

APPENDIX A

Thirteen of the 67 material balance periods were selected as yield periods, which cover operating conditions of greatest interest. For these, a full spectrum of analyses were obtained on representative samples of feed coal, bottom char, mid char and filter fines collected during the period. The complete off-line data workup is presented in the following pages. These data include critical process temperatures, carbon and steam conversions, relative gasification rates, methane yields, solids composition, catalyst distribution, fluid bed properties, and particle size distribution.

To develop the data presented here, all of the raw data were entered in a computer program which reconciled the raw values to force overall and individual component material balance closures. This program, known as the "reconciliation program," uses statistical methods to close all material balances while minimizing total variance from measured values. This procedure smooths the data in a consistent manner for use in kinetic model development. There are 138 operating variables measured in the raw data; they are subjected to 47 material balance constraints.

For each of the 13 yield periods, the following pages contain the 138 operating variables in the data workup program which were adjusted by the reconciliation program. Also shown are lists of raw data and reconciled data. The reconciliation program generally produced changes of less than 10% in the data to force the material balance closures.

RECONCILED DATA

*** YIELD PERIOD 1. UNIT OPERATIONS * PAGE 1 * * * * * ** YIELD PERIOD 1. UNIT PROCESS VARIABLES * PAGE 2 * * * * *

TIME DATE
 FROM 1630 05/02/80
 TO 1630 05/03/80
 DURATION 24.00 HRS

* MODE OF OPERATION YIELD PERIOD 1

* PERCENT OF TIME ON STREAM

COAL FEED 100.0X
 STEAM 100.0X
 SYN GAS 100.0X
 BACKEND 100.0X

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1235.	260.

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	986.
77.6	1297.
67.9	1308.
57.8	1290.
47.7	1301.
42.6	1308.
37.5	1299.
26.4	1290.
21.4	1288.
11.3	1287.
6.1	1265.
0.0	844.

UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	110.	84.
SCREW DRYER	302.	320.
OXIDIZER 1 TOP	313.	
MID	329.	
HTM	347.	
OXIDIZER 2 TOP	291.	
MID	291.	
BTM	291.	
LOCK HOPPER 1 TOP	171.	
MID	183.	187.
LOWER	194.	
CONE	201.	257.
LOCK HOPPER 2A MID	343.	361.
CONE	342.	378.
LH-2A FEED POT		345.
LH-2A FEED LINE MID		264.
LOWER		387.
LOCK HOPPER 2B MID	307.	329.
CONE	291.	378.
LH-2B FEED POT		300.
LH-2B FEED LINE MID		327.
LOWER		271.
SYN GAS PREHEATER		534.
STEAM GENERATOR	450.	
STM & SG SUPERHEATER	1200.	1031.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		
TOP OF BED	1308.	1297.
BTM OF BED	1265.	1324.
BED AVERAGE	1235.	1305.
CYCLONE		1035.
DIPLEG TOP	1173.	1134.
DIPLEG MID	90.	115.
DIPLEG BTM	752.	1249.
DIPLEG SLOPE		1260.
FILTER INLET	869.	808.
FILTER 1		707.
FILTER 2		707.
SCRUBBER INLET	590.	563.
SCRUBBER TOP	54.	
SCRUBBER MID	117.	
SCRUBBER BTM	201.	
SOUR GAS STRIPPER TOP	212.	
MID	214.	
BTM	216.	

YIELD PERIOD 1. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	(WTX OF TOTAL SOLIDS, DRY)				LH3 FEED (COAL) (WTX)
	COAL+CAT (FC) (WTX)	(GMC) (WTX)	CHAR W/D & C/O (GB) (WTX)	(GF) (WTX)	
H	4.18	0.61	0.43	0.53	5.06
C	63.08	31.00	24.27	36.66	69.24
S	4.05	3.94	3.82	2.57	4.28
PYRITIC	0.0	0.04	0.23	0.06	0.0
SULFATE	0.20	0.25	0.42	0.40	0.21
ORGANIC	3.85	3.65	3.17	2.12	4.07
O	11.43	5.13	10.37	8.87	9.81
N	1.25	0.10	0.02	0.04	1.25
CL	0.10	0.15	0.15	0.31	0.15
803-FREE ASH	15.90	59.11	60.95	51.01	10.21
TOTAL	100.00	100.00	100.00	100.00	100.00
* ASH ANALYSIS (WTX OF TOTAL SOLIDS)					
ASH	25.65	71.95	75.74	60.44	10.46
C/H RESIDUE	21.67	66.90	75.89	59.28	10.36
803-C/H RES.	14.13	54.03	61.64	51.20	10.11
* ASH ELEMENT ANALYSIS (WTX OF 803-FREE ASH)					
SiO2	20.38	29.18	29.50	24.83	53.90
Fe2O3	8.27	9.04	10.87	7.25	18.90
Al2O3	6.96	11.04	10.48	7.83	16.60
CaO	2.24	2.44	3.20	1.35	4.20
H2O	0.40	0.65	0.63	0.44	1.06
YtO2	0.35	0.46	0.41	0.49	0.80
P2O5	0.17	0.22	0.27	0.16	0.96
H2O	1.56	0.98	0.90	1.77	0.98
CATALYST (FROM ACID SOLUBLE ANALYSIS)					
K2O	59.67	42.87	43.74	55.88	2.06
TOTAL	100.00	96.85	100.00	100.00	91

YIELD PERIOD 1. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES		GASIFIER		
BALANCE USED		H2O	O2	H2
TOTAL PRESSURE	(KPA)	1845.3	1845.3	1845.3
H2	(KPA)	670.6	670.6	670.6
CO	(KPA)	121.8	121.8	121.8
CH4	(KPA)	228.8	228.8	228.8
CO2	(KPA)	205.7	205.7	205.7
H2S	(KPA)	6.9	6.9	6.9
H2O	(KPA)	498.7	498.7	498.7
N2	(KPA)	114.7	114.7	114.7
NH3	(KPA)	0.0	0.0	0.0
H2O/CO		4.1	4.1	4.1
H2O/CO2		2.4	2.4	2.4

* UNIT GAS DATA		GASIFIER
SYN GAS MNT	(GM/MOL)	8.6
INJECTION GAS MNT	(GM/MOL)	8.5
PRODUCT GAS MNT	(GM/MOL)	15.5
PRODUCT GAS		
PG AT DTH (DRY)	(SCMH)	120.5
(DRY, N2 FREE)	(SCMH)	110.2
PG AT GASIFIER OUTLET	(SCMH)	164.9
INCLUDES N2 AND H2O	(ACMH)	53.3
PG AT GASIFIER OUTLET	(SCMH)	154.7
(EXCLUDES N2)	(ACMH)	31.2

* BASED ON OXYGEN BALANCE

YIELD PERIOD 1. SOLIDS DATA

YIELD PERIOD 1. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GB (WTX)	GF (WTX)
K AS K2O	9.5	25.3	25.3	26.7	26.5
K AS KOH	11.3	30.2	30.2	31.8	34.0
K AS K2CO3	13.9	37.2	37.2	39.1	41.8
K AS K	7.9	21.0	21.0	22.1	23.7
K WATER/ACID					
SOLUBLE RATIO	0.646	0.695	0.695	0.644	0.747
K2O H2O INSOL	3.4	7.7	7.7	9.5	7.2
K2CO3 INSOL	4.9	11.3	11.3	13.9	10.6
K INSOL	2.8	6.4	6.4	7.9	6.0

CARBON	63.1	31.1	31.0	24.3	36.7
K ON CARBON	12.5	67.7	67.9	91.2	64.5
ASTH ASH	25.7	72.0	72.0	75.7	60.4
K ON ASH	30.7	29.2	29.2	29.2	39.1
KOH-FREE ASH	14.0	41.0	41.0	43.3	25.3
K2CO3-FREE ASH	11.3	33.8	33.8	35.7	17.1
K ON K2CO3-FREE ASH	69.7	62.3	62.3	62.0	138.8

* BASED ON ACID SOLUBLE DETERMINATION

CATALYST ---KOH

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN (GTC)	(GMC)	(GB)	FINES (GF)
10 MESH	99.9	99.9	100.0	99.9	99.9
20 MESH	99.6	99.4	99.4	99.0	99.0
30 MESH	99.2	97.8	98.1	97.2	98.2
40 MESH	94.5	92.1	92.1	89.7	97.7
60 MESH	59.3	63.1	62.0	55.8	96.1
80 MESH	37.7	42.6	41.3	36.1	90.4
100 MESH	24.3	30.2	29.0	24.3	79.7
200 MESH	6.4	13.9	9.4	8.2	42.1
325 MESH	2.0	4.2	4.3	3.7	15.6

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	22.	16.	14.	15.	12.
VOLUME SURFACE MEAN	161.	130.	137.	150.	63.
WEIGHT MEAN	241.	234.	239.	261.	117.

* ROSEN-RAHMLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	259.	255.	262.	297.	132.
SIZE DISTRIBUTION CONSTANT	2.20	1.72	1.78	1.73	1.36
BULK DENSITY (G/CC)	0.760	0.0	0.390	0.440	0.641
BULK DENSITY (LBS/CFT)	47.4	0.0	24.3	27.5	40.0

YIELD PERIOD 1. FLUID-SOLIDS DATA

*** GASIFIER BED PROPERTIES**

BED BOTTOM DENSITY	(LBS/CF)	14.6
BED TOP DENSITY	(LBS/CF)	8.4
BED AVERAGE DENSITY	(LBS/CF)	12.1
BED HEIGHT	(FEET)	49.9
BED HOLDUP	(LBS)	329.5
BED VOLUME	(CFT)	27.214
ACTIVE BED TEMPERATURE	(DEG F)	1293.4
ACTIVE BED VOLUME	(CFT)	23.904
SPACE VELOCITY (ACT BED)	(ACFH/CF)	47.7
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.396
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.581

*** CYCLONE PERFORMANCE**

TEMPERATURE	(DEG F)	1034.6
PRESSURE	(PSIA)	269.1
INLET GAS RATE	(SCFH)	6156.3
	(ACFH)	966.8
INLET GAS VELOCITY	(FT/SEC)	30.1
SOLIDS ENTERING	(LBS/HR)	6.5
DUST LOAD	(LBS/ACF)	0.2378
SOLIDS CAPTURED	(LBS/HR)	6.5
SOLIDS ESCAPING	(LBS/HR)	-0.0
OVERALL EFFICIENCY (CAPTURED/ENTERING, WT%)		100.2

*** SOLIDS ENTRAINMENT LOSS**

TOTAL -325 MESH

COAL+CATALYST FEED	(LBS/HR)	58.69	1.18
TOTAL ENTRAINED	(LBS/HR)	6.51	1.02
ENTRAINED/FEED	(WT%)	11.1%	1.7%

ENTRAINED/FEED (FEED FINES BACKED OUT)	(WT%)		-0.3%
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*** SOLIDS CARBON LOSS**

CARBON IN FEED	(LBS/HR)	37.02	0.66
CARBON IN ENTRAINED FINES	(LBS/HR)	2.39	0.37
ENTRAINED/FEED	(WT%)	6.4%	1.0%
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WT%)		-0.8%

YIELD PERIOD 1. UNIT CONVERSIONS

*** STEAM CONSUMPTION**

PRIMARY GASIFIER

STEAM INTO UNIT	(LBS/HR)	114.83
STEAM REACTED WITH CARBON	(LBS/HR)	30.48
STEAM REACTED IN SHIFT	(LBS/HR)	32.31
STEAM FROM METHANATION		
BASED ON RECOVERED H2O	(LBS/HR)	-26.72
BASED ON H2 BALANCE	(LBS/HR)	-26.72
BASED ON O2 BALANCE	(LBS/HR)	-26.72
TOTAL STEAM CONSUMED		
BASED ON RECOVERED H2O	(LBS/HR)	36.07
BASED ON H2 BALANCE	(LBS/HR)	36.07
BASED ON O2 BALANCE	(LBS/HR)	36.07

*** STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)**

GASIFICATION	(%)	26.5
WATER-GAS SHIFT	(%)	26.1
METHANATION		
BASED ON RECOVERED H2O	(%)	-23.3
BASED ON H2 BALANCE	(%)	-23.3
BASED ON O2 BALANCE	(%)	-23.3

TOTAL STEAM CONVERTED

BASED ON RECOVERED H2O	(%)	31.4
BASED ON H2 BALANCE	(%)	31.4
BASED ON O2 BALANCE	(%)	31.4

*** REACTION RATE PARAMETERS**

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.177
GASIFICATION ONLY	(MOL/MOL)	0.266
INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.269
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.402

CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.747
GASIFICATION ONLY	(MOL/HR)/CF	0.063

INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	1.133
GASIFICATION ONLY	(MOL/HR)/CF	0.094

CARBON IN BED/STEAM FED	LBS/(LBS/HR)	0.890
CARBON IN BED/STEAM FED	MOL/(MOL/HR)	1.335

*** CARBON CONVERTED BASED ON RECOVERED SOLIDS**

YIELD PERIOD 1. UNIT CONVERSIONS

YIELD PERIOD 1. MATERIAL BALANCES

* CARBON CONSUMPTION

	PRIMARY GASIFIER
CARBON IN COAL+CATALYST (LBS/HR)	37.02
CARBON FROM DEVOLATILIZATION (LBS/HR)	10.52
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CARBON GASIFIED	
BASED ON GC ANALYSIS (LBS/HR)	20.32
BASED ON RECOVERED SOLIDS (LBS/HR)	20.32
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TOTAL CARBON CONVERTED	
BASED ON GC ANALYSIS (LBS/HR)	30.84
BASED ON RECOVERED SOLIDS (LBS/HR)	30.84

* CARBON CONVERSION (C CONVERTED/C IN FEED)

GASIFICATION ONLY		
BASED ON GC ANALYSIS (%)		54.9
BASED ON RECOVERED SOLIDS (%)		54.9
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INCLUDING DEVOLATIZATION		
BASED ON GC ANALYSIS (%)		83.3
BASED ON RECOVERED SOLIDS (%)		83.3

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)

GASIFICATION ONLY		
BASED ON GC ANALYSES (%/HR)		19.9
BASED ON RECOVERED SOLIDS (%/HR)		19.9
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INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES (%/HR)		30.2
BASED ON RECOVERED SOLIDS (%/HR)		30.2

* ASH AND FINES BALANCES

	ASTH	ASH	C/H RESIDUE	803 FREE	803 FREE	-325 MESH FINES
	(LBS/HR)	(LBS/HR)	(LBS/HR)	(LBS/HR)	(LBS/HR)	(LBS/HR)
INPUT:						
COAL+CATALYST	15.05	12.72	9.33	8.29	1.16	
OUTPUT:						
PRI CHAR CARRYOVER	3.93	3.86	3.32	3.33	1.02	
SOLIDS WITHDRAWN	7.11	7.12	5.72	5.78	0.68	
TOTAL	11.04	10.98	9.04	9.12	1.70	
ACCUMULATION:	1.15	0.08	0.28	-0.08	0.65	
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CLOSURE:						
(OUT+ACCUH)/IN	81.0%	87.0%	99.9%	109.0%	199.2%	
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-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUH-INPUT)						1.17
PRODUCED/(OUTPUT+ACCUH)						49.6%

* ASH ELEMENT BALANCE

	SiO2	Fe2O3	Al2O3	CaO	MgO	SO3	TiO2	P2O5	Na2O
	LBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HR								
INPUT:									
COAL+CATALYST	1.902	0.771	0.650	0.210	0.037	4.427	0.033	0.016	0.108
OUTPUT:									
CHAR ENTRAINED	0.825	0.241	0.260	0.045	0.015	0.525	0.016	0.005	0.044
CHAR WITHDRAWN	1.687	0.622	0.599	0.163	0.036	1.536	0.024	0.015	0.038
TOTAL	2.512	0.863	0.859	0.228	0.051	2.061	0.040	0.021	0.082
ACCUMULATION:	-0.610	-0.091	-0.210	-0.018	-0.013	0.259	-0.007	-0.005	0.027
CLOSURE									
(OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	52.4%	100.0%	100.0%	100.0%

YIELD PERIOD 1. MATERIAL BALANCES

YIELD PERIOD 1. UNIT PRESSURES

UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	281.4
LOCK HOPPER 2B	273.3
STEAM GENERATOR	416.8
COAL FEED LINE A	270.3
COAL FEED LINE B	278.8
GASIFIER TOP	267.6
MID	269.2
BTM	271.2
CYCLONE OUTLET	266.2
FILTER OUTLET	266.2
SCRUBBER	266.2

GASIFIER DIFFERENTIAL PRESSURES

BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	5.0
6.1	3.6
16.4	2.5
26.4	1.6
37.5	0.7
47.7	0.1
57.8	-0.0
67.9	-0.0
84.2	-0.0

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	37.02	2.46	6.71	2.376	0.735	0.057
STEAM	-	12.85	101.98	-	-	-
SYN GAS	27.97	13.75	37.26	-	-0.000	-
TOTAL	64.99	29.05	145.95	2.376	0.735	0.057

OUTPUT (LBS/HR)

PRODUCT GAS (DRY)	58.60	20.14	74.54	1.930	28.277	-
PRODUCT WATER	0.20	8.81	70.49	0.008	0.000	-
CHAR WITHDRAWN	2.28	0.04	0.97	0.359	0.002	0.014
CHAR ENTRAINED	2.39	0.03	0.58	0.168	0.003	0.020
TOTAL	63.47	29.03	146.58	2.464	28.282	0.034
SOLIDS ACC.	1.52	0.02	-0.63	-0.088	-0.010	0.023
CLOSURE:	100.00	100.00	100.00	100.000	*****	100.000

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUT:	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL+CATALYST	4.62	2.99
OUTPUT:		
PRI CHAR CARRYOVER	1.54	1.15
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/O	2.08	1.34
TOTAL	3.62	2.49
ACCUMULATION:		
PRI GASIF	1.01	0.28
CLOSURE:		
(OUT+ACCUM)/IN	100.0%	92.7%

RECONCILED DATA

YIELD PERIOD 2. UNIT OPERATIONS

	TIME	DATE
FROM	1430	5-5-80
TO	1430	5-6-80
DURATION	24.00 HRS	

* MODE OF OPERATION GASIFIER ONLY

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS
UNIT

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1236.	272.
Active Bed	1296	

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	981.
77.6	1296.
67.9	1308.
57.8	1296.
47.7	1305.
42.6	1308.
37.5	1299.
26.4	1292.
21.4	1290.
11.3	1288.
6.1	1278.
0.0	846.

YIELD PERIOD 2. UNIT PROCESS VARIABLES

* UNIT TEMPERATURES PROCESS (DEG F) METAL (DEG F)

CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	117.	84.
SCREW DRYER	302.	324.
OXIDIZER 1 TOP	235.	
MID	234.	
BTH	226.	
OXIDIZER 2 TOP	302.	
MID	302.	
BTH	297.	
LOCK HOPPER 1 TOP	169.	
MID	163.	147.
LOWER	192.	
CONE	162.	261.
LOCK HOPPER 2A MID	304.	338.
CONE	273.	392.
LH-2A FEED POT		333.
LH-2A FEED LINE MID		334.
LOWER		365.
LOCK HOPPER 2B MID	333.	351.
CONE	336.	378.
LH-2B FEED POT		307.
LH-2B FEED LINE MID		261.
LOWER		262.
SYN GAS PREHEATER		536.
STEAM GENERATOR	450.	
STM & SO SUPERHEATER	1209.	1051.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		
TOP OF BED	1308.	1303.
BTH OF BED	1278.	1326.
BED AVERAGE	1238.	1304.
CYCLONE		1186.
DIPLEG TOP	1189.	1134.
DIPLEG MID	93.	117.
DIPLEG BTH	748.	1247.
DIPLEG BLUPE		1258.
FILTER INLET	676.	813.
FILTER 1		716.
FILTER 2		-418.
SCRUBBER INLET	601.	572.
SCRUBBER TOP	66.	
SCRUBBER MID	120.	
SCRUBBER BTH	230.	
SOUR GAS STRIPPER TOP	32.	
MID	212.	
BTH	217.	

YIELD PERIOD 2. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	COAL+CAT (FC) (WT%)	(WT% OF TOTAL SOLIDS, DRY) CHAR W/D & C/O			FHS FEED (COAL) (WT%)
		(GHC) (WT%)	(GB) (WT%)	(GF) (WT%)	
H	4.11	0.40	0.35	0.46	5.00
C	63.49	20.51	16.77	32.19	69.94
S	4.11	3.92	5.49	3.52	4.00
PYRITIC	1.28	0.11	0.13	0.11	1.24
SULFATE	0.26	0.21	0.22	0.25	0.25
ORGANIC	2.57	3.60	5.14	3.16	2.50
O	11.85	8.17	5.68	6.12	9.85
N	1.18	0.02	0.25	0.03	1.29
CL	0.07	0.20	0.15	0.47	0.09
803-FREE ASH	15.19	67.04	71.32	55.16	9.75
TOTAL	100.00	100.26	100.00	100.00	100.00
* ASH ANALYSIS		(WT% OF TOTAL SOLIDS)			
ASH	24.91	80.70	86.88	64.69	10.26
C/H RESIDUE	21.52	80.00	85.49	64.31	9.66
803-C/H RES.	13.98	66.33	70.58	56.32	9.15
* ASH ELEMENT ANALYSIS		(WT% OF 803-FREE ASH)			
SiO2	22.46	23.82	30.19	24.99	53.00
Fe2O3	7.11	9.25	10.77	6.97	15.00
Al2O3	7.71	9.41	9.40	7.59	20.00
CaO	1.66	2.50	3.08	1.23	4.00
H2O	0.42	0.55	0.50	0.41	1.00
TiO2	0.10	0.38	0.29	0.46	1.00
P2O5	0.21	0.16	0.18	0.01	0.40
Na2O	0.00	0.0	0.00	0.00	0.0
CATALYST		(FROM ACID SOLUBLE ANALYSIS)			
K2O	60.33	41.32	45.60	58.34	4.72
TOTAL	100.00	87.39	100.00	100.00	99.12

YIELD PERIOD 2. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES		GASIFIER		
BALANCE USED		H2O	O2	H2
TOTAL PRESSURE	(PSIA)	272.4	272.4	272.4
H2	(PSIA)	104.3	104.3	104.3
CO	(PSIA)	17.8	17.8	17.8
CH4	(PSIA)	34.6	34.6	34.6
CO2	(PSIA)	29.7	29.7	29.7
H2S	(PSIA)	0.9	0.9	0.9
H2O	(PSIA)	73.4	73.4	73.4
N2	(PSIA)	12.0	12.0	12.0
NH3	(PSIA)	0.0	0.0	0.0
H2O/CO		4.1	4.1	4.1
H2O/CO2		2.5	2.5	2.5

* UNIT GAS DATA		GASIFIER
SYN GAS HWT	(LBS/MOL)	8.0
INJECTION GAS HWT	(LBS/MOL)	0.0
PRODUCT GAS HWT	(LBS/MOL)	14.7
PRODUCT GAS		
PG AT DTN (DRY)	(SCFH)	4452.9
(DRY, N2 FREE)	(SCFH)	4184.7
PG AT GASIFIER OUTLET	(SCFH)	6089.2
INCLUDES N2 AND H2O	(ACFH)	1144.6
PG AT GASIFIER OUTLET	(SCFH)	5821.0
(EXCLUDES N2)	(ACFH)	1094.3

* BASED ON OXYGEN BALANCE

YIELD PERIOD 2. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GB (WTX)	GF (WTX)
K AS K2O	9.2	27.7	27.7	32.5	32.2
K AS KOH	10.9	33.0	33.0	38.8	38.4
K AS K2CO3	13.4	40.7	40.7	47.7	47.3
K AS K	7.6	23.0	23.0	27.0	26.7
K WATER/ACID					
SOLUBLE RATIO	0.515	0.572	0.572	0.538	0.656
K2O H2O INSOL	4.4	11.9	11.9	15.0	11.1
K2CO3 " INSOL	6.5	17.4	17.4	22.1	16.3
K " INSOL	3.7	9.8	9.8	12.5	9.2

CARBON	63.5	20.5	20.5	16.8	32.2
K ON CARBON	12.0	112.1	112.1	161.0	83.0

ASTM ASH	24.9	80.7	80.7	86.9	64.7
K ON ASH	30.5	28.5	28.5	31.1	41.3

KOH-FREE ASH	14.0	47.7	47.7	48.1	26.3
K2CO3-FREE ASH	11.5	40.0	40.0	39.1	17.4
K ON K2CO3-FREE ASH	66.4	57.4	57.4	69.0	153.4

* BASED ON ACID SOLUBLE DETERMINATION

CATALYST ---KOH

YIELD PERIOD 2. SOLIDS DATA

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN		FINES (GF)
		(GTC)	(GMC)	(GB)
10 MESH	99.9	99.9	99.9	99.8
20 MESH	99.8	99.4	99.4	99.2
30 MESH	99.8	97.8	97.8	98.2
40 MESH	94.3	92.1	92.1	90.4
60 MESH	56.2	63.1	63.1	56.8
80 MESH	36.6	42.6	42.6	36.0
100 MESH	28.4	30.2	30.2	24.2
200 MESH	3.1	13.9	13.9	15.1
325 MESH	1.8	4.2	4.2	3.1

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	22.	16.	16.	19.	9.
VOLUME SURFACE MEAN	168.	130.	130.	141.	47.
WEIGHT MEAN	242.	234.	234.	251.	100.

