

400 North Fourth Street  
Bismarck, ND 58501  
(701) 222-7900

December 20, 2013

Executive Secretary  
North Dakota Public Service Commission  
State Capitol Building  
Bismarck, ND 58505-0480

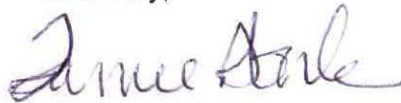
Re: Case No. 11,006 (Therm Billing)  
Monthly Report – October 2013

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., herewith submits the following information, pursuant to the Ordering paragraphs one and two of the Order issued in the above-referenced docket, dated October 20, 1987:

1. Attachment A is a schedule showing the thermal billing factors by community that reflect the BTU values shown on Attachment B and were used for billing purposes in November 2013.
2. Attachment B consists of copies of the monthly Heating Value Test Reports received from our supplier for the month of October 2013. There is a report for each of the 17 thermal zones for the month.
3. Attachment C is a listing which states the type of measuring device in place at each zone.
4. Attachment D is a monthly list of the heating value data, by zone, for the most recent 12-month period and an average thereof. It is being provided pursuant to a Staff request.
5. Attachment E provides a brief explanation of the thermal variances, where applicable, for the month of October 2013.

Please acknowledge receipt by stamping or initialing the duplicate copy of this letter attached hereto and returning the same in the enclosed self-addressed, stamped envelope. Should the Commission or its Staff have any comments or questions with respect to these reports, please call me.

Sincerely,



Tamie Aberle  
Director of Regulatory Affairs

**Montana-Dakota Utilities Co.**  
**Therm Billing Factors - North Dakota**  
**November 2013**

Town	Heat Zone	Therm Factor
MDU-303-ALEXANDER	025	1.117345
MDU-308-ARNEGARD	025	1.117345
MDU-314-APPLE VALLEY	271	1.142404
MDU-318-BEACH	032	1.011927
MDU-319-BELFIELD	032	1.019361
MDU-323-BERTHOLD	262	1.130568
MDU-327-BISMARCK	028	1.106704
MDU-330-BOWMAN	034	1.025593
MDU-337-BURLINGTON	262	1.154947
MDU-343-CARRINGTON	273	1.142404
MDU-344-CLEVELAND	272	1.134366
MDU-364-CAVALIER	273	1.166517
MDU-365-DAWSON	271	1.134366
MDU-368-DES LACS	262	1.138694
MDU-369-DICKINSON	031	1.055864
MDU-374-FT TOTTEN	273	1.150441
MDU-375-DEVILS LAKE	273	1.150441
MDU-379-BARLOW	273	1.142404
MDU-384-EPPING	264	1.137179
MDU-387-ELDRIDGE	272	1.142404
MDU-407-GLADSTONE	031	1.055864
MDU-411-GLEN ULLIN	311	1.046507
MDU-413-GOLVA	032	0.997060
MDU-416-GARRISON	262	1.138694
MDU-417-GRAFTON	273	1.174555
MDU-429-HEBRON	311	1.046507
MDU-432-HETTINGER	903	2.387549
MDU-449-JAMESTOWN	272	1.150441
MDU-459-KILLDEER	033	1.116400
MDU-463-LANGDON	273	1.142404
MDU-469-LEFOR	031	1.055864
MDU-474-LIGNITE	263	1.070201
MDU-475-LINTON	802	1.000568
MDU-478-LINCOLN	028	1.106704
MDU-494-MEDINA	271	1.134366
MDU-498-MANDAN	028	1.106704
MDU-500-MARMARTH	034	1.033182
MDU-505-MINOT	262	1.154947
MDU-510-MOTT	031	1.055864
MDU-512-MAX	262	1.154947
MDU-522-NEW ENGLAND	031	1.048219
MDU-524-NEW SALEM	028	1.083343
MDU-532-NEW ROCKFORD	273	1.142404
MDU-539-PARK RIVER	273	1.166517
MDU-540-PALERMO	262	1.130568
MDU-558-RAY	264	1.137179
MDU-561-REGENT	031	1.055864
MDU-563-RHAME	034	1.018003
MDU-564-RICHARDTON	311	1.031463

