

August 25, 2016

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

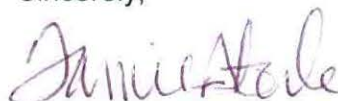
Re: Case No. PU-16-002 (Therm Billing)
Monthly Report – July 2016

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



Tamie Aberle
Director of Regulatory Affairs

Montana-Dakota Utilities Co.
Therm Billing Factors - North Dakota
Aug-16

Town	Heat Zone	Therm Factor
MDU-303-ALEXANDER	025	1.1391
MDU-308-ARNEGARD	025	1.1391
MDU-314-APPLE VALLEY	271	1.1656
MDU-318-BEACH	032	1.0655
MDU-319-BELFIELD	032	1.0734
MDU-323-BERTHOLD	262	1.1410
MDU-327-BISMARCK	028	1.1656
MDU-330-BOWMAN	034	0.9137
MDU-337-BURLINGTON	262	1.1656
MDU-343-CARRINGTON	273	1.1636
MDU-344-CLEVELAND	272	1.1564
MDU-364-CAVALIER	273	1.1882
MDU-365-DAWSON	271	1.1574
MDU-368-DES LACS	262	1.1492
MDU-369-DICKINSON	031	1.0577
MDU-374-FT TOTTEN	273	1.1718
MDU-375-DEVILS LAKE	273	1.1718
MDU-379-BARLOW	273	1.1636
MDU-384-EPPING	264	1.1173
MDU-387-ELDRIDGE	272	1.1646
MDU-407-GLADSTONE	031	1.0577
MDU-411-GLEN ULLIN	031	1.0654
MDU-413-GOLVA	032	1.0499
MDU-416-GARRISON	262	1.1492
MDU-417-GRAFTON	273	1.1964
MDU-429-HEBRON	031	1.0654
MDU-432-HETTINGER	903	2.3875
MDU-449-JAMESTOWN	272	1.1728
MDU-459-KILLDEER	033	1.1192
MDU-463-LANGDON	273	1.1636
MDU-469-LEFOR	031	1.0577
MDU-474-LIGNITE	263	1.0616
MDU-475-LINTON	802	1.0276
MDU-478-LINCOLN	028	1.1656
MDU-488-MCKENZIE	271	1.1656
MDU-494-MEDINA	271	1.1574
MDU-498-MANDAN	028	1.1656
MDU-500-MARMARTH	034	0.9204
MDU-505-MINOT	262	1.1656
MDU-510-MOTT	031	1.0577
MDU-512-MAX	262	1.1410
MDU-522-NEW ENGLAND	031	1.0501
MDU-524-NEW SALEM	028	1.1410
MDU-532-NEW ROCKFORD	273	1.1636
MDU-539-PARK RIVER	273	1.1882
MDU-540-PALERMO	262	1.1410
MDU-558-RAY	264	1.1173
MDU-561-REGENT	031	1.0577
MDU-563-RHAME	034	0.9069

MDU-564-RICHARDTON	031	1.0501
MDU-568-ROSS	261	1.1084
MDU-572-RUTHVILLE	262	1.1656
MDU-574-SANBORN	272	1.1728
MDU-583-SENTINEL BUTTE	032	1.0655
MDU-588-SOUTH HEART	031	1.0501
MDU-717-SPIRITWOOD	272	1.1728
MDU-590-SPRINGBROOK	264	1.1173
MDU-591-STANLEY	261	1.1164
MDU-593-STEELE	271	1.1574
MDU-598-SHEYENNE	273	1.1718
MDU-605-SURREY	262	1.1656
MDU-610-TAPPEN	271	1.1574
MDU-611-TAYLOR	031	1.0501
MDU-616-TIOGA	261	1.1164
MDU-619-TURTLE LAKE	262	1.1492
MDU-620-TRENTON	024	1.1330
MDU-624-UNDERWOOD	262	1.1492
MDU-625-VALLEY CITY	272	1.1810
MDU-629-WALHALLA	273	1.1882
MDU-632-WATFORD CITY	610	1.1202
MDU-636-WHEELOCK	264	1.1093
MDU-637-WHITE EARTH	261	1.1164
MDU-642-WILLISTON	024	1.1330
MDU-646-WASHBURN	262	1.1574
MDU-647-WILTON	262	1.1410
MDU-664-RIVERDALE	262	1.1492
MDU-691-FAIRVIEW	241	1.1387
MDU-712-MINOT AFB	262	1.1656
MDU-718-FAIRMOUNT	600	1.1228
MDU-732-NEKOMA	273	1.1636
MDU-732-MSR SITE	273	1.1636