* ROSEN-RAHLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	260.	255.	255.	272.	100.
SIZE DISTRIBUTION CONSTANT	2.41	1.72	1.72	1.79	0.94
BULK DENSITY (G/CC)	0.750	0.460	0.460	0.580	0.300
BULK DENSITY (LBS/CFT)	46.8	28.7	28.7	36.2	18.7

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YIELD PERIOD 2. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES			
BED BOTTOM DENSITY	(LBS/CF)	19.4	
BED TOP DENSITY	(LBS/CF)	9.3	
BED AVERAGE DENSITY	(LBS/CF)	15.5	
BED HEIGHT	(FEET)	56.0	
BED MOLOUP	(LBS)	474.3	
BED VOLUME	(CFT)	30.547	
ACTIVE BED TEMPERATURE	(DEG F)	1296.0	
ACTIVE BED VOLUME	(CFT)	27.236	
SPACE VELOCITY (ACT BED)	(ACFH/CF)	40.7	
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.304	
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.565	
* CYCLONE PERFORMANCE			
TEMPERATURE	(DEG F)	1187.6	
PRESSURE	(PSIA)	272.4	
INLET GAS RATE	(SCFH)	6089.2	
	(ACFH)	1041.2	
INLET GAS VELOCITY	(FT/SEC)	32.5	
SOLIDS ENTERING	(LBS/HR)	3.9	
DUST LOAD	(LBS/ACF)	0.1308	
SOLIDS CAPTURED	(LBS/HR)	0.0	
SOLIDS ESCAPING	(LBS/HR)	3.9	
OVERALL EFFICIENCY (CAPTURED/ENTERING, WTX)		0.0	
* SOLIDS ENTRAINMENT LOSS			
		TOTAL	=325 MESH
COAL+CATALYST FEED	(LBS/HR)	55.57	1.01
TOTAL ENTRAINED	(LBS/HR)	3.86	1.14
ENTRAINED/FEED	(WTX)	6.9X	2.0X
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WTX)		0.2X
* SOLIDS CARBON LOSS			
CARBON IN FEED	(LBS/HR)	35.28	0.56
CARBON IN ENTRAINED FINES	(LBS/HR)	1.24	0.35
ENTRAINED/FEED	(WTX)	3.5X	1.0X
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WTX)		-0.6X

YIELD PERIOD 2. UNIT CONVERSIONS

* STEAM CONSUMPTION		PRIMARY GASIFIER
STEAM INTO UNIT	(LBS/HR)	115.48
STEAM REACTED WITH CARBON	(LBS/HR)	31.64
STEAM REACTED IN SHIFT	(LBS/HR)	31.21
STEAM FROM METHANATION		
BASED ON RECOVERED H2O	(LBS/HR)	-25.05
BASED ON H2 BALANCE	(LBS/HR)	-25.05
BASED ON O2 BALANCE	(LBS/HR)	-25.05
TOTAL STEAM CONSUMED		
BASED ON RECOVERED H2O	(LBS/HR)	37.80
BASED ON H2 BALANCE	(LBS/HR)	37.80
BASED ON O2 BALANCE	(LBS/HR)	37.80
* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)		
GASIFICATION	(%)	27.4
WATER-GAS SHIFT	(%)	27.0
METHANATION		
BASED ON RECOVERED H2O	(%)	-21.7
BASED ON H2 BALANCE	(%)	-21.7
BASED ON O2 BALANCE	(%)	-21.7
TOTAL STEAM CONVERTED		
BASED ON RECOVERED H2O	(%)	32.7
BASED ON H2 BALANCE	(%)	32.7
BASED ON O2 BALANCE	(%)	32.7
* REACTION RATE PARAMETERS		
CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.183
GASIFICATION ONLY	(MOL/MOL)	0.274
INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.282
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.423
CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.690
GASIFICATION ONLY	(MOL/HR)/CF	0.057
INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	1.066
GASIFICATION ONLY	(MOL/HR)/CF	0.089
CARBON IN BED/STEAM FED	LBS/(LBS/HR)	0.842
CARBON IN BED/STEAM FED	MOL/(MOL/HR)	1.264

* CARBON CONVERTED BASED ON RECOVERED SOLID

YIELD PERIOD 2. UNIT CONVERSIONS

YIELD PERIOD 2. MATERIAL BALANCES

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	35.28
CARBON FROM DEVOLATILIZATION	(LBS/HR)	11.48
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	21.09
BASED ON RECOVERED SOLIDS	(LBS/HR)	21.09
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	32.57
BASED ON RECOVERED SOLIDS	(LBS/HR)	32.57

* CARBON CONVERSION (C CONVERTED/C IN FEED)

GASIFICATION ONLY		
BASED ON GC ANALYSIS	(%)	59.8
BASED ON RECOVERED SOLIDS	(%)	59.8
INCLUDING DEVOLATIZATION		
BASED ON GC ANALYSIS	(%)	92.3
BASED ON RECOVERED SOLIDS	(%)	92.3

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)

GASIFICATION ONLY		
BASED ON GC ANALYSES	(%/HR)	21.7
BASED ON RECOVERED SOLIDS	(%/HR)	21.7
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES	(%/HR)	33.5
BASED ON RECOVERED SOLIDS	(%/HR)	33.5

* ASH AND FINES BALANCES					
	ASTH ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	803 FREE ASTH ASH (LBS/HR)	803 FREE C/H RESID (LBS/HR)	-325 MESH FINES (LBS/HR)
INPUT:					
COAL+CATALYST	13.84	11.94	8.44	7.77	1.01
OUTPUT:					
PRI CHAR CARRYOVER	2.50	2.48	2.13	2.17	1.14
SOLIDS WITHDRAWN	6.28	6.18	5.16	5.10	0.18
TOTAL	8.78	8.66	7.29	7.28	1.31
ACCUMULATION:	1.07	2.38	1.16	2.52	-0.26
CLOSURE: (OUT+ACCUM)/IN	71.1%	92.3%	100.0%	126.0%	104.6%
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					0.05
PRODUCED/(OUTPUT+ACCUM)					4.4%

* ASH ELEMENT BALANCE

	SiO2	Fe2O3	Al2O3	CaO	MgO	803	TiO2	P2O5	Na2O
INPUT:	LBS/HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS/H
COAL+CATALYST	1.896	0.600	0.651	0.140	0.033	4.187	0.009	0.018	0.000
OUTPUT:									
CHAR ENTRAINED	0.532	0.148	0.162	0.026	0.009	0.308	0.010	0.000	0.000
CHAR WITHDRAWN	1.557	0.556	0.489	0.159	0.026	1.877	0.015	0.009	0.000
TOTAL	2.088	0.704	0.646	0.185	0.034	1.385	0.025	0.010	0.000
ACCUMULATION	-0.192	-0.104	0.005	-0.045	0.001	-0.137	-0.016	0.008	0.000
CLOSURE (OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	29.8%	100.0%	100.0%	99.8%

YIELD PERIOD 2. UNIT PRESSURES

* UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	281.5
LOCK HOPPER 2B	67.9
STEAM GENERATOR	417.0
COAL FEED LINE A	283.3
COAL FEED LINE B	274.7
GASIFIER TOP	272.4
MID	275.2
BTM	277.6
CYCLONE OUTLET	272.4
FILTER OUTLET	270.4
SCRUBBER	270.4
GASIFIER DIFFERENTIAL PRESSURES	
BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	6.9
6.1	5.2
16.4	3.8
26.4	2.8
37.5	1.9
47.7	1.2
57.8	0.7
67.9	0.7
84.2	0.7

YIELD PERIOD 2. MATERIAL BALANCES

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	35.28	2.28	6.59	2.283	0.657	0.037
STEAM	-	12.92	102.56	-	-	-
SYN GAS	25.56	14.25	34.05	-	0.000	-
TOTAL	60.84	29.45	143.19	2.283	0.657	0.037
OUTPUT (LBS/HR)						
PRODUCT GAS (DRY)	57.93	20.74	72.22	1.710	19.798	-
PRODUCT WATER	0.20	8.69	69.92	-0.000	0.000	-
CHAR WITHDRAWN	1.21	0.03	0.41	0.397	0.018	0.011
CHAR ENTRAINED	1.24	0.02	0.31	0.136	0.001	0.018
TOTAL	60.58	29.48	142.87	2.243	19.817	0.029
SOLIDS ACC.	0.26	-0.02	0.73	0.040	-0.006	0.009
CLOSURE	100.00	100.00	100.00	100.000	*****	100.000

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
INPUT:		
COAL+CATALYST	4.23	2.18
OUTPUT:		
PRI CHAR CARRYOVER	1.03	0.68
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/D	1.95	1.05
TOTAL	2.98	1.73
ACCUMULATION:		
PRI GASIF	1.24	0.30
CLOSURE	100.00	93.14

2LD PERIOD 2. PRODUCT GAS DATA

* GASIFIER PRODUCT GAS (FROM FILTERS AND SCRUBBER) (DRY)

MAJOR COMPONENTS, MOL %		MINOR COMPONENTS, PPM	
H2	52.42	C2H6	0.0
CO	8.94	C2H4	0.0
CO2	14.76	C3H8	0.0
CH4	17.40	N2+AR	0.0
H2S	0.45	CO3	0.0
N2	6.02	SO2	0.0

* GASIFIER PRODUCT GAS (INCLUDES UNREACTED STEAM)

H2	38.33		
CO	6.54		
CO2**	10.90	SCFH CH4/LB C FEED	21.96
CH4	12.72		
H2O**	26.87		
H2S	0.33	SCFH CH4/LB C IN BED	7.96
N2	4.40		
NH3	0.00		

* EQUILIBRIUM CONSTANTS

REACTION	EQUILIBRIUM AT ACTIVE BED TEMP (1296.0 F)	ACTUAL EQUILIBRIUM EXPRESSION	CORRESPONDING EQUILIBRIUM TEMPERATURE (DEG F)
GRAPHITE-H2O: C + H2O = CO + H2	1.7309	1.7205	1295.3
SHIFT: CO + H2O = CO2 + H2	1.5411	2.3691	1135.8
METHANATION: CO + 3H2 = CH4 + H2O	0.0741	0.0272	1361.7
WATER-GAS: CO + H2O = CO2 + H2	0.3420	0.1906	

* MATERIAL BALANCES *

INPUT: (LBS/HR)	OUTPUT: (LBS/HR)
GASIFIER (INCLUDES FILTER AND SCRUBBER)	
COAL + CATALYST	53.91
STEAM	115.48
MAKEUP SYN GAS	75.98
RECYCLE GAS	0.0
TOTAL	244.37
ACCUMULATION	2.16
OVERALL INPUT	244.37
GASIF ACCUM	2.16
PRODUCT WATER	
CHAR WITHDRAWN	70.42
CHAR ENTRAINED	7.21
PRODUCT GAS (DRY)	3.86
TOTAL	79.49
CLOSURE: (OUT+ACC)/IN =	99.9%
PURGE GAS	
OVERALL OUTPUT	0.0
CLOSURE: (OUT+ACC)/IN	99.1%

* SYN GAS BALANCE

INPUT: (SCFH)	OUTPUT: (SCFH)
SYN GAS TO GASIF	3489.59
H2 MOL % 76.86	2682.09
CO MOL % 23.14	807.50
H2+CO IN PRODUCT GAS	2732.35
H2 MOL % 52.42	2334.24
CO MOL % 8.94	398.11

SYN GAS BALANCE: 78.30% H2 BALANCE: 87.03% CO BALANCE: 49.30%

YIELD PERIOD 2. MATERIAL BALANCES

* GASIFIER MOLE BALANCES

GAS INPUT	LB-MOLES/HR				
	C	H	O	S	N
SYN GAS					
H2 (7.068)	-	14.135	-	-	-
CO (2.126)	2.126	-	2.126	-	-
CH4 (0.000)	0.000	0.000	-	-	-
CO2 (0.0)	0.0	-	0.0	-	-
N2 (0.000)	-	-	-	-	0.000
STEAM					
H2O (6.410)	-	12.820	6.410	-	-
TOTAL (15.605)	2.126	26.955	8.536	-	0.000

SOLIDS INPUT	LB-MOLES/HR					
	C	H	O	S	N	K
COAL+CATALYST	2.937	2.264	0.412	0.071	0.047	0.108
TOTAL INPUT	5.065	29.219	8.950	0.071	0.047	0.108

GAS OUTPUT	LB-MOLES/HR				
	C	H	O	S	N
PRODUCT GAS					
H2 (6.151)	-	12.302	-	-	-
CO (1.049)	1.049	-	1.049	-	-
CH4 (2.041)	2.041	0.166	-	-	-
CO2 (1.749)	1.749	-	3.498	-	-
H2S (0.053)	-	0.107	-	0.053	-
N2 (0.707)	-	-	-	-	1.413
NH3 (0.000)	-	0.000	-	-	0.000
H2O (4.312)	-	8.624	4.312	-	-
TOTAL (16.062)	4.839	29.198	8.859	0.053	1.413

SOLIDS OUTPUT	LB-MOLES/HR					
	C	H	O	S	N	K
CHAR ENTRAINED	0.103	0.018	0.020	0.004	0.000	0.026
CHAR WITHDRAWN	0.101	0.025	0.026	0.012	0.001	0.050
TOTAL SOLIDS	0.204	0.043	0.045	0.017	0.001	0.076
TOTAL OUTPUT	5.044	29.242	8.904	0.070	1.415	0.076
ACCUMULATION	0.021	-0.023	0.045	0.001	-0.000	0.032

CLOSURE	(OUT+ACC)/IN, %					
	100.0	100.0	100.0	100.0	100.0	100.0

RECONCILED DATA

YIELD PERIOD 3. UNIT OPERATIONS

	TIME	DATE
FROM	0830	5 19 80
TO	0830	5 20 80
DURATION	24.00 HRS	

* MODE OF OPERATION PARTIAL RECYCLE (ABOUT HALF), NO CRYO

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	100.0%

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1196.	264.
MEA ABSORBER	165.	227.
CRYOGENIC FRACTIONATOR	-130.	227.

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	1074.
77.6	1287.
67.9	1303.
57.8	1292.
47.7	1299.
42.6	1299.
37.5	1285.
26.4	1265.
21.4	1256.
11.3	1254.
6.1	1157.
0.0	855.

YIELD PERIOD 3. UNIT PROCESS VARIABLES

* UNIT TEMPERATURES

	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	120.	91.
SCREW DRYER	302.	334.
OXIDIZER 1 TOP	250.	
MID	252.	
BTH	408.	
OXIDIZER 2 TOP	320.	
MID	320.	
BTH	331.	
LOCK HOPPER 1 TOP	181.	
MID	208.	212.
LOWER CONE	212.	
LOCK HOPPER 2A MID	163.	270.
CONC	325.	358.
LH-2A FEED POT	316.	378.
LH-2A FEED LINE MID		338.
LOWER		300.
LOCK HOPPER 2B MID	302.	367.
CONC	307.	333.
LH-2B FEED POT		379.
LH-2B FEED LINE MID		298.
LOWER		327.
SYN GAS PREHEATER		358.
STEAM GENERATOR	490.	563.
BTH & SC SUPERHEATER	1114.	698.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		
TOP OF BED	1303.	1314.
BTH OF BED	1254.	1335.
BED AVERAGE	1196.	1293.
CYCLONE		1188.
DIPLEG TOP	1169.	1134.
DIPLEG MID	93.	117.
DIPLEG BTH	748.	1247.
DIPLEG SLOPE		1258.
FILTER INLET	865.	813.
FILTER 1		712.
FILTER 2		685.
SCRUBBER INLET	588.	561.
SCRUBBER TOP	55.	
SCRUBBER MID	120.	
SCRUBBER BTH	223.	
SOUR GAS STRIPPER TOP	167.	
MID	205.	
BTH	216.	

YIELD PERIOD 3. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	COAL+CAT (FC) (WTX)	(WTX OF TOTAL SOLIDS, DRY) CHAR W/D & C/O			LHS FEED (COAL) (WTX)
		(GHC) (WTX)	(GB) (WTX)	(GF) (WTX)	
H	4.23	0.82	0.78	0.79	5.20
C	61.19	50.90	47.81	54.62	70.60
S	3.85	3.20	2.87	1.40	3.80
PYRITIC	1.20	1.90	2.00	1.30	1.19
SULFATE	0.20	0.40	0.40	0.30	0.20
ORGANIC	2.45	0.90	0.46	-0.20	2.42
O	11.77	7.10	7.46	8.67	9.50
N	1.20	0.08	0.60	0.50	1.20
CL	0.10	0.20	0.17	0.49	0.08
803-FREE ASH	17.65	37.70	40.31	33.54	9.70
TOTAL	100.00	100.00	100.00	100.00	100.08

* ASH ANALYSIS	(WTX OF TOTAL SOLIDS)				
ASH	25.50	46.50	48.20	38.40	9.80
C/H RESIDUE	21.50	43.00	46.90	40.50	9.60
803-C/H RES.	14.50	34.00	38.20	36.00	9.50

* ASH ELEMENT ANALYSIS	(WTX OF 803-FREE ASH)				
SiO2	25.80	25.20	26.46	19.89	0.0
Fe2O3	7.70	6.90	7.82	5.61	0.0
Al2O3	9.28	9.10	9.55	7.28	0.0
CaO	2.21	1.40	2.25	1.43	0.0
MgO	0.64	0.60	0.64	0.51	0.0
TiO2	0.46	0.50	0.43	0.61	0.0
P2O5	0.08	0.05	0.08	0.01	0.0
Na2O	-0.00	0.0	-0.00	0.00	0.0
CATALYST	(FROM ACID SOLUBLE ANALYSIS)				
K2O	23.85	56.23	52.76	64.67	2.06
TOTAL	96.90	99.98	100.00	100.00	2.06

YIELD PERIOD 3. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES	GASIFIER		
BALANCE USED	H2O	O2	H2
TOTAL PRESSURE (PSIA)	264.2	264.2	264.2
H2 (PSIA)	105.6	105.6	105.6
CO (PSIA)	14.1	14.1	14.1
CH4 (PSIA)	33.1	33.1	33.1
CO2 (PSIA)	23.9	23.9	23.9
H2S (PSIA)	0.9	0.9	0.9
H2O (PSIA)	67.9	67.9	67.9
N2 (PSIA)	18.9	18.9	18.9
NH3 (PSIA)	0.0	0.0	0.0
H2O/CO	4.8	4.8	4.8
H2O/CO2	2.8	2.8	2.8

* UNIT GAS DATA	GASIFIER	
SYN GAS MMT (LBS/HOL)		9.1
INJECTION GAS MMT (LBS/HOL)		0.0
PRODUCT GAS MMT (LBS/HOL)		14.0
PRODUCT GAS		
PG AT OTH (DRY) (SCFH)		4752.0
(DRY, N2 FREE) (SCFH)		4294.2
PG AT GASIFIER OUTLET (SCFH)		6369.9
INCLUDES N2 AND H2O (ACFH)		1237.7
PG AT GASIFIER OUTLET (SCFH)		5932.1
(EXCLUDES N2) (ACFH)		1149.0

* BASED ON OXYGEN BALANCE

* CATALYST DISTRIBUTION

	FEED (HTX)	GTC (HTX)	GMC (HTX)	GB (HTX)	GF (HTX)
K AS K2O	9.5	21.2	21.2	21.3	21.7
K AS KOH	11.3	25.3	25.3	25.4	25.9
K AS K2CO3	13.9	31.1	31.1	31.2	31.8
K AS K	7.9	17.6	17.6	17.7	18.0
K WATER/ACID					
SOLUBLE RATIO	0.600	0.712	0.712	0.719	0.784
K2O H2O INSOL	3.8	6.1	6.1	6.0	4.7
K2CO3 * INSOL	5.6	9.0	9.0	8.8	6.9
K... * INSOL	3.2	5.1	5.1	5.0	3.9
CARBON					
K ON CARBON	61.2	50.9	50.9	47.8	54.6
ASTH ASH	25.5	46.6	46.5	46.2	38.4
K ON ASH	30.9	37.8	37.8	36.6	46.9
KOH-FREE ASH					
K2CO3-FREE ASH	14.2	21.3	21.2	22.8	12.5
K ON K2CO3-FREE ASH	11.6	15.5	15.4	17.0	6.6
FREE ASH	68.3	113.7	114.5	104.0	274.5

* BASED ON ACID SOLUBLE DETERMINATION

CATALYST ---KOH

UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
SOUR GAS REMOVAL UNIT		
MEA ABSORBER INLET	158.	
TOP	140.	
UPPER	149.	
MID	165.	
BTH	163.	
MEA REGENERATOR TOP	217.	
BTH	225.	
REG OFF GAS COOLER 1	32.	
REG OFF GAS COOLER 2	32.	
MOL. SIEVE COL 1 TOP	198.	205.
MID	201.	
BTH	140.	149.
MOL. SIEVE COL 2 TOP	225.	219.
MID	214.	
BTH	158.	174.
CRYOGENIC FRACTIONATOR		
GAS INLET	-126.	
CONDENSER	-157.	
GAS OUTLET	-153.	
PACKING TOP	-148.	
UPPER	-141.	
LOWER	-130.	
BTH	-150.	
REBOILER TOP	-80.	
MID	-63.	
BTH	-65.	

YIELD PERIOD 3. SOLIDS DATA

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN			FINES (GF)
		(GTC)	(GMC)	(GB)	
10 MESH	99.9	99.8	99.8	99.8	99.9
20 MESH	99.9	98.5	98.5	98.7	99.9
30 MESH	99.7	96.2	96.2	95.5	99.3
40 MESH	95.4	86.9	86.9	83.7	99.0
60 MESH	62.2	54.6	54.6	49.2	95.1
80 MESH	41.1	35.9	35.9	30.7	81.4
100 MESH	25.9	25.0	25.0	20.2	62.8
200 MESH	6.2	10.5	10.5	9.0	20.7
325 MESH	3.1	8.4	8.4	4.3	12.7

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	16.	9.	9.	13.	10.
VOLUME SURFACE MEAN	150.	122.	122.	152.	78.
HEIGHT MEAN	229.	268.	268.	288.	134.

