



MONTANA-DAKOTA

UTILITIES CO.

A Division of MDU Resources Group, Inc.

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

November 14, 2014

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

Re: Case No. 11,006 (Therm Billing)
Monthly Report – September 2014

Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., herewith submits the following information, pursuant to the Ordering paragraphs one and two of the Order issued in the above-referenced docket, dated October 20, 1987 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 October 2014.
2. Attachment B consists of copies of the monthly Heating Value Test Reports received from our supplier for the month of September 2014. There is a report for each of the 18 thermal zones for the month.
3. Attachment C is a listing which states the type of measuring device in place at each zone.
4. Attachment D is a monthly list of the heating value data, by zone, for the most recent 12-month period and an average thereof. It is being provided pursuant to a Staff request.
5. Attachment E provides a brief explanation of the thermal variances, where applicable, for the month of September 2014.

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
October 2014

Town	Heat Zone	Therm Factor
MDU-303-ALEXANDER	025	1.1381
MDU-308-ARNEGARD	025	1.1495
MDU-314-APPLE VALLEY	271	1.1067
MDU-318-BEACH	032	1.0757
MDU-319-BELFIELD	032	1.0836
MDU-323-BERTHOLD	262	1.0862
MDU-327-BISMARCK	028	1.0989
MDU-330-BOWMAN	034	1.0348
MDU-337-BURLINGTON	262	1.1096
MDU-343-CARRINGTON	273	1.1057
MDU-344-CLEVELAND	272	1.0980
MDU-364-CAVALIER	273	1.1291
MDU-365-DAWSON	271	1.0989
MDU-368-DES LACS	262	1.0940
MDU-369-DICKINSON	031	1.0971
MDU-374-FT TOTTEN	273	1.1135
MDU-375-DEVILS LAKE	273	1.1135
MDU-379-BARLOW	273	1.1057
MDU-384-EPPING	264	1.1230
MDU-387-ELDRIDGE	272	1.1057
MDU-407-GLADSTONE	031	1.0971
MDU-411-GLEN ULLIN	311	1.0673
MDU-413-GOLVA	032	1.0599
MDU-416-GARRISON	262	1.0940
MDU-417-GRAFTON	273	1.1369
MDU-429-HEBRON	311	1.0673
MDU-432-HETTINGER	903	2.3875
MDU-449-JAMESTOWN	272	1.1135
MDU-459-KILLDEER	033	1.1164
MDU-463-LANGDON	273	1.1057
MDU-469-LEFOR	031	1.0971
MDU-474-LIGNITE	263	1.0493
MDU-475-LINTON	802	1.0170
MDU-478-LINCOLN	028	1.1067
MDU-494-MEDINA	271	1.0989
MDU-498-MANDAN	028	1.1067
MDU-500-MARMARTH	034	1.0424
MDU-505-MINOT	262	1.1096
MDU-510-MOTT	031	1.0971
MDU-512-MAX	262	1.1096
MDU-522-NEW ENGLAND	031	1.0892
MDU-524-NEW SALEM	028	1.1067
MDU-532-NEW ROCKFORD	273	1.1057
MDU-539-PARK RIVER	273	1.1291
MDU-540-PALERMO	262	1.0862
MDU-558-RAY	264	1.1230
MDU-561-REGENT	031	1.0971
MDU-563-RHAME	034	1.0271
MDU-564-RICHARDTON	311	1.0519

MDU-568-ROSS	261	0.9630
MDU-572-RUTHVILLE	262	1.1096
MDU-574-SANBORN	272	1.1135
MDU-583-SENTINEL BUTTE	032	1.0757
MDU-588-SOUTH HEART	031	1.0892
MDU-717-SPIRITWOOD	272	1.1135
MDU-590-SPRINGBROOK	264	1.1230
MDU-591-STANLEY	261	0.9700
MDU-593-STEELE	271	1.0989
MDU-598-SHEYENNE	273	1.1135
MDU-605-SURREY	262	1.1096
MDU-610-TAPPEN	271	1.0989
MDU-611-TAYLOR	031	1.0892
MDU-616-TIOGA	261	0.9700
MDU-619-TURTLE LAKE	262	1.0940
MDU-620-TRENTON	024	1.1311
MDU-624-UNDERWOOD	262	1.0940
MDU-625-VALLEY CITY	272	1.1213
MDU-629-WALHALLA	273	1.1291
MDU-632-WATFORD CITY	610	1.1428
MDU-636-WHEELOCK	264	1.1149
MDU-637-WHITE EARTH	261	0.9700
MDU-642-WILLISTON	024	1.1311
MDU-646-WASHBURN	262	1.1018
MDU-647-WILTON	262	1.0862
MDU-664-RIVERDALE	262	1.0940
MDU-691-FAIRVIEW	241	1.1463
MDU-712-MINOT AFB	262	1.1096
MDU-732-MSR SITE	273	1.1057