**Montana-Dakota Utilities Co.**  
**Therm Billing Factors - North Dakota**  
**November 2013**

Town	Heat Zone	Therm Factor
MDU-568-ROSS	261	1.101812
MDU-572-RUTHVILLE	262	1.154947
MDU-574-SANBORN	272	1.150441
MDU-583-SENTINEL BUTTE	032	1.011927
MDU-588-SOUTH HEART	031	1.048219
MDU-717-SPIRITWOOD	272	1.150441
MDU-590-SPRINGBROOK	264	1.132457
MDU-591-STANLEY	261	1.109789
MDU-593-STEELE	271	1.134366
MDU-598-SHEYENNE	273	1.150441
MDU-605-SURREY	262	1.154947
MDU-610-TAPPEN	271	1.134366
MDU-611-TAYLOR	031	1.031463
MDU-616-TIOGA	261	1.101812
MDU-619-TURTLE LAKE	262	1.138694
MDU-620-TRENTON	024	1.145353
MDU-624-UNDERWOOD	262	1.138694
MDU-625-VALLEY CITY	272	1.158479
MDU-629-WALHALLA	273	1.166517
MDU-632-WATFORD CITY	025	1.117345
MDU-636-WHEELOCK	264	1.124317
MDU-637-WHITE EARTH	261	1.109789
MDU-642-WILLISTON	024	1.145353
MDU-646-WASHBURN	262	1.146821
MDU-647-WILTON	262	1.129623
MDU-664-RIVERDALE	262	1.138694
MDU-691-FAIRVIEW	241	1.139645
MDU-712-MINOT AFB	262	1.154947
MDU-732-MSR SITE	273	1.156877



## GQ Source Daily Summary

October 2013

Number: 372	Pressure Base: 14.730	Contract Day: 1
Name: NESSON PLANT-CHARBONNEAU STATION	Temperature Base:	Contract Hour: 9

