 TWF	4143.000	3400.00	661206.938	731855.750	NQ
UE-3 TWE	4934.000	3000.00	695991.375	839984.625	NQ
UE-5 WW #5a	3093.000	910.00	707514.000	738361.000	NQ
UE-5 WW #5b	3092.000	900.00	704263.000	747359.000	NQ
UE-5 WW #5c	3081.000	1200.00	705888.000	742860.000	NQ
UE-6 WW c	3921.000	1701.00	692061.000	790082.000	NQ
UE-6 WW c #1	3921.000	1707.00	692132.000	790011.000	NQ
US-25 #1	4258.500	53.00	565422.750	762630.500	NQ
US-25 #18	3545.000	50.00	574709.250	761895.500	NQ
US-25 #2	4316.200	53.00	566430.125	762402.375	NQ
USW SD-6	4905.400	2541.00	558652.625	762290.500	NQ
USW SD-6ST1	4905.400	0.00	558652.625	762290.500	NQ
USW SP-5a	3368.900	0.00	538653.375	751454.875	NQ
USW SP-5b	3366.100	0.00	538763.875	751426.875	NQ
USW SRS-205	0.000	0.00	525425.062	750475.375	NQ
USW SRS-205a	0.000	0.00	525425.062	750475.375	NQ
USW SRS-205b	0.000	0.00	525425.062	750475.375	NQ
USW SRS-305a	0.000	0.00	563176.938	757705.062	NQ
USW SRS-305b	0.000	0.00	563230.562	757705.188	NQ
USW TW-3	3477.000	1860.00	736937.000	750189.000	NQ
USW TW-4	0.000	1500.00	755786.000	669497.000	NQ
USW TW-5	3050.000	926.00	607632.000	687231.000	NQ

Attachment II:
Mismatches Between Topographic Grid and Survey Data
(1 page)

Type: scattered data
 # Version: 4
 # Description: Old topo minus Q borehole collar elevations.
 # Format: free
 # Field: 1 wellid non-numeric
 # Field: 2 x
 # Field: 3 y
 # Field: 4 z
 # Projection: State Plane
 # Zone: 2702 -- Nevada (Central)
 # Units: feet
 # Ellipsoid: Clarke 1866
 # End:

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a#4	564472	767972	5
a#5	564755	766956	-3
a#6	564501	765900	0
b#1	566416	765244	0
c#2	569634	756850	1
G-1	561001	770502	-2
G-2	560504	778826	1
G-3	558483	752780	0
G-4	563082	765808	1
H-1	562388	770255	4
H-3	558452	756542	1
H-4	563911	761644	2
H-5	558908	766634	-1
H-6	554075	763299	9
J-13	579648	749202	3
NRG#1	569803	765359	-1
NRG#2	569162	765764	-4
NRG#4	566820	767080	3
NRG#5	564770	767890	7
NRG-6	564187	766726	7
NRG-7A	562984	768880	10
ONC#1	568093	759257	0
p#1	571484	756173	2
SD-7	561240	758950	-1
SD-9	561818	767998	-7
SD-12	561606	761957	-11
UZ-1	560222	771277	0
UZ#4	566140	768716	4
UZ#5	566136	768593	6
UZ-6	558325	759730	0
UZ-7a	562270	760693	7
UZ-14	560142	771310	3
UZ#16	564857	760535	5
WT-1	563739	753942	6
WT-2	561924	760662	-1
WT#3	573385	745996	2
WT#4	568038	768512	3
WT#6	564524	780576	-3
WT-7	553892	755571	-1
WT-10	553302	748772	2
WT-11	558377	739071	4
WT#12	567012	739727	6
WT#13	578842	756885	3
WT#14	575210	761651	1
WT#15	579806	766117	1
WT#16	570395	774420	-2
WT#17	566212	748422	3
WT#18	564855	771167	4
WT#24	562330	776703	-1

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