GQ Source Daily Summary

September 2014

Number: 372

Pressure Base: 14.730

Contract Day: 1

Name: NESSON PLANT-CHARBONNEAU STATION

Temperature Base:

Contract Hour: 9

Day	Relative Density	Heating Value Wet	Heating Value Dry	CO2	N2	C1	C2	C3	IC4	NC4	IC5	NC5	C6	C7	C8	C9	C10	Wobbe	CCT
1	0.7075	1165.0	1185.6	0.853	2.826	72.089	21.696	2.193	0.090	0.211	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1409.53	
2	0.7074	1163.0	1183.6	0.823	2.984	72.423	20.913	2.480	0.097	0.232	0.021	0.026	0.000	0.000	0.000	0.000	0.000	1407.16	
3	0.7088	1164.3	1184.9	0.820	3.033	72.207	21.100	2.430	0.102	0.250	0.026	0.033	0.000	0.000	0.000	0.000	0.000	1407.44	
4	0.7055	1164.5	1185.1	0.879	2.628	72.351	21.809	2.008	0.085	0.198	0.018	0.023	0.000	0.000	0.000	0.000	0.000	1410.94	
5	0.7083	1163.7	1184.3	0.825	3.014	72.233	21.104	2.448	0.096	0.231	0.022	0.027	0.000	0.000	0.000	0.000	0.000	1407.22	
6	0.7106	1167.2	1187.9	0.845	2.991	71.849	21.461	2.456	0.100	0.243	0.024	0.031	0.000	0.000	0.000	0.000	0.000	1409.12	
7	0.7102	1166.2	1186.8	0.832	3.034	72.063	21.066	2.603	0.101	0.246	0.024	0.031	0.000	0.000	0.000	0.000	0.000	1408.30	
8	0.7095	1165.9	1186.5	0.839	2.981	71.900	21.530	2.385	0.094	0.225	0.020	0.025	0.000	0.000	0.000	0.000	0.000	1408.59	
9	0.7099	1166.4	1187.0	0.857	2.952	71.990	21.375	2.428	0.100	0.244	0.024	0.030	0.000	0.000	0.000	0.000	0.000	1408.88	
10	0.7106	1167.0	1187.7	0.831	3.025	71.790	21.545	2.401	0.103	0.251	0.024	0.030	0.000	0.000	0.000	0.000	0.000	1408.89	
11	0.7102	1167.7	1188.4	0.852	2.908	72.008	21.348	2.476	0.103	0.249	0.024	0.031	0.000	0.000	0.000	0.000	0.000	1410.15	
12	0.6950	1149.8	1170.2	0.786	2.682	73.656	21.093	1.581	0.058	0.125	0.009	0.010	0.000	0.000	0.000	0.000	0.000	1403.55	
13	0.7104	1167.6	1188.3	0.852	2.938	71.789	21.618	2.436	0.096	0.226	0.020	0.024	0.000	0.000	0.000	0.000	0.000	1409.79	
14	0.7117	1170.1	1190.8	0.848	2.909	71.798	21.465	2.556	0.107	0.261	0.025	0.032	0.000	0.000	0.000	0.000	0.000	1411.58	
15	0.7117	1170.0	1190.7	0.830	2.944	71.781	21.440	2.587	0.108	0.258	0.023	0.028	0.000	0.000	0.000	0.000	0.000	1411.40	
16	0.7100	1166.2	1186.8	0.834	3.018	71.901	21.398	2.482	0.096	0.226	0.020	0.025	0.000	0.000	0.000	0.000	0.000	1408.45	
17	0.7085	1164.9	1185.5	0.829	2.960	72.055	21.421	2.387	0.091	0.215	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1408.43	
18	0.7096	1165.5	1186.2	0.849	2.994	72.010	21.254	2.547	0.091	0.213	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1408.10	
19	0.7095	1165.6	1186.2	0.837	2.998	71.935	21.411	2.487	0.088	0.205	0.018	0.022	0.000	0.000	0.000	0.000	0.000	1408.29	
20	0.7082	1164.9	1185.5	0.840	2.916	72.123	21.399	2.373	0.092	0.215	0.018	0.022	0.000	0.000	0.000	0.000	0.000	1408.69	
21	0.7092	1166.0	1186.6	0.850	2.923	72.113	21.255	2.484	0.098	0.231	0.021	0.026	0.000	0.000	0.000	0.000	0.000	1409.08	
22	0.7094	1166.4	1187.1	0.844	2.931	72.079	21.244	2.532	0.097	0.228	0.020	0.025	0.000	0.000	0.000	0.000	0.000	1409.33	
23	0.7116	1169.2	1189.9	0.843	2.963	71.628	21.667	2.546	0.094	0.217	0.018	0.023	0.000	0.000	0.000	0.000	0.000	1410.59	
24	0.7154	1175.8	1196.7	0.912	2.810	71.202	21.979	2.689	0.108	0.250	0.022	0.028	0.000	0.000	0.000	0.000	0.000	1414.81	
25	0.7165	1177.4	1198.3	0.913	2.815	70.947	22.205	2.737	0.105	0.237	0.019	0.023	0.000	0.000	0.000	0.000	0.000	1415.65	
26	0.7176	1177.6	1198.4	0.929	2.887	70.866	22.068	2.862	0.105	0.239	0.019	0.024	0.000	0.000	0.000	0.000	0.000	1414.70	
27	0.7147	1174.7	1195.5	0.922	2.806	71.205	22.071	2.608	0.104	0.239	0.020	0.025	0.000	0.000	0.000	0.000	0.000	1414.04	
28	0.7150	1175.1	1195.9	0.920	2.809	71.210	22.040	2.601	0.111	0.259	0.023	0.027	0.000	0.000	0.000	0.000	0.000	1414.28	
29	0.7160	1177.0	1197.9	0.922	2.786	71.047	22.200	2.616	0.112	0.264	0.024	0.030	0.000	0.000	0.000	0.000	0.000	1415.58	
30	0.7128	1173.5	1194.3	0.908	2.713	71.417	22.147	2.426	0.103	0.239	0.021	0.025	0.000	0.000	0.000	0.000	0.000	1414.63	
Avg	0.7104	1168.0	1188.6	0.857	2.906	71.856	21.544	2.462	0.098	0.231	0.021	0.026	0.000	0.000	0.000	0.000	0.000	1410.24	

