

TABLE 2.--Analyses of drill core samples of lignite and of some associated carbonaceous rocks in the Fort Union Formation, Dengage quadrangle, Morton County, N. Dak.

a. <u>Standard coal analysis (partial)</u>												b. <u>MgO, CaO, Na₂O, K₂O, and eU in sample (percent)</u>					c. <u>Abundance of selected major and minor elements in ash</u>																																																																																																																																																																																																																																																																																																																																															
[Analyses by U.S. Bureau of Mines, Pittsburgh, Pa. All analyses are for samples on an as-received basis; volatile matter determined by modified method]												[Analyses by U.S. Geological Survey, Denver, Colo. MgO, CaO, Na ₂ O, and K ₂ O determined by atomic absorption by Wayne Mountjoy; eU determined by Beta Gamma Scaler by Johnnie Gardner]					[Percent ash determined by ignition method by G. D. Shipley and V. M. Merritt, U.S. Geological Survey. Semiquantitative spectrographic analyses by B. W. Lanthorn, U.S. Geological Survey. Results are based on their identity with geometric brackets whose boundaries are 1.2, 0.83, 0.56, 0.38, 0.26, 0.18, 0.12, and so forth, and are reported arbitrarily as midpoints of these brackets, 1., 0.7, 0.5, 0.3, 0.2, 0.15, 0.1, respectively. The precision of a reported value is approximately plus or minus one bracket at 68-percent, or two brackets at 95-percent confidence. Approximate usual lower limits of detection for Ag is .00005; Be .0001; La .003; Mo .0003; Sn .001; Zn .02; Ge .015; Ge .001; Li .005; Nd .007. Figures in percent by weight. G, greater than 10 percent; N, not detected; L, detected but below value shown; --, not looked for]																																																																																																																																																																																																																																																																																																																																															
Field No.	Location of drill hole	Sample interval depth (ft)	Sample description	Port Union Formation Member	USBM Lab.No.	Analyses, in percent					Heating value (Btu)	USGS Lab. No.	MgO	CaO	Na ₂ O	K ₂ O	eU	Ash in sample	Major elements				Minor elements																																																																																																																																																																																																																																																																																																																																									
						Moisture	Volatile matter	Fixed carbon	Ash	Sulfur									Al	Fe	Mg	Ca	Ti	Mn	Ag	B	Ba	Be	Co	Cr	Cu	La	Mo	Nb	Ni	Pb	Sc	Sn	Sr	V	Y	Zn	Zr	Ce	Ga	Ge	Li	Yb	Nd																																																																																																																																																																																																																																																																																																															
DC-1-1a	NE ₁ cor. SE ₁ SE ₁ NE ₁ sec. 20, T. 138 N.,R. 87 W.	39.8-41.5 (upper part)	Richter lignite bed (srl bed?).	Sentinel Butte.	-----	D137652	0.42	1.09	0.28	0.03	<0.001	5.9	5.0	7.0	5.0	G	0.15	.05	.00015	.5	.5	.0015	.01	.003	.015	.007	.002	.003	.01	.003	.0015	N	.3	.01	.015	N	.007	N	.007	N	N	.0007	N																																																																																																																																																																																																																																																																																																																					
DC-1-1b	do.	39.8-41.5 (lower part)	do.	do.	-----	D137653	.81	1.89	.46	.31	<.001	19.5	7.0	3.0	3.0	7.0	.3	.03	.0001	.15	.05	.001	.002	.007	.02	N	.003	.005	.01	.007	.002	N	.15	.03	.01	N	.015	N	.005	N	N	.001	--																																																																																																																																																																																																																																																																																																																					
D-1-20	do.	41.5-42.0 (upper 0.2 ft sampled)	Carbonaceous claystone, silty.	do.	-----	D137681	2.07	.64	.75	3.16	.002	85.6	10.0	5.0	2.0	.3	.5	.03	N	.015	.1	N	.0015	.015	.007	.007	.0007	.002	.005	.007	.002	N	.03	.03	.002	N	.015	N	.005	N	N	.0003	N																																																																																																																																																																																																																																																																																																																					
D-1-21	do.	42.0-43.1	Claystone, carbonaceous.	do.	-----	D137682	2.43	.64	1.37	3.18	.002	93.0	10.0	3.0	3.0	.3	.3	.03	N	.01	.1	N	.0015	.01	.007	N	N	.002	.003	.007	.002	N	.03	.02	.002	NN	.01	N	.005	N	N	.0003	--																																																																																																																																																																																																																																																																																																																					
