



UTILITIES CO.

A Division of MDU Resources Group, Inc.

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

March 15, 2016

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

Re: Case No. PU-16-002 (Therm Billing)  
Monthly Report – December 2015

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 Case No. 11,006, dated October 20, 1987 and pursuant to the North Dakota Administrative Code 69-09-01-02, part 2.

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 January 2016.
2. Attachment B consists of copies of the monthly Heating Value Test Reports received from our suppliers for the month of December 2015.
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 December 2015.

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,

A handwritten signature in blue ink that reads 'Tamie Aberle'.

Tamie Aberle  
Director of Regulatory Affairs

**Montana-Dakota Utilities Co.**  
**Therm Billing Factors - North Dakota**  
**December 2015**

Town	Heat Zone	Therm Factor
MDU-303-ALEXANDER	025	1.1551
MDU-308-ARNEGARD	025	1.1551
MDU-314-APPLE VALLEY	271	1.1501
MDU-318-BEACH	032	1.0267
MDU-319-BELFIELD	032	1.0343
MDU-323-BERTHOLD	262	1.1258
MDU-327-BISMARCK	028	1.0999
MDU-330-BOWMAN	034	1.0109
MDU-337-BURLINGTON	262	1.1501
MDU-343-CARRINGTON	273	1.1482
MDU-344-CLEVELAND	272	1.1401
MDU-364-CAVALIER	273	1.1724
MDU-365-DAWSON	271	1.1420
MDU-368-DES LACS	262	1.1339
MDU-369-DICKINSON	031	1.4255
MDU-374-FT TOTTEN	273	1.1563
MDU-375-DEVILS LAKE	273	1.1563
MDU-379-BARLOW	273	1.1482
MDU-384-EPPING	264	1.1126
MDU-387-ELDRIDGE	272	1.1492
MDU-407-GLADSTONE	031	1.0643
MDU-411-GLEN ULLIN	311	1.1136
MDU-413-GOLVA	032	1.0116
MDU-416-GARRISON	262	1.1339
MDU-417-GRAFTON	273	1.1805
MDU-421-HALLIDAY	031	1.0643
MDU-429-HEBRON	311	1.0833
MDU-432-HETTINGER	903	2.3875
MDU-449-JAMESTOWN	272	1.1572
MDU-459-KILLDEER	033	1.1192
MDU-463-LANGDON	273	1.1482
MDU-469-LEFOR	031	1.0643
MDU-474-LIGNITE	263	1.0578
MDU-475-LINTON	802	1.0353
MDU-478-LINCOLN	028	1.1077
MDU-488-MCKENZIE	271	1.1501
MDU-494-MEDINA	271	1.1420
MDU-498-MANDAN	028	1.1077
MDU-500-MARMARTH	034	1.0184
MDU-505-MINOT	262	1.1501
MDU-510-MOTT	031	1.0643
MDU-512-MAX	262	1.1258
MDU-522-NEW ENGLAND	031	1.0566
MDU-524-NEW SALEM	028	1.1077
MDU-532-NEW ROCKFORD	273	1.1482
MDU-539-PARK RIVER	273	1.1724
MDU-540-PALERMO	262	1.1258
MDU-558-RAY	264	1.1126
MDU-561-REGENT	031	1.0643

MDU-563-RHAME	034	1.0034
MDU-564-RICHARDTON	311	1.0678
MDU-568-ROSS	261	0.9818
MDU-572-RUTHVILLE	262	1.1501
MDU-574-SANBORN	272	1.1572
MDU-583-SENTINEL BUTTE	032	1.0350
MDU-588-SOUTH HEART	031	1.0566
MDU-717-SPIRITWOOD	272	1.1572
MDU-590-SPRINGBROOK	264	1.1126
MDU-591-STANLEY	261	0.9889
MDU-593-STEELE	271	1.1420
MDU-598-SHEYENNE	273	1.1563
MDU-605-SURREY	262	1.1501
MDU-610-TAPPEN	271	1.1420
MDU-611-TAYLOR	031	1.0566
MDU-616-TIOGA	261	0.9818
MDU-619-TURTLE LAKE	262	1.1339
MDU-620-TRENTON	024	1.1254
MDU-624-UNDERWOOD	262	1.1339
MDU-625-VALLEY CITY	272	1.1653
MDU-629-WALHALLA	273	1.1724
MDU-632-WATFORD CITY	610	1.1306
MDU-636-WHEELOCK	264	1.1046
MDU-637-WHITE EARTH	261	0.9889
MDU-642-WILLISTON	024	1.1254
MDU-646-WASHBURN	262	1.1420
MDU-647-WILTON	262	1.1258
MDU-664-RIVERDALE	262	1.1339
MDU-691-FAIRVIEW	241	1.1263
MDU-712-MINOT AFB	262	1.1501
MDU-718-FAIRMOUNT	600	1.1179
MDU-732-NEKOMA	273	1.1482
MDU-732-MSR SITE	273	1.1549



## GQ Source Analysis

<b>GQ Source Number:</b>	0602330	<b>Specific Gravity:</b>	0.7136
<b>GQ Source Name:</b>	WILLISTON BORDER	<b>Dry Heat Value:</b>	1199.24
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1178.37
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1199.24
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	332.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	71.235		CO2	Carbon Dioxide	0.882
C2	Ethane	22.164	5.9100	N2	Nitrogen	2.498
C3	Propane	2.877	0.7902	O2	Oxygen	0.000
IC4	Isobutane	0.098	0.0320	He	Helium	
NC4	n-Butane	0.208	0.0655	H2	Hydrogen	
IC5	Isopentane	0.016	0.0060	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.019	0.0069	Ar	Argon	
C6	Hexanes	0.002	0.0008	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					
<b>Totals</b>		100.000%		6.811 GPM		

**Sample Date:** 1/4/2016 12:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** RR  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 24

## GQ Source Analysis

<b>GQ Source Number:</b>	0602160	<b>Specific Gravity:</b>	0.7339
<b>GQ Source Name:</b>	FAIRVIEW BORDER	<b>Dry Heat Value:</b>	1199.08
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1178.21
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1199.08
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	337.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	68.950		CO2	Carbon Dioxide	1.202
C2	Ethane	20.939	0.0000	N2	Nitrogen	3.911
C3	Propane	4.592	1.2615	O2	Oxygen	0.011
IC4	Isobutane	0.136	0.0443	He	Helium	
NC4	n-Butane	0.235	0.0738	H2	Hydrogen	
IC5	Isopentane	0.013	0.0047	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.010	0.0038	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%      1.388 GPM