Zone 24, 264

GQ Source Analysis

GQ Source Number:	0602160	Specific Gravity:	0.7342
GQ Source Name:	FAIRVIEW BORDER	Dry Heat Value:	1204.86
Effective Date:	9/1/2014 9:00:00 AM	Wet Heat Value:	1183.89
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1204.86
Pressure Base:	14.730	Sample Pressure:	0.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	68.631		CO2	Carbon Dioxide	1.167
C2	Ethane	21.955	0.0000	N2	Nitrogen	3.648
C3	Propane	4.075	1.1194	O2	Oxygen	0.011
IC4	Isobutane	0.187	0.0611	He	Helium	
NC4	n-Butane	0.287	0.0903	H2	Hydrogen	
IC5	Isopentane	0.020	0.0074	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.019	0.0068	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% 1.285 GPM

Sample Date: 10/1/2014 12:00:00 AM
Sample Type: Composite
Sample Tech: Rocky Robson
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 241

GQ Source Analysis

GQ Source Number:	0602230	Specific Gravity:	0.7282
GQ Source Name:	WATFORD CITY BORDER	Dry Heat Value:	1216.84
Effective Date:	9/1/2014 9:00:00 AM	Wet Heat Value:	1195.66
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1216.84
Pressure Base:	14.730	Sample Pressure:	356.00
Viscosity:		Sample Temperature:	

	<u>Mol %</u>	<u>Liquid Content</u>		<u>Mol %</u>	
C1	Methane	68.994	CO2	Carbon Dioxide	0.980
C2	Ethane	23.745	N2	Nitrogen	2.664
C3	Propane	3.007	O2	Oxygen	0.000
IC4	Isobutane	0.174	He	Helium	
NC4	n-Butane	0.363	H2	Hydrogen	
IC5	Isopentane	0.032	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.036	Ar	Argon	
C6	Hexanes	0.004	CO	Carbon Monoxide	
C7	Heptanes		H2	Water	
C8	Octanes		Neo-C5	Neopentane	
C9	Nonanes				
C10	Decanes				
Totals		100.000%	7.354 GPM		

Sample Date: 10/1/2014 12:00:00 AM
Sample Type: Composite
Sample Tech: Eric Smeltzer
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 25

GQ Source Analysis

GQ Source Number:	2501030	Specific Gravity:	0.6579
GQ Source Name:	LIGNITE PLANT	Dry Heat Value:	1103.15
Effective Date:	9/1/2014 9:00:00 AM	Wet Heat Value:	1083.95
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1103.15
Pressure Base:	14.730	Sample Pressure:	348.00
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	79.157		CO2	Carbon Dioxide	0.094
C2	Ethane	15.506	4.1346	N2	Nitrogen	4.218
C3	Propane	1.015	0.2789	O2	Oxygen	0.008
IC4	Isobutane	0.000	0.0000	He	Helium	
NC4	n-Butane	0.000	0.0000	H2	Hydrogen	
IC5	Isopentane	0.000	0.0000	H2S	Hydrogen Sulfide	
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%	4.414 GPM			