GQ Source Daily Summary

July 2016

Number: 251

Pressure Base: 14.730

Contract Day: 1

Name: SIDNEY BORDER-MONDAK JNCTN-SIDNEY PLANT

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	0.7348	1178.8	1199.7	1.210	3.990	68.991	21.060	4.299	0.144	0.274	0.017	0.014	0.000	0.000	0.000	0.000	0.000	1399.55	
2	0.7365	1181.8	1202.8	1.218	3.951	68.959	20.859	4.533	0.152	0.292	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1401.53	
3	0.7391	1186.5	1207.5	1.207	3.926	68.501	21.285	4.595	0.153	0.297	0.019	0.017	0.000	0.000	0.000	0.000	0.000	1404.62	
4	0.7377	1184.2	1205.1	1.223	3.915	68.664	21.254	4.462	0.152	0.296	0.019	0.015	0.000	0.000	0.000	0.000	0.000	1403.15	
5	0.7362	1181.9	1202.9	1.221	3.917	68.661	21.521	4.229	0.143	0.275	0.018	0.015	0.000	0.000	0.000	0.000	0.000	1401.92	
6	0.7369	1183.0	1204.0	1.220	3.915	68.575	21.554	4.287	0.142	0.275	0.017	0.014	0.000	0.000	0.000	0.000	0.000	1402.57	
7	0.7377	1184.2	1205.2	1.221	3.918	68.611	21.310	4.495	0.141	0.273	0.017	0.015	0.000	0.000	0.000	0.000	0.000	1403.18	
8	0.7397	1187.4	1208.4	1.216	3.919	68.447	21.260	4.684	0.149	0.288	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1405.01	
9	0.7414	1190.4	1211.5	1.214	3.899	68.351	21.152	4.883	0.159	0.305	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1406.93	
10	0.7376	1184.2	1205.2	1.212	3.920	68.655	21.277	4.455	0.153	0.293	0.018	0.016	0.000	0.000	0.000	0.000	0.000	1403.29	
11	0.7389	1186.8	1207.8	1.206	3.896	68.423	21.514	4.467	0.157	0.303	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1405.10	
12	0.7351	1180.1	1201.0	1.218	3.930	68.918	21.257	4.189	0.155	0.298	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1400.76	
13	0.7389	1186.1	1207.1	1.215	3.923	68.455	21.441	4.451	0.162	0.315	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1404.30	
14	0.7372	1183.8	1204.8	1.217	3.906	68.464	21.740	4.196	0.151	0.292	0.018	0.015	0.000	0.000	0.000	0.000	0.000	1403.15	
15	0.7379	1185.1	1206.1	1.204	3.904	68.417	21.721	4.268	0.154	0.297	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1404.12	
16	0.7370	1183.7	1204.6	1.206	3.910	68.574	21.576	4.242	0.155	0.300	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1403.20	
17	0.7377	1184.8	1205.8	1.202	3.907	68.481	21.619	4.312	0.151	0.292	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1403.94	
18	0.7404	1189.0	1210.0	1.212	3.893	68.353	21.381	4.640	0.164	0.318	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1406.24	
19	0.7456	1197.6	1218.8	1.205	3.867	67.949	21.223	5.179	0.183	0.351	0.023	0.020	0.000	0.000	0.000	0.000	0.000	1411.44	
20	0.7408	1189.3	1210.3	1.209	3.917	68.438	21.083	4.851	0.158	0.305	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1406.19	
21	0.7467	1199.1	1220.3	1.198	3.888	67.891	21.087	5.365	0.184	0.344	0.022	0.019	0.000	0.000	0.000	0.000	0.000	1412.16	
22	0.7449	1195.9	1217.0	1.204	3.904	68.437	20.379	5.469	0.196	0.365	0.024	0.021	0.000	0.000	0.000	0.000	0.000	1410.07	
23	0.7375	1183.9	1204.9	1.213	3.924	68.772	21.075	4.525	0.154	0.300	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1403.06	
24	0.7396	1187.8	1208.8	1.217	3.886	68.490	21.260	4.639	0.159	0.310	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1405.55	
25	0.7399	1187.8	1208.8	1.215	3.911	68.453	21.247	4.674	0.158	0.305	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1405.36	
26	0.7376	1184.4	1205.4	1.217	3.904	68.525	21.551	4.324	0.151	0.293	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1403.50	
27	0.7368	1183.2	1204.2	1.218	3.897	68.546	21.669	4.205	0.147	0.284	0.018	0.015	0.000	0.000	0.000	0.000	0.000	1402.91	
28	0.7380	1185.4	1206.4	1.220	3.876	68.397	21.733	4.310	0.146	0.283	0.018	0.015	0.000	0.000	0.000	0.000	0.000	1404.33	
29	0.7363	1182.0	1202.9	1.219	3.928	68.815	21.214	4.337	0.152	0.298	0.019	0.017	0.000	0.000	0.000	0.000	0.000	1401.82	
30	0.7441	1195.1	1216.2	1.206	3.873	68.080	21.224	5.084	0.165	0.326	0.022	0.019	0.000	0.000	0.000	0.000	0.000	1409.95	
31	0.7409	1189.3	1210.4	1.206	3.929	68.231	21.455	4.693	0.152	0.297	0.020	0.017	0.000	0.000	0.000	0.000	0.000	1406.18	
Avg	0.7390	1187.0	1207.5	1.213	3.911	68.501	21.322	4.559	0.156	0.301	0.019	0.016	0.000	0.000	0.000	0.000	0.000	1404.68	

Zone 211

GQ Source Analysis

GQ Source Number:	0602160	Specific Gravity:	0.7364
GQ Source Name:	FAIRVIEW BORDER	Dry Heat Value:	1202.25
Effective Date:	7/1/2016 9:00:00 AM	Wet Heat Value:	1181.32
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1202.25
Pressure Base:	14.730	Sample Pressure:	170.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	68.673		CO2	Carbon Dioxide	1.232
C2	Ethane	21.092	0.0000	N2	Nitrogen	3.911
C3	Propane	4.579	1.2580	O2	Oxygen	0.012
IC4	Isobutane	0.164	0.0534	He	Helium	
NC4	n-Butane	0.299	0.0940	H2	Hydrogen	
IC5	Isopentane	0.020	0.0074	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.017	0.0063	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% 1.419 GPM

Sample Date: 8/1/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: RR
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 241

GQ Source Analysis

GQ Source Number:	0602225	Specific Gravity:	0.7298
GQ Source Name:	WATFORD CITY WEST BORDER	Dry Heat Value:	1211.05
Effective Date:	7/1/2016 9:00:00 AM	Wet Heat Value:	1189.97
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1211.05
Pressure Base:	14.730	Sample Pressure:	444.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	69.631		CO2	Carbon Dioxide	1.021
C2	Ethane	21.819	5.8179	N2	Nitrogen	3.081
C3	Propane	3.680	1.0110	O2	Oxygen	0.007
IC4	Isobutane	0.215	0.0701	He	Helium	
NC4	n-Butane	0.462	0.1453	H2	Hydrogen	
IC5	Isopentane	0.040	0.0146	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.041	0.0147	Ar	Argon	
C6	Hexanes	0.003	0.0012	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

Totals 100.000% 7.075 GPM

Sample Date: 8/1/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: ES
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 25

GQ Source Analysis

GQ Source Number:	2501030	Specific Gravity:	0.6581
GQ Source Name:	LIGNITE PLANT	Dry Heat Value:	1117.94
Effective Date:	7/1/2016 9:00:00 AM	Wet Heat Value:	1098.49
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1117.94
Pressure Base:	14.730	Sample Pressure:	650.00
Viscosity:		Sample Temperature:	

	<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>	
C1	Methane	80.376		CO2	Carbon Dioxide	0.105
C2	Ethane	14.123	3.7659	N2	Nitrogen	3.325
C3	Propane	1.989	0.5463	O2	Oxygen	0.006
IC4	Isobutane	0.046	0.0149	He	Helium	
NC4	n-Butane	0.026	0.0083	H2	Hydrogen	
IC5	Isopentane	0.000	0.0000	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.000	0.0000	Ar	Argon	
C6	Hexanes	0.003	0.0016	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

Totals 100.000% 4.337 GPM

Sample Date: 8/1/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: ES
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 263

*** End of Report ***

GQ Source Analysis

GQ Source Number:	0702010	Specific Gravity:	0.6976
GQ Source Name:	EPPING BORDER	Dry Heat Value:	1168.73
Effective Date:	7/1/2016 9:00:00 AM	Wet Heat Value:	1148.39
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1168.73
Pressure Base:	14.730	Sample Pressure:	560.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	73.935		CO2	Carbon Dioxide	0.720
C2	Ethane	19.361	5.1626	N2	Nitrogen	3.041
C3	Propane	2.637	0.7245	O2	Oxygen	0.024
IC4	Isobutane	0.084	0.0276	He	Helium	
NC4	n-Butane	0.170	0.0535	H2	Hydrogen	
IC5	Isopentane	0.013	0.0046	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.014	0.0052	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% 5.978 GPM

Sample Date: 8/1/2016 12:00:00 AM
Sample Type: Composite
Sample Tech: ES
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 264