**Sample Date:** 1/4/2016 12:00:00 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>	0.7313
<b>GQ Source Name:</b>	WATFORD CITY BORDER	<b>Dry Heat Value:</b>	1215.83
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1194.67
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1215.83
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	303.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	70.368		CO2	Carbon Dioxide	1.010
C2	Ethane	20.297	5.4122	N2	Nitrogen	2.943
C3	Propane	4.498	1.2356	O2	Oxygen	0.008
IC4	Isobutane	0.260	0.0848	He	Helium	
NC4	n-Butane	0.537	0.1689	H2	Hydrogen	
IC5	Isopentane	0.039	0.0142	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.037	0.0133	Ar	Argon	
C6	Hexanes	0.002	0.0009	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					
<b>Totals</b>		100.000%		6.930 GPM		

**Sample Date:** 1/4/2016 12:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** ES  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 25

## GQ Source Daily Summary

December 2015

Number: 163

Pressure Base: 14.730

Contract Day: 1

Name: NORTH TIOGA TRANSFER-PALERMO BORDER LI

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	0.6228	1034.4	1052.7	0.155	3.879	86.502	8.699	0.659	0.028	0.066	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	1333.84
2	0.6781	1111.9	1131.6	0.619	3.639	77.738	15.589	2.040	0.090	0.225	0.025	0.035	0.000	0.000	0.000	0.000	0.000	0.000	1373.81
3	0.6297	1040.1	1058.5	0.308	3.947	85.720	8.829	1.041	0.040	0.095	0.009	0.010	0.000	0.000	0.000	0.000	0.000	0.000	1333.84
4	0.6169	1022.1	1040.2	0.206	3.999	87.841	7.089	0.754	0.030	0.069	0.006	0.007	0.000	0.000	0.000	0.000	0.000	0.000	1324.25
5	0.6262	1035.2	1053.5	0.281	3.960	86.310	8.347	0.954	0.038	0.091	0.009	0.011	0.000	0.000	0.000	0.000	0.000	0.000	1331.28
6	0.6142	1019.5	1037.6	0.162	3.965	88.308	6.760	0.688	0.031	0.072	0.007	0.008	0.000	0.000	0.000	0.000	0.000	0.000	1323.85
7	0.6238	1035.3	1053.6	0.210	3.832	86.546	8.490	0.795	0.033	0.078	0.007	0.009	0.000	0.000	0.000	0.000	0.000	0.000	1334.01
8	0.6168	1022.8	1040.9	0.219	3.924	88.062	6.799	0.856	0.037	0.087	0.008	0.009	0.000	0.000	0.000	0.000	0.000	0.000	1325.32
9	0.5992	994.1	1011.7	0.109	4.183	90.990	4.169	0.471	0.020	0.048	0.004	0.005	0.000	0.000	0.000	0.000	0.000	0.000	1306.97
10	0.6069	1002.9	1020.6	0.174	4.279	89.690	5.122	0.624	0.028	0.067	0.007	0.009	0.000	0.000	0.000	0.000	0.000	0.000	1310.03
11	0.5908	980.3	997.7	0.070	4.291	92.440	2.845	0.302	0.014	0.032	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	1298.04
12	0.5951	987.9	1005.4	0.096	4.195	91.776	3.436	0.420	0.020	0.047	0.004	0.005	0.000	0.000	0.000	0.000	0.000	0.000	1303.27
13	0.6050	1002.6	1020.4	0.158	4.135	90.148	4.789	0.644	0.031	0.076	0.008	0.010	0.000	0.000	0.000	0.000	0.000	0.000	1311.80
14	0.6302	1040.1	1058.6	0.321	3.966	85.896	8.440	1.169	0.053	0.127	0.012	0.016	0.000	0.000	0.000	0.000	0.000	0.000	1333.46
15	0.6445	1062.9	1081.7	0.371	3.851	83.305	10.890	1.332	0.061	0.150	0.016	0.022	0.000	0.000	0.000	0.000	0.000	0.000	1347.26
16	0.6459	1064.9	1083.8	0.417	3.788	83.293	10.731	1.491	0.069	0.169	0.018	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1348.46
17	0.6595	1086.5	1105.8	0.477	3.666	80.618	13.430	1.531	0.068	0.168	0.018	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1361.50
18	0.6594	1085.6	1104.8	0.471	3.718	80.955	12.819	1.687	0.082	0.211	0.024	0.032	0.000	0.000	0.000	0.000	0.000	0.000	1360.45
19	0.6488	1068.6	1087.6	0.429	3.815	82.772	11.166	1.527	0.071	0.177	0.019	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1350.18
20	0.6408	1056.4	1075.1	0.385	3.876	83.885	10.411	1.227	0.053	0.132	0.014	0.018	0.000	0.000	0.000	0.000	0.000	0.000	1343.04
21	0.6383	1052.4	1071.1	0.380	3.893	84.191	10.208	1.158	0.044	0.104	0.010	0.012	0.000	0.000	0.000	0.000	0.000	0.000	1340.58
22	0.6372	1050.8	1069.4	0.365	3.905	84.618	9.634	1.265	0.053	0.130	0.013	0.016	0.000	0.000	0.000	0.000	0.000	0.000	1339.70
23	0.6531	1074.9	1093.9	0.466	3.780	81.919	12.002	1.564	0.067	0.163	0.017	0.022	0.000	0.000	0.000	0.000	0.000	0.000	1353.65
24	0.6397	1054.8	1073.5	0.383	3.874	84.130	10.140	1.256	0.053	0.133	0.014	0.018	0.000	0.000	0.000	0.000	0.000	0.000	1342.18
25	0.6487	1068.4	1087.3	0.433	3.816	82.884	11.014	1.522	0.077	0.202	0.023	0.030	0.000	0.000	0.000	0.000	0.000	0.000	1349.98
26	0.6578	1083.0	1102.1	0.476	3.715	81.501	12.136	1.774	0.091	0.241	0.029	0.037	0.000	0.000	0.000	0.000	0.000	0.000	1358.89
27	0.6548	1077.3	1096.4	0.481	3.773	81.769	12.031	1.635	0.074	0.188	0.021	0.028	0.000	0.000	0.000	0.000	0.000	0.000	1354.87
28	0.6509	1071.3	1090.2	0.449	3.818	82.386	11.511	1.555	0.066	0.168	0.020	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1351.37
29	0.6512	1072.4	1091.4	0.445	3.787	82.387	11.492	1.596	0.069	0.177	0.021	0.027	0.000	0.000	0.000	0.000	0.000	0.000	1352.46
30	0.6447	1062.0	1080.8	0.422	3.847	83.427	10.616	1.429	0.061	0.156	0.018	0.023	0.000	0.000	0.000	0.000	0.000	0.000	1346.06
31	0.6413	1057.1	1075.9	0.402	3.849	83.874	10.359	1.307	0.051	0.127	0.014	0.018	0.000	0.000	0.000	0.000	0.000	0.000	1343.51
Avg	0.6346	1048.0	1066.2	0.334	3.902	85.028	9.355	1.170	0.052	0.128	0.014	0.018	0.000	0.000	0.000	0.000	0.000	0.000	1338.32

