HIGH PRESSURE TURBINE REPLACEMENT- PROPOSED DESIGN 11/16/00

NOTE: This analysis is based upon projected turbine performance (extrapolated from existing turbine conditions). We need new turbine design conditions for more accurate analysis (1 stage conditions, actual number of stages, extraction points, etc..).

TURBINE DESIGN POINT

		Unit 1	Unit 2
Throttle Steam Flow Increase:	kpph	225	450
HP Turbine Efficiency Improvement	%	6.5	8.0
HP Turbine Capacity Increase:	MW	19	26
NTCHR Improvement	B/Kwh	102	124

RWN CASE 6975

Valves Wide Open/ 2400 psig/ 1000 F/ 1000 F/ BP-actual, HP Turb Eff= 92 %

		Unit 1	Unit 2
Throttle Flow	kpph	6,750	6,750
Unit Capacity	MWg	930	960
Net Turbine Cycle Heat Rate	B/Kwh	7874	7637

6977

TURBINE MAXIMUM CAPABILITY

Maximum Throttle Steam Flow Limit= 7100 kpph
(requires adding an additional main steam relief valve of 350 kpph)

350

~ 2500 psig/ 1000 F/ 1000 F/ BP-actual, HP Turb Eff= 92 %

		Unit 1	Unit 2
Throttle Flow	kpph	7,100	7,100
Unit Capacity	MWg	972	1005
Net Turbine Cycle Heat Rate	B/Kwh	7859	7600

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TURBINE OPERATING POINT

Normal Operating Load (allows 2% load control variance for AGC, pressure upsets and seasonal conditions)

910 MW gross/ 860 MW net NOTE:requires 5 MW additional on auxiliary power at 5.5 %

→ leaves lattitude of increasing capacity in future (920MWg)

~ 2400 psig/ 1000 F/ 1000 F/ BP-actual, HP Turb Eff= 92 %

		Unit 1	Unit 2
Throttle Flow	kpph	6,585	6,355
Unit Capacity	MWg	910	910
Net Turbine Cycle Heat Rate	B/Kwh	7865	7625

High Pressure Turbine Replacement- Design Review

11/10/00

	GE DESIGN		
	GE Design HBD Guar 820 Mw	GE Design HBD VWO	GE Design HBD VWO 5% OP
Gross Power (Mw)	820.0	862.7	903.2
NTCHR (Btu/kwh)	7,738	7,730	7,707
Throttle flow (kpph)	5,755	6,123	6,449
Throttle press (psia)	2,412.2	2,412.2	2,532.2
Throttle temp (°F)	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000
Reheater flow (kpph)	4,681.2	4,952.2	5,188.8
% Reheater press drop (%)	10	10	10
Reheater duty (MBtu/h)	1,002.1	1,040.0	1,103.1
High Pressure Turbine			
Efficiency (%)	85.14	86.12	86.12
Wheel power (Mw)	249.7	259.3	271.4
% Total Wheel power	29.9	29.5	29.5
Section press drop (psi)	1,795.7	1,764.6	1,853.9
1st stg shell press (psia)	1,764.5	1,886.9	1,980.7
1st stg press drop (psi)	575.3	452.9	475.5
4th stg ext press (psia)	1,011.6	1,077.5	1,127.6
4th stg ext enthalpy (Btu/lb)	1,367.8	1,372.6	1,368.8
Exhaust press (psia)	544.1	575.2	602.4
Exhaust enthalpy (Btu/lb)	1,306.6	1,309.7	1,306.5
Intermediat Pressure Turbine			
Efficiency (%)	89.7	89.5	89.1
Wheel power (Mw)	231.2	244.3	255.6
% Total Wheel power	27.7	27.8	27.8
8th stg bowl press (psia)	480	507.4	531.4
Section press drop (psi)	361.9	382.9	401.2
Exhaust press (psia)	118	124.5	130.2
Exhaust enthalpy (Btu/lb)	1,349.5	1,348.9	1,348.4
Low Pressure Turbines			
Wheel power (Mw)	354.8	375.5	393.4
% Total Wheel power	42.5	42.7	42.7
LPA exhaust press ("hg)	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66

Conditions: GE design HBD submittal 5, design fwhtr ttd's and dca's, 10% reheater pressure drop, design condenser back pressures, 1% cycle makeup, 0.1% blowdown. HP efficiency calc from throttle to exhaust after N2 mix, IP efficiency calc from cold reheat to exhaust after HP packing remix.