Day	Relative Density	Heating Value Wet	Heating Value Dry	CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
1	0.7187	1179.1	1200.0	0.785	3.110	71.452	20.630	3.489	0.139	0.325	0.029	0.037	0.000	0.000	0.000	0.000	0.000	1415.45	
2	0.7204	1180.8	1201.7	0.769	3.188	71.060	21.061	3.349	0.144	0.351	0.034	0.043	0.000	0.000	0.000	0.000	0.000	1415.83	
3	0.7212	1182.9	1203.9	0.786	3.112	70.955	21.160	3.421	0.145	0.347	0.032	0.041	0.000	0.000	0.000	0.000	0.000	1417.56	
4	0.7206	1182.3	1203.2	0.795	3.073	71.171	20.900	3.488	0.149	0.351	0.032	0.040	0.000	0.000	0.000	0.000	0.000	1417.47	
5	0.7201	1180.9	1201.8	0.802	3.103	71.218	20.849	3.471	0.147	0.341	0.030	0.037	0.000	0.000	0.000	0.000	0.000	1416.22	
6	0.7198	1179.5	1200.4	0.786	3.188	71.189	20.857	3.433	0.141	0.335	0.031	0.039	0.000	0.000	0.000	0.000	0.000	1414.86	
7	0.7194	1179.2	1200.1	0.776	3.180	71.216	20.905	3.386	0.138	0.328	0.030	0.038	0.000	0.000	0.000	0.000	0.000	1414.92	
8	0.7155	1175.1	1195.9	0.779	3.055	71.983	20.232	3.457	0.134	0.303	0.025	0.031	0.000	0.000	0.000	0.000	0.000	1413.88	
9	0.7204	1179.2	1200.1	0.766	3.286	71.249	20.579	3.536	0.147	0.357	0.034	0.044	0.000	0.000	0.000	0.000	0.000	1413.97	
10	0.7176	1175.5	1196.3	0.774	3.238	71.595	20.462	3.390	0.139	0.331	0.031	0.040	0.000	0.000	0.000	0.000	0.000	1412.25	
11	0.7145	1171.5	1192.3	0.775	3.192	71.782	20.679	3.096	0.122	0.291	0.027	0.035	0.000	0.000	0.000	0.000	0.000	1410.53	
12	0.7162	1173.9	1194.7	0.752	3.244	71.572	20.764	3.145	0.131	0.320	0.031	0.040	0.000	0.000	0.000	0.000	0.000	1411.66	
13	0.7227	1183.5	1204.5	0.748	3.264	70.940	20.842	3.575	0.156	0.387	0.038	0.049	0.000	0.000	0.000	0.000	0.000	1416.90	
14	0.7223	1182.8	1203.7	0.765	3.249	71.009	20.857	3.454	0.163	0.407	0.041	0.054	0.000	0.000	0.000	0.000	0.000	1416.35	
15	0.7203	1180.1	1201.0	0.764	3.232	71.165	20.872	3.385	0.145	0.355	0.036	0.046	0.000	0.000	0.000	0.000	0.000	1415.04	
16	0.7117	1168.4	1189.1	0.651	3.308	71.943	20.731	3.006	0.092	0.219	0.021	0.027	0.000	0.000	0.000	0.000	0.000	1409.54	
17	0.7194	1178.2	1199.0	0.777	3.248	71.112	21.105	3.199	0.137	0.342	0.034	0.045	0.000	0.000	0.000	0.000	0.000	1413.61	
18	0.7218	1183.1	1204.0	0.789	3.149	71.107	20.757	3.587	0.158	0.375	0.034	0.043	0.000	0.000	0.000	0.000	0.000	1417.19	
19	0.7189	1178.2	1199.0	0.792	3.176	71.371	20.720	3.388	0.142	0.339	0.032	0.041	0.000	0.000	0.000	0.000	0.000	1414.13	
20	0.7218	1183.7	1204.7	0.785	3.109	71.291	20.476	3.701	0.164	0.390	0.036	0.046	0.000	0.000	0.000	0.000	0.000	1418.02	
21	0.7184	1178.2	1199.0	0.795	3.119	71.520	20.581	3.437	0.143	0.336	0.030	0.039	0.000	0.000	0.000	0.000	0.000	1414.66	
22	0.7210	1182.0	1202.9	0.789	3.142	71.281	20.581	3.591	0.156	0.378	0.036	0.045	0.000	0.000	0.000	0.000	0.000	1416.62	
23	0.7320	1201.0	1222.2	0.770	3.031	70.635	20.154	4.476	0.234	0.575	0.055	0.069	0.000	0.000	0.000	0.000	0.000	1428.52	
24	0.7145	1172.3	1193.1	0.801	3.105	71.935	20.418	3.292	0.123	0.276	0.022	0.028	0.000	0.000	0.000	0.000	0.000	1411.47	
25	0.7216	1183.0	1204.0	0.786	3.141	71.277	20.503	3.649	0.166	0.394	0.037	0.047	0.000	0.000	0.000	0.000	0.000	1417.27	
26	0.7236	1185.8	1206.8	0.788	3.148	71.149	20.452	3.754	0.179	0.434	0.041	0.053	0.000	0.000	0.000	0.000	0.000	1418.68	
27	0.7220	1184.2	1205.1	0.791	3.096	71.086	20.814	3.609	0.156	0.369	0.034	0.043	0.000	0.000	0.000	0.000	0.000	1418.32	
28	0.7191	1180.2	1201.1	0.798	3.061	71.474	20.627	3.467	0.149	0.349	0.032	0.041	0.000	0.000	0.000	0.000	0.000	1416.33	
29	0.7192	1180.4	1201.3	0.797	3.060	71.522	20.512	3.540	0.150	0.346	0.032	0.041	0.000	0.000	0.000	0.000	0.000	1416.47	
30	0.7399	1213.2	1234.7	0.786	3.001	69.870	20.408	4.725	0.284	0.743	0.082	0.101	0.000	0.000	0.000	0.000	0.000	1435.30	
31	0.7478	1225.1	1246.8	0.767	3.045	69.342	20.283	5.096	0.335	0.915	0.094	0.122	0.000	0.000	0.000	0.000	0.000	1441.76	
Avg	0.7214	1183.0	1203.6	0.777	3.150	71.209	20.670	3.568	0.158	0.384	0.037	0.047	0.000	0.000	0.000	0.000	0.000	1417.12	

