



UTILITIES CO.

A Division of MDU Resources Group, Inc.

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

May 6, 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 – March 2016

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

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 purple ink that reads 'Tamie Aberle'.

Tamie Aberle
Director of Regulatory Affairs

Montana-Dakota Utilities Co.
Therm Billing Factors - North Dakota
March 2016

Town	Heat Zone	Therm Factor
MDU-303-ALEXANDER	025	1.1457
MDU-308-ARNEGARD	025	1.1457
MDU-314-APPLE VALLEY	271	1.1395
MDU-318-BEACH	032	1.0397
MDU-319-BELFIELD	032	1.0473
MDU-323-BERTHOLD	262	1.1240
MDU-327-BISMARCK	028	1.1019
MDU-330-BOWMAN	034	0.9926
MDU-337-BURLINGTON	262	1.1482
MDU-343-CARRINGTON	273	1.1376
MDU-344-CLEVELAND	272	1.1305
MDU-364-CAVALIER	273	1.1616
MDU-365-DAWSON	271	1.1315
MDU-368-DES LACS	262	1.1320
MDU-369-DICKINSON	031	1.0681
MDU-374-FT TOTTEN	273	1.1456
MDU-375-DEVILS LAKE	273	1.1456
MDU-379-BARLOW	273	1.1376
MDU-384-EPPING	264	1.1155
MDU-387-ELDRIDGE	272	1.1385
MDU-407-GLADSTONE	031	1.0681
MDU-411-GLEN ULLIN	031	1.0758
MDU-413-GOLVA	032	1.0244
MDU-416-GARRISON	262	1.1320
MDU-417-GRAFTON	273	1.1696
MDU-421-HALLIDAY	031	1.0681
MDU-429-HEBRON	031	1.0758
MDU-432-HETTINGER	903	2.4049
MDU-449-JAMESTOWN	272	1.1466
MDU-459-KILLDEER	033	1.1173
MDU-463-LANGDON	273	1.1376
MDU-469-LEFOR	031	1.0681
MDU-474-LIGNITE	263	1.0531
MDU-475-LINTON	802	1.0189
MDU-478-LINCOLN	028	1.1019
MDU-488-MCKENZIE	271	1.1395
MDU-494-MEDINA	271	1.1315
MDU-498-MANDAN	028	1.1019
MDU-500-MARMARTH	034	0.9999
MDU-505-MINOT	262	1.1482
MDU-510-MOTT	031	1.0681
MDU-512-MAX	262	1.1240
MDU-522-NEW ENGLAND	031	1.0603
MDU-524-NEW SALEM	028	1.0786
MDU-532-NEW ROCKFORD	273	1.1376
MDU-539-PARK RIVER	273	1.1616
MDU-540-PALERMO	262	1.1240
MDU-558-RAY	264	1.1155
MDU-561-REGENT	031	1.0681

MDU-563-RHAME	034	0.9852
MDU-564-RICHARDTON	031	1.0603
MDU-568-ROSS	261	0.9705
MDU-572-RUTHVILLE	262	1.1482
MDU-574-SANBORN	272	1.1466
MDU-583-SENTINEL BUTTE	032	1.0397
MDU-588-SOUTH HEART	031	1.0603
MDU-717-SPIRITWOOD	272	1.1466
MDU-590-SPRINGBROOK	264	1.1155
MDU-591-STANLEY	261	0.9776
MDU-593-STEELE	271	1.1315
MDU-598-SHEYENNE	273	1.1456
MDU-605-SURREY	262	1.1482
MDU-610-TAPPEN	271	1.1315
MDU-611-TAYLOR	031	1.0603
MDU-616-TIOGA	261	0.9776
MDU-619-TURTLE LAKE	262	1.1320
MDU-620-TRENTON	024	1.1368
MDU-624-UNDERWOOD	262	1.1320
MDU-625-VALLEY CITY	272	1.1546
MDU-629-WALHALLA	273	1.1616
MDU-632-WATFORD CITY	610	1.0767
MDU-636-WHEELOCK	264	1.1074
MDU-637-WHITE EARTH	261	0.9776
MDU-642-WILLISTON	024	1.1368
MDU-646-WASHBURN	262	1.1401
MDU-647-WILTON	262	1.1240
MDU-664-RIVERDALE	262	1.1320
MDU-691-FAIRVIEW	241	1.1425
MDU-712-MINOT AFB	262	1.1482
MDU-718-FAIRMOUNT	600	1.1110
MDU-732-NEKOMA	273	1.1376
MDU-732-MSR SITE	273	1.1385