Sample Date: 10/1/2014 12:00:00 AM
Sample Type: Composite
Sample Tech: Rocky Robson
H2S: ppm

Sample Remarks:

Analysis Tech: MB
Analysis Remarks:

Zone 263

GQ Source Analysis

GQ Source Number:	0202080	Specific Gravity:	0.6649
GQ Source Name:	RICHARDTON-GLEN ULLIN COMPRE	Dry Heat Value:	1129.93
Effective Date:	9/1/2014 9:00:00 AM	Wet Heat Value:	1110.26
Effective End Date:	1/18/2038 9:14:00 PM	As Deliv. Heat Value:	
Pressure Base:	14.730	Sample Pressure:	336.00
Viscosity:		Sample Temperature:	0.00

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	79.190		CO2	Carbon Dioxide	0.903
C2	Ethane	16.959	4.5220	N2	Nitrogen	2.082
C3	Propane	0.667	0.1830	O2	Oxygen	
IC4	Isobutane	0.064	0.0210	He	Helium	
NC4	n-Butane	0.050	0.0160	H2	Hydrogen	
IC5	Isopentane	0.029	0.0110	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.014	0.0050	Ar	Argon	
C6	Hexanes	0.040	0.0160	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	0.002
C9	Nonanes					
C10	Decanes					

Totals 100.000% 4.774 GPM

Sample Date: 5/1/2014 10:29:00 AM
Sample Type: Composite
Sample Tech: RR
H2S: ppm

Sample Remarks:

Analysis Tech: MB

Analysis Remarks:

Zone 311

GQ Source Daily Summary

September 2014

Number: 111

Pressure Base: 14.730

Contract Day: 1

Name: LITTLE KNIFE-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	0.6883	1162.2	1182.7	0.001	2.501	72.984	23.814	0.685	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.57	
2	0.6881	1161.5	1182.1	0.001	2.517	72.998	23.816	0.655	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.06	
3	0.6882	1161.7	1182.3	0.001	2.514	73.001	23.791	0.678	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.20	
4	0.6882	1162.0	1182.6	0.002	2.504	72.978	23.835	0.666	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.44	
5	0.6882	1161.9	1182.5	0.002	2.506	72.994	23.806	0.677	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.40	
6	0.6878	1161.2	1181.8	0.003	2.511	73.081	23.705	0.686	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.94	
7	0.6881	1161.4	1182.0	0.002	2.523	73.034	23.731	0.694	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.92	
8	0.6879	1161.5	1182.1	0.002	2.502	73.040	23.774	0.667	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.22	
9	0.6873	1160.7	1181.3	0.002	2.493	73.148	23.699	0.643	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.87	
10	0.6876	1161.3	1181.9	0.001	2.485	73.072	23.800	0.627	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.29	
11	0.6847	1155.8	1176.3	0.000	2.547	73.656	23.160	0.619	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1421.58	
12	0.6843	1154.9	1175.3	0.000	2.567	73.755	23.026	0.632	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1420.81	
13	0.6848	1155.8	1176.3	0.000	2.561	73.644	23.138	0.638	0.008	0.011	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1421.43	
14	0.6859	1157.4	1177.9	0.000	2.566	73.445	23.311	0.658	0.008	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1422.26	
15	0.7044	1187.0	1208.0	0.001	2.484	72.438	22.548	1.901	0.149	0.363	0.054	0.062	0.000	0.000	0.000	0.000	0.000	1438.75	
16	0.6870	1160.0	1180.6	0.001	2.512	73.178	23.672	0.624	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.30	
17	0.6874	1160.9	1181.5	0.001	2.491	73.134	23.714	0.647	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.01	
18	0.6871	1160.8	1181.3	0.001	2.467	73.208	23.659	0.652	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.21	
19	0.6879	1161.3	1181.9	0.001	2.482	73.096	23.755	0.652	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.00	
20	0.6870	1160.6	1181.2	0.001	2.471	73.194	23.697	0.623	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.06	
21	0.6874	1160.8	1181.3	0.002	2.497	73.130	23.714	0.644	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.87	
22	0.6881	1162.1	1182.7	0.001	2.484	73.064	23.732	0.689	0.009	0.018	0.001	0.002	0.000	0.000	0.000	0.000	0.000	1425.77	
23	0.6870	1160.4	1181.0	0.000	2.485	73.212	23.641	0.647	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.81	
24	0.6871	1160.8	1181.4	0.001	2.468	73.213	23.641	0.663	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.22	
25	0.6915	1167.2	1187.8	0.001	2.489	72.773	23.614	1.097	0.011	0.015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1428.49	
26	0.6895	1164.0	1184.7	0.001	2.497	72.960	23.629	0.892	0.009	0.013	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1426.66	
27	0.6869	1160.2	1180.8	0.000	2.491	73.233	23.608	0.653	0.006	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1424.64	
28	0.6872	1160.8	1181.3	0.002	2.482	73.192	23.638	0.670	0.007	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1425.02	
29	0.6859	1158.8	1179.3	0.001	2.480	73.397	23.498	0.610	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1423.98	
30	0.6858	1158.7	1179.2	0.002	2.478	73.409	23.494	0.603	0.006	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1423.91	
Avg	0.6879	1161.0	1182.0	0.001	2.502	73.155	23.589	0.716	0.011	0.021	0.002	0.002	0.000	0.000	0.000	0.000	0.000	1425.16	