Zone 24, 264

## GQ Source Analysis

<b>GQ Source Number:</b>	0602160	<b>Specific Gravity:</b>	0.7292
<b>GQ Source Name:</b>	FAIRVIEW BORDER	<b>Dry Heat Value:</b>	1198.08
<b>Effective Date:</b>	10/1/2013 9:00:00 AM	<b>Wet Heat Value:</b>	1177.23
<b>Effective End Date:</b>	1/18/2038 9:14:00 PM	<b>As Deliv. Heat Value:</b>	1198.08
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	313.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	0.00

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	68.994		CO2	Carbon Dioxide	1.134
C2	Ethane	22.104	5.8941	N2	Nitrogen	3.638
C3	Propane	3.763	1.0338	O2	Oxygen	0.009
IC4	Isobutane	0.116	0.0379	He	Helium	
NC4	n-Butane	0.219	0.0688	H2	Hydrogen	
IC5	Isopentane	0.010	0.0038	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.011	0.0041	Ar	Argon	
C6	Hexanes	0.000	0.0000	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

**Totals**      100.000%      7.042 GPM

**Sample Date:** 11/1/2013 9:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** RR  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 241

## GQ Source Analysis

<b>GQ Source Number:</b>	0602230	<b>Specific Gravity:</b>	0.7127
<b>GQ Source Name:</b>	WATFORD CITY BORDER	<b>Dry Heat Value:</b>	1183.38
<b>Effective Date:</b>	10/1/2013 9:00:00 AM	<b>Wet Heat Value:</b>	1162.78
<b>Effective End Date:</b>	1/18/2038 9:14:00 PM	<b>As Deliv. Heat Value:</b>	1183.38
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	393.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	0.00

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	71.981		CO2	Carbon Dioxide	0.796
C2	Ethane	19.945	5.3183	N2	Nitrogen	3.492
C3	Propane	3.246	0.8916	O2	Oxygen	0.002
IC4	Isobutane	0.142	0.0462	He	Helium	
NC4	n-Butane	0.320	0.1008	H2	Hydrogen	
IC5	Isopentane	0.036	0.0131	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.036	0.0131	Ar	Argon	
C6	Hexanes	0.004	0.0000	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

**Totals**      100.000%      6.383 GPM

**Sample Date:** 11/1/2013 9:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** PP  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 25





## GQ Source Analysis

<b>GQ Source Number:</b>	2501030	<b>Specific Gravity:</b>	0.6688
<b>GQ Source Name:</b>	LIGNITE PLANT	<b>Dry Heat Value:</b>	1124.62
<b>Effective Date:</b>	10/1/2013 9:00:00 AM	<b>Wet Heat Value:</b>	1105.05
<b>Effective End Date:</b>	1/18/2038 9:14:00 PM	<b>As Deliv. Heat Value:</b>	1124.62
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	450.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	0.00

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	77.067		CO2	Carbon Dioxide	0.102
C2	Ethane	17.753	4.7339	N2	Nitrogen	3.949
C3	Propane	1.115	0.3063	O2	Oxygen	0.007
IC4	Isobutane	0.000	0.0000	He	Helium	
NC4	n-Butane	0.000	0.0000	H2	Hydrogen	
IC5	Isopentane	0.000	0.0000	H2S	Hydrogen Sulfide	
NCS	n-Pentane	0.000	0.0000	Ar	Argon	
C6	Hexanes	0.000	0.0000	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

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**Totals**      99.993%      5.040 GPM

**Sample Date:** 11/1/2013 9:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** PP  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 263

\*\*\* End of Report \*\*\*





## GQ Source Daily Summary

October 2013

Number: 061	Pressure Base: 14.730	Contract Day: 1
Name: CLEVELAND STATION-GRAFTON BORDER	Temperature Base:	Contract Hour: 9

