Table 6-28

TOTAL PLANT INVESTMENT - CASE EXT-SH3
MID-1978 DOLLARS

Steam Cycle: 736 psig/900°F

Oxidant Plant Compressor Drivers: Steam Turbines

Product Fuel Gas: 7,637 x 10^6 Btu/hr**

Gas Temperature Entering Gas Cooling: 2400°F

Sulfur Removal: 94.6 percent

By-Product Power: 36.57 MW

	Cost Breakdown Without Contingencies							Contingencies		Total Plant Investment	
Plant Section	Direct Field Material#	Direct Field Labor##	Eng. & Support Costs§	Sales Tax	Total Cost $1000*	Total Cost $/MM Btu/hr	Per-cent	Process $1000*	Project $1000*	$1000*	$/MM Btu/hr
Coal Handling	20,566	8,356	14,413	1,026	44,361	5.808	9.0	0	6,654	51,015	6.680
Oxidant Feed	92,573	33,462	43,517	2,214	171,766	22.492	34.9	0	25,765	197,531	25.866
Gasification and Ash Handling	24,062	9,810	16,702	1,171	51,745	6.776	10.5	5,133	7,762	64,640	8.464
Raw Gas Cooling	67,506	15,618	33,152	3,408	119,684	15.672	24.3	23,938	17,951	161,573	21.157
Acid Gas Removal	6,918	2,493	4,513	353	14,277	1.870	2.9	0	2,142	16,419	2.150
Sulfur Recovery	2,590	1,217	2,049	134	5,990	.784	1.2	0	899	6,889	.902
Tail Gas Treating	4,552	2,102	3,463	222	10,339	1.354	2.1	1,551	1,551	13,441	1.760
Fuel Gas Expansion	6,954	2,063	4,018	358	13,393	1.754	2.7	0	2,009	15,402	2.017
Steam, Condensate and BFW	BZD	295	348	14	1,477	.193	.3	0	222	1,699	.223
Steam Turbine-Generator	2,731	811	1,578	141	5,261	.689	1.1	0	789	6,050	.792
General Facilities	25,950	10,296	15,211	900	52,357	6.856	10.7	0	7,854	60,211	7.884
Initial Chemicals and Catalysts	-	-	-	-	1,277	0.167	0.3	-	-	1,277	.167
TOTAL	255,222	86,523	138,964	9,941	491,927	64.415	100.0	30,622	73,598	596,147	78.062

TOTAL PLANT INVESTMENT SUMMARY

	$1000*	$/$10^6$ Btu/hr**
Process Plant Investment and General Facilities	491,927	64.415
Process Contingency	30,622	4.010
Project Contingency	73,598	9.637
Total Plant Investment	596,147	78.062

*Mid-1978 dollars

**Based on 100 percent plant design power output of 7636.8 MM Btu/hr fuel gas

#All materials and equipment that become a part of the plant facility

##Labor cost for installing direct field materials (exclusive of payroll burdens and craft benefits)

§Includes:
- Indirect field costs including all labor, supervision and expense required to support field construction
- Home office costs including all salaries and expenses required for engineering design and procurement
- Contractor's fee

Table 6-29

TOTAL PLANT INVESTMENT - CASE EXT-SH4
MID-1978 DOLLARS

Steam Cycle: 1450 psig/1000°/1000°F | Oxidant Plant Compressor Drivers: Motors | Product Fuel Gas: 7,668 x 10^6 Btu/hr**

Gas Temperature Entering Gas Cooling: 2400°F | Sulfur Removal: 83.6 percent | By-Product Power: 54.73 MW

	Cost Breakdown Without Contingencies							Contingencies			
Plant Section	Direct Field Mat'l$	Direct Field Labor##	Eng. & Support Costs§	Sales Tax	Total Cost $1000*	Total Cost $/MM Btu/hr	Per-cent	Process $1000*	Project $1000*	Total Plant Investment $1000*	Total Plant Investment $/MM Btu/hr
Coal Handling	20,566	8,356	14,413	1,026	44,361	5.785	8.6	0	6,654	51,015	6.653
Oxidant Feed	85,214	30,568	38,425	1,839	156,046	20.350	30.2	0	23,407	179,453	23.403
Gasification and Ash Handling	24,062	9,810	16,702	1,171	51,745	6.748	10.0	5,133	7,762	64,640	8.430
Raw Gas Cooling	81,692	18,889	40,139	4,129	144,849	18.890	28.0	31,867	21,727	198,443	25.880
Acid Gas Removal	5,778	2,077	3,762	295	11,912	1.553	2.3	0	1,787	13,699	1.787
Sulfur Recovery	2,415	1,135	1,912	125	5,587	.730	1.1	0	838	6,425	.838
Tail Gas Treating	3,808	1,741	2,831	179	8,559	1.116	1.7	1,284	1,284	11,127	1.451
Fuel Gas Expansion	6,994	2,075	4,042	360	13,471	1.757	2.6	0	2,021	15,492	2.020
Steam, Condensate and BFW	749	269	315	13	1,346	.176	.3	0	202	1,548	.202
Steam Turbine-Generator	13,539	4,107	7,821	697	26,074	3.400	5.0	0	3,911	29,985	3.910
General Facilities	25,605	10,153	15,013	890	51,661	6.738	10.0	0	7,749	59,410	7.748
Initial Chemicals and Catalysts	-	-	-	-	1,070	.140	.2	-	-	1,070	.140
TOTAL	270,422	89,090	145,375	10,724	516,681	67.383	100.0	38,284	77,342	632,307	82.462

TOTAL PLANT INVESTMENT SUMMARY

	$1000*	$/MM Btu/hr
Process Plant Investment and General Facilities	516,681	67.383
Process Contingency	38,284	4.993
Project Contingency	77,342	10.086
Total Plant Investment	632,307	82,462

*Mid-1978 dollars

**Based on 100 percent plant design power output of 7667.9 MM Btu/hr fuel gas

#All materials and equipment that become a part of the plant facility

##Labor cost for installing direct field materials (exclusive of payroll burdens and craft benefits)

§Includes:
- Indirect field costs including all labor, supervision and expense required to support field construction
- Home office costs including all salaries and expenses required for engineering design and procurement
- Contractor's fee

Table 6-30

TOTAL PLANT INVESTMENT - CASE EXT-SH5
MID-1978 DOLLARS

Steam Cycle: 1450 psig/1000°/1000°F

Oxidant Plant Compressor Drivers: Motors

Product Fuel Gas: 7,621 x 10^6 Btu/hr**

Gas Temperature Entering Gas Cooling: 2400°F

Sulfur Removal: +99.9 percent

By-Product Power: 47.20 MW

	Cost Breakdown Without Contingencies							Contingencies			
Plant Section	Direct Field Mat'l#	Direct Field Labor##	Eng. & Support Costs§	Sales Tax	Total Cost $1000*	Total Cost $/MM Btu/hr	Per-cent	Process $1000*	Project $1000*	Total Plant Investment $1000*	Total Plant Investment $/MM Btu/hr
Coal Handling	20,566	8,356	14,413	1,026	44,361	5.821	8.4	0	6,654	51,015	6.694
Oxidant Feed	85,214	30,568	38,425	1,839	156,046	20.476	29.5	0	23,407	179,453	23.547
Gasification and Ash Handling	24,062	9,810	16,702	1,171	51,745	6.790	9.8	5,133	7,762	64,640	8.482
Raw Gas Cooling	81,842	18,924	40,214	4,137	145,117	19.042	27.4	31,925	21,768	198,810	26.087
COS Hydrolysis	447	246	400	23	1,116	.146	.2	0	167	1,283	.168
Acid Gas Removal	7,821	2,818	5,102	399	16,140	2.118	3.0	0	2,421	18,561	2.435
Sulfur Recovery	2,753	1,293	2,177	143	6,366	.835	1.2	0	955	7,321	.961
Tail Gas Treating	4,899	2,240	3,638	230	11,007	1.444	2.1	1,651	1,651	14,309	1.878
ZnO Bed	1,812	326	775	91	3,004	.394	.6	0	451	3,455	.453
Fuel Gas Expansion	6,900	2,047	3,985	355	13,287	1.743	2.5	0	1,993	15,280	2.005
Steam, Condensate and BFW	745	267	316	13	1,341	.175	0.2	0	201	1,542	.202
Steam Turbine-Generator	12,779	3,792	7,384	658	24,613	3.230	4.6	0	3,692	28,305	3.714
General Facilities	25,773	10,186	15,073	896	51,928	6.814	9.8	0	7,789	59,717	7.836
Initial Chemicals and Catalysts	-	-	-	-	3,730	.489	.7	-	-	3,730	.489
TOTAL	275,613	90,873	148,604	10,981	529,801	69.517	100.0	38,709	78,911	647,421	84.951

TOTAL PLANT INVESTMENT SUMMARY

	$1000*	$/MM Btu/hr
Process Plant Investment and General Facilities	529,801	69.517
Process Contingency	38,709	5,080
Project Contingency	78,911	10.354
Total Plant Investment	647,421	84.951

*Mid-1978 dollars

**Based on 100 percent plant design power output of 7621.1 MM Btu/hr fuel gas

#All materials and equipment that become a part of the plant facility

##Labor cost for installing direct field materials (exclusive of payroll burdens and craft benefits)

§Includes:
- Indirect field costs including all labor, supervision and expense required to support field construction
- Home office costs including all salaries and expenses required for engineering design and procurement
- Contractor's fee

Table 6-31

SUMMARY OF PLANT FACILITIES INVESTMENT - TEXACO-BASED FUEL GAS

Steam Cycle, psig/°F/°F	1450/900/900	1450/900/900	1450/900/900	736/900	1450/800/800	1450/1000/1000	1450/900/900
Steam Generated in Gas Coolers	←			SATURATED			→
Gas Temperature Entering Heat Recovery, °F	2400	2400	←	1500	→		2400
Sulfur Removal, %	←			94.6	→		+99.9¶
Oxidant Plant Compressor Drivers	←			MOTORS	→		
Nominal Capacity of Gasifiers, ST/day	1375	2200	←	1375	→		
Fuel Gas Production, 10^6 Btu/hr#	6664	6664	6802	7163	6942	6658	6626
Net By-product Power, MW#	142.40	142.40	105.96	58.28	88.92	125.32	136.61
CASE DESIGNATION	EXT-SS	EXT-SS*	EXT-SS1	EXT-SS2	EXT-SS3	EXT-SS4	EXT-SS5
Plant Facilities Investment Mid-1978 ($1,000)	647,723	598,984	616,615	594,855	608,279	631,342	662,563
Plant Facilities Investment Mid-1980 ($1,000)	822,608	760,709	783,102	755,466	772,514	801,804	841,456

Steam Cycle, psig/°F/°F	1450/1000/1000	1450/1000/1000	1450/900/900	736/900	736/900	1450/1000/1000	1450/1000/1000
Steam Generated in Gas Coolers	←			SUPERHEATED	→		
Gas Temperature Entering Heat Recovery, °F	2400	→	1500	→	2400	→	
Sulfur Removal, %	←		94.6	→		83.6	+99.9¶
Oxidant Plant Compressor Drivers	←			MOTORS	STEAM TURBINES	MOTORS	→
Nominal Capacity of Gasifiers, ST/day	1375	2200	←	1375	→		
Fuel Gas Production, 10^6 Btu/hr#	7637	7637	7402	7637	7637	7668	7621
Net By-product Power, MW#	53.30	53.30	46.82	15.84	36.57	54.73	47.20
CASE DESIGNATION	EXT-SH	EXT-SH*	EXT-SH1	EXT-SH2	EXT-SH3	EXT-SH4	EXT-SH5
Plant Facilities Investment Mid-1978 ($1,000)	639,135	587,248	572,865	581,100	596,147	632,307	647,421
Plant Facilities Investment Mid-1980 ($1,000)	811,701	745,805	727,539	737,997	757,106	803,030	822,225

¶ Total sulfur in product gas was one ppm.
# Production at design capacity.
* Case EXT-SS or EXT-SH with 2200 ST/day gasifiers.
The Plant Facilities Investment includes the cost of Initial Catalysts and Chemicals.

Table 6-32

TOTAL CAPITAL REQUIREMENT - TEXACO-BASED FUEL GAS - INVESTOR OWNED UTILITY, MID-1980 ($1,000)

Steam Cycle, psig/°F/°F	1450/900/900	1450/900/900	1450/900/900	736/900 SATURATED	1450/800/800	1450/1000/1000	1450/900/900
Steam Generated in Gas Coolers	←				→		
Gas Temperature Entering Heat Recovery, °F	2400	2400	←	1500	→		2400
Sulfur Removal, %	←			94.6	→		+99.9¶
Oxidant Plant Compressor Drivers	←			MOTORS	→		
Nominal Capacity of Gasifiers, ST/day	1375	2200	←	1375	→		
Fuel Gas Production, 10^6 Btu/hr#	6664	6664	6802	7163	6942	6658	6626
Net By-product Power, MW#	142.40	142.40	105.96	58.28	88.92	125.32	136.61
CASE DESIGNATION	EXT-S5	EXT-S5*	EXT-S51	EXT-S52	EXT-S53	EXT-S54	EXT-S55
Plant Facilities Investment	822,608.	760,709.	783,102.	755,466.	772,514.	801,804.	841,456.
Prepaid Royalties	4,113.	3,804.	3,916.	3,777.	3,863.	4,009.	4,207.
Organization and Startup Costs	24,678.	22,821.	23,493.	22,664.	23,175.	24,054.	25,244.
Working Capital	19,577.	18,974.	19,468.	19,354.	19,400.	19,543.	19,811.
Land	950.	940.	950.	950.	950.	950.	950.
AFDC**	31,044.	28,711.	29,552.	28,519.	29,151.	30,254.	31,755.
Total Capital Requirement ($1,000)	902,970.	835,959.	860,481.	830,730.	849,053.	880,614.	923,423.
Total Capital Requirement ($1,000/FOEB/D)##	27.70	25.65	27.04	26.34	26.73	27.57	28.65

¶ Total sulfur in product gas was one ppm.
# Production at design capacity.
* Case EXT-S5 with 2200 ton/day gasifiers.
** The Mid-1980 AFDC was determined in the same manner as outlined in Section 4 of this report.
This value was determined by dividing Total Capital Requirement (in $1,000) by the Fuel Oil Equivalent Barrel plant output per day, using a conversion factor of 5.85×10^6 Btu/FOEB for fuel gas. Similarly, electricity production was converted to a FOEB equivalent assuming an energy value of 9,000 Btu/KWh.

Table 6-32 (Continued)

TOTAL CAPITAL REQUIREMENT - TEXACO-BASED FUEL GAS - INVESTOR OWNED UTILITY, MID-1980 ($1,000)

Steam Cycle, psig/°F/°F	1450/1000/1000	1450/1000/1000	1450/900/900	736/900 SUPERHEATED	736/900	1450/1000/1000	1450/1000/1000
Steam Generated in Gas Coolers	←				→		
Gas Temperature Entering Heat Recovery, °F	2400 →		1500 →		2400 →		
Sulfur Removal, %	←		94.6 →			83.6	99.9¶
Oxidant Plant Compressor Drivers	←			MOTORS	STEAM TURBINES	MOTORS	→
Nominal Capacity of Gasifiers, ST/day	1375	2200	←	1375	→		
Fuel Gas Production, 10^6 Btu/hr#	7637	7637	7402	7637	7637	7668	7621
Net By-product Power, MW#	53.30	53.30	46.82	15.84	36.57	54.73	47.20
CASE DESIGNATION	EXT-SH	EXT-SH*	EXT-SH1	EXT-SH2	EXT-SH3	EXT-SH4	EXT-SH5
Plant Facilities Investment	811,701.	745,805.	727,539.	737,997.	757,106.	803,030.	822,225.
Prepaid Royalties	4,059.	3,729.	3,638.	3,690.	3,786.	4,015.	4,111.
Organization and Startup Costs	24,351.	22,374.	21,826.	22,140.	22,713.	24,091.	24,667.
Working Capital	19,523.	18,893.	19,153.	19,174.	19,224.	19,481.	19,706.
Land	875.	865.	925.	875.	875.	875.	875.
AFDC**	30,623.	28,148.	27,462.	27,854.	28,573.	30,298.	31,026.
Total Capital Requirement ($1,000)	891,132.	819,814.	800,543.	811,730.	832,277.	881,790.	902,610.
Total Capital Requirement ($1,000/FOEB/D)##	26.76	24.62	24.94	25.43	25.47	26.34	27.34

¶ Total sulfur in product gas was one ppm.
# Production at design capacity.
* Case EXT-SH with 2200 ton/day gasifiers.
** The Mid-1980 AFDC was determined in the same manner as outlined in Section 4 of this report.
This value was determined by dividing Total Capital Requirement (in $1,000) by the Fuel Oil Equivalent Barrel plant output per day, using a conversion factor of 5.85 x 10^6 Btu/FOEB for fuel gas. Similarly, electricity production was converted to a FOEB equivalent assuming an energy value of 9,000 Btu/kWhr.

Table 6-33

ANNUAL OPERATING AND MAINTENANCE COSTS - TEXACO-BASED FUEL GAS - INVESTOR OWNED UTILITY - MID-1980 ($1,000)

Steam Cycle, psig/°F/°F	1450/900/900	1450/900/900	1450/900/900	736/900	1450/800/800	1450/1000/1000	1450/900/900
Steam Generated in Gas Coolers	←			SATURATED	→		
Gas Temperature Entering Heat Recovery, °F	2400	2400	←	1500	→		2400
Sulfur Removal, %	←			94.6	→		99.9¶
Oxidant Plant Compressor Drivers	←			MOTORS	→		
Nominal Capacity of Gasifiers, ST/day	1375	2200	←	1375	→		
Fuel Gas Production, 10^6 Btu/hr‡	6664	6664	6802	7163	6942	6658	6626
Net By-product Power, MW‡	142.40	142.40	105.96	58.28	88.92	125.32	136.61
CASE DESIGNATION	EXT-SS	EXT-SS*	EXT-SS1	EXT-SS2	EXT-SS3	EXT-SS4	EXT-SS5
FIXED OPERATING COSTS							
Operating Labor	5,431.	5,081.	5,431.	5,431.	5,431.	5,431.	5,431.
Maintenance Labor	8,277.	7,458.	8,095.	7,884.	8,002.	8,232.	8,445.
Maintenance Materials	12,415.	11,187.	12,142.	11,826.	12,004.	12,348.	12,667.
Administrative and Support Labor	4,112.	3,762.	4,058.	3,994.	4,030.	4,098.	4,163.
Total Fixed Costs	30,235.	27,487.	29,726.	29,135.	29,467.	30,109.	30,705.
VARIABLE OPERATING COSTS (100% Capacity Factor)							
Raw Water	1,311.	1,311.	1,225.	1,145.	1,194.	1,252.	1,302.
Catalysts and Chemicals	1,464.	1,464.	1,483.	1,618.	1,365.	1,437.	2,816.
Ash Disposal	1,867.	1,867.	1,867.	1,867.	1,867.	1,867.	1,867.
Total Variable Costs	4,642.	4,642.	4,575.	4,630.	4,426.	4,556.	5,985.

For nonregulated ownership the Total Variable Costs will be the same as those above. However, the Total Fixed Costs will be the sum of each above Total Fixed Costs plus 0.7% of the plant facilities investment for each case. This additional cost is associated with general and administrative expenses.

¶ Total sulfur in product gas was one ppm.
‡ Production at design capacity.
* Case EXT-SS with 2200 ST/day gasifiers.

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Table 6-34

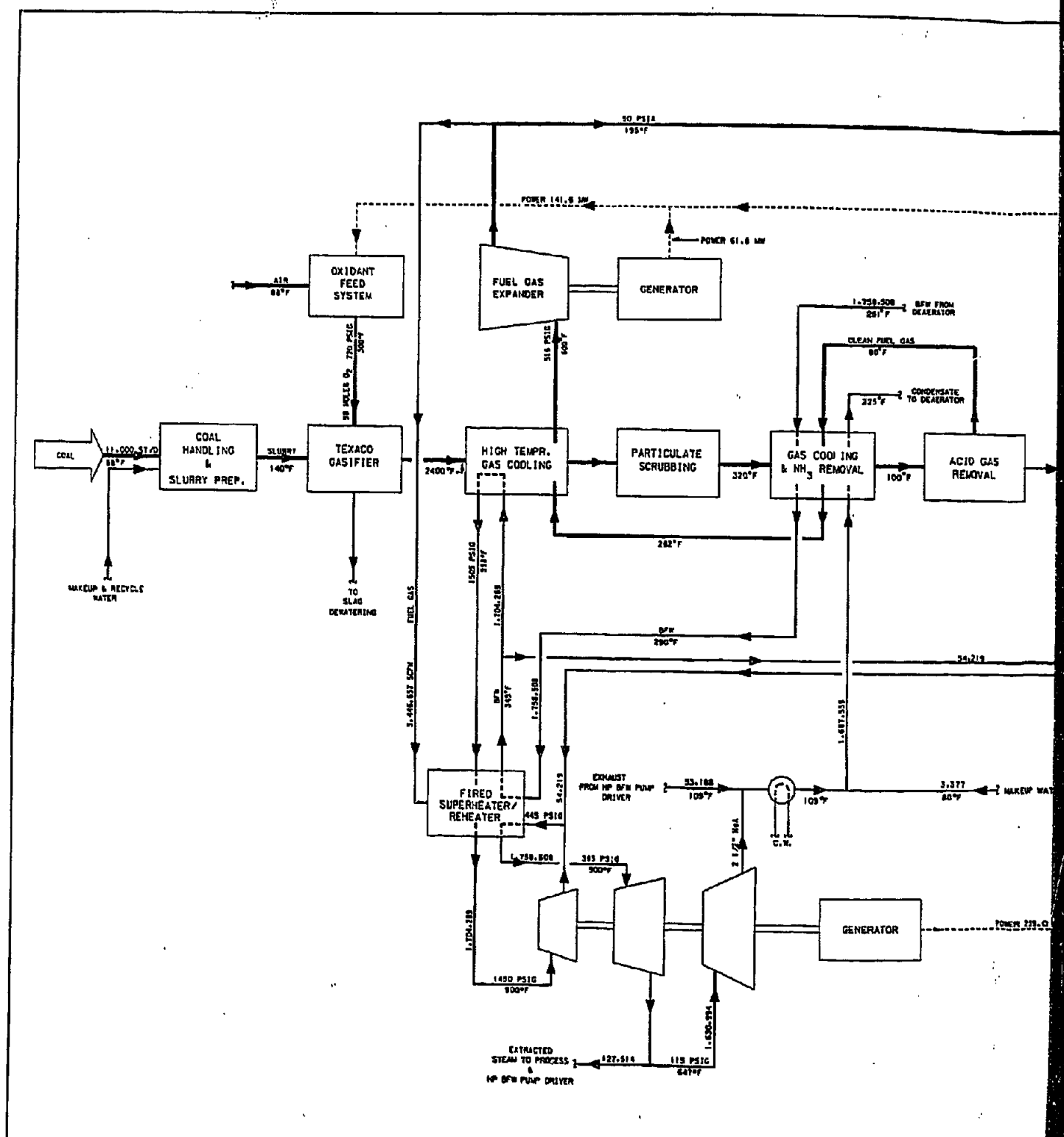
CATALYST AND CHEMICAL SUMMARY

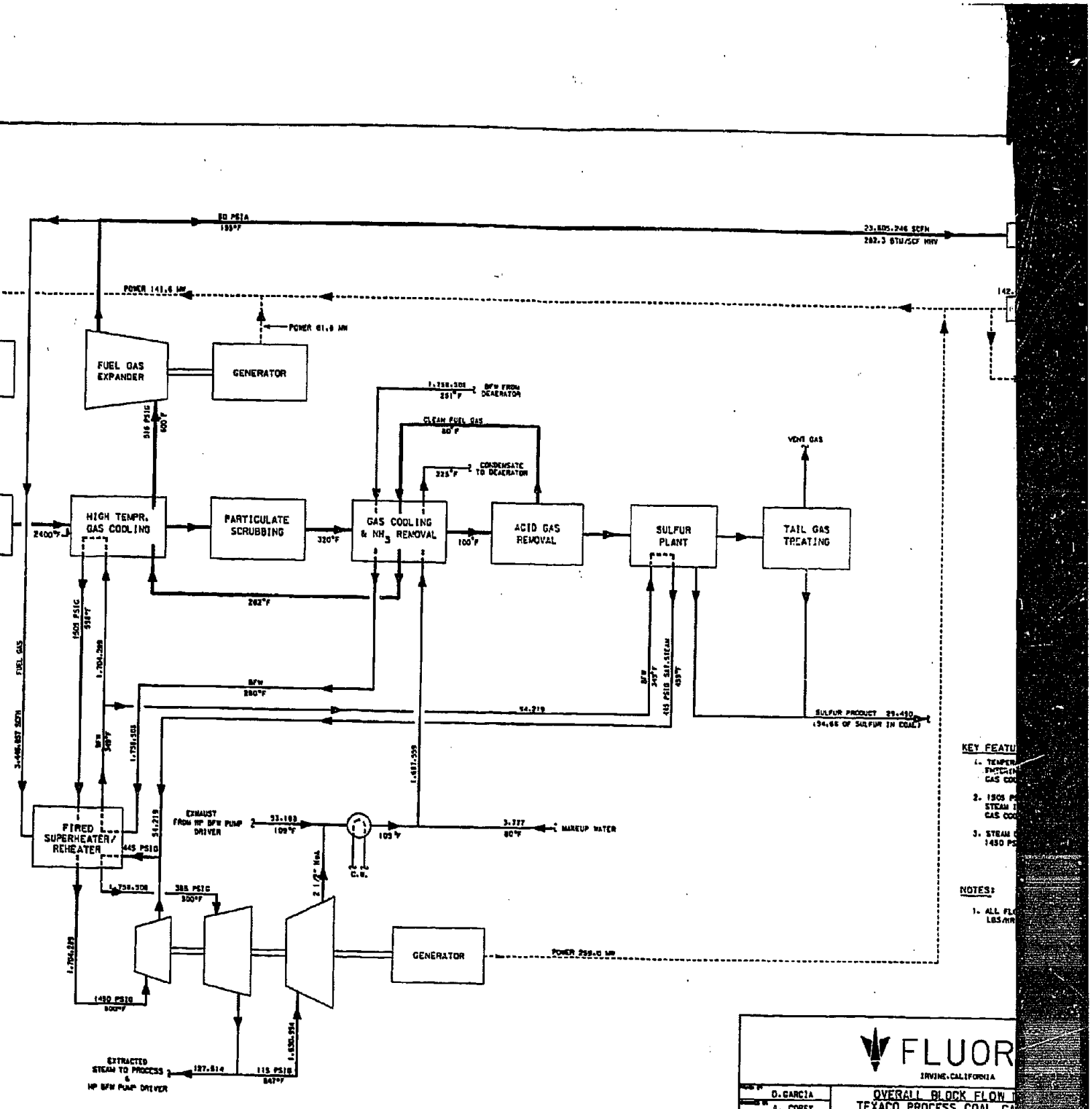
ITEM	UNIT COST	TOTAL REQUIREMENTS EXT-555 INITIAL	TOTAL REQUIREMENTS EXT-555 ANNUAL	TOTAL REQUIREMENTS EXT-SH4 INITIAL	TOTAL REQUIREMENTS EXT-SH4 ANNUAL	TOTAL REQUIREMENTS EXT-SH5 INITIAL	TOTAL REQUIREMENTS EXT-SH5 ANNUAL	TOTAL COST*($1000) EXT-555 INITIAL	TOTAL COST*($1000) EXT-555 ANNUAL**	TOTAL COST*($1000) EXT-SH4 INITIAL	TOTAL COST*($1000) EXT-SH4 ANNUAL**	TOTAL COST*($1000) EXT-SH5 INITIAL	TOTAL COST*($1000) EXT-SH5 ANNUAL**
BFW DEMINERALIZER													
H_2SO_4 (93%)	$49.76/TON		53.3 TON		33.2 TON		33.2 TON		2 7		1.6		1.6
NaOH (50%)	$142.80/TON		5.5 TON		3.5 TON		3.5 TON		0.8		0 5		0 5
BFW TREATING													
Na_3PO_4	$0.22/LB		7,170 LB		4,402 LB		4,524 LB		1 6		1 0		1 0
Hydrazine (35% Soln)	$1.00/LB		91,382 LB		56,101 LB		57,662 LB		91 4		56 1		57 6
Morpholine	$0.86/LB		31,976 LB		19,634 LB		20,181 LB		27 5		16 8		17 3
POLISHING													
H_2SO_4 (93%)	$49.76/TON		34.7 TON		22.5 TON		20 0 TON		1 7		1 1		1 0
NaOH (50%)	$142 80/TON		69.3 TON		45 7 TON		40 0 TON		9 8		6 4		5 7
C.W. TREATING													
Lime	$42.50/TON		503.0 TON		296.5 TON		291.8 TON		21 4		12 6		12 4
Soda Ash	$78.00/TON		615.5 TON		530.9 TON		539.9 TON		48 0		41 4		42 1
H_2SO_4 (93%)	$49.76/TON	0.6 TON	795.6 TON	0.4 TON	617.3 TON	0 6 TON	634.3 TON	0 03	39 6	0.02	31 5	0 02	31 6
Corrosion Inhibitor	$0.80/LB	563 LB	203,600 LB	412 LB	195,450 LB	400 LB	200,450 TON	0 45	162 9	0 33	156 4	0 32	160 4
Sufactant	$0.60/LB	544 LB	203,600 LB	398 LB	195,450 LB	398 LB	200,450 TON	0 33	122 2	0 24	117 3	0 24	120 3
Chlorine	$135.00/TON		20.3 TON		14.6 TON		14.8 TON		2 7		2 0		2 0
Biocide	$0.80/LB		22,510 LB		16,368 LB		16,743 TON		17 6		11 1		11 0
SELEXOL UNIT													
Solvent	$1.00/LB	1,116,950 LB	118,525 LB	792,970 LB	120,125 LB	1,116,950 LB	118,525 LB	1,117 0	118 5	751 0	120 1	1 117 0	118 5
CLAUS SULFUR PLANT	$320.00/TON	126.3 TON	27 9 TON	118 8 TON	26 4 TON	126 1 TON	27 9 TON	40.4	8 9	38 0	8 4	40 4	8 9
STRETFORD PLANT													
Chemicals	$3504/TPD SULFUR $2.13/TON SULFUR							98.1	21 8	98 8	27 0	98 1	21 8
BEAVON UNIT													
Catalyst	$154/ft³	1,647 ft³	219.4 ft³	1,175 ft³	156 4 ft³	1,647 ft³	219 4 ft³	253 6	33 8	180 9	24 1	253 6	33 8
ZN OXIDE TREATING													
Chemical	$40/ft³	23,600 ft³	11,800 ft³			23,600 ft³	11,800 ft³	1,888.0	944 0			1,888 0	944 0
COS HYDROLYSIS													
Catalyst	$79.2/ft³	4,200 ft³	1,400 ft³			4,200 ft³	1,400 ft³	332.6	110.9			332 6	110 9
MISCELLANEOUS OFFSITES													
Plant & Instrument Air Dryers			3,200 LB/YR		3,200 LB/YR		3,200 LB/YR		5.2		5.2		5 2
Flare	$12.22/BBL		4,500 BBL/YR		4,500 BBL/YR		4,500 BBL/YR		55 0		55 0		55 0
Texaco Waste Water Treating									214.9		214 9		214 9
Fuel Oil System	$16.50/BBL	65,630 BBL	9,381 BBL/YR					1,082.8	154.7				
TOTALS, MID-1978 DOLLARS								4,813.4	2,217 6	1,070 3	907.8	3,730 4	1,979 7
TOTALS, MID-1980 DOLLARS‖								6,113.0	2,816 4	1,359 3	1,152 9	4,737 6	2,513 7