* ROSEN-RAHMLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	251.	293.	293.	320.	149.
SIZE DISTRIBUTION CONSTANT	2.10	1.47	1.47	1.64	1.75
BULK DENSITY (G/CC)	0.740	0.230	0.230	0.260	0.230
BULK DENSITY (LBS/CFT)	46.2	14.4	14.4	16.2	14.4

YIELD PERIOD 3. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES			
BED BOTTOM DENSITY	(LBS/CF)		6.9
BED TOP DENSITY	(LBS/CF)		4.7
BED AVERAGE DENSITY	(LBS/CF)		5.9
BED HEIGHT	(FEET)		57.0
BED HOLDUP	(LBS)		186.8
BED VOLUME	(CFT)		31.530
ACTIVE BED TEMPERATURE	(DEG F)		1282.2
ACTIVE BED VOLUME	(CFT)		25.392
SPACE VELOCITY (ACT BED)	(ACFH/CF)		46.9
BTM SUPERFICIAL VELOCITY	(FT/SEC)		0.315
TOP SUPERFICIAL VELOCITY	(FT/SEC)		0.607

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)		1187.6
PRESSURE	(PSIA)		264.2
INLET GAS RATE	(SCFH)		6349.9
	(ACFH)		1126.8
INLET GAS VELOCITY	(FT/SEC)		35.1
SOLIDS ENTERING	(LBS/HR)		5.0
DUST LOAD	(LBS/ACF)		0.1577
SOLIDS CAPTURED	(LBS/HR)		0.0
SOLIDS ESCAPING	(LBS/HR)		5.0
OVERALL EFFICIENCY (CAPTURED/ENTERING,WTX)			0.0

* SOLIDS ENTRAINMENT LOSS TOTAL -325 MESH

COAL+CATALYST FEED	(LBS/HR)	68.08	2.18
TOTAL ENTRAINED	(LBS/HR)	5.03	0.64
ENTRAINED/FEED	(WTX)	7.4%	0.9%

ENTRAINED/FEED (FEED FINES BACKED OUT) (WTX) -2.3%

* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	41.66	1.21
CARBON IN ENTRAINED FINES	(LBS/HR)	2.75	0.34
ENTRAINED/FEED	(WTX)	6.6%	0.8%
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WTX)		-2.1%

YIELD PERIOD 3. UNIT CONVERSIONS

* STEAM CONSUMPTION		PRIMARY GASIFIER
STEAM INTO UNIT	(LBS/HR)	113.21
STEAM REACTED WITH CARBON	(LBS/HR)	18.72
STEAM REACTED IN SHIFT	(LBS/HR)	27.18
STEAM FROM METHANATION		
BASED ON RECOVERED H2O	(LBS/HR)	-10.44
BASED ON H2 BALANCE	(LBS/HR)	-10.44
BASED ON O2 BALANCE	(LBS/HR)	-10.44
TOTAL STEAM CONSUMED		
BASED ON RECOVERED H2O	(LBS/HR)	35.45
BASED ON H2 BALANCE	(LBS/HR)	35.45
BASED ON O2 BALANCE	(LBS/HR)	35.45

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	16.5
WATER-GAS SHIFT	(%)	24.0
METHANATION		
BASED ON RECOVERED H2O	(%)	-9.2
BASED ON H2 BALANCE	(%)	-9.2
BASED ON O2 BALANCE	(%)	-9.2

TOTAL STEAM CONVERTED		
BASED ON RECOVERED H2O	(%)	31.3
BASED ON H2 BALANCE	(%)	31.3
BASED ON O2 BALANCE	(%)	31.3

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.110
GASIFICATION ONLY	(MOL/MOL)	0.165
INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.232
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.348

CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.396
GASIFICATION ONLY	(MOL/HR)/CF	0.033
INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	0.832
GASIFICATION ONLY	(MOL/HR)/CF	0.069

CARBON IN BED/STEAM FEED	LBS/(LBS/HR)	0.840
CARBON IN BED/STEAM FEED	MOL/(MOL/HR)	1.260

* CARBON CONVERTED BASED ON RECOVERED H2O

YIELD PERIOD 3. UNIT CONVERSIONS

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	41.66
CARBON FROM DEVOLATILIZATION	(LBS/HR)	13.77
<hr/>		
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	12.48
BASED ON RECOVERED SOLIDS	(LBS/HR)	12.48
<hr/>		
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	26.25
BASED ON RECOVERED SOLIDS	(LBS/HR)	26.25

*CARBON CONVERSION (C CONVERTED/C IN FEED)

GASIFICATION ONLY		
BASED ON GC ANALYSIS	(%)	30.0
BASED ON RECOVERED SOLIDS	(%)	30.0
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INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSIS	(%)	63.0
BASED ON RECOVERED SOLIDS	(%)	63.0

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)

GASIFICATION ONLY		
BASED ON GC ANALYSES	(%/HR)	13.1
BASED ON RECOVERED SOLIDS	(%/HR)	13.1
<hr/>		
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES	(%/HR)	27.6
BASED ON RECOVERED SOLIDS	(%/HR)	27.6

YIELD PERIOD 3. MATERIAL BALANCES

* ASH AND FINES BALANCES					
	ASTM ASH	C/H RESIDUE	803 FREE	803 FREE	-325 MESH
INPUT:	(LBS/HR)	(LBS/HR)	(LBS/HR)	(LBS/HR)	(LBS/HR)
COAL+CATALYST	17.36	14.64	12.02	9.87	2.16
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OUTPUT:					
PRI CHAR CARRYOVER	1.93	2.04	1.69	1.81	0.64
SOLIDS WITHDRAWN	13.07	12.72	10.93	10.36	1.17
TOTAL	15.00	14.76	12.62	12.17	1.81
ACCUMULATION:	-0.56	-0.70	-0.60	-0.63	-0.04
<hr/>					
CLOSURE:					
(OUT+ACCUM)/IN	83.2%	96.0%	100.0%	116.9%	81.2%
<hr/>					
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					-0.41
					PRODUCED/(OUTPUT+ACCUM) = 23.1%

* ASH ELEMENT BALANCE

	SiO2	Fe2O3	Al2O3	CaO	MgO	803	TiO2	P2O5
INPUT:	LBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HRLBS/HR							
COAL+CATALYST	3.100	0.926	1.114	0.266	0.076	5.260	0.055	0.009
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OUTPUT:								
CHAR ENTRAINED	0.336	0.095	0.123	0.024	0.009	0.226	0.010	0.000
CHAR WITHDRAWN	2.893	0.855	1.044	0.246	0.070	2.366	0.047	0.009
TOTAL	3.229	0.950	1.167	0.270	0.079	2.592	0.057	0.009
ACCUMULATION	-0.129	-0.024	-0.053	-0.004	-0.003	-0.081	-0.002	-0.000
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CLOSURE								
(OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	47.7%	100.0%	100.0%

YIELD PERIOD 3. UNIT PRESSURES

UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	272.7
LOCK HOPPER 2B	274.1
STEAM GENERATOR	412.9
COAL FEED LINE A	267.4
COAL FEED LINE B	273.3
GASIFIER TOP	264.2
HIO	265.3
BTH	266.2
CYCLONE OUTLET	264.2
FILTER OUTLET	261.8
SCRUBBER	260.4
HEA ABSORBER	227.1
HEA REGENERATOR	14.7
CRYOGENIC FRACTIONATOR	
PACKING TOP	227.1
HIO	227.1
REBOILER	227.1
CRYO. OUTLET	227.1

GASIFIER DIFFERENTIAL PRESSURES

BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	3.1
6.1	2.1
16.4	1.6
26.4	1.1
37.5	0.7
47.7	0.4
57.8	0.0
67.9	0.0
84.2	0.0

YIELD PERIOD 3. MATERIAL BALANCES

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	41.66	2.88	8.02	2.622	0.820	0.065
STEAM	-	12.67	100.54	-	-	-
SYN GAS	28.20	15.60	25.85	-	12.713	-
TOTAL	69.86	31.15	134.41	2.622	13.532	0.065
OUTPUT (LBS/HR)						
PRODUCT GAS (DRY)	54.29	22.21	62.58	1.820	33.793	-
PRODUCT WATER	0.16	8.70	69.48	-0.000	0.0	-
CHAR WITHDRAWN	12.97	0.21	2.02	0.778	0.163	0.046
CHAR ENTRAINED	2.75	0.04	0.44	0.070	0.025	0.025
TOTAL	70.16	31.16	134.62	2.668	33.981	0.071
SOLIDS ACC.	-0.30	-0.01	-0.21	-0.047	-0.003	-0.006
CLOSURE:	100.00	100.00	100.00	100.000	251.087	100.000

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUT:	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL+CATALYST	5.37	3.22
OUTPUT:		
PRI CHAR CARRYOVER	0.91	0.71
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/O	4.79	3.44
TOTAL	5.69	4.15
ACCUMULATION:		
PRI GASIF	-0.32	-0.20
CLOSURE:		
(T+ACCUM)/IN	300.0X	222.97

YIELD PERIOD 3. PRODUCT GAS DATA

* GASIFIER PRODUCT GAS (FROM FILTERS AND SCRUBBER) (DRY)

MAJOR COMPONENTS, MOL %		MINOR COMPONENTS, PPM	
H2	53.02	C2H6	0.0
CO	7.19	C2H4	0.0
CO2	12.05	C3H8	0.0
CH4	16.86	O2+AR	0.0
H2S	0.45	CO3	0.3
N2	9.63	SO2	0.0

* GASIFIER PRODUCT GAS (INCLUDES UNREACTED STEAM)

H2	40.02		
CO	5.35		
CO2**	9.04	SCFH CH4/LB C FEED	12.56
CH4	12.54		
H2O**	25.63		
H2S	0.34	SCFH CH4/LB C IN BED	5.50
N2	7.16		
NH3	0.0		

* EQUILIBRIUM CONSTANTS

REACTION	EQUILIBRIUM AT ACTIVE BED TEMP (1282.2 F)	ACTUAL EQUILIBRIUM EXPRESSION	CORRESPONDING EQUILIBRIUM TEMPERATURE (DEG F)
GRAPHITE=H2O: C +H2O=CO +H2	1.5161	1.4953	1280.8
WATER SHIFT: CO+H2O=CO2+H2	1.5942	2.6303	1101.2
ETHANATION: CO+3H2=CH4+H2O	0.0923	0.0291	1356.9
OVERALL: 12C+2H2O=CH4+CO2	0.3360	0.1714	

* MATERIAL BALANCES *

INPUTS (LBS/HR) OUTPUTS (LBS/HR)

GASIFIER (INCLUDES FILTER AND SCRUBBER)

COAL + CATALYST	67.26	PRODUCT WATER	78.34
STEAM	113.21	CHAR WITHDRAWN	26.96
MAKEUP SYN GAS	44.45	CHAR ENTRAINED	5.01
RECYCLE GAS	25.21	PRODUCT GAS (DRY)	140.99
TOTAL	250.82	TOTAL	251.30
ACCUMULATION	-1.18	CLOSURE: (OUT+ACC)/IN =	99.7%

SYN GAS BALANCE

INPUTS (SCFH) OUTPUTS (SCFH)

SYN GAS TO GASIF	2994.60	H2+CO IN PRODUCT GAS	2899.17
H2 MOL % 79.52	2381.49	H2 MOL % 53.82	2557.40
CO MOL % 20.48	613.19	CO MOL % 7.19	341.77

SYN GAS BALANCE: 96.81% H2 BALANCE: 107.39% CO BALANCE: 55.74%

YIELD PERIOD 3. MATERIAL BALANCES

* GASIFIER MOLE BALANCES

GAS INPUT	LB-MOLES/HR					
	C	H	O	S	N	K
SYN GAS						
H2 (4.275)	-	12.551	-	-	-	-
CO (1.616)	1.616	-	1.616	-	-	-
CH4 (0.732)	0.732	2.929	-	-	-	-
CO2 (0.000)	0.000	-	0.000	-	-	-
N2 (0.454)	-	-	-	-	0.908	-
STEAM						
H2O (6.284)	-	12.568	6.284	-	-	-
TOTAL (14.175)	2.348	28.048	7.900	-	0.908	-

SOLIDS INPUT	LB-MOLES/HR					
	C	H	O	S	N	K
COAL+CATALYST	3.468	2.857	0.501	0.082	0.059	0.137
TOTAL INPUT	5.816	30.905	8.401	0.082	0.966	0.137

GAS OUTPUT	LB-MOLES/HR					
	C	H	O	S	N	K
PRODUCT GAS						
H2 (6.739)	-	13.478	-	-	-	-
CO (0.901)	0.901	-	0.901	-	-	-
CH4 (2.111)	2.111	8.444	-	-	-	-
CO2 (1.522)	1.522	-	3.044	-	-	-
H2S (0.057)	-	0.114	-	0.057	-	-
N2 (1.206)	-	-	-	-	2.413	-
NH3 (0.0)	-	0.0	-	-	0.0	-
H2O (4.316)	-	8.632	4.316	-	-	-
TOTAL (16.851)	4.533	30.667	8.260	0.057	2.413	-

SOLIDS OUTPUT	LB-MOLES/HR					
	C	H	O	S	N	K
CHAR ENTRAINED	0.229	0.039	0.027	0.002	0.002	0.023
CHAR WITHDRAWN	1.079	0.210	0.126	0.024	0.012	0.122
TOTAL SOLIDS	1.308	0.249	0.154	0.026	0.013	0.146
TOTAL OUTPUT	5.842	30.917	8.414	0.083	2.426	0.146
ACCUMULATION	-0.025	-0.012	-0.013	-0.001	-0.000	-0.008
CLOSURE:						

(OUT+ACC)/IN, % 100.0 100.0 100.0 100.0 251.1 100.0

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PDU YIELD PERIOD 4

RECONCILED DATA

YIELD PERIOD 4. UNIT OPERATIONS

	TIME	DATE
FROM	1430	6-21-80
TO	1230	6-22-80
DURATION	22.00 HRS	

* MODE OF OPERATION GASIFIER ONLY

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1196.	264.

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	1099.
77.6	1298.
67.9	1308.
57.8	1283.
47.7	1287.
42.6	1290.
37.5	1276.
26.4	1254.
21.4	1249.
11.3	1251.
6.1	1236.
0.0	813.

YIELD PERIOD 4. UNIT PROCESS VARIABLES

* UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	228.	115.
SCREW DRYER	302.	315.
OXIDIZER 1 TOP	322.	
MID	322.	
BTM	336.	
OXIDIZER 2 TOP	324.	
MID	324.	
BTM	349.	
LOCK HOPPER 1 TOP	185.	
MID	205.	219.
LOWER	212.	
CONE	163.	163.
LOCK HOPPER 2A MID	340.	358.
CONE	336.	388.

YIELD PERIOD 4. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	(WT% OF TOTAL SOLIDS, DRY)				
	COAL+CAT (FC) (WT%)	CHAR (GHC) (WT%)	H/D & C/O (GB) (WT%)	(GF) (WT%)	LH3 FEED (COAL) (WT%)
H	4.18	0.89	0.82	0.83	5.19
C	63.96	53.97	55.80	58.39	68.86
S	3.58	2.95	2.55	1.41	4.12
PYRITIC	1.44	0.09	0.10	0.04	1.65
SULFATE	0.26	0.39	0.24	0.21	0.30
ORGANIC	1.89	2.47	2.21	1.16	2.17
O	11.84	7.81	11.11	8.95	10.60
N	1.30	0.09	0.15	0.16	1.34
CL	0.06	0.20	0.16	0.19	0.08
803-FREE ASH	15.07	34.10	29.40	30.07	9.61
TOTAL	100.00	100.01	100.00	100.00	100.00

* ASH ANALYSIS	(WT% OF TOTAL SOLIDS)				
ASH	23.88	41.19	41.89	33.47	9.91
C/H RESIDUE	20.59	40.01	41.73	35.14	9.81
803-C/H RES.	15.49	32.92	34.97	31.40	9.51

* ASH ELEMENT ANALYSIS	(WT% OF 803-FREE ASH)				
SiO2	25.58	19.51	23.30	21.99	0.01
Fe2O3	6.09	5.40	5.45	4.64	0.01
Al2O3	8.45	7.13	7.41	8.33	0.01
CaO	1.29	0.97	1.16	1.08	0.01
H2O	0.47	0.41	0.43	0.32	0.01
TiO2	0.43	0.47	0.35	0.49	0.01
P2O5	0.03	0.02	0.02	0.06	0.01
Na2O	0.11	0.03	0.03	0.03	0.10
CATALYST K2O	57.55	45.72	61.64	63.07	1.98
TOTAL	100.00	79.66	100.00	100.00	2.15

YIELD PERIOD 4. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES	GASIFIER		
BALANCE USED	H2O	O2	H2
TOTAL PRESSURE (PSIA)	264.5	264.5	264.5
H2 (PSIA)	113.9	113.9	113.9
CO (PSIA)	21.4	21.4	21.4
CH4 (PSIA)	26.9	26.9	26.9
CO2 (PSIA)	27.4	27.8	27.8
H2S (PSIA)	1.0	1.0	1.0
H2O (PSIA)	69.5	69.5	69.5
N2 (PSIA)	4.1	4.1	4.1
NH3 (PSIA)	0.0	0.0	0.0
H2O/CO	3.2	3.2	3.2
H2O/CO2	2.5	2.5	2.5

* UNIT GAS DATA	GASIFIER	
BYN GAS MWT (LBS/MOL)		8.2
INJECTION GAS MWT (LBS/MOL)		8.5
PRODUCT GAS MWT (LBS/MOL)		13.5
PRODUCT GAS		
PG AT OTH (DRY) (SCFH)		4240.7
(DRY, N2 FREE) (SCFH)		4151.2
PG AT GASIFIER OUTLET (SCFH)		5746.4
INCLUDES N2 AND H2O (ACFH)		1111.8
PG AT GASIFIER OUTLET (SCFH)		5656.9
(EXCLUDES N2) (ACFH)		1094.5

* BASED ON OXYGEN BALANCE

YIELD PERIOD 4. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GB (WTX)	GF (WTX)
K AS K2O	8.7	15.6	15.6	18.2	19.0
K AS KOH	10.3	18.6	18.6	21.7	22.6
K AS K2CO3	17.7	22.9	22.9	26.7	27.8
K AS K	2.2	12.9	12.9	15.1	15.7
K WATER/ACID					
SOLUBLE RATIO	0.6	0.704	0.704	0.609	0.698
K2O H2O INSOL	3.4	4.6	4.6	7.1	5.7
K2CO3 " INSOL	5.1	6.8	6.8	10.4	8.4
K " INSOL	2.9	3.8	3.8	5.9	4.8
CARBON	64.0	54.0	54.0	55.8	58.4
K ON CARBON	11.3	24.0	24.0	27.1	27.0
ASH ASH	23.9	41.2	41.2	41.9	33.5
K ON ASH	30.2	31.4	31.4	36.0	47.0
KOH-FREE ASH	13.5	22.6	22.6	20.2	10.8
K2CO3-FREE ASH	11.1	18.3	18.3	15.2	5.6
K ON K2CO3					
FREE ASH	64.7	70.6	70.6	99.4	200.5

* BASED ON ACID SOLUBLE DETERMINATION

CATALYST ---KOH

YIELD PERIOD 4. SOLIDS DATA

1. PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT.%)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN (GTC)	(GMC)	(GB)	FINES (GF)
10 MESH	99.8	99.4	99.4	99.9	99.5
20 MESH	99.5	97.3	97.3	99.0	99.0
30 MESH	99.3	93.0	93.0	96.2	98.2
40 MESH	91.3	81.3	81.3	83.7	97.4
60 MESH	55.6	51.7	51.7	46.8	95.8
80 MESH	36.9	35.3	35.3	28.9	87.8
100 MESH	24.4	25.2	25.2	19.3	74.7
200 MESH	6.9	11.9	11.9	6.4	39.8
325 MESH	2.3	7.2	7.2	2.8	21.8

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	20.	10.	19.	16.	9.
VOLUME SURFACE MEAN	161.	128.	128.	171.	58.
HEIGHT MEAN	250.	291.	291.	292.	116.