GQ Source Number:	0602330	Specific Gravity:	0.7117
GQ Source Name:	WILLISTON BORDER	Dry Heat Value:	1194.38
Effective Date:	3/1/2016 9:00:00 AM	Wet Heat Value:	1173.59
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1194.38
Pressure Base:	14.730	Sample Pressure:	400.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	71.718		CO2	Carbon Dioxide	0.884
C2	Ethane	21.494	5.7313	N2	Nitrogen	2.610
C3	Propane	2.918	0.8017	O2	Oxygen	0.000
IC4	Isobutane	0.106	0.0347	He	Helium	
NC4	n-Butane	0.228	0.0716	H2	Hydrogen	
IC5	Isopentane	0.018	0.0066	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.022	0.0078	Ar	Argon	
C6	Hexanes	0.002	0.0010	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

Totals 100.000% 6.655 GPM

Sample Date: 4/4/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: Eric
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 24

GQ Source Number:	0602160	Specific Gravity:	0.7356
GQ Source Name:	FAIRVIEW BORDER	Dry Heat Value:	1201.11
Effective Date:	2/1/2016 9:00:00 AM	Wet Heat Value:	1180.21
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1201.11
Pressure Base:	14.730	Sample Pressure:	327.00
Viscosity:		Sample Temperature:	

	<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>	
C1	Methane	68.860		CO2	Carbon Dioxide	1.212
C2	Ethane	20.758	5.5350	N2	Nitrogen	3.933
C3	Propane	4.817	1.3232	O2	Oxygen	0.011
IC4	Isobutane	0.141	0.0461	He	Helium	
NC4	n-Butane	0.244	0.0768	H2	Hydrogen	
IC5	Isopentane	0.013	0.0048	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% 6.990 GPM

Sample Date: 3/1/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: RR
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 241

GQ Source Number:	0602230	Specific Gravity:	0.7280
GQ Source Name:	WATFORD CITY BORDER	Dry Heat Value:	1210.97
Effective Date:	3/1/2016 9:00:00 AM	Wet Heat Value:	1189.89
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1210.97
Pressure Base:	14.730	Sample Pressure:	388.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	69.512		CO2	Carbon Dioxide	0.981
C2	Ethane	22.367	5.9641	N2	Nitrogen	2.987
C3	Propane	3.518	0.9663	O2	Oxygen	0.006
IC4	Isobutane	0.186	0.0606	He	Helium	
NC4	n-Butane	0.384	0.1209	H2	Hydrogen	
IC5	Isopentane	0.030	0.0108	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.029	0.0104	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% 7.133 GPM

Sample Date: 4/4/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: Eric
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 25

GQ Source Number:	2501030	Specific Gravity:	0.6524
GQ Source Name:	LIGNITE PLANT	Dry Heat Value:	1082.11
Effective Date:	3/1/2016 9:00:00 AM	Wet Heat Value:	1063.28
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1082.11
Pressure Base:	14.730	Sample Pressure:	318.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	80.205		CO2	Carbon Dioxide	0.079
C2	Ethane	13.781	3.6748	N2	Nitrogen	4.708
C3	Propane	0.963	0.2646	O2	Oxygen	0.256
IC4	Isobutane	0.003	0.0011	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	0.005	0.0023	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					
		Totals	100.000%	3.943	GPM	

Sample Date: 4/4/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: Eric
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 263

*** End of Report ***

GQ Source Number:	0702010	Specific Gravity:	0.7072
GQ Source Name:	EPPING BORDER	Dry Heat Value:	1188.73
Effective Date:	3/1/2016 9:00:00 AM	Wet Heat Value:	1168.04
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1188.73
Pressure Base:	14.730	Sample Pressure:	370.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	72.956		CO2	Carbon Dioxide	0.878
C2	Ethane	20.092	5.3575	N2	Nitrogen	2.526
C3	Propane	3.137	0.8618	O2	Oxygen	0.000
IC4	Isobutane	0.119	0.0387	He	Helium	
NC4	n-Butane	0.245	0.0772	H2	Hydrogen	
IC5	Isopentane	0.020	0.0073	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.024	0.0086	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% 6.352 GPM

Sample Date: 4/4/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: Eric
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 264

GQ Source Daily Summary

March 2016

Number: 063

Pressure Base: 14.730

Contract Day: 1

Name: CLEVELAND STATION-MAPLETON

Temperature Base:

Contract Hour: 9

Day	Relative Density	Heating Value	Heating Value	CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT	
		Wet	Dry																	
1	0.7157	1147.2	1167.5	0.593	5.070	71.348	18.994	3.556	0.123	0.280	0.018	0.018	0.000						1379.99	
2	0.7122	1157.3	1177.8	0.727	3.924	71.762	20.153	3.059	0.104	0.234	0.017	0.019	0.000						1395.53	
3	0.7358	1172.8	1193.6	0.774	5.117	68.195	21.223	4.176	0.146	0.328	0.020	0.021	0.000						1391.52	
4	0.7381	1169.2	1189.9	0.750	5.589	67.979	20.686	4.435	0.158	0.359	0.021	0.022	0.000						1384.97	
5	0.7315	1159.1	1179.6	0.727	5.618	69.119	19.703	4.285	0.154	0.352	0.021	0.022	0.000						1379.21	
6	0.7428	1172.8	1193.5	0.799	5.737	67.275	21.007	4.589	0.165	0.380	0.023	0.024	0.000						1384.83	
7	0.7466	1177.0	1197.8	0.819	5.806	66.601	21.498	4.685	0.166	0.379	0.023	0.023	0.000						1386.26	
8	0.7387	1170.5	1191.2	0.788	5.505	67.838	20.947	4.369	0.155	0.355	0.021	0.022	0.000						1386.00	
9	0.7286	1154.9	1175.4	0.718	5.611	69.605	19.323	4.207	0.150	0.344	0.020	0.021	0.000						1377.02	
10	0.7377	1165.1	1185.7	0.748	5.803	68.158	20.179	4.534	0.163	0.372	0.022	0.022	0.000						1380.52	
11	0.7369	1164.5	1185.1	0.745	5.768	68.261	20.174	4.482	0.160	0.367	0.021	0.022	0.000						1380.56	
12	0.7432	1172.7	1193.4	0.783	5.807	67.211	20.953	4.656	0.166	0.379	0.022	0.023	0.000						1384.32	
13	0.7422	1171.5	1192.3	0.767	5.799	67.444	20.721	4.671	0.168	0.384	0.022	0.023	0.000						1383.99	
14	0.7461	1176.9	1197.8	0.787	5.814	66.810	21.181	4.795	0.172	0.394	0.023	0.024	0.000						1386.63	
15	0.7428	1172.7	1193.5	0.771	5.784	67.353	20.796	4.697	0.168	0.385	0.023	0.024	0.000						1384.74	
16	0.7438	1174.4	1195.2	0.786	5.750	67.158	20.998	4.722	0.166	0.376	0.022	0.022	0.000						1385.87	
17	0.7286	1159.8	1180.4	0.673	5.381	69.511	19.760	4.157	0.146	0.332	0.019	0.020	0.000						1382.88	
18	0.7180	1145.7	1166.0	0.705	5.199	71.429	18.264	3.917	0.138	0.313	0.018	0.018	0.000						1376.05	
19	0.7207	1149.5	1169.8	0.720	5.199	70.960	18.662	3.960	0.140	0.319	0.019	0.020	0.000						1378.01	
20	0.7237	1154.6	1175.0	0.739	5.139	70.451	19.145	4.024	0.141	0.321	0.019	0.020	0.000						1381.29	
21	0.7296	1159.9	1180.4	0.757	5.342	69.523	19.578	4.281	0.147	0.332	0.019	0.020	0.000						1382.00	
22	0.7247	1159.7	1180.2	0.653	5.056	69.988	19.917	3.922	0.134	0.296	0.017	0.018	0.000						1386.40	
23	0.7176	1150.5	1170.8	0.657	4.945	71.241	18.961	3.756	0.127	0.280	0.016	0.016	0.000						1382.16	
24	0.7203	1151.2	1171.6	0.684	5.106	70.939	18.864	3.936	0.135	0.301	0.017	0.018	0.000						1380.55	
25	0.7299	1162.4	1182.9	0.706	5.300	69.372	19.862	4.246	0.147	0.327	0.020	0.021	0.000						1384.64	
26	0.7317	1162.8	1183.4	0.697	5.452	69.065	19.941	4.325	0.151	0.328	0.019	0.020	0.000						1383.51	
27	0.7442	1176.5	1197.4	0.799	5.635	67.218	20.960	4.790	0.172	0.378	0.023	0.025	0.000						1388.00	
28	0.7449	1177.6	1198.5	0.803	5.632	67.111	21.030	4.822	0.174	0.380	0.023	0.025	0.000						1388.60	
29	0.7430	1174.9	1195.7	0.797	5.632	67.388	20.837	4.760	0.170	0.371	0.022	0.023	0.000						1387.13	
30	0.7436	1175.6	1196.4	0.799	5.634	67.291	20.922	4.769	0.170	0.369	0.022	0.023	0.000						1387.49	
31	0.7397	1169.9	1190.6	0.758	5.676	67.956	20.335	4.697	0.169	0.366	0.022	0.022	0.000						1384.40	
Avg	0.7336	1165.0	1185.4	0.743	5.446	68.760	20.180	4.332	0.153	0.344	0.021	0.021	0.000						1384.03	