Zone 261



## GQ Source Analysis

<b>GQ Source Number:</b>	2501030	<b>Specific Gravity:</b>	0.6413
<b>GQ Source Name:</b>	LIGNITE PLANT	<b>Dry Heat Value:</b>	1082.38
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1063.55
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1082.38
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	318.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	82.065		CO2	Carbon Dioxide	0.067
C2	Ethane	13.446	3.5853	N2	Nitrogen	3.941
C3	Propane	0.464	0.1275	O2	Oxygen	0.010
IC4	Isobutane	0.002	0.0007	He	Helium	
NC4	n-Butane	0.003	0.0009	H2	Hydrogen	
IC5	Isopentane	0.000	0.0000	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.000	0.0000	Ar	Argon	
C6	Hexanes	0.002	0.0009	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

---

**Totals**      100.000%      3.715 GPM

**Sample Date:** 1/4/2016 12:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** RR  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 263

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

## GQ Source Analysis

<b>GQ Source Number:</b>	0702010	<b>Specific Gravity:</b>	0.7011
<b>GQ Source Name:</b>	EPPING BORDER	<b>Dry Heat Value:</b>	1179.52
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1158.99
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1179.52
<b>Pressure Base:</b>	14.730	<b>Sample Pressure:</b>	387.00
<b>Viscosity:</b>		<b>Sample Temperature:</b>	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	73.482		CO2	Carbon Dioxide	0.860
C2	Ethane	20.228	5.3937	N2	Nitrogen	2.534
C3	Propane	2.555	0.7018	O2	Oxygen	0.000
IC4	Isobutane	0.094	0.0305	He	Helium	
NC4	n-Butane	0.204	0.0641	H2	Hydrogen	
IC5	Isopentane	0.018	0.0067	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.022	0.0081	Ar	Argon	
C6	Hexanes	0.003	0.0012	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					
		<b>Totals</b>	100.000%	6.206	GPM	

**Sample Date:** 1/4/2016 12:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:** RR  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:** MB

**Analysis Remarks:**

Zone 264



## GQ Source Daily Summary

December 2015

Number: 043	Pressure Base: 14.730	Contract Day: 1
Name: BISMARCK STATION-CLEVELAND 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	0.7414	1172.5	1193.3	0.738	5.705	67.764	20.399	4.766	0.183	0.402	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1385.91	
2	0.7366	1167.4	1188.0	0.713	5.612	68.501	19.978	4.594	0.176	0.385	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1384.24	
3	0.7454	1180.5	1201.4	0.790	5.521	67.042	21.266	4.739	0.183	0.409	0.024	0.026	0.000	0.000	0.000	0.000	0.000	1391.54	
4	0.7432	1175.3	1196.1	0.768	5.670	67.365	20.851	4.728	0.180	0.393	0.022	0.023	0.000	0.000	0.000	0.000	0.000	1387.40	
5	0.7366	1167.0	1187.7	0.736	5.599	68.403	20.175	4.500	0.171	0.373	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1383.84	
6	0.7412	1172.5	1193.2	0.764	5.653	67.599	20.784	4.616	0.171	0.371	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1386.03	
7	0.7390	1169.5	1190.2	0.751	5.648	68.003	20.425	4.595	0.169	0.368	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1384.57	
8	0.7379	1169.6	1190.3	0.730	5.576	68.138	20.457	4.518	0.169	0.370	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1385.64	
9	0.7384	1169.3	1190.0	0.746	5.612	68.123	20.349	4.586	0.170	0.372	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1384.89	
10	0.7415	1173.4	1194.2	0.753	5.648	67.620	20.693	4.683	0.175	0.383	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1386.75	
11	0.7332	1161.3	1181.8	0.709	5.672	68.952	19.661	4.434	0.167	0.364	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1380.20	
12	0.7344	1161.3	1181.8	0.719	5.773	68.731	19.740	4.464	0.168	0.365	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1379.04	
13	0.7236	1148.5	1168.9	0.669	5.609	70.586	18.397	4.198	0.158	0.345	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1374.07	
14	0.7247	1152.4	1172.8	0.661	5.490	70.227	19.002	4.102	0.148	0.329	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1377.65	
15	0.7285	1157.1	1177.6	0.662	5.553	69.464	19.685	4.125	0.145	0.326	0.019	0.021	0.000	0.000	0.000	0.000	0.000	1379.75	
16	0.7282	1160.5	1181.0	0.655	5.337	69.505	19.929	4.049	0.146	0.336	0.021	0.023	0.000	0.000	0.000	0.000	0.000	1383.96	
17	0.7199	1151.3	1171.7	0.614	5.177	70.773	19.245	3.706	0.135	0.310	0.019	0.021	0.000	0.000	0.000	0.000	0.000	1380.93	
18	0.7145	1147.8	1168.1	0.579	4.938	71.528	19.054	3.458	0.125	0.282	0.017	0.018	0.000	0.000	0.000	0.000	0.000	1381.92	
19	0.7204	1156.1	1176.5	0.604	4.950	70.584	19.755	3.639	0.131	0.298	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1386.17	
20	0.7255	1160.7	1181.2	0.637	5.095	69.891	19.959	3.927	0.137	0.313	0.019	0.021	0.000	0.000	0.000	0.000	0.000	1386.81	
21	0.7229	1156.2	1176.7	0.627	5.137	70.371	19.476	3.903	0.139	0.308	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1383.96	
22	0.7289	1162.7	1183.3	0.668	5.247	69.377	20.109	4.098	0.146	0.318	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1385.96	
23	0.7195	1151.6	1172.0	0.619	5.108	70.882	19.161	3.754	0.137	0.303	0.017	0.018	0.000	0.000	0.000	0.000	0.000	1381.75	
24	0.7276	1161.2	1181.7	0.666	5.218	69.627	19.937	4.032	0.150	0.332	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1385.41	
25	0.7247	1157.3	1177.8	0.639	5.218	70.038	19.690	3.919	0.144	0.315	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1383.62	
26	0.7182	1151.9	1172.3	0.582	5.030	71.001	19.251	3.676	0.133	0.291	0.017	0.018	0.000	0.000	0.000	0.000	0.000	1383.31	
27	0.7180	1153.1	1173.6	0.576	4.942	71.092	19.239	3.682	0.134	0.296	0.018	0.020	0.000	0.000	0.000	0.000	0.000	1385.00	
28	0.7181	1153.4	1173.8	0.571	4.946	71.039	19.304	3.683	0.132	0.289	0.017	0.019	0.000	0.000	0.000	0.000	0.000	1385.16	
29	0.7161	1149.7	1170.1	0.566	4.992	71.290	19.124	3.587	0.128	0.278	0.016	0.018	0.000	0.000	0.000	0.000	0.000	1382.68	
30	0.7195	1152.7	1173.1	0.592	5.087	70.814	19.310	3.731	0.135	0.295	0.017	0.019	0.000	0.000	0.000	0.000	0.000	1383.03	
31	0.7231	1156.6	1177.1	0.613	5.154	70.326	19.508	3.903	0.143	0.314	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1384.26	
Avg	0.7287	1161.0	1181.2	0.668	5.352	69.505	19.804	4.142	0.152	0.337	0.019	0.021	0.000	0.000	0.000	0.000	0.000	1383.72	