* ROSEN-RAHMLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	271.	316.	316.	328.	132.
SIZE DISTRIBUTION CONSTANT	2.07	1.39	1.39	1.80	1.11

BULK DENSITY (G/CC)	0.750	0.220	0.220	0.270	0.0
BULK DENSITY (LBS/CFT)	46.8	13.7	13.7	16.8	0.0

Unavailable

YIELD PERIOD 4. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES			
BED BOTTOM DENSITY	(LBS/CF)		7.5
BED TOP DENSITY	(LBS/CF)		5.6
BED AVERAGE DENSITY	(LBS/CF)		5.4
BED HEIGHT	(FEET)		54.8
BED HOLDUP	(LBS)		189.9
BED VOLUME	(CFT)		29.891
ACTIVE BED TEMPERATURE	(DEG F)		1276.8
ACTIVE BED VOLUME	(CFT)		23.754
SPACE VELOCITY (ACT BED)	(ACFH/CF)		44.9
BTH SUPERFICIAL VELOCITY	(FT/SEC)		0.274
TOP SUPERFICIAL VELOCITY	(FT/SEC)		0.543

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)		1223.6
PRESSURE	(PSIA)		263.0
INLET GAS RATE	(SCFH)		3746.4
	(ACFH)		1040.1
INLET GAS VELOCITY	(FT/SEC)		32.4
SOLIDS ENTERING	(LBS/HR)		4.0
DUST LOAD	(LBS/ACF)		0.1375
SOLIDS CAPTURED	(LBS/HR)		0.0
SOLIDS ESCAPING	(LBS/HR)		4.0
OVERALL EFFICIENCY (CAPTURED/ENTERING, HTX)			0.1

* SOLIDS ENTRAINMENT LOSS TOTAL -325 MESH

COAL+CATALYST FEED	(LBS/HR)	73.89	1.67
TOTAL ENTRAINED	(LBS/HR)	4.05	0.88
ENTRAINED/FEED	(WTX)	5.5%	1.2%

ENTRAINED/FEED (FEED FINES BACKED OUT) (WTX) -1.1%

* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	47.26	1.04
CARBON IN ENTRAINED FINES	(LBS/HR)	2.36	0.51
ENTRAINED/FEED	(WTX)	5.0%	1.1%
ENTRAINED/FEED (FEED FINES BACKED OUT) (WTX)			-1.1%

YIELD PERIOD 4. UNIT CONVERSIONS

* STEAM CONSUMPTION		PRIMARY GASIFIER
STEAM INTO UNIT	(LBS/HR)	110.73
STEAM REACTED WITH CARBON	(LBS/HR)	23.26
STEAM REACTED IN SHIFT	(LBS/HR)	28.48
STEAM FROM METHANATION		
BASED ON RECOVERED H2O	(LBS/HR)	-12.49
BASED ON H2 BALANCE	(LBS/HR)	-12.49
BASED ON O2 BALANCE	(LBS/HR)	-12.49
TOTAL STEAM CONSUMED		
BASED ON RECOVERED H2O	(LBS/HR)	39.25
BASED ON H2 BALANCE	(LBS/HR)	39.25
BASED ON O2 BALANCE	(LBS/HR)	39.25

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	21.0
WATER-GAS SHIFT	(%)	25.7
METHANATION		
BASED ON RECOVERED H2O	(%)	-11.3
BASED ON H2 BALANCE	(%)	-11.3
BASED ON O2 BALANCE	(%)	-11.3
TOTAL STEAM CONVERTED		
BASED ON RECOVERED H2O	(%)	35.4
BASED ON H2 BALANCE	(%)	35.4
BASED ON O2 BALANCE	(%)	35.4

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.140
GASIFICATION ONLY	(MOL/MOL)	0.210
INCLUDES DEVOLATILIZATION		
	(LBS/LBS)	0.267
	(MOL/MOL)	0.401
CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.519
GASIFICATION ONLY	(MOL/HR)/CF	0.043
INCLUDE DEVOLATILIZATION		
	(LBS/HR)/CF	0.990
	(MOL/HR)/CF	0.082

CARBON IN BED/STEAM FED	LBS/(LBS/HR)	0.926
CARBON IN BED/STEAM FED	MOL/(MOL/HR)	1.389

* CARBON CONVERTED BASED ON RECOVERED H2O

YIELD PERIOD 4. UNIT CONVERSIONS

* CARBON CONSUMPTION	PRIMARY GASIFIER
CARBON IN COAL+CATALYST (LBS/HR)	47.26
CARBON FROM DEVOLATILIZATION (LBS/HR)	14.09
CARBON GASIFIED	
BASED ON GC ANALYSIS (LBS/HR)	15.51
BASED ON RECOVERED SOLIDS (LBS/HR)	15.51
TOTAL CARBON CONVERTED	
BASED ON GC ANALYSIS (LBS/HR)	29.59
BASED ON RECOVERED SOLIDS (LBS/HR)	29.59

* CARBON CONVERSION (C CONVERTED/C IN FEED)	
GASIFICATION ONLY	
BASED ON GC ANALYSIS (%)	32.8
BASED ON RECOVERED SOLIDS (%)	32.8
INCLUDING DEVOLATIZATION	
BASED ON GC ANALYSIS (%)	62.6
BASED ON RECOVERED SOLIDS (%)	62.6

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)	
GASIFICATION ONLY	
BASED ON GC ANALYSES (%/HR)	15.1
BASED ON RECOVERED SOLIDS (%/HR)	15.1
INCLUDING DEVOLATILIZATION	
BASED ON GC ANALYSES (%/HR)	28.9
BASED ON RECOVERED SOLIDS (%/HR)	28.9

YIELD PERIOD 4. MATERIAL BALANCES

* ASH AND FINES BALANCES	ASTM ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	503 FREE (LBS/HR)	503 FREE (LBS/HR)	-325 MESH FINES (LBS/HR)
INPUT:					
COAL+CATALYST	17.64	15.21	11.13	9.97	1.67
OUTPUT:					
PRI CHAR CARRYOVER SOLIDS WITHDRAWN	1.35	1.42	1.22	1.27	0.88
TOTAL	14.24	14.26	10.27	12.03	1.75
ACCUMULATION	-0.75	-1.19	0.85	-1.08	-0.10
CLOSURE (OUT+ACCUM)/IN					
	76.5%	85.9%	99.8%	109.8%	98.7%
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					
					-0.02
PRODUCED/(OUTPUT+ACCUM)					
					-1.4%

* ASH ELEMENT BALANCE	SiO2	FE2O3	AL2O3	CaO	H2O	SO3	TiO2	P2O5	Na2O
INPUT:									
COAL+CATALYST	2.849	0.678	0.941	0.144	0.032	5.244	0.048	0.003	0.009
OUTPUT:									
CHAR ENTRAINED	0.268	0.056	0.101	0.013	0.004	0.151	0.006	0.001	0.000
CHAR WITHDRAWN	2.108	0.493	0.671	0.107	0.039	2.079	0.031	0.002	0.002
TOTAL	2.376	0.550	0.772	0.120	0.043	2.231	0.037	0.002	0.009
ACCUMULATION	-0.473	-0.128	-0.169	-0.024	0.010	-0.105	0.011	0.000	-0.000
CLOSURE (OUT+ACC)/IN									
	100.0%	100.0%	100.0%	100.0%	100.0%	40.5%	100.0%	100.0%	100.0%

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YIELD PERIOD 4. MATERIAL BALANCES

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N
COAL + CATALYST**	47.26	3.09	8.75	2.649	0.957
STEAM	-	12.39	98.34	-	-
BYN GAS	22.84	12.29	30.43	-	0.000
TOTAL	70.10	27.76	137.52	2.649	0.957

OUTPUT (LBS/HR)

PRODUCT GAS (DRY)	52.26	19.50	70.25	1.862	6.606
PRODUCT WATER	0.18	0.00	63.95	0.007	0.006
CHAR WITHDRAWN	17.17	0.25	3.42	0.793	0.046
CHAR ENTHAINED	2.36	0.03	0.36	0.057	0.006
TOTAL	71.97	27.78	137.98	2.709	6.665
SOLIDS ACC.	-1.87	-0.02	-0.46	-0.061	-0.004
CLOSURE:	100.00	100.00	100.00	100.000	695.603

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

CATALYST BALANCE

	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
INPUT:		
COAL+CATALYST	5.32	3.21
OUTPUT:		
PRI CHAR CARRYOVER	0.64	0.44
PRI PRODUCT WATER	0.01	0.01
SOLIDS W/O	4.64	2.63
TOTAL	5.29	3.28
ACCUMULATIONS:		
PRI GASIF	0.03	0.16
CLOSURE: (OUT+ACCUM)/IN	100.0%	107.4%

YIELD PERIOD 4. PRODUCT GAS DATA

* GASIFIER PRODUCT GAS (FROM FILTERS AND SCRUBBER) (DRY)

MAJOR COMPONENTS, MOL %		MINOR COMPONENTS, PPM	
H2	56.43	C2H6	0.0
CO	11.00	C2H4	0.0
CO2	14.15	C3H8	0.0
CH4	13.79	O2+AR	0.0
H2S	0.52	CO3	0.0
N2	2.11	SO2	0.0

* GASIFIER PRODUCT GAS (INCLUDES UNREACTED STEAM)

H2	43.12		
CO	8.12		
CO2**	10.54	SCFH CH4/LB C FEED	12.38
CH4	10.18		
H2O**	26.20		
H2S	0.38	SCFH CH4/LB C IN BED	5.71
N2	1.56		
NH3	0.00		

* EQUILIBRIUM CONSTANTS

REACTION	ACTUAL EQUILIBRIUM AT ACTIVE BED TEMP (1276.8 F)	CORRESPONDING EQUILIBRIUM TEMPERATURE (DEG F)
GRAPHITE-H2O: C + H2O = CO + H2	1.4384	2,392.4
WFT: CO + H2O = CO2 + H2	1.6157	2,120.1
ETHANATION: CO + 3H2 = CH4 + H2O	0.1006	0.0127
VERALL: 2C + 2H2O = CH4 + CO2	0.3365	0.1550

* MATERIAL BALANCES *

INPUT: (LBS/HR) OUTPUT: (LBS/HR)

GASIFIER (INCLUDES FILTER AND SCRUBBER)

COAL + CATALYST	72.93	PRODUCT WATER	72.13
STEAM	110.73	CHAR WITHDRAWN	30.72
MAKEUP SYN GAS	65.56	CHAR ENTRAINED	4.04
RECYCLE GAS	0.0	PRODUCT GAS (DRY)	143.87

TOTAL	249.22	TOTAL	250.76
ACCUMULATION	-1.56	CLOSURE: (OUT+ACC)/IN	100.0%

OVERALL INPUT	249.22	PURGE GAS	0.01
GASIF. ACCUM	-1.56	OVERALL OUTPUT	250.76
		CLOSURE: (OUT+ACC)/IN	100.6%

SYN GAS BALANCE

INPUT:	(SCFH)	OUTPUT:	(SCFH)
SYN GAS TO GASIF	3034.40	H2+CO IN PRODUCT GAS	2944.37
H2 MOL % 76.21	2312.62	H2 MOL %	50.43
CO MOL % 23.79	721.78	CO MOL %	11.00

SYN GAS BALANCE: 97.03% H2 BALANCE: 107.15% CO BALANCE: 64.63%

YIELD PERIOD 4. MATERIAL BALANCES

* GASIFIER MOLE BALANCES

GAS INPUT	LB-MOLES/HR				
	C	H	O	S	N
SYN GAS					
H2 (6.094)	-	12.188	-	-	-
CO (1.902)	1.902	-	1.902	-	-
CH4 (0.000)	0.000	0.000	-	-	-
CO2 (0.0)	0.0	-	0.0	-	-
N2 (0.000)	-	-	-	-	0.000
STEAM					
H2O (6.146)	-	12.292	6.146	-	-
TOTAL (14.142)	1.902	24.480	8.048	-	0.000

SOLIDS INPUT	LB-MOLES/HR					
	C	H	O	S	N	K
COAL+CATALYST	3.934	3.061	0.547	0.083	0.068	0.136
TOTAL INPUT	5.836	27.541	8.595	0.083	0.068	0.136

GAS OUTPUT	LB-MOLES/HR				
	C	H	O	S	N
PRODUCT GAS					
H2 (6.530)	-	13.059	-	-	-
CO (1.224)	1.224	-	1.224	-	-
CH4 (1.541)	1.541	6.165	-	-	-
CO2 (1.595)	1.595	-	3.191	-	-
H2S (0.058)	-	0.117	-	0.058	-
N2 (0.236)	-	-	-	-	0.472
NH3 (0.000)	-	0.001	-	-	0.000
H2O (3.967)	-	7.935	3.967	-	-
TOTAL (15.157)	4.366	27.277	8.387	0.058	0.472

SOLIDS OUTPUT	LB-MOLES/HR					
	C	H	O	S	N	K
CHAR ENTRAINED	0.197	0.033	0.023	0.002	0.000	0.016
CHAR WITHDRAWN	1.430	0.250	0.214	0.024	0.003	0.119
TOTAL SOLIDS	1.626	0.284	0.236	0.026	0.004	0.135
TOTAL OUTPUT	5.992	27.561	8.624	0.085	0.476	0.135
ACCUMULATION	-0.156	-0.019	-0.029	-0.002	-0.000	0.001

CLOSURE

(OUT+ACC)/IN, % 100.0 100.0 100.0 100.0 695.8 99.9

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PDU YIELD PERIOD 5

RECONCILED DATA

YIELD PERIOD 5. UNIT OPERATIONS .

TIME	DATE	
FROM 0730	07-21-6	
TO 0 0730	07-22-6	
DURATION	24.00 HRS	
MODE OF OPERATION	GASIFIER ONLY	
PERCENT OF TIME ON STREAM		
COAL FEED	100.0%	
STEAM	100.0%	
SYN GAS	100.0%	
BACKEND	0.0%	
UNIT CONDITIONS		
UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1226.	267.
Active Bed	1238.	
GASIFIER PROCESS TEMPERATURES		
BED HEIGHT (FEET)	TEMP (DEG F)	
82.2	882.	
77.6	1285.	
67.9	1310.	
57.8	1292.	
47.7	1305.	
42.6	1308.	
37.5	1292.	
26.4	1285.	
21.4	1279.	
11.3	1279.	
6.1	1245.	
0.0	828.	

YIELD PERIOD 5. UNIT PROCESS VARIABLES

UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	196.	111.
SCREEN DRYER	284.	324.
OXIDIZER 1 TOP	327.	
MID	334.	
BTH	313.	
OXIDIZER 2 TOP	414.	
MID	414.	
BTH	410.	
LOCK HOPPER 1 TOP	275.	
MID	277.	275.
LOWER	205.	
CONE	160.	225.
LOCK HOPPER 2A MID	316.	345.
CONE	351.	405.
LH-2A FEED POT		367.
LH-2A FEED LINE MID		370.
LOWER		457.
LOCK HOPPER 2B MID	318.	378.
CONE	347.	399.
LH-2B FEED POT		352.
LH-2B FEED LINE MID		381.
LOWER		514.
SYN GAS PREHEATER		615.
STEAM GENERATOR	457.	
8TH & 8G SUPERHEATER	1092.	1004.
GASIFIER, FILTERS AND SCRUBBER		
GASIFIER		
TOP OF BED	1310.	1330.
BTH OF BED	1245.	1326.
BED AVERAGE	1226.	1312.
CYCLONE		1224.
DIPLEG TOP	1229.	1225.
DIPLEG MID	1294.	1278.
DIPLEG BTH	1211.	1236.
DIPLEG SLOPE		1294.
FILTER INLET	829.	804.
FILTER 1		691.
FILTER 2		693.
SCRUBBER INLET	628.	597.
SCRUBBER TOP	43.	
SCRUBBER MID	133.	
SCRUBBER BTH	183.	
SOUR GAS STRIPPER TOP	32.	
MID	190.	
BTH	214.	

YIELD PERIOD 5. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS (WTX OF TOTAL SOLIDS, DRY)					
COMPONENT	COAL+CAT (FC) (WTX)	(GMC) (WTX)	CHAR W/D & C/O (GB) (WTX)	(GF) (WTX)	LHS FEED (COAL) (WTX)
H	3.99	0.73	0.50	0.63	5.02
C	63.76	51.05	41.24	54.36	69.37
S	3.98	3.23	3.26	2.13	4.11
PYRITIC	1.92	0.08	0.07	0.15	1.98
SULFATE	0.22	0.35	0.33	0.32	0.23
ORGANIC	1.84	2.80	2.86	1.66	1.90
O	11.77	6.83	14.50	8.90	10.16
N	0.85	0.20	0.07	0.35	1.26
CL	0.07	0.16	0.12	0.26	0.09
SO3-FREE ASH	15.57	37.80	40.31	33.37	9.99
TOTAL	100.00	100.00	100.00	100.00	100.00

* ASH ANALYSIS (WTX OF TOTAL SOLIDS)					
ASH	26.59	48.76	53.93	39.52	10.30
C/H RESIDUE	21.72	47.15	56.13	40.96	10.34
SO3-C/H RES.	15.26	36.19	44.21	35.31	10.03

* ASH ELEMENT ANALYSIS (WTX OF SO3-FREE ASH)					
SiO2	26.06	22.56	27.23	21.83	0.0
Fe2O3	0.66	7.29	9.22	6.52	0.0
Al2O3	0.79	8.15	9.04	8.18	0.0
CaO	2.02	1.25	2.26	1.28	0.0
H2O	0.45	0.46	0.50	0.34	0.0
TiO2	0.47	0.45	0.42	0.61	0.0
P2O5	0.22	0.15	0.26	0.06	0.0
Na2O	0.00	0.0	0.00	0.00	0.0
CATALYST (FROM ACID SOLUBLE ANALYSIS)					
K2O	53.32	50.74	51.07	61.19	2.30
TOTAL	100.00	91.05	100.00	100.00	2.30

YIELD PERIOD 5. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES GASIFIER				
BALANCE USED		H2O	O2	H2
TOTAL PRESSURE	(PSIA)	266.6	266.6	266.6
H2	(PSIA)	101.2	101.2	101.2
CO	(PSIA)	17.9	17.9	17.9
CH4	(PSIA)	34.3	34.3	34.3
CO2	(PSIA)	27.8	27.8	27.8
H2S	(PSIA)	1.1	1.1	1.1
H2O	(PSIA)	70.4	70.4	70.4
N2	(PSIA)	14.2	14.2	14.2
NH3	(PSIA)	-0.0	-0.0	-0.0
H2O/CO		3.9	3.9	3.9
H2O/CO2		2.5	2.5	2.5

* UNIT GAS DATA		GASIFIER
SYN GAS MWT	(LBS/HOL)	7.8
INJECTION GAS MWT	(LBS/HOL)	0.0
PRODUCT GAS MWT	(LBS/HOL)	14.8
PRODUCT GAS		
PG AT DTH (DRY)	(SCFH)	4196.5
(DRY, N2 FREE)	(SCFH)	3893.5
PG AT GASIFIER OUTLET	(SCFH)	5696.4
INCLUDES N2 AND H2O	(ACFH)	1096.4
PG AT GASIFIER OUTLET	(SCFH)	5393.4
(EXCLUDES N2)	(ACFH)	1038.1

* BASED ON OXYGEN BALANCE

YIELD PERIOD 5. SOLIDS DATA

YIELD PERIOD 5. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GB (WTX)	GF (WTX)
K AS K2O	8.3	19.2	19.2	20.6	20.4
K AS KOH	9.9	22.9	22.9	24.5	24.3
K AS K2CO3	12.2	28.2	28.2	30.2	30.0
K AS K	6.9	15.9	15.9	17.1	17.0
K WATER/ACID					
SOLUBLE RATIO	0.608	0.0	0.621	0.621	0.780
K2O H2O INSOL	3.3	19.2	7.3	7.8	4.5
K2CO3 " INSOL	4.8	28.2	10.7	11.4	6.6
K " INSOL	2.7	15.9	6.0	6.5	3.7

CARBON	63.8	51.1	51.1	41.2	54.4
K ON CARBON	10.8	31.2	31.2	41.4	31.2
ASTH ASH	24.6	48.8	48.8	53.9	39.5
K ON ASH	28.0	32.7	32.7	31.7	42.9
KOH-FREE ASH	14.7	25.9	25.9	29.4	15.2
K2CO3-FREE ASH	12.4	20.6	20.6	23.7	9.5
K ON K2CO3-FREE ASH	55.6	77.3	77.3	72.1	177.7

4. BASED ON ACID SOLUBLE DETERMINATION

* CATALYST -- KOH

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN		FINES (GF)
		(GTC)	(GMC)	(GB)
10 MESH	99.7	99.8	99.8	99.4
20 MESH	99.4	99.0	99.0	98.4
30 MESH	98.7	94.1	94.1	97.6
40 MESH	94.1	79.3	79.3	94.8
60 MESH	51.1	43.4	43.4	83.8
80 MESH	31.0	32.4	32.4	60.3
100 MESH	20.0	19.2	19.2	45.3
200 MESH	5.2	6.7	6.7	21.2
325 MESH	1.5	1.6	1.6	0.4

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	24.	23.	23.	27.	57.
VOLUME SURFACE MEAN	176.	183.	183.	195.	121.
HEIGHT MEAN	257.	305.	305.	279.	185.

* ROSEN-RAHLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	286.	339.	339.	310.	252.
SIZE DISTRIBUTION CONSTANT	2.22	1.89	1.89	2.22	2.51
BULK DENSITY (G/CC)	0.760	0.290	0.290	0.330	0.250
BULK DENSITY (LBS/CFT)	47.4	18.1	18.1	20.6	15.6

YIELD PERIOD 5. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES

BED BOTTOM DENSITY	(LBS/CF)	9.3
BED TOP DENSITY	(LBS/CF)	4.7
BED AVERAGE DENSITY	(LBS/CF)	6.8
BED HEIGHT	(FEET)	59.1
BED HOLDUP	(LBS)	218.7
BED VOLUME	(CF)	32.251
ACTIVE BED TEMPERATURE...	(DEG F)	1288.0
ACTIVE BED VOLUME	(CF)	28.940
SPACE VELOCITY (ACT BED)	(ACFH/CF)	36.5
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.237
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.538

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)	1233.6
PRESSURE	(PSIA)	265.2
INLET GAS RATE	(SCFH)	5696.8
	(ACFH)	1022.6
INLET GAS VELOCITY	(FT/SEC)	31.9
SOLIDS ENTERING	(LBS/HR)	5.7
DUST LOAD	(LBS/ACF)	0.1980
SOLIDS CAPTURED	(LBS/HR)	0.0
SOLIDS ESCAPING	(LBS/HR)	5.7
OVERALL EFFICIENCY (CAPTURED/ENTERING, HTX)		0.0

* SOLIDS ENTRAINMENT LOSS

COAL+CATALYST FEED	(LBS/HR)	71.58	1.07
TOTAL ENTRAINED	(LBS/HR)	5.73	0.06
ENTRAINED/FEED	(HTX)	8.0X	0.1X

ENTRAINED/FEED

(FEED FINES BACKED OUT) (HTX) -1.4X

* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	45.62	0.62
CARBON IN ENTRAINED FINES	(LBS/HR)	3.12	0.03
ENTRAINED/FEED	(HTX)	6.8X	0.1X
ENTRAINED/FEED	(FEED FINES BACKED OUT) (HTX)		-1.3X

YIELD PERIOD 5. UNIT CONVERSIONS

* STEAM CONSUMPTION

STEAM INTO UNIT	(LBS/HR)	100.61	PRIMARY GASIFIER
STEAM REACTED WITH CARBON	(LBS/HR)	28.73	
STEAM REACTED IN SHIFT	(LBS/HR)	27.99	
STEAM FROM METHANATION			
BASED ON RECOVERED H2O	(LBS/HR)	-19.32	
BASED ON H2 BALANCE	(LBS/HR)	-19.32	
BASED ON O2 BALANCE	(LBS/HR)	-19.32	
TOTAL STEAM CONSUMED			
BASED ON RECOVERED H2O	(LBS/HR)	37.40	
BASED ON H2 BALANCE	(LBS/HR)	37.40	
BASED ON O2 BALANCE	(LBS/HR)	37.40	

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	26.5
WATER-GAS SHIFT	(%)	25.8
METHANATION		
BASED ON RECOVERED H2O	(%)	-17.8
BASED ON H2 BALANCE	(%)	-17.8
BASED ON O2 BALANCE	(%)	-17.8

TOTAL STEAM CONVERTED

BASED ON RECOVERED H2O	(%)	34.4
BASED ON H2 BALANCE	(%)	34.4
BASED ON O2 BALANCE	(%)	34.4

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.176
GASIFICATION ONLY	(MOL/MOL)	0.265
INCLUDE DEVOLATILIZATION	(LBS/LBS)	0.300
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.450
CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.594
GASIFICATION ONLY	(MOL/HR)/CF	0.049
INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	1.010
GASIFICATION ONLY	(MOL/HR)/CF	0.084

CARBON IN BED/STEAM FEED LBS/(LBS/HR) 1.028
 CARBON IN BED/STEAM FEED MOL/(MOL/HR) 1.543

o CARBON CONVERTED BASED ON RECOVERED SOLI

YIELD PERIOD 5. UNIT CONVERSIONS

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	45.62
CARBON FROM DEVOLATILIZATION	(LBS/HR)	13.42
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	19.15
BASED ON RECOVERED SOLIDS	(LBS/HR)	19.15
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	32.58
BASED ON RECOVERED SOLIDS	(LBS/HR)	32.58

* CARBON CONVERSION (C CONVERTED/C IN FEED)	
GASIFICATION ONLY	
BASED ON GC ANALYSIS	(%) 42.0
BASED ON RECOVERED SOLIDS	(%) 42.0
INCLUDING DEVOLATILIZATION	
BASED ON GC ANALYSIS	(%) 71.4
BASED ON RECOVERED SOLIDS	(%) 71.4

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)	
GASIFICATION ONLY	
BASED ON GC ANALYSES	(%/HR) 17.2
BASED ON RECOVERED SOLIDS	(%/HR) 17.2
INCLUDING DEVOLATILIZATION	
BASED ON GC ANALYSES	(%/HR) 29.2
BASED ON RECOVERED SOLIDS	(%/HR) 29.2