Zone 33

GQ Source Analysis

GQ Source Number:	1202160	Specific Gravity:	0.7805
GQ Source Name:	BOWMAN BORDER	Dry Heat Value:	1128.27
Effective Date:	9/1/2014 9:00:00 AM	Wet Heat Value:	1108.63
Effective End Date:	1/18/2038 9:14:07 PM	As Deliv. Heat Value:	1128.27
Pressure Base:	14.730	Sample Pressure:	
Viscosity:		Sample Temperature:	

		<u>Mol %</u>	<u>Liquid Content</u>			<u>Mol %</u>
C1	Methane	57.400		CO2	Carbon Dioxide	1.733
C2	Ethane	25.787	6.8760	N2	Nitrogen	11.802
C3	Propane	2.880	0.7910	O2	Oxygen	
IC4	Isobutane	0.087	0.0280	He	Helium	
NC4	n-Butane	0.263	0.0830	H2	Hydrogen	
IC5	Isopentane	0.012	0.0040	H2S	Hydrogen Sulfide	
NC5	n-Pentane	0.030	0.0110	Ar	Argon	
C6	Hexanes	0.006	0.0020	CO	Carbon Monoxide	
C7	Heptanes			H2	Water	
C8	Octanes			Neo-C5	Neopentane	
C9	Nonanes					
C10	Decanes					

Totals 100.000% 7.795 GPM

Sample Date: 4/1/2014 1:01:00 PM
Sample Type: Composite
Sample Tech: MIKE GENTILINI
H2S: ppm

Sample Remarks:

Analysis Tech: MIKE GENTILINI

Analysis Remarks:

Zone 34

Sep-14

Begin Date	End Date	Watford City 01320 Watford City Border			01312 Watford City East Border			Weighted AVG BTU	
		MCF	DK	BTU Zone 25	MCF	DK	BTU Zone 43		
9/1/2014	9/2/2014	84	102	1.217	13	16	1.198	1.214	9/1/2014
9/2/2014	9/3/2014	97	117	1.217	9	11	1.202	1.216	9/2/2014
9/3/2014	9/4/2014	98	120	1.217	10	12	1.208	1.216	9/3/2014
9/4/2014	9/5/2014	119	145	1.217	49	60	1.219	1.218	9/4/2014
9/5/2014	9/6/2014	107	130	1.217	82	100	1.209	1.214	9/5/2014
9/6/2014	9/7/2014	102	124	1.217	251	300	1.196	1.202	9/6/2014
9/7/2014	9/8/2014	96	117	1.217	198	240	1.251	1.240	9/7/2014
9/8/2014	9/9/2014	100	122	1.217	37	44	1.196	1.211	9/8/2014
9/9/2014	9/10/2014	138	168	1.217	466	558	1.198	1.202	9/9/2014
9/10/2014	9/11/2014	162	197	1.217	432	521	1.208	1.210	9/10/2014
9/11/2014	9/12/2014	182	221	1.217	137	165	1.203	1.211	9/11/2014
9/12/2014	9/13/2014	170	207	1.217	295	355	1.205	1.209	9/12/2014
9/13/2014	9/14/2014	169	206	1.217	441	531	1.203	1.207	9/13/2014
9/14/2014	9/15/2014	168	205	1.217	203	244	1.204	1.210	9/14/2014
9/15/2014	9/16/2014	154	187	1.217	179	215	1.207	1.212	9/15/2014
9/16/2014	9/17/2014	138	168	1.217	343	411	1.198	1.203	9/16/2014
9/17/2014	9/18/2014	121	148	1.217	235	280	1.191	1.200	9/17/2014
9/18/2014	9/19/2014	107	131	1.217	132	158	1.199	1.207	9/18/2014
9/19/2014	9/20/2014	107	130	1.217	120	144	1.195	1.205	9/19/2014
9/20/2014	9/21/2014	123	149	1.217	254	305	1.204	1.208	9/20/2014
9/21/2014	9/22/2014	122	148	1.217	204	245	1.200	1.206	9/21/2014
9/22/2014	9/23/2014	110	134	1.217	246	294	1.193	1.200	9/22/2014
9/23/2014	9/24/2014	106	129	1.217	177	211	1.196	1.204	9/23/2014
9/24/2014	9/25/2014	97	118	1.217	181	216	1.194	1.202	9/24/2014
9/25/2014	9/26/2014	94	115	1.217	50	60	1.197	1.210	9/25/2014
9/26/2014	9/27/2014	91	111	1.217	12	14	1.207	1.216	9/26/2014
9/27/2014	9/28/2014	102	125	1.217	18	22	1.203	1.215	9/27/2014
9/28/2014	9/29/2014	133	162	1.217	73	88	1.208	1.214	9/28/2014
9/29/2014	9/30/2014	145	176	1.217	90	109	1.207	1.213	9/29/2014
9/30/2014	10/1/2014	137	167	1.217	72	87	1.200	1.211	9/30/2014
									1/0/1900
		3,679	4,479		5,009	6,016	1.2033	1.2103	