DC-1-2	do.	43.1-43.5	Richter lignite bed (srl bed?).	do.	-----	D137654	.62	1.48	.50	.27	<.001	20.0	7.0	G	3.0	7.0	.3	.03	N	.1	.05	.003	.005	.015	.03	N	.007	.015	.02	.005	.003	N	.15	.05	.015	N	.1	N	.005	.007	N	.002	--																																																																																																																																																																																																																																																																																																																					
D-1-75	do.	85.6-86.8	Claystone,	Tongue River.	-----	D137683	3.08	2.00	1.98	3.26	.002	93.4	10.0	5.0	2.0	1.5	.5	.1	N	.007	.1	N	.0015	.01	.007	N	N	.002	.005	.005	.002	N	.03	.02	.003	N	.015	N	.003	N	N	.0003	--																																																																																																																																																																																																																																																																																																																					
D-1-76	do.	86.8-87.1	Claystone to carbonaceous claystone.	do.	-----	D137684	2.74	1.14	1.70	3.10	.002	89.8	7.0	3.0	1.5	.7	.3	.05	N	.01	.1	L.0002	.003	.01	.01	.007	N	.002	.01	.005	.0015	N	.03	.015	.003	N	.015	N	.005	N	N	.0003	N																																																																																																																																																																																																																																																																																																																					
D-1-77	do.	87.1-87.5	Carbonaceous claystone.	do.	-----	D137685	2.08	1.22	1.54	2.29	.001	75.4	7.0	5.0	2.0	.7	.5	.03	N	.015	.1	N	.003	.007	.007	.007	.0007	.003	.015	.003	.0015	N	.03	.015	.003	N	.02	N	.003	N	N	.0005	N																																																																																																																																																																																																																																																																																																																					
DC-1-2a	do.	87.5-92.8	Tavis Creek lignite bed.	do.	I-42084	38.1	25.2	24.6	12.1	0.5	6,070	D137655	.65	1.69	1.22	.22	.001	17.6	10.0	3.0	3.0	7.0	.7	.07	.0002	.15	.3	.0005	.0015	.007	.015	.007	.002	.002	.007	.007	.0015	N	.15	.015	.007	N	.03	N	.003	N	N	.0007	N																																																																																																																																																																																																																																																																																																															
D-1-78	do.	92.8-93.1	Claystone and carbonaceous claystone.	do.	-----	D137686	2.50	.60	1.50	3.06	.002	87.2	10.0	7.0	2.0	.3	.5	.03	N	.01	.1	N	.002	.015	.01	N	.001	.002	.01	.007	.002	N	.03	.03	.003	N	.015	N	.005	N	N	.0005	--																																																																																																																																																																																																																																																																																																																					
D-1-79	do.	93.1-94.6	do.	do.	-----	D137687	2.84	1.01	2.04	3.22	.001	93.6	10.0	5.0	2.0	.5	.3	.03	N	.007	.1	N	.0015	.015	.015	.007	N	.002	.007	.005	.002	N	.03	.03	.003	N	.01	N	.005	N	N	.0005	N																																																																																																																																																																																																																																																																																																																					
DC-1-3	do.	120.3-121.4	Lignite; local bed.	do.	-----	D137656	.38	1.19	1.10	.10	<.001	11.3	5.0	3.0	3.0	7.0	.3	.05	.00015	.3	.2	.003	.005	.015	.01	N	.0015	.007	.003	.005	.005	N	.2	.02	.02	N	.05	N	.003	N	N	.002	--																																																																																																																																																																																																																																																																																																																					
DC-1-4	do.	136.0-136.6	Lignite.	do.	-----	D137657	.42	1.24	1.10	.08	.002	11.5	7.0	5.0	2.0	10.0	.2	.05	.0007	.2	.3	.005	.002	.015	.03	.007	.01	.02	.007	.005	.007	N	.2	.05	.02	N	.05	N	.015	.015	N	.003	N																																																																																																																																																																																																																																																																																																																					
DC-1-5	do.	162.5-163.1	do.	do.	-----	D137658	.53	1.66	1.24	.06	<.001	12.7	10.0	3.0	5.0	G	.3	.03	L.0001	.2	.7	.003	.002	.015	.03	N	.015	.003	.007	.01	.007	N	.5	.03	.03	N	.015	N	.01	.01	N	.002	--																																																																																																																																																																																																																																																																																																																					
DC-1-6	do.	214.0-216.5	Lignite; local bed.	do.	I-42087	37.2	26.6	27.0	9.2	.9	6,640	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

This report is preliminary and has not been edited or reviewed for conformity with U.S. Geological Survey standards or nomenclature.