Zone 292

GQ Source Number:	1202160	Specific Gravity:	0.5731
GQ Source Name:	BOWMAN BORDER	Dry Heat Value:	979.46
Effective Date:	3/1/2016 9:00:00 AM	Wet Heat Value:	962.41
Effective End Date:	3/31/2016 9:00:00 AM	As Deliv. Heat Value:	979.46
Pressure Base:	14.730	Sample Pressure:	340.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	95.832		CO2	Carbon Dioxide	0.106
C2	Ethane	0.400	0.0000	N2	Nitrogen	3.626
C3	Propane	0.000	0.0000	O2	Oxygen	0.021
IC4	Isobutane	0.009	0.0030	He	Helium	
NC4	n-Butane	0.004	0.0010	H2	Hydrogen	
IC5	Isopentane	0.000	0.0000	H2S	Hydrogen Sulfide	
NC5	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					

Totals 99.998% 0.004 GPM

Sample Date: 3/31/2016 12:00:00 AM
Sample Type: Spot
Sample Tech: MG
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 34

GQ Source Daily Summary

March 2016

Number: 471

Pressure Base: 14.730

Contract Day:

Name: SPRING CREEK I INTERCONNECT

Temperature Base:

Contract Hour: 9

Day	Relative Density	Heating Value Wet	Heating Value Dry																Wobbe	CCT
				CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10			
1	0.6634	1087.5	1106.7	1.034	3.128	79.546	15.106	1.114	0.026	0.046	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1358.83	
2	0.6616	1083.8	1103.0	1.029	3.193	79.829	14.824	1.055	0.025	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1356.04	
3	0.6555	1073.5	1092.5	1.045	3.227	80.902	13.862	0.908	0.020	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.35	
4	0.6535	1070.1	1089.0	1.050	3.232	81.317	13.440	0.912	0.018	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1347.18	
5	0.6603	1082.2	1101.4	1.035	3.156	80.057	14.662	1.032	0.021	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1355.43	
6	0.6674	1094.7	1114.1	1.024	3.081	78.751	15.918	1.152	0.026	0.046	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1363.73	
7	0.6702	1098.5	1118.0	1.019	3.121	78.168	16.477	1.136	0.028	0.050	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1365.61	
8	0.6569	1074.7	1093.7	0.993	3.359	80.715	13.827	1.035	0.025	0.045	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.42	
9	0.6587	1076.1	1095.2	1.051	3.352	80.365	14.159	1.009	0.023	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.42	
10	0.6566	1075.0	1094.0	1.040	3.242	80.644	14.145	0.878	0.019	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1350.14	
11	0.6552	1062.2	1081.0	1.067	3.852	80.833	13.348	0.847	0.019	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1335.46	
12	0.6592	1067.2	1086.1	1.070	3.921	80.126	13.869	0.950	0.023	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1337.66	
13	0.6627	1072.7	1091.7	1.061	3.921	79.467	14.486	0.998	0.024	0.043	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1341.10	
14	0.6597	1067.7	1086.6	1.067	3.942	79.977	14.032	0.922	0.022	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1337.82	
15	0.6607	1070.8	1089.7	1.061	3.854	79.805	14.284	0.938	0.021	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1340.67	
16	0.6594	1068.8	1087.7	1.066	3.844	80.161	13.863	0.998	0.025	0.043	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1339.50	
17	0.6569	1065.8	1084.7	1.053	3.812	80.514	13.688	0.881	0.019	0.034	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1338.31	
18	0.6559	1070.0	1089.0	1.060	3.451	80.879	13.577	0.969	0.023	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1344.61	
19	0.6575	1066.8	1085.7	1.065	3.787	80.458	13.710	0.920	0.021	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1338.96	
20	0.6580	1069.8	1088.7	1.057	3.669	80.404	13.850	0.957	0.023	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1342.15	
21	0.6579	1076.8	1095.8	1.050	3.243	80.429	14.309	0.912	0.021	0.036	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1351.02	
22	0.6558	1075.3	1094.4	1.047	3.136	80.796	14.127	0.843	0.019	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1351.40	
23	0.6972	1149.1	1169.4	0.935	2.717	72.582	22.544	1.190	0.013	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1400.33	
24	0.6994	1151.0	1171.4	0.936	2.798	72.255	22.649	1.349	0.007	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1400.67	
25	0.6913	1138.6	1158.8	0.952	2.771	73.596	21.651	1.007	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1393.66	
26	0.6862	1130.4	1150.4	0.960	2.785	74.201	21.448	0.602	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1388.71	
27	0.6908	1131.4	1151.4	0.969	3.138	73.663	21.182	1.040	0.004	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1385.35	
28	0.6872	1132.0	1152.0	0.959	2.774	74.205	21.278	0.764	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1389.75	
29	0.6901	1136.3	1156.4	0.957	2.796	73.885	21.281	1.064	0.008	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1391.95	
30	0.6867	1130.0	1150.0	0.958	2.857	74.244	21.185	0.751	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1387.71	
31	0.6843	1124.7	1144.6	0.969	2.931	74.757	20.567	0.770	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1383.71	
Avg	0.6683	1093.0	1112.0	1.021	3.293	78.307	16.366	0.965	0.018	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1360.18	