GQ Source Daily Summary

July 2016

Number: 161

Pressure Base: 14.730

Contract Day: 1

Name: NORTH TIOGA TRANSFER-PORTAL

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	0.7060	1155.6	1176.0	0.828	3.294	72.609	20.360	2.620	0.081	0.173	0.016	0.020	0.000	0.000	0.000	0.000	0.000	1399.61	
2	0.7048	1154.7	1175.2	0.787	3.289	72.900	19.987	2.761	0.083	0.166	0.012	0.014	0.000	0.000	0.000	0.000	0.000	1399.85	
3	0.7073	1158.5	1179.0	0.803	3.278	72.695	19.998	2.892	0.093	0.199	0.018	0.023	0.000	0.000	0.000	0.000	0.000	1401.80	
4	0.7067	1158.3	1178.8	0.783	3.259	72.809	19.919	2.902	0.094	0.196	0.017	0.021	0.000	0.000	0.000	0.000	0.000	1402.22	
5	0.7034	1153.5	1173.9	0.769	3.265	73.067	19.945	2.691	0.081	0.158	0.011	0.013	0.000	0.000	0.000	0.000	0.000	1399.68	
6	0.7046	1154.5	1174.9	0.799	3.273	72.966	19.962	2.704	0.084	0.177	0.016	0.019	0.000	0.000	0.000	0.000	0.000	1399.67	
7	0.7040	1153.8	1174.2	0.793	3.265	73.063	19.916	2.661	0.084	0.182	0.016	0.020	0.000	0.000	0.000	0.000	0.000	1399.46	
8	0.7046	1155.1	1175.6	0.773	3.272	72.984	19.911	2.758	0.087	0.182	0.015	0.017	0.000	0.000	0.000	0.000	0.000	1400.46	
9	0.7089	1160.8	1181.3	0.821	3.255	72.501	20.118	2.946	0.102	0.217	0.018	0.023	0.000	0.000	0.000	0.000	0.000	1403.05	
10	0.7053	1156.2	1176.7	0.773	3.271	72.919	19.888	2.852	0.089	0.179	0.013	0.015	0.000	0.000	0.000	0.000	0.000	1401.07	
11	0.7094	1163.0	1183.6	0.753	3.270	72.804	19.546	3.154	0.129	0.280	0.027	0.037	0.000	0.000	0.000	0.000	0.000	1405.20	
12	0.7088	1161.1	1181.7	0.808	3.246	72.624	19.938	2.993	0.112	0.233	0.020	0.025	0.000	0.000	0.000	0.000	0.000	1403.54	
13	0.7073	1158.5	1179.0	0.777	3.310	73.105	19.301	3.055	0.123	0.272	0.025	0.032	0.000	0.000	0.000	0.000	0.000	1401.85	
14	0.7093	1161.7	1182.3	0.792	3.281	72.744	19.673	3.044	0.125	0.280	0.027	0.034	0.000	0.000	0.000	0.000	0.000	1403.74	
15	0.7081	1159.4	1179.9	0.798	3.303	72.774	19.771	2.938	0.112	0.250	0.024	0.031	0.000	0.000	0.000	0.000	0.000	1402.10	
16	0.7033	1151.8	1172.1	0.791	3.323	73.109	19.863	2.633	0.082	0.169	0.014	0.016	0.000	0.000	0.000	0.000	0.000	1397.73	
17	0.7059	1156.1	1176.5	0.788	3.311	72.884	19.875	2.820	0.091	0.191	0.017	0.022	0.000	0.000	0.000	0.000	0.000	1400.34	
18	0.7062	1156.6	1177.1	0.777	3.326	72.845	19.831	2.900	0.094	0.193	0.016	0.019	0.000	0.000	0.000	0.000	0.000	1400.66	
19	0.7075	1158.8	1179.3	0.775	3.315	72.873	19.626	3.039	0.106	0.221	0.020	0.026	0.000	0.000	0.000	0.000	0.000	1402.01	
20	0.7118	1165.5	1186.2	0.779	3.296	72.467	19.698	3.310	0.125	0.268	0.025	0.032	0.000	0.000	0.000	0.000	0.000	1405.95	
21	0.7116	1165.4	1186.0	0.769	3.296	72.657	19.459	3.302	0.136	0.314	0.029	0.037	0.000	0.000	0.000	0.000	0.000	1405.98	
22	0.6847	1132.1	1152.1	0.448	3.300	76.434	17.063	2.517	0.079	0.131	0.012	0.016	0.000	0.000	0.000	0.000	0.000	1392.34	
23	0.6855	1133.0	1153.1	0.449	3.313	76.349	17.026	2.614	0.083	0.142	0.011	0.013	0.000	0.000	0.000	0.000	0.000	1392.70	
24	0.7112	1164.2	1184.8	0.783	3.316	72.434	19.862	3.143	0.125	0.278	0.026	0.032	0.000	0.000	0.000	0.000	0.000	1404.92	
25	0.7140	1165.6	1186.2	0.891	3.331	71.856	20.355	3.160	0.113	0.246	0.021	0.027	0.000	0.000	0.000	0.000	0.000	1403.83	
26	0.7132	1165.4	1186.0	0.827	3.364	71.898	20.446	3.027	0.116	0.265	0.025	0.031	0.000	0.000	0.000	0.000	0.000	1404.40	
27	0.7059	1155.8	1176.2	0.792	3.323	72.878	19.869	2.796	0.097	0.206	0.017	0.021	0.000	0.000	0.000	0.000	0.000	1399.97	
28	0.7048	1154.2	1174.7	0.804	3.296	73.056	19.770	2.748	0.091	0.195	0.018	0.022	0.000	0.000	0.000	0.000	0.000	1399.20	
29	0.7059	1155.8	1176.3	0.806	3.294	72.887	19.904	2.778	0.091	0.198	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1400.10	
30	0.7069	1156.8	1177.3	0.806	3.329	72.634	20.101	2.826	0.086	0.185	0.015	0.018	0.000	0.000	0.000	0.000	0.000	1400.29	
31	0.7092	1160.6	1181.1	0.813	3.305	72.523	20.013	2.968	0.102	0.226	0.022	0.027	0.000	0.000	0.000	0.000	0.000	1402.54	
Avg	0.7060	1157.0	1177.3	0.773	3.296	72.979	19.710	2.889	0.100	0.212	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1401.17	

Zone 265

GQ Source Daily Summary

July 2016

Number: 061

Pressure Base: 14.730

Contract Day: 1

Name: CLEVELAND STATION-GRAFTON BORDER

Temperature Base:

Contract Hour: 9

Day	Relative Density	Heating Value		CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
		Wet	Dry																
1	0.7539	1183.9	1204.9	0.827	6.051	65.982	21.046	5.406	0.198	0.443	0.023	0.023	0.000	0.000	0.000	0.000	0.000	0.000	1387.68
2	0.7549	1186.3	1207.3	0.830	5.999	65.823	21.221	5.423	0.201	0.454	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.52
3	0.7549	1184.8	1205.8	0.831	6.082	65.872	21.041	5.457	0.206	0.463	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1387.85
4	0.7554	1186.8	1207.9	0.830	6.014	65.780	21.182	5.475	0.206	0.465	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.69
5	0.7555	1187.0	1208.0	0.826	6.019	65.774	21.178	5.484	0.206	0.464	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.78
6	0.7553	1186.4	1207.4	0.829	6.032	65.803	21.147	5.477	0.204	0.459	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.27
7	0.7548	1186.1	1207.1	0.826	6.006	65.902	21.083	5.476	0.202	0.456	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.37
8	0.7554	1186.3	1207.3	0.821	6.053	65.843	21.019	5.563	0.203	0.452	0.024	0.023	0.000	0.000	0.000	0.000	0.000	0.000	1389.12
9	0.7541	1183.8	1204.7	0.827	6.084	65.969	20.965	5.459	0.200	0.448	0.024	0.023	0.000	0.000	0.000	0.000	0.000	0.000	1387.27
10	0.7542	1183.7	1204.6	0.828	6.092	65.945	21.000	5.435	0.201	0.451	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1387.13
11	0.7549	1185.0	1206.0	0.823	6.081	65.883	21.010	5.494	0.204	0.456	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.06
12	0.7553	1186.2	1207.2	0.826	6.047	65.840	21.057	5.520	0.204	0.458	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.05
13	0.7564	1188.3	1209.3	0.820	6.032	65.679	21.214	5.525	0.207	0.472	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.47
14	0.7556	1186.2	1207.2	0.823	6.081	65.739	21.168	5.477	0.205	0.459	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.77
15	0.7564	1187.1	1208.1	0.823	6.094	65.597	21.283	5.482	0.206	0.466	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.16
16	0.7556	1185.9	1206.9	0.823	6.094	65.707	21.209	5.451	0.205	0.462	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.47
17	0.7556	1186.1	1207.1	0.826	6.075	65.709	21.227	5.449	0.204	0.460	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.72
18	0.7551	1185.0	1206.0	0.826	6.101	65.801	21.097	5.464	0.203	0.458	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1387.87
19	0.7557	1185.7	1206.7	0.829	6.112	65.739	21.088	5.515	0.205	0.462	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.09
20	0.7597	1185.1	1206.0	0.981	6.009	66.957	20.535	4.915	0.173	0.392	0.020	0.018	0.000	0.000	0.000	0.000	0.000	0.000	1383.73
21	0.7553	1183.9	1204.9	0.830	6.176	65.774	21.049	5.447	0.208	0.468	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1386.43
22	0.7561	1186.0	1207.0	0.826	6.130	65.667	21.166	5.473	0.211	0.476	0.026	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.15
23	0.7560	1186.0	1207.0	0.829	6.121	65.705	21.105	5.506	0.211	0.473	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.15
24	0.7564	1186.0	1207.0	0.831	6.154	65.616	21.163	5.502	0.210	0.472	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1387.81
25	0.7568	1187.0	1208.0	0.828	6.136	65.606	21.139	5.548	0.212	0.479	0.026	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.57
26	0.7569	1187.3	1208.3	0.828	6.127	65.587	21.169	5.545	0.213	0.480	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1388.83
27	0.7560	1185.8	1206.8	0.826	6.136	65.733	21.047	5.520	0.211	0.475	0.026	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1387.92
28	0.7553	1185.3	1206.3	0.821	6.105	65.812	21.052	5.486	0.207	0.466	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.04
29	0.7552	1184.6	1205.5	0.825	6.139	65.838	20.981	5.490	0.208	0.468	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1387.22
30	0.7551	1184.1	1205.0	0.825	6.154	65.872	20.928	5.493	0.208	0.469	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1386.78
31	0.7548	1183.9	1204.9	0.830	6.135	65.939	20.858	5.509	0.209	0.469	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1386.80
Avg	0.7556	1186.0	1206.7	0.831	6.086	65.822	21.078	5.467	0.205	0.461	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.19

Zone 293

GQ Source Daily Summary

July 2016

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		CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
		Wet	Dry																
1	0.7546	1185.7	1206.7	0.822	6.016	65.928	21.089	5.436	0.202	0.459	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.13
2	0.7551	1187.5	1208.5	0.822	5.952	65.889	21.155	5.463	0.204	0.466	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.78
3	0.7557	1186.7	1207.7	0.826	6.057	65.832	21.025	5.523	0.210	0.477	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.23
4	0.7559	1188.2	1209.2	0.822	5.986	65.784	21.166	5.509	0.208	0.475	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.85
5	0.7563	1189.0	1210.0	0.823	5.978	65.715	21.230	5.522	0.208	0.475	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1391.35
6	0.7560	1188.3	1209.3	0.822	5.992	65.758	21.188	5.512	0.205	0.472	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.82
7	0.7559	1188.1	1209.2	0.820	5.990	65.805	21.117	5.550	0.204	0.467	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1390.80
8	0.7559	1187.7	1208.7	0.819	6.026	65.778	21.104	5.559	0.203	0.463	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1390.20
9	0.7550	1185.7	1206.6	0.822	6.056	65.893	21.037	5.479	0.202	0.462	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.71
10	0.7550	1185.8	1206.7	0.821	6.053	65.889	21.047	5.472	0.204	0.465	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1388.80
11	0.7557	1187.1	1208.1	0.820	6.040	65.805	21.095	5.519	0.205	0.468	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1389.70
12	0.7333	1163.9	1184.5	0.823	5.341	69.504	18.975	4.738	0.177	0.401	0.021	0.021	0.000	0.000	0.000	0.000	0.000	0.000	1383.67
13	0.7562	1187.8	1208.8	0.821	6.043	65.702	21.191	5.516	0.207	0.471	0.024	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1390.07
14	0.7573	1189.6	1210.7	0.818	6.039	65.503	21.380	5.527	0.208	0.476	0.025	0.024	0.000	0.000	0.000	0.000	0.000	0.000	1391.18
15	0.7571	1189.0	1210.1	0.820	6.051	65.540	21.341	5.511	0.208	0.478	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.71
16	0.7560	1187.3	1208.3	0.821	6.055	65.702	21.219	5.475	0.206	0.472	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.67
17	0.7562	1187.8	1208.8	0.822	6.044	65.692	21.215	5.498	0.206	0.473	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.04
18	0.7560	1187.1	1208.1	0.822	6.066	65.750	21.113	5.520	0.206	0.473	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.43
19	0.7563	1187.0	1208.0	0.821	6.100	65.741	21.044	5.561	0.207	0.475	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.02
20	0.7552	1184.9	1205.9	0.820	6.119	65.871	20.987	5.473	0.206	0.473	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1387.69
21	0.7559	1186.4	1207.4	0.821	6.096	65.770	21.083	5.487	0.211	0.483	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.78
22	0.7572	1188.1	1209.1	0.819	6.121	65.579	21.188	5.535	0.214	0.492	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1389.48
23	0.7571	1188.8	1209.8	0.821	6.060	65.587	21.257	5.529	0.212	0.484	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1390.47
24	0.7571	1188.2	1209.3	0.819	6.100	65.590	21.208	5.535	0.212	0.486	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1389.79
25	0.7576	1188.9	1210.0	0.820	6.106	65.583	21.118	5.608	0.216	0.496	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1390.10
26	0.7573	1188.6	1209.7	0.820	6.095	65.585	21.182	5.563	0.214	0.490	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1390.04
27	0.7565	1187.4	1208.4	0.822	6.091	65.708	21.101	5.530	0.212	0.485	0.026	0.026	0.000	0.000	0.000	0.000	0.000	0.000	1389.33
28	0.7562	1187.3	1208.3	0.819	6.078	65.727	21.118	5.518	0.209	0.479	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.45
29	0.7558	1186.2	1207.2	0.818	6.109	65.816	20.988	5.527	0.210	0.481	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.52
30	0.7554	1185.6	1206.6	0.818	6.095	65.922	20.889	5.537	0.210	0.480	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.37
31	0.7556	1185.8	1206.8	0.821	6.098	65.900	20.891	5.543	0.212	0.483	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1388.40
Avg	0.7554	1187.0	1207.6	0.821	6.034	65.866	21.056	5.493	0.207	0.474	0.025	0.025	0.000	0.000	0.000	0.000	0.000	0.000	1389.50