Day	Relative Density	Heating Value Wet	Heating Value Dry	CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
1	0.7373	1183.0	1204.0	0.573	4.947	67.476	22.434	4.227	0.099	0.220	0.013	0.013	0.000	0.000	0.000	0.000	0.000	1402.11	
2	0.7365	1183.3	1204.3	0.575	4.848	67.596	22.475	4.166	0.097	0.217	0.013	0.013	0.000	0.000	0.000	0.000	0.000	1403.27	
3	0.7375	1181.2	1202.1	0.609	5.021	67.412	22.464	4.129	0.103	0.232	0.015	0.016	0.000	0.000	0.000	0.000	0.000	1399.78	
4	0.7352	1179.1	1199.9	0.565	5.001	67.752	22.239	4.113	0.094	0.208	0.014	0.015	0.000	0.000	0.000	0.000	0.000	1399.44	
5	0.7281	1171.9	1192.6	0.563	4.772	68.896	21.683	3.755	0.094	0.208	0.014	0.015	0.000	0.000	0.000	0.000	0.000	1397.72	
6	0.7296	1172.8	1193.5	0.593	4.812	68.684	21.765	3.798	0.098	0.219	0.015	0.016	0.000	0.000	0.000	0.000	0.000	1397.35	
7	0.7350	1178.0	1198.8	0.597	5.001	67.806	22.185	4.058	0.099	0.224	0.015	0.015	0.000	0.000	0.000	0.000	0.000	1398.33	
8	0.7379	1182.4	1203.4	0.579	5.019	67.718	21.772	4.550	0.106	0.226	0.014	0.015	0.000	0.000	0.000	0.000	0.000	1400.93	
9	0.7340	1181.6	1202.5	0.517	4.805	68.390	21.427	4.538	0.100	0.198	0.012	0.012	0.000	0.000	0.000	0.000	0.000	1403.61	
10	0.7300	1178.6	1199.4	0.574	4.522	69.156	21.204	4.158	0.107	0.238	0.019	0.022	0.000	0.000	0.000	0.000	0.000	1403.95	
11	0.7373	1181.5	1202.4	0.584	5.013	67.811	21.723	4.519	0.103	0.217	0.014	0.015	0.000	0.000	0.000	0.000	0.000	1400.38	
12	0.7342	1178.2	1199.1	0.557	4.971	68.147	21.690	4.316	0.094	0.201	0.012	0.013	0.000	0.000	0.000	0.000	0.000	1399.39	
13	0.7314	1175.5	1196.3	0.526	4.921	68.557	21.481	4.217	0.088	0.187	0.011	0.012	0.000	0.000	0.000	0.000	0.000	1398.79	
14	0.7238	1167.2	1187.9	0.487	4.765	69.782	20.753	3.947	0.080	0.165	0.011	0.010	0.000	0.000	0.000	0.000	0.000	1396.31	
15	0.7193	1162.5	1183.1	0.461	4.676	70.441	20.427	3.744	0.076	0.156	0.011	0.009	0.000	0.000	0.000	0.000	0.000	1394.94	
16	0.7100	1153.4	1173.8	0.517	4.267	72.286	19.188	3.482	0.080	0.150	0.016	0.013	0.000	0.000	0.000	0.000	0.000	1393.07	
17	0.7188	1161.8	1182.4	0.527	4.567	70.550	20.501	3.594	0.079	0.157	0.013	0.011	0.000	0.000	0.000	0.000	0.000	1394.66	
18	0.7143	1161.8	1182.4	0.482	4.216	70.943	20.978	3.143	0.073	0.141	0.013	0.010	0.000	0.000	0.000	0.000	0.000	1399.00	
19	0.7115	1152.1	1172.5	0.494	4.528	71.636	19.810	3.263	0.079	0.165	0.013	0.012	0.000	0.000	0.000	0.000	0.000	1390.02	
20	0.7084	1148.3	1168.6	0.477	4.487	72.192	19.366	3.227	0.075	0.152	0.012	0.011	0.000	0.000	0.000	0.000	0.000	1388.53	
21	0.7003	1139.5	1159.7	0.447	4.308	73.518	18.579	2.913	0.071	0.141	0.012	0.011	0.000	0.000	0.000	0.000	0.000	1385.83	
22	0.7076	1147.9	1168.2	0.492	4.422	72.353	19.333	3.121	0.080	0.170	0.014	0.014	0.000	0.000	0.000	0.000	0.000	1388.76	
23	0.7053	1146.3	1166.6	0.504	4.287	72.706	19.220	3.020	0.077	0.157	0.014	0.013	0.000	0.000	0.000	0.000	0.000	1389.02	
24	0.7001	1139.4	1159.6	0.468	4.273	73.497	18.730	2.755	0.079	0.164	0.016	0.016	0.000	0.000	0.000	0.000	0.000	1385.80	
25	0.7018	1141.2	1161.4	0.495	4.276	73.235	18.928	2.777	0.084	0.174	0.016	0.014	0.000	0.000	0.000	0.000	0.000	1386.40	
26	0.7083	1148.5	1168.9	0.504	4.429	72.198	19.499	3.073	0.087	0.181	0.015	0.015	0.000	0.000	0.000	0.000	0.000	1388.84	
27	0.7127	1152.9	1173.4	0.517	4.549	71.483	19.891	3.266	0.085	0.181	0.014	0.014	0.000	0.000	0.000	0.000	0.000	1389.92	
28	0.7053	1145.7	1166.0	0.483	4.345	72.673	19.234	2.994	0.080	0.164	0.014	0.013	0.000	0.000	0.000	0.000	0.000	1388.43	
29	0.7045	1145.0	1165.2	0.496	4.296	72.985	18.916	2.962	0.097	0.209	0.020	0.019	0.000	0.000	0.000	0.000	0.000	1388.30	
30	0.7141	1155.7	1176.1	0.545	4.470	71.399	19.920	3.325	0.097	0.209	0.018	0.018	0.000	0.000	0.000	0.000	0.000	1391.86	
31	0.7270	1169.4	1190.1	0.570	4.808	69.279	21.201	3.731	0.112	0.261	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1395.78	
Avg	0.7205	1163.0	1184.0	0.528	4.633	70.276	20.613	3.641	0.089	0.190	0.014	0.014	0.000	0.000	0.000	0.000	0.000	1394.86	