Zone 43

Mar-16

ZONE 610

Watford City		Effective 2-3-16			01312			Weighted	
		01325			Watford City East Border				
		Watford City West Border							
Begin Date	End Date	MCF	DK	BTU	MCF	DK	BTU	AVG	
				Zone 25			Zone 43		
3/1/2016	3/2/2016	443	537	1.211	540	598	1.107	1.154	3/1/2016
3/2/2016	3/3/2016	401	485	1.211	480	530	1.103	1.152	3/2/2016
3/3/2016	3/4/2016	371	449	1.211	485	530	1.093	1.144	3/3/2016
3/4/2016	3/5/2016	316	382	1.211	472	514	1.089	1.138	3/4/2016
3/5/2016	3/6/2016	138	167	1.211	331	364	1.101	1.133	3/5/2016
3/6/2016	3/7/2016	97	117	1.211	251	280	1.114	1.141	3/6/2016
3/7/2016	3/8/2016	256	310	1.211	329	367	1.118	1.159	3/7/2016
3/8/2016	3/9/2016	381	461	1.211	446	489	1.094	1.148	3/8/2016
3/9/2016	3/10/2016	284	344	1.211	372	408	1.095	1.145	3/9/2016
3/10/2016	3/11/2016	158	191	1.211	268	293	1.094	1.137	3/10/2016
3/11/2016	3/12/2016	160	194	1.211	292	316	1.081	1.127	3/11/2016
3/12/2016	3/13/2016	83	100	1.211	248	269	1.086	1.117	3/12/2016
3/13/2016	3/14/2016	129	156	1.211	279	305	1.092	1.130	3/13/2016
3/14/2016	3/15/2016	230	279	1.211	278	302	1.087	1.143	3/14/2016
3/15/2016	3/16/2016	296	358	1.211	332	362	1.090	1.147	3/15/2016
3/16/2016	3/17/2016	400	484	1.211	400	435	1.088	1.150	3/16/2016
3/17/2016	3/18/2016	480	582	1.211	501	544	1.085	1.147	3/17/2016
3/18/2016	3/19/2016	429	519	1.211	494	538	1.089	1.146	3/18/2016
3/19/2016	3/20/2016	388	470	1.211	452	491	1.086	1.144	3/19/2016
3/20/2016	3/21/2016	265	321	1.211	366	399	1.089	1.140	3/20/2016
3/21/2016	3/22/2016	282	341	1.211	389	426	1.096	1.144	3/21/2016
3/22/2016	3/23/2016	397	481	1.211	449	491	1.094	1.149	3/22/2016
3/23/2016	3/24/2016	404	490	1.211	482	560	1.169	1.188	3/23/2016
3/24/2016	3/25/2016	252	305	1.211	340	398	1.171	1.188	3/24/2016
3/25/2016	3/26/2016	402	487	1.211	475	550	1.159	1.183	3/25/2016
3/26/2016	3/27/2016	266	323	1.211	340	391	1.150	1.177	3/26/2016
3/27/2016	3/28/2016	177	214	1.211	326	375	1.151	1.172	3/27/2016
3/28/2016	3/29/2016	194	235	1.211	325	375	1.152	1.174	3/28/2016
3/29/2016	3/30/2016	254	308	1.211	325	376	1.156	1.180	3/29/2016
3/30/2016	3/31/2016	250	303	1.211	321	369	1.150	1.177	3/30/2016
3/31/2016	4/1/2016	369	447	1.211	391	447	1.145	1.177	3/31/2016
		8,952	10,840		11,779	13,092	1.1121	1.1533	