Zone 271



## GQ Source Daily Summary

December 2015

**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	0.7333	1161.9	1182.5	0.702	5.646	69.043	19.511	4.508	0.172	0.377	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1380.94	
2	0.7436	1175.2	1196.0	0.750	5.741	67.364	20.681	4.832	0.185	0.403	0.022	0.022	0.000	0.000	0.000	0.000	0.000	1386.91	
3	0.7394	1171.4	1192.2	0.744	5.579	67.986	20.474	4.612	0.175	0.384	0.022	0.023	0.000	0.000	0.000	0.000	0.000	1386.45	
4	0.7434	1176.0	1196.8	0.788	5.612	67.282	21.044	4.658	0.178	0.389	0.023	0.025	0.000	0.000	0.000	0.000	0.000	1388.10	
5	0.7401	1170.9	1191.6	0.756	5.662	67.838	20.519	4.626	0.175	0.380	0.022	0.023	0.000	0.000	0.000	0.000	0.000	1385.11	
6	0.7365	1165.8	1186.5	0.745	5.648	68.365	20.183	4.490	0.167	0.361	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1382.54	
7	0.7409	1171.3	1192.0	0.766	5.704	67.638	20.674	4.637	0.171	0.368	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1384.79	
8	0.7368	1166.6	1187.2	0.736	5.642	68.336	20.193	4.522	0.168	0.362	0.021	0.021	0.000	0.000	0.000	0.000	0.000	1383.16	
9	0.7374	1168.5	1189.2	0.737	5.589	68.217	20.358	4.524	0.168	0.364	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1384.77	
10	0.7408	1171.5	1192.3	0.756	5.694	67.700	20.594	4.661	0.174	0.378	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1385.17	
11	0.7354	1164.4	1185.0	0.727	5.665	68.589	19.940	4.502	0.169	0.367	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1381.79	
12	0.7332	1159.0	1179.5	0.719	5.799	68.925	19.546	4.446	0.166	0.359	0.020	0.020	0.000	0.000	0.000	0.000	0.000	1377.46	
13	0.7263	1150.6	1171.0	0.685	5.706	70.111	18.682	4.271	0.160	0.346	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1374.07	
14	0.7230	1149.1	1169.4	0.666	5.521	70.549	18.666	4.080	0.150	0.328	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1375.31	
15	0.7257	1152.8	1173.2	0.654	5.565	69.882	19.400	4.012	0.138	0.312	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1377.25	
16	0.7295	1159.1	1179.7	0.675	5.510	69.332	19.799	4.158	0.148	0.336	0.021	0.022	0.000	0.000	0.000	0.000	0.000	1381.14	
17	0.7231	1154.4	1174.9	0.628	5.266	70.233	19.559	3.821	0.137	0.314	0.020	0.021	0.000	0.000	0.000	0.000	0.000	1381.63	
18	0.7142	1146.3	1166.6	0.588	4.989	71.599	18.909	3.469	0.126	0.283	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1380.38	
19	0.7183	1152.7	1173.2	0.596	4.970	70.878	19.541	3.562	0.128	0.288	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1384.19	
20	0.7240	1158.7	1179.2	0.636	5.077	70.078	19.888	3.839	0.135	0.306	0.019	0.021	0.000	0.000	0.000	0.000	0.000	1385.90	
21	0.7236	1157.0	1177.5	0.630	5.156	70.186	19.651	3.900	0.137	0.303	0.019	0.019	0.000	0.000	0.000	0.000	0.000	1384.20	
22	0.7261	1159.0	1179.5	0.659	5.224	69.824	19.796	4.006	0.143	0.309	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1384.18	
23	0.7225	1154.4	1174.9	0.636	5.200	70.389	19.406	3.889	0.140	0.303	0.018	0.018	0.000	0.000	0.000	0.000	0.000	1382.16	
24	0.7238	1156.7	1177.1	0.649	5.162	70.203	19.589	3.899	0.144	0.315	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1383.63	
25	0.7265	1157.8	1178.3	0.663	5.329	69.777	19.706	4.014	0.149	0.324	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1382.39	
26	0.7187	1151.3	1171.7	0.594	5.096	70.910	19.242	3.701	0.133	0.288	0.017	0.018	0.000	0.000	0.000	0.000	0.000	1382.10	
27	0.7167	1150.3	1170.7	0.575	4.994	71.282	19.044	3.642	0.133	0.291	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1382.87	
28	0.7175	1152.4	1172.8	0.573	4.949	71.143	19.201	3.677	0.132	0.287	0.018	0.020	0.000	0.000	0.000	0.000	0.000	1384.58	
29	0.7160	1149.5	1169.8	0.564	5.001	71.275	19.149	3.580	0.126	0.271	0.016	0.017	0.000	0.000	0.000	0.000	0.000	1382.48	
30	0.7175	1150.3	1170.6	0.582	5.059	71.115	19.135	3.657	0.131	0.285	0.017	0.019	0.000	0.000	0.000	0.000	0.000	1382.06	
31	0.7213	1153.6	1174.1	0.604	5.180	70.580	19.315	3.840	0.140	0.304	0.018	0.019	0.000	0.000	0.000	0.000	0.000	1382.40	
Avg	0.7282	1159.0	1179.8	0.670	5.385	69.569	19.722	4.130	0.152	0.332	0.019	0.020	0.000	0.000	0.000	0.000	0.000	1382.58	