Zone 213





## GQ Source Analysis

<b>GQ Source Number:</b>	0202080	<b>Specific Gravity:</b>	0.6537
<b>GQ Source Name:</b>	RICHARDTON-GLEN ULLIN COMPRE	<b>Dry Heat Value:</b>	1107.67
<b>Effective Date:</b>	10/1/2013 9:00:00 AM	<b>Wet Heat Value:</b>	1088.39
<b>Effective End Date:</b>	1/18/2038 9:14:00 PM	<b>As Deliv. Heat Value:</b>	1107.67
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	336.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	0.00

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	80.842		CO2	Carbon Dioxide	0.399
C2	Ethane	14.455	3.8544	N2	Nitrogen	3.072
C3	Propane	1.085	0.2980	O2	Oxygen	0.019
IC4	Isobutane	0.052	0.0168	He	Helium	
NC4	n-Butane	0.053	0.0168	H2	Hydrogen	
IC5	Isopentane	0.008	0.0030	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.010	0.0035	Ar	Argon	
C6	Hexanes	0.004	0.0000	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

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**Totals**      99.998%      4.192 GPM

**Sample Date:** 11/1/2013 9:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** RR  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 311





## GQ Source Analysis

<b>GQ Source Number:</b>	1202160	<b>Specific Gravity:</b>	0.7801
<b>GQ Source Name:</b>	BOWMAN BORDER	<b>Dry Heat Value:</b>	1118.44
<b>Effective Date:</b>	10/1/2013 9:00:00 AM	<b>Wet Heat Value:</b>	1098.97
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1118.44
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	58.073		CO2	Carbon Dioxide	2.793
C2	Ethane	25.632	6.8350	N2	Nitrogen	10.747
C3	Propane	2.437	0.6690	O2	Oxygen	
IC4	Isobutane	0.071	0.0230	He	Helium	
NC4	n-Butane	0.209	0.0660	H2	Hydrogen	
IC5	Isopentane	0.010	0.0040	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.024	0.0090	Ar	Argon	
C6	Hexanes	0.004	0.0020	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	0.000
C9	Nonanes					
C10	Decanes					
<b>Totals</b>						
		100.000%		7.608	GPM	

**Sample Date:** 11/1/2013 11:42:00 AM  
**Sample Type:** Composite  
**Sample Tech:** MIKE GENTILINI  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MIKE GENTILINI