ROW ID	LOCATION DESCRIPTION	GROSS HEATING VALUE (BTU/CF)	SPECIFIC GRAVITY	WOBBE (cal/cf)	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	1053.3	0.6066	1352.4	-76.2	1.3211	0.8139	90.0461	7.1251	0.4604	0.0127	0.0079	0	0	0	0	0.1955	0.0198	2/29/2016	3/1/2016	3/1/2016 2:39:13 PM	
11587	GLEN ULLIN	1052	0.6055	1352	-77.6	1.3112	0.8015	90.2045	7.0495	0.4067	0.0092	0.0063	0	0	0	0	0.1918	0.0197	3/1/2016	3/2/2016	3/2/2016 2:40:20 PM	
11587	GLEN ULLIN	1055	0.6079	1353.1	-75.4	1.37	0.7943	89.7332	7.4311	0.4377	0.0116	0.0084	0.0002	0.0004	0	0	0.1921	0.0205	3/2/2016	3/3/2016	3/3/2016 2:39:52 PM	
11587	GLEN ULLIN	1055.7	0.6085	1353.4	-74.9	1.3727	0.8046	89.614	7.5417	0.4339	0.0127	0.0086	0.0001	0.0005	0	0	0.1916	0.02	3/3/2016	3/4/2016	3/4/2016 2:39:11 PM	
11587	GLEN ULLIN	1059.9	0.6112	1355.7	-72.3	1.3395	0.8275	89.1495	7.9524	0.4946	0.0128	0.0089	0.0002	0.0005	0	0	0.1944	0.0187	3/4/2016	3/5/2016	3/5/2016 2:39:47 PM	
11587	GLEN ULLIN	1061.7	0.6124	1356.7	-70.8	1.3344	0.8321	88.9403	8.1235	0.5158	0.0167	0.0124	0.0009	0.0015	0	0.0001	0.2008	0.0202	3/5/2016	3/6/2016	3/6/2016 2:39:13 PM	
11587	GLEN ULLIN	1058.4	0.6099	1355.3	-73.5	1.3089	0.8203	89.3955	7.7822	0.4606	0.0119	0.0084	0.0001	0.0006	0	0	0.1888	0.0207	3/6/2016	3/7/2016	3/7/2016 2:44:27 PM	
11587	GLEN ULLIN	1056.5	0.6084	1354.5	-75.2	1.3088	0.8036	89.6354	7.6341	0.3989	0.0108	0.0076	0.0002	0.0004	0	0	0.1784	0.0202	3/7/2016	3/8/2016	3/8/2016 2:44:29 PM	
11587	GLEN ULLIN	1056.9	0.6088	1354.5	-74.7	1.3248	0.8085	89.5318	7.6863	0.4124	0.012	0.008	0	0.0004	0	0	0.193	0.0234	3/8/2016	3/9/2016	3/9/2016 2:43:55 PM	
11587	GLEN ULLIN	1057.6	0.6099	1354.3	-73.6	1.3719	0.8141	89.3654	7.7588	0.4532	0.0142	0.0095	0.0003	0.0007	0	0	0.1899	0.0222	3/9/2016	3/10/2016	3/10/2016 2:44:53 PM	
11587	GLEN ULLIN	1056	0.608	1354.3	-75.5	1.296	0.8093	89.7228	7.5469	0.4049	0.0109	0.0074	0.0001	0.0002	0	0	0.177	0.0218	3/10/2016	3/11/2016	3/11/2016 2:47:05 PM	
11587	GLEN ULLIN	1055.6	0.608	1353.8	-75.7	1.312	0.8124	89.7812	7.51	0.3914	0.012	0.0081	0.0001	0.0003	0	0	0.1485	0.0226	3/11/2016	3/12/2016	3/12/2016 2:44:31 PM	
11587	GLEN ULLIN	1055.3	0.6083	1353.1	-75.6	1.3658	0.8066	89.695	7.538	0.3956	0.0119	0.0078	0.0001	0.0003	0	0	0.1572	0.02	3/12/2016	3/13/2016	3/13/2016 2:44:30 PM	
11587	GLEN ULLIN	1056.8	0.6092	1354	-74.5	1.3609	0.8092	89.5167	7.6779	0.4248	0.0129	0.0086	0.0001	0.0004	0	0	0.1684	0.0205	3/13/2016	3/14/2016	3/14/2016 2:43:28 PM	
11587	GLEN ULLIN	1055.2	0.608	1353.2	-75.9	1.3652	0.7945	89.7015	7.5439	0.3842	0.0107	0.0069	0	0.0001	0	0	0.1688	0.0222	3/14/2016	3/15/2016	3/15/2016 2:44:06 PM	
11587	GLEN ULLIN	1055.8	0.6082	1353.8	-75.5	1.3527	0.794	89.6821	7.5559	0.4063	0.011	0.0077	0	0.0001	0	0	0.1636	0.0256	3/15/2016	3/16/2016	3/16/2016 2:42:37 PM	