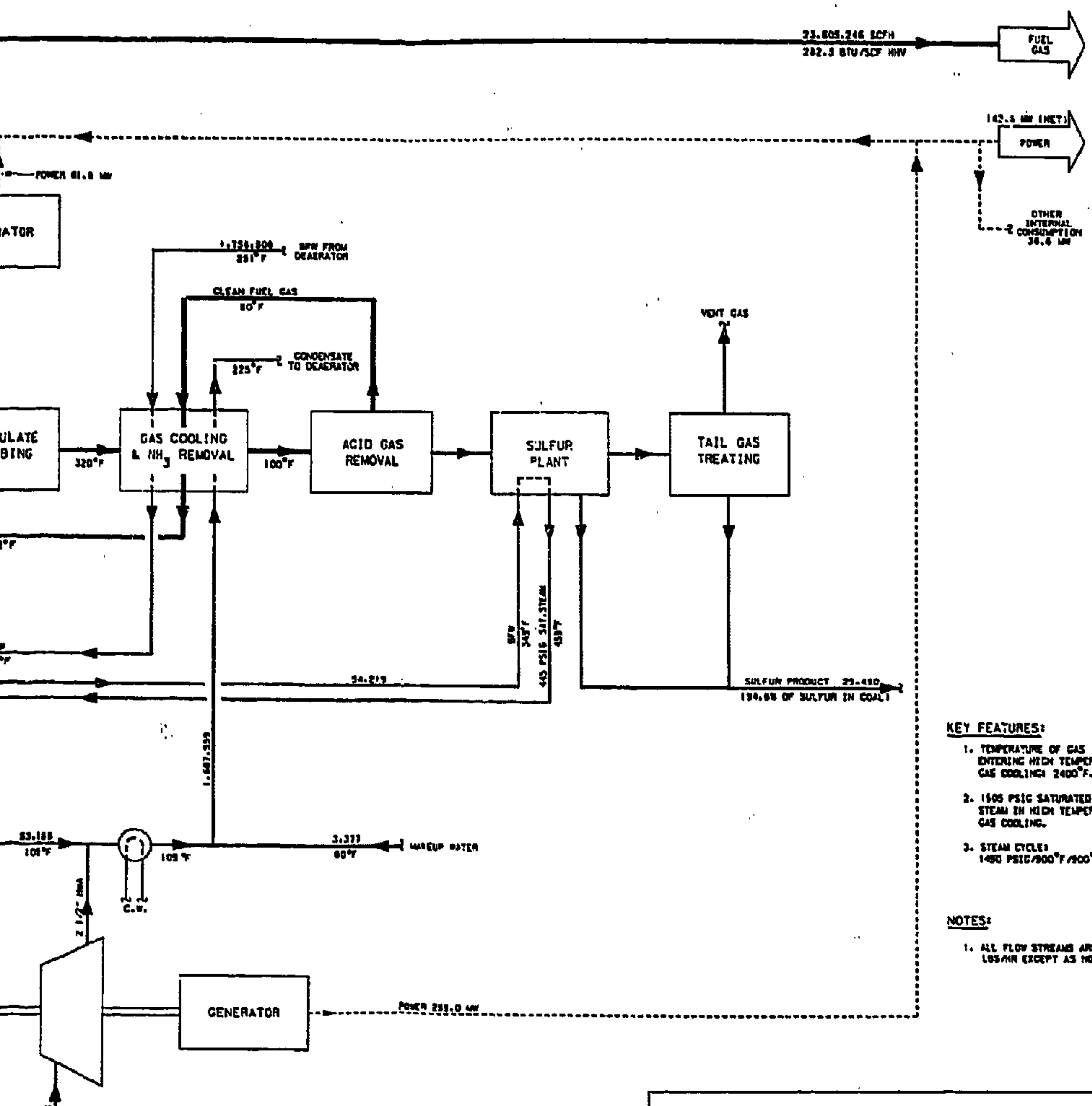
* Mid-1978 Basis, except where noted

** At 100 percent capacity

‖ These estimates were derived by escalating the mid-1978 costs at 27 percent


50 PSIA
195°F
POWER 141.6 MW
POWER 61.6 MW
OXIDANT FEED SYSTEM
AIR
88°F
FUEL GAS EXPANDER
GENERATOR
1,758,508 lb/hr
281°F
BFW FROM DEAERATOR
CLEAN FUEL GAS
80°F
325°F
CONDENSATE TO DEAERATOR
770 PSIG
500°F
99 MOLES O2
516 PSIG
600°F
COAL
11,000 STPD
88°F
COAL HANDLING & SLURRY PREP.
SLURRY
140°F
TEXACO GASIFIER
2400°F
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
320°F
GAS COOLING & NH3 REMOVAL
100°F
ACID GAS REMOVAL
282°F
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
1505 PSIG
318°F
1,204,288 lb/hr
FUEL GAS
3,446,637 SCFH
BFW
290°F
365°F
1,758,508 lb/hr
54,219 lb/hr
1,687,559 lb/hr
FIRED SUPERHEATER/ REHEATER
445 PSIG
EXHAUST FROM HP BFW PUMP DRIVER
53,188 lb/hr
109°F
109°F
3,377 lb/hr
80°F
MAKEUP WATER
C.W.
1,758,508 lb/hr
385 PSIG
900°F
2 1/2" Hg A
1,204,288 lb/hr
GENERATOR
1450 PSIG
900°F
EXTRACTED STEAM TO PROCESS & HP BFW PUMP DRIVER
127,514 lb/hr
115 PSIG
647°F
1,630,994 lb/hr


FUEL GAS EXPANDER
GENERATOR
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH_3 REMOVAL
ACID GAS REMOVAL
SULFUR PLANT
TAIL GAS TREATING
VENT GAS
FIRED SUPERHEATER/ REHEATER
GENERATOR
CLEAN FUEL GAS
CONDENSATE TO DEAERATOR
BFW FROM DEAERATOR
EXHAUST FROM HP BFW PUMP DRIVER
MAKEUP WATER
EXTRACTED STEAM TO PROCESS & HP BFW PUMP DRIVER
SULFUR PRODUCT 29,410
(94.66 OF SULFUR IN COAL)
POWER 141.6 MW
POWER 61.8 MW
POWER 299.0 MW
KEY FEATU
NOTES:
FLUOR
IRVINE, CALIFORNIA
D. GARCIA
A. COREY
OVERALL BLOCK FLOW
TEXACO PROCESS COAL GA
OXYGEN-BLOWN
SATURATED STEAM BA
EPRI
NONE
448334-EX



KEY FEATURES:

1. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 2400°F.
2. 1505 PSIG SATURATED STEAM IN HIGH TEMPERATURE GAS COOLING.
3. STEAM CYCLE: 1450 PSIG/900°F/900°F

NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

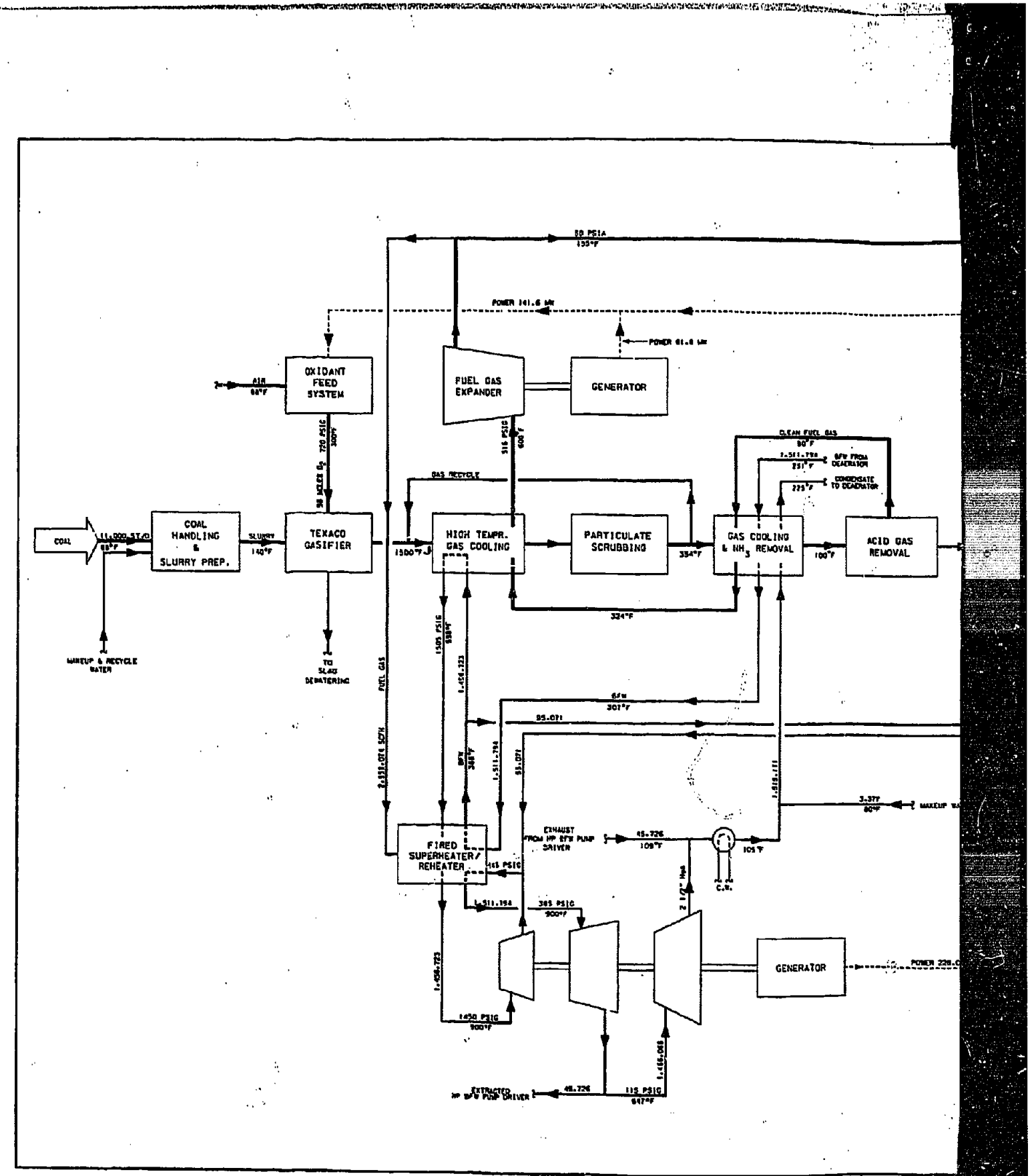
D. GARCIA
A. COREY
EPRI

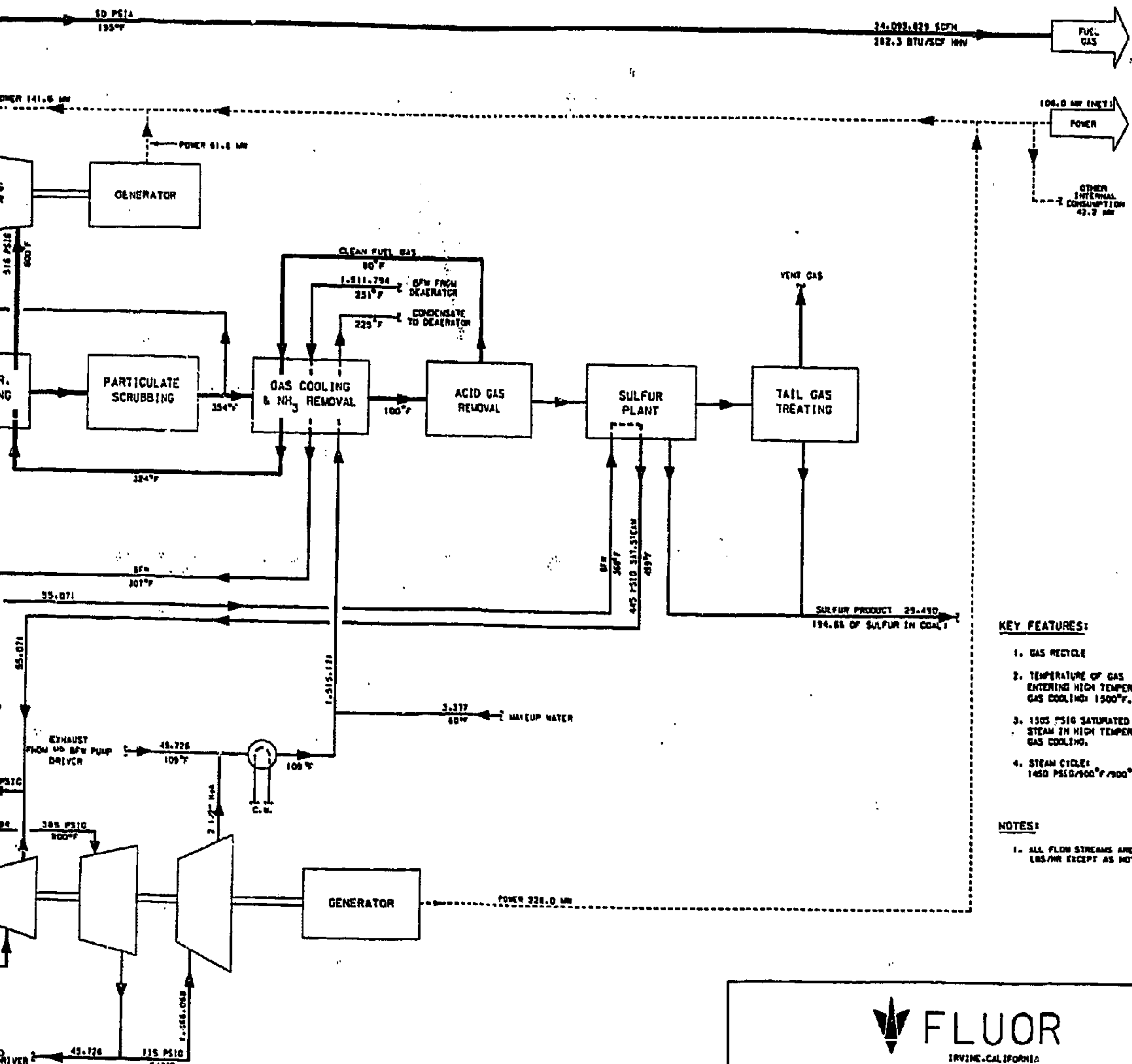
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SATURATED STEAM BASE CASE

EPRI PALO ALTO, CALIFORNIA

NONE	448334-EXT-SS	03

4635K1312


OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH3 REMOVAL
ACID GAS REMOVAL
FIRED SUPERHEATER/ REHEATER
GENERATOR
COAL
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
GAS RECYCLE
CLEAN FUEL GAS
CONDENSATE TO DEAERATOR
EXHAUST FROM HP BFW PUMP DRIVER
EXTRACTED HP BFW PUMP DRIVER
C.W.



KEY FEATURES:

1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 1500°F.
3. 1305 PSIG SATURATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 1450 PSIG/900°F/900°F

NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

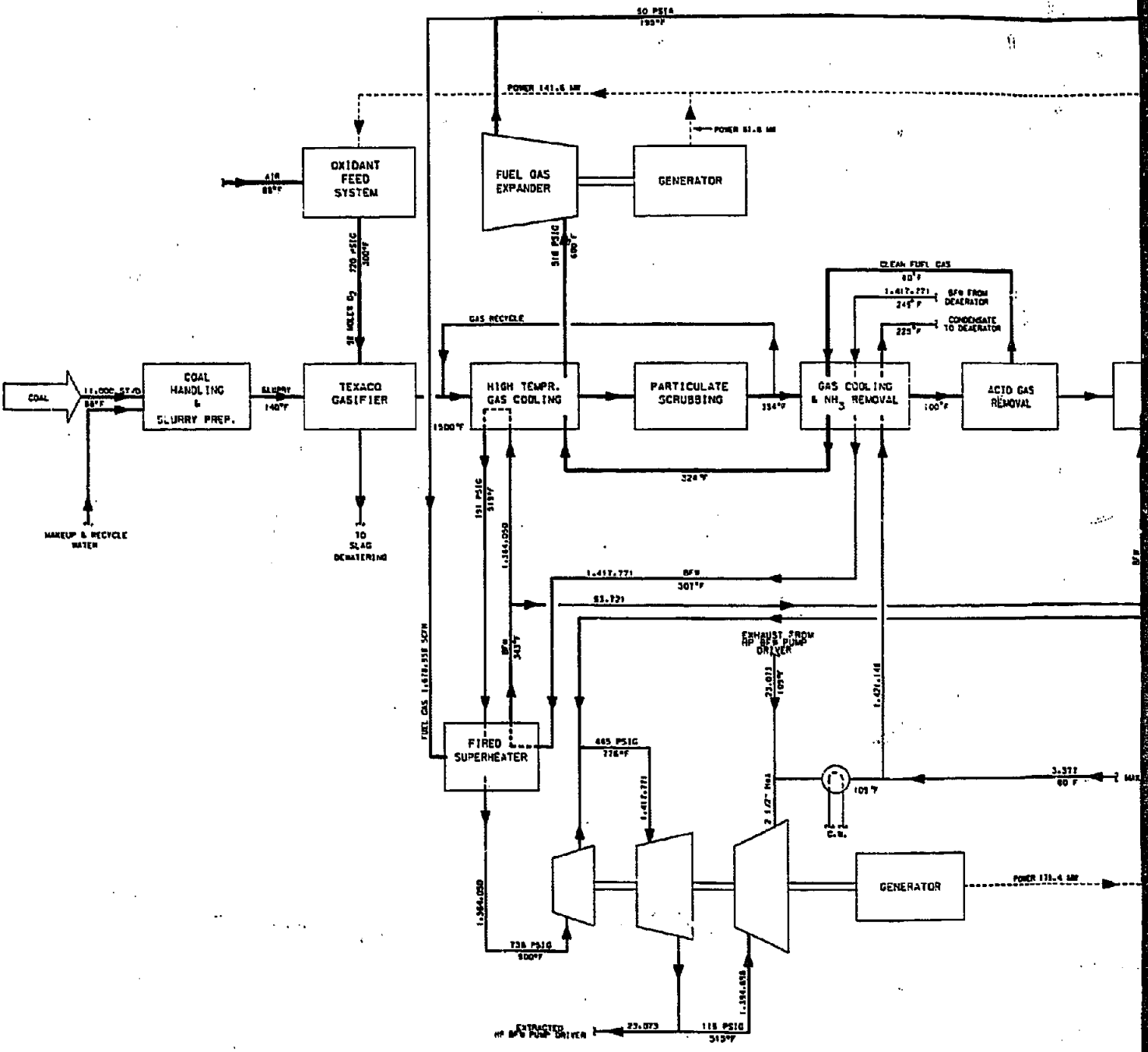
D. GARCIA
A. COREY
EPRI

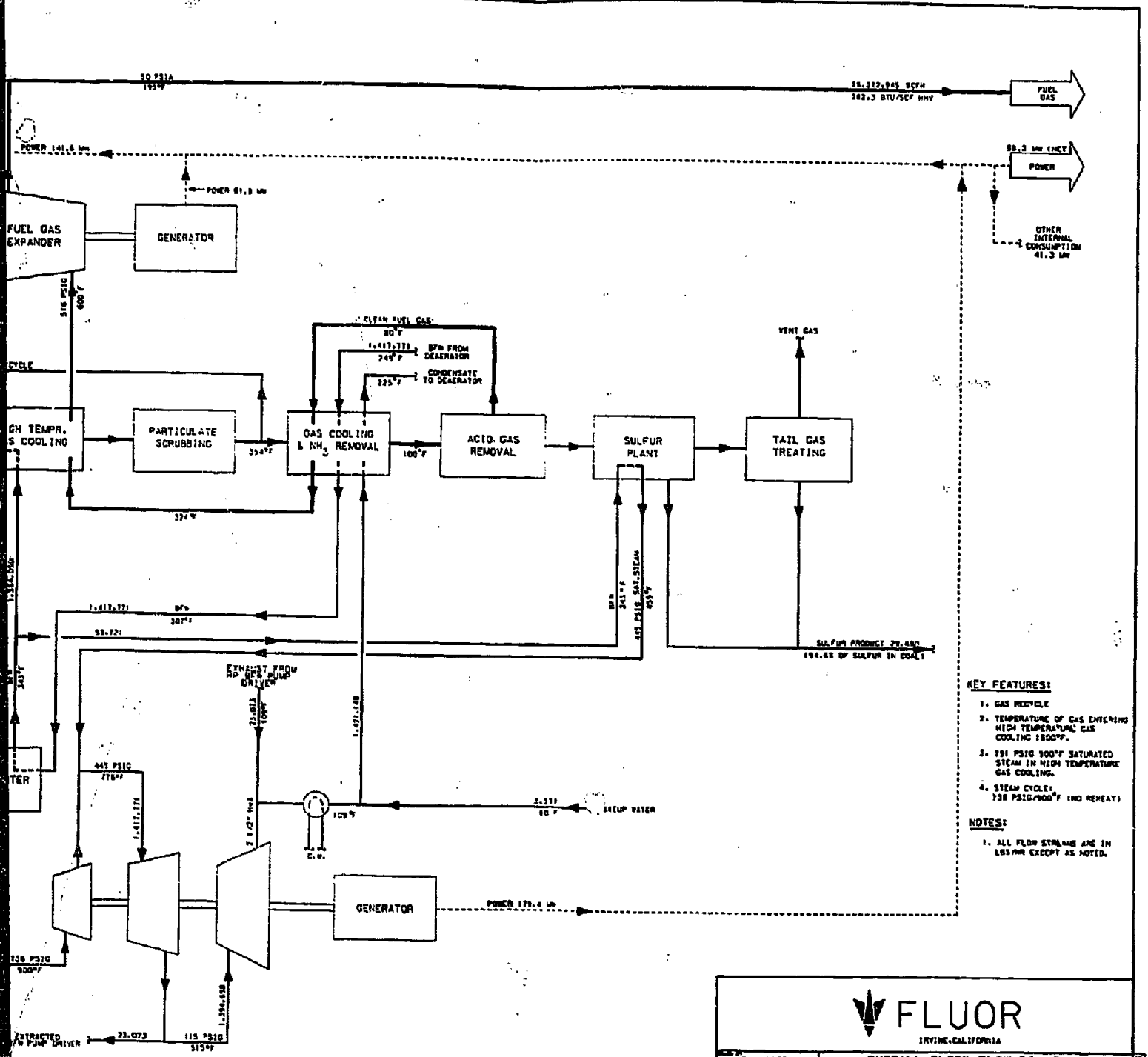
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SATURATED STEAM SUBSTUDY CASE I

EPRI
PALO ALTO, CALIFORNIA

NONE	448334-EXT-SSI	06

4835K1301


50 PSIA
195°F
POWER 141.6 MW
POWER 83.8 MW
OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
AIR
88°F
720 PSIG
300°F
516 PSIG
600°F
CLEAN FUEL GAS
90°F
1,417,771
245°F
BFW FROM DEAERATOR
CONDENSATE TO DEAERATOR
225°F
GAS RECYCLE
COAL
11,000 ST/D
60°F
COAL HANDLING & SLURRY PREP.
SLURRY
140°F
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH3 REMOVAL
ACID GAS REMOVAL
1500°F
334°F
100°F
324°F
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
191 PSIG
519°F
1,384,050
1,417,771
BFW
301°F
83,721
EXHAUST FROM HP BFW PUMP DRIVER
23,073
109°F
1,421,148
FUEL GAS 1,678,558 SCFH
BFW
343°F
FIRED SUPERHEATER
465 PSIG
776°F
3,377
60°F
109°F
C.W.
GENERATOR
POWER 131.4 MW
738 PSIG
900°F
EXTRACTED HP BFW PUMP DRIVER
23,073
115 PSIG
519°F



KEY FEATURES:

1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING 1800°F.
3. 791 PSIG 900°F SATURATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 738 PSIG/900°F (NO REHEAT)