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

Zone 293

## GQ Source Daily Summary

December 2015

Number: 041

Pressure Base: 14,730

Contract Day: 1

Name: BISMARCK STATION-GLEN ULLIN 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	0.6740	1120.4	1140.2	0.131	3.494	76.811	18.006	1.482	0.028	0.045	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1388.88	
2	0.6721	1114.9	1134.6	0.072	3.742	77.097	17.498	1.544	0.019	0.027	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1383.99	
3	0.6724	1117.5	1137.3	0.070	3.610	76.999	17.795	1.475	0.020	0.029	0.001	0.001	0.000	0.000	0.000	0.000	0.000	1386.97	
4	0.6680	1109.9	1129.5	0.084	3.645	77.786	17.077	1.359	0.019	0.029	0.001	0.001	0.000	0.000	0.000	0.000	0.000	1381.97	
5	0.6738	1118.7	1138.5	0.074	3.664	76.630	18.184	1.401	0.018	0.027	0.001	0.001	0.000	0.000	0.000	0.000	0.000	1387.02	
6	0.6769	1125.3	1145.2	0.073	3.559	76.070	18.777	1.480	0.017	0.023	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1391.94	
7	0.6845	1128.6	1148.6	0.207	3.859	75.236	18.651	1.920	0.042	0.077	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1388.40	
8	0.6873	1134.5	1154.6	0.199	3.782	74.728	19.172	1.989	0.043	0.079	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1392.68	
9	0.6872	1132.6	1152.6	0.237	3.830	74.908	18.803	2.072	0.048	0.093	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1390.40	
10	0.6946	1141.6	1161.8	0.321	3.850	73.862	19.414	2.350	0.064	0.125	0.007	0.007	0.000	0.000	0.000	0.000	0.000	1393.95	
11	0.6807	1130.7	1150.7	0.244	3.328	75.832	18.813	1.672	0.039	0.065	0.004	0.003	0.000	0.000	0.000	0.000	0.000	1394.66	
12	0.6736	1117.4	1137.2	0.150	3.609	76.889	17.790	1.494	0.026	0.038	0.002	0.001	0.000	0.000	0.000	0.000	0.000	1385.55	
13	0.6766	1121.7	1141.5	0.162	3.611	76.475	18.022	1.649	0.029	0.047	0.003	0.003	0.000	0.000	0.000	0.000	0.000	1387.80	
14	0.6799	1127.4	1147.4	0.168	3.559	75.928	18.535	1.708	0.034	0.060	0.005	0.005	0.000	0.000	0.000	0.000	0.000	1391.55	
15	0.6775	1122.4	1142.2	0.169	3.645	76.383	17.997	1.710	0.032	0.057	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1387.70	
16	0.6742	1116.4	1136.2	0.179	3.677	77.035	17.342	1.668	0.033	0.057	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1383.76	
17	0.6639	1100.8	1120.3	0.178	3.665	78.990	15.539	1.526	0.034	0.059	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1374.94	
18	0.6611	1096.3	1115.7	0.173	3.679	79.459	15.169	1.426	0.032	0.055	0.004	0.004	0.000	0.000	0.000	0.000	0.000	1372.25	
19	0.6762	1119.2	1139.0	0.209	3.650	76.800	17.429	1.806	0.037	0.061	0.003	0.003	0.000	0.000	0.000	0.000	0.000	1385.17	
20	0.6755	1119.0	1138.8	0.183	3.642	76.811	17.545	1.727	0.033	0.053	0.003	0.002	0.000	0.000	0.000	0.000	0.000	1385.55	
21	0.6721	1113.9	1133.6	0.164	3.659	77.328	17.172	1.597	0.029	0.046	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1382.79	
22	0.6705	1111.7	1131.3	0.156	3.661	77.593	16.959	1.556	0.028	0.043	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1381.61	
23	0.6709	1111.9	1131.5	0.167	3.665	77.462	17.137	1.498	0.026	0.040	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1381.49	
24	0.6700	1110.5	1130.1	0.155	3.689	77.561	17.080	1.449	0.024	0.038	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1380.63	
25	0.6715	1113.3	1133.0	0.150	3.663	77.341	17.248	1.533	0.025	0.037	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1382.64	
26	0.6719	1113.6	1133.3	0.161	3.662	77.329	17.201	1.577	0.026	0.040	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1382.64	
27	0.6709	1112.3	1132.0	0.134	3.692	77.546	16.934	1.622	0.027	0.041	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1381.98	
28	0.6720	1113.5	1133.2	0.130	3.724	77.329	17.109	1.638	0.026	0.039	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1382.39	
29	0.6706	1111.4	1131.1	0.127	3.730	77.493	17.054	1.531	0.024	0.037	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1381.18	
30	0.6701	1110.0	1129.7	0.136	3.751	77.623	16.874	1.546	0.026	0.039	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1380.00	
31	0.6694	1108.9	1128.6	0.140	3.751	77.738	16.782	1.520	0.026	0.039	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1379.31	
Avg	0.6745	1118.0	1137.4	0.158	3.669	76.873	17.584	1.630	0.030	0.050	0.003	0.002	0.000	0.000	0.000	0.000	0.000	1384.90	