Zone 610

ROW ID	LOCATION DESCRIPTION	GROSS HEATING VALUE (BTU/SCF)	SPECIFIC GRAVITY	WOBBE (unit)	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	Change timestamp	NOTES
11587	GLEN ULLIN	1051	0.6064	1349.6	-76	1.3661	0.8683	89.9514	7.0089	0.4607	0.0191	0.0113	0.0002	0.0009	0	0	0.2988	0.019	8/31/2014	9/1/2014	9/1/2014 2:17:11 PM	
11587	GLEN ULLIN	1049.4	0.6043	1350	-78	1.3412	0.8121	90.2074	6.8868	0.3866	0.0166	0.0101	0.0001	0.0006	0	0	0.3211	0.019	9/1/2014	9/2/2014	9/2/2014 2:18:25 PM	
11587	GLEN ULLIN	1049.4	0.6044	1349.9	-77.3	1.3384	0.817	90.3781	6.6902	0.4507	0.0206	0.0124	0.0001	0.0014	0	0	0.2735	0.019	9/2/2014	9/3/2014	9/3/2014 2:17:44 PM	
11587	GLEN ULLIN	1048	0.6033	1349.2	-77.9	1.3256	0.8215	90.6721	6.4157	0.4667	0.0223	0.014	0.0012	0.0019	0	0	0.2444	0.019	9/3/2014	9/4/2014	9/4/2014 2:17:53 PM	
11587	GLEN ULLIN	1052.6	0.6067	1351.4	-74.1	1.3288	0.8408	89.8358	7.0483	0.5193	0.0238	0.0161	0.0019	0.0026	0	0	0.3416	0.0388	9/4/2014	9/5/2014	9/5/2014 2:18:56 PM	
11587	GLEN ULLIN	1049.6	0.605	1349.4	-77.2	1.364	0.8292	90.365	6.7038	0.4624	0.0192	0.0117	0.0005	0.0011	0	0	0.2246	0.0139	9/5/2014	9/6/2014	9/6/2014 2:18:05 PM	
11587	GLEN ULLIN	1046.8	0.6031	1348	-79.2	1.4037	0.7992	90.6528	6.4719	0.4033	0.0192	0.0114	0.0006	0.0013	0	0	0.2191	0.0139	9/6/2014	9/7/2014	9/7/2014 2:18:24 PM	
11587	GLEN ULLIN	1047.9	0.604	1348.4	-77.7	1.4206	0.7986	90.8232	6.2736	0.5162	0.0266	0.0157	0.0004	0.001	0	0	0.1055	0.0139	9/7/2014	9/8/2014	9/8/2014 2:17:15 PM	
11587	GLEN ULLIN	1047.2	0.6043	1347.2	-78.4	1.5032	0.7862	90.6516	6.4208	0.4592	0.0237	0.0139	0.0004	0.001	0	0	0.1208	0.0144	9/8/2014	9/9/2014	9/9/2014 2:20:28 PM	
11587	GLEN ULLIN	1046.1	0.6042	1345.8	-79.6	1.5165	0.8185	90.6457	6.4754	0.3959	0.0169	0.0101	0.0001	0.0005	0	0	0.1015	0.0242	9/9/2014	9/10/2014	9/10/2014 2:19:04 PM	
11587	GLEN ULLIN	1050	0.6066	1348.2	-77	1.4751	0.8418	90.1983	6.8598	0.4548	0.0177	0.0107	0.0001	0.0003	0	0	0.1246	0.0242	9/10/2014	9/11/2014	9/11/2014 2:18:35 PM	
11587	GLEN ULLIN	1060.2	0.6107	1356.7	-72.3	1.3654	0.7662	89.4155	7.7785	0.521	0.0202	0.0119	0.0001	0.0009	0	0	0.1028	0.0242	9/11/2014	9/12/2014	9/12/2014 2:18:58 PM	
11587	GLEN ULLIN	1052.5	0.6065	1351.5	-76.6	1.3505	0.8151	90.2788	6.9594	0.4528	0.0181	0.011	0.0002	0.0004	0	0	0.0999	0.0172	9/12/2014	9/13/2014	9/13/2014 2:18:09 PM	
11587	GLEN ULLIN	1054.5	0.6079	1352.5	-75.3	1.3539	0.8199	89.9581	7.2394	0.4614	0.0182	0.0109	0.0001	0.0004	0	0	0.1214	0.0161	9/13/2014	9/14/2014	9/14/2014 2:17:23 PM	
11587	GLEN ULLIN	1056.1	0.6094	1352.9	-74	1.3445	0.8598	89.7235	7.4301	0.4835	0.0189	0.0112	0.0001	0.0005	0	0	0.1113	0.0154	9/14/2014	9/15/2014	9/15/2014 2:17:56 PM	