YIELD PERIOD 5. MATERIAL BALANCES

* ASH AND FINES BALANCES					
INPUT:	ASTH ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	803 FREE ASTH (LBS/HR)	803 FREE C/H RESID (LBS/HR)	-325 MESH FINES (LBS/HR)
COAL+CATALYST	17.59	15.54	11.14	10.92	1.07
OUTPUT:					
PRI CHAR CARRYOVER	2.27	2.35	1.91	2.02	0.06
SOLIDS WITHDRAWN	11.28	11.74	8.43	9.25	0.24
TOTAL	13.54	14.09	10.34	11.27	0.30
ACCUMULATION	1.12	1.31	0.80	0.99	0.29
CLOSURE (OUT+ACCUM)/IN	83.3%	99.3%	100.0%	112.3%	55.2%
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT) -0.46					
PRODUCED/(OUTPUT+ACCUM) =81.0%					

* ASH ELEMENT BALANCE:									
INPUT:	SiO2	Fe2O3	Al2O3	CaO	H2O	803	TiO2	P2O5	Na2S
	LBS/HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS
COAL+CATALYST	2.904	0.765	0.960	0.225	0.050	4.829	0.052	0.024	0.01
OUTPUT:									
CHAR ENTRAINED	0.418	0.125	0.156	0.025	0.006	0.324	0.012	0.001	0.01
CHAR WITHDRAWN	2.296	0.777	0.762	0.191	0.042	2.304	0.036	0.022	0.01
TOTAL	2.713	0.902	0.918	0.215	0.049	2.628	0.047	0.023	0.01
ACCUMULATION	0.191	0.064	0.062	0.009	0.002	0.231	0.005	0.001	0.01
CLOSURE (OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	59.2%	100.0%	100.0%	99.1%

YIELD PERIOD 5. MATERIAL BALANCES

YIELD PERIOD 5. UNIT PRESSURES

* UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	211.5
LOCK HOPPER 2B	203.1
STEAM GENERATOR	493.8
COAL FEED LINE A	278.7
COAL FEED LINE B	270.8
GASIFIER TOP	266.6
MID	267.7
BTM	269.0
CYCLONE OUTLET	268.1
FILTER OUTLET	266.6
SCRUBBER	266.6

GASIFIER DIFFERENTIAL PRESSURES

BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	3.5
6.1	2.4
16.4	1.7
26.4	1.1
37.5	0.5
47.7	0.1
57.8	-0.2
67.9	-0.2
84.2	-0.2

* GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	45.62	2.85	8.42	2.846	0.609	0.051
STEAM	-	12.15	96.45	-	-	-
SYN GAS	21.58	12.53	28.74	-	0.000	-
TOTAL	67.19	27.54	133.62	2.846	0.609	0.051
OUTPUT (LBS/HR)						
PRODUCT GAS (DRY)	53.98	19.42	65.81	1.993	22.365	-
PRODUCT WATER	0.17	7.97	63.70	-0.000	-0.000	-
CHAR WITHDRAWN	8.62	0.10	3.03	0.682	0.015	0.025
CHAR ENTRAINED	3.12	0.04	0.51	0.122	0.020	0.015
TOTAL	65.89	27.53	133.06	2.797	22.400	0.040
SOLIDS ACC.	1.30	0.01	0.56	0.049	0.028	0.011
CLOSURE	100.00	100.00	100.00	100.000	*****	100.000

** EXCLUDED CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUT	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL+CATALYST	4.93	3.00
OUTPUT:		
PRI CHAR CARRYOVER	0.97	0.76
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/D	3.57	2.22
TOTAL	4.55	2.98
ACCUMULATION:		
PRI GASIF	0.39	0.19
CLOSURE:		
(OUT+ACCUM)/IN	100.0%	105.5%

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PDU YIELD PERIOD 6

RECONCILED DATA

YIELD PERIOD 6. UNIT OPERATIONS

TIME	DATE
FROM 0330	07-26-8
TO 0 0330	07-27-8
DURATION	24.00. HRS.

* MODE OF OPERATION GASIFIER ONLY

* PERCENT. OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1224.	275.

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	885.
77.6	1283.
67.9	1301.
57.8	1290.
47.7	1301.
42.6	1305.
37.5	1288.
26.4	1279.
21.4	1279.
11.3	1281.
6.1	1267.
0.0	790.

YIELD PERIOD 6. UNIT PROCESS VARIABLES

UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	192.	120.
SCREEN DRYER	302.	324.
OXIDIZER 1 TOP	329.	
MID	331.	
BTH	306.	
OXIDIZER 2 TOP	406.	
MID	406.	
BTH	406.	
LOCK HOPPER 1 TOP	268.	
MID	271.	270.
LOWER	239.	
CONE	156.	223.
LOCK HOPPER 2A MID	351.	369.
CONE	345.	405.
LH-2A FEED POT		367.
LH-2A FEED LINE MID		361.
LOWER		462.
LOCK HOPPER 2B MID	315.	370.
CONE	334.	399.
LH-2B FEED POT		352.
LH-2B FEED LINE MID		325.
LOWER		450.
SYN GAS PREHEATER		525.
STEAM GENERATOR	460.	
BTH & SG SUPERHEATER	1078.	939.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		1324.
TOP OF BED	1301.	1328.
BTH OF BED	1267.	1314.
BED AVERAGE	1224.	1191.
CYCLONE		1243.
DIPLEG TOP	1249.	1281.
DIPLEG MID	1296.	1245.
DIPLEG BTH	1213.	1294.
DIPLEG SLOPE		792.
FILTER INLET	824.	703.
FILTER 1		678.
FILTER 2		599.
SCRUBBER INLET	631.	
SCRUBBER TOP	52.	
SCRUBBER MID	133.	
SCRUBBER BTH	172.	
SOUR GAS STRIPPER TOP	32.	
MID	171.	
BTH	210.	

YIELD PERIOD 6. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES

GASIFIER

HAIRING USED		H2O	N2	H2
TOTAL PRESSURE	(PSIA)	274.9	274.9	274.9
H2	(PSIA)	102.3	102.3	102.3
CO	(PSIA)	18.4	18.4	18.4
CH4	(PSIA)	37.3	37.3	37.3
CO2	(PSIA)	30.3	30.3	30.3
H2S	(PSIA)	1.1	1.1	1.1
H2O	(PSIA)	75.9	75.9	75.9
N2	(PSIA)	9.9	9.9	9.9
NH3	(PSIA)	0.0	0.0	0.0
H2O/CO		4.1	4.1	4.1
H2O/CO2		2.5	2.5	2.5

* UNIT GAS DATA

GASIFIER

SYN GAS MMT	(LBS/MOL)	8.0
INJECTION GAS MMT	(LBS/MOL)	8.0
PRODUCT GAS MMT	(LBS/MOL)	14.9
PRODUCT GAS		
PG AT DYM (DRY)	(SCFH)	3986.8
(DRY, H2 FREE)	(SCFH)	3788.2
PG AT GASIFIER OUTLET	(SCFH)	5500.8
INCLUDES N2 AND H2O	(ACFH)	1017.7
PG AT GASIFIER OUTLET	(SCFH)	5302.1
(EXCLUDES N2)	(ACFH)	981.0

* BASED ON OXYGEN BALANCE

YIELD PERIOD 6. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES

BED BOTTOM DENSITY	(LBS/CF)	9.1
BED TOP DENSITY	(LBS/CF)	4.1
BED AVERAGE DENSITY	(LBS/CF)	6.6
BED HEIGHT	(FEET)	64.4
BED HOLDUP	(LBS)	230.6
BED VOLUME	(CFT)	35.124
ACTIVE BED TEMPERATURE	(DEG F)	1287.5
ACTIVE BED VOLUME	(CFT)	31.813
SPACE VELOCITY (ACT BED)	(ACFH/CF)	31.1
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.197
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.504

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)	1191.2
PRESSURE	(PSIA)	273.4
INLET GAS RATE	(SCFH)	5500.8
	(ACFH)	939.2
INLET GAS VELOCITY	(FT/SEC)	29.3
SOLIDS ENTERING	(LBS/HR)	6.3
DUST LOAD	(LBS/ACF)	0.2361
SOLIDS CAPTURED	(LBS/HR)	0.0
SOLIDS ESCAPING	(LBS/HR)	6.3
OVERALL EFFICIENCY (CAPTURED/ENTERING, WT%)		0.0

* SOLIDS ENTRAINMENT LOSS TOTAL -325 MESH

COAL+CATALYST FEED	(LBS/HR)	75.48	1.51
TOTAL ENTRAINED	(LBS/HR)	6.20	0.13
ENTRAINED/FEED	(WT%)	8.3%	0.2%

ENTRAINED/FEED (FEED FINES BACKED OUT)	(WT%)	-1.9%
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* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	40.03	0.85
CARBON IN ENTRAINED FINES	(LBS/HR)	3.40	0.07
ENTRAINED/FEED	(WT%)	7.1%	0.1%
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WT%)	-1.7%	

YIELD PERIOD 6. UNIT CONVERSIONS

* STEAM CONSUMPTION PRIMARY GASIFIER

STEAM INTO UNIT (LBS/HR) 108.67

STEAM REACTED WITH CARBON (LBS/HR) 33.50

STEAM REACTED IN SHIFT (LBS/HR) 28.51

STEAM FROM METHANATION

BASED ON RECOVERED H2O (LBS/HR) -25.22

BASED ON H2 BALANCE (LBS/HR) -25.22

BASED ON O2 BALANCE (LBS/HR) -25.22

TOTAL STEAM CONSUMED

BASED ON RECOVERED H2O (LBS/HR) 36.79

BASED ON H2 BALANCE (LBS/HR) 36.79

BASED ON O2 BALANCE (LBS/HR) 36.79

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION (%) 30.8

WATER-GAS SHIFT (%) 26.2

METHANATION

BASED ON RECOVERED H2O (%) -23.2

BASED ON H2 BALANCE (%) -23.2

BASED ON O2 BALANCE (%) -23.2

TOTAL STEAM CONVERTED

BASED ON RECOVERED H2O (%) 33.9

BASED ON H2 BALANCE (%) 33.9

BASED ON O2 BALANCE (%) 33.9

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED

GASIFICATION ONLY (LBS/LBS) 0.206

GASIFICATION ONLY (MOL/MOL) 0.308

INCLUDES DEVOLATILIZATION (LBS/LBS) 0.317

INCLUDE DEVOLATILIZATION (MOL/MOL) 0.476

CARBON CONVERTED/BED VOLUME

GASIFICATION ONLY (LBS/HR)/CF 0.636

GASIFICATION ONLY (MOL/HR)/CF 0.053

INCLUDE DEVOLATILIZATION (LBS/HR)/CF 0.981

GASIFICATION ONLY (MOL/HR)/CF 0.082

CARBON IN BED/STEAM FEED LBS/(LBS/HR) 0.986

CARBON IN BED/STEAM FEED MOL/(MOL/HR) 1.479

* CARBON CONVERTED BASED ON RECOVERED SOLIDS

YIELD PERIOD 6. UNIT CONVERSIONS

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	48.03
CARBON FROM DEVOLATILIZATION	(LBS/HR)	12.11
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	22.33
BASED ON RECOVERED SOLIDS	(LBS/HR)	22.33
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	34.44
BASED ON RECOVERED SOLIDS	(LBS/HR)	34.44

* CARBON CONVERSION (C CONVERTED/C IN FEED)		
GASIFICATION ONLY		
BASED ON GC ANALYSIS	(%)	46.5
BASED ON RECOVERED SOLIDS	(%)	46.5
INCLUDING DEVOLATIZATION		
BASED ON GC ANALYSIS	(%)	71.7
BASED ON RECOVERED SOLIDS	(%)	71.7

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)

GASIFICATION ONLY		
BASED ON GC ANALYSES	(%/HR)	20.8
BASED ON RECOVERED SOLIDS	(%/HR)	20.8
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES	(%/HR)	32.2
BASED ON RECOVERED SOLIDS	(%/HR)	32.2

YIELD PERIOD 6. MATERIAL BALANCES

* ASH AND FINES BALANCES					
	ASTH ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	803 FREE ASTH ASH (LBS/HR)	803 FREE C/H REED (LBS/HR)	-325 MESH FINES (LBS/HR)
INPUT:					
COAL+CATALYST	18.45	15.20	10.95	10.89	1.51
OUTPUT:					
PRI CHAR CARRYOVER	2.53	2.59	2.11	2.27	0.13
SOLIDS WITHDRAWN	12.64	13.44	9.20	11.29	0.61
TOTAL	15.18	16.03	11.32	13.56	0.74
ACCUMULATION:	0.02	0.01	0.36	0.01	0.13
CLOSURE:					
(OUT+ACCUM)/IN	82.4%	105.5%	100.0%	124.5%	40.0%
*325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT) =0.91					
PRODUCED/(OUTPUT+ACCUM) =149.8%					

* ASH ELEMENT BALANCE										
	SiO2	Fe2O3	Al2O3	CaO	MgO	SO3	TiO2	P2O5	Na2	
INPUT:	LBS/HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	
COAL+CATALYST	3.147	0.881	0.971	0.139	0.044	5.564	0.049	0.020	0.0	
OUTPUT:										
CHAR ENTRAINED	0.466	0.150	0.171	0.023	0.007	0.325	0.012	0.001	0.0	
CHAR WITHDRAWN	3.010	0.785	0.887	0.117	0.041	2.157	0.040	0.019	0.0	
TOTAL	3.476	0.935	1.059	0.140	0.048	2.482	0.053	0.020	0.0	
ACCUMULATION	-0.329	-0.054	-0.086	-0.002	-0.004	0.004	-0.004	-0.000	0.0	
CLOSURE										
(OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	46.7%	100.0%	100.0%	100.0%	

YIELD PERIOD 6. MATERIAL BALANCES

YIELD PERIOD 6. UNIT PRESSURES

* UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	194.2
LOCK HOPPER 2B	198.8
STEAM GENERATOR	450.6
COAL FEED LINE A	286.5
COAL FEED LINE B	280.0
GASIFIER TOP	274.9
MID	276.2
BTH	277.4
CYCLONE OUTLET	276.3
FILTER OUTLET	274.7
SCRUBBER	276.2

BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	3.6
6.1	2.6
16.4	1.9
26.4	1.3
37.5	0.6
47.7	0.3
57.6	-0.2
67.9	-0.2
84.2	-0.2

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	48.03	3.08	9.49	2.925	0.951	0.048
STEAM	-	12.16	96.51	-	-	-
SYN GAS	20.08	11.90	27.60	-	1.068	-
TOTAL	68.11	27.14	133.60	2.925	2.018	0.048

OUTPUT (LBS/HR)

PRODUCT GAS (DRY)	54.33	18.94	66.22	1.944	14.665	-
PRODUCT WATER	0.19	8.04	64.35	0.000	0.000	-
CHAR WITHDRAWN	10.07	0.13	2.37	0.868	0.030	0.034
CHAR ENTRAINED	3.80	0.03	0.60	0.123	0.008	0.012
TOTAL	67.98	27.14	133.54	2.935	14.703	0.046
SOLIDS ACC.	0.13	-0.00	0.06	-0.010	0.007	0.003
CLOSURE:	100.00	100.00	100.00	100.000	120.804	100.000

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUTS	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL + CATALYST	4.73	4.37
OUTPUTS		
PRI CHAR CARRYOVER	1.06	0.81
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/O	3.57	2.17
TOTAL	4.64	2.98
ACCUMULATION:		
PRI GASIF	0.10	-0.26
CLOSURE:		
(OUT+ACCUM)/IN	100.01	62.01

YIELD PERIOD 6. PRODUCT GAS DATA

* GASIFIER PRODUCT GAS (FROM FILTERS AND SCRUBBER) (DRY)

MAJOR COMPONENTS, MOL %	MINOR COMPONENTS,	PPH
H2	C2H6	0.0
CO	C2H4	0.0
CO2	C3H6	0.0
CH4	O2+AR	0.0
H2S	CO2	0.0
N2	SO2	0.0

* GASIFIER PRODUCT GAS (INCLUDES UNREACTED STEAM)

H2	37.24		
CO	6.71		
CO2**	11.03	SCFH CH4/LB C FEED	15.54
CH4	13.57		
H2O**	27.52		
H2S	0.42	SCFH CH4/LB C IN BED	6.97
N2	3.61		
NH3	0.00		

* EQUILIBRIUM CONSTANTS

REACTION	ACTUAL EQUILIBRIUM AT ACTIVE BED TEMP (1267.5 F)	EQUILIBRIUM EXPRESSION	CORRESPONDING EQUILIBRIUM TEMPERATURE (DEG F)
GRAPHITE-H2O: C + H2O = CO + H2	1.5959	1.6909	1293.5
SHIFT: CO + H2O = CO2 + H2	1.5734	2.2138	1159.1
METHANATION: CO + 3H2 = CH4 + H2O	0.0847	0.0310	1352.8
OVERALL: 12C + 2H2O = CH4 + CO2	0.3396	0.1960	

* MATERIAL BALANCES *

INPUT: (LBS/HR)	OUTPUT: (LBS/HR)
GASIFIER (INCLUDES FILTER AND SCRUBBER)	
COAL + CATALYST	74.53
STEAM	108.67
MAKEUP SYN GAS	60.16
RECYCLE GAS	0.0
TOTAL	243.35
ACCUMULATION	-0.18
OVERALL INPUT	243.35
GASIF. ACCUM	-0.18
PRODUCT WATER	
CHAR WITHDRAWN	72.58
CHAR ENTRAINED	22.68
PRODUCT GAS (DRY)	6.27
TOTAL	242.95
CLOSURE: (OUT+ACC)/IN	99.8%
PURGE GAS	
OVERALL OUTPUT	0.0
CLOSURE: (OUT+ACC)/IN	99.8%

SYN GAS BALANCE

INPUT: (SCFH)	OUTPUT: (SCFH)
SYN GAS TO GASIF	2853.52
H2 MOL %	78.48
CO MOL %	21.52
H2+CO IN PRODUCT GAS	2416.04
H2 MOL %	51.39
CO MOL %	48.61

SYN GAS BALANCE: 84.74% H2 BALANCE: 91.49% CO BALANCE: 0.14%

YIELD PERIOD 6. MATERIAL BALANCES

* GASIFIER MOLE BALANCES

GAS INPUT	LB-MOLES/HR				
	C	H	O	S	N
SYN GAS					
H2	(5.901)	11.802			
CO	(1.618)	1.618	1.618		
CH4	(-0.000)	-0.000	-0.000		
CO2	(0.053)	0.053	0.107		
N2	(0.036)				0.076
STEAM					
H2O	(6.032)	12.064	6.032		
TOTAL	(13.551)	1.672	23.865	7.757	0.076

SOLIDS INPUT LB-MOLES/HR

	C	H	O	S	N	K
COAL+CATALYST	2.999	3.060	0.593	0.091	0.066	0.121
TOTAL INPUT	5.670	26.925	8.350	0.091	0.144	0.121

GAS OUTPUT LB-MOLES/HR

	C	H	O	S	N
PRODUCT GAS					
H2	(5.396)	10.792			
CO	(0.973)	0.973	0.973		
CH4	(1.967)	1.967	7.868		
CO2	(1.599)	1.599	3.198		
H2O	(0.061)	0.121		0.061	
N2	(0.524)				1.047
NH3	(0.000)	0.000			0.000
H2O	(3.989)	7.979	3.989		
TOTAL	(14.511)	4.539	26.766	8.160	1.047

SOLIDS OUTPUT LB-MOLES/HR

	C	H	O	S	N	X
CHAR ENTRAINED	0.283	0.030	0.037	0.004	0.001	0.027
CHAR WITHDRAWN	0.638	0.133	0.148	0.027	0.002	0.091
TOTAL SOLIDS	1.121	0.163	0.186	0.031	0.003	0.119
TOTAL OUTPUT	5.660	26.929	8.346	0.092	1.050	0.119
ACCUMULATION	0.010	-0.063	0.004	-0.000	0.000	0.002
CLOSURE						
(OUT+ACC)/IN, %	100.0	100.0	100.0	100.0	8	100.0

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PDU YIELD PERIOD 7

RECONCILED DATA
YIELD PERIOD 7. UNIT OPERATIONS

	TIME	DATE
FROM	1030	8-7-80
TO	1030	8-8-80
DURATION	24.00 HRS	

* MODE OF OPERATION GASIFIER ONLY

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1184.	272.
Active Bed	1271.7	

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	1086.
77.6	1288.
67.9	1288.
57.8	1274.
47.7	1283.
42.6	1274.
37.5	1264.
26.4	1250.
21.4	1258.
11.3	1261.
6.1	1180.
0.0	798.

YIELD PERIOD 7. UNIT PROCESS VARIABLES

* UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	193.	115.
SCREW DRYER	32.	335.
OXIDIZER 1 TOP	226.	
MID	227.	
BTM	205.	
OXIDIZER 2 TOP	375.	
MID	370.	
BTM	374.	
LOCK HOPPER 1 TOP	280.	
MID	278.	265.
LOWER	281.	
CONE	248.	243.
LOCK HOPPER 2A MID	237.	246.
CONE	255.	257.
LH-2A FEED POT		360.
LH-2A FEED LINE MID		360.
LOWER		463.
LOCK HOPPER 2B MID	242.	248.
CONE	257.	257.
LH-2B FEED POT		356.
LH-2B FEED LINE MID		328.
LOWER		452.
SYN GAS PREHEATER	459.	521.
STEAM GENERATOR	459.	
3TH & 3G SUPERHEATER	1078.	936.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		
TOP OF BED	1288.	1328.
BTM OF BED	1261.	1234.
BED AVERAGE	1184.	1298.
CYCLONE		999.
DIPLEG TOP	1234.	1158.
DIPLEG MID	1220.	895.
DIPLEG BTM	759.	1264.
DIPLEG SLOPE		1295.
FILTER INLET	747.	806.
FILTER 1		709.
FILTER 2		698.
SCRUBBER INLET	582.	556.
SCRUBBER TOP	68.	
SCRUBBER MID	139.	
SCRUBBER BTM	185.	
SOUR GAS STRIPPER TOP	248.	
MID	189.	
BTM	213.	