11587	GLEN ULLIN	1053.3	0.6068	1352.1	-77	1.3558	0.799	90.0504	7.2431	0.3858	0.0111	0.0077	0	0.0003	0	0	0.126	0.0227	3/16/2016	3/17/2016	3/17/2016 2:44:14 PM	
11587	GLEN ULLIN	1054.9	0.6077	1353.2	-76	1.3511	0.8001	89.8079	7.4736	0.3795	0.0122	0.0087	0.0001	0.0006	0	0	0.1466	0.0206	3/17/2016	3/18/2016	3/18/2016 2:44:35 PM	
11587	GLEN ULLIN	1056.8	0.6089	1354.3	-74.7	1.3389	0.8051	89.6356	7.6316	0.4071	0.0138	0.0104	0.0005	0.0013	0	0	0.135	0.0206	3/18/2016	3/19/2016	3/19/2016 2:43:46 PM	
11587	GLEN ULLIN	1055.7	0.6084	1353.4	-75.5	1.3777	0.792	89.7026	7.561	0.3913	0.0122	0.0089	0.0003	0.0006	0	0	0.132	0.0206	3/19/2016	3/20/2016	3/20/2016 2:42:09 PM	
11587	GLEN ULLIN	1055.4	0.6084	1353.1	-75.8	1.3853	0.7962	89.6901	7.5749	0.3822	0.0099	0.007	0	0.0001	0	0	0.1354	0.0206	3/20/2016	3/21/2016	3/21/2016 2:43:19 PM	
11587	GLEN ULLIN	1057.1	0.6088	1354.8	-75.1	1.3279	0.7979	89.6056	7.6954	0.3953	0.0108	0.0076	0	0.0001	0	0	0.1431	0.0206	3/21/2016	3/22/2016	3/22/2016 2:43:05 PM	
11587	GLEN ULLIN	1059.9	0.6102	1356.8	-72.4	1.3032	0.7891	89.3818	7.8829	0.4383	0.0175	0.0135	0.0014	0.002	0	0.0007	0.1502	0.0206	3/22/2016	3/23/2016	3/23/2016 2:43:13 PM	
11587	GLEN ULLIN	1056.5	0.6065	1356.6	-74.8	1.1696	0.7756	90.1923	7.1947	0.4589	0.02	0.0151	0.0017	0.0027	0	0.0002	0.1506	0.0206	3/23/2016	3/24/2016	3/24/2016 2:42:55 PM	
11587	GLEN ULLIN	1063.1	0.6122	1358.7	-70.8	1.2783	0.8003	89.0482	8.198	0.4829	0.0159	0.012	0.0013	0.0017	0	0.0004	0.1424	0.0206	3/24/2016	3/25/2016	3/25/2016 2:40:46 PM	
11587	GLEN ULLIN	1059.3	0.6101	1356.2	-73.7	1.3206	0.7938	89.3768	7.8962	0.4313	0.0107	0.0075	0.0001	0.0002	0	0	0.1432	0.0189	3/25/2016	3/26/2016	3/26/2016 2:42:44 PM	
11587	GLEN ULLIN	1059.1	0.6101	1355.9	-73.9	1.3284	0.7975	89.3594	7.9265	0.4106	0.0103	0.0073	0.0001	0.0003	0	0	0.1412	0.0206	3/26/2016	3/27/2016	3/27/2016 2:43:13 PM	
11587	GLEN ULLIN	1058.2	0.6098	1355.1	-74.3	1.3579	0.7912	89.4206	7.8347	0.413	0.0102	0.0072	0	0.0003	0	0	0.1455	0.0178	3/27/2016	3/28/2016	3/28/2016 2:43:30 PM	
11587	GLEN ULLIN	1059.2	0.6101	1356	-73.8	1.3267	0.7948	89.3774	7.9035	0.4211	0.0113	0.0081	0.0001	0.0005	0	0	0.1375	0.0179	3/28/2016	3/29/2016	3/29/2016 2:43:19 PM	
11587	GLEN ULLIN	1058.8	0.6098	1355.9	-73.9	1.3185	0.7982	89.3941	7.8739	0.4167	0.0116	0.0082	0.0002	0.0005	0	0	0.1587	0.0193	3/29/2016	3/30/2016	3/30/2016 2:43:35 PM	
11587	GLEN ULLIN	1059.4	0.6102	1356.2	-73.7	1.3078	0.8057	89.2655	8.0115	0.394	0.0107	0.0077	0.0002	0.0004	0	0.0001	0.1761	0.0188	3/30/2016	3/31/2016	3/31/2016 2:43:39 PM	
11587	GLEN ULLIN	1059.2	0.61	1356.2	-74.3	1.2958	0.8068	89.2703	8.0661	0.3525	0.0082	0.0063	0.0001	0.0002	0	0	0.1762	0.0186	3/31/2016	4/1/2016	4/1/2016 2:43:34 PM	