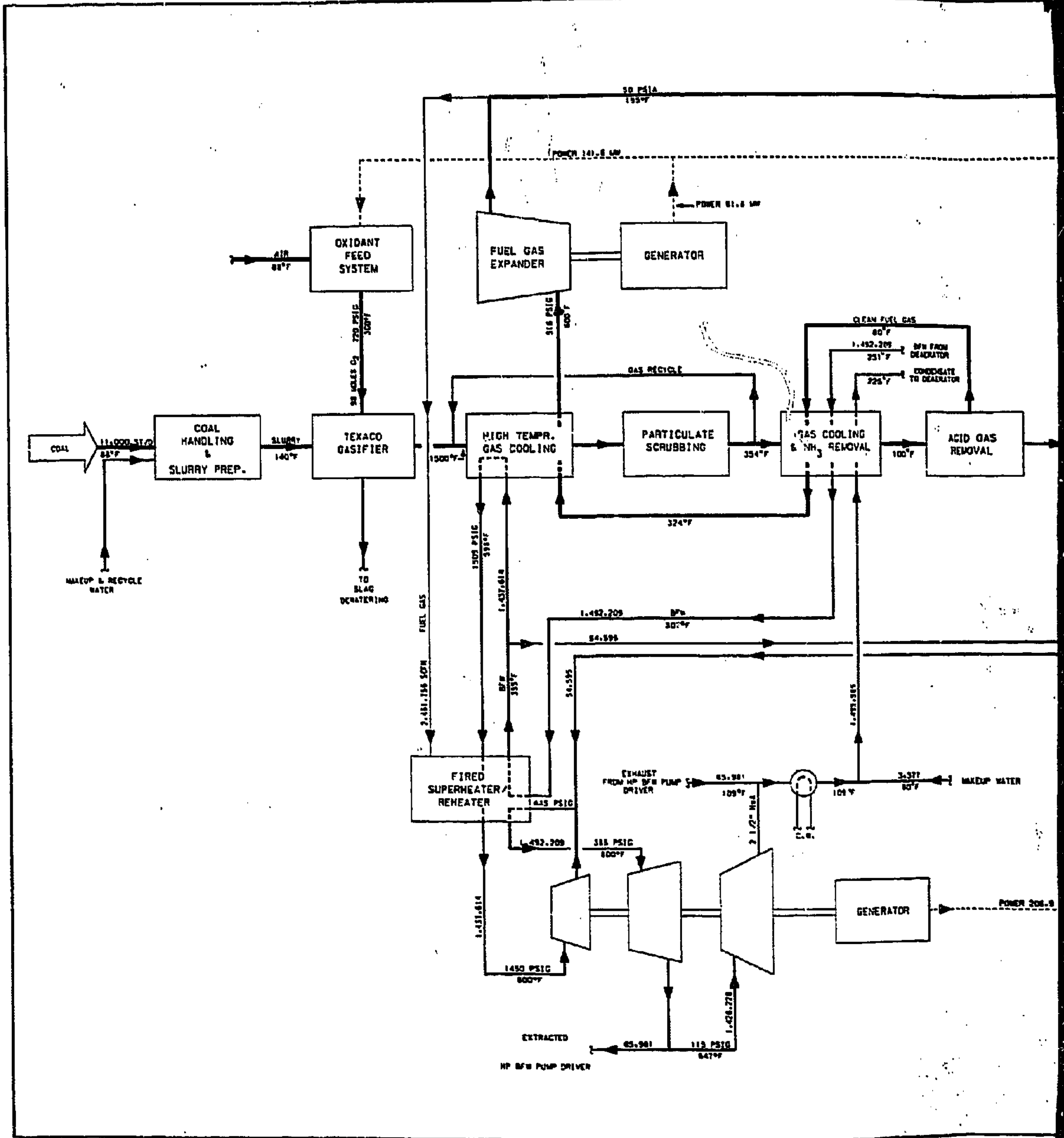
NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

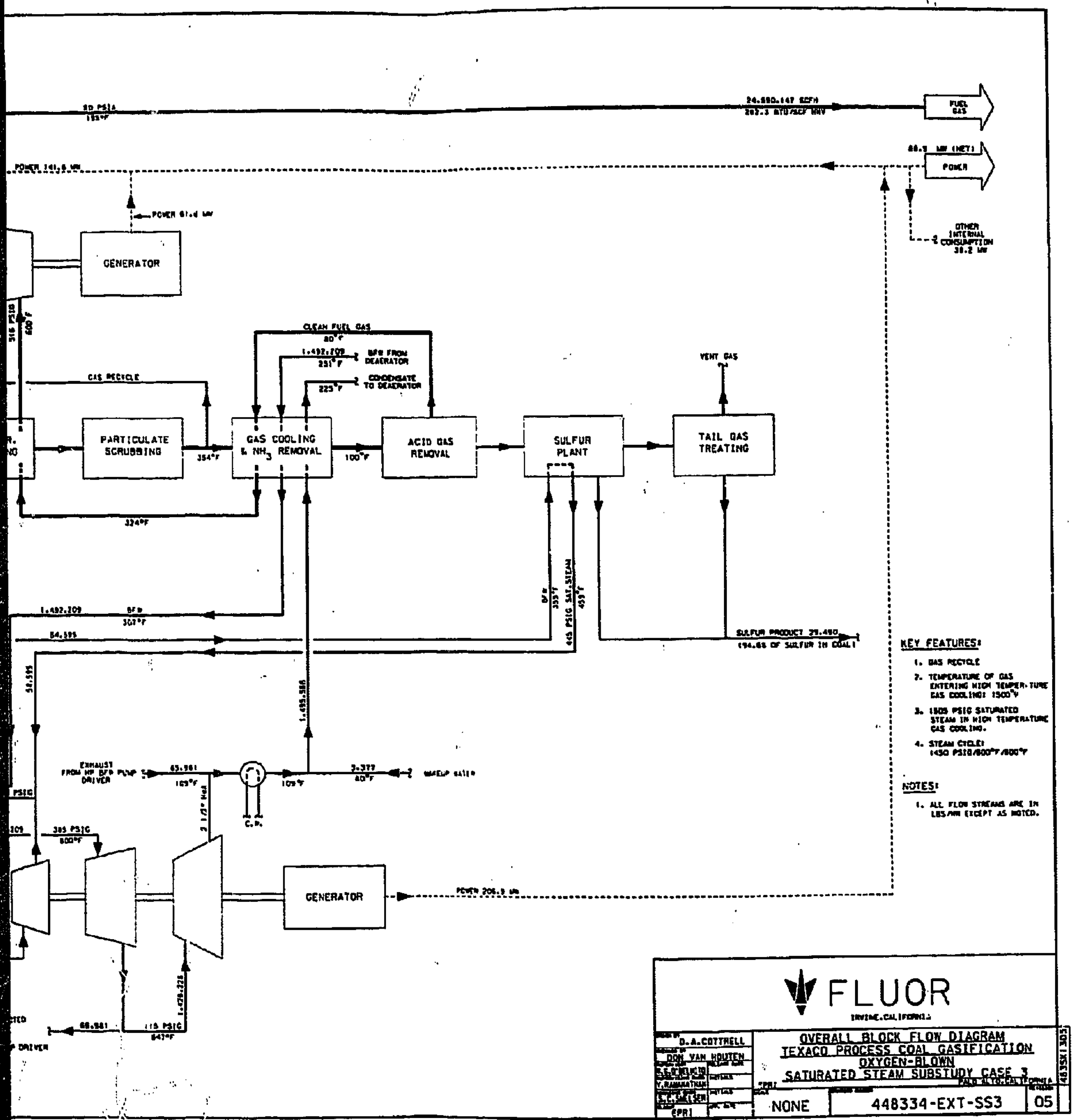
FLUOR
IRVINE, CALIFORNIA

D.A. COTTRELL	OVERALL BLOCK FLOW DIAGRAM TEXACO PROCESS COAL GASIFICATION OXYGEN-BLOWN SATURATED STEAM SUBSTUDY CASE 2	
DON VAN HOUTEN	PALO ALTO, CALIFORNIA	
EPRI	NONE	448334-EXT-SS2 05

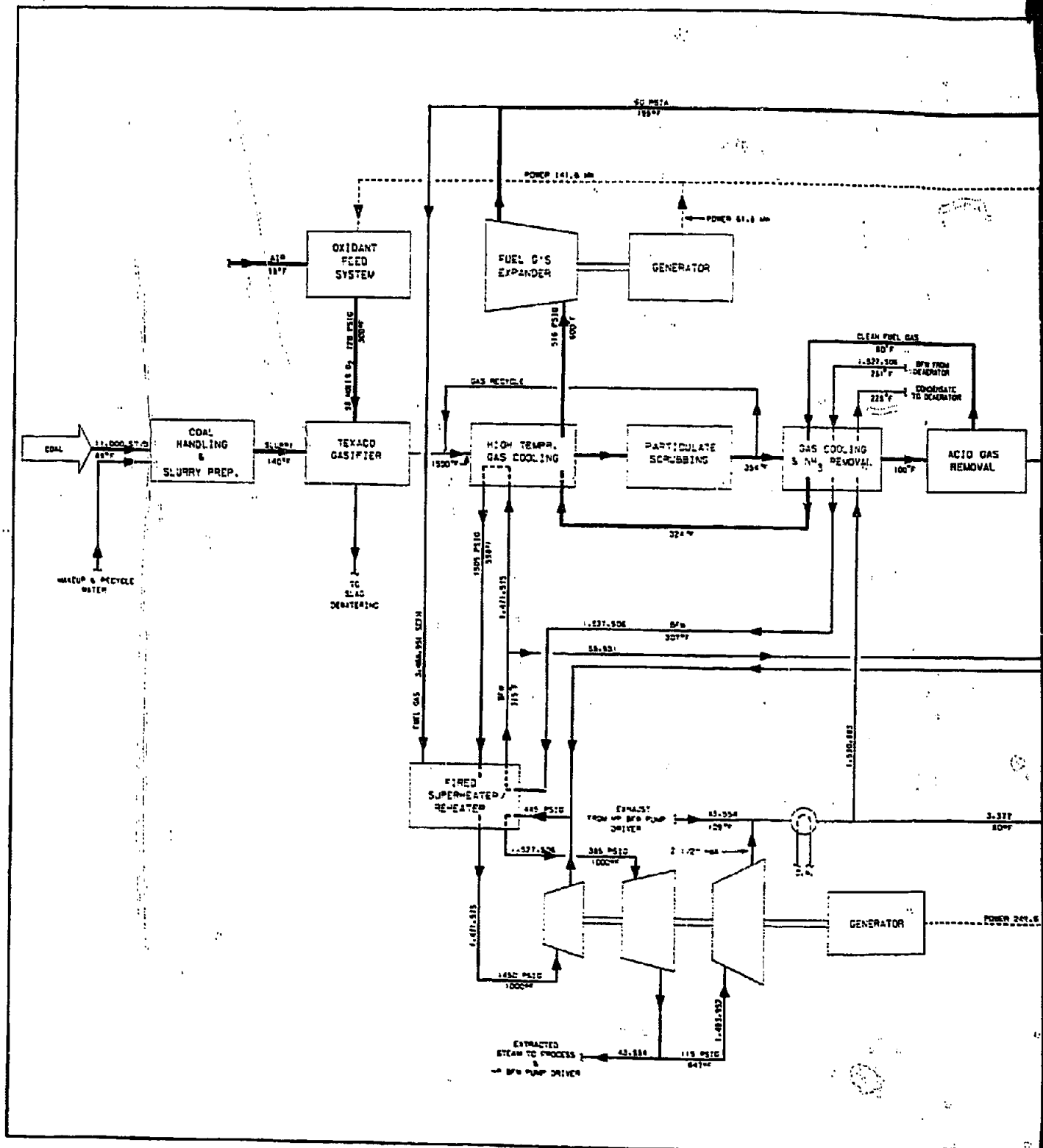
4835K1304

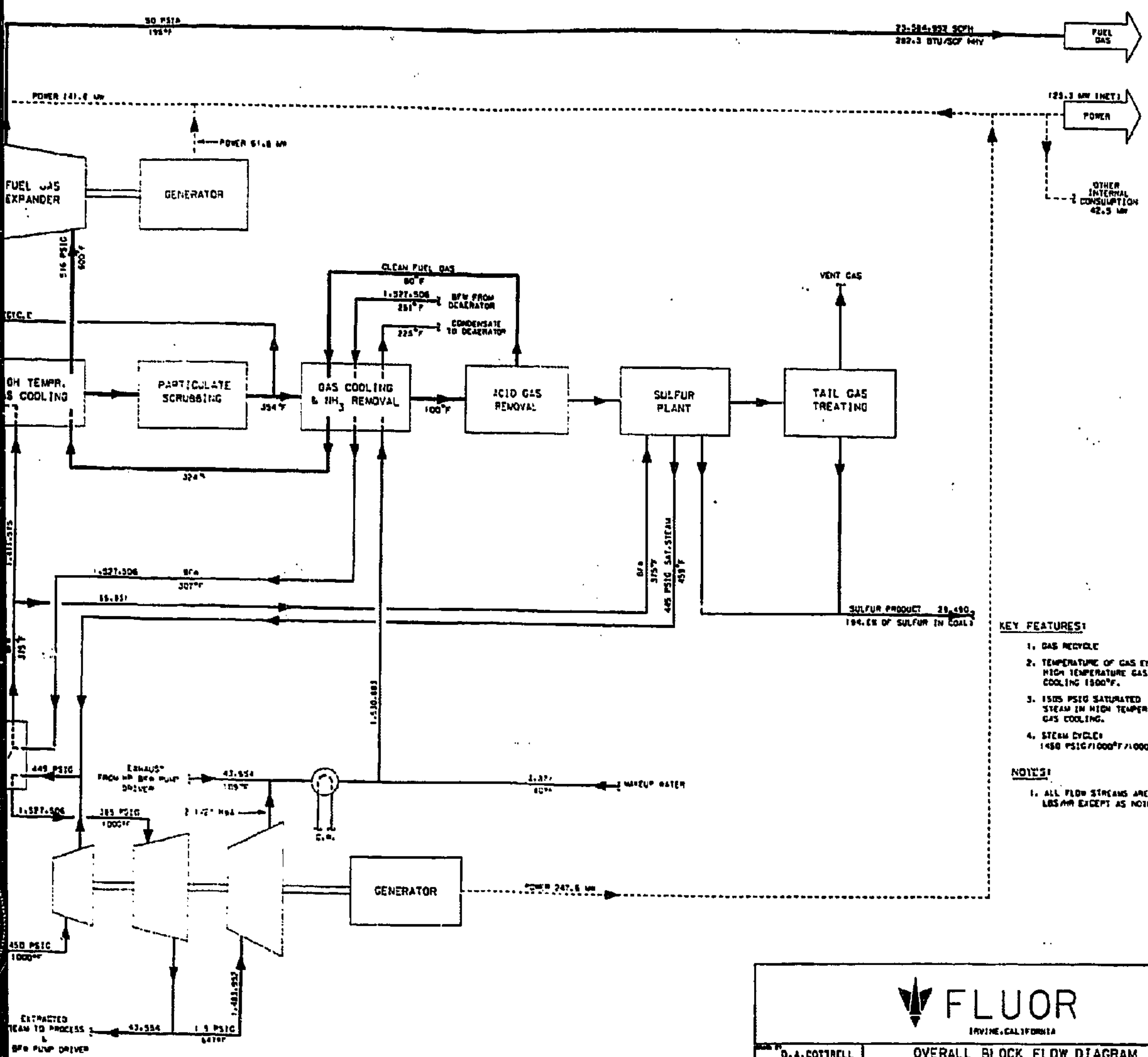


COAL
11,000 ST/D
85°F
COAL HANDLING & SLURRY PREP.
MAKEUP & RECYCLE WATER
SLURRY
140°F
TEXACO GASIFIER
TO SLAG DEWATERING
AIR
88°F
OXIDANT FEED SYSTEM
220 PSIG
300°F
FUEL GAS EXPANDER
GENERATOR
POWER 61.8 MW
50 PSIA
155°F
316 PSIG
600°F
1500°F
HIGH TEMPR. GAS COOLING
GAS RECYCLE
PARTICULATE SCRUBBING
354°F
324°F
GAS COOLING & NH3 REMOVAL
CLEAN FUEL GAS
80°F
BFW FROM DEAERATOR
CONDENSATE TO DEAERATOR
225°F
100°F
ACID GAS REMOVAL
FUEL GAS
1505 PSIG
1,437,614
1,482,209
BFW
54,595
FIRED SUPERHEATER/ REHEATER
1445 PSIG
315 PSIG
600°F
1450 PSIG
800°F
1,431,614
EXHAUST FROM HP BFW PUMP DRIVER
65,981
109°F
2 1/2" HgA
C.W.
MAKEUP WATER
80°F
GENERATOR
EXTRACTED
HP BFW PUMP DRIVER
115 PSIG
647°F
1,428,728



FUEL GAS
POWER
POWER 141.6 MW
POWER 61.4 MW
GENERATOR
316 PSIG
600°F
CLEAN FUEL GAS
80°F
1,492,209
251°F
BFW FROM DEAERATOR
CONDENSATE TO DEAERATOR
225°F
GAS RECYCLE
PARTICULATE SCRUBBING
354°F
GAS COOLING & NH3 REMOVAL
100°F
ACID GAS REMOVAL
SULFUR PLANT
VENT GAS
TAIL GAS TREATING
324°F
OTHER INTERNAL CONSUMPTION
1,492,209
BFW
307°F
54,595
58,595
1,495,586
BFW
355°F
445 PSIG SAT. STEAM
459°F
SULFUR PRODUCT 29,490
EXHAUST FROM HP BFW PUMP DRIVER
109°F
C.P.
109°F
40°F
MAKEUP WATER
385 PSIG
800°F
GENERATOR
115 PSIG
DRIVER
KEY FEATURES:
1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 1500°F
3. 1505 PSIG SATURATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 1450 PSIG/800°F/800°F
NOTES:
1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.
FLUOR
IRVINE, CALIFORNIA
D.A. COTTRELL
DON VAN HOUTEN
Y. RAMANATHAN
EPRI
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SATURATED STEAM SUBSTUDY CASE 3
PALO ALTO, CALIFORNIA
NONE
448334-EXT-SS3
05


OXIDANT FEED SYSTEM
FUEL G'S EXPANDER
GENERATOR
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMP. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH_3 REMOVAL
ACID GAS REMOVAL
FIRED SUPERHEATER/ REHEATER
GENERATOR
COAL
CLEAN FUEL GAS
GAS RECYCLE
EXTRACTED STEAM TO PROCESS



KEY FEATURES:

1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING 1500°F.
3. 1505 PSIG SATURATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 1450 PSIG/1000°F/1000°F

NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

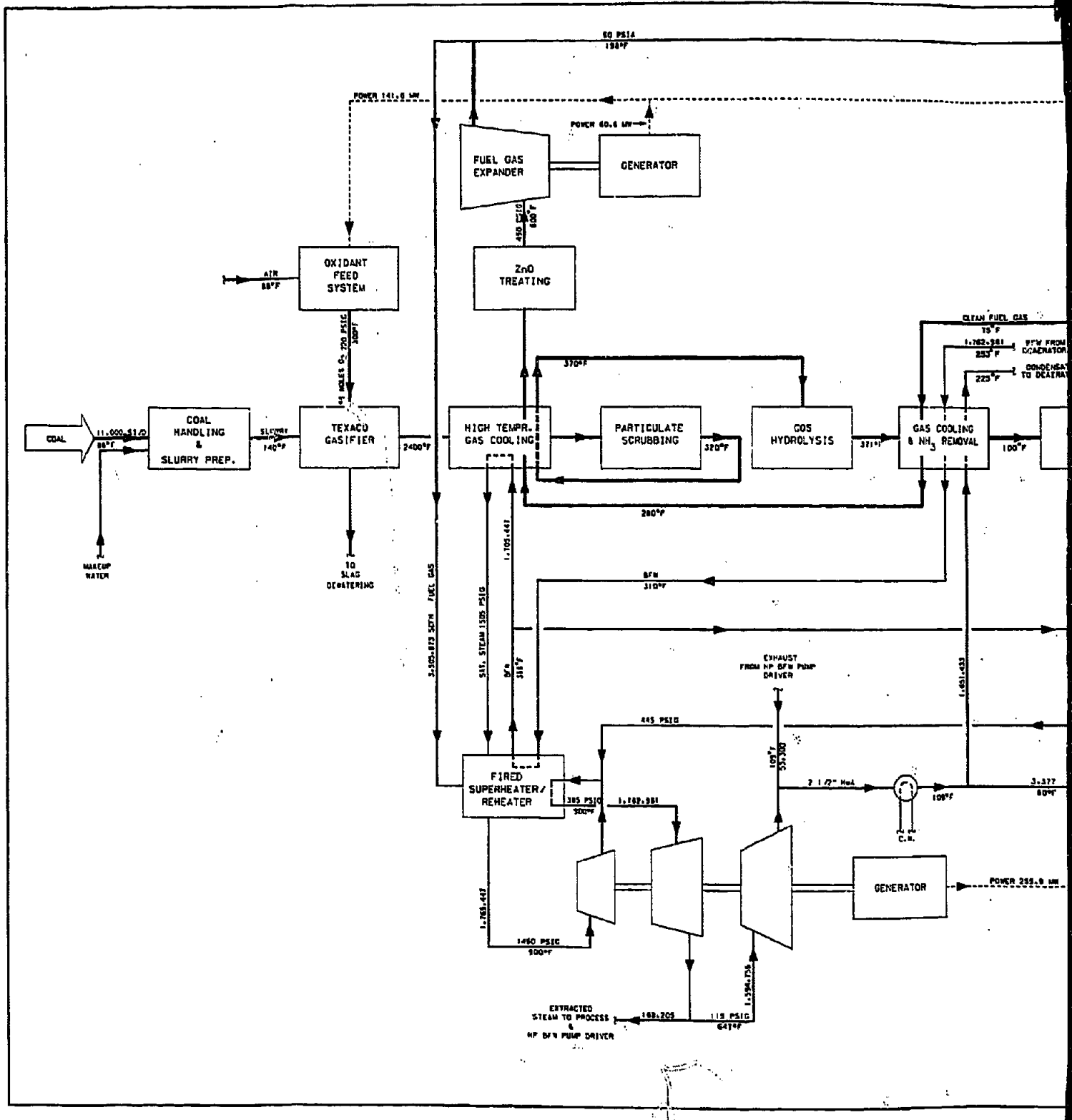
D.A. COTTRELL
DON VAN HOUTEN
S.C. SMELSER
EPRI

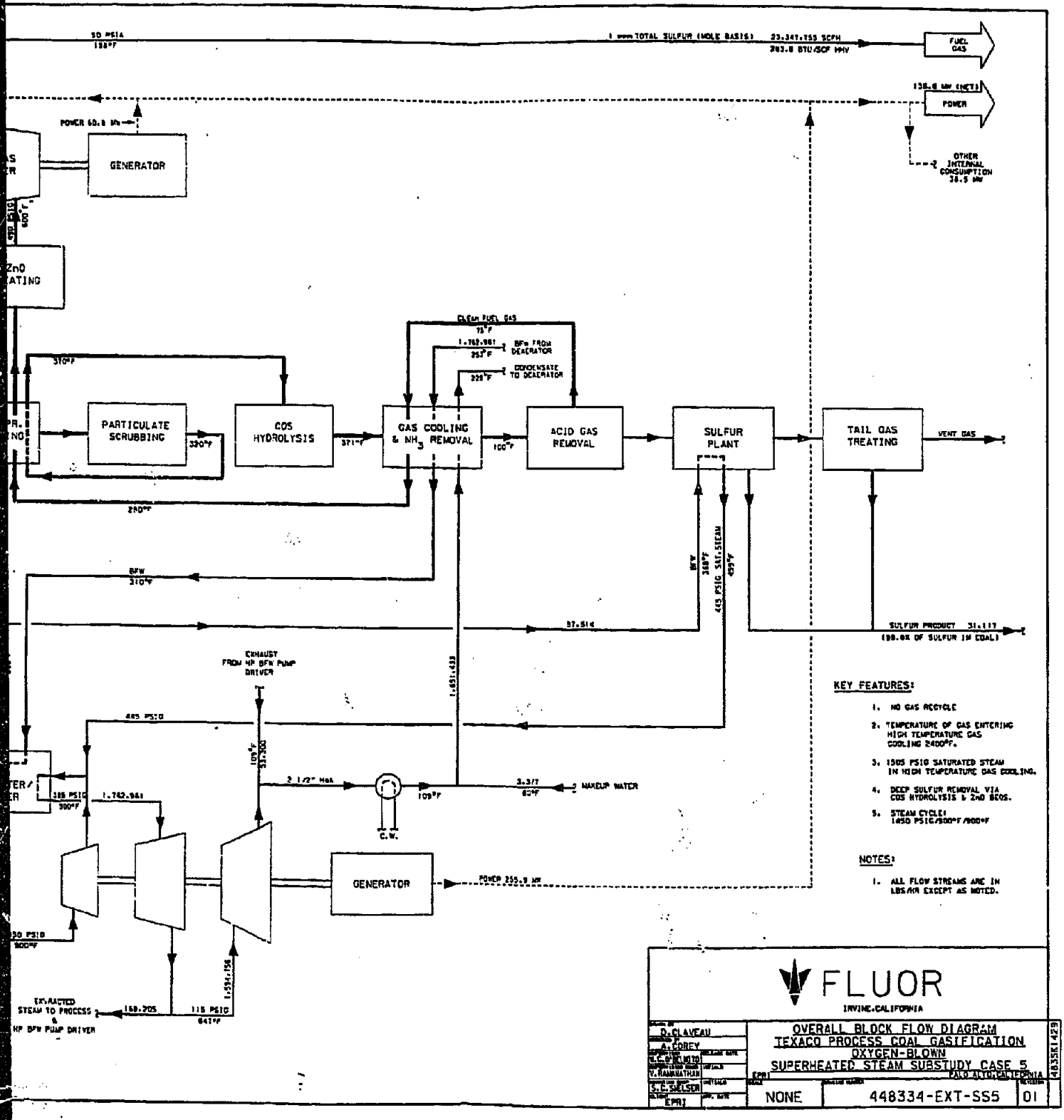
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SATURATED STEAM SUBSTUDY CASE 4

EPRI PALO ALTO, CALIFORNIA

NONE	448334-EXT-SS4	05

J35K1306


FUEL GAS EXPANDER
GENERATOR
POWER 60.6 MW
POWER 141.6 MW
OXIDANT FEED SYSTEM
AIR
ZnO TREATING
COAL
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
COS HYDROLYSIS
GAS COOLING & NH_3 REMOVAL
CLEAN FUEL GAS
MAKEUP WATER
TO SLAG DEWATERING
BFW
EXHAUST FROM HP BFW PUMP DRIVER
FIRED SUPERHEATER/ REHEATER
GENERATOR
EXTRACTED STEAM TO PROCESS & HP BFW PUMP DRIVER