Zone 28







## GQ Source Analysis

<b>GQ Source Number:</b>	1202160	<b>Specific Gravity:</b>	0.6694
<b>GQ Source Name:</b>	BOWMAN BORDER	<b>Dry Heat Value:</b>	1120.53
<b>Effective Date:</b>	12/1/2015 9:00:00 AM	<b>Wet Heat Value:</b>	1101.03
<b>Effective End Date:</b>	1/18/2038 9:14:07 PM	<b>As Deliv. Heat Value:</b>	1120.53
<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	77.952		CO2	Carbon Dioxide	0.245
C2	Ethane	15.936	4.2490	N2	Nitrogen	4.017
C3	Propane	1.669	0.4580	O2	Oxygen	0.014
IC4	Isobutane	0.048	0.0160	He	Helium	
NC4	n-Butane	0.092	0.0290	H2	Hydrogen	
IC5	Isopentane	0.009	0.0030	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.018	0.0070	Ar	Argon	
C6	Hexanes			CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					
<b>Totals</b>		100.000%		4.762 GPM		

**Sample Date:** 12/1/2015 9:00:00 AM  
**Sample Type:** Composite  
**Sample Tech:**  
**H2S:** ppm

**Sample Remarks:**

**Analysis Tech:**

**Analysis Remarks:**

Zone 34

		Watford City			01312			Weighted		
		01320			Watford City East Border					
		Watford City Border								
Begin Date	End Date	MCF	DK	BTU	MCF	DK	BTU	AVG	BTU	
				Zone 25			Zone 43			
12/1/2015	12/2/2015	632	768	1.216	321	347	1.082	1.171	12/1/2015	
12/2/2015	12/3/2015	560	681	1.216	168	183	1.091	1.187	12/2/2015	
12/3/2015	12/4/2015	506	615	1.216	118	128	1.091	1.192	12/3/2015	
12/4/2015	12/5/2015	501	610	1.216	115	125	1.091	1.193	12/4/2015	
12/5/2015	12/6/2015	515	627	1.216	137	148	1.085	1.188	12/5/2015	
12/6/2015	12/7/2015	483	588	1.216	115	125	1.084	1.191	12/6/2015	
12/7/2015	12/8/2015	474	576	1.216	103	112	1.088	1.193	12/7/2015	
12/8/2015	12/9/2015	429	522	1.216	96	104	1.086	1.192	12/8/2015	
12/9/2015	12/10/2015	393	478	1.216	110	119	1.088	1.188	12/9/2015	
12/10/2015	12/11/2015	578	703	1.216	162	176	1.087	1.188	12/10/2015	
12/11/2015	12/12/2015	567	689	1.216	183	199	1.087	1.185	12/11/2015	
12/12/2015	12/13/2015	586	713	1.216	202	220	1.086	1.183	12/12/2015	
12/13/2015	12/14/2015	564	686	1.216	186	202	1.087	1.184	12/13/2015	
12/14/2015	12/15/2015	587	714	1.216	219	238	1.088	1.181	12/14/2015	
12/15/2015	12/16/2015	626	762	1.216	360	394	1.092	1.171	12/15/2015	
12/16/2015	12/17/2015	692	842	1.216	430	469	1.090	1.168	12/16/2015	
12/17/2015	12/18/2015	705	857	1.216	510	560	1.098	1.166	12/17/2015	
12/18/2015	12/19/2015	641	780	1.216	659	719	1.091	1.153	12/18/2015	
12/19/2015	12/20/2015	487	593	1.216	397	433	1.091	1.160	12/19/2015	
12/20/2015	12/21/2015	477	580	1.216	318	350	1.100	1.170	12/20/2015	
12/21/2015	12/22/2015	496	603	1.216	413	453	1.097	1.162	12/21/2015	
12/22/2015	12/23/2015	520	632	1.216	417	458	1.099	1.164	12/22/2015	
12/23/2015	12/24/2015	546	664	1.216	394	434	1.100	1.167	12/23/2015	
12/24/2015	12/25/2015	510	620	1.216	287	315	1.099	1.174	12/24/2015	
12/25/2015	12/26/2015	645	784	1.216	464	511	1.100	1.167	12/25/2015	
12/26/2015	12/27/2015	665	809	1.216	516	568	1.101	1.166	12/26/2015	
12/27/2015	12/28/2015	607	737	1.216	447	492	1.100	1.167	12/27/2015	
12/28/2015	12/29/2015	603	734	1.216	510	559	1.097	1.161	12/28/2015	
12/29/2015	12/30/2015	619	753	1.216	626	684	1.092	1.154	12/29/2015	
12/30/2015	12/31/2015	625	760	1.216	627	683	1.090	1.153	12/30/2015	
12/31/2015	1/1/2016	622	756	1.216	475	521	1.097	1.164	12/31/2015	
		17,461	21,236		10,085	11,029	1.0921	1.1743		