Zone 28

GQ Source Daily Summary

July 2016

Number: 111

Pressure Base: 14.730

Contract Day: 1

Name: LITTLE KNIFE PLANT-BELFIELD TRANSFER

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	0.6889	1162.3	1182.9	0.003	2.539	73.104	23.426	0.907	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.20	
2	0.6890	1162.6	1183.2	0.002	2.539	73.104	23.403	0.927	0.009	0.015	0.001	0.001	0.000	0.000	0.000	0.000	0.000	1425.37	
3	0.6894	1163.3	1183.9	0.002	2.532	73.048	23.431	0.965	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.84	
4	0.6880	1161.0	1181.6	0.001	2.544	73.221	23.348	0.869	0.007	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.47	
5	0.6876	1160.5	1181.1	0.001	2.536	73.249	23.385	0.813	0.007	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.28	
6	0.6879	1160.9	1181.4	0.001	2.536	73.208	23.417	0.820	0.007	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.48	
7	0.6886	1162.2	1182.8	0.001	2.529	73.052	23.582	0.817	0.007	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.29	
8	0.6895	1163.5	1184.1	0.003	2.528	72.982	23.548	0.920	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.98	
9	0.6900	1163.9	1184.5	0.003	2.546	72.980	23.433	1.017	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.98	
10	0.6895	1163.4	1184.0	0.004	2.532	72.988	23.523	0.935	0.008	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.88	
11	0.6889	1162.3	1182.9	0.003	2.538	73.094	23.453	0.884	0.010	0.017	0.001	0.001	0.000	0.000	0.000	0.000	0.000	1425.22	
12	0.6880	1161.0	1181.6	0.015	2.513	73.230	23.401	0.817	0.009	0.012	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1424.58	
13	0.6888	1162.6	1183.2	0.001	2.516	73.023	23.627	0.816	0.007	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.67	
14	0.6889	1162.4	1183.0	0.004	2.532	73.077	23.477	0.890	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.34	
15	0.6900	1164.1	1184.7	0.004	2.532	72.934	23.541	0.971	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.25	
16	0.6894	1163.4	1184.0	0.003	2.523	72.984	23.568	0.902	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.00	
17	0.6895	1163.3	1183.9	0.002	2.541	72.938	23.616	0.885	0.007	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.75	
18	0.6897	1163.4	1184.1	0.003	2.550	72.950	23.541	0.937	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.72	
19	0.6906	1164.8	1185.4	0.003	2.549	72.851	23.565	1.012	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.47	
20	0.6932	1169.0	1189.7	0.003	2.530	72.625	23.519	1.295	0.011	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1429.00	
21	0.6927	1168.1	1188.8	0.003	2.544	72.693	23.470	1.260	0.012	0.018	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1428.32	
22	0.6905	1165.0	1185.6	0.003	2.533	72.869	23.561	1.011	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.76	
23	0.6893	1163.0	1183.5	0.003	2.544	72.977	23.572	0.884	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.51	
24	0.6896	1163.1	1183.7	0.004	2.561	72.955	23.533	0.927	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.39	
25	0.6907	1164.9	1185.5	0.006	2.551	72.809	23.619	0.997	0.008	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.46	
26	0.6903	1164.4	1185.0	0.006	2.544	72.894	23.532	1.005	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.27	
27	0.6888	1161.9	1182.5	0.007	2.551	73.112	23.410	0.900	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.79	
28	0.6886	1161.7	1182.3	0.007	2.546	73.131	23.412	0.884	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.71	
29	0.6894	1162.8	1183.4	0.004	2.559	73.022	23.469	0.914	0.010	0.018	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1425.24	
30	0.6889	1162.1	1182.7	0.004	2.556	73.081	23.428	0.913	0.007	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.91	
31	0.6897	1163.3	1183.9	0.004	2.555	73.022	23.392	1.004	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.57	
Avg	0.6895	1163.0	1183.8	0.004	2.540	73.007	23.490	0.939	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.70	

Zone 33

GQ Source Analysis

GQ Source Number:	1202160	Specific Gravity:	0.5840
GQ Source Name:	BOWMAN BORDER	Dry Heat Value:	996.12
Effective Date:	6/1/2016 9:00:00 AM	Wet Heat Value:	978.78
Effective End Date:	1/18/2038 9:14:00 PM	As Deliv. Heat Value:	996.12
Pressure Base:	14.730	Sample Pressure:	380.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	94.019		CO2	Carbon Dioxide	0.232
C2	Ethane	1.995	0.5321	N2	Nitrogen	3.460
C3	Propane	0.226	0.0621	O2	Oxygen	0.020
IC4	Isobutane	0.020	0.0066	He	Helium	
NC4	n-Butane	0.022	0.0068	H2	Hydrogen	
IC5	Isopentane	0.003	0.0010	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.002	0.0007	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%		0.609 GPM	