11587	GLEN ULLIN	1057.8	0.6105	1353.8	-72.9	1.3449	0.8609	89.5985	7.5436	0.5186	0.0205	0.0122	0.0004	0.001	0	0	0.0837	0.0135	9/15/2014	9/16/2014	9/16/2014 2:16:31 PM	
11587	GLEN ULLIN	1062.2	0.6127	1357	-70.1	1.3605	0.8154	89.1159	7.9678	0.571	0.0254	0.0149	0.0011	0.0016	0	0	0.1113	0.013	9/16/2014	9/17/2014	9/17/2014 2:29:04 PM	
11587	GLEN ULLIN	1062.8	0.6124	1358.1	-71	1.3305	0.7924	89.0827	8.1596	0.4815	0.0228	0.013	0.0008	0.0013	0	0.0001	0.1007	0.013	9/17/2014	9/18/2014	9/18/2014 2:21:50 PM	
11587	GLEN ULLIN	1054.3	0.6077	1352.4	-75.7	1.334	0.8313	90.0156	7.254	0.4144	0.0194	0.0116	0.0007	0.0016	0	0	0.1025	0.013	9/18/2014	9/19/2014	9/19/2014 2:20:59 PM	
11587	GLEN ULLIN	1059.8	0.6116	1355.2	-72.3	1.3425	0.8508	89.2498	7.9545	0.4458	0.021	0.0121	0.0006	0.0013	0	0	0.1068	0.013	9/19/2014	9/20/2014	9/20/2014 2:20:44 PM	
11587	GLEN ULLIN	1056.7	0.6087	1354.4	-74.4	1.3443	0.7894	89.7793	7.4867	0.4416	0.0196	0.0122	0.0009	0.0015	0	0	0.1069	0.013	9/20/2014	9/21/2014	9/21/2014 2:19:53 PM	
11587	GLEN ULLIN	1056.7	0.6087	1354.4	-74.4	1.3443	0.7894	89.7793	7.4867	0.4416	0.0196	0.0122	0.0009	0.0015	0	0	0.1069	0.013	9/20/2014	9/22/2014	9/22/2014 2:20:36 PM	
11587	GLEN ULLIN	1055.5	0.6086	1353	-74.6	1.3873	0.8032	89.7372	7.4401	0.4349	0.0208	0.0124	0.0008	0.0016	0	0	0.1431	0.0194	9/22/2014	9/23/2014	9/23/2014 2:19:47 PM	
11587	GLEN ULLIN	1054.9	0.6069	1354.1	-75.8	1.327	0.7669	89.9277	7.3504	0.3987	0.0189	0.0111	0.0005	0.0012	0	0	0.1808	0.0203	9/23/2014	9/24/2014	9/24/2014 2:16:40 PM	
11587	GLEN ULLIN	1053.4	0.6054	1353.8	-76.9	1.2901	0.7604	90.1279	7.1456	0.4014	0.0173	0.0102	0.0002	0.0006	0	0	0.2298	0.0203	9/24/2014	9/25/2014	9/25/2014 2:17:18 PM	
11587	GLEN ULLIN	1055.8	0.6078	1354.2	-74.3	1.3218	0.7913	89.6698	7.4461	0.4559	0.0207	0.0122	0.0008	0.0013	0	0	0.2633	0.0203	9/25/2014	9/26/2014	9/26/2014 2:17:39 PM	
11587	GLEN ULLIN	1054.2	0.6074	1352.6	-75.1	1.3046	0.8402	89.8301	7.291	0.4394	0.0206	0.0125	0.0006	0.0013	0	0	0.2443	0.0203	9/26/2014	9/27/2014	9/27/2014 2:17:43 PM	
11587	GLEN ULLIN	1055.4	0.6088	1352.6	-74.3	1.3268	0.8601	89.7826	7.338	0.4883	0.0187	0.0115	0.0002	0.0007	0	0	0.1576	0.0203	9/27/2014	9/28/2014	9/28/2014 2:17:40 PM	
11587	GLEN ULLIN	1055.1	0.6087	1352.3	-74.6	1.3518	0.8556	89.6824	7.4293	0.4526	0.0175	0.0108	0	0.0006	0	0	0.1846	0.0203	9/28/2014	9/29/2014	9/29/2014 2:16:57 PM	
11587	GLEN ULLIN	1054.2	0.6078	1352.3	-75	1.3038	0.8641	89.9226	7.2025	0.4826	0.0177	0.011	0.0001	0.0004	0	0	0.1801	0.0203	9/29/2014	9/30/2014	9/30/2014 2:17:03 PM	