ROW ID	LOCATION DESCRIPTION	GROSS HEATING VALUE (BTU/CF)	SPECIFIC GRAVITY	WOBBE (calc)	CRICONDENTHERM (deg F)	NITROGEN (mole percent)	CARBON DIOXIDE (mole percent)	METHANE (mole percent)	ETHANE (mole percent)	PROPANE (mole percent)	NORMAL BUTANE (mole percent)	ISO BUTANE (mole percent)	PENTANE (mole percent)	ISO PENTANE (mole percent)	NEO PENTANE (mole percent)	HEXANES PLUS (mole percent)	HYDROGEN (mole percent)	HELIUM (mole percent)	PRODUCTION DATE	POSTING DATE	ChangeTimestamp	NOTES
11587	GLEN ULLIN	1063.3	0.6131	1358	-63.9	1.3882	0.7732	88.9467	7.9028	0.6742	0.0358	0.0266	0.0034	0.0049	0	0.0019	0.2251	0.021	11/30/2015	12/1/2015	12/1/2015 2:33:08 PM	
11587	GLEN ULLIN	1057.5	0.6086	1355.6	-69	1.3065	0.7796	89.7913	7.1721	0.6294	0.0327	0.0239	0.0029	0.0042	0	0.0012	0.2401	0.021	12/1/2015	12/2/2015	12/2/2015 2:32:14 PM	
11587	GLEN ULLIN	1060.9	0.611	1357.2	-66.3	1.3183	0.7879	89.3637	7.5563	0.662	0.0328	0.0247	0.0032	0.0046	0	0.0015	0.2284	0.021	12/2/2015	12/3/2015	12/3/2015 2:35:56 PM	
11587	GLEN ULLIN	1058.1	0.6093	1355.6	-68.2	1.3418	0.7773	89.6735	7.2614	0.6416	0.0322	0.0239	0.0028	0.0042	0	0.0013	0.2239	0.021	12/3/2015	12/4/2015	12/4/2015 2:35:26 PM	
11587	GLEN ULLIN	1053.1	0.6054	1353.4	-75.8	1.3003	0.7601	90.3074	6.8229	0.5419	0.018	0.0122	0.0005	0.001	0	0	0.2191	0.021	12/4/2015	12/5/2015	12/5/2015 2:33:58 PM	
11587	GLEN ULLIN	1057.4	0.6088	1355.2	-72.4	1.3259	0.7831	89.7893	7.2147	0.6442	0.0197	0.0134	0.0006	0.0011	0	0	0.1919	0.021	12/5/2015	12/6/2015	12/6/2015 2:34:18 PM	
11587	GLEN ULLIN	1060	0.6103	1356.9	-70.4	1.3068	0.7872	89.5648	7.3652	0.7287	0.0209	0.0141	0.0005	0.0008	0	0	0.1948	0.021	12/6/2015	12/7/2015	12/7/2015 2:33:00 PM	
11587	GLEN ULLIN	1059.7	0.6099	1357	-69.8	1.2818	0.7854	89.6792	7.2623	0.7251	0.0258	0.0187	0.0019	0.0027	0	0.0002	0.2002	0.021	12/7/2015	12/8/2015	12/8/2015 2:33:52 PM	
11587	GLEN ULLIN	1059.4	0.6099	1356.5	-71.1	1.2945	0.7962	89.6059	7.3666	0.6911	0.0185	0.0128	0.0005	0.001	0	0	0.1981	0.021	12/8/2015	12/9/2015	12/9/2015 2:34:33 PM	
11587	GLEN ULLIN	1063.2	0.6131	1357.8	-68.5	1.3426	0.8112	88.9477	7.884	0.7351	0.0193	0.0129	0.0003	0.0007	0	0	0.2293	0.021	12/9/2015	12/10/2015	12/10/2015 2:34:02 PM	
11587	GLEN ULLIN	1068.5	0.6167	1360.6	-64.1	1.3621	0.8147	88.2693	8.3616	0.8476	0.0279	0.0203	0.0015	0.0022	0	0	0.277	0.021	12/10/2015	12/11/2015	12/11/2015 2:35:58 PM	
11587	GLEN ULLIN	1082.8	0.6268	1367.7	-53.8	1.4193	0.836	86.6014	9.5639	1.1717	0.048	0.0443	0.0023	0.0038	0	0	0.292	0.021	12/11/2015	12/12/2015	12/12/2015 2:33:59 PM	
11587	GLEN ULLIN	1072.5	0.6205	1361.5	-60.7	1.4653	0.8268	87.5734	8.8035	0.961	0.0322	0.0251	0.0013	0.0021	0	0	0.292	0.021	12/12/2015	12/13/2015	12/13/2015 2:33:59 PM	
11587	GLEN ULLIN	1070.9	0.62	1360	-61.6	1.5276	0.8193	87.5895	8.775	0.9164	0.0323	0.0195	0.0015	0.0018	0	0	0.3001	0.021	12/13/2015	12/14/2015	12/14/2015 2:34:20 PM	
11587	GLEN ULLIN	1072.8	0.6215	1360.8	-60.6	1.5457	0.8245	87.2485	9.0776	0.9171	0.0321	0.0185	0.0016	0.0017	0	0	0.3062	0.0255	12/14/2015	12/15/2015	12/15/2015 2:34:13 PM	
11587	GLEN ULLIN	1071.1	0.6198	1360.6	-62.8	1.5163	0.7982	87.5815	8.9257	0.8507	0.0247	0.0147	0.0008	0.0009	0	0	0.2476	0.0381	12/15/2015	12/16/2015	12/16/2015 2:33:27 PM	
11587	GLEN ULLIN	1066.9	0.6172	1358	-65.8	1.532	0.7961	87.9399	8.6636	0.7243	0.0227	0.0137	0.0004	0.0003	0	0	0.2907	0.0172	12/16/2015	12/17/2015	12/17/2015 2:35:46 PM	
11587	GLEN ULLIN	1059.6	0.6113	1355.2	-70.5	1.4286	0.7869	89.025	7.7455	0.6512	0.0199	0.0119	0.0001	0.0001	0	0	0.3147	0.0167	12/17/2015	12/18/2015	12/18/2015 2:35:23 PM	
11587	GLEN ULLIN	1061.2	0.6115	1357.1	-64.6	1.3415	0.7916	89.2627	7.5275	0.7204	0.038	0.0274	0.0032	0.0045	0	0.0018	0.2657	0.0167	12/18/2015	12/19/2015	12/19/2015 2:35:20 PM	
11587	GLEN ULLIN	1069.2	0.6172	1361	-56.7	1.3686	0.8081	88.3561	8.2464	0.8533	0.0517	0.0387	0.0051	0.0071	0	0.0029	0.2453	0.0167	12/19/2015	12/20/2015	12/20/2015 2:35:14 PM	
11587	GLEN ULLIN	1069.9	0.6184	1360.5	-60.5	1.4294	0.8188	88.0336	8.5493	0.8288	0.0433	0.0298	0.0035	0.0048	0	0.0014	0.2404	0.0167	12/20/2015	12/21/2015	12/21/2015 2:34:26 PM	
11587	GLEN ULLIN	1070.2	0.6188	1360.4	-62.9	1.5024	0.7885	87.7352	8.768	0.8344	0.0338	0.0212	0.0009	0.0014	0	0	0.2981	0.0172	12/21/2015	12/22/2015	12/22/2015 2:33:43 PM	
11587	GLEN ULLIN	1074.4	0.6214	1363	-59.4	1.4382	0.8233	87.4056	9.0208	0.9366	0.039	0.0278	0.002	0.0031	0	0.0004	0.2882	0.0175	12/22/2015	12/23/2015	12/23/2015 2:35:48 PM	
11587	GLEN ULLIN	1070.4	0.6187	1360.8	-62.7	1.4339	0.815	87.9803	8.5912	0.8734	0.035	0.023	0.001	0.0015	0	0	0.2293	0.0178	12/23/2015	12/24/2015	12/24/2015 2:34:53 PM	
11587	GLEN ULLIN	1069.6	0.6183	1360.3	-63.4	1.4622	0.7992	88.022	8.5435	0.8718	0.0289	0.0201	0.0008	0.0015	0	0	0.2325	0.0182	12/24/2015	12/25/2015	12/25/2015 2:35:26 PM	
11587	GLEN ULLIN	1076.1	0.6232	1363.2	-58.3	1.5211	0.811	87.1742	9.1549	1.0132	0.0375	0.0268	0.0018	0.0026	0	0.0002	0.2388	0.0182	12/25/2015	12/26/2015	12/26/2015 2:36:45 PM	
11587	GLEN ULLIN	1072.8	0.6206	1361.8	-61.2	1.4742	0.8096	87.5871	8.8747	0.9316	0.0288	0.0214	0.0013	0.0018	0	0.0001	0.2529	0.0174	12/26/2015	12/27/2015	12/27/2015 2:37:05 PM	
11587	GLEN ULLIN	1068.6	0.6174	1360	-64.4	1.4497	0.7928	88.132	8.4714	0.8472	0.0268	0.0172	0.0001	0.0002	0	0	0.2457	0.0174	12/27/2015	12/28/2015	12/28/2015 2:34:50 PM	
11587	GLEN ULLIN	1068.6	0.617	1360.4	-64.4	1.4361	0.7788	88.3062	8.3242	0.8798	0.0286	0.0192	0	0	0	0	0.2094	0.0173	12/28/2015	12/29/2015	12/29/2015 2:35:17 PM	
11587	GLEN ULLIN	1057.8	0.608	1355.5	-72.4	1.2319	0.7778	90.0637	6.9846	0.7156	0.0189	0.0133	0	0	0	0	0.1785	0.0173	12/29/2015	12/30/2015	12/30/2015 2:36:54 PM	
11587	GLEN ULLIN	1060.5	0.6098	1358.1	-67.1	1.2286	0.7877	89.8182	7.1322	0.7695	0.0346	0.0265	0.002	0.0031	0	0.0012	0.1805	0.0173	12/30/2015	12/31/2015	12/31/2015 2:36:51 PM	
11587	GLEN ULLIN	1064.2	0.6129	1359.3	-64.4	1.2982	0.7877	89.2362	7.5493	0.8352	0.0401	0.0307	0.0028	0.0042	0	0.0011	0.1989	0.0173	12/31/2015	1/1/2016	1/1/2016 2:35:36 PM	