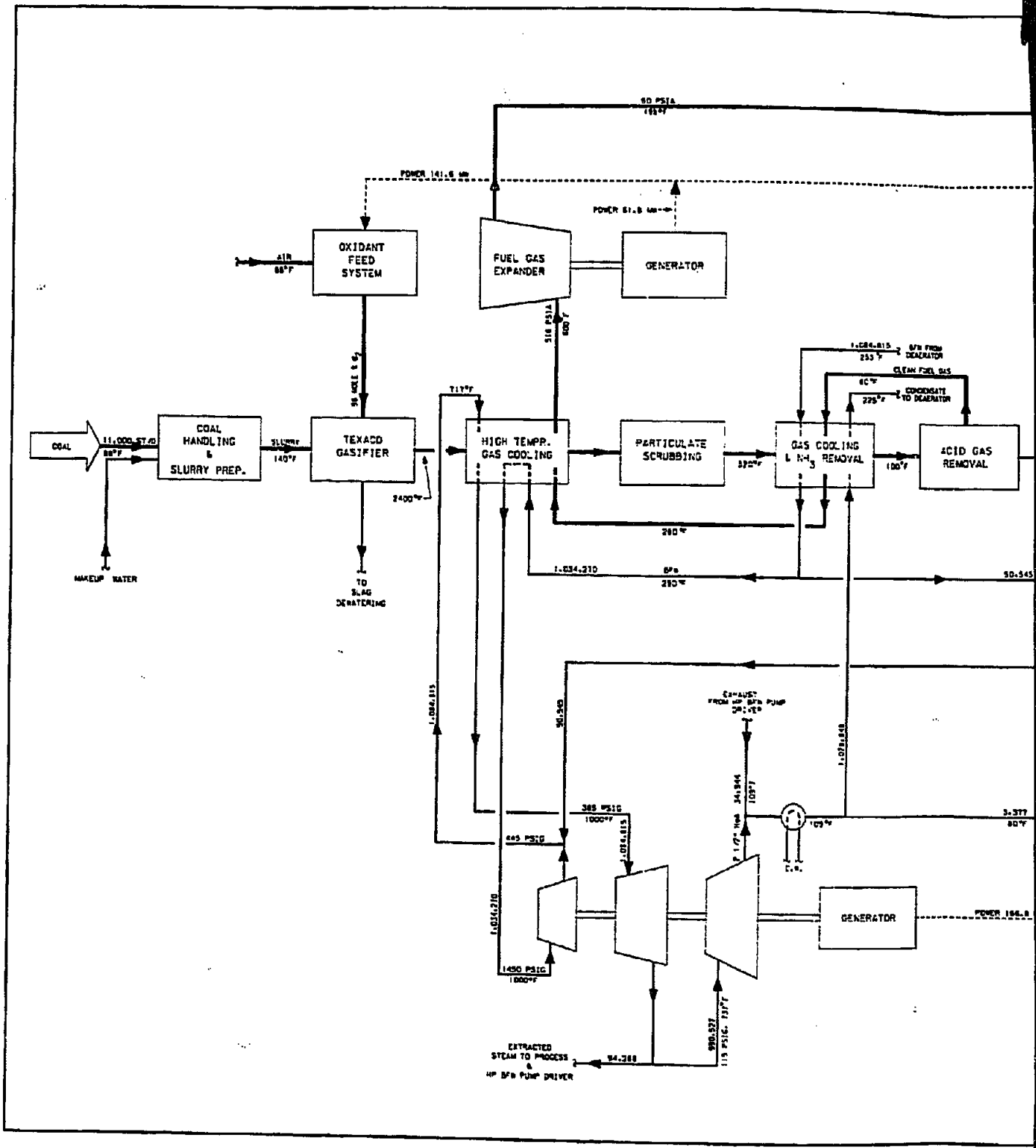
FLUOR
IRVINE, CALIFORNIA

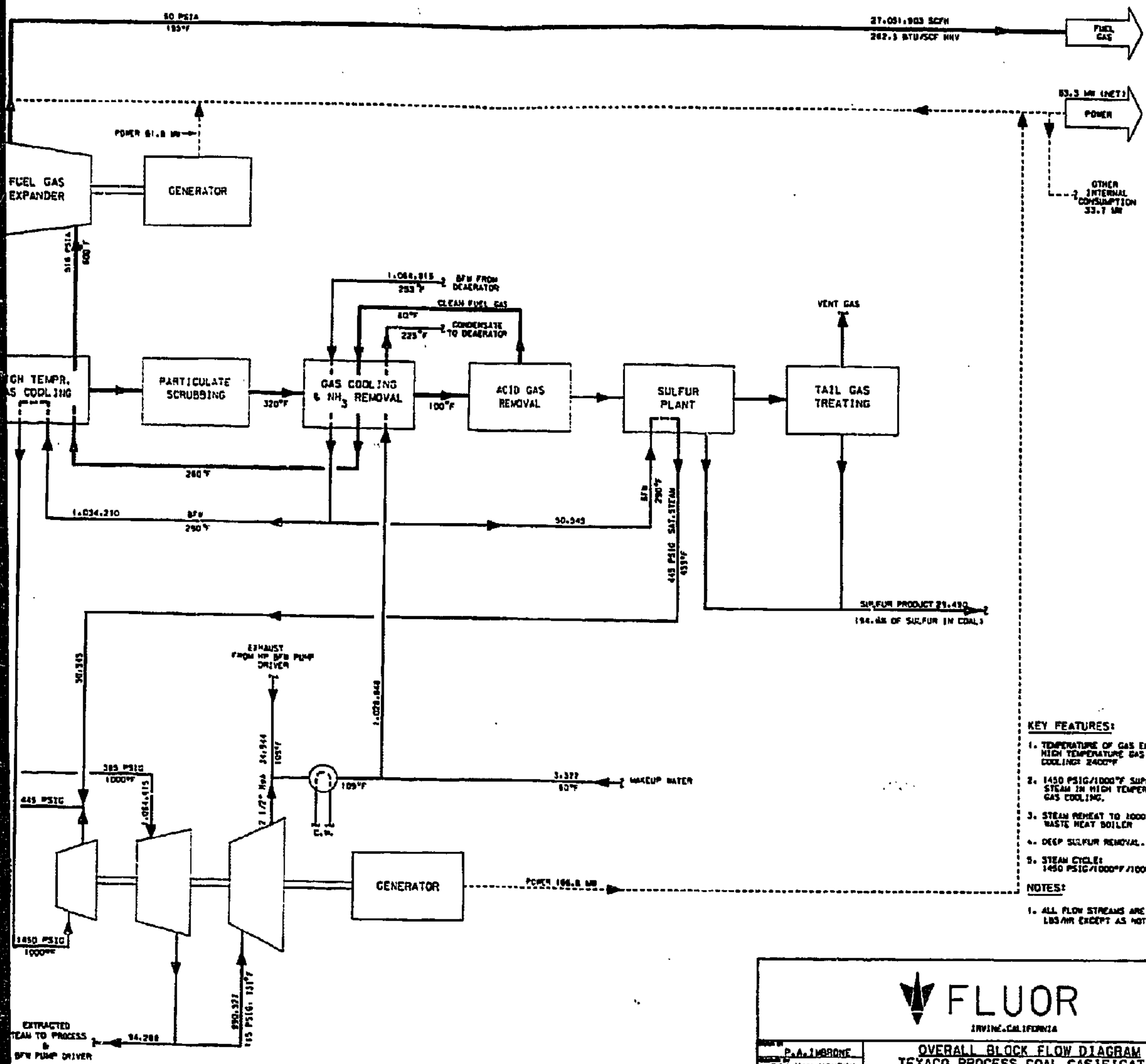
D. CLAVEAU
A. COREY
V. RAMANATHAN
S. E. SHELSER
EPRI

OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SUPERHEATED STEAM SUBSTUDY CASE 5
EPRI PALO ALTO, CALIFORNIA

NONE | 448334-EXT-SS5 | 01

4835K1429


OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH3 REMOVAL
ACID GAS REMOVAL
COAL
MAKEUP WATER
TO SLAG DEWATERING
GENERATOR



KEY FEATURES:

1. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 2400°F
2. 1450 PSIG/1000°F SUPERHEATED STEAM IN HIGH TEMPERATURE GAS COOLING.
3. STEAM REHEAT TO 1000°F IN WASTE HEAT BOILER
4. DEEP SULFUR REMOVAL.
5. STEAM CYCLE: 1450 PSIG/1000°F/1000°F.

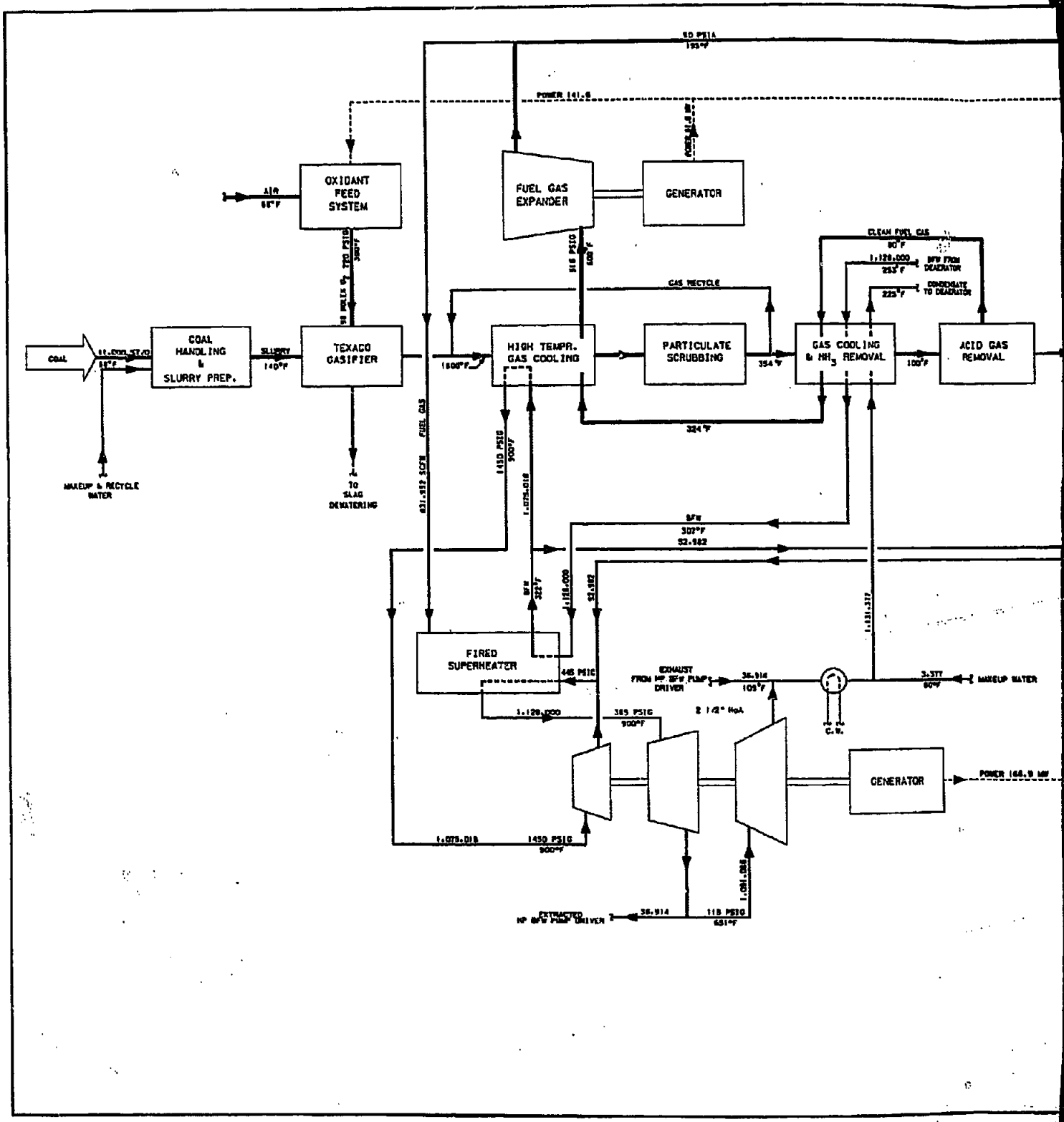
NOTES:

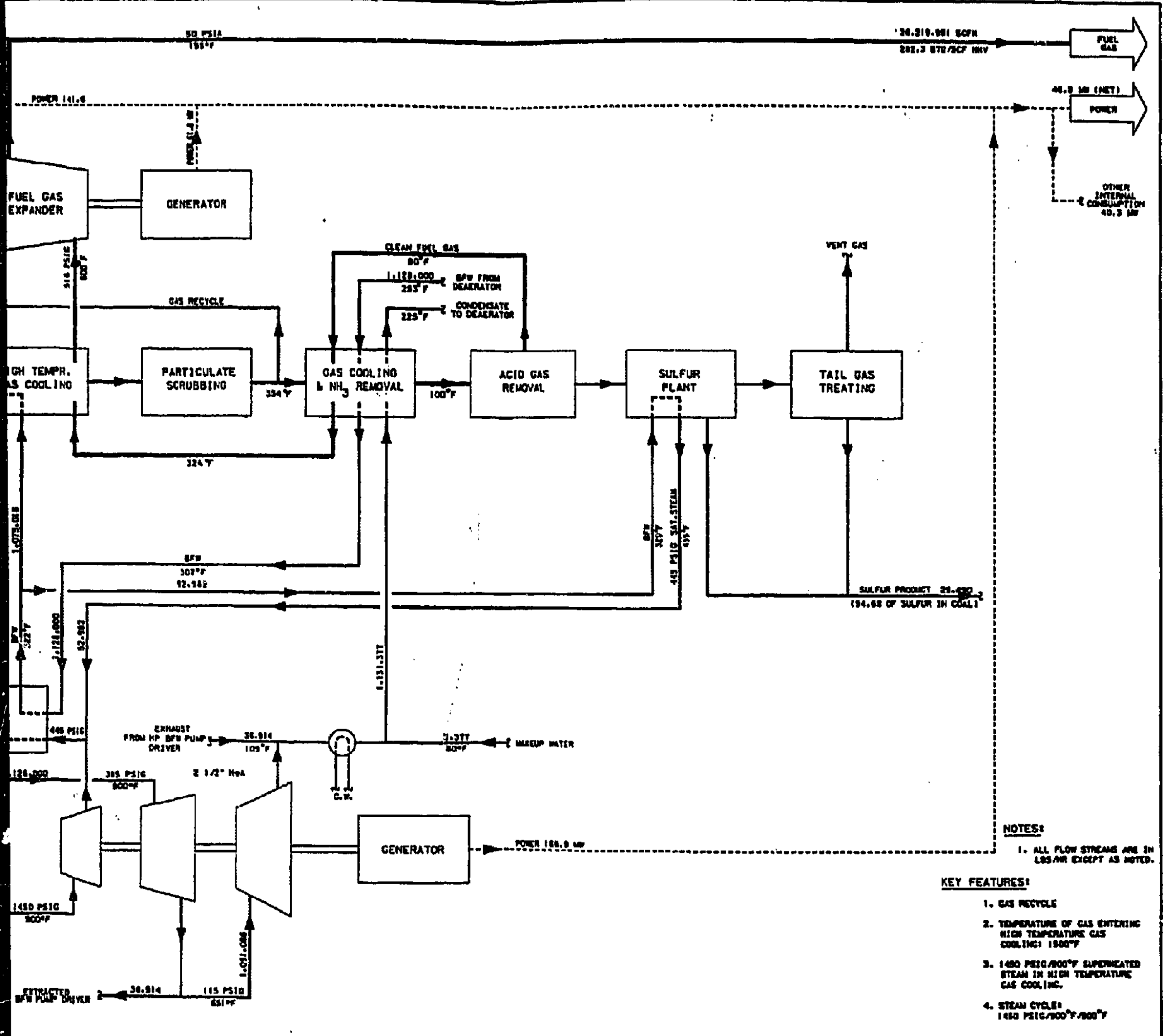
1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

P.A. IMBRONE	OVERALL BLOCK FLOW DIAGRAM
DON VAN HOUTEN	TEXACO PROCESS COAL GASIFICATION
R.G. GEIL/SETO	OXYGEN-BLOWN
V. RAMANATHAN	SUPERHEATED STEAM SUBSTUDY CASE 4
E.C. SAILSER	EPRI PALO ALTO, CALIFORNIA
EPRI	NONE — 448334-EXT-SH — 02

4835K1313


OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH3 REMOVAL
ACID GAS REMOVAL
FIRED SUPERHEATER
GENERATOR
COAL
AIR
CLEAN FUEL GAS
GAS RECYCLE
SLURRY
FUEL GAS
BFW
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
EXHAUST FROM HP BFW PUMP'S DRIVER
MAKEUP WATER
C.W.
EXTRACTED
POWER 166.9 MW



NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

KEY FEATURES:

1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 1500°F
3. 1450 PSIG/900°F SUPERHEATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 1450 PSIG/900°F/900°F

FLUOR
IRVINE, CALIFORNIA

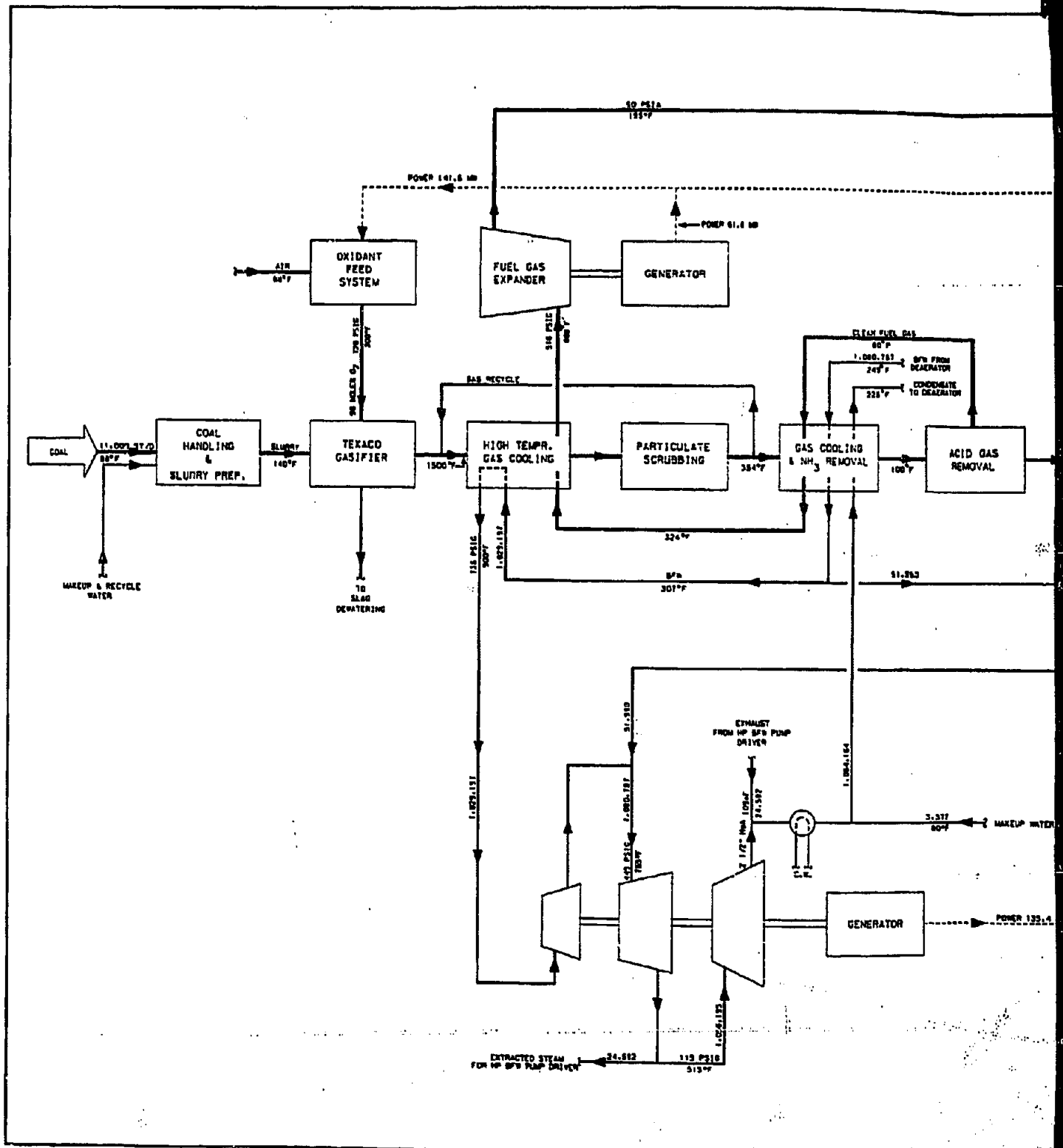
D.A. COTTRELL
DON VAN HOUTEN
V. RAMANATHAN
S.C. SMELSER
EPRI

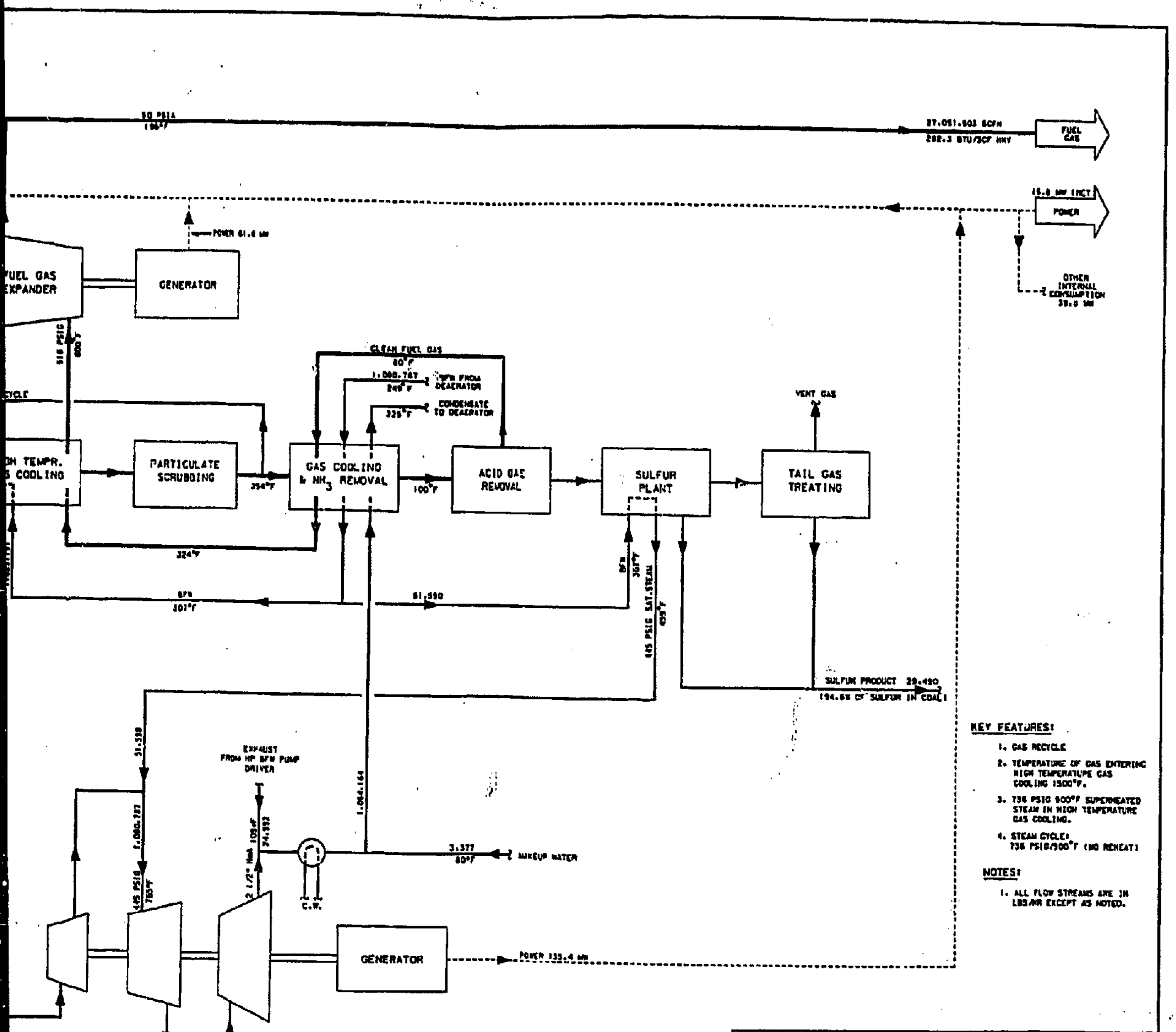
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SUPERHEATED STEAM SUBSTUDY CASE 1

EPRI PALO ALTO, CALIFORNIA

NONE	448334-EXT-SH1	05

483SK1307


OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMP. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH3 REMOVAL
ACID GAS REMOVAL
COAL
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
GAS RECYCLE
EXHAUST FROM HP BFW PUMP DRIVER
MAKEUP WATER
GENERATOR
EXTRACTED STEAM FOR HP BFW PUMP DRIVER



KEY FEATURES:

1. GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING 1500°F.
3. 736 PSIG 900°F SUPERHEATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM CYCLE: 736 PSIG/900°F (NO REHEAT)

NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

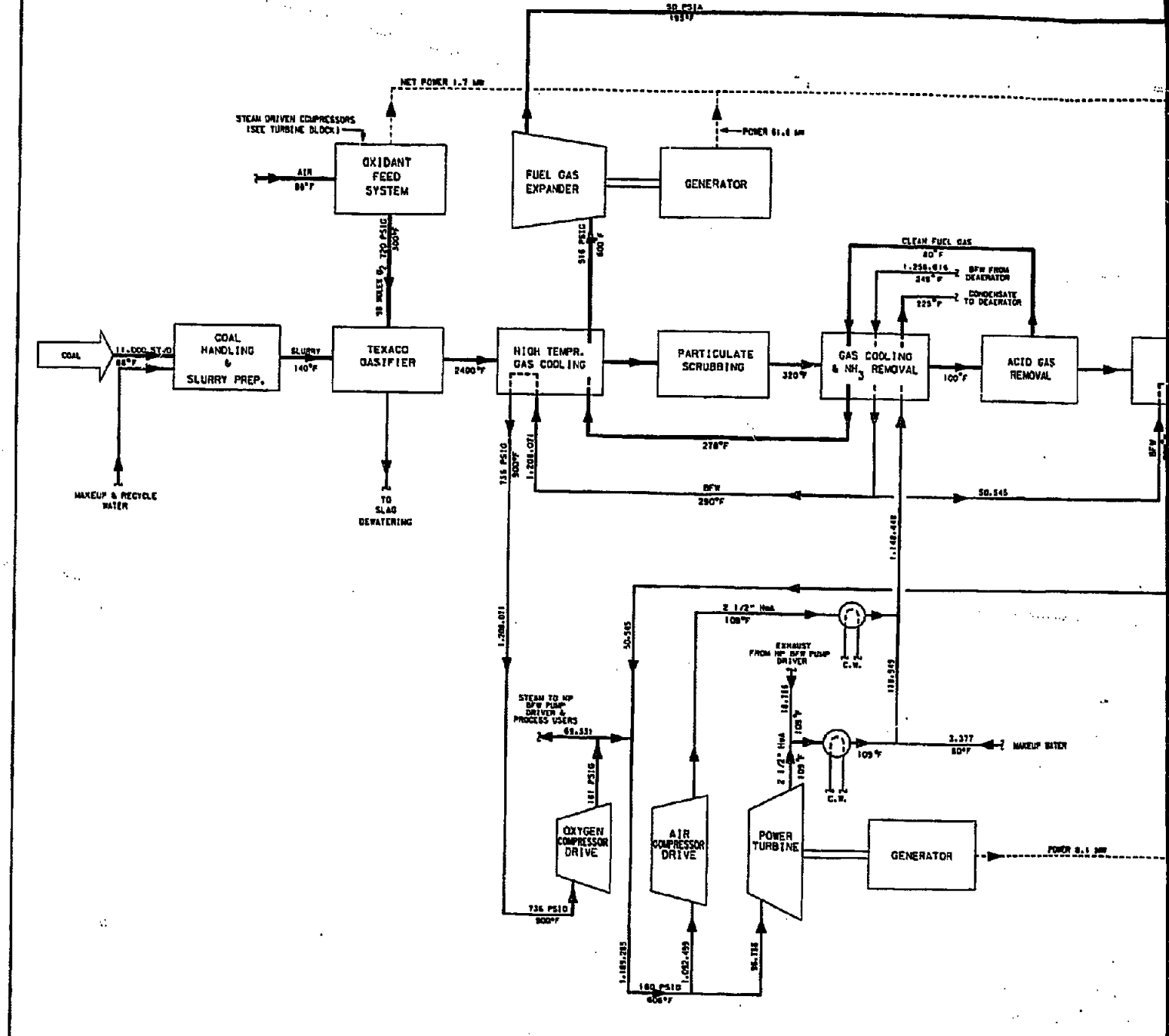
L.R. LAMBERT
DON VAN HOUTEN
S.C. SMELSER
EPRI

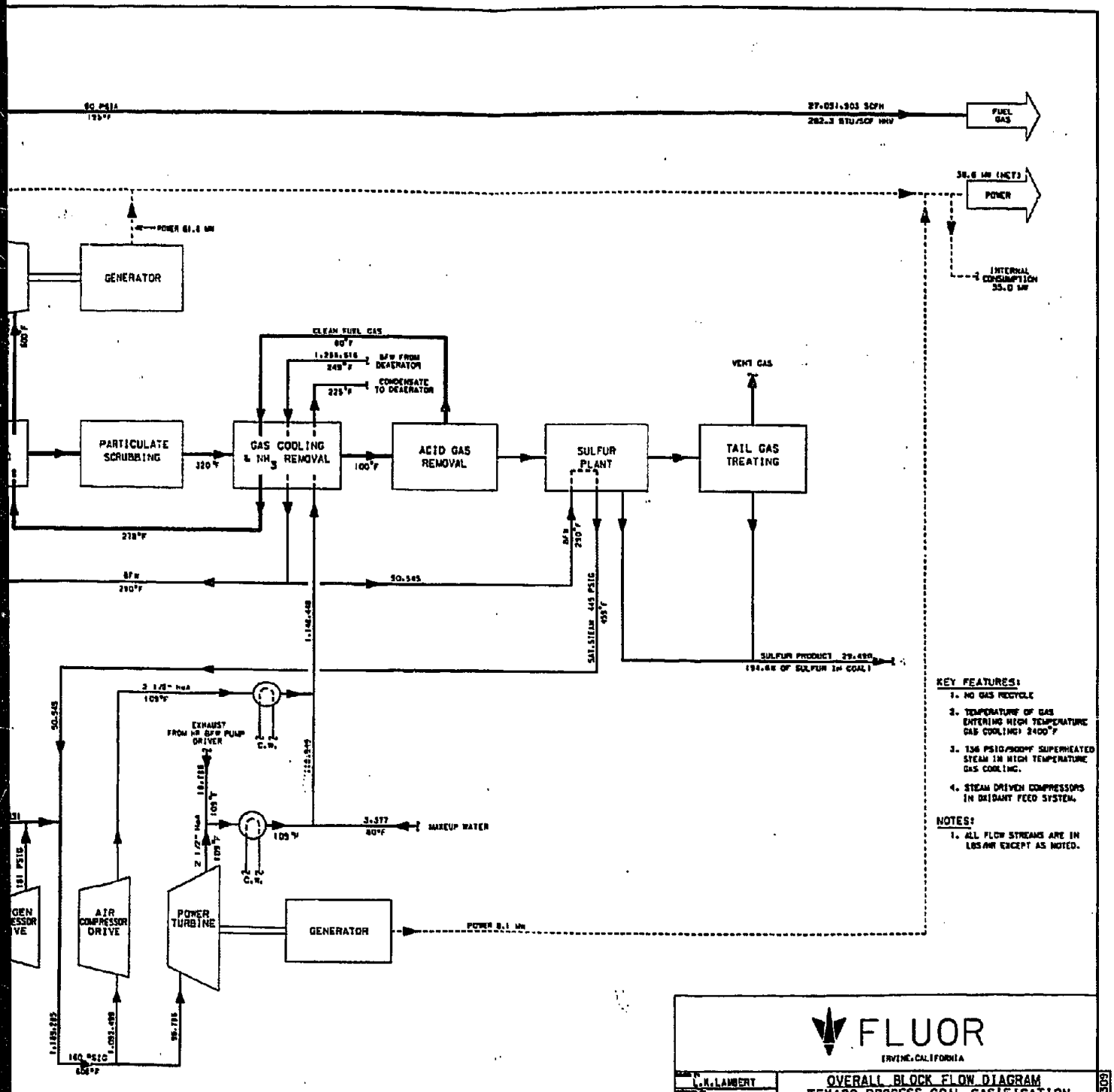
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SUPERHEATED STEAM SUBSTUDY CASE 2