Sample Date: 7/1/2016 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

July 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	CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
1	0.6495	1063.4	1082.3	1.068	3.236	82.090	12.705	0.852	0.018	0.031	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1342.90	
2	0.6503	1063.2	1082.1	1.082	3.307	81.952	12.731	0.873	0.020	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1341.78	
3	0.6559	1073.8	1092.9	1.073	3.197	80.938	13.760	0.970	0.023	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.42	
4	0.6460	1057.0	1075.7	1.069	3.300	82.823	11.881	0.876	0.019	0.032	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1338.32	
5	0.6458	1057.4	1076.1	1.084	3.231	82.833	11.980	0.826	0.017	0.029	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1339.12	
6	0.6472	1057.8	1076.5	1.083	3.344	82.541	12.147	0.832	0.019	0.033	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1338.08	
7	0.6394	1045.9	1064.4	1.061	3.361	84.042	10.726	0.769	0.015	0.026	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1331.18	
8	0.6557	1073.0	1092.0	1.077	3.223	81.009	13.633	0.993	0.023	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1348.51	
9	0.6567	1075.2	1094.2	1.071	3.192	80.858	13.765	1.047	0.024	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1350.25	
10	0.6561	1073.4	1092.4	1.074	3.237	80.912	13.734	0.980	0.023	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1348.68	
11	0.6576	1072.5	1091.5	1.107	3.380	80.632	13.837	0.977	0.024	0.042	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1346.10	
12	0.6564	1074.5	1093.5	1.066	3.218	80.787	13.931	0.938	0.022	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.67	
13	0.6574	1076.1	1095.1	1.067	3.210	80.672	13.976	1.009	0.024	0.042	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1350.67	
14	0.6608	1080.3	1099.4	1.059	3.287	80.066	14.402	1.110	0.027	0.048	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1352.47	
15	0.6519	1067.2	1086.1	1.053	3.255	81.709	12.962	0.958	0.022	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1345.17	
16	0.6492	1063.7	1082.5	1.037	3.242	82.216	12.517	0.927	0.022	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1343.49	
17	0.6623	1085.1	1104.3	1.052	3.146	79.805	14.788	1.131	0.028	0.049	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1356.89	
18	0.6630	1086.5	1105.7	1.051	3.125	79.588	15.108	1.052	0.027	0.048	0.001	0.000	0.000	0.000	0.000	0.000	0.000	1357.98	
19	0.6514	1065.8	1084.6	1.075	3.264	81.775	12.925	0.900	0.022	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1343.85	
20	0.6557	1073.5	1092.5	1.047	3.244	80.983	13.651	1.006	0.025	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1349.09	
21	0.6529	1068.9	1087.8	1.077	3.206	81.500	13.241	0.917	0.021	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1346.31	
22	0.6479	1060.5	1079.3	1.065	3.267	82.479	12.229	0.900	0.022	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1340.89	
23	0.6452	1054.7	1073.4	1.100	3.308	83.005	11.687	0.844	0.020	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1336.40	
24	0.6533	1069.0	1088.0	1.079	3.234	81.450	13.228	0.947	0.022	0.040	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1346.05	
25	0.6540	1069.8	1088.8	1.077	3.255	81.304	13.349	0.949	0.023	0.041	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1346.30	
26	0.6591	1078.5	1097.6	1.058	3.234	80.355	14.241	1.043	0.024	0.044	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1351.97	
27	0.6556	1072.7	1091.7	1.068	3.244	81.032	13.583	1.012	0.022	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1348.29	
28	0.6566	1074.1	1093.1	1.067	3.256	80.825	13.773	1.021	0.021	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1348.98	
29	0.6586	1078.1	1097.2	1.064	3.209	80.428	14.200	1.042	0.021	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1351.92	
30	0.6586	1076.6	1095.6	1.060	3.303	80.394	14.169	1.019	0.020	0.035	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1350.08	
31	0.6588	1077.1	1096.1	1.065	3.283	80.397	14.153	1.045	0.021	0.037	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1350.50	
Avg	0.6538	1070.0	1088.8	1.069	3.252	81.336	13.323	0.960	0.022	0.039	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1346.49	

Zone 43

Jul-16

ZONE 610

Watford City		Effective 2-3-16 01325 Watford City West Border			01312 Watford City East Border			Weighted	
Begin Date	End Date	MCF	DK	BTU Zone 25	MCF	DK	BTU Zone 43	AVG BTU	
7/1/2016	7/2/2016	33	40	1.211	7	7	1.082	1.188	7/1/2016
7/2/2016	7/3/2016	9	11	1.211	0	0	1.082	1.211	7/2/2016
7/3/2016	7/4/2016	9	11	1.211	7	7	1.093	1.159	7/3/2016
7/4/2016	7/5/2016	11	13	1.211	4	5	1.076	1.175	7/4/2016
7/5/2016	7/6/2016	52	63	1.211	1	1	1.076	1.208	7/5/2016
7/6/2016	7/7/2016	61	74	1.211	1	1	1.077	1.209	7/6/2016
7/7/2016	7/8/2016	56	68	1.211	41	44	1.064	1.149	7/7/2016
7/8/2016	7/9/2016	30	36	1.211	0	0	1.092	1.211	7/8/2016
7/9/2016	7/10/2016	17	20	1.211	0	0	1.094	1.211	7/9/2016
7/10/2016	7/11/2016	41	49	1.211	0	0	1.092	1.211	7/10/2016
7/11/2016	7/12/2016	97	117	1.211	1	1	1.092	1.210	7/11/2016
7/12/2016	7/13/2016	100	121	1.211	1	1	1.094	1.210	7/12/2016
7/13/2016	7/14/2016	83	101	1.211	1	1	1.095	1.210	7/13/2016
7/14/2016	7/15/2016	78	94	1.211	2	2	1.099	1.208	7/14/2016
7/15/2016	7/16/2016	45	55	1.211	11	12	1.086	1.186	7/15/2016
7/16/2016	7/17/2016	54	66	1.211	1	1	1.083	1.209	7/16/2016
7/17/2016	7/18/2016	51	61	1.211	1	1	1.104	1.209	7/17/2016
7/18/2016	7/19/2016	72	87	1.211	1	1	1.106	1.210	7/18/2016
7/19/2016	7/20/2016	63	76	1.211	1	1	1.085	1.209	7/19/2016
7/20/2016	7/21/2016	53	64	1.211	1	1	1.093	1.209	7/20/2016
7/21/2016	7/22/2016	59	71	1.211	1	1	1.088	1.209	7/21/2016
7/22/2016	7/23/2016	72	88	1.211	3	3	1.079	1.206	7/22/2016
7/23/2016	7/24/2016	68	83	1.211	1	1	1.073	1.209	7/23/2016
7/24/2016	7/25/2016	39	47	1.211	1	1	1.088	1.208	7/24/2016
7/25/2016	7/26/2016	55	66	1.211	1	1	1.089	1.209	7/25/2016
7/26/2016	7/27/2016	75	91	1.211	1	1	1.098	1.210	7/26/2016
7/27/2016	7/28/2016	73	89	1.211	1	1	1.092	1.209	7/27/2016
7/28/2016	7/29/2016	61	74	1.211	1	2	1.093	1.209	7/28/2016
7/29/2016	7/30/2016	34	42	1.211	1	1	1.097	1.208	7/29/2016
7/30/2016	7/31/2016	27	32	1.211	1	1	1.096	1.207	7/30/2016
7/31/2016	8/1/2016	24	29	1.211	1	1	1.096	1.206	7/31/2016
		1,602	1,939		95	101	1.0888	1.2029	

