

TABLE 2. - LOW-Btu-GAS PROPERTY FORM

Property				
Composition, vol%:				
H <sub>2</sub>				
CO				
CO <sub>2</sub>				
H <sub>2</sub> S				
NH <sub>3</sub>				
CH <sub>4</sub>				
Other hydrocarbons				
N <sub>2</sub>				
COS				
Specific gravity				
Average molecular weight				
Heating value, Btu/ft <sup>3</sup> :				
Gross				
Net				
Gross with CO <sub>2</sub> , H <sub>2</sub> S, and NH <sub>3</sub> removed				
Net with CO <sub>2</sub> , H <sub>2</sub> S, and NH <sub>3</sub> removed				
Sulfur, ppm				
Alkali metals and sulfur, ppm				
Water, vol. %				
Solids, ppm				
Solids: particle size, μm				
Flammability limit ratio				

Property	Test	Distillate categories				
		Light distillate	Heavy distillate	Crude and blended residue	Heavy residue	
Gravity, °API (specific)	D-1298	Report	Report	0.96 max.	0.96 max.	
Bubbling range:	D-86					
initial boiling point, °F						
5 %						
10 %						
20 %						
30 %						
40 %						
50 %						
60 %						
70 %						
80 %						
90 %		650 max.	Report	-----	-----	
95 %						
Final boiling point, °F						
Four point, °F	D-97	0°-20° below sub.	Report	Report	Report	
Flashpoint, °F	D-23	Report	Report	Report	Report	
at 100°F, cs, min.	D-445	0.5	1.8	1.8	1.8	
at 100°F, cs, max.	D-445	5.8	20	160	300	
at 210°F, cs, max.	D-445					
Ash, wt% max. %	D-682	0.0050	0.0050	Report	Report	
Ash: melt temperature, °F						
Heat of combustion, Btu/lb						
Carbon residue (10% bottom max.)	D-524	0.25				
Carbon residue (bottom, wt%)	D-524	1.0	1.0	1.0	Report	
Thermal stability (tube no., max.)	D-1661	---	2.0	2.0	2.0	
Electrical conductivity						
Water, vol. % max.	D-95	0.1	0.1	Report	0.1	
Bediment						
Neutrality						
Corrosion						



TABLE 4. - TYPICAL PROPERTIES OF LIQUID FUELS

[Data from ref. 27]

Property	Fuel type			
	True distillates		Ash-bearing fuels	
	Kerosene	No. 2 distillate	Blended residuals and grades	Heavy residuals
Specific gravity at 100° F (38° C)	0.78 - 0.83	0.82 - 0.88	0.80 - 0.92	0.92 - 1.05
Viscosity at 100° F (38° C), cS	1.4 - 2.2	2.0 - 4.0	2 - 100	100 - 1800
Flashpoint, °F (°C)	130 - 180 (55 - 70)	160 - 200 (65 - 95)	50 - 200 (10 - 95)	175 - 265 (80 - 130)
Pourpoint, °F (°C)	-60 (-45)	-10 - 30 (-20 - 0)	15 - 110 (-10 - 45)	15 - 95 (-10 - 35)
Gross heating value, kcal/kg (Btu/lb)	10 750 - 10 950 (19 300 - 19 700)	10 600 - 10 950 (19 000 - 19 600)	10 500 - 10 900 (19 000 - 19 400)	10 150 - 10 500 (18 300 - 18 900)
Filterable dirt, percent of maximum	0.002	0.005	0.05	0.2
Carbon residue, percent:				
10 Percent bottoms	0.01 - 0.1	0.03 - 0.3	-----	-----
100 Percent bottoms	-----	-----	0.3 - 3	2 - 10
Sulfur content, percent	0.01 - 0.1	0.1 - 0.6	0.2 - 3	0.5 - 4
Nitrogen content, percent	0.002 - 0.01	0.005 - 0.06	0.06 - 0.2	0.05 - 0.9
Hydrogen content, percent	12.8 - 14.5	12.2 - 13.2	12.0 - 13.2	10 - 12.5
Ash content, ppm:				
Fuel as delivered	1 - 5	2 - 50	25 - 200	100 - 1000
Inhibited	-----	-----	-----	-----
Trace-metal contaminants, ppm:				
Sodium plus potassium	0 - 0.5	0 - 1	1 - 100	2 - 350
Vanadium	0 - 0.1	0 - 0.1	0.1 - 50	5 - 400
Lead	0 - 0.5	0 - 1	0 - 1	0 - 25
Calcium	0 - 1	0 - 2	0 - 10	0 - 50