EPRI PALO ALTO, CALIFORNIA

NONE	448334-EXT-SH2	05

483SK1306


NET POWER 1.7 MW
STEAM DRIVEN COMPRESSORS (SEE TURBINE BLOCK)
AIR
80°F
OXIDANT FEED SYSTEM
FUEL GAS EXPANDER
GENERATOR
POWER 61.8 MW
COAL
COAL HANDLING & SLURRY PREP.
SLURRY
140°F
TEXACO GASIFIER
2400°F
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
320°F
GAS COOLING & NH_3 REMOVAL
100°F
ACID GAS REMOVAL
CLEAN FUEL GAS
80°F
BFW FROM DEAERATOR
348°F
CONDENSATE TO DEAERATOR
325°F
276°F
BFW
290°F
50,545
MAKEUP & RECYCLE WATER
TO SLAG DEWATERING
735 PSIG
500°F
STEAM TO HP BFW PUMP DRIVER & PROCESS USERS
69,531
161 PSIG
OXYGEN COMPRESSOR DRIVE
AIR COMPRESSOR DRIVE
POWER TURBINE
GENERATOR
POWER 8.1 MW
EXHAUST FROM HP BFW PUMP DRIVER
C.W.
MAKEUP WATER
3,377
60°F
109°F
735 PSIG
900°F
180 PSIG
606°F



KEY FEATURES:

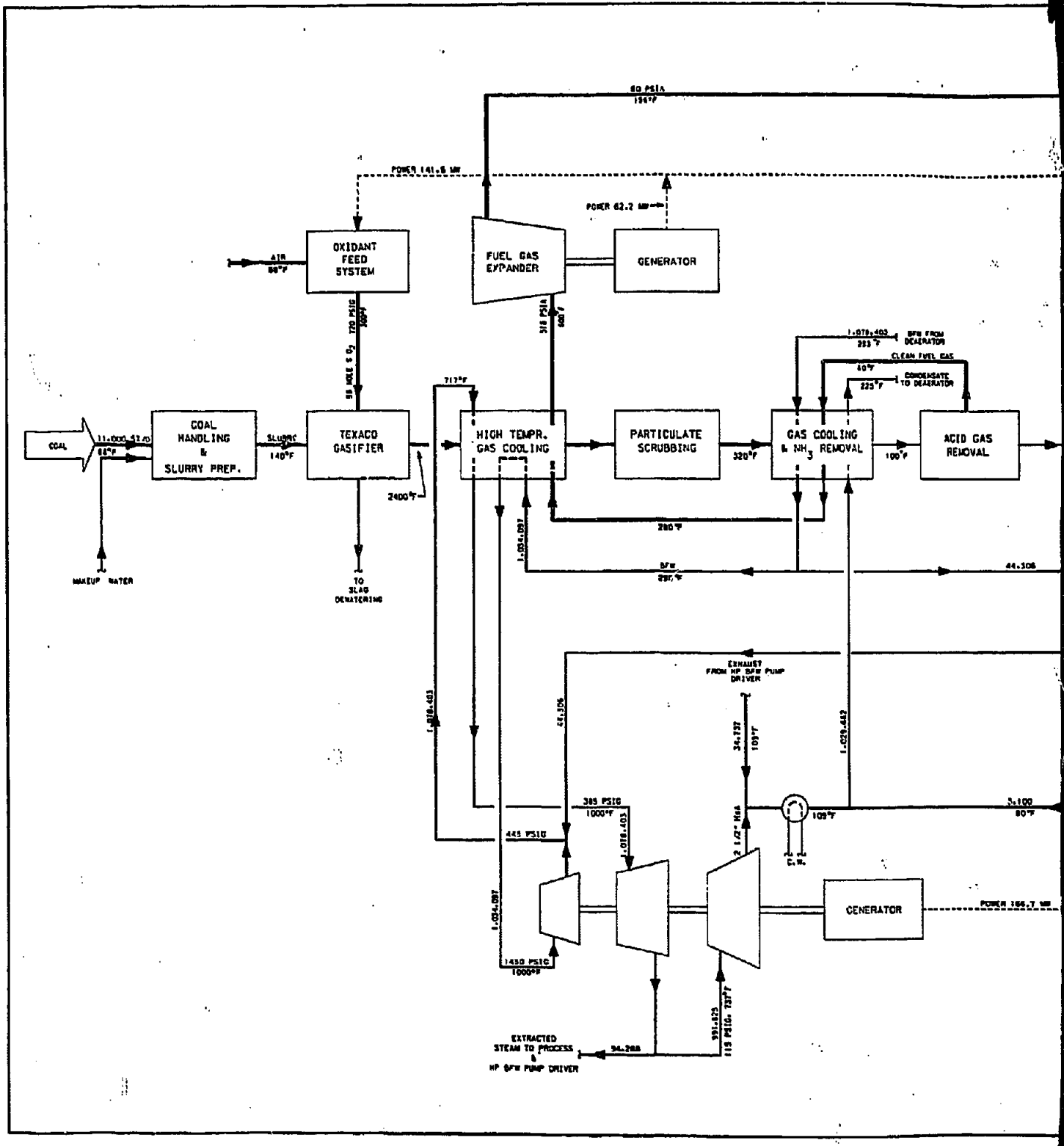
1. NO GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING: 2400°F
3. 136 PSIG/900°F SUPERHEATED STEAM IN HIGH TEMPERATURE GAS COOLING.
4. STEAM DRIVEN COMPRESSORS IN OXIDANT FEED SYSTEM.

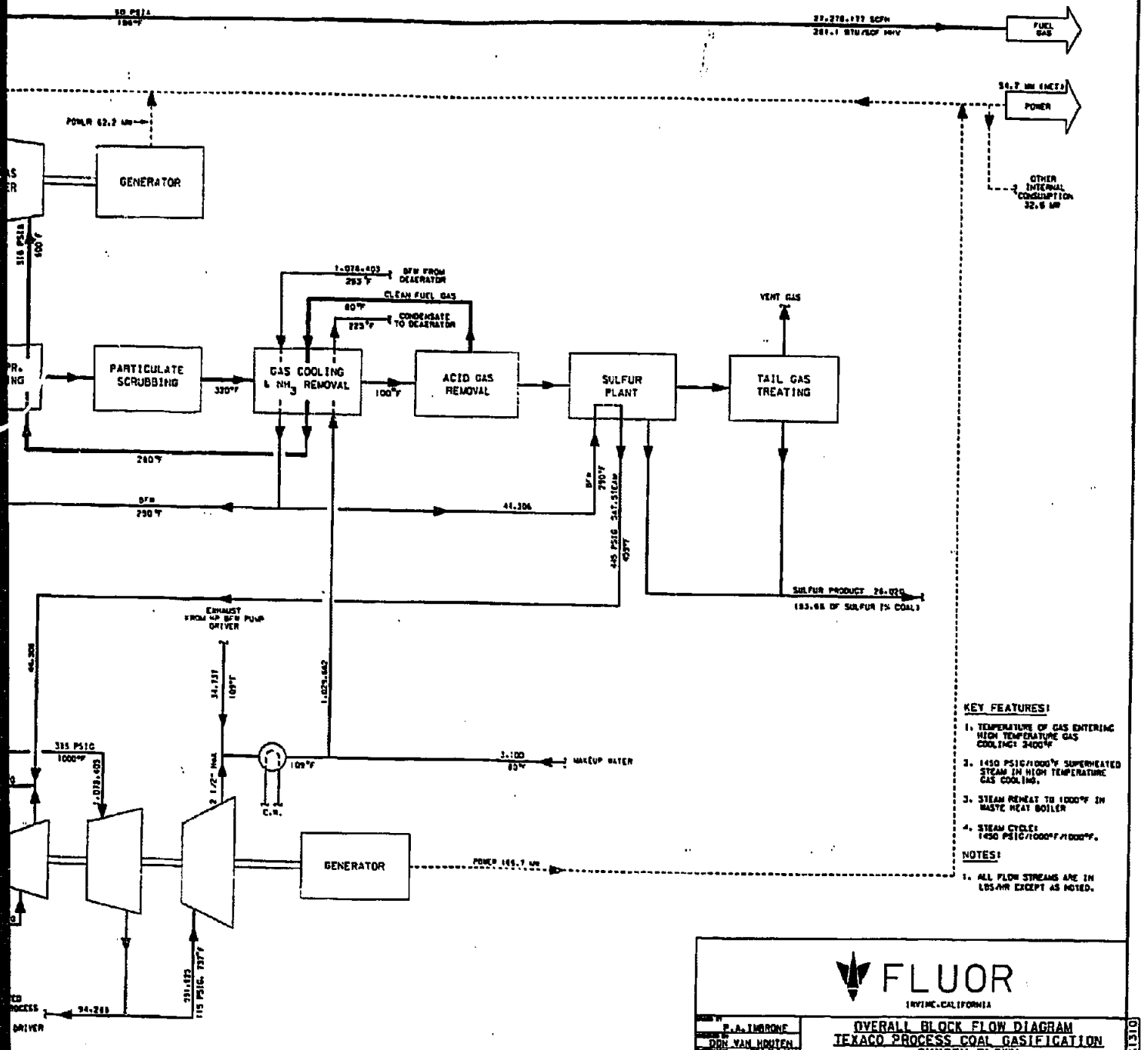
NOTES:

1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.

FLUOR
IRVINE, CALIFORNIA

L.K.LAMBERT	OVERALL BLOCK FLOW DIAGRAM TEXACO PROCESS COAL GASIFICATION OXYGEN-BLOWN SUPERHEATED STEAM SUBSTUDY CASE 3	433SK1309
DON VAN HOUTEN		
R.E.D'ELVITO		
V.RAMARATHAM		
S.C.SAELSER		
EPRI	PALO ALTO, CALIFORNIA	
EPRI NONE	448334-EXT-SH3	05

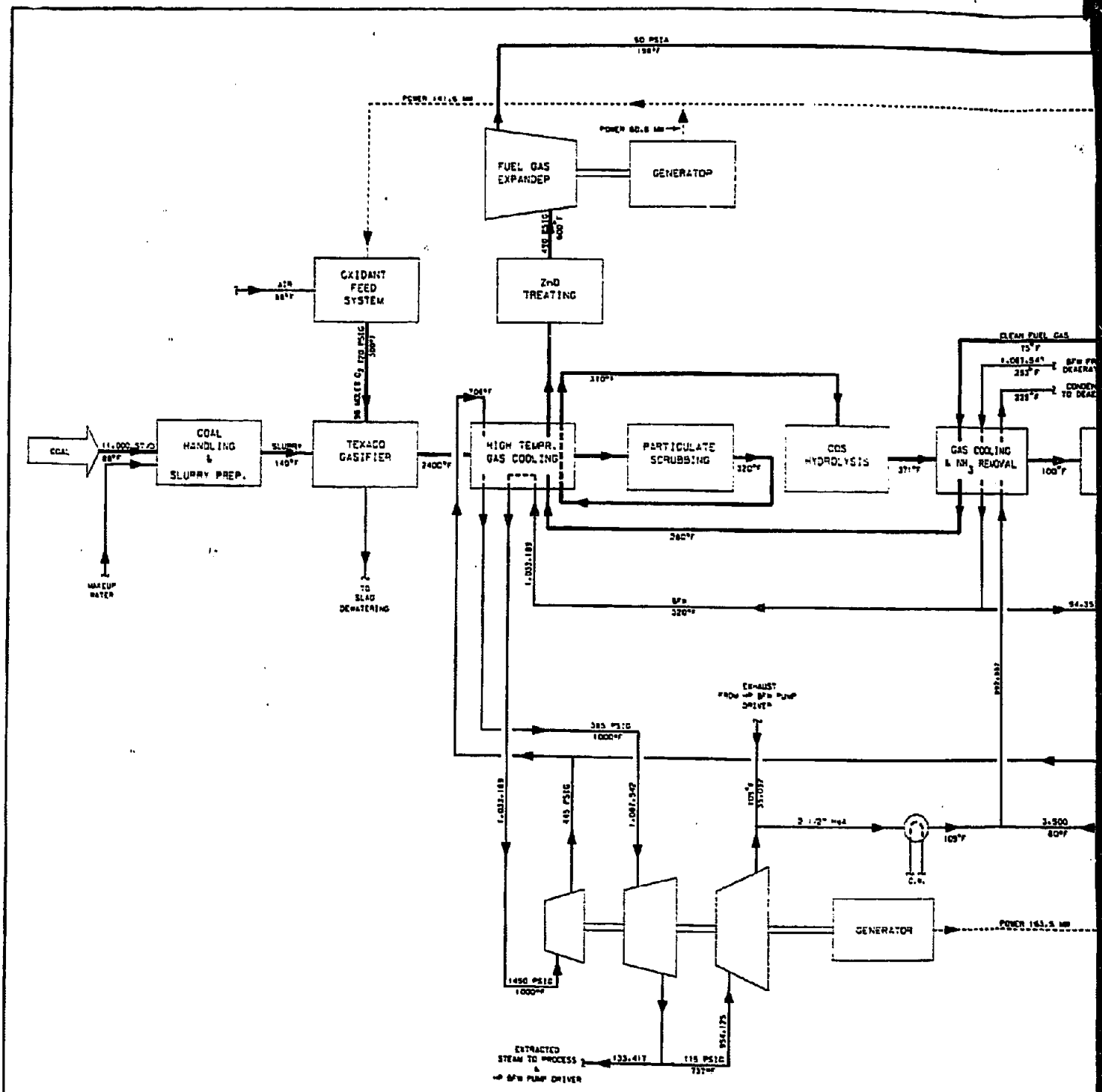

60 PSIA
POWER 141.6 MW
POWER 62.2 MW
OXIDANT FEED SYSTEM
AIR
FUEL GAS EXPANDER
GENERATOR
COAL
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
GAS COOLING & NH_3 REMOVAL
ACID GAS REMOVAL
MAKEUP WATER
TO SLAG DEWATERING
BFW FROM DEAERATOR
CLEAN FUEL GAS
CONDENSATE TO DEAERATOR
EXHAUST FROM HP BFW PUMP DRIVER
385 PSIG
445 PSIG
1430 PSIG
GENERATOR
EXTRACTED STEAM TO PROCESS & HP BFW PUMP DRIVER

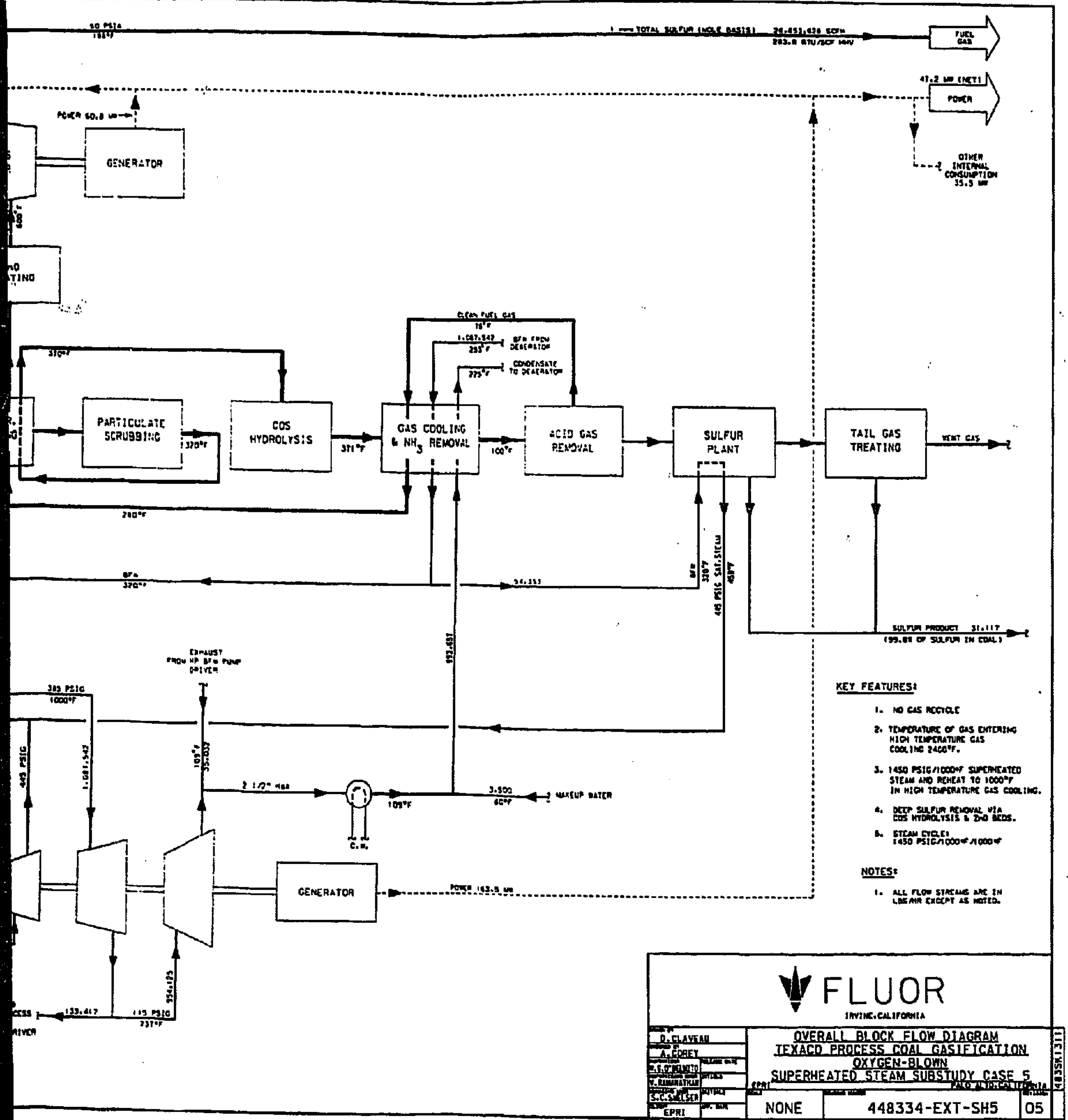


FLUOR
IRVINE, CALIFORNIA

DRN VAN HOUTEN	OVERALL BLOCK FLOW DIAGRAM TEXACO PROCESS COAL GASIFICATION OXYGEN-BLOWN SUPERHEATED STEAM BASE CASE		
EPRI	PALO ALTO, CALIFORNIA		
	NONE	448334-EXT-SH4	02

4855K1310


FUEL GAS EXPANDER
GENERATOR
OXIDANT FEED SYSTEM
ZnO TREATING
COAL HANDLING & SLURRY PREP.
TEXACO GASIFIER
HIGH TEMPR. GAS COOLING
PARTICULATE SCRUBBING
COS HYDROLYSIS
GAS COOLING & NH3 REMOVAL
COAL
MAKEUP WATER
TO SLAG DEWATERING
GENERATOR


FUEL GAS
POWER
GENERATOR
PARTICULATE SCRUBBING
COS HYDROLYSIS
GAS COOLING & NH_3 REMOVAL
ACID GAS REMOVAL
SULFUR PLANT
TAIL GAS TREATING
CLEAN FUEL GAS
BFW FROM DEAERATOR
CONDENSATE TO DEAERATOR
VENT GAS
OTHER INTERNAL CONSUMPTION 35.5 MW
SULFUR PRODUCT 31,117
(99.8% OF SULFUR IN COAL)
445 PSIG SAT. STEAM
MAKEUP WATER
GENERATOR
KEY FEATURES:
1. NO GAS RECYCLE
2. TEMPERATURE OF GAS ENTERING HIGH TEMPERATURE GAS COOLING 2400°F.
3. 1450 PSIG/1000°F SUPERHEATED STEAM AND REHEAT TO 1000°F IN HIGH TEMPERATURE GAS COOLING.
4. DEEP SULFUR REMOVAL VIA COS HYDROLYSIS & ZnO BEDS.
5. STEAM CYCLE: 1450 PSIG/1000°F/1000°F
NOTES:
1. ALL FLOW STREAMS ARE IN LBS/HR EXCEPT AS NOTED.
FLUOR
IRVINE, CALIFORNIA
D. CLAVEAU
A. COREY
OVERALL BLOCK FLOW DIAGRAM
TEXACO PROCESS COAL GASIFICATION
OXYGEN-BLOWN
SUPERHEATED STEAM SUBSTUDY CASE 5
EPRI
EPRI
NONE
448334-EXT-SH5
05

Appendix A

AREA AND UNIT NUMBERING

Each plant consists of a number of facilities or systems called units, which are grouped into areas having similar purposes. The areas and units are numbered according to the following consistent convention for identification.

Area	Area Description	Unit	Unit Description
10	Feed Systems	10	Coal Handling, Grinding/ Slurry Preparation
		11	Oxidant Feed
20	Onsite Units	20	Gasification and Ash Handling
		21	Gas Cooling and Particulate Removal and COS Hydrolysis
		22	Acid Gas Removal
		23	Sulfur Recovery
		24	Tail Gas Treating
		25	ZnO Treating
30	Utility Systems	30	Steam, Condensate, and Boiler Feedwater
		32*	Cooling Water
		33*	Plant and Instrument Air
		34*	Potable and Utility Water
		35*	Fuel Oil
		36*	Nitrogen
40	Offsite Facilities	40*	Effluent Water Treating
		41*	Flare System
		42*	Firewater System
		43*	Buildings
		44*	Railroad Loading and Unloading
		45*	Electrical Distribution
50	Power Generation System	50	Gas Expander Power Generation
		51	Fired Heater and Steam Turbine Power Generation

*Costs of these systems are included in the General Facilities section for each estimate of Total Plant Investment

TEXACO BASED FUEL GAS CASE EXT-SS
INVESTOR OWNED UTILITY OWNERSHIP

Table B-1

CAPITAL OUTLAY SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

DESIGN/ CONSTR- UCTION PERIOD (YEAR)	CALEN- DAR YEAR	PLANT FACILITIES INVESTMENT: IN MID-1980 DOLLARS	PLANT FACILITIES INVESTMENT: AMOUNT OF ESCALA- TION	PLANT FACILITIES INVESTMENT: ESCALA- TED INVEST- MENT	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: EQUITY	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: INTEREST	OTHER OUTLAYS*	TOTAL OUTLAY	GRANTS IN AID OF CONSTR- UCTION	INVEST- MENT TAX CREDITS	OTHER INCOME TAX OFFSETS	NET OUTLAY FOR PLANT
1.	1986.	123391.	95204.	218596.	--	--	1685.	220280.	0.	0.	0.	220280.
2.	1987.	205652.	195106.	400759.	--	--	0.	400759.	0.	0.	0.	400759.
3.	1988.	287913.	329255.	617168.	--	--	0.	617168.	0.	0.	0.	617168.
4.	1989.	205652.	273965.	479618.	--	--	116776.	601694.	0.	0.	0.	601694.
	TOTALS	822613.	893830.	1721443.	0.	393259.	118380.	1839821.	0.	169218.**	0.	1839821.

GROSS DEPRECIABLE INVESTMENT	=	2183060.
NET NON-DEPRECIABLE PLANT OUTLAY	=	56819.
TOTAL NON-DEPRECIABLE INVESTMENT	=	53819.
TOTAL INVESTMENT	=	2233880.

* PREPAID ROYALTIES, LAND, ORGANIZATION AND STARTUP EXPENSES, AND WORKING CAPITAL

** TO BE NORMALIZED OVER PERIOD OF COMMERCIAL OPERATION

GROSS DEPRECIABLE INVESTMENT = ESCALATED PLANT FACILITIES INVESTMENT LESS GRANTS-IN-AID OF CONSTRUCTION PLUS ALLOWANCE FOR FUNDS DURING CONSTRUCTION PLUS PRE-PAID ROYALTIES PLUS ORGANIZATION AND STARTUP EXPENSES

PLANT FINANCING:

COMMON EQUITY	= (	.350)X(	2233080.) =	781578.
PREFERRED STOCK	= (	.150)X(	2233080.) =	334962.
DEBT	= (	.500)X(	2233080.) =	1116540.
				2233080.