ROW ID	LOCATION DESCRIPTION	GROSS HEATING VALUE (BTU/CF)	SPECIFIC GRAVITY	WOBBE (cal)	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	ChangeinTimestamp	NOTES
11587	GLEN ULLIN	1049.3	0.6037	1350.5	-78.9	1.2646	0.8258	90.7381	6.5764	0.4116	0.0153	0.01	0.0005	0.0006	0	0	0.1423	0.0172	6/30/2016	7/1/2016	7/1/2016 2:51:37 PM	
11587	GLEN ULLIN	1051.1	0.6048	1351.5	-76.6	1.2813	0.8114	90.5742	6.6665	0.4571	0.0227	0.0162	0.002	0.0026	0	0.0002	0.1497	0.0159	7/1/2016	7/2/2016	7/2/2016 2:50:52 PM	
11587	GLEN ULLIN	1058.9	0.6099	1355.8	-56.9	1.2592	0.8382	89.8744	7.1288	0.6292	0.051	0.0392	0.0067	0.0087	0	0.004	0.146	0.0159	7/2/2016	7/3/2016	7/3/2016 2:52:53 PM	
11587	GLEN ULLIN	1058.5	0.6102	1355.1	-66.9	1.2936	0.8416	89.7441	7.3564	0.562	0.0368	0.0274	0.0037	0.0052	0	0.0017	0.1108	0.0159	7/3/2016	7/4/2016	7/4/2016 2:52:20 PM	
11587	GLEN ULLIN	1057.1	0.6091	1354.5	-71.1	1.2847	0.8362	89.8476	7.2749	0.5309	0.0326	0.0245	0.003	0.0044	0	0.0007	0.1429	0.016	7/4/2016	7/5/2016	7/5/2016 2:54:09 PM	
11587	GLEN ULLIN	1055.2	0.6077	1353.6	-72.3	1.2627	0.8469	90.1162	7.0498	0.5136	0.0301	0.0225	0.0027	0.0039	0	0.0009	0.1355	0.0165	7/5/2016	7/6/2016	7/6/2016 2:56:14 PM	
11587	GLEN ULLIN	1054	0.607	1352.8	-69.5	1.2611	0.846	90.3355	6.8167	0.5299	0.0341	0.0262	0.0036	0.0049	0	0.0016	0.124	0.0165	7/6/2016	7/7/2016	7/7/2016 2:55:47 PM	
11587	GLEN ULLIN	1047.9	0.603	1349.4	-79.1	1.2916	0.8197	90.9643	6.3195	0.4353	0.0188	0.0134	0.0012	0.0018	0	0	0.1172	0.0171	7/7/2016	7/8/2016	7/8/2016 2:53:12 PM	
11587	GLEN ULLIN	1048.4	0.6033	1349.8	-78.3	1.2996	0.8162	90.8698	6.3567	0.4601	0.021	0.0146	0.0013	0.0019	0	0.0001	0.142	0.0167	7/8/2016	7/9/2016	7/9/2016 2:52:41 PM	
11587	GLEN ULLIN	1048.1	0.6034	1349.3	-77.8	1.3136	0.8249	90.8944	6.312	0.4614	0.0237	0.0171	0.0018	0.0026	0	0.0002	0.1309	0.0167	7/9/2016	7/10/2016	7/10/2016 2:53:02 PM	
11587	GLEN ULLIN	1048.2	0.6035	1349.3	-78.6	1.3273	0.8194	90.8176	6.3943	0.4557	0.0191	0.0123	0.0007	0.0012	0	0	0.1367	0.0167	7/10/2016	7/11/2016	7/11/2016 2:53:23 PM	
11587	GLEN ULLIN	1048.2	0.6036	1349.2	-78.6	1.3093	0.8329	90.7869	6.4381	0.4357	0.0189	0.0126	0.0009	0.0014	0	0	0.1457	0.0163	7/11/2016	7/12/2016	7/12/2016 2:54:37 PM	
11587	GLEN ULLIN	1050.1	0.6047	1350.4	-76.9	1.3089	0.8242	90.657	6.5681	0.4632	0.0224	0.0154	0.0014	0.002	0	0.0003	0.1182	0.0186	7/12/2016	7/13/2016	7/13/2016 2:55:16 PM	
11587	GLEN ULLIN	1051.7	0.6056	1351.5	-72.5	1.3441	0.7987	90.4079	6.6368	0.5372	0.0327	0.0242	0.003	0.0043	0	0.001	0.1913	0.018	7/13/2016	7/14/2016	7/14/2016 2:58:04 PM	
11587	GLEN ULLIN	1051.3	0.6055	1351	-76.4	1.3327	0.8172	90.4693	6.7131	0.479	0.0234	0.0158	0.0014	0.002	0	0.0001	0.1273	0.018	7/14/2016	7/15/2016	7/15/2016 2:55:52 PM	
11587	GLEN ULLIN	1057.2	0.6098	1353.8	-67.9	1.3355	0.8432	89.9737	7.1283	0.5779	0.0396	0.0298	0.0041	0.0056	0	0.0014	0.0447	0.018	7/15/2016	7/16/2016	7/16/2016 2:54:54 PM	
11587	GLEN ULLIN	1054.1	0.6078	1352	-75	1.3528	0.8334	90.2557	6.9954	0.4932	0.0233	0.0159	0.0013	0.002	0	0.0001	0.0126	0.0185	7/16/2016	7/17/2016	7/17/2016 2:55:31 PM	
11587	GLEN ULLIN	1055.9	0.609	1353	-74.3	1.3358	0.8462	90.0181	7.2446	0.4888	0.0214	0.0144	0.001	0.0015	0	0	0.0126	0.0191	7/17/2016	7/18/2016	7/18/2016 2:43:45 PM	
11587	GLEN ULLIN	1056	0.6089	1353.2	-74.7	1.3313	0.8417	90.0258	7.2761	0.47	0.0197	0.0127	0.0005	0.0012	0	0	0.0123	0.012	7/18/2016	7/19/2016	7/19/2016 2:44:34 PM	
11587	GLEN ULLIN	1054.6	0.6082	1352.3	-74.2	1.3487	0.8344	90.1986	7.0524	0.4924	0.0243	0.0171	0.0015	0.0023	0	0.0004	0.0119	0.0193	7/19/2016	7/20/2016	7/20/2016 2:47:55 PM	
11587	GLEN ULLIN	1062.8	0.6131	1357.3	-55.3	1.342	0.8206	89.5633	7.4051	0.7167	0.0572	0.0448	0.0066	0.0091	0	0.004	0.0103	0.0209	7/20/2016	7/21/2016	7/21/2016 2:45:41 PM	
11587	GLEN ULLIN	1053.7	0.6074	1352	-75.5	1.377	0.8065	90.2838	6.9949	0.4659	0.0226	0.0155	0.0017	0.0021	0	0	0.0084	0.0211	7/21/2016	7/22/2016	7/22/2016 2:44:37 PM	