**TABLE 5. - TYPICAL PRODUCT COMPOSITION  
FROM SOLVENT-REFINED-COAL PROCESS**

Component	Raw coal	SRC product
	Typical analysis, wt %	
Carbon	70.7	88.2
Hydrogen	4.7	5.2
Nitrogen	1.1	1.5
Sulfur	3.4	1.2
Oxygen	10.3	3.4
Ash	7.1	.5
Moisture	<u>2.7</u>	<u>0</u>
	100.0	100.0
Volatile matter	38.7	36.5
Fixed carbon	51.5	63.0
Ash	7.1	.5
Moisture	<u>2.7</u>	<u>0</u>
	100.0	100.0
Heating value, Btu/lb	12 821	15 768

TABLE 6. - FUEL DATA FROM II-COAL PROCESS

(a) II-Coal from Illinois #6 coal (fuel oil mode); data from ref. 1

Property	Test	Distillate categories			
		Full-range liquid	Naphtha	Middle distillate	Heavy distillate
Gravity, °API (specific)		27.6	40.6	16.7	5.4
Boiling range:					
Initial boiling point, °F		180	196	452	
5 %			215	452	682
10 %			228	452	688
20 %			250	454	699
30 %			270	470	706
40 %			292	492	722
50 %			312	514	737
60 %			332	534	756
70 %			350	570	783
80 %			366	592	843
90 %			380	616	896
95 %			394	630	944
Final boiling point, °F		>544		636	
Pour point, °F					
Flashpoint, °F					
Viscosity, nt	°F				
	°F				
	°F				
Ash, wt %					
Ash: melt temperature, °F					
Heat of combustion, Btu/lb					
Carbon residue					
Carbon remainder, wt %					
Thermal stability					
Electrical conductivity					
Water					
Sediment					
Neutrality					
Corrosion					









(e) H-Coal from Illinois #6 coal; data from ref. 2

Property	Test	Distillate categories			
		Naphtha (1BP - 350°F) (19.8 wt%)	Middle distillate (350° - 550°F) (12.1 wt%)	Vec. gas oil (450° - 800°F) (11.5 wt%)	Residual (800°F+) (56.6 wt%)
Gravity, °API (specific)		44.9	25.9	7.9	
Boiling range:					
Initial boiling point, °F		-30	217	434	
5 %					
10 %		170	266	532	
20 %		188	378	597	
30 %		217	395	627	
40 %		279	408	635	
60 %		256	417	675	
60 %		282	432	695	
70 %		306	449	716	
80 %		330	471	740	
90 %		353	500	767	
95 %					
Final boiling point, °F					
Four point, °F					
Flashpoint, °F					
Viscosity at	°F				
at	°F				
at	°F				
Ash, wt%					25.3
Ash melt temperature, °F					13.4
Heat of combustion, Btu/lb					unretarded coal
Carbon residue					
Carbon ramabottom, wt%					
Thermal stability					
Electrical conductivity					
Water					
Sediment					
Neutrality					
Corrosion					



TABLE 6. - Continued.

4) H-Coal residue from Illinois #6 coal (hydroxone bottoms) data from memo for record by John S. Clark, NASA Lewis Research Center, July 19, 1977

Property	Test	Distillate categories					
Gravity, °API (specific)							
Boiling range:							
Initial boiling point, °F							
5 %	-7.5						
10 %							
20 %							
30 %							
40 %							
50 %							
60 %							
70 %							
80 %							
90 %							
95 %							
Final boiling point, °F							
Pour point, °F							
Flashpoint, °F							
Viscosity at 200°F, cP							
at 300°F, cP							
at 400°F, cP							
Ash, wt %							
AP <sub>50</sub> : melt temperature, °F							
Heat of combustion, Btu/lb Higher							
Carbon residue, wt %							
Carbon rembottom, wt %							
Thermal stability (unstable above-)							
Electrical conductivity, ohm/cm							
Water							
Sediment							
Neutrality							
Corrosion							



Property	Test	Distillate categories			
		Hydrocarbons underflow (#3296-87)	Hydrocarbons underflow filtrate (#3296-15)		
Gravity, ° API (specific)		-16.3 (L. 2307)	17.7 (L. 2433)		
Boiling range:	D-1160				
Initial boiling point, °F		466	493		
5 %		533	538		
10 %		560	567		
20 %		615	621		
30 %		690	680		
40 %		770	752		
50 %		876	822		
60 %			910		
70 %					
80 %					
90 %					
95 %					
Final boiling point, °F					
Pour point, °F (softening point)		172	240		
Flashpoint, °F					
Viscosity at 250°F, SFS		307.3	161.6		
at 300°F, SFS			154.1		
at °F					
Ash, wt %					
Ash: melt temperature, °F					
Heat of combustion, Btu/lb					
Carbon residue (Conradson), wt %					
Carbon residue, wt %		39.43	33.2		
Thermal stability					
Electrical conductivity					
Water					
Sediment					
Neutrality					
Corrosion					



TABLE 6. - Continued.