TEXACO BASED FUEL GAS CASE EXT-SS
INVESTOR OWNED UTILITY OWNERSHIP

Table B-2

CAPITAL RECOVERY SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

PERIOD OF COMMERCIAL OPERATION (YEAR)	CALENDAR YEAR	DEBT BALANCE (BEGINNING OF YR.)	DEBT PRINCIPAL PAYMENT	PREFERRED STOCK BALANCE (BEGINNING OF YEAR)	RECOVERY OF PREFERRED	COMMON EQUITY OUTSTANDING (BEGINNING OF YEAR)	ANNUAL RECOVERY OF COMMON EQUITY	
							THROUGH BOOK DEPRECIATION	OTHER
1.	1990.	1116540.	37218.	334962.	11165.	781578.	17108.	0.
2.	1991.	1079322.	37218.	323797.	11165.	764469.	17108.	0.
3.	1992.	1042104.	37218.	312631.	11165.	747361.	17108.	0.
4.	1993.	1004886.	37218.	301466.	11165.	730253.	17108.	0.
5.	1994.	967668.	37218.	290300.	11165.	713144.	17108.	0.
6.	1995.	930450.	37218.	279135.	11165.	696036.	17108.	0.
7.	1996.	893232.	37218.	267970.	11165.	678927.	17108.	0.
8.	1997.	856014.	37218.	256804.	11165.	661819.	17108.	0.
9.	1998.	818796.	37218.	245639.	11165.	644710.	17108.	0.
10.	1999.	781578.	37218.	234473.	11165.	627602.	17108.	0.
11.	2000.	744360.	37218.	223308.	11165.	610494.	17108.	0.
12.	2001.	707142.	37218.	212143.	11165.	593385.	17108.	0.
13.	2002.	669924.	37218.	200977.	11165.	576277.	17108.	0.
14.	2003.	632706.	37218.	189812.	11165.	559168.	17108.	0.
15.	2004.	595488.	37218.	178646.	11165.	542060.	17108.	0.
16.	2005.	558270.	37218.	167481.	11165.	524952.	17108.	0.
17.	2006.	521052.	37218.	156316.	11165.	507843.	17108.	0.
18.	2007.	483834.	37218.	145150.	11165.	490735.	17108.	0.
19.	2008.	446616.	37218.	133985.	11165.	473626.	17108.	0.
20.	2009.	409398.	37218.	122819.	11165.	456518.	17108.	0.
21.	2010.	372180.	37218.	111654.	11165.	439409.	17108.	0.
22.	2011.	334962.	37218.	100489.	11165.	422301.	17108.	0.
23.	2012.	297744.	37218.	89323.	11165.	405193.	17108.	0.
24.	2013.	260526.	37218.	78158.	11165.	388084.	17108.	0.
25.	2014.	223308.	37218.	66992.	11165.	370976.	17108.	0.
26.	2015.	186090.	37218.	55827.	11165.	353867.	17108.	0.
27.	2016.	148872.	37218.	44662.	11165.	336759.	17108.	0.
28.	2017.	111654.	37218.	33496.	11165.	319651.	17108.	0.
29.	2018.	74436.	37218.	22331.	11165.	302542.	17108.	0.
30.	2019.	37218.	37218.	11165.	11165.	285434.	17108.	0.
31.	2020.	0.	0.	0.	0.	268325.	0.	0.

TEXACO BASED FUEL GAS CASE EXT-SS
INVESTOR OWNED UTILITY OWNERSHIP

Table B-3

REVENUE REQUIREMENTS SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

YR	CALENDAR YEAR	RETURN ON COMMON EQUITY	PREFERRED STOCK DIVIDENDS	INTEREST ON DEBT	INCOME TAXES	OTHER TAXES AND INSURANCE	RECOVERY OF CAPITAL: BOOK DEPRECIATION	RECOVERY OF CAPITAL: OTHER	FUEL/RAW MATERIAL COST	OPERATING AND MAINTENANCE COSTS	TOTAL REVENUE REQUIRED	REVENUE FROM BY-PRODUCTS	REVENUE FROM PRINCIPAL PRODUCT: TOTAL	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU EXPRESSED IN MID-1988 DOLLARS
1	1990.	125852.	42708.	136776.	-57119.	51643.	65492.	0.	302587.	89258.	756396.	145597.	610800.	11.63	4.27
2	1991.	122315.	41284.	132217.	-47211.	51643.	65492.	0.	336174.	98184.	807097.	160157.	646940.	12.31	4.12
3	1992.	119578.	39860.	127658.	-23364.	51643.	65492.	0.	373489.	108802.	862418.	176172.	686246.	13.06	3.97
4	1993.	116848.	38437.	123099.	-6396.	51643.	65492.	0.	414946.	118802.	922864.	193789.	729074.	13.88	3.83
5	1994.	114103.	37013.	118539.	15512.	51643.	65492.	0.	461605.	130683.	988991.	213168.	775822.	14.77	3.71
6	1995.	111366.	35590.	113984.	27428.	51643.	65492.	0.	512177.	143751.	1061418.	234485.	826933.	15.74	3.59
7	1996.	108628.	34166.	109421.	44328.	51643.	65492.	0.	569028.	158126.	1140832.	257934.	882899.	16.81	3.49
8	1997.	105891.	32743.	104862.	61236.	51643.	65492.	0.	632191.	173938.	1227995.	283727.	944268.	17.97	3.39
9	1998.	103154.	31319.	100302.	78143.	51643.	65492.	0.	702364.	191332.	1323750.	312188.	1011650.	19.26	3.30
10	1999.	100416.	29895.	95743.	95051.	51643.	65492.	0.	780326.	210466.	1429033.	343310.	1085723.	20.67	3.22
11	2000.	97679.	28472.	91184.	111959.	51643.	65492.	0.	866942.	231512.	1544883.	377641.	1167243.	22.22	3.15
12	2001.	94942.	27048.	86625.	128867.	51643.	65492.	0.	963173.	254663.	1672453.	415405.	1257048.	23.93	3.08
13	2002.	92204.	25625.	82066.	145775.	51643.	65492.	0.	1070085.	280130.	1813019.	456945.	1356074.	25.81	3.02
14	2003.	89467.	24201.	77506.	162683.	51643.	65492.	0.	1188865.	308143.	1967999.	502640.	1465359.	27.89	2.97
15	2004.	86730.	22777.	72947.	156646.	51643.	65492.	0.	1320829.	338957.	2118021.	552984.	1565117.	29.79	2.88
16	2005.	83992.	21354.	68388.	154616.	51643.	65492.	0.	1467441.	372853.	2285772.	608194.	1677578.	31.93	2.81
17	2006.	81255.	19930.	63829.	156574.	51643.	65492.	0.	1630327.	410138.	2473187.	669014.	1804173.	34.34	2.75
18	2007.	78518.	18507.	59270.	146537.	51643.	65492.	0.	1811293.	451152.	2682419.	735915.	1946495.	37.05	2.69
19	2008.	75780.	17083.	54710.	142501.	51643.	65492.	0.	2012346.	496267.	2915823.	809507.	2106316.	40.09	2.65
20	2009.	73043.	15659.	50151.	138465.	51643.	65492.	0.	2235717.	545893.	3176063.	891457.	2284606.	43.50	2.61
21	2010.	70306.	14236.	45592.	134428.	51643.	65492.	0.	2483881.	600483.	3466061.	979503.	2486558.	47.33	2.59
22	2011.	67568.	12812.	41033.	130392.	51643.	65492.	0.	2759592.	660531.	3789063.	1077453.	2711610.	51.61	2.56
23	2012.	64831.	11389.	36474.	126356.	51643.	65492.	0.	3065907.	726584.	4148675.	1185199.	2963476.	56.41	2.55
24	2013.	62093.	9965.	31914.	122319.	51643.	65492.	0.	3406222.	799243.	4549892.	1305718.	3245174.	61.77	2.54
25	2014.	59356.	8542.	27355.	118283.	51643.	65492.	0.	3784313.	879167.	4994151.	1434090.	3560060.	67.76	2.53
26	2015.	56619.	7118.	22796.	114247.	51643.	65492.	0.	4204372.	967084.	5489370.	1577499.	3911870.	74.46	2.53
27	2016.	53881.	5694.	18237.	110210.	51643.	65492.	0.	4671857.	1063792.	6040907.	1735249.	4304758.	81.94	2.53
28	2017.	51144.	4271.	13678.	106174.	51643.	65492.	0.	5189546.	1170171.	6652117.	1908774.	4743343.	90.29	2.53
29	2018.	48407.	2847.	9118.	102138.	51643.	65492.	0.	5765594.	1287188.	7332417.	2099652.	5232765.	99.60	2.54
30	2019.	45669.	1424.	4559.	98101.	51643.	65492.	0.	6405564.	1415907.	8088359.	2369617.	5778742.	109.99	2.55
												LEVELIZED		19.11 *	3.27 **

LEVELIZED FIXED CHARGE RATE IN CURRENT DOLLARS = .178827
* LEVELIZED USING RETURN ON EQUITY OF 16.000 PCT./YEAR
** LEVELIZED USING RETURN ON EQUITY OF 5.455 PCT./YEAR

TEXACO BASED FUEL GAS CASE EXT-SS
INVESTOR OWNED UTILITY OWNERSHIP

Table B-4

PROJECT CASH FLOW SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

YR	CALEN-DAR YEAR	TOTAL REVENUE AT: PRICES NOT LEVELIZED	TOTAL REVENUE AT: LEVELIZED PRICE *	TAXES ON INCOME WITH REVENUE AT: PRICES NOT LEVELIZED	TAXES ON INCOME WITH REVENUE AT: LEVELIZED PRICE *	OTHER TAXES AND INSURANCE	PREFERRED STOCK COST +	DEBT PRINCIPAL AND INTEREST	FUEL/RAW MATERIAL COST	OPERATING AND MAINTENANCE COSTS	COMMON EQUITY PORTION OF RECURRING INVESTMENT	PLANT SALVAGE VALUE, WORKING CAPITAL, AND LAND	CASH FLOW TO COMMON EQUITY WITH REVENUE AT: PRICES NOT LEVELIZED	CASH FLOW TO COMMON EQUITY WITH REVENUE AT: LEVELIZED PRICE *
1	1990.	756396.	1149633.	-57119.	136510.	51643.	53873.	173994.	302587.	89258.	0.	0.	142161.	341768.
2	1991.	807097.	1164192.	-40211.	135622.	51643.	52449.	169435.	336174.	98184.	0.	0.	139424.	320685.
3	1992.	862418.	1180208.	-23384.	133176.	51643.	51026.	164876.	373489.	108002.	0.	0.	136686.	297996.
4	1993.	922864.	1197825.	-6396.	128995.	51643.	49602.	160316.	414946.	118802.	0.	0.	133949.	273519.
5	1994.	988991.	1217204.	10512.	122884.	51643.	48179.	155757.	461005.	130683.	0.	0.	131211.	247053.
6	1995.	1061418.	1238521.	27420.	114625.	51643.	46755.	151198.	512177.	143751.	0.	0.	128474.	218372.
7	1996.	1140832.	1261970.	44328.	103976.	51643.	45332.	146639.	569028.	158126.	0.	0.	125737.	187226.
8	1997.	1227995.	1287763.	61236.	90665.	51643.	43908.	142080.	632191.	173938.	0.	0.	122999.	153338.
9	1998.	1323750.	1316136.	78143.	74394.	51643.	42484.	137520.	702364.	191332.	0.	0.	120262.	116397.
10	1999.	1429033.	1347346.	95051.	54828.	51643.	41061.	132961.	780326.	210466.	0.	0.	117525.	75069.
11	2000.	1544883.	1381677.	111959.	31596.	51643.	39637.	128402.	866942.	231512.	0.	0.	114787.	31944.
12	2001.	1672453.	1419441.	128867.	4284.	51643.	38214.	123843.	963173.	254663.	0.	0.	112050.	-16379.
13	2002.	1813819.	1460981.	145775.	-27569.	51643.	36790.	119284.	1070085.	280130.	0.	0.	109313.	-69382.
14	2003.	1967999.	1506676.	162683.	-64473.	51643.	35366.	114724.	1188865.	308143.	0.	0.	106575.	-127592.
15	2004.	2118021.	1556940.	158646.	-117630.	51643.	33943.	110165.	1320829.	338957.	0.	0.	103838.	-188947.
16	2005.	2285772.	1612230.	154610.	-177042.	51643.	32519.	105606.	1467441.	372853.	0.	0.	101101.	-240789.
17	2006.	2473187.	1673850.	150574.	-243414.	51643.	31096.	101047.	1630327.	410138.	0.	0.	98363.	-307786.
18	2007.	2682410.	1739951.	146537.	-317538.	51643.	29672.	96488.	1811293.	451152.	0.	0.	95626.	-382766.
19	2008.	2915823.	1813542.	142501.	-400262.	51643.	28248.	91928.	2012346.	496267.	0.	0.	92889.	-466629.
20	2009.	3176063.	1894493.	138465.	-492581.	51643.	26825.	87369.	2235717.	545893.	0.	0.	90151.	-560374.
21	2010.	3466061.	1983539.	134428.	-595566.	51643.	25401.	82810.	2483681.	600483.	0.	0.	87414.	-665114.
22	2011.	3789063.	2081489.	130392.	-710418.	51643.	23978.	78251.	2759592.	660531.	0.	0.	84677.	-782888.
23	2012.	4148675.	2189234.	126356.	-838473.	51643.	22554.	73692.	3065907.	726584.	0.	0.	81939.	-912673.
24	2013.	4548892.	2307754.	122319.	-981217.	51643.	21131.	69132.	3406222.	799243.	0.	0.	79202.	-1056400.
25	2014.	4994151.	2438126.	118283.	-1140304.	51643.	19707.	64573.	3784313.	879167.	0.	0.	76465.	-1228974.
26	2015.	5489370.	2581535.	114247.	-1317571.	51643.	18283.	60014.	4204372.	967084.	0.	0.	73727.	-1422290.
27	2016.	6040087.	2739285.	110210.	-1515065.	51643.	16860.	55455.	4671057.	1063792.	0.	0.	70990.	-1684457.
28	2017.	6652117.	2912810.	106174.	-1735061.	51643.	15436.	50896.	5189545.	1170171.	0.	0.	68253.	-1829820.
29	2018.	7332417.	3103687.	102138.	-1980089.	51643.	14013.	46336.	5765584.	1287188.	0.	0.	65515.	-2080988.
30	2019.	8088359.	3313653.	98101.	-2252964.	51643.	12589.	41777.	6405564.	1415907.	0.	268325.	331103.	-2092538.

PRESENT VALUE AT BEGINNING OF 1990 OF CASH FLOWS TO COMMON EQUITY DISCOUNTED AT 16.00 PCT./YEAR:

WITH REVENUE AT LEVELIZED PRICE = $ 781577828.
WITH REVENUE AT PRICES NOT LEVELIZED = $ 781577828.

COMMON EQUITY OUTSTANDING AT BEGINNING OF 1990 = $ 781577828.

* ONLY PRINCIPAL PRODUCT PRICE IS LEVELIZED, USING RETURN ON EQUITY OF 16.00 PCT./YEAR
+ RECOVERY AND DIVIDENDS

TEXACO BASED FUEL GAS CASE EXT-SS
NON-REGULATED COMPANY OWNERSHIP

Table B-5

CAPITAL OUTLAY SCHEDULE
FOR A
NON-UTILITY COMPANY

(THOUSAND DOLLARS)

DESIGN/ CONSTR- UCTION PERIOD (YEAR)	CALEN- DAR YEAR	PLANT FACILITIES INVESTMENT: IN MID-1980 DOLLARS	PLANT FACILITIES INVESTMENT: AMOUNT OF ESCALA- TION	PLANT FACILITIES INVESTMENT: ESCALA- TED INVEST- MENT	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: EQUITY	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: INTEREST	OTHER OUTLAYS*	TOTAL OUTLAY	GRANTS IN AID OF CONSTR- UCTION	INVEST- MENT TAX CREDITS	OTHER INCOME TAX OFFSETS	NET OUTLAY FOR PLANT
1.	1986.	123391.	95204.	218596.	--	0.	1605.	220208.	0.	21488.	1830.	196882.
2.	1987.	215652.	185106.	400759.	--	0.	0.	400759.	0.	39395.	3355.	358889.
3.	1988.	287913.	329255.	617168.	--	0.	0.	617168.	0.	60668.	5166.	551334.
4.	1989.	295652.	279265.	484918.	--	0.	118260.	603177.	0.	47667.	32712.	522798.
	TOTALS	822616.	698830.	1721440.	680480.	0.	119864.	1841304.	0.	169218.	43062.	1629025.

GROSS DEPRECIABLE INVESTMENT	=	1702347.
NET NON-DEPRECIABLE PLANT OUTLAY	=	-73323.**
EQUITY PORTION OF AFDC	=	680480.
TOTAL NON-DEPRECIABLE INVESTMENT	=	527077.
TOTAL INVESTMENT	=	2229424.

* PREPAID ROYALTIES, LAND, ORGANIZATION AND STARTUP EXPENSES, AND WORKING CAPITAL

GROSS DEPRECIABLE INVESTMENT = ESCALATED PLANT FACILITIES INVESTMENT LESS GRANTS-IN-AID OF CONSTRUCTION LESS EXPENSABLE PORTION OF ESCALATED PLANT FACILITIES INVESTMENT PLUS PREPAID ROYALTIES

PLANT FINANCING:

COMMON EQUITY	2229424.
	2229424.

**CONSISTS OF:

LAND	=	1605.
WORKING CAPITAL	=	49658.
AFDC INTEREST	=	0.
EXPENSABLE PORTION OF ESCALATED PLANT FACILITIES INVESTMENT	=	29264.
ORGANIZATION AND START-UP EXPENSES	=	58189.
INVESTMENT TAX CREDITS	= -	169218.
OTHER INCOME TAX OFFSETS	= -	43062.
TOTAL	=	-73323.

TEXACO BASED FUEL GAS CASE EXT-SS
NON-REGULATED COMPANY OWNERSHIP

Table B-6

CAPITAL RECOVERY SCHEDULE
FOR A
NON-UTILITY COMPANY

(THOUSAND DOLLARS)

PERIOD OF COMMERCIAL OPERATION (YEAR)	CALENDAR YEAR	DEBT BALANCE (BEGINNING OF YR.)	DEBT PRINCIPAL PAYMENT *	PREFERRED STOCK BALANCE (BEGINNING OF YEAR)	RECOVERY OF PREFERRED *	COMMON EQUITY OUTSTANDING (BEGINNING OF YEAR)	ANNUAL RECOVERY OF COMMON EQUITY *	
							THROUGH BOOK DEPRECIATION	OTHER **
1.	1990.	0.	0.	0.	0.	2229424.	76606.	23779.
2.	1991.	0.	0.	0.	0.	2129848.	76606.	23779.
3.	1992.	0.	0.	0.	0.	2028556.	76606.	23779.
4.	1993.	0.	0.	0.	0.	1928271.	76606.	23779.
5.	1994.	0.	0.	0.	0.	1827987.	76606.	23779.
6.	1995.	0.	0.	0.	0.	1727583.	76606.	23779.
7.	1996.	0.	0.	0.	0.	1627118.	76606.	23779.
8.	1997.	0.	0.	0.	0.	1526734.	76606.	23779.
9.	1998.	0.	0.	0.	0.	1426350.	76606.	23779.
10.	1999.	0.	0.	0.	0.	1325965.	76606.	23779.
11.	2000.	0.	0.	0.	0.	1225581.	76606.	23779.
12.	2001.	0.	0.	0.	0.	1125197.	76606.	23779.
13.	2002.	0.	0.	0.	0.	1024812.	76606.	23779.
14.	2003.	0.	0.	0.	0.	924428.	76606.	23779.
15.	2004.	0.	0.	0.	0.	824044.	76606.	23779.
16.	2005.	0.	0.	0.	0.	723659.	76606.	23779.
17.	2006.	0.	0.	0.	0.	623275.	76606.	23779.
18.	2007.	0.	0.	0.	0.	522891.	76606.	23779.
19.	2008.	0.	0.	0.	0.	422507.	76606.	23779.
20.	2009.	0.	0.	0.	0.	322122.	76606.	23779.
21.	2010.	0.	0.	0.	0.	221738.	0.	0.

* RECOVERED THROUGH BOOK DEPRECIATION WHEN SUFFICIENT BOOK DEPRECIATION IS AVAILABLE. OTHERWISE, RECOVERY IS THROUGH OTHER CHARGES.

** EQUITY PORTION OF NON-DEPRECIABLE INVESTMENT LESS WORKING CAPITAL LESS LAND

TEXACO BASED FUEL GAS CASE EXT-SS
NON-REGULATED COMPANY OWNERSHIP

Table B-7

YEAR-BY-YEAR
REVENUE REQUIREMENTS SCHEDULE
FOR A
NON-UTILITY COMPANY
(SEE NOTE)
(THOUSAND DOLLARS)

YR	CALENDAR YEAR	RETURN ON COMMON EQUITY	PREFERRED STOCK DIVIDENDS	INTEREST ON DEBT	INCOME TAXES	OTHER TAXES AND INSURANCE	RECOVERY OF CAPITAL: BOOK DEPRECIATION	RECOVERY OF CAPITAL: * OTHER	FUEL/RAW MATERIAL COST	OPERATING AND MAINTENANCE COSTS	TOTAL REVENUE REQUIRED	REVENUE FROM BY-PRODUCTS	REVENUE FROM PRINCIPAL PRODUCT: TOTAL	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU EXPRESSED IN MID-1980 DOLLARS
1	1990.	445885.	0.	0.	317592.	51643.	76606.	23779.	332587.	104193.	1322284.	145597.	1176687.	22.40	8.23
2	1991.	425898.	0.	0.	314449.	51643.	76606.	23779.	336174.	114612.	1343073.	160157.	1182913.	22.52	7.52
3	1992.	405731.	0.	0.	311305.	51643.	76606.	23779.	373489.	126073.	1368626.	176172.	1192454.	22.70	6.98
4	1993.	385654.	0.	0.	308162.	51643.	76606.	23779.	414946.	138680.	1399470.	193789.	1205681.	22.95	6.34
5	1994.	365577.	0.	0.	335018.	51643.	76606.	23779.	461905.	152549.	1436177.	213168.	1223009.	23.28	5.84
6	1995.	345501.	0.	0.	301875.	51643.	76606.	23779.	512177.	167803.	1479383.	234485.	1244898.	23.70	5.41
7	1996.	325424.	0.	0.	298732.	51643.	76606.	23779.	569028.	184584.	1529795.	257934.	1271861.	24.21	5.02
8	1997.	305347.	0.	0.	295588.	51643.	76606.	23779.	632191.	203042.	1588195.	283727.	1304468.	24.83	4.68
9	1998.	285270.	0.	0.	292445.	51643.	76606.	23779.	702364.	223346.	1655452.	312180.	1343353.	25.57	4.38
10	1999.	265193.	0.	0.	289301.	51643.	76606.	23779.	780326.	245681.	1732529.	343310.	1389219.	26.44	4.12
11	2000.	245116.	0.	0.	286158.	51643.	76606.	23779.	866942.	270249.	1820493.	377641.	1442852.	27.46	3.89
12	2001.	225039.	0.	0.	283014.	51643.	76606.	23779.	963173.	297274.	1920528.	415405.	1505123.	28.65	3.69
13	2002.	204962.	0.	0.	279871.	51643.	76606.	23779.	1070085.	327001.	2033948.	456945.	1577002.	30.02	3.52
14	2003.	184886.	0.	0.	276728.	51643.	76606.	23779.	1188865.	359701.	2162217.	502649.	1659567.	31.59	3.36
15	2004.	164809.	0.	0.	257252.	51643.	76606.	23779.	1320829.	395672.	2298588.	552904.	1737685.	33.08	3.28
16	2005.	144732.	0.	0.	237776.	51643.	76606.	23779.	1467441.	435239.	2437215.	608154.	1829021.	34.81	3.06
17	2006.	124655.	0.	0.	218301.	51643.	76606.	23779.	1630327.	478763.	2604072.	669814.	1935059.	36.83	2.95
18	2007.	104578.	0.	0.	198825.	51643.	76606.	23779.	1811293.	526639.	2793362.	735915.	2057447.	39.16	2.85
19	2008.	84501.	0.	0.	179349.	51643.	76606.	23779.	2012346.	579303.	3007527.	809507.	2198021.	41.84	2.77
20	2009.	64424.	0.	0.	159874.	51643.	76606.	23779.	2235717.	637233.	3249275.	890457.	2358818.	44.90	2.78
														**	***
											LEVELIZED			24.51	5.32

LEVELIZED FIXED CHARGE RATE IN CURRENT DOLLARS = **.362988

NOTE: PRODUCTS ARE NOT SOLD AT YEAR-BY-YEAR REVENUE REQUIREMENTS. THEY ARE SOLD AT MARKET PRICES. HOWEVER, THESE REVENUES ARE USED TO DEVELOP THE STARTING PRICES SHOWN BELOW. (SEE USER'S MANUAL)

* NON-DEPRECIABLE INVESTMENT LESS WORKING CAPITAL LESS LAND
** LEVELIZED USING RETURN ON EQUITY OF 20.000 PCT./YEAR
*** LEVELIZED USING RETURN ON EQUITY OF 9.391 PCT./YEAR

TEXACO BASED FUEL GAS CASE EXT-SS
NON-REGULATED COMPANY OWNERSHIP

Table B-7 (Continued)
REVENUE REQUIREMENTS SCHEDULE
FOR A
NON-UTILITY COMPANY

STARTING PRICE** PRODUCT AT THE BEGINNING OF 1999, THE FIRST YEAR OF COMMERCIAL OPERATION

AT GENERAL INFLATION RATE OF	10.00 PCT./YEAR	=$ 15.16 PER MMBTU
AT ESCALATION RATE OF THE PRICE OF COMPETITIVE ALTERNATIVE OF	0.00 PCT./YEAR***	=$ 24.51 PER MMBTU

INFLATION-INDEPENDENT PRICES** OF PRIMARY PRODUCT IN MID - 1980, THE BASE YEAR FOR COST DATA INPUT

AT GENERAL INFLATION RATE OF	10.00 PCT./YEAR	=$ 5.32 PER MMBTU
AT ESCALATION RATE OF THE PRICE OF COMPETITIVE ALTERNATIVE OF	0.00 PCT./YEAR***	=$ 24.51 PER MMBTU

** THE PRICE OF THE PRINCIPAL PRODUCT WHICH IF ALLOWED TO INCREASE AT
- THE SPECIFIED RATE OF GENERAL INFLATION, OR
- THE SPECIFIED RATE OF ESCALATION OF THE PRICE OF THE COMPETITIVE ALTERNATIVE
WOULD PROVIDE THE SAME DCF RATE OF RETURN AS EITHER THE CALCULATED YEAR-BY-YEAR PRICES OR THE CALCULATED LEVELIZED PRICES

***INCLUDES 10.00 PCT./YEAR GENERAL INFLATION RATE AND A REAL DECREASE OF 9.09 PCT./YEAR OF THE PRICE OF THE COMPETITIVE ALTERNATIVE

TEXACO BASED FUEL GAS CASE EXT-SS
NON-REGULATED COMPANY OWNERSHIP

Table B-8

CASH FLOW SCHEDULE FOR A NON-UTILITY COMPANY
WITH PRINCIPAL PRODUCT SOLD AT ESCALATED REQUIRED STARTING PRICE

(THOUSAND DOLLARS)

YEAR	CALEN-DAR YEAR	REQUIRED PRICE, $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT	REVENUE FROM BY-PRODUCTS	TOTAL REVENUE	TAXES ON INCOME	OTHER CASH DISBURSE-MENTS *	COMMON EQUITY PORTION OF RE-CURRING INVEST-MENT	PLANT SALVAGE VALUE, WORKING CAPITAL, AND LAND	CASH FLOW TO COMMON EQUITY
1	1990.	14.48	760594.	145597.	906167.	112706.	458422.	0.	0.	335058.
2	1991.	15.92	836649.	160157.	996806.	143948.	502429.	0.	0.	358429.
3	1992.	17.52	920314.	176172.	1096486.	177304.	551265.	0.	0.	367977.
4	1993.	19.27	1012345.	193789.	1206135.	212963.	605270.	0.	0.	387901.
5	1994.	21.20	1113586.	213168.	1326748.	251136.	665197.	0.	0.	410416.
6	1995.	23.32	1224936.	234485.	1459423.	292547.	731623.	0.	0.	435753.
7	1996.	25.65	1347432.	257934.	1605365.	335942.	805255.	0.	0.	464168.
8	1997.	28.21	1482175.	283727.	1765902.	383091.	886876.	0.	0.	495935.
9	1998.	31.03	1630392.	312100.	1942492.	433783.	977353.	0.	0.	531356.
10	1999.	34.14	1793432.	343310.	2136741.	488335.	1077650.	0.	0.	570756.
11	2000.	37.55	1972775.	377641.	2350415.	547192.	1188835.	0.	0.	614389.
12	2001.	41.30	2170452.	415405.	2585857.	610425.	1312990.	0.	0.	662942.
13	2002.	45.44	2387057.	456945.	2844003.	678742.	1448730.	0.	0.	716531.
14	2003.	49.98	2625763.	502640.	3128403.	752463.	1600209.	0.	0.	775711.
15	2004.	54.98	2888339.	552904.	3441243.	823834.	1768143.	0.	0.	849265.
16	2005.	60.47	3177173.	608194.	3785368.	901607.	1954323.	0.	0.	929438.
17	2006.	66.52	3494891.	669014.	4163904.	986362.	2160732.	0.	0.	1016810.
18	2007.	73.17	3844380.	735915.	4580295.	1078710.	2389575.	0.	0.	1112009.
19	2008.	80.49	4228818.	809507.	5038324.	1179314.	2643292.	0.	0.	1215718.
20	2009.	88.54	4651699.	890457.	5542157.	1288888.	2924593.	0.	221738.	1550419.