11587	GLEN ULLIN	1051.4	0.6058	1350.8	-77.7	1.3877	0.7913	90.5382	6.7837	0.4453	0.0149	0.0095	0.0003	0.0005	0	0	0.0086	0.0207	7/22/2016	7/23/2016	7/23/2016 2:46:44 PM	
11587	GLEN ULLIN	1054	0.6073	1352.5	-74	1.3639	0.7976	90.3442	6.9169	0.4971	0.0264	0.0188	0.0018	0.0028	0	0.0009	0.0087	0.0215	7/23/2016	7/24/2016	7/24/2016 2:44:53 PM	
11587	GLEN ULLIN	1052.9	0.6067	1351.8	-74.8	1.3737	0.7954	90.4816	6.755	0.5147	0.0275	0.0181	0.002	0.0028	0	0.0003	0.0087	0.0215	7/24/2016	7/25/2016	7/25/2016 2:45:58 PM	
11587	GLEN ULLIN	1051.1	0.6059	1350.4	-76.4	1.4261	0.7818	90.5965	6.6135	0.5111	0.0244	0.014	0.0014	0.0016	0	0	0.0082	0.0212	7/25/2016	7/26/2016	7/26/2016 2:46:58 PM	
11587	GLEN ULLIN	1057.3	0.6102	1353.5	-71.1	1.459	0.7793	89.8305	7.2623	0.5815	0.0311	0.0199	0.0026	0.0033	0	0.0007	0.0082	0.0223	7/26/2016	7/27/2016	7/27/2016 2:45:39 PM	
11587	GLEN ULLIN	1059.7	0.6113	1353.3	-66.9	1.3926	0.8008	89.7171	7.355	0.6294	0.0393	0.0275	0.0039	0.0052	0	0.0014	0.0082	0.0225	7/27/2016	7/28/2016	7/28/2016 2:46:05 PM	
11587	GLEN ULLIN	1058.4	0.6104	1354.7	-71.6	1.3739	0.8075	89.8138	7.3449	0.5766	0.0296	0.0196	0.0025	0.0033	0	0.0001	0.0082	0.0225	7/28/2016	7/29/2016	7/29/2016 2:45:27 PM	
11587	GLEN ULLIN	1055.3	0.6086	1352.8	-74.4	1.3737	0.8152	90.094	7.1354	0.5144	0.0208	0.0137	0.0012	0.0016	0	0.0001	0.0082	0.0225	7/29/2016	7/30/2016	7/30/2016 2:44:58 PM	
11587	GLEN ULLIN	1065.1	0.6147	1358.5	-58.3	1.3228	0.8435	89.1997	7.8101	0.6958	0.0471	0.0355	0.0057	0.0075	0	0.0033	0.0082	0.0225	7/30/2016	7/31/2016	7/31/2016 2:46:36 PM	
11587	GLEN ULLIN	1066.6	0.6154	1359.6	-55.9	1.2921	0.8467	89.1024	7.9045	0.7193	0.0501	0.0379	0.0062	0.0082	0	0.0037	0.0082	0.0225	7/31/2016	8/1/2016	8/1/2016 2:48:40 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	JULY 16	JUNE 16	MAY 16	APR 16	MAR 16	FEB 16	JAN 16	DEC 15	NOV 15	OCT 15	SEPT 15	AUG 15	ZONE
MT/ND	211	Sidney Area	1203	1208	1206	1205	1207	1213	1209	1207	1204	1195	1188	1193	1196	211
ND	24	Williston Area	1188	1197	1191	1182	1196	1194	1195	1195	1199	1183	1177	1166	1179	24
ND	25	Watford City Border	1211	1211	1206	1209	1211	1211	1213	1216	1216	1223	1216	1198	1198	25
ND/MT	241	Fairview Area	1195	1202	1197	1202	1207	1201	1201	1199	1199	1184	1182	1177	1188	241
ND	261	Williston - Tioga - Minot Line	1088	1206	1182	1179	1186	1048	1035	1052	1066	1047	1000	1042	1015	261
ND	262	Minot Area	1198	1208	1208	1208	1206	1189	1190	1189	1188	1192	1198	1201	1201	262
ND	263	Tioga - Portal	1091	1118	1116	947	1105	1082	1107	1092	1082	1112	1112	1104	1117	263
ND	264	Williston - Ray	1175	1169	1183	1184	1190	1189	1181	1183	1180	1178	1162	1154	1146	264
ND	265	North Tioga Transfer - Portal	1184	1177	1170	1173	1190	1186	1187	1190	1188	1189	1180	1188	1188	265
ND	271	Bismarck - Cleveland	1195	1208	1208	1208	1206	1186	1181	1172	1181	1192	1199	1203	1199	271
ND	272	Cleveland - Mapleton	1194	1207	1207	1206	1204	1185	1180	1171	1180	1191	1197	1202	1199	272
ND	273	Cleveland - Grafton	1194	1207	1206	1206	1201	1185	1179	1171	1180	1190	1197	1203	1199	273
ND	28	Bismarck - Cabin Creek	1177	1208	1208	1202	1190	1154	1142	1131	1137	1148	1196	1203	1200	28
ND	31	Dickinson Area	1136	1124	1128	1117	1114	1144	1139	1130	1136	1135	1161	1161	1145	31
ND	311	Taylor Take-Off - Glen Ullin Comp	1163	0	0	0	0	0	0	0	0	1147	1179	1168	1158	311
ND/MT	32	Cabin Creek - Dickinson	1136	1157	1153	1137	1129	1121	1125	1117	1117	1111	1120	1176	1173	32
ND	33	Killdeer	1185	1184	1185	1184	1181	1181	1183	1182	1186	1185	1186	1186	1191	33
ND	34	Bowman Area	1049	996	996	980	982	979	1082	1103	1121	1102	1084	1025	1133	34
ND	43	Spring Creek - Garden Crk Plant	1103	1089	1087	1102	1143	1112	1091	1087	1092	1088	1083	1100	1162	43
ND	610	MDU-Watford City BTU	1181	1203	1186	1184	1174	1153	1140	1155	1174	1197	1211	1197	1197	610
ND	802	Linton	1061	1054	1065	1062	1062	1057	1056	1060	1066	1073	1064	1055	1055	802
ND	903	Hettinger Propane	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	2549	903

**THERMAL ZONE VARIANCE
DOCUMENTATION**

July 2016

ZONE	<i>BTU VARIANCE</i>	<i>REASON</i>
261	24	Operational Changes