(b) If-Coal fuel oil mode. from it from a 46 coal; data from ref

Property	Test	Distillate categories <sup>a</sup>		
		Total overhead	<203°C(397°F)   35.6 percent	>203°C(397°F); 63.7 percent
Gravity, °API (specific)		19.8 (0.935)	32.3 (0.864)	13.0(0.979)
Boiling range:				
Initial boiling point, °F				
5 %	ERDA route fine method	144	144	397
10 %				
20 %				
30 %				
40 %				
50 %				
60 %				
70 %				
80 %				
90 %				
95 %				
Final boiling point, °F		687	397	687
Pour point, °F		<5	<5	<5
Flashpoint, °F				
Viscosity at 77°F, SUS		38		
at 100°F, SUS				
at 100°F, cS		35 (2.4cS)		39 (3.8cS)
Ash, wt%	D-445		1.08	3.87
Ash: melt temperature, °F				
Heat of combustion, Btu/lb				
Carbon residue (Conradson), wt%	524	0.8	0	2.33
Carbon remainder, wt%				
Thermal stability				
Electrical conductivity				
Water				
Sediment				
Neutrality				
Corrosion				





Property	Test	Distillate categories <sup>a,b</sup>
Gravity, °API (specific)	overhead	Distillate categories <sup>a,b</sup>
Boiling range:		
Initial boiling point, °F	17.0(0.95)	Distillate categories <sup>a,b</sup>
3%	138	Distillate categories <sup>a,b</sup>
10%	138	Distillate categories <sup>a,b</sup>
20%	138	Distillate categories <sup>a,b</sup>
30%	138	Distillate categories <sup>a,b</sup>
40%	138	Distillate categories <sup>a,b</sup>
50%	138	Distillate categories <sup>a,b</sup>
60%	138	Distillate categories <sup>a,b</sup>
70%	138	Distillate categories <sup>a,b</sup>
80%	138	Distillate categories <sup>a,b</sup>
90%	138	Distillate categories <sup>a,b</sup>
Final boiling point, °F	387	Distillate categories <sup>a,b</sup>
Pour point, °F	<5	Distillate categories <sup>a,b</sup>
Flashpoint, °F	795	Distillate categories <sup>a,b</sup>
Viscosity at 77 °F, SUS	59	Distillate categories <sup>a,b</sup>
at 100 °F, SUS	46	Distillate categories <sup>a,b</sup>
at 100 °F, cS	6.1	Distillate categories <sup>a,b</sup>
Ash, wt%	0.86	Distillate categories <sup>a,b</sup>
Ash: melt temperature, °F	14.9	Distillate categories <sup>a,b</sup>
Heat of combustion, Btu/lb		Distillate categories <sup>a,b</sup>
Carbon residue (Conradson), wt%	2.3	Distillate categories <sup>a,b</sup>
Carbon residue (Conradson), wt%		Distillate categories <sup>a,b</sup>
Thermal stability		Distillate categories <sup>a,b</sup>
Electrical conductivity		Distillate categories <sup>a,b</sup>
Water		Distillate categories <sup>a,b</sup>
Sediment		Distillate categories <sup>a,b</sup>
Neutrality		Distillate categories <sup>a,b</sup>
Corrosion		Distillate categories <sup>a,b</sup>



Property	Test	Distillate categories			
		180° - 380°F	380° - 650°F	650° - 975°F	Total crude
Gravity, °API (specific)		38.6	14.0	-2.3	6.4
Boiling range:					
Initial boiling point, °F		180	372	639	180
5%		226	420	652	
10%		248	440	670	
20%		264	474	728	
30%		280	500	737	
40%		292	510	758	
50%		306	530	799	
60%		318	542	823	
70%		330	568	840	
80%		338	593	868	
90%		364	616	932	
98%		386	670	969	
Final boiling point, °F		445	680	975	975
Pour point, °F			-100	86	-5
Flashpoint, °F					
Viscosity at 100°F, SUS			41 (4.4 cS)		707 (155 cS)
at 210°F, SUS			36 (2.7 cS)	163 (36 cS)	
at °C					
Ash, wt%		0.03			
Ash: melt temperature, °F					
Heat of combustion, Btu/lb					
Carbon residue					
Carbon remainder, wt%			4.4		
Thermal stability					
Electrical conductivity					
Water					
Sediment					
Neutrality					
Corrosion					