**Analysis Remarks:**

Zone 34

<b>NORTH DAKOTA HEATING VALUE ZONES</b>		
<b>ZONES</b>	<b>MEASURING DEVICE</b>	<b>LOCATION</b>
211	Chromatograph	Sidney Area
24	Chromatograph	Williston Area
241	Monthly Sampler	Fairview Area
25	Monthly Sampler	Watford City Area
261	Chromatograph	Williston – Tioga – Minot Line
262	Chromatograph	Minot Area
263	Monthly Sampler	Tioga – Portal
264	Chromatograph	Williston – Ray
271	Chromatograph	Bismarck – Cleveland
272	Chromatograph	Cleveland – Mapleton
273	Chromatograph	Cleveland – Grafton
28	Chromatograph	Bismarck
31	Chromatograph	Dickinson
311	Monthly Sampler	Taylor Take-Off – Glen Ullin Comp
32	Chromatograph	Cabin Creek – Dickinson
33	Chromatograph	Killdeer
34	Monthly Sampler	Bowman Area

MONTANA DAKOTA UTILITIES CO  
NORTH DAKOTA  
HEATING VALUE DATA  
12 MONTH ACCUMULATIVE AT 14.73 psia, 60 f. DRY

STATE	ZONE	ZONE BOUNDARY	12 MONTH AVERAGE	OCT 13	SEPT 13	AUG 13	JULY 13	JUNE 13	MAY 13	APR 13	MAR 13	FEB 13	JAN 13	DEC 12	NOV 12	ZONE
MT/ND	211	Sidney Area	1206	1211	1206	1208	1209	1212	1201	1213	1206	1202	1203	1200	1201	211
ND	24	Williston Area	1202	1204	1199	1196	1198	1196	1197	1216	1204	1204	1204	1203	1199	24
ND	25	Watford City Area	1190	1183	1198	1193	1193	1188	1154	1200	1201	1196	1192	1192	1188	25
ND/MT	241	Fairview Area	1199	1198	1202	1203	1205	1205	1203	1203	1195	1196	1191	1191	1192	241
ND	261	Williston - Tioga - Minot Line	1160	1175	1180	1165	1172	1156	1159	1163	1123	1139	1160	1162	1162	261
ND	262	Minot Area	1178	1197	1196	1185	1191	1181	1177	1172	1170	1168	1163	1165	1165	262
ND	263	Tioga - Portal	1116	1125	1130	1130	1130	1127	1123	1117	1116	1116	1069	1069	1135	263
ND	264	Williston - Ray	1202	1204	1199	1196	1198	1196	1197	1216	1204	1204	1204	1203	1199	264
ND	271	Bismarck - Cleveland	1168	1184	1199	1187	1191	1183	1175	1167	1145	1144	1137	1147	1154	271
ND	272	Cleveland - Mapleton	1169	1184	1199	1187	1192	1183	1178	1169	1147	1145	1138	1148	1155	272
ND	273	Cleveland - Grafton	1169	1184	1199	1188	1192	1184	1177	1169	1146	1145	1138	1149	1155	273
ND	28	Bismarck - Cabin Creek	1144	1147	1199	1187	1191	1182	1173	1117	1102	1100	1108	1114	1104	28
ND	31	Dickinson Area	1113	1126	1079	1098	1112	1130	1163	1117	1103	1098	1105	1110	1111	31
ND	311	Taylor Take-Off - Glen Ullin Comp		1108	1094	1135	1188	1097	1163	1117	1103	1098	1105	1110		
ND/MT	32	Cabin Creek - Dickinson	1099	1095	1115	1135	1142	1094	1100	1088	1089	1086	1094	1099	1056	32
ND	33	Killdeer	1179	1182	1183	1182	1183	1180	1179	1177	1176	1177	1177	1176	1177	33
ND	34	Bowman Area	1138	1118	1145	1127	1140	1121	1136	1146	1144	1147	1143	1142	1142	34
ND	35	Baker Field - North Dakota	979	0	0	0	0	0	0	0	0	0	979	979	979	35

**THERMAL ZONE VARIANCE  
DOCUMENTATION**

**October 2013**

<b><i>ZONE</i></b>	<b><i>BTU VARIANCE</i></b>	<b><i>REASON</i></b>
28	-52	Mix of gas in the area
31	47	Mix of gas in the area
32	-20	Mix of gas in the area
34	-27	Mix of gas in the area