YIELD PERIOD 7. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	(WTX OF TOTAL SOLIDS, DRY) CHAR W/D & C/O					LH3 FEED (COAL) (WTX)
	COAL+CAT (FC) (WTX)	(GHC) (WTX)	(GB) (WTX)	(GF) (WTX)		
H	4.13	0.88	0.79	0.84	5.15	
C	62.72	54.82	49.89	63.15	70.23	
S	4.10	3.33	3.72	3.60	4.19	
PYRITIC	1.60	0.07	0.26	0.06	1.63	
SULFATE	0.24	0.31	0.34	0.22	0.25	
ORGANIC	2.26	2.95	3.12	3.32	2.31	
O	12.51	10.48	8.20	4.70	9.22	
N	1.24	0.26	0.22	0.50	1.36	
CL	0.07	0.10	0.15	0.17	0.06	
SO3-FREE ASH	17.23	30.13	37.03	27.04	9.79	
TOTAL	100.00	100.00	100.00	100.00	100.00	
* ASH ANALYSIS (WTX OF TOTAL SOLIDS)						
ASH	23.21	39.45	103.59	38.32	10.06	
C/H RESIDUE	20.52	42.10	52.72	37.34	9.52	
SO3-C/H RES.	13.05	32.76	40.46	30.00	9.25	
* ASH ELEMENT ANALYSIS (WTX OF SO3-FREE ASH)						
SiO2	26.91	23.60	28.52	26.72	53.36	
FE2O3	9.27	8.29	9.69	8.65	15.38	
AL2O3	9.29	8.55	9.71	8.94	19.67	
CAO	2.03	1.11	2.19	1.11	3.77	
MGO	0.45	0.48	0.46	0.48	0.97	
TiO2	0.47	0.53	0.45	0.54	1.08	
P2O5	0.25	0.13	0.27	0.13	0.36	
Na2O	0.90	1.86	0.00	0.00	0.0	
CATALYST (FROM ACID SOLUBLE ANALYSIS)						
K2O	50.43	48.99	48.71	53.43	2.35	
TOTAL	100.00	93.54	100.00	100.00	46.96	

YIELD PERIOD 7. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES		GASIFIER		
BALANCE USED		H2O	O2	H2
TOTAL PRESSURE	(PSIA)	271.8	271.6	271.6
H2	(PSIA)	100.7	100.7	100.7
CO	(PSIA)	14.7	14.7	14.7
CH4	(PSIA)	34.3	34.3	34.3
CO2	(PSIA)	24.8	24.8	24.8
H2S	(PSIA)	1.3	1.3	1.3
H2O	(PSIA)	85.1	85.1	85.1
N2	(PSIA)	11.2	11.2	11.2
NH3	(PSIA)	-0.0	-0.0	-0.0
H2O/CO		5.8	5.8	5.8
H2O/CO2		3.4	3.4	3.4

* UNIT GAS DATA		GASIFIER
SYN GAS MNT	(LBS/MOL)	6.1
INJECTION GAS MNT	(LBS/MOL)	0.0
PRODUCT GAS MNT	(LBS/MOL)	13.9
PRODUCT GAS		
PG AT DTM (DRY)	(SCFH)	3094.1
(DRY, N2 FREE)	(SCFH)	2909.1
PG AT GASIFIER OUTLET	(SCFH)	4500.6
INCLUDES N2 AND H2O	(ACFH)	840.0
PG AT GASIFIER OUTLET	(SCFH)	4315.6
(EXCLUDES N2)	(ACFH)	806.1

* BASED ON OXYGEN BALANCE

YIELD PERIOD 7. SOLIDS DATA

YIELD PERIOD 7. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GB (WTX)	GF (WTX)
K AS K2O	7.7	14.8	14.8	18.0	14.5
K AS KOH	9.2	17.6	17.6	21.5	17.2
K AS K2CO3	11.3	21.7	21.7	26.5	21.2
K AS K	6.4	12.3	12.3	15.0	12.0
K WATER/ACID SOLUBLE RATIO	0.505	0.652	0.652	0.553	0.646
K2O H2O INSOL	3.8	5.1	5.1	8.1	5.1
K2CO3 " INSOL	5.6	7.5	7.5	11.8	7.5
K " INSOL	3.2	4.3	4.3	6.7	4.3

CARBON	62.7	54.8	54.8	49.9	63.2
K ON CARBON	10.2	22.4	22.4	30.0	19.0
ASTM ASH	23.2	39.5	39.5	103.6	38.3
K ON ASH	27.5	31.1	31.1	14.5	31.3
KOH-FREE ASH	13.9	21.9	21.1	82.1	21.1
K2CO3-FREE ASH	11.7	17.8	16.8	77.1	17.1
K ON K2CO3-FREE ASH	54.4	68.9	72.8	19.4	70.1

* BASED ON ACID SOLUBLE DETERMINATION

CATALYST ---KOH

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT X)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN		FINES (GF)
		(GTC)	(GMC)	(GB)
10 MESH	100.0	99.6	99.6	99.0
20 MESH	99.8	97.3	97.3	95.5
30 MESH	98.4	93.7	93.7	84.2
40 MESH	91.4	80.6	80.6	67.5
60 MESH	49.9	39.7	39.7	24.9
80 MESH	36.3	25.5	25.5	13.1
100 MESH	25.4	22.2	22.2	6.4
200 MESH	12.2	8.3	8.3	1.3
325 MESH	2.7	0.4	0.4	0.1

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	20.	51.	51.	70.	33.
VOLUME SURFACE MEAN	149.	194.	194.	290.	220.
HEIGHT MEAN	255.	319.	319.	403.	330.

* ROSEN-RAHLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	274.	344.	344.	525.	378.
SIZE DISTRIBUTION CONSTANT	1.87	2.28	2.28	2.35	2.22
BULK DENSITY (G/CC)	0.770	0.250	0.250	0.391	0.250
BULK DENSITY (LBS/CFT)	48.0	15.6	15.6	24.6	15.6

YIELD PERIOD 7. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES

BED BOTTOM DENSITY	(LBS/CF)	11.8
BED TOP DENSITY	(LBS/CF)	8.3
BED AVERAGE DENSITY	(LBS/CF)	10.3
BED HEIGHT	(FEET)	52.2
BED HOLDUP	(LBS)	291.9
BED VOLUME	(CFT)	28,450
ACTIVE BED TEMPERATURE	(DEG F)	1271.7
ACTIVE BED VOLUME	(CFT)	22,312
SPACE VELOCITY (ACT BED)	(ACFH/CF)	36.3
BTM SUPERFICIAL VELOCITY	(FT/SEC)	0.280
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.413

* CYCLONE PERFORMANCE *Not operating*

TEMPERATURE	(DEG F)	499.2
PRESSURE	(PSIA)	271.6
INLET GAS RATE	(SCFH)	4500.6
	(ACFH)	683.2
INLET GAS VELOCITY	(FT/SEC)	21.3
SOLIDS ENTERING	(LBS/HR)	3.5
DUST LOAD	(LBS/ACF)	0.1792
SOLIDS CAPTURED	(LBS/HR)	0.0
SOLIDS ESCAPING	(LBS/HR)	3.5
OVERALL EFFICIENCY (CAPTURED/ENTERING, WT%)		0.0

* SOLIDS ENTRAINMENT LOSS

TOTAL			-325 MESH
COAL+CATALYST FEED	(LBS/HR)	68.64	1.85
TOTAL ENTRAINED	(LBS/HR)	3.47	0.02
ENTRAINED/FEED	(WT%)	5.1%	0.0%

ENTRAINED/FEED

(FEED FINES BACKED OUT) (WT%) -2.7%

* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	43.05	1.06
CARBON IN ENTRAINED FINES	(LBS/HR)	2.19	0.01
ENTRAINED/FEED	(WT%)	5.1%	0.0%
ENTRAINED/FEED (FEED FINES BACKED OUT)	(WT%)		-2.5%

YIELD PERIOD 7. UNIT CONVERSIONS

* STEAM CONSUMPTION

STEAM INTO UNIT	(LBS/HR)	94.84	PRIMARY GASIFIER
STEAM REACTED WITH CARBON	(LBS/HR)	27.34	
STEAM REACTED IN SHIFT	(LBS/HR)	19.32	
STEAM FROM METHANATION			
BASED ON RECOVERED H2O	(LBS/HR)	-18.59	
BASED ON H2 BALANCE	(LBS/HR)	-18.59	
BASED ON O2 BALANCE	(LBS/HR)	-18.59	
TOTAL STEAM CONSUMED			
BASED ON RECOVERED H2O	(LBS/HR)	28.07	
BASED ON H2 BALANCE	(LBS/HR)	28.07	
BASED ON O2 BALANCE	(LBS/HR)	28.07	

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	28.8
WATER-GAS SHIFT	(%)	20.4
METHANATION		
BASED ON RECOVERED H2O	(%)	-19.6
BASED ON H2 BALANCE	(%)	-19.6
BASED ON O2 BALANCE	(%)	-19.6
TOTAL STEAM CONVERTED		
BASED ON RECOVERED H2O	(%)	29.6
BASED ON H2 BALANCE	(%)	29.6
BASED ON O2 BALANCE	(%)	29.6

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.192
GASIFICATION ONLY	(MOL/MOL)	0.288
INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.300
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.450
CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.641
GASIFICATION ONLY	(MOL/HR)/CF	0.053
INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	0.999
GASIFICATION ONLY	(MOL/HR)/CF	0.083

CARBON IN BED/STEAM FEED	LBS/(LBS/HR)	1.687
CARBON IN BED/STEAM FEED	MOL/(MOL/HR)	2.532

* CARBON CONVERTED BASED ON RECOVERED SOLIDS

YIELD PERIOD 7. UNIT CONVERSIONS

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	43.05
CARBON FROM DEVOLATILIZATION	(LBS/HR)	10.20
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	10.23
BASED ON RECOVERED SOLIDS	(LBS/HR)	10.23
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	20.42
BASED ON RECOVERED SOLIDS	(LBS/HR)	20.42

* CARBON CONVERSION (C CONVERTED/C IN FEED)

GASIFICATION ONLY		
BASED ON GC ANALYSIS	(%)	42.3
BASED ON RECOVERED SOLIDS	(%)	42.3
INCLUDING DEVOLATIZATION		
BASED ON GC ANALYSIS	(%)	66.0
BASED ON RECOVERED SOLIDS	(%)	66.0

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)

GASIFICATION ONLY		
BASED ON GC ANALYSES	(%/HR)	11.4
BASED ON RECOVERED SOLIDS	(%/HR)	11.4
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES	(%/HR)	17.8
BASED ON RECOVERED SOLIDS	(%/HR)	17.8

YIELD PERIOD 7. MATERIAL BALANCES

* ASH AND FINES BALANCES

	ASTM ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	803 FREE ASTH (LBS/HR)	803 FREE C/H RESD (LBS/HR)	-325 MESH FINES (LBS/HR)
INPUT:					
COAL+CATALYST	15.93	14.08	10.45	8.96	1.65
OUTPUT:					
PRI CHAR CARRYOVER	1.33	1.29	0.94	1.04	0.02
SOLIDS WITHDRAWN	26.11	13.29	9.33	10.20	0.03
TOTAL	27.44	14.58	10.27	11.24	0.06
ACCUMULATION:	0.02	0.02	0.16	0.01	0.00
CLOSURE:					
(OUT+ACCUM)/IN	172.4%	103.7%	99.8%	125.6%	3.1%
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					-1.80
PRODUCED/(OUTPUT+ACCUM)					*****

* ASH ELEMENT BALANCE

	SiO2	FE2O3	Al2O3	CaO	MgO	803	TiO2	P2O5	Na2O
	LBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS
INPUT:									
COAL+CATALYST	2.813	0.969	0.971	0.212	0.047	4.384	0.049	0.027	0.01
OUTPUT:									
CHAR ENTRAINED	0.251	0.081	0.084	0.010	0.004	0.314	0.005	0.001	0.01
CHAR WITHDRAWN	2.662	0.905	0.906	0.204	0.043	4.961	0.042	0.026	0.01
TOTAL	2.912	0.986	0.990	0.215	0.048	5.275	0.047	0.027	0.01
ACCUMULATION	-0.100	-0.017	-0.019	-0.003	-0.001	0.004	0.002	-0.000	0.01
CLOSURE									
(OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	120.4%	100.0%	100.0%	100.1%

YIELD PERIOD 7. MATERIAL BALANCES

YIELD PERIOD 7. UNIT PRESSURES

UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	183.2
LOCK HOPPER 2B	195.4
STEAM GENERATOR	447.3
COAL FEED LINE A	282.9
COAL FEED LINE B	278.3
GASIFIER TOP	271.8
MID	273.4
BTM	275.0
CYCLONE OUTLET	271.8
FILTER OUTLET	270.9
SCRUBBER	270.9

GASIFIER DIFFERENTIAL PRESSURES	
BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	4.1
6.1	3.2
16.4	2.4
26.4	1.6
37.5	0.9
47.7	0.4
57.8	0.1
67.9	0.2
84.2	0.2

* GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	43.05	2.83	8.59	2.813	0.852	0.041
STEAM	-	10.61	84.23	-	-	-
SYN GAS	10.33	9.27	13.76	-	0.000	-
TOTAL	53.38	22.72	106.58	2.813	0.852	0.041

OUTPUT (LBS/HR)

PRODUCT GAS (DRY)	38.60	15.02	44.60	1.706	13.657	-
PRODUCT WATER	0.15	7.47	59.71	-0.000	-0.000	-
CHAR WITHDRAWN	12.58	0.20	2.07	0.938	0.056	0.03
CHAR ENTRAINED	2.19	0.03	0.16	0.125	0.017	0.00
TOTAL	53.52	22.72	106.54	2.828	13.730	0.04
SOLIDS ACC.	-0.13	-0.00	0.04	-0.016	0.000	0.00
CLOSURE:	100.00	100.00	100.00	100.000	*****	100.00

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUT:	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL+CATALYST	4.38	2.21
OUTPUT:		
PRI CHAR CARRYOVER	0.42	0.27
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/D	3.77	2.09
TOTAL	4.19	2.35
ACCUMULATION:		
PRI GASIF	0.19	0.00
CLOSURE:		
(OUT+ACCUM)/IN	100.0%	106.7%

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PDU YIELD PERIOD 8

RECONCILED DATA

YIELD PERIOD 8. UNIT OPERATIONS

TIME	DATE
FROM 1230	09-12-8
TO 0 1230	09-13-8
DURATION	24.00 HRS

* MODE OF OPERATION YIELD PERIOD 8; MATERIAL BALANCE 38

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS

UNIT	TEMPERATURE (DEG F)	PRESSURE (PSIA)
GASIFIER	1182.	519.

* GASIFIER PROCESS TEMPERATURES

BED HEIGHT (FEET)	TEMP (DEG F)
82.2	1030.
77.6	1276.
67.9	1299.
57.8	1291.
47.7	1303.
42.6	1311.
37.5	1296.
26.4	1293.
21.4	1284.
11.3	1261.
6.1	1172.
0.0	655.

YIELD PERIOD 8. UNIT PROCESS VARIABLES

UNIT TEMPERATURES	PROCESS (DEG F)	METAL (DEG F)
CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS		
LOCK HOPPER 3	101.	92.
SCREW DRYER	302.	339.
OXIDIZER 1 TOP	258.	
MID	265.	
BTM	228.	
OXIDIZER 2 TOP	391.	
MID	391.	
BTM	390.	
LOCK HOPPER 1 TOP	298.	
MID	305.	294.
LOWER	308.	
CONE	303.	271.
LOCK HOPPER 2A MID	289.	312.
CONE	309.	341.
LH-2A FEED POT		347.
LH-2A FEED LINE MID		259.
LOWER		377.
LOCK HOPPER 2B MID	282.	351.
CONE	336.	376.
LH-2B FEED POT		307.
LH-2B FEED LINE MID		269.
LOWER		625.
SYN GAS PREHEATER		397.
STEAM GENERATOR	486.	
STM & SG SUPERHEATER	1023.	925.
* GASIFIER, FILTERS AND SCRUBBER		
GASIFIER		
TOP OF BED	1299.	1324.
BTM OF BED	1261.	1179.
BED AVERAGE	1182.	1289.
CYCLONE		1082.
DIPLEG TOP	956.	796.
DIPLEG MID	744.	896.
DIPLEG BTM	736.	1193.
DIPLEG SLOPE		1130.
FILTER INLET	1013.	32.
FILTER 1		900.
FILTER 2		32.
SCRUBBER INLET	356.	804.
SCRUBBER TOP	72.	
SCRUBBER MID	133.	
SCRUBBER BTM	246.	
SOUR GAS STRIPPER TOP	212.	
MID	200.	
BTM	216.	

YIELD PERIOD 8. MATERIAL BALANCES

YIELD PERIOD 8. UNIT PRESSURES

UNIT PRESSURE	(PSIA)
LOCK HOPPER 2A	468.3
LOCK HOPPER 2B	527.9
STEAM GENERATOR	583.5
COAL FEED LINE A	529.5
COAL FEED LINE B	523.1
GASIFIER TOP	519.4
MID	522.6
BTM	525.5
CYCLONE OUTLET	519.8
FILTER OUTLET	520.9
SCRUBBER	520.9

GASIFIER DIFFERENTIAL PRESSURES

BED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
0.0	7.2
6.1	6.0
16.4	4.6
26.4	3.4
37.5	2.6
47.7	1.8
57.8	1.2
67.9	1.2
84.2	1.2

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	63.61	3.99	11.61	4.150	1.484	0.063
STEAM	-	16.15	128.19	-	-	-
SYN GAS	16.58	14.59	24.75	-	1.237	-
TOTAL	82.19	34.73	164.55	4.150	2.720	0.063
OUTPUT (LBS/HR)						
PRODUCT GAS (DRY)	70.94	24.06	77.50	3.118	36.113	-
PRODUCT WATER	0.51	10.52	84.82	0.009	0.008	-
CHAR WITHDRAWN	7.15	0.11	1.52	0.670	0.071	0.031
CHAR ENTRAINED	2.69	0.03	0.40	0.279	0.006	0.013
TOTAL	81.29	34.71	164.25	4.077	36.198	0.044
SOLIDS ACC.	0.90	0.01	0.30	0.074	0.148	0.019
CLOSURE:	100.00	100.00	100.00	100.000	*****	100.000

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

*** CATALYST BALANCE**

	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
INPUT:		
COAL+CATALYST	4.71	2.38
OUTPUT:		
PRI CHAR CARRYOVER	1.15	0.87
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/D	2.96	1.74
TOTAL	4.11	2.61
ACCUMULATION:		
PRI GASIF	0.60	*****
CLOSURE:		
(OUT+ACCUH)/IN	100.0%	*****

YIELD PERIOD 8. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES

BED BOTTOM DENSITY	(LBS/CF)	20.2
BED TOP DENSITY	(LBS/CF)	11.3
BED AVERAGE DENSITY	(LBS/CF)	18.0
BED HEIGHT	(FEET)	55.0
BED HOLDUP	(LBS)	541.0
BED VOLUME	(CFT)	30.022
ACTIVE BED TEMPERATURE	(DEG F)	1290.5
ACTIVE BED VOLUME	(CFT)	23.804
SPACE VELOCITY (ACT BED)	(ACFH/CF)	27.4
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.144
TOP SUPERFICIAL VELOCITY	(FT/SEC)	0.333

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)	1041.7
PRESSURE	(PSIA)	519.0
INLET GAS RATE	(SCFH)	6862.7
"	(ACFH)	561.4
INLET GAS VELOCITY	(FT/SEC)	17.5
SOLIDS ENTERING	(LBS/HR)	6.7
DUST LOAD	(LBS/ACF)	0.4208
SOLIDS CAPTURED	(LBS/HR)	0.0
SOLIDS ESCAPING	(LBS/HR)	6.7
OVERALL EFFICIENCY (CAPTURED/ENTERING,WTX)		0.3

* SOLIDS ENTRAINMENT LOSS

COAL+CATALYST FEED	(LBS/HR)	98.83	-325 MESH	0.40
TOTAL ENTRAINED	(LBS/HR)	6.69		0.03
ENTRAINED/FEED	(WTX)	6.8%		0.0%

ENTRAINED/FEED (FEED FINES BACKED OUT) (WTX)

-0.4%

* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	63.61	0.22
CARBON IN ENTRAINED FINES	(LBS/HR)	2.69	0.01
ENTRAINED/FEED	(WTX)	4.2%	0.0%
ENTRAINED/FEED (FEED FINES BACKED OUT) (WTX)			-0.3%

YIELD PERIOD 8. UNIT CONVERSIONS

* STEAM CONSUMPTION

STEAM INTO UNIT	(LBS/HR)	144.34	PRIMARY GASIFIER
STEAM REACTED WITH CARBON	(LBS/HR)	54.72	
STEAM REACTED IN SHIFT	(LBS/HR)	37.27	
STEAM FROM METHANATION			
BASED ON RECOVERED H2O	(LBS/HR)	-41.61	
BASED ON H2 BALANCE	(LBS/HR)	-41.61	
BASED ON O2 BALANCE	(LBS/HR)	-41.61	

TOTAL STEAM CONSUMED			
BASED ON RECOVERED H2O	(LBS/HR)	50.38	
BASED ON H2 BALANCE	(LBS/HR)	50.38	
BASED ON O2 BALANCE	(LBS/HR)	50.38	

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	37.9
WATER-GAS SHIFT	(%)	25.8
METHANATION		
BASED ON RECOVERED H2O	(%)	-28.8
BASED ON H2 BALANCE	(%)	-28.8
BASED ON O2 BALANCE	(%)	-28.8

TOTAL STEAM CONVERTED			
BASED ON RECOVERED H2O	(%)	34.9	
BASED ON H2 BALANCE	(%)	34.9	
BASED ON O2 BALANCE	(%)	34.9	

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED			
GASIFICATION ONLY	(LBS/LBS)	0.253	
GASIFICATION ONLY	(MOL/MOL)	0.379	

INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.366
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.550

CARBON CONVERTED/BED VOLUME			
GASIFICATION ONLY	(LBS/HR)/CF	1.215	
GASIFICATION ONLY	(MOL/HR)/CF	0.101	

INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	1.761
GASIFICATION ONLY	(MOL/HR)/CF	0.147

CARBON IN BED/STEAM FEED	LBS/(LBS/HR)	1.233
CARBON IN BED/STEAM FEED	MOL/(MOL/HR)	1.850

* CARBON CONVERTED BASED ON RECOVERED H2O

YIELD PERIOD 8. UNIT CONVERSIONS

* CARBON CONSUMPTION		PRIMARY GASIFIER
CARBON IN COAL+CATALYST	(LBS/HR)	63.61
CARBON FROM DEVOLATILIZATION	(LBS/HR)	16.40
CARBON GASIFIED		
BASED ON GC ANALYSIS	(LBS/HR)	36.48
BASED ON RECOVERED SOLIDS	(LBS/HR)	36.48
TOTAL CARBON CONVERTED		
BASED ON GC ANALYSIS	(LBS/HR)	52.88
BASED ON RECOVERED SOLIDS	(LBS/HR)	52.88

* CARBON CONVERSION (C CONVERTED/C IN FEED)		
GASIFICATION ONLY		
BASED ON GC ANALYSIS	(%)	57.4
BASED ON RECOVERED SOLIDS	(%)	57.4
INCLUDING DEVOLATIZATION		
BASED ON GC ANALYSIS	(%)	83.1
BASED ON RECOVERED SOLIDS	(%)	83.1

* SPECIFIC REACTION RATES (C CONVERTED/C IN BED)		
GASIFICATION ONLY		
BASED ON GC ANALYSES	(%/HR)	20.5
BASED ON RECOVERED SOLIDS	(%/HR)	20.5
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES	(%/HR)	29.7
BASED ON RECOVERED SOLIDS	(%/HR)	29.7

YIELD PERIOD 8. MATERIAL BALANCES

* ASH AND FINES BALANCES		C/H RESIDUE	SO3 FREE	SO3 FREE	-325 MESH
	ASTM ASH (LBS/HR)	(LBS/HR)	ASTM ASH (LBS/HR)	C/H RESID (LBS/HR)	FINES (LBS/HR)
INPUT:					
COAL+CATALYST	21.15	19.87	13.93	14.33	0.40
OUTPUT:					
PRI CHAR CARRYOVER SOLIDS WITHDRAWN	3.90	3.73	3.27	3.30	0.03
	11.86	12.13	9.67	10.17	0.08
TOTAL	15.76	15.86	12.94	13.46	0.11
ACCUMULATION:	2.31	2.57	0.99	2.33	-0.02
CLOSURE: (OUT+ACCUM)/IN	85.4%	92.8%	100.0%	110.2%	21.7%
-325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					-0.31
PRODUCED/(OUTPUT+ACCUM)					-361.6%