Zone 802

<b>NORTH DAKOTA HEATING VALUE ZONES</b>		
<b>ZONES</b>	<b>MEASURING DEVICE</b>	<b>LOCATION</b>
211	Chromatograph	Sidney Area
24	Monthly Sampler	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	Monthly Sampler	Williston – Ray
265	Chromatograph	North Tioga
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
600	Chromatograph	Hankinson Area
610	Monthly Sampler & Chromatograph	Watford City
802	Chromatograph	Linton

MONTANA DAKOTA UTILITIES CO  
 NORTH DAKOTA  
 HEATING VALUE DATA

STATE	ZONE	ZONE BOUNDARY	12 MONTH AVERAGE	DEC 15	NOV 15	OCT 15	SEPT 15	AUG 15	JULY 15	JUNE 15	MAY 15	APRIL 15	MAR 15	FEB 15	JAN 15	ZONE
MT/ND	211	Sidney Area	1201	1204	1195	1188	1193	1196	1199	1205	1202	1204	1205	1209	1215	211
ND	24	Williston Area	1182	1199	1183	1177	1166	1179	1185	1187	1206	1174	1171	1180	1173	24
ND	25	Watford City Border	1207	1216	1223	1216	1198	1198	1188	1207	1220	1212	1207	1196	1203	25
ND/MT	241	Fairview Area	1193	1199	1184	1182	1177	1188	1195	1195	1197	1198	1196	1202	1203	241
ND	261	Williston - Tioga - Minot Line	1022	1066	1047	1000	1042	1015	1028	1026	1006	1021	992	1004	1015	261
ND	262	Minot Area	1189	1188	1192	1198	1201	1201	1201	1185	1188	1188	1175	1173	1173	262
ND	263	Tioga - Portal	1103	1082	1112	1112	1104	1117	1121	1107	1090	1090	1084	1121	1097	263
ND	264	Williston - Ray	1172	1180	1178	1162	1154	1146	1170	1187	1189	1174	1171	1180	1173	264
ND	265	North Tioga Transfer - Portal	1188	1188	1189	1180	1188	1188	1191	1187	1187	1183	1187	1197	1195	265
ND	271	Bismarck - Cleveland	1183	1181	1192	1199	1203	1199	1201	1186	1189	1186	1171	1139	1151	271
ND	272	Cleveland - Mapleton	1182	1180	1191	1197	1202	1199	1200	1186	1188	1185	1169	1137	1149	272
ND	273	Cleveland - Grafton	1182	1180	1190	1197	1203	1199	1200	1185	1189	1182	1167	1137	1149	273
ND	28	Bismarck - Cabin Creek	1163	1137	1148	1196	1203	1200	1201	1186	1189	1170	1133	1089	1101	28
ND	31	Dickinson Area	1137	1136	1135	1161	1161	1145	1181	1127	1129	1136	1139	1091	1104	31
ND	311	Taylor Take-Off - Glen Ullin Comp	1144	0	1147	1179	1168	1158	1200	1168	1171	1096	1115	1090	1094	311
ND/MT	32	Cabin Creek - Dickinson	1134	1117	1111	1120	1176	1173	1181	1169	1165	1118	1110	1079	1091	32
ND	33	Killdeer	1183	1186	1185	1186	1186	1191	1185	1183	1183	1180	1179	1177	1177	33
ND	34	Bowman Area	1103	1121	1102	1084	1025	1133	1176	1121	1130	1123	1099	1068	1049	34
ND	610	MDU-Watford City BTU	1190	1174	1197	1211	1197	1197	1145	1175	1216	1202	1192	1190	1189	
ND	802	Linton	1061	1066	1073	1064	1055	1055	1057	1068	1064	1064	1054	1054	1056	802
ND	903	Hettinger Propane	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	903

**THERMAL ZONE VARIANCE  
DOCUMENTATION**

**December 2015**

<b><i>ZONE</i></b>	<b><i>BTU VARIANCE</i></b>	<b><i>REASON</i></b>
263	-30	Temporary Loss/ Change in Supply