Zone 201

NORTH DAKOTA HEATING VALUE ZONES		
ZONES	MEASURING DEVICE	LOCATION
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
32	Chromatograph	Cabin Creek – Dickinson
33	Chromatograph	Killdeer
34	Monthly Sampler	Bowman Area
43	Chromatograph	Spring Creek
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	MAR 16	FEB 16	JAN 16	DEC 15	NOV 15	OCT 15	SEPT 15	AUG 15	JULY 15	JUNE 15	MAY 15	APRIL 15	ZONE
MT/ND	211	Sidney Area	1201	1213	1209	1207	1204	1195	1188	1193	1196	1199	1205	1202	1204	211
ND	24	Williston Area	1188	1194	1195	1195	1199	1183	1177	1166	1179	1185	1187	1206	1174	24
ND	25	Watford City Border	1210	1211	1213	1216	1216	1223	1216	1198	1198	1188	1207	1220	1212	25
ND/MT	241	Fairview Area	1193	1201	1201	1199	1199	1184	1182	1177	1188	1195	1195	1197	1198	241
ND	261	Williston - Tioga - Minot Line	1033	1048	1035	1052	1066	1047	1000	1042	1015	1028	1026	1006	1021	261
ND	262	Minot Area	1193	1189	1190	1189	1188	1192	1198	1201	1201	1201	1185	1188	1188	262
ND	263	Tioga - Portal	1102	1082	1107	1092	1082	1112	1112	1104	1117	1121	1107	1090	1090	263
ND	264	Williston - Ray	1174	1189	1181	1183	1180	1178	1162	1154	1146	1170	1187	1189	1174	264
ND	265	North Tioga Transfer - Portal	1187	1186	1187	1190	1188	1189	1180	1188	1188	1191	1187	1187	1183	265
ND	271	Bismarck - Cleveland	1190	1186	1181	1172	1181	1192	1199	1203	1199	1201	1186	1189	1186	271
ND	272	Cleveland - Mapleton	1189	1185	1180	1171	1180	1191	1197	1202	1199	1200	1186	1188	1185	272
ND	273	Cleveland - Grafton	1189	1185	1179	1171	1180	1190	1197	1203	1199	1200	1185	1189	1182	273
ND	28	Bismarck - Cabin Creek	1172	1154	1142	1131	1137	1148	1196	1203	1200	1201	1186	1189	1170	28
ND	31	Dickinson Area	1144	1144	1139	1130	1136	1135	1161	1161	1145	1181	1127	1129	1136	31
ND	311	Taylor Take-Off - Glen Ullin Comp	1170	0	0	0	0	1147	1179	1168	1158	1200	1168	1171	1096	311
ND/MT	32	Cabin Creek - Dickinson	1143	1121	1125	1117	1117	1111	1120	1176	1173	1181	1169	1165	1118	32
ND	33	Killdeer	1185	1181	1183	1182	1186	1185	1186	1186	1191	1185	1183	1183	1180	33
ND	34	Bowman Area	1096	979	1082	1103	1121	1102	1084	1025	1133	1176	1121	1130	1123	34
ND	43	Spring Creek - Garden Crk Plant	1119	1112	1091	1087	1092	1088	1083	1100	1162	1129	1099	1196	1189	43
ND	610	MDU-Watford City BTU	1178	1153	1140	1155	1174	1197	1211	1197	1197	1145	1175	1216	1202	610
ND	802	Linton	1061	1057	1056	1060	1066	1073	1064	1055	1055	1057	1068	1064	1064	802
ND	903	Hettinger Propane	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	903

**THERMAL ZONE VARIANCE
DOCUMENTATION**

March 2016

<i>ZONE</i>	<i>BTU VARIANCE</i>	<i>REASON</i>
34	-103	Change in Gas Source
43	21	Operational Changes
263	-25	Operational Changes