PRESENT VALUE AT BEGINNING OF 1990 OF CASH FLOWS TO COMMON EQUITY DISCOUNTED AT 20.00 PCT./YEAR = $ 2229424379.

COMMON EQUITY OUTSTANDING AT BEGINNING OF 1990 = $ 2229424379.

* OTHER TAXES AND INSURANCE, PREFERRED STOCK COST, DEBT PRINCIPAL AND INTEREST, FUEL/RAW MATERIAL COST, AND OPERATING AND MAINTENANCE COSTS

Appendix C

FINANCIAL ANALYSIS OF THE TEXACO BASED FUEL GAS PLANT DESIGN EXT-SH BOTH INVESTOR OWNED UTILITY AND NONREGULATED COMPANY OWNERSHIP

TEXACO BASED FUEL GAS CASE EXT-SH
INVESTOR OWNED UTILITY OWNERSHIP

Table C-1

CAPITAL OUTLAY SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

DESIGN/ CONSTRUCTION PERIOD (YEAR)	CALENDAR YEAR	PLANT FACILITIES INVESTMENT: IN MID-1980 DOLLARS	PLANT FACILITIES INVESTMENT: AMOUNT OF ESCALATION	PLANT FACILITIES INVESTMENT: ESCALATED INVESTMENT	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: EQUITY	ALLOWANCE FOR FUNDS DURING CONSTRUCTION: INTEREST	OTHER OUTLAYS*	TOTAL OUTLAY	GRANTS IN AID OF CONSTRUCTION	INVESTMENT TAX CREDITS	OTHER INCOME TAX OFFSETS	NET OUTLAY FOR PLANT
1.	1986.	121755.	93941.	215696.	--	--	1478.	217174.	0.	0.	0.	217174.
2.	1987.	232925.	162518.	395443.	--	--	0.	395443.	0.	0.	0.	395443.
3.	1988.	284095.	324888.	608983.	--	--	0.	608983.	0.	0.	0.	608983.
4.	1989.	202925.	275562.	478487.	--	--	115736.	594223.	0.	0.	0.	594223.
										**		
	TOTALS	811700.	886909.	1698609.	0.	387581.	117214.	1815823.	0.	166973.	0.	1815823.

GROSS DEPRECIABLE INVESTMENT	=	2154046.
NET NON-DEPRECIABLE PLANT OUTLAY	=	49759.
TOTAL NON-DEPRECIABLE INVESTMENT	=	49759.
TOTAL INVESTMENT	=	2203805.

* PREPAID ROYALTIES, LAND, ORGANIZATION AND STARTUP EXPENSES, AND WORKING CAPITAL

** TO BE NORMALIZED OVER PERIOD OF COMMERCIAL OPERATION

GROSS DEPRECIABLE INVESTMENT = ESCALATED PLANT FACILITIES INVESTMENT LESS GRANTS-IN-AID OF CONSTRUCTION PLUS ALLOWANCE FOR FUNDS DURING CONSTRUCTION PLUS PRE-PAID ROYALTIES PLUS ORGANIZATION AND STARTUP EXPENSES

PLANT FINANCING:

COMMON EQUITY	= (	.350)X(	2203805.) =	771332.
PREFERRED STOCK	= (	.150)X(	2203805.) =	330571.
DEBT	= (	.500)X(	2203805.) =	1101902.
				2203805.

C2

TEXACO BASED FUEL GAS CASE EXT-SH
INVESTOR OWNED UTILITY OWNERSHIP

Table C-2

CAPITAL RECOVERY SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

PERIOD OF COMMERCIAL OPERATION (YEAR)	CALENDAR YEAR	DEBT BALANCE (BEGINNING OF YR.)	DEBT PRINCIPAL PAYMENT	PREFERRED STOCK BALANCE (BEGINNING OF YEAR)	RECOVERY OF PREFERRED	COMMON EQUITY OUTSTANDING (BEGINNING OF YEAR)	ANNUAL RECOVERY OF COMMON EQUITY	
							THROUGH BOOK DEPRECIATION	OTHER
1.	1990.	1101982.	36730.	330571.	11019.	771332.	16872.	0.
2.	1991.	1065172.	36730.	319552.	11019.	754459.	16872.	0.
3.	1992.	1028442.	36730.	308533.	11019.	737587.	16872.	0.
4.	1993.	991712.	36730.	297514.	11019.	720715.	16872.	0.
5.	1994.	954982.	36730.	286495.	11019.	703843.	16872.	0.
6.	1995.	918252.	36730.	275476.	11019.	686970.	16872.	0.
7.	1996.	881522.	36730.	264457.	11019.	670098.	16872.	0.
8.	1997.	844792.	36730.	253438.	11019.	653226.	16872.	0.
9.	1998.	808062.	36730.	242419.	11019.	636354.	16872.	0.
10.	1999.	771332.	36730.	231400.	11019.	619481.	16872.	0.
11.	2000.	734602.	36730.	220380.	11019.	602609.	16872.	0.
12.	2001.	697872.	36730.	209361.	11019.	585737.	16872.	0.
13.	2002.	661141.	36730.	198342.	11019.	568864.	16872.	0.
14.	2003.	624411.	36730.	187323.	11019.	551992.	16872.	0.
15.	2004.	587681.	36730.	176304.	11019.	535120.	16872.	0.
16.	2005.	550951.	36730.	165285.	11019.	518248.	16872.	0.
17.	2006.	514221.	36730.	154266.	11019.	501375.	16872.	0.
18.	2007.	477491.	36730.	143247.	11019.	484503.	16872.	0.
19.	2008.	440761.	36730.	132228.	11019.	467631.	16872.	0.
20.	2009.	404031.	36730.	121209.	11019.	450759.	16872.	0.
21.	2010.	367301.	36730.	110190.	11019.	433886.	16872.	0.
22.	2011.	330571.	36730.	99171.	11019.	417014.	16872.	0.
23.	2012.	293841.	36730.	88152.	11019.	400142.	16872.	0.
24.	2013.	257111.	36730.	77133.	11019.	383270.	16872.	0.
25.	2014.	220380.	36730.	66114.	11019.	366397.	16872.	0.
26.	2015.	183650.	36730.	55095.	11019.	349525.	16872.	0.
27.	2016.	146920.	36730.	44076.	11019.	332653.	16872.	0.
28.	2017.	110190.	36730.	33057.	11019.	315780.	16872.	0.
29.	2018.	73460.	36730.	22038.	11019.	298908.	16872.	0.
30.	2019.	36730.	36730.	11019.	11019.	282036.	16872.	0.
31.	2020.	0.	0.	0.	0.	265164.	0.	0.

TEXACO BASED FUEL GAS CASE EXT-SH
INVESTOR OWNED UTILITY OWNERSHIP

Table C-3

REVENUE REQUIREMENTS SCHEDULE
FOR AN
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

YR	CALEN-DAR YEAR	RETURN ON COMMON EQUITY	PRE-FERRED STOCK DIVI-DENDS	INTER-EST ON DEBT	INCOME TAXES	OTHER TAXES AND INSUR-ANCE	RECOVERY OF CAPITAL: BOOK DEPREC-IATION	RECOVERY OF CAPITAL: OTHER	FUEL/RAW MATERIAL COST	OPER-ATING AND MAINTE-NANCE COSTS	TOTAL REVENUE REQUIRED	REVENUE FROM BY-PRODUCTS	REVENUE FROM PRINCIPAL PRODUCT: TOTAL	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU EXPRESSED IN MID-1988 DOLLARS
1	1990.	123413.	42148.	134983.	-56331.	50958.	64621.	0.	382557.	88285.	750634.	54496.	696138.	11.56	4.25
2	1991.	120714.	40743.	130484.	-39647.	50958.	64621.	0.	336140.	97114.	801127.	59945.	741181.	12.31	4.11
3	1992.	118014.	39338.	125984.	-22963.	50958.	64621.	0.	373452.	106825.	856230.	65940.	790290.	13.13	3.99
4	1993.	115314.	37933.	121485.	-6278.	50958.	64621.	0.	414965.	117507.	916446.	72534.	843912.	14.02	3.87
5	1994.	112615.	36528.	116985.	10406.	50958.	64621.	0.	460560.	129258.	982331.	79787.	902544.	14.99	3.76
6	1995.	109915.	35123.	112486.	27090.	50958.	64621.	0.	512126.	142184.	1054564.	87766.	966738.	16.06	3.66
7	1996.	107216.	33718.	107986.	43774.	50958.	64621.	0.	568972.	156402.	1133649.	96543.	1037106.	17.23	3.57
8	1997.	104516.	32313.	103487.	60459.	50958.	64621.	0.	632128.	172043.	1228525.	106197.	1114328.	18.51	3.49
9	1998.	101817.	30908.	98988.	77143.	50958.	64621.	0.	702294.	189247.	1315976.	116817.	1199159.	19.92	3.42
10	1999.	99117.	29503.	94488.	93827.	50958.	64621.	0.	780249.	208171.	1420936.	128498.	1292437.	21.47	3.35
11	2000.	96417.	28099.	89989.	110511.	50958.	64621.	0.	866856.	228989.	1536441.	141348.	1395093.	23.17	3.28
12	2001.	93718.	26694.	85489.	127196.	50958.	64621.	0.	963077.	251887.	1663641.	155483.	1508158.	25.05	3.23
13	2002.	91018.	25289.	80990.	143860.	50958.	64621.	0.	1069979.	277076.	1803812.	171031.	1632780.	27.12	3.18
14	2003.	88319.	23884.	76490.	160564.	50958.	64621.	0.	1188747.	304784.	1958367.	188134.	1770233.	29.40	3.13
15	2004.	85619.	22479.	71991.	156582.	50958.	64621.	0.	1320698.	335262.	2108211.	206948.	1901263.	31.58	3.06
16	2005.	82920.	21074.	67492.	152601.	50958.	64621.	0.	1467295.	368788.	2275749.	227643.	2048106.	34.02	2.99
17	2006.	80220.	19669.	62992.	148619.	50958.	64621.	0.	1630165.	405657.	2462912.	250407.	2212505.	36.	2.94
18	2007.	77521.	18264.	58493.	144638.	50958.	64621.	0.	1811113.	446234.	2671842.	275448.	2396394.	39.	2.89
19	2008.	74821.	16859.	53993.	140656.	50958.	64621.	0.	2012147.	490857.	2904913.	302992.	2601921.	43.22	2.86
20	2009.	72121.	15454.	49494.	136675.	50958.	64621.	0.	2235495.	539943.	3164762.	333292.	2831470.	47.03	2.83
21	2010.	69422.	14049.	44994.	132693.	50958.	64621.	0.	2483635.	593938.	3454310.	366621.	3087690.	51.28	2.88
22	2011.	66722.	12644.	40495.	128711.	50958.	64621.	0.	2759316.	653331.	3776802.	403283.	3373519.	56.03	2.78
23	2012.	64023.	11239.	35995.	124730.	50958.	64621.	0.	3065603.	718864.	4135834.	443611.	3692223.	61.32	2.77
24	2013.	61323.	9834.	31496.	120748.	50958.	64621.	0.	3405885.	790531.	4535397.	487972.	4047425.	67.22	2.76
25	2014.	58624.	8430.	26997.	116767.	50958.	64621.	0.	3783938.	869584.	4979918.	536769.	4443148.	73.88	2.75
26	2015.	55924.	7025.	22497.	112785.	50958.	64621.	0.	4203955.	956542.	5474308.	590446.	4883861.	81.12	2.75
27	2016.	53224.	5620.	17998.	108803.	50958.	64621.	0.	4670594.	1052197.	6024015.	649491.	5374524.	89.27	2.75
28	2017.	50525.	4215.	13498.	104822.	50958.	64621.	0.	5189830.	1157416.	6635085.	714440.	5920645.	98.34	2.76
29	2018.	47825.	2810.	8999.	100840.	50958.	64621.	0.	5765612.	1273158.	7314224.	785884.	6528340.	108.43	2.76
30	2019.	45126.	1405.	4499.	96859.	50958.	64621.	0.	6404528.	1400474.	8068878.	864472.	7204398.	119.66	2.77
													LEVELIZED	19.81 *	3.39 **

LEVELIZED FIXED CHARGE RATE IN CURRENT DOLLARS = .178837
* LEVELIZED USING RETURN ON EQUITY OF 16.000 PCT./YEAR
** LEVELIZED USING RETURN ON EQUITY OF 5.455 PCT./YEAR

TEXACO BASED FUEL GAS CASE EXT-SH
INVESTOR OWNED UTILITY OWNERSHIP

Table C-4

PROJECT CASH FLOW SCHEDULE
FOR AK
INVESTOR OWNED UTILITY

(THOUSAND DOLLARS)

YR	CALENDAR YEAR	TOTAL REVENUE AT: PRICES NOT LEVELIZED	TOTAL REVENUE AT: LEVELIZED PRICE *	TAXES ON INCOME WITH REVENUE AT: PRICES NOT LEVELIZED	TAXES ON INCOME WITH REVENUE AT: LEVELIZED PRICE *	OTHER TAXES AND INSURANCE	PREFERRED STOCK COST +	DEBT PRINCIPAL AND INTEREST	FUEL/RAW MATERIAL COST	OPERATING AND MAINTENANCE COSTS	COMMON EQUITY PORTION OF RECURRING INVESTMENT	PLANT SALVAGE VALUE, WORKING CAPITAL, AND LAND	CASH FLOW TO COMMON EQUITY WITH REVENUE AT: PRICES NOT LEVELIZED	CASH FLOW TO COMMON EQUITY WITH REVENUE AT: LEVELIZED PRICE *
1	1990.	750634.	1246994.	-56331.	188077.	50958.	53167.	171713.	302557.	88285.	0.	0.	140285.	392238.
2	1991.	801127.	1252444.	-59647.	182582.	50958.	51762.	167214.	336140.	97114.	0.	0.	137586.	366674.
3	1992.	856230.	1258438.	-22963.	175085.	50958.	50357.	162714.	373452.	106825.	0.	0.	134886.	339647.
4	1993.	916446.	1265032.	-6278.	165366.	50958.	48952.	158215.	414955.	117507.	0.	0.	132187.	309129.
5	1994.	982331.	1272286.	10486.	153179.	50958.	47547.	153715.	460960.	129258.	0.	0.	129487.	276668.
6	1995.	1054504.	1280265.	27090.	138256.	50958.	46142.	149216.	512126.	142184.	0.	0.	126788.	241384.
7	1996.	1133649.	1289041.	43774.	120290.	50958.	44737.	144717.	568972.	156402.	0.	0.	124088.	202965.
8	1997.	1220525.	1298695.	68459.	98953.	50958.	43332.	140217.	632128.	172043.	0.	0.	121388.	161068.
9	1998.	1315976.	1309315.	77143.	73863.	50958.	41927.	135718.	702294.	189247.	0.	0.	118689.	115308.
10	1999.	1420936.	1320997.	93827.	44617.	50958.	40522.	131219.	780249.	208171.	0.	0.	115989.	65260.
11	2000.	1536441.	1333847.	110511.	10754.	50958.	39118.	126719.	866856.	229089.	0.	0.	113290.	10453.
12	2001.	1663641.	1347981.	127196.	-28235.	50958.	37713.	122219.	963077.	251887.	0.	0.	110590.	-49639.
13	2002.	1803812.	1363536.	143881.	-72915.	50958.	36308.	117720.	1069979.	277976.	0.	0.	107891.	-115596.
14	2003.	1958367.	1380633.	160564.	-123912.	50958.	34903.	113220.	1188747.	304784.	0.	0.	105191.	-188667.
15	2004.	2128211.	1399446.	156582.	-192413.	50958.	33498.	108721.	1320698.	335262.	0.	0.	102491.	-257277.
16	2005.	2275749.	1420141.	152601.	-268700.	50958.	32093.	104222.	1467295.	368788.	0.	0.	99792.	-334515.
17	2006.	2462912.	1442905.	148619.	-353632.	50958.	30688.	99722.	1630165.	405667.	0.	0.	97092.	-420663.
18	2007.	2671842.	1467946.	144638.	-448161.	50958.	29283.	95223.	1811113.	446234.	0.	0.	94393.	-516785.
19	2008.	2904913.	1495491.	140656.	-553343.	50958.	27878.	90723.	2012147.	490857.	0.	0.	91693.	-623730.
20	2009.	3164762.	1525790.	136675.	-670355.	50958.	26473.	86224.	2235495.	539943.	0.	0.	88994.	-742948.
21	2010.	3454310.	1559119.	132693.	-800499.	50958.	25068.	81724.	2483635.	593938.	0.	0.	86294.	-875785.
22	2011.	3776802.	1595781.	128711.	-945223.	50958.	23663.	77225.	2759318.	653331.	0.	0.	83595.	-1023492.
23	2012.	4135834.	1636115.	124730.	-1106135.	50958.	22258.	72726.	3065603.	718664.	0.	0.	80895.	-1187965.
24	2013.	4535397.	1680471.	120748.	-1285017.	50958.	20854.	68226.	3405885.	790531.	0.	0.	78195.	-1370965.
25	2014.	4979918.	1729268.	116767.	-1483853.	50958.	19449.	63727.	3783938.	869584.	0.	0.	75496.	-1574534.
26	2015.	5474308.	1782945.	112785.	-1704842.	50958.	18044.	59227.	4203955.	956542.	0.	0.	72796.	-1800940.
27	2016.	6024015.	1841989.	108803.	-1950426.	50958.	16639.	54728.	4670594.	1052197.	0.	0.	70097.	-2052700.
28	2017.	6635085.	1906938.	104822.	-2223318.	50958.	15234.	50228.	5189630.	1157416.	0.	0.	67397.	-2332618.
29	2018.	7314224.	1978382.	100840.	-2526528.	50958.	13829.	45729.	5765012.	1273158.	0.	0.	64698.	-2643775.
30	2019.	8068870.	2056971.	96859.	-2863401.	50958.	12424.	41230.	6404928.	1400474.	0.	265164.	327162.	-2724479.

PRESENT VALUE AT BEGINNING OF 1990 OF CASH FLOWS TO COMMON EQUITY DISCOUNTED AT 16.00 PCT./YEAR:

WITH REVENUE AT LEVELIZED PRICE = $ 771331712.
WITH REVENUE AT PRICES NOT LEVELIZED = $ 771331712.

COMMON EQUITY OUTSTANDING AT BEGINNING OF 1990 = $ 771331712.

* ONLY PRINCIPAL PRODUCT PRICE IS LEVELIZED, USING RETURN ON EQUITY OF 16.00 PCT./YEAR
+ RECOVERY AND DIVIDENDS

TEXACO BASED FUEL GAS CASE EXT-SH
NON-REGULATED COMPANY OWNERSHIP

Table C-5

CAPITAL OUTLAY SCHEDULE
FOR A
NON-UTILITY COMPANY

(THOUSAND DOLLARS)

DESIGN/ CONSTR- UCTION PERIOD (YEAR)	CALEN- DAR YEAR	PLANT FACILITIES INVESTMENT			ALLOWANCE FOR FUNDS DURING CONSTRUCTION		OTHER CUTLAYS*	TOTAL OUTLAY	GRANTS IN AID OF CONSTR- UCTION	INVEST- MENT TAX CREDITS	OTHER INCOME TAX OFFSETS	NET OUTLAY FOR PLANT
		IN MID-1980 DOLLARS	AMOUNT OF ESCALA- TION	ESCALA- TED INVEST- MENT	EQUITY	INTEREST						
1.	1986.	121755.	93941.	215696.	--	0.	1478.	217174.	0.	21203.	1806.	194166.
2.	1987.	282925.	192518.	395443.	--	0.	0.	395443.	0.	38872.	3310.	353261.
3.	1988.	284095.	324888.	608983.	--	0.	0.	608983.	0.	59863.	5098.	544022.
4.	1989.	202925.	275562.	478487.	--	0.	117200.	595687.	0.	47035.	32278.	516374.
	TOTALS	811700.	886909.	1698609.	592324.	0.	118678.	1817288.	0.	166973.	42492.	1607823.

GROSS DEPRECIABLE INVESTMENT	=	1679770.
NET NON-DEPRECIABLE PLANT OUTLAY	=	-71947.**
EQUITY PORTION OF AFDC	=	592324.
TOTAL NON-DEPRECIABLE INVESTMENT	=	520377.
TOTAL INVESTMENT	=	2200147.

* PREPAID ROYALTIES, LAND, ORGANIZATION AND STARTUP EXPENSES, AND WORKING CAPITAL

GROSS DEPRECIABLE INVESTMENT = ESCALATED PLANT FACILITIES INVESTMENT LESS GRANTS-IN-AID OF CONSTRUCTION LESS EXPENSABLE PORTION OF ESCALATED PLANT FACILITIES INVESTMENT PLUS PREPAID ROYALTIES

PLANT FINANCING:

COMMON EQUITY	2200147.
	2200147.

**CONSISTS OF:

LAND	=	1478.
WORKING CAPITAL	=	49745.
AFDC INTEREST	=	0.
EXPENSABLE PORTION OF ESCALATED PLANT FACILITIES INVESTMENT	=	28876.
ORGANIZATION AND START-UP EXPENSES	=	57418.
INVESTMENT TAX CREDITS	= -	166973.
OTHER INCOME TAX OFFSETS	= -	42492.
TOTAL	=	-71947.

TEXACO BASED FUEL GAS CASE EXT-SH
NON-REGULATED COMPANY OWNERSHIP

Table C-6

CAPITAL RECOVERY SCHEDULE
FOR A
NON-UTILITY COMPANY

(THOUSAND DOLLARS)

PERIOD OF COMMERCIAL OPERATION (YEAR)	CALENDAR YEAR	DEBT BALANCE (BEGINNING OF YR.)	DEBT PRINCIPAL PAYMENT *	PREFERRED STOCK BALANCE (BEGINNING OF YEAR)	RECOVERY OF PREFERRED *	COMMON EQUITY OUTSTANDING (BEGINNING OF YEAR)	ANNUAL RECOVERY OF COMMON EQUITY *	
							THROUGH BOOK DEPRECIATION	OTHER **
1.	1990.	0.	0.	0.	0.	2266147.	75590.	23458.
2.	1991.	0.	0.	0.	0.	2101099.	75590.	23458.
3.	1992.	0.	0.	0.	0.	2002052.	75590.	23458.
4.	1993.	0.	0.	0.	0.	1903005.	75590.	23458.
5.	1994.	0.	0.	0.	0.	1803957.	75590.	23458.
6.	1995.	0.	0.	0.	0.	1704910.	75590.	23458.
7.	1996.	0.	0.	0.	0.	1605863.	75590.	23458.
8.	1997.	0.	0.	0.	0.	1506815.	75590.	23458.
9.	1998.	0.	0.	0.	0.	1407768.	75590.	23458.
10.	1999.	0.	0.	0.	0.	1308721.	75590.	23458.
11.	2000.	0.	0.	0.	0.	1209673.	75590.	23458.
12.	2001.	0.	0.	0.	0.	1110626.	75590.	23458.
13.	2002.	0.	0.	0.	0.	1011579.	75590.	23458.
14.	2003.	0.	0.	0.	0.	912531.	75590.	23458.
15.	2004.	0.	0.	0.	0.	813484.	75590.	23458.
16.	2005.	0.	0.	0.	0.	714437.	75590.	23458.
17.	2006.	0.	0.	0.	0.	615389.	75590.	23458.
18.	2007.	0.	0.	0.	0.	516342.	75590.	23458.
19.	2008.	0.	0.	0.	0.	417295.	75590.	23458.
20.	2009.	0.	0.	0.	0.	318247.	75590.	23458.
21.	2010.	0.	0.	0.	0.	219200.	0.	0.

* RECOVERED THROUGH BOOK DEPRECIATION WHEN SUFFICIENT BOOK DEPRECIATION IS AVAILABLE. OTHERWISE, RECOVERY IS THROUGH OTHER CHARGES.