30 record(s) retrieved

Zone 802

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

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

STATE	ZONE	ZONE BOUNDARY	12 MONTH AVERAGE	SEPT 14	AUG 14	JULY 14	JUNE 14	MAY 14	APR 14	MAR 14	FEB 14	JAN 14	DEC 13	NOV 13	OCT 13	ZONE
MT/ND	211	Sidney Area	1207	1204	1209	1212	1207	1212	1198	1204	1205	1208	1204	1209	1211	211
ND	24	Williston Area	1189	1189	1186	1184	1183	1180	1177	1181	1177	1201	1201	1207	1204	24
ND	25	Watford City Border	1212	1217	1205	1219	1226	1241	1221	1220	1205	1218	1191	1197	1183	25
ND/MT	241	Fairview Area	1200	1205	1201	1208	1202	1204	1194	1197	1197	1203	1197	1189	1198	241
ND	261	Williston - Tioga - Minot Line	1137	1027	1013	1094	1115	1118	1181	1187	1185	1189	1193	1166	1175	261
ND	262	Minot Area	1181	1150	1149	1154	1166	1161	1196	1201	1200	1201	1201	1192	1197	262
ND	263	Tioga - Portal	1080	1103	1089	1098	1078	1062	1074	1058	1051	1063	1061	1096	1125	263
ND	264	Williston - Ray	1189	1189	1186	1184	1183	1180	1177	1181	1177	1201	1201	1207	1204	264
ND	271	Bismarck - Cleveland	1157	1147	1148	1152	1164	1162	1192	1159	1127	1144	1145	1164	1184	271
ND	272	Cleveland - Mapleton	1157	1146	1148	1151	1163	1162	1192	1158	1127	1144	1145	1164	1184	272
ND	273	Cleveland - Grafton	1157	1146	1148	1151	1163	1162	1190	1158	1127	1144	1145	1164	1184	273
ND	28	Bismarck - Cabin Creek	1123	1147	1148	1151	1163	1155	1135	1077	1072	1081	1092	1105	1147	28
ND	31	Dickinson Area	1124	1170	1174	1176	1171	1140	1102	1079	1073	1082	1092	1107	1126	31
ND	311	Taylor Take-Off - Glen Ullin Comp	1115	1130	1114	1131	1138	1105	1091	1072	1197	1092	1092	1104	1108	311
ND/MT	32	Cabin Creek - Dickinson	1102	1164	1134	1147	1134	1100	1077	1061	1058	1070	1082	1096	1095	32
ND	33	Killdeer	1182	1182	1182	1183	1183	1183	1183	1180	1181	1182	1180	1180	1182	33
ND	34	Bowman Area	1096	1128	1127	1130	1119	1123	1030	1059	1047	1073	1082	1118	1118	34
ND	610	MDU-Watford City BTU	1203	1210	1204	1204	1195									
ND	802	Linton	1045	1054	1060	1050	1047	1047	1044	1045	1039	1042	1033	1037	1037	802

**THERMAL ZONE VARIANCE
DOCUMENTATION**

September 2014

<i>ZONE</i>	<i>BTU VARIANCE</i>	<i>REASON</i>
32	30	Change in gas supply