* ASH ELEMENT BALANCE	SI02	FE2O3	AL2O3	CAO	MGO	SO3	TIO2	P2O5	NA2O
	LBS/HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS	HRLBS
INPUT:									
COAL+CATALYST	4.760	1.477	1.623	0.222	0.001	5.584	0.069	0.001	0.00
OUTPUT:									
CHAR ENTRAINED	1.191	0.317	0.315	0.029	0.008	0.421	0.024	0.002	0.00
CHAR WITHDRAWN	3.576	1.004	1.220	0.173	0.061	1.957	0.058	0.010	0.00
TOTAL	4.769	1.321	1.535	0.203	0.070	2.378	0.082	0.012	0.00
ACCUMULATION	-0.009	0.155	0.088	0.020	0.012	-0.201	0.007	-0.011	0.00
CLOSURE (OUT+ACC)/IN	100.0%	100.0%	100.0%	100.0%	100.0%	46.2%	100.0%	100.0%	100.0%

YIELD PERIOD 8. SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	COAL+CAT (FC) (WTX)	(WTX OF TOTAL SOLIDS, DRY)			LHS FEED (COAL) (WTX)
		(GHC) (WTX)	CHAR W/D & C/O (GB) (WTX)	(GF) (WTX)	
H	4.03	0.50	0.56	0.44	5.13
C	64.36	32.90	37.18	40.20	70.40
S	4.20	3.31	3.49	4.18	4.08
PYRITIC	0.53	0.17	0.14	0.85	0.51
SULFATE	0.30	0.15	0.47	0.26	0.29
ORGANIC	3.37	2.99	2.88	3.07	3.28
O	11.75	9.23	7.92	6.02	9.90
N	1.50	0.36	0.37	0.09	1.17
CL	0.06	0.13	0.16	0.20	0.09
803-FREE ASH	14.09	53.50	50.32	48.88	9.27
TOTAL	100.00	99.93	100.00	100.00	100.04

* ABH ANALYSIS	(WTX OF TOTAL SOLIDS)				
ASH	21.40	63.17	61.70	58.30	9.65
C/H RESIDUE	20.10	66.50	63.10	55.80	8.95
803-C/H RES.	14.50	56.90	52.90	49.30	8.57

* ASH ELEMENT ANALYSIS	(WTX OF 803-FREE ASH)				
SiO2	34.18	32.70	37.00	36.42	0.0
Fe2O3	10.60	8.70	10.38	9.71	0.0
Al2O3	11.66	11.50	12.62	9.62	0.0
CaO	1.60	0.61	1.79	0.90	0.0
H2O	0.58	0.38	0.63	0.25	0.0
TiO2	0.64	0.59	0.60	0.74	0.0
P2O5	0.01	0.14	0.10	0.08	0.0
Na2O	0.00	0.0	0.00	0.00	0.11
CATALYST	(FROM ACID SOLUBLE ANALYSIS)				
K2O	40.73	36.26	36.87	42.29	1.83
TOTAL	100.00	90.88	100.00	100.00	9.98

YIELD PERIOD 8. PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES	GASIFIER		
BALANCE USED	H2O	O2	H2
TOTAL PRESSURE (PSIA)	519.4	519.4	519.4
H2 (PSIA)	159.8	159.8	159.8
CO (PSIA)	20.3	20.3	20.3
CH4 (PSIA)	89.7	89.7	89.7
CO2 (PSIA)	60.5	60.5	60.5
H2S (PSIA)	2.8	2.8	2.8
H2O (PSIA)	150.7	150.7	150.7
N2 (PSIA)	36.9	36.9	36.9
NH3 (PSIA)	0.0	0.0	0.0
H2O/CO	7.4	7.4	7.4
H2O/CO2	2.5	2.5	2.5

* UNIT GAS DATA	GASIFIER	
SYN GAS HMT (LBS/HOL)	6.7	
INJECTION GAS HMT (LBS/HOL)	6.7	
PRODUCT GAS HMT (LBS/HOL)	16.5	
PRODUCT GAS		
PG AT DTH (DRY) (SCFH)	4883.3	
(DRY, H2 FREE) (SCFH)	4394.1	
PG AT GASIFIER OUTLET (SCFH)	6862.7	
INCLUDES N2 AND H2O (ACFH)	670.5	
PG AT GASIFIER OUTLET (SCFH)	6373.5	
(EXCLUDES N2) (ACFH)	622.7	

* BASED ON OXYGEN BALANCE

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YIELD PERIOD 8. SOLIDS DATA

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN			FINES (GF)
		(GTC)	(GMC)	(GB)	
10 MESH	100.0	99.8	99.8	99.8	98.3
20 MESH	99.8	99.1	99.1	99.0	97.7
30 MESH	98.4	95.7	95.7	96.3	95.6
40 MESH	92.9	93.0	93.0	93.9	93.2
60 MESH	51.8	50.4	50.4	41.9	66.0
80 MESH	38.2	36.8	36.8	29.4	50.4
100 MESH	18.7	17.1	17.1	16.9	13.4
200 MESH	5.8	6.2	6.2	6.3	1.1
325 MESH	0.4	0.2	0.2	0.4	0.4

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GB)	(GF)
NUMBER MEAN	53.	70.	70.	50.	55.
VOLUME SURFACE MEAN	184.	190.	190.	196.	178.
WEIGHT MEAN	258.	268.	268.	280.	211.

* ROSEN-RAHMLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GB)	(GF)
ABSOLUTE SIZE CONSTANT(MICRONS)	202.	285.	285.	325.	374.
SIZE DISTRIBUTION CONSTANT	2.64	2.98	2.98	2.40	2.44
BULK DENSITY(G/CC)	0.770	0.480	0.480	0.470	0.0
BULK DENSITY(LBS/CFT)	49.0	30.0	30.0	29.3	0.0

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PDU YIELD PERIOD 9

NONRECONCILED DATA

YIELD PERIOD 9. UNIT OPERATIONS

	TIME	DATE
FROM	11-25-A	0 123
TO	011-26-B	0 123
DURATION	24.00 HRS	

* MODE OF OPERATION GASIFIER ONLY, NO RECYCLE

* PERCENT OF TIME ON STREAM

COAL FEED	100.0%
STEAM	100.0%
SYN GAS	100.0%
BACKEND	0.0%

* UNIT CONDITIONS
UNIT

GASIFIER

TEMPERATURE (DEG F)	PRESSURE (PSIA)
1256.	505.

* GASIFIER PROCESS TEMPERATURES

RED HEIGHT (FEET)	TEMP (DEG F)
82.2	1004.
77.6	1297.
67.9	1308.
57.8	1305.
47.7	1310.
42.6	1317.
37.5	1294.
26.4	1276.
21.4	1267.
11.3	1269.
6.1	1214.
0.0	1155.

YIELD PERIOD 9. UNIT PROCESS VARIABLES

* UNIT TEMPERATURES
PROCESS (DEG F) METAL (DEG F)

CATALYST ADDITION, COAL PRETREATMENT AND FEED UNITS	PROCESS (DEG F)	METAL (DEG F)
LOCK HOPPER 3	65.	72.
SCREW DRYER	302.	35.
OXIDIZER 1 TOP	361.	
MID	376.	
BTM	377.	
OXIDIZER 2 TOP	374.	
MID	374.	
BTM	217.	
LOCK HOPPER 1 TOP	210.	
MID	213.	215.
LOWER CONE	205.	
CONE	162.	249.
LOCK HOPPER 2A MID	266.	286.
CONE	265.	307.
LH-2A FEED POT		292.
LH-2A FEED LINE MID		196.
LOWER		324.
LOCK HOPPER 2B MID	245.	248.
CONE	246.	32.
LH-2B FEED POT		32.
LH-2B FEED LINE MID		178.
LOWER		291.
SYN GAS PREHEATER		478.
STEAM GENERATOR	483.	
STM & SG SUPERHEATER	1179.	1064.

* GASIFIER, FILTERS AND SCRUBBER

GASIFIER		
TOP OF BED	1308.	1340.
BTM OF BED	1269.	1334.
BED AVERAGE	1256.	1333.
CYCLONE		1198.
DIPLEG TOP	53.	53.
DIPLEG MID	57.	59.
DIPLEG BTM	32.	32.
DIPLEG SLOPE		32.
FILTER INLET	870.	32.
FILTER 1		833.
FILTER 2		32.
SCRUBBER INLET	750.	711.
SCRUBBER TOP	177.	
SCRUBBER MID	145.	
SCRUBBER BTM	298.	
SOUR GAS STRIPPER TOP	32.	
MID	132.	
BTM	178.	

YIELD PERIOD % SOLIDS COMPOSITIONS

* ULTIMATE ANALYSIS COMPONENT	QUAL+CAT (FC) (WT%)	(WT% OF TOTAL SOLIDS, DRY) CHAR W/O & C/H			LHG FEED (TUAL) (WT%)
		(GHC) (WT%)	(GH) (WT%)	(GF) (WT%)	
H	4.09	0.36	0.35	0.27	4.95
C	60.56	22.04	15.14	20.85	69.80
S	3.47	3.45	3.39	2.24	4.69
PYRITIC	0.68	0.11	0.15	0.15	0.92
SULFATE	0.12	0.0	0.0	0.0	0.16
ORGANIC	2.67	3.34	3.24	2.10	3.61
O	13.12	15.82	15.33	9.18	9.81
N	1.17	0.06	0.05	0.05	1.34
CL	0.12	0.12	0.04	0.22	0.10
SO3-FREE ASH	17.45	58.15	65.71	67.18	9.31
TOTAL	99.98	100.00	100.01	99.99	100.00

* ASH ANALYSIS	(WT% OF TOTAL SOLIDS)				
ASH	24.61	66.62	74.60	74.82	9.49
C/H RESIDUE	21.13	76.02	81.27	75.82	9.67
SO3-C/H RES.	13.97	67.55	72.30	68.18	9.49

* ASH ELEMENT ANALYSIS	(WT% OF SO3-FREE ASH)				
SiO2	25.59	27.43	27.17	26.78	0.0
Fe2O3	8.52	7.20	8.30	7.74	0.0
Al2O3	9.09	10.23	10.03	8.51	0.0
CaO	1.68	1.09	1.65	1.09	0.0
MgO	0.52	0.61	0.57	0.47	0.0
TiO2	0.53	0.48	0.43	0.63	0.0
P2O5	0.21	0.58	0.18	0.46	0.0
Na2O	0.0	0.0	0.0	0.0	0.0
CATALYST K2O	41.78	(FROM ACID SOLUBLE ANALYSIS)			2.15
TOTAL	87.92	89.98	88.32	88.43	2.15

YIELD PERIOD % PRODUCT GAS DATA

* PRODUCT GAS PARTIAL PRESSURES	GASIFIER		
BALANCE USED	H2O	O2	H2
TOTAL PRESSURE (PSIA)	505.4	505.4	505.4
H2 (PSIA)	164.4	158.7	161.2
CO (PSIA)	23.4	22.6	23.0
CH4 (PSIA)	84.5	81.6	82.9
CO2 (PSIA)	60.2	58.1	59.0
H2S (PSIA)	2.1	2.1	2.1
H2O (PSIA)	150.2	162.6	157.2
N2 (PSIA)	22.0	21.2	21.6
NH3 (PSIA)	0.0	0.0	0.0
H2O/CO	6.4	7.2	5.8
H2O/CO2	2.5	2.8	2.7

* UNIT GAS DATA	GASIFIER	
SYN GAS MWT (LBS/MOL)	6.1	
INJECTION GAS MWT (LBS/MOL)	0.0	
PRODUCT GAS MWT (LBS/MOL)	15.8	
PRODUCT GAS		
PG AT OTH (DRY) (SCFH)	4290.2	
(DRY, N2 FREE) (SCFH)	4029.5	
PG AT GASIFIER OUTLET (SCFH)	6311.4	
INCLUDES H2 AND H2O (ACFH)	639.3	
PG AT GASIFIER OUTLET (SCFH)	6045.7	
(EXCLUDES N2) (ACFH)	612.4	

* BASED ON OXYGEN BALANCE

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YIELD PERIOD 9. UNIT CONVERSIONS

* CATALYST DISTRIBUTION

	FEED (WTX)	GTC (WTX)	GMC (WTX)	GR (WTX)	GF (WTX)
K AS K2O	7.3	24.6	24.6	26.3	28.7
K AS KOH	8.7	29.4	29.4	31.3	34.2
K AS K2CO3	10.7	36.2	36.2	38.0	42.2
K AS K	6.1	20.4	20.4	21.8	23.8
K WATER/ACID SOLUBLE RATIO	0.525	0.700	0.700	0.703	0.713
K2O H2O INSOL	3.5	7.4	7.4	7.8	8.3
K2CO3 " INSOL	5.1	10.8	10.8	11.5	12.1
K " INSOL	2.9	6.1	6.1	6.5	6.8
CARBON	60.6	22.0	22.0	15.1	20.9
K ON CARBON	10.0	92.8	92.8	124.1	114.3
ASTH ASH	24.6	66.6	66.6	74.6	74.8
K ON ASH	24.6	30.7	30.7	29.2	31.9
KOH-FREE ASH	15.9	37.3	37.3	43.3	40.6
K2CO3-FREE ASH	13.9	30.5	30.5	36.0	32.7
K ON K2CO3- FREE ASH	43.5	67.1	67.1	60.6	73.0

* BASED ON ACID SOLUBLE DETERMINATION
CATALYST ---KOH

YIELD PERIOD 9. SOLIDS DATA

* PARTICLE SIZE DISTRIBUTION (CUMULATIVE WT %)

SIEVE	FEED (FC)	SOLIDS WITHDRAWN			FINES (GF)
		(GTC)	(GMC)	(GR)	
10 MESH	100.0	97.7	97.7	97.7	100.0
20 MESH	99.8	95.0	95.0	94.2	100.0
30 MESH	98.9	89.8	89.8	87.0	99.0
40 MESH	95.1	84.8	84.8	84.7	96.9
60 MESH	32.3	66.7	66.7	62.9	94.9
80 MESH	26.4	57.1	57.1	54.7	91.4
100 MESH	16.8	48.6	48.6	32.5	88.0
200 MESH	6.2	27.7	27.7	13.2	79.3
325 MESH	0.8	3.1	3.1	3.1	0.8

* MEAN PARTICLE DIAMETER (MICRONS)

	(FC)	(GTC)	(GMC)	(GR)	(GF)
NUMBER MEAN	34.	25.	25.	20.	52.
VOLUME SURFACE MEAN	199.	110.	110.	136.	68.
WEIGHT MEAN	283.	235.	235.	269.	95.

* ROSEN-RAHMLER CONSTANTS

	(FC)	(GTC)	(GMC)	(GR)	(GF)
ABSOLUTE SIZE CONSTANT (MICRONS)	299.	305.	305.	349.	169.
SIZE DISTRIBUTION CONSTANT	2.40	1.34	1.34	1.38	3.16
BULK DENSITY (G/CC)	0.760	0.350	0.350	0.540	0.0
BULK DENSITY (LBS/CF)	47.4	21.8	21.8	33.7	0.0

YIELD PERIOD 9. FLUID-SOLIDS DATA

* GASIFIER BED PROPERTIES

BED BOTTOM DENSITY	(LBS/CF)	18.2
BED TOP DENSITY	(LBS/CF)	7.6
BED AVERAGE DENSITY	(LBS/CF)	13.7
BED HEIGHT	(FEET)	51.7
BED HOLDUP	(LBS)	385.5
BED VOLUME	(CFT)	28,724
ACTIVE BED TEMPERATURE	(DEG F)	1293.6
ACTIVE BED VOLUME	(CFT)	22,086
SPACE VELOCITY (ACT BED)	(ACFH/CF)	25.0
BTH SUPERFICIAL VELOCITY	(FT/SEC)	0.145
TIP SUPERFICIAL VELOCITY	(FT/SEC)	0.315

* CYCLONE PERFORMANCE

TEMPERATURE	(DEG F)	1197.8
PRESSURE	(PSIA)	505.2
INLET GAS RATE	(SCFH)	511.4
"	(ACFH)	585.5
INLET GAS VELOCITY	(FT/SEC)	18.3
SOLIDS ENTERING	(LBS/HR)	7.9
DUST LOAD	(LBS/ACF)	0.4760
SOLIDS CAPTURED	(LBS/HR)	0.0
SOLIDS ESCAPING	(LBS/HR)	7.9
OVERALL EFFICIENCY (CAPTURED/ENTERING, WT%)		0.0

* SOLIDS ENTRAINMENT LOSS TOTAL -325 MESH

COAL+CATALYST FEED	(LBS/HR)	84.66	0.68
TOTAL ENTRAINED	(LBS/HR)	7.89	0.06
ENTRAINED/FEED	(WT%)	9.3%	0.1%

ENTRAINED/FEED (FEED FINES RACKED OUT)	(WT%)		-0.7%
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* SOLIDS CARBON LOSS

CARBON IN FEED	(LBS/HR)	51.27	0.38
CARBON IN ENTRAINED FINER	(LBS/HR)	1.85	0.01
ENTRAINED/FEED	(WT%)	3.2%	0.0%
ENTRAINED/FEED (FEED FINES RACKED OUT)	(WT%)		-0.7%

YIELD PERIOD 9. UNIT CONVERSIONS

* STEAM CONSUMPTION

STEAM INTO UNIT	(LBS/HR)	150.79	PRIMARY GASIFIER
STEAM REACTED WITH CARBON	(LBS/HR)	49.26	
STEAM REACTED IN SHIFT	(LBS/HR)	33.81	
STEAM FROM METHANATION			
BASED ON RECOVERED H ₂ O	(LBS/HR)	-17.71	
BASED ON H ₂ BALANCE	(LBS/HR)	-23.52	
BASED ON O ₂ BALANCE	(LBS/HR)	-28.23	
TOTAL STEAM CONSUMED			
BASED ON RECOVERED H ₂ O	(LBS/HR)	65.36	
BASED ON H ₂ BALANCE	(LBS/HR)	59.55	
BASED ON O ₂ BALANCE	(LBS/HR)	54.84	

* STEAM CONVERSION (STEAM CONSUMED/STEAM INTO BED)

GASIFICATION	(%)	32.7
WATER-GAS SHIFT	(%)	22.4
METHANATION		
BASED ON RECOVERED H ₂ O	(%)	-11.7
BASED ON H ₂ BALANCE	(%)	-15.6
BASED ON O ₂ BALANCE	(%)	-18.7
TOTAL STEAM CONVERTED		
BASED ON RECOVERED H ₂ O	(%)	43.3
BASED ON H ₂ BALANCE	(%)	39.5
BASED ON O ₂ BALANCE	(%)	36.4

* REACTION RATE PARAMETERS

CARBON CONVERTED/STEAM FED		
GASIFICATION ONLY	(LBS/LBS)	0.184
GASIFICATION ONLY	(MOL/MOL)	0.276
INCLUDES DEVOLATILIZATION	(LBS/LBS)	0.311
INCLUDE DEVOLATILIZATION	(MOL/MOL)	0.466
CARBON CONVERTED/BED VOLUME		
GASIFICATION ONLY	(LBS/HR)/CF	0.984
GASIFICATION ONLY	(MOL/HR)/CF	0.047
INCLUDE DEVOLATILIZATION	(LBS/HR)/CF	1.660
GASIFICATION ONLY	(MOL/HR)/CF	0.138

CARBON IN BED/STEAM FED	LBS/(LBS/HR)	0.563
CARBON IN BED/STEAM FED	MOL/(MOL/HR)	0.849

* CARBON CONVERTED BASED ON RECOVERED SOLIDS

YIELD PERIOD 9. UNIT CONVERSIONS

*** CARBON CONSUMPTION**

	PRIMARY GASIFIER
CARBON IN COAL+CATALYST (LBS/HR)	51.27
CARBON FROM DEVOLATILIZATION (LBS/HR)	14.04
CARBON GASIFIED	
BASED ON GC ANALYSIS (LBS/HR)	32.89
BASED ON RECOVERED SOLIDS (LBS/HR)	27.77
TOTAL CARBON CONVERTED	
BASED ON GC ANALYSIS (LBS/HR)	51.92
BASED ON RECOVERED SOLIDS (LBS/HR)	46.85

*** CARBON CONVERSION (C CONVERTED/C IN FEED)**

GASIFICATION ONLY		
BASED ON GC ANALYSIS (X)		64.1
BASED ON RECOVERED SOLIDS (X)		54.2
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSIS (X)		101.3
BASED ON RECOVERED SOLIDS (X)		91.4

*** SPECIFIC REACTION RATES (C CONVERTED/C IN BED)**

GASIFICATION ONLY		
BASED ON GC ANALYSES (%/HR)		34.7
BASED ON RECOVERED SOLIDS (%/HR)		32.7
INCLUDING DEVOLATILIZATION		
BASED ON GC ANALYSES (%/HR)		61.1
BASED ON RECOVERED SOLIDS (%/HR)		55.1

YIELD PERIOD 9. MATERIAL BALANCES

*** ASH AND FINES BALANCES**

INPUT:	ASTM ASH (LBS/HR)	C/H RESIDUE (LBS/HR)	S03 FREE ASTH (LBS/HR)	S03 FREE C/H RESID (LBS/HR)	= 325 MESH FINES (LBS/HR)
COAL+CATALYST	20.81	17.69	14.77	11.83	0.68
PRI CHAR CARRYOVER SOLIDS WITHDRAWN	5.91	5.98	5.30	5.30	0.06
TOTAL	20.87	22.29	16.48	19.90	0.67
ACCUMULATION:	-2.98	-3.52	-2.53	-3.07	-1.19
CLOSURE:					
(OUT+ACCUM)/IN	85.9%	104.9%	106.0%	142.3%	-76.4%
= 325 MESH FINES PRODUCED IN UNIT (OUTPUT+ACCUM-INPUT)					-1.19
					PRODUCED/(OUTPUT+ACCUM) 250.9%

*** ASH ELEMENT BALANCE**

INPUT:	SiO2	Fe2O3	AL2O3	CAO	MGN	S03	TIO2	P2O5	NA2O
	LBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS	HRLBS/HRLBS
COAL+CATALYST	3.780	1.259	1.343	0.248	0.077	5.925	0.078	0.031	0.0
OUTPUT:									
CHAR ENTRAINED	1.420	0.910	0.451	0.058	0.025	0.635	0.033	0.024	0.0
CHAR WITHDRAWN	3.562	1.094	1.322	0.218	0.075	2.480	0.057	0.024	0.0
TOTAL	5.002	1.505	1.773	0.275	0.100	3.115	0.090	0.048	0.0
ACCUMULATION	0.0	0.0	0.0	0.0	0.0	-0.450	0.0	0.0	0.0
CLOSURE (UNT+ACC)/IN									
	132.3%	119.5%	132.1%	110.9%	130.1%	45.0%	115.1%	155.1%	100.0%

YIELD PERIOD 9. MATERIAL BALANCES

YIELD PERIOD 9. UNIT PRESSURES

* UNIT PRESSURE	(PSIA)
LOCK HUPPER 2A	341.3
LOCK HUPPER 2B	209.1
STEAM GENERATOR	565.0
COAL FEED LINE A	505.4
COAL FEED LINE B	505.5
GASIFIER TOP	505.4
MID	507.4
BTM	509.5
CYCLONE OUTLET	505.5
FILTER OUTLET	504.9
SCRUBBER	504.9

GASIFIER DIFFERENTIAL PRESSURES	RED HEIGHT (FEET)	DIFFERENTIAL PRESSURE (PSIA)
	0.0	5.2
	6.1	4.1
	16.4	2.8
	26.4	2.0
	37.5	1.1
	47.7	0.5
	57.8	0.3
	67.9	0.3
	84.2	0.3