** EQUITY PORTION OF NON-DEPRECIABLE INVESTMENT LESS WORKING CAPITAL LESS LAND

TEXACO BASED FUEL GAS CASE EXT-SH
NON-REGULATED COMPANY OWNERSHIP

Table C-7

YEAR-BY-YEAR
REVENUE REQUIREMENTS SCHEDULE
FOR A
NON-UTILITY COMPANY
(SEE NOTE)
(THOUSAND DOLLARS)

YR	CALENDAR YEAR	RETURN ON COMMON EQUITY	PREFERRED STOCK DIVIDENDS	INTEREST ON DEBT	INCOME TAXES	OTHER TAXES AND INSURANCE	RECOVERY OF CAPITAL: BOOK DEPRECIATION	RECOVERY OF CAPITAL: * OTHER	FUEL/RAW MATERIAL COST	OPERATING AND MAINTENANCE COSTS	TOTAL REVENUE REQUIRED	REVENUE FROM BY-PRODUCTS	REVENUE FROM PRINCIPAL PRODUCT: TOTAL	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT: $ PER MMBTU EXPRESSED IN MID-1980 DOLLARS
1	1998.	440029.	0.	0.	513431.	50958.	75590.	23458.	302557.	103823.	1309045.	54496.	1254549.	20.84	7.65
2	1991.	420226.	0.	0.	510330.	50958.	75590.	23458.	336140.	113325.	1330021.	59945.	1270076.	21.09	7.05
3	1992.	400410.	0.	0.	507230.	50958.	75590.	23458.	373452.	124657.	1355755.	65940.	1289815.	21.42	6.51
4	1993.	380691.	0.	0.	504129.	50958.	75590.	23458.	414905.	137123.	1386764.	72534.	1314230.	21.83	6.03
5	1994.	360791.	0.	0.	501028.	50958.	75590.	23458.	460960.	150833.	1423620.	79787.	1343833.	22.32	5.60
6	1995.	340982.	0.	0.	497928.	50958.	75590.	23458.	512126.	165949.	1466960.	87766.	1379194.	22.91	5.23
7	1996.	321173.	0.	0.	494827.	50958.	75590.	23458.	568972.	182511.	1517488.	96543.	1420945.	23.60	4.90
8	1997.	301363.	0.	0.	491726.	50958.	75590.	23458.	632128.	200762.	1575985.	106197.	1469788.	24.41	4.60
9	1998.	281554.	0.	0.	488626.	50958.	75590.	23458.	702294.	220838.	1643317.	116817.	1526501.	25.35	4.35
10	1999.	261744.	0.	0.	485525.	50958.	75590.	23458.	780249.	242922.	1720446.	128498.	1591947.	26.48	4.12
11	2000.	241935.	0.	0.	482424.	50958.	75590.	23458.	866856.	267214.	1808435.	141348.	1667087.	27.69	3.92
12	2001.	222125.	0.	0.	479324.	50958.	75590.	23458.	963077.	293936.	1908468.	155483.	1752985.	29.12	3.75
13	2002.	202316.	0.	0.	476223.	50958.	75590.	23458.	1069979.	323329.	2021853.	171031.	1850822.	30.74	3.60
14	2003.	182506.	0.	0.	473123.	50958.	75590.	23458.	1188747.	355662.	2150043.	188134.	1961909.	32.59	3.47
15	2004.	162697.	0.	0.	253906.	50958.	75590.	23458.	1320698.	391228.	2278535.	206948.	2071587.	34.41	3.33
16	2005.	142887.	0.	0.	234690.	50958.	75590.	23458.	1467295.	430351.	2425229.	227643.	2197587.	36.50	3.21
17	2006.	123078.	0.	0.	215474.	50958.	75590.	23458.	1630165.	473386.	2592108.	250407.	2341702.	38.89	3.11
18	2007.	103268.	0.	0.	196257.	50958.	75590.	23458.	1811113.	520725.	2781378.	275448.	2505922.	41.62	3.03
19	2008.	83459.	0.	0.	177041.	50958.	75590.	23458.	2012147.	572796.	2995450.	302992.	2692458.	44.72	2.96
20	2009.	63649.	0.	0.	157825.	50958.	75590.	23458.	2235495.	630077.	3237052.	333292.	2903761.	48.23	2.90
														**	***
											LEVELIZED			23.74	5.15

**

LEVELIZED FIXED CHARGE RATE IN CURRENT DOLLARS = .362991
NOTE: PRODUCTS ARE NOT SOLD AT YEAR-BY-YEAR REVENUE REQUIREMENTS. THEY ARE SOLD AT MARKET PRICES. HOWEVER, THESE REVENUES ARE USED TO DEVELOP THE STARTING PRICES SHOWN BELOW. (SEE USER'S MANUAL)

* NON-DEPRECIABLE INVESTMENT LESS WORKING CAPITAL LESS LAND
** LEVELIZED USING RETURN ON EQUITY OF 20.00 PCT./YEAR
*** LEVELIZED USING RETURN ON EQUITY OF 9.491 PCT./YEAR

TEXACO BASED FUEL GAS CASE EXT-SH
NON-REGULATED COMPANY OWNERSHIP

Table C-7 (Continued)
REVENUE REQUIREMENTS SCHEDULE
FOR A
NON-UTILITY COMPANY

** STARTING PRICES OF PRIMARY PRODUCT AT THE BEGINNING OF 1990,THE FIRST YEAR OF COMMERCIAL OPERATION

AT GENERAL INFLATION RATE OF	10.00 PCT./YEAR	=$	12.75 PER MMBTU
AT ESCALATION RATE OF THE PRICE OF COMPETITIVE ALTERNATIVE OF	0.00 PCT./YEAR ***	=$	23.74 PER MMBTU

** INFLATION-INDEPENDENT PRICES OF PRIMARY PRODUCT IN MID - 1980,THE BASE YEAR FOR COST DATA INPUT

AT GENERAL INFLATION RATE OF	10.00 PCT./YEAR	=$	5.15 PER MMBTU
AT ESCALATION RATE OF THE PRICE OF COMPETITIVE ALTERNATIVE OF	0.00 PCT./YEAR ***	=$	23.74 PER MMBTU

** THE PRICE OF THE PRINCIPAL PRODUCT WHICH IF ALLOWED TO INCREASE AT
- THE SPECIFIED RATE OF GENERAL INFLATION,OR
- THE SPECIFIED RATE OF ESCALATION OF THE PRICE OF THE COMPETITIVE ALTERNATIVE
WOULD PROVIDE THE SAME DCF RATE OF RETURN AS EITHER THE CALCULATED YEAR-BY-YEAR PRICES OR THE CALCULATED LEVELIZED PRICES

***INCLUDES 10.00 PCT./YEAR GENERAL INFLATION RATE AND A REAL DECREASE OF 9.09 PCT./YEAR OF THE PRICE OF THE COMPETITIVE ALTERNATIVE

TEXACO BASCO FUEL GAS CASE EXT-SH
NON-REGULATED COMPANY OWNERSHIP

Table C-8

CASH FLOW SCHEDULE FOR A NON-UTILITY COMPANY
WITH PRINCIPAL PRODUCT SOLD AT ESCALATED REQUIRED STARTING PRICE

(THOUSAND DOLLARS)

YEAR	CALENDAR YEAR	REQUIRED PRICE, $ PER MMBTU	REVENUE FROM PRINCIPAL PRODUCT	REVENUE FROM BY-PRODUCTS	TOTAL REVENUE	TAXES ON INCOME	OTHER CASH DISBURSEMENTS *	COMMON EQUITY PORTION OF RECURRING INVESTMENT	PLANT SALVAGE VALUE, WORKING CAPITAL, AND LAND	CASH FLOW TO COMMON EQUITY
1	1990.	14.02	844217.	54496.	898713.	111383.	456538.	0.	0.	330792.
2	1991.	15.42	928639.	59945.	988584.	142207.	500424.	0.	0.	345954.
3	1992.	16.97	1021503.	65940.	1087442.	175113.	549068.	0.	0.	363262.
4	1993.	18.66	1123653.	72534.	1196187.	210289.	602987.	0.	0.	382911.
5	1994.	20.53	1236018.	79787.	1315805.	247941.	662753.	0.	0.	405112.
6	1995.	22.58	1359620.	87766.	1447386.	288289.	729503.	0.	0.	430093.
7	1996.	24.84	1495582.	96543.	1592125.	331578.	802441.	0.	0.	458105.
8	1997.	27.32	1645140.	106197.	1751337.	378070.	883848.	0.	0.	489419.
9	1998.	30.06	1809654.	116817.	1926471.	428050.	974891.	0.	0.	524338.
10	1999.	33.06	1990619.	128498.	2119118.	481831.	1074129.	0.	0.	563157.
11	2000.	36.37	2189681.	141348.	2331038.	539750.	1185029.	0.	0.	606251.
12	2001.	40.01	2408650.	155483.	2564132.	602173.	1307971.	0.	0.	653988.
13	2002.	44.01	2649514.	171031.	2820546.	669500.	1444267.	0.	0.	706780.
14	2003.	48.41	2914466.	188134.	3102600.	742162.	1595367.	0.	0.	765072.
15	2004.	53.25	3205913.	206948.	3412860.	812448.	1762884.	0.	0.	837528.
16	2005.	58.57	3526504.	227643.	3754146.	889049.	1948605.	0.	0.	916493.
17	2006.	64.43	3879154.	250407.	4129561.	972515.	2154509.	0.	0.	1002536.
18	2007.	70.87	4267070.	275448.	4542517.	1063446.	2382796.	0.	0.	1096274.
19	2008.	77.96	4693777.	302992.	4996769.	1162491.	2635982.	0.	0.	1198376.
20	2009.	85.75	5163154.	333292.	5496446.	1270350.	2916530.	0.	219209.	1528765.

PRESENT VALUE AT BEGINNING OF 1990 OF CASH FLOWS TO COMMON EQUITY DISCOUNTED AT 20.00 PCT./YEAR = $ 2288146558.

COMMON EQUITY OUTSTANDING AT BEGINNING OF 1990 = $ 2288146558.

* OTHER TAXES AND INSURANCE, PREFERRED STOCK COST, DEBT PRINCIPAL AND INTEREST, FUEL/RAW MATERIAL COST, AND OPERATING AND MAINTENANCE COSTS

Appendix D

FIRED HEATER AND POWER GENERATION

GENERAL

The power generation systems for all the cases consists of gas expansion turbogenerators (a set of two expanders), a steam turbogenerator, auxiliary pumps, and a deaerator. In all the saturated steam (SS) cases and in case EXT-SH1 a fired heater is included.

The base case steam cycle conditions for high-pressure steam are those specified by EPRI. Steam cycle conditions for lower-pressure steam cases (EXT-SS2, SH2 and SH3) were selected by Fluor. Design parameters have been selected to provide heat balances that reflect performance of equipment currently available for order.

Table D-1 is a summary of the calculated power output at the generator terminals and heat rejected to the process and power plant cooling towers for all the cases. The summaries for the 2200 ton/day capacity gasifier cases are the same as that for the corresponding base cases. The calculated power outputs include deduction for estimated mechanical, electrical, and radiation losses of approximately two percent for the steam turbines and the gas expanders.

TECHNICAL CRITERIA

Process Interface

Flow rates, compositions, pressures, and temperatures of the fluids to power generation are based on the design of the process fuel plant, for each case. Heat integration between the process units and the power generation includes a fired heater for the saturated steam (SS) cases and for case EXT-SH1.

The quantity and quality of waste heat provided to power generation is determined by the process design. For instance, the quantity of HP steam available in Case EXT-SS, where hot gasifier effluent is used directly to produce steam, is greater than that in Case EXT-SS1, where gasifier effluent is

quenched before heat exchange begins. Also, the utilization of the chemical energy in the fuel gas in the fired heater increases the power generation at the expense of reduced fuel gas for export. The use of fuel gas in this manner is dependent upon whether saturated or superheated steam is generated in gas cooling, whether reheating is required, and whether reheating is done in gas cooling or in the fired heater.

GAS EXPANSION

For all cases except EXT-SS5 and EXT-SH5, the fuel gas from the gasification process (after cleanup and reheating) is delivered to the gas expander at 502 psig. In EXT-SS5 and EXT-SH5, the pressure of fuel gas is only 490 psig, due to extra pressure drop primarily in the COS hydrolysis step and ZnO beds. The exhaust pressure for all cases is 36 psig. This pressure was chosen to meet the minimum pressure requirements for the fired heater.

STEAM CYCLE

Table D-2 is a summary of steam conditions and specific enthalpies used for all the cases. The summaries for the 2200 ton/day gasifier cases are the same as for the corresponding base cases.

All high-pressure steam is generated from the sensible heat in the raw gasifier effluent. Chemical energy from the clean fuel gas is used for superheating and/or reheating in a fired heater in the cases already mentioned. In the cases where a fired heater is not used, superheating and/or reheating is accomplished by the transfer of sensible heat from the gasifier effluent.

Steam Driver

A medium-pressure condensing turbine is used in each case for the main HP boiler feedwater pump. The spare HP boiler feedwater pump is motor driven.

FIRED HEATER

A single fired heater is used in cases where it is required. Fired heater duties are summarized in Table D-3. The summary for the 2200 ton/day gasifier case is the same as for its corresponding base case. The fired heater in EXT-SS has a large duty, 971×10^6 Btu/hr total heat fired. This duty is not considered unreasonable, however, because a unit has been installed in Antwerp, Belgium and started up in 1975 using a proprietary Exxon designed furnace and burners with 964×10^6 Btu/hr, as the total heat fired.

COMPONENT DESCRIPTION

Gas Expander (50-1-EX-1). The optimum thermodynamic design of gas expanders varies with gas composition, pressure, and temperature. However, these conditions remain the same for all cases, except Cases EXT-SS5, EXT-SH4 and EXT-SH5 where the compositions are slightly different. The pressure differs in Cases EXT-SS5 and EXT-SH5. Overall engine performance was calculated by Fluor using an adiabatic efficiency of 82 percent, based on vendor information for similar machines.

The expander is a prototype design using existing steam turbine designs but with iso-carbon seals.

Gas Expander Generator (50-1-G-1). Each gas turbine drives a suitably rated, 0.9 power factor, 0.58 short circuit ratio, three-phase, 60 hertz, 13.8 kV, 3600 rpm, open-ventilated, air-cooled generator.

Steam Turbine (51-T-1A&B and 51-T-2). A tandem compound, reheat turbine system consisting of HP and IP stages 51-T-1A&B and MP stage 51-T-2 is used for all cases with 1450 psig steam. For the low pressure steam cases, SS2 and SH2, the HP and IP stages are combined, since steam reheat is not used. Steam is extracted at the MP level to meet process steam requirements and for the steam driver. In Case EXT-SH3 the steam turbine consists of an MP condensing stage.

The HP end receives superheated steam and exhausts to the IP steam header at approximately 445 psig in all HP steam cases. The IP steam after combining with sulfur plant steam is reheated in the fired heater or in the gas cooling unit and flows to the IP stage. The inlet and exhaust pressures are 385 psig and 115 psig, respectively.

The LP end 51-T-2 is a condensing type unit receiving steam at 115 psig and exhausting at 2-1/2 inches Hg absolute. In Case EXT-SH3, steam exhausting from the air compressor driver in the oxidant plant combines with sulfur plant steam and enters the condensing steam turbine 51-T-1 and exhausts at 2-1/2 inches Hg absolute. The main surface condenser is designed for two tube side passes with 80°F cooling water inlet temperature and 20°F temperature rise.

Steam Turbine Generator (51-G-1). The steam turbine drives a suitably rated, 0.9 power factor, 0.58 short circuit ratio, three-phase, 60 hertz, 24.0 kV, 3600 rpm outdoor type, hydrogen inner-cooled generator with water cooling for

95°F or lower. The directly connected, enclosed brushless exciter portion is air-cooled and has a permanent magnet generator.

A tabulation of steam turbine performance and generator output is given in Table D-2.

EQUIPMENT STATE OF THE ART

The steam turbines are commercially available. The gas expanders, as previously mentioned, are prototype designs using existing technology.

Table D-1

STEAM TURBINE PERFORMANCE SUMMARY

Steam Cycle, psig/°F/°F	Base Case 1450/900/900	1450/900/900	736/900	1450/800/800	1450/1000/1000	1450/900/900
Steam Generated in Gas Coolers	←		Saturated	→		
Gas Temperature Entering Heat Recovery, °F	2400	1500	→	→		2400
Sulfur Removal, %	←		94.6	→		+ 99.9%
Oxidant Plant Compressor Drivers	←		Motors	→		
Case Designation	EXT-SS	EXT-SS1	EXT-SS2	EXT-SS3	EXT-SS4	EXT-SS5
HP BACK-PRESSURE ELEMENT						
Throttle Conditions	1450 psig/900°F	1450 psig/900°F	736 psig/900°F	1450 psig/800°F	1450 psig/1000°F	1450 psig/900°F
Inlet Enthalpy, Btu/lb	1,430.6	1,430.6	1,457.6	1,365.9	1,491.2	1,430.6
Throttle Flow from Process, lb/s	473.4	404.6	378.9	399.3	408.8	473.7
Exhaust Flow To Process, lb/s	0.0	0.0	0.0	0.0	0.0	0.0
Exhaust Enthalpy, Btu/lb	1,317.1	1,317.1	1,407.7	1,264.8	1,366.2	1,317.2
Isentropic Efficiency, %	81.5	81.5	76.0	81.5	81.5	81.5
Power, bhp	75,999	64,959	26,721	57,109	72,290	75,991
IP BACK-PRESSURE ELEMENT						
Inlet Conditions*	385 psig/900°F	385 psig/900°F	445 psig/776°F	385 psig/800°F	385 psig/1000°F	385 psig/900°F
Inlet Flow, lb/s	488.5	419.9	393.8	414.5	424.3	489.7
Inlet Enthalpy, Btu/lb	1,470.2	1,470.2	1,400.1	1,417.1	1,523.3	1,470.2
Exhaust Flow to Process, lb/s	35.4	12.7	6.4	18.3	12.1	14.8
Exhaust Enthalpy, Btu/lb	1,350.9	1,350.9	1,282.4	1,307.6	1,394.3	1,350.9
Isentropic Efficiency, %	82.0	82.0	82.5	82.0	82.0	82.0
Power, bhp	82,462	70,893	65,584	64,186	77,446	82,641
MP CONDENSING ELEMENT						
Inlet Conditions	115 psig/647°F	115 psig/647°F	115 psig/512°F	115 psig/561°F	115 psig/732°F	115 psig/647°F
Inlet Enthalpy, Btu/lb	1,350.9	1,350.9	1,282.4	1,307.6	1,394.3	1,350.9
Inlet Flow, lb/s	453.0	407.2	387.4	396.2	412.2	443.0
Exhaust Enthalpy**, Btu/lb	1,045.2	1,045.2	1,002.8	1,018.8	1,070.0	1,045.2
Isentropic Efficiency, %	84.5	84.5	84.5	84.5	84.5	84.5
Power bhp	195,914	176,103	153,231	161,833	189,086	191,582
TOTAL POWER OUTPUT#, kW	258,970	227,980	179,430	206,910	247,610	255,930

*For Case EXT-SS2 a single condensing turbogenerator without reheat is used.
**Exhaust at 2-1/2 inches Hg absolute in all cases.
#At generator terminals.
‡One ppm total sulfur in the product gas on a mole basis.

Table D-1 (Continued)

STEAM TURBINE PERFORMANCE SUMMARY

Steam Cycle, psig/°F/°F	Base Case 1450/1000/1000	1450/900/900	736/900	736/900	1450/1000/1000	1450/1000/1000
Steam Generated in Gas Coolers	←	←	Superheated		→	→
Gas Temperature Entering Heat Recovery, °F	2400	1500	→	2400	→	→
Sulfur Removal, %	94.6	→	→	→	83.6	+99.9¶
Oxidant Plant Compressor Drivers	Motors	→	→	Steam Turbines	Motors	→
Case Designation	**EXT-SH**	**EXT-SH1**	**EXT-SH2**	**EXT-SH3**	**EXT-SH4**	**EXT-SH5**
HP BACK-PRESSURE ELEMENT						
Throttle Conditions	1450 psig/1000°F	1450 psig/900°F	736 psig/900°F	-	1450 psig/1000°F	1450 psig/1000°F
Inlet Enthalpy, Btu/lb	1,491.2	1,430.6	1,457.6	-	1,491.2	1,491.2
Throttle Flow from Process, lb/s	287.3	298.6	285.9	-	287.2	287.0
Exhaust Flow To Process, lb/s	0.0	0.0	0.0	-	0.0	0.0
Exhaust Enthalpy, Btu/lb	1,370.8	1,321.3	1,404.9	-	1,370.8	1,370.8
Isentropic Efficiency, %	78.5	78.5	75.0	-	78.5	78.5
Power, bhp	48,930	46,169	21,304	-	48,922	48,879
IP BACK-PRESSURE ELEMENT						
Inlet Conditions*	385 psig/1000°F	385 psig/900°F	445 psig/776°F	-	385 psig/1000°F	385 psig/1000°F
Inlet Flow, lb/s	301.3	313.3	300.2	-	299.6	302.1
Inlet Enthalpy, Btu/lb	1,523.3	1,470.3	1,395.2	-	1,523.3	1,523.3
Exhaust Flow to Process, lb/s	26.2	10.2	6.8	-	26.2	37.1
Exhaust Enthalpy, Btu/lb	1,398.2	1,354.6	1,280.0	-	1,398.2	1,398.2
Isentropic Efficiency, %	79.5	79.5	81.0	-	79.5	79.5
Power, bhp	53,324	51,281	48,948	-	53,009	53,458
MP CONDENSING ELEMENT						
Inlet Conditions	115 psig/740°F	115 psig/654°F	115 psig/515°F	160 psig/608°F	115 psig/740°F	115 psig/740°F
Inlet Enthalpy, Btu/lb	1,398.2	1,354.6	1,280.0	1,328.3	1,398.2	1,398.2
Inlet Flow, lb/s	275.1	303.1	293.4	26.9	275.5	265.0
Exhaust Enthalpy**, Btu/lb	1,074.3	1,049.1	1,002.8	1,038.8	1,074.3	1,074.3
Isentropic Efficiency, %	84.0	84.0	84.0	78.5	84.0	84.0
Power bhp	126,056	130,973	115,012	11,011	126,215	121,439
TOTAL POWER OUTPUT#, kW	166,850	166,930	135,390	8,050	166,730	163,510

*For Cases EXT-SH2 and EXT-SH3, a single condensing turbogenerator without reheat is used.
**Exhaust as 2-1/2 inches Hg absolute in all cases.
#At generator terminals.
¶One ppm total sulfur in the product gas on a mole basis.

Table D-2

FIRED HEATER PERFORMANCE

Steam Cycle, psig/°F/°F	BASE CASE 1450/900/900	1450/900/900	736/900	1450/800/800	1450/1000/1000	1450/900/900	1450/900/900
Steam Generated in 609 Coolers	←		Saturated			→	Superheated
Gas Temperature Entering Heat Recovery	2400	1500	→			2400	1500
Sulfur Removal, %	←			94.6	→	+99.9¶	94.6
Oxidant Plant Compressor Drivers	←			Motors			→
Case Designation	EXT-SS	EXT-SS1	EXT-SS2	EXT-SS3	EXT-SS4	EXT-SS5	EXT-SH1
STEAM SUPERHEATING							
Inlet Conditions							
Temperature, °F	598	598	517	598	598	598	-
Pressure, psig	1,505	1,505	791	1,505	1,505	1,505	-
Enthalpy, Btu/lb	1,169.0	1,169.0	1,199.6	1,169.0	1,169.0	1,169.0	-
Outlet Conditions							
Temperature, °F	900	900	900	800	1,000	900	-
Pressure, psig	1,450	1,450	736	1,450	1,450	1,450	-
Enthalpy, Btu/lb	1,430.6	1,430.6	1,457.6	1,365.9	1,491.2	1,430.6	-
Flow Rate, lb/hr	1,704,289	1,456,723	1,364,050	1,437,614	1,471,575	1,705,447	-
Duty, 10^6 Btu/hr	446.5	381.6	351.6	285.5	477.1	466.8	None
STEAM REHEATING							
Inlet Conditions							
Temperature, °F	619	618	-	538	700	618	622
Pressure, psig	445	445	-	445	445	445	445
Enthalpy, Btu/lb	1,313.8	1,313.1	-	1,262.7	1,360.3	1,313.4	1,315.8
Outlet Conditions			-				
Temperature, °F	900	900		800	1,000	900	900
Pressure, psig	385	385	-	385	385	385	385
Enthalpy, Btu/lb	1,470.2	1,470.2	-	1,417.1	1,523.3	1,470.2	1,470.2
Flow Rate, lb/hr	1,758,508	1,511,794	-	1,492,209	1,527,506	1,762,961	1,128,000
Duty, 10^6 Btu/hr	275.3	237.6	None	230.4	249.0	276.4	174.2

¶ One ppm total sulfur in the product gas on a mole basis.

Table D-2 (Continued)

FIRED HEATER PERFORMANCE

Steam Cycle, psig/°F/°F	BASE CASE 1450/900/900	1450/900/900	736/900	1450/800/800	1450/1000/1000	1450/900/900	1450/900/900
Steam Generated in Gas Coolers	←		Saturated			→	Superheated
Gas Temperature Entering Heat Recovery	2400	1500	→			2400	1500
Sulfur Removal, %	←			94.6	→	¶99.9¶	94.6
Oxidant Plant Compressor Drivers	←			Motors	→		
Case Designation	EXT-SS	EXT-SS1	EXT-SS2	EXT-SS3	EXT-SS4	EXT-SS5	EXT-SH1
BOILER FEEDWATER HEATING							
Inlet Conditions							
Temperature, °F	290	307	307	307	307	310	307
Pressure, psig	1,675	1,675	905	1,675	1,675	1,675	1,675
Enthalpy, Btu/lb	262.6	279.9	278.5	279.9	279.9	283.0	279.9
Outlet Conditions							
Temperature, °F	349	366	343	357	375	368	329
Pressure, psig	1,650	1,650	880	1,650	1,650	1,650	1,650
Enthalpy, Btu/lb	323.4	340.8	315.2	330.9	350.4	343.8	302.8
Flow Rate, lb/hr	1,758,508	1,511,794	1,417,771	1,492,209	1,527,506	1,762,961	1,128,000
Duty, 10^6 Btu/hr	107.0	92.8	52.1	76.1	107.6	107.2	25.8
TOTAL ABSORBED DUTY, 10^6 BTU/HR	828.8	711.2	403.7	592.0	833.7	830.4	200.0
FUEL GAS RATE, 10^6 SCFH	3.37	2.89	1.64	2.41	3.39	3.38	0.81
STACK TEMPERATURE, °F	←			400		→	

¶ One ppm Total sulfur in the product gas on a mole basis.

Appendix E

SUMMARY OF LURGI AND TEXACO FUEL GAS PLANT ECONOMICS (MID-1980 $)

An economic comparison of Lurgi and Texaco gasification processes was made in the Summary and was tabulated in Table S-7.

Table E-1 compares these two systems in more detail. The Lurgi gasification process has been discussed in prior reports and the financial results from these studies have been updated here.

Both Investor owned utility and nonregulated company ownerships are shown in the table. Cost of fuel gas is compared in both current dollars and mid-1980 dollars through first year and levelized values.

Table E-1

A COMPARISON OF LURGI- AND TEXACO-BASED FUEL GAS
(Mid-1980 Thousands of Dollars)

	Investor Owned Utility				Nonregulated Company			
Gasifier	Texaco 1375 ST/D		Lurgi, Oxygen-Blown		Texaco, 1375 ST/D		Lurgi, Oxygen-Blown	
By-Products Credited	Electricity	Electricity	Ammonia Electricity Hydrocarbons	Ammonia Electricity	Electricity	Electricity	Ammonia Electricity Hydrocarbons	Ammonia Electricity
Case Designation	EXT-SS	EXT-SH	MX	MX	EXT-SS	EXT-SH	MX	MX
NET PRODUCTION [#]								
Fuel Gas, 10^6 Btu/day	159,931.	183,283.	131,880.	——→	159,931.	183,283.	131,880.	——→
Electric Power, kW	142,400.	53,300.	63,700.	——→	142,400.	53,300.	63,700.	——→
Ammonia, ST/D	0.	0.	123.	——→	0.	0.	123.	——→
Sulfur, ST/D	354.	354.	308.9	——→	354.	354.	308.9	——→
Hydrocarbons, 10^6 Btu/day	0.	0.	21,912.	——→	0.	0.	21,912.	——→
TOTAL CAPITAL REQUIREMENTS								
Plant Facilities Investment	822,608.	811,701.	807,692.	——→	822,608.	811,701.	807,692.	——→
Prepaid Royalties	4,113.	4,059.	4,038	——→	4,113.	4,059.	4,038.	——→
Organization Startup	24,678.	24,351.	24,230.	——→	24,678.	24,351	24,230	——→
Working Capital	19,577.	19,523.	20,083.	——→	20,177.	20,115.	20,671.	——→
Land,	950.	875.	1,000.	——→	950.	875.	1,000.	——→
AFDC	31,044.	30,623.	30,484.	——→	28,965.	28,552	28,466	——→
Total Capital Requirement	902,970.	891,132.	887,527.	——→	901,491.	889,653	886,097.	——→
FIXED OPERATING COSTS								
Operating Labor	5,431.	5,256.	6,397.	——→	5,431.	5,256.	6,397.	——→
Maintenance Labor	8,277.	8,420.	8,665.	——→	8,277.	8,420	8,665.	——→
Maintenance Materials	12,415.	12,630	12,998.	——→	12,415.	12,630	12,998.	——→
A&S Labor	4,112.	4,103.	4,519.	——→	4,112.	4,103.	4,519.	——→
General and Administrative	--	--	--	--	5,758.	5,682.	5,654.	——→
Total Fixed Costs	10,215.	10,408.	17,579.	——→	15,993.	16,090.	38,733.	——→
VARIABLE OPERATING COSTS								
Raw Water	1,311.	1,002.	1943.	——→	1,311.	1,002.	1,943.	——→
Catalyst & Chemicals	1,464.	1,164.	1085.	——→	1,464.	1,164.	1,085.	——→
Ash Disposal	1,867.	1,867.	1825.	——→	1,867.	1,867.	1,825.	——→
Total Variable Costs	4,642.	4,033	4853	——→	4,642.	4,033	4,853.	——→
Coal Cost	117,345.	117,345.	116,110	——→	117,345.	117,345	116,110	——→
BY-PRODUCT CREDIT [##]								
Ammonia [@]	--	--	5,389.	5,387.	--	--	5,387.	5,387.
Hydrocarbon [@]	--	--	23,994.	0.	--	--	23,994.	0.
Electric Power	62,371.	23,345.	27,901.	27,901.	62,371.	23,345.	27,901.	27,901.
Total By-product Credit	62,371.	23,345.	57,282.	33,288.	62,371.	23,345.	57,282.	33,288.
COST OF FUEL GAS, ($/10^6$ Btu)								
1st Year in Mid-1980 $	4.27	4.25	5.28	5.76	5.32	5.15	6.48	6.96
1st Year in Current $	11.63	11.56	14.36	15.66	14.48	14.01	16.03	17.21
Levelized in Mid-1980 $	3.27	3.39	4.08	4.56	5.32	3.15	6.48	6.96
Levelized in Current $	19.11	19.81	23.85	26.64	24.51	23.74	29.87	32.07
System Cold Efficiency (%)	77.11	78.77	68.3	68.3	77.11	78.77	68.3	68.3

[#]At 100% of design capacity
[!]Allowance for funds during construction
[##]Ammonia is credited at 120.00 $/ST.
[@]Hydrocarbons are credited at 3.90 $/$10^6$ Btu and at 0.00 $/$10^6$ Btu.
[**]{(HHV of clean fuel gas) + (HHV of liquid hydrocarbons) + (net power)(9000 Btu/kWh)}(100)/(HHV of coal)
Note that the sulfur removal in the Texaco case was 94.6% while in the Lurgi case it was 83.5%. Plant startup in 1990.