GASIFIER ELEMENT BALANCES

INPUT (LBS/HR)	C	H	O	S	N	CL
COAL + CATALYST**	51.27	3.46	11.11	2.938	0.990	0.102
STEAM	-	16.87	133.92	-	-	-
SYN GAS	12.37	11.49	16.48	-	0.943	-
TOTAL	63.64	31.83	161.50	2.938	1.933	0.102
OUTPUT (LBS/HR)						
PRODUCT GAS (DRY)	63.82	21.54	71.99	2.175	19.635	-
PRODUCT WATER	0.47	9.56	77.12	0.0	0.0	-
CHAR WITHDRAWN	3.04	0.07	3.08	0.680	0.009	0.008
CHAR ENTRAINED	1.65	0.02	0.72	0.177	0.004	0.017
TOTAL	68.97	31.19	152.91	3.032	19.648	0.025
SOLIDS ACC.	-0.27	-0.01	-0.75	-0.183	-0.011	-0.013
CLOSURE:	107.96	97.96	94.21	96.994	*****	11.027

** EXCLUDES CARBON, HYDROGEN AND OXYGEN IN CATALYST

* CATALYST BALANCE

INPUT:	ACID SOL POTASSIUM (LBS/HR)	H2O SOL POTASSIUM (LBS/HR)
COAL+CATALYST	2.12	2.69
OUTPUT:		
PRI CHAR CARRYOVER	1.88	1.34
PRI PRODUCT WATER	0.0	0.0
SOLIDS W/D	4.38	3.08
TOTAL	6.26	4.42
ACCUMULATION:		
PRI GASIF	-1.17	-0.82
CLOSURE:		
(OUT+ACCUM)/IN	99.3%	133.7%

YIELD PERIOD 9. PRODUCT GAS DATA

* GASIFIER PRODUCT GAS (FROM FILTERS AND SCRUBBER) (DRY)

MAJOR COMPONENTS, MOL %		MINOR COMPONENTS, PPM	
H2	46.25	C2H6	0.0
CO	6.59	C2H4	0.0
CO2	16.58	C3H8	0.0
CH4	23.70	O2+AR	0.0
H2S	0.60	CO2	0.0
N2	6.19	SO2	0.0

* GASIFIER PRODUCT GAS (INCLUDES UNREACTED STEAM)

H2	31.47		
CO	4.49		
CO2**	11.52	SCFH CH4/LB C FEED	19.92
CH4	16.18		
H2O**	32.02		
H2S	0.41	SCFH CH4/LB C IN BED	12.0P
N2	4.21		
NH3	0.0		

* EQUILIBRIUM CONSTANTS

REACTION	EQUILIBRIUM AT ACTIVE BED TEMP (1293.6 F)	ACTUAL EQUILIBRIUM EXPRESSION	CORRESPONDING EQUILIBRIUM TEMPERATURE (DEG F)
GRAPHITE-H2O: C + H2O = CO + H2	1.6923	1.5017	1281.2
SHIFT: CO + H2O = CO2 + H2	1.5501	2.5047	1117.2
METHANATION: CO + 3H2 = CH4 + H2O	0.8769	0.0317	1351.3
OVERALL: 12C + 2H2O = CH4 + CO2	0.3413	0.1791	

* MATERIAL BALANCES *

INPUT:	(LBS/HR)	OUTPUT:	(LBS/HR)
GASIFIER (INCLUDES FILTER AND SCRUBBER)			
COAL + CATALYST	83.67	PRODUCT WATER	87.18
STEAM	150.79	CHAR WITHDRAWN	20.05
MAKEUP SYN GAS	40.62	CHAR ENTHAINED	7.89
RECYCLE GAS	0.0	PRODUCT GAS (DRY)	159.51
TOTAL	275.08	TOTAL	274.60
ACCUMULATION	-3.76	CLOSURE: (OUT+ACC)/IN =	98.5%
		PURGE GAS	0.0
OVERALL INPUT	275.08	OVERALL OUTPUT	274.60
GASIF ACCUM	-3.76	CLOSURE: (OUT+ACC)/IN	99.8%

SYN GAS BALANCE

INPUT:	(SCFH)	OUTPUT:	(SCFH)
SYN GAS TO GASIF			
H2 MOL % 84.70	2163.44	H2+CO IN PRODUCT GAS	2269.53
CO MOL % 15.30	390.80	H2 MOL %	46.30
		CO MOL %	6.60
			283.14
SYN BALANCE	88.85%	H2 BALANCE	91.82%
		CO BALANCE	

YIELD PERIOD 9. MATERIAL BALANCES

* GASIFIER MOLE BALANCES

GAS INPUT	LB-MOLES/HR					
	C	H	O	S	N	K
BYN GAS						
H2 (5.701)	-	11.402	-	-	-	-
CO (1.030)	1.030	-	1.030	-	-	-
CH4 (0.0)	0.0	0.0	-	-	-	-
CO2 (9.0)	0.0	-	0.0	-	-	-
N2 (0.034)	-	-	-	-	0.067	-
STEAM	-	-	-	-	-	-
H2O (8.370)	-	16.740	8.370	-	-	-
TOTAL (15.101)	1.030	28.142	9.400	-	0.067	-
SOLIDS INPUT						
	LB-MOLE/HR					
	C	H	O	S	N	K
COAL+CATALYST	4.268	3.435	0.694	0.092	0.071	0.131
TOTAL INPUT	5.298	31.577	10.094	0.092	0.138	0.131
GAS OUTPUT						
	LB-MOLES/HR					
	C	H	O	S	N	K
PRODUCT GAS						
H2 (5.234)	-	10.469	-	-	-	-
CO (0.746)	0.746	-	0.746	-	-	-
CH4 (2.691)	2.691	10.763	-	-	-	-
CO2 (1.916)	1.916	-	3.831	-	-	-
H2S (0.068)	-	0.136	-	0.068	-	-
N2 (0.701)	-	-	-	-	1.402	-
NH3 (0.0)	-	0.0	-	-	0.0	-
H2O (4.742)	-	9.484	4.742	-	-	-
TOTAL (16.050)	5.352	30.851	9.319	0.068	1.402	-
SOLIDS OUTPUT						
	LB-MOLES/HR					
	C	H	O	S	N	K
CHAR ENTHAINED	0.137	0.021	0.045	0.006	0.000	0.008
CHAR WITHDRAWN	0.253	0.070	0.142	0.021	0.001	0.112
TOTAL SOLIDS	0.390	0.091	0.237	0.027	0.001	0.160
TOTAL OUTPUT	5.742	30.942	9.557	0.095	1.403	0.160
ACCUMULATION	-0.022	-0.010	-0.047	-0.006	-0.001	-0.030
CLOSURE						
(OUT+ACC)/IN, %	108.0	98.0	98.2	97.0	99.0	99.1

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PDU YIELD PERIOD 10

* ENGLISH UNITS *

GASIFIER MATERIAL BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LS/HR)
COAL+CATALYST	121.64	PRODUCT GAS	207.23
STEAM	209.69	PRODUCT WATER	140.11
SYN GAS	53.55	CHAR ENTRAINED	24.11
		CHAR WITHDRAWN	10.79
TOTAL	384.88	TOTAL	382.24
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	2.64

SYN GAS BALANCE *****

INPUT:	(SCFH)	OUTPUT:	(SCFH)
MAKE UP SYN GAS	4574.87	H2+CO IN PRODUCT GAS	4032.88
RECYCLE SYN GAS	0.0		
GASIFIER SYN GAS	4574.87		

CLOSURE: OVERALL: 88.2 % H2: 89.1 % CO: 78.7 %

***** HYDROGEN BALANCE (SCFH H2) ***** OXYGEN BALANCE (SCFH O2) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 566.4	PRODUCT GAS 6230.4	COAL+CAT 149.8	PRODUCT GAS 1087.5
STEAM 4416.3	PG WATER 2950.8	STEAM 2208.1	PG WATER 1475.4
SYN GAS 4219.0	CHAR ENTRND 20.4	SYN GAS 205.0	CHAR ENTRND 0.0
	CHAR WTHDRN 1.0		CHAR WTHDRN 0.0
TOTAL 9202.6	TOTAL 9202.6	TOTAL 2562.9	TOTAL 2562.9
CLOSURE: (OUT/IN) = 100.0 %		CLOSURE: (OUT/IN) = 100.0 %	

GASIFIER CARBON BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	76.07	PRODUCT GAS	78.73
STEAM	0.0	PRODUCT WATER	0.0
SYN GAS	13.85	CHAR ENTRAINED	8.00
		CHAR WITHDRAWN	2.39
TOTAL	89.92	TOTAL	89.13
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	0.79

***** SO3-FREE ASH BALANCE (LB/HR) ***** A.S. K BALANCE (LB/HR) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 21.54	CHAR ENTRND 12.63	COAL+CAT 8.56	CHAR ENTRND 5.48
	CHAR WTHDRN 7.46		CHAR WTHDRN 2.54
TOTAL 21.54	TOTAL 20.10	TOTAL 8.56	TOTAL 8.02
CLOSURE 100.00	ACCUM 1.45	CLOSURE 100.00	ACCUM 0.54

EQUILIBRIUM CONSTANT ***** EQUILI. ** TARGET **** ACTUAL **** EQUILI **

GRAPHITE+H2O: C + H2O=CO + H2	1.5014	1.2943	1.3861	1273.0
SHIFT : CO+ H2O=CO2+ H2	1.5981	1.5981	3.6069	1005.2

METANIZATION : $Cu + 3H_2 = H_2O + CH_4$ 0.0937 0.0937 0.0190 1306.5
 OVERALL : $2C + 2H_2O = CO_2 + CH_4$ 0.3377 0.2510 0.1317

ACTUAL UNIT	TARGET
CONDITIONS	CONDITIONS
GASIFIER TEMPERATURE (DEG F)	1281.2
GASIFIER PRESSURE (PSIA)	504.5
BACKEND PRESSURE (PSIA)	116.2
CARBON CONVERSION (GC ANALYSIS) (%)	85.3
CARBON CONVERSION (GMC COMP.) (%)	84.5
GASIFICATION RATE (%)	42.8
K/C ATOM RATIO	0.210
STEAM CONVERSION (H ₂ O BALANCE) (%)	33.2
STEAM CONVERSION (H ₂ BALANCE) (%)	33.2
STEAM CONVERSION (O ₂ BALANCE) (%)	33.2
TOTAL CH ₄ MADE (SCF CH ₄ /LB C IN FEED)	15.92
CH ₄ IN DRY N ₂ FREE PRODUCT GAS (MOL %)	19.8

BED PROPERTIES

BED DENSITY (LB/CFT)	19.3
BED HEIGHT (FEET)	48.7
BED WEIGHT (LB)	500.4
SUPERFICIAL VELOCITY (FT/SEC)	0.495
SOLID RESIDENCE TIME (HOURS)	13.7

3-2-61, 1930 FOR 24H

* ENGLISH UNITS *

GASIFIER MATERIAL BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	129.88	PRODUCT GAS	235.12
STEAM	192.16	PRODUCT WATER	123.52
SYN GAS	77.14	CHAR ENTRAINED	24.77
		CHAR WITHDRAWN	13.73
TOTAL	399.19	TOTAL	397.13
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	2.06

SYN GAS BALANCE *****

INPUT:	(SCFH)	OUTPUT:	(SCFH)
MAKE UP SYN GAS	5099.99	H2+CO IN PRODUCT GAS	3923.09
RECYCLE SYN GAS	0.0		
GASIFIER SYN GAS	5099.99		

CLOSURE: OVERALL: 76.9 % H2: 79.5 % CO: 61.5 %

*** HYDROGEN BALANCE (SCFH H2) ***** OXYGEN BALANCE (SCFH O2) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 616.7	PRODUCT GAS 6449.8	COAL+CAT 160.0	PRODUCT GAS 1243.6
TEAM 4047.1	PG WATER 2601.4	STEAM 2023.5	PG WATER 1300.7
SYN GAS 4407.7	CHAR ENTRND 21.0	SYN GAS 360.8	CHAR ENTRND 0.0
	CHAR WTHDRN 1.3		CHAR WTHDRN 0.0
TOTAL 9073.5	TOTAL 9073.5	TOTAL 2544.3	TOTAL 2544.3
CLOSURE: (OUT/IN) = 100.0 %		CLOSURE: (OUT/IN) = 100.0 %	

GASIFIER CARBON BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	81.54	PRODUCT GAS	92.81
STEAM	0.0	PRODUCT WATER	0.0
SYN GAS	23.30	CHAR ENTRAINED	8.99
		CHAR WITHDRAWN	2.46
TOTAL	104.84	TOTAL	104.25
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	0.59

***** SO3-FREE ASH BALANCE (LB/HR) ***** A.S. K BALANCE (LB/HR) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 22.78	CHAR ENTRND 11.90	COAL+CAT 9.46	CHAR ENTRND 5.95
	CHAR WTHDRN 9.64		CHAR WTHDRN 3.05
TOTAL 22.78	TOTAL 21.54	TOTAL 9.46	TOTAL 9.00
CLOSURE 100.00	ACCUM 1.25	CLOSURE 100.00	ACCUM 0.46

EQUILIBRIUM CONSTANT *****	EQUILI. ** TARGET *****	ACTUAL *****	EQUILI **
GRAPHITE+H2O: C + H2O=CO + H2	CONSTANT	CONDITIONS	CONDITIONS TEMPERATURE
SHIFT : CO+ H2O=CO2+ H2	1.5548	1.3382	2.0340 1313.0
	1.5840	1.5840	3.0794 1051.7

METHANOL : $C_1 = CO + 3H_2 = H_2O + CH_4$	0.0845	0.0835	0.0174	1392.0
OVERALL : $2C + 2H_2O = CO_2 + CH_4$	0.3368	0.2916	0.2214	

INIT CONDITIONS ***** ACTUAL UNIT ***** TARGET ***
 CONDITIONS CONDITIONS CONDITIONS

GASIFIER TEMPERATURE	(DEG F)	1284.8	
GASIFIER PRESSURE	(PSIA)	503.9	
BACKEND PRESSURE	(PSIA)	290.3	
CARBON CONVERSION (GC ANALYSIS)	(%)	85.2	
CARBON CONVERSION (GMC COMP.)	(%)	86.8	----
GASIFICATION RATE	(%)	49.9	
K/C ATOM RATIO		0.243	----
STEAM CONVERSION (H2O BALANCE)	(%)	35.7	
STEAM CONVERSION (H2 BALANCE)	(%)	35.7	
STEAM CONVERSION (O2 BALANCE)	(%)	35.7	
TOTAL CH4 MADE (SCF CH4/LB C IN FEED)		17.81	
CH4 IN DRY N2 FREE PRODUCT GAS (MOL %)		22.7	

BED PROPERTIES

BED DENSITY	(LB/CFT)	16.8
BED HEIGHT	(FEET)	55.2
BED WEIGHT	(LB)	496.0
SUPERFICIAL VELOCITY	(FT/SEC)	0.494
SOLID RESIDENCE TIME	(HOURS)	14.0

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* ENGLISH UNITS *

GASIFIER MATERIAL BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	120.31	PRODUCT GAS	231.55
STEAM	194.26	PRODUCT WATER	121.25
SYN GAS	76.02	CHAR ENTRAINED	25.30
		CHAR WITHDRAWN	13.54
TOTAL	390.59	TOTAL	391.64
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	-1.04

SYN GAS BALANCE *****

INPUT:	(SCFH)	OUTPUT:	(SCFH)
MAKE UP SYN GAS	4461.52	H2+CO IN PRODUCT GAS	3778.43
RECYCLE SYN GAS	0.0		
GASIFIER SYN GAS	4461.52		

CLOSURE: OVERALL: 84.7 % H2: 88.3 % CO: 67.2 %

***** HYDRUGEN BALANCE (SCFH H2) ***** OXYGEN BALANCE (SCFH O2) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 556.6	PRODUCT GAS 5802.7	COAL+CAT 148.2	PRODUCT GAS 1294.0
STEAM 4091.2	PG WATER 2553.7	STEAM 2045.6	PG WATER 1276.7
SYN GAS 3731.0	CHAR ENTRND 21.4	SYN GAS 377.9	CHAR ENTRND 0.0
	CHAR WTHDRN 1.3		CHAR WTHDRN 0.0
TOTAL 8379.1	TOTAL 8379.1	TOTAL 2571.8	TOTAL 2571.8
CLOSURE: (OUT/IN) = 100.0 %		CLOSURE: (OUT/IN) = 100.0 %	

GASIFIER CARBON BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	77.77	PRODUCT GAS	88.56
STEAM	0.0	PRODUCT WATER	0.0
SYN GAS	24.33	CHAR ENTRAINED	10.23
		CHAR WITHDRAWN	3.61
TOTAL	102.09	TOTAL	102.39
CLOSURE: (OUTPUT+ACCUM/INPUT) = 100.0 %		ACCUMULATION	-0.30

***** SO3-FREE ASH BALANCE (LB/HR) ***** A.S. K BALANCE (LB/HR) *****

INPUT:	OUTPUT:	INPUT:	OUTPUT:
COAL+CAT 20.19	CHAR ENTRND 11.27	COAL+CAT 7.78	CHAR ENTRND 5.20
	CHAR WTHDRN 9.54		CHAR WTHDRN 2.76
TOTAL 20.19	TOTAL 20.81	TOTAL 7.78	TOTAL 7.98
CLOSURE 100.00	ACCUM -0.62	CLOSURE 100.00	ACCUM -0.20

EQUILIRRIUM CONSTANT ***** EQUILI. ** TARGET **** ACTUAL **** EQUILI **

GRAPHITE+H2O: C + H2O=CO + H2	CONSTANT	CONDITIONS	CONDITIONS	TEMPERATURE
SHIFT : CO+ H2O=CO2+ H2	1.4754	1.2728	2.3682	1329.4
	1.6053	1.6053	2.6234	1102.0

METHANE DIT	=	CO + 3/2 H ₂ + CH ₄	0.0965	0.0965	0.0155	1410.5
OVERALL	=	2C + 2H ₂ L = CO ₂ + CH ₄	0.3372	0.2510	0.1093	

7 CONDITIONS ***** ACTUAL UNIT ***** TARGET ***
 CONDITIONS CONDITIONS

GASIFIER TEMPERATURE	(DEG F)	1279.4	
GASIFIER PRESSURE	(PSIA)	500.4	
BACKEND PRESSURE	(PSIA)	290.3	
CARBON CONVERSION (GC ANALYSIS)	(%)	82.6	
CARBON CONVERSION (GMC COMP.)	(%)	87.5	----
GASIFICATION RATE	(%)	57.7	
K/C ATOM RATIO		0.211	----
STEAM CONVERSION (H ₂ O BALANCE)	(%)	37.6	
STEAM CONVERSION (H ₂ BALANCE)	(%)	37.6	
STEAM CONVERSION (O ₂ BALANCE)	(%)	37.6	
TOTAL CH ₄ MADE (SCF CH ₄ /LB C IN FEED)		15.89	
CH ₄ IN DRY N ₂ FREE PRODUCT GAS (MOL %)		20.5	

BED PROPERTIES

BED DENSITY	(LB/CFT)	13.3
BED HEIGHT	(FEET)	58.5
BED WEIGHT	(LR)	414.5
SUPERFICIAL VELOCITY	(FT/SEC)	0.464
SOLID RESIDENCE TIME	(HOURS)	11.8

METHANATION : $CO + 3H_2 = CH_4 + H_2O$ 0.0911 0.0911 0.0133 1411.7
 OVERALL : $2C + 2H_2O = CO_2 + CH_4$ 0.3383 0.2510 0.1765

ACTUAL CONDITIONS	UNIT	TARGET CONDITIONS
GASIFIER TEMPERATURE	(DEG F)	1283.0
GASIFIER PRESSURE	(PSIA)	501.1
BACKEND PRESSURE	(PSIA)	290.3
CARBON CONVERSION (GC ANALYSIS)	(%)	84.8
CARBON CONVERSION (GMC COMP.)	(%)	91.0
GASIFICATION RATE	(%)	79.2
K/C ATOM RATIO		0.316
STEAM CONVERSION (H2O BALANCE)	(%)	36.3
STEAM CONVERSION (H2 BALANCE)	(%)	36.3
STEAM CONVERSION (O2 BALANCE)	(%)	36.3
TOTAL CH4 MADE (SCF CH4/LB C IN FEED)		16.38
CH4 IN DRY N2 FREE PRODUCT GAS (MOL %)		19.4

BED PROPERTIES

BED DENSITY	(LB/CFT)	12.3
BED HEIGHT	(FEET)	57.2
BED WEIGHT	(LB)	375.4
SUPERFICIAL VELOCITY	(FT/SEC)	0.476
SOLID RESIDENCE TIME	(HOURS)	12.8

* ENGLISH UNITS *

GASIFIER MATERIAL BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	113.98	PRODUCT GAS	227.37
STEAM	197.97	PRODUCT WATER	126.09
SYN GAS	76.59	CHAR ENTRAINED	21.28
		CHAR WITHDRAWN	13.85
TOTAL	388.54	TOTAL	388.58
CLOSURE: (OUTPUT+ACCUM/INPUT) =	100.0 %	ACCUMULATION	-0.05

SYN GAS BALANCE *****

INPUT:	(SCFH)	OUTPUT:	(SCFH)
MAKE UP SYN GAS	4569.01	H2+CO IN PRODUCT GAS	3904.29
RECYCLE SYN GAS	0.0		
GASIFIER SYN GAS	4569.01		

CLOSURE: OVERALL: 85.5 % H2: 90.2 % CO: 61.6 %

***** HYDROGEN BALANCE (SCFH H2) ***** OXYGEN BALANCE (SCFH O2) *****

INPUT:		OUTPUT:		INPUT:		OUTPUT:	
COAL+CAT	533.6	PRODUCT GAS	5867.2	COAL+CAT	140.4	PRODUCT GAS	1275.2
STEAM	4169.4	PG WATER	2655.6	STEAM	2084.7	PG WATER	1327.7
SYN GAS	3839.1	CHAR ENTRND	18.0	SYN GAS	377.8	CHAR ENTRND	0.0
		CHAR WTHDRN	1.3			CHAR WTHDRN	0.0
TOTAL	8542.1	TOTAL	8542.1	TOTAL	2603.0	TOTAL	2603.0
CLOSURE: (OUT/IN) =	100.0 %			CLOSURE: (OUT/IN) =	100.0 %		

GASIFIER CARBON BALANCE

INPUT:	(LB/HR)	OUTPUT:	(LB/HR)
COAL+CATALYST	72.23	PRODUCT GAS	85.59
STEAM	0.0	PRODUCT WATER	0.0
SYN GAS	24.33	CHAR ENTRAINED	7.92
		CHAR WITHDRAWN	3.06
TOTAL	96.56	TOTAL	96.57
CLOSURE: (OUTPUT+ACCUM/INPUT) =	100.0 %	ACCUMULATION	-0.01

***** SO3-FREE ASH BALANCE (LB/HR) ***** A.S. K BALANCE (LB/HR) *****

INPUT:		OUTPUT:		INPUT:		OUTPUT:	
COAL+CAT	20.28	CHAR ENTRND	10.75	COAL+CAT	7.91	CHAR ENTRND	4.78
		CHAR WTHDRN	9.56			CHAR WTHDRN	3.14
TOTAL	20.28	TOTAL	20.31	TOTAL	7.91	TOTAL	7.92
CLOSURE	100.00	ACCUM	-0.03	CLOSURE	100.00	ACCUM	-0.01

EQUILIBRIUM CONSTANT	*****	EQUILI. CONSTANT	** TARGET CONDITIONS	**** ACTUAL CONDITIONS	****	EQUILI. TEMPERATURE
GRAPHITE+H2O: C + H2O=CO + H2		1.5279	1.3161	2.1432		1318.6
SHIFT : CO + H2O=CO2 + H2		1.5910	1.5910	2.9004		1070.1

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