IP7010350

High Pressure Turbine Replacement- Design Review

11/10/00

	GE DESIGN GE Design HBD Guar 820 Mw	GE Design HBD VWO	GE Design HBD VWO 5% OP
Stage Bowl Flow			
HP 1st stg flow (lb/hr)	5,750,401	6,117,864	6,443,984
HP 2-5th stg flow (lb/hr)	5,692,216	6,055,961	6,378,780
HP 6-7th stg flow (lb/hr)	5,195,004	5,507,273	5,785,163
IP 8th stg flow (lb/hr)	4,685,163	4,956,154	5,192,904
IP 9-11th stg flow (lb/hr)	4,708,175	4,980,637	5,218,692
IP 12-14th stg flow (lb/hr)	4,510,232	4,767,162	4,991,332
LP 15th stg flow (lb/hr)	4,097,173	4,185,493	4,524,352
LP 16th stg flow (lb/hr)	3,966,707	3,899,384	4,375,660
LP 17-18th stg flow (lb/hr)	3,699,179	3,738,278	4,073,383
LPA 19th stg flow (lb/hr)	1,182,760	1,196,723	1,301,001
LPB 19th stg flow (lb/hr)	1,182,760	1,196,723	1,301,001
LPC 19th stg flow (lb/hr)	1,182,760	1,196,723	1,301,001
LPA 20th stg flow (lb/hr)	1,138,544	1,196,722	1,247,031
LPB 20th stg flow (lb/hr)	1,138,544	1,196,724	1,247,031
LPC 20th stg flow (lb/hr)	1,138,544	1,196,724	1,247,031
Stage Bowl Pressure			
HP 1st stg press (psia)	2339.83	2339.83	2446.23
HP 2-5th stg press (psia)	1764.45	1886.89	1980.67
HP 6-7th stg press (psia)	1011.59	1077.50	1127.59
IP 8th stg press (psia)	497.99	507.42	531.36
IP 9-11th stg press (psia)	397.24	419.97	439.8
IP 12-14th stg press (psia)	222.33	234.85	245.76
LP 15th stg press (psia)	114.47	120.77	126.25
LP 16th stg press (psia)	62.22	65.61	68.56
LP 17-18th stg press (psia)	38.06	40.10	41.86
LPA 19th stg press (psia)	10.81	11.39	11.9
LPB 19th stg press (psia)	10.81	11.39	11.9
LPC 19th stg press (psia)	10.81	11.39	11.9
LPA 20th stg press (psia)	4.58	4.82	5.02
LPB 20th stg press (psia)	4.58	4.82	5.02
LPC 20th stg press (psia)	4.58	4.82	5.02
Stage Press Drop			
HP 1st stg press drop (psi)	575.38	452.94	465.56
HP 2-5th stg press drop (psi)	752.86	809.39	853.08
HP 6-7th stg press drop (psi)	467.49	502.30	525.19
IP 8th stg press drop (psi)	100.75	87.45	91.56
IP 9-11th stg press drop (psi)	174.91	185.12	194.04
IP 12-14th stg press drop (psi)	107.86	114.08	119.51
LP 15th stg press drop (psi)	52.25	55.16	57.69
LP 16th stg press drop (psi)	24.16	25.51	26.70
LP 17-18th stg press drop (psi)	27.25	28.71	29.96
LPA 19th stg press drop (psi)	6.23	6.57	6.88
LPB 19th stg press drop (psi)	6.23	6.57	6.88
LPC 19th stg press drop (psi)	6.23	6.57	6.88
LPA 20th stg press drop (psi)	3.11	3.35	3.55
LPB 20th stg press drop (psi)	3.48	3.72	3.92
LPC 20th stg press drop (psi)	3.76	4.00	4.20

IP7010351

High Pressure Turbine Replacement- Benchmark Review

11/10/00

	U1 BENCHMARK Tests		U2 BENCHMARK Tests	
	U1 Benchmark VWO	U1 Benchmark VWO 5% OP	U2 Benchmark VWO	U2 Benchmark VWO 5% OP
Gross Power (Mw)	891.6	933.5	884.8	926.2
NTCHR (Btu/kwh)	7,669	7,644	7,689	7,665
Throttle flow (kpph)	6,308	6,644	6,281	6,616
Throttle press (psia)	2,412.2	2,532.2	2,412.2	2,532.2
Throttle temp (°F)	1,000	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000	1,000
Reheater flow (kpph)	5,075.4	5,316.8	5,049.6	5,289.2
% Reheater press drop (%)	10	10	10	10
Reheater duty (MBtu/h)	1,064	1,128	1,063	1,074
High Pressure Turbine				
Efficiency (%)	87.69	87.69	87.1	87.1
Wheel power (Mw)	264.2	276.5	266.1	278.5
% Total Wheel power	29.2	29.2	29.6	29.6
Section press drop (psi)	1,747.0	1,835.6	1,757.9	1,847.0
1st stg shell press (psia)	1,953.0	2,050.1	1,954.5	2,051.6
1st stg press drop (psi)	386.834	406.134	385.334	404.634
4th stg ext press (psia)	1,113.9	1,165.4	1,092.1	1,142.5
4th stg ext enthalpy (Btu/lb)	1,374.7	1,370.9	1,371.9	1,368.1
Exhaust press (psia)	592.8	620.6	581.9	609.2
Exhaust enthalpy (Btu/lb)	1,308.9	1,305.7	1,308.1	1,304.9
Intermediat Pressure Turbine				
Efficiency (%)	88.71	88.74	90.05	90.04
Wheel power (Mw)	250.7	262.1	258.7	270.5
% Total Wheel power	27.7	27.7	28.8	28.8
8th stg bowl press (psia)	533.5	558.6	523.7	548.2
Section press drop (psi)	403.3	422.5	400.1	419
Exhaust press (psia)	130.2	136.1	123.6	129.2
Exhaust enthalpy (Btu/lb)	1,347.7	1,347.2	1,341.5	1,341.0
Low Pressure Turbines				
Wheel power (Mw)	389.9	408.6	373.0	390.8
% Total Wheel power	43.1	43.1	41.5	41.6
LPA exhaust press ("hg)	2.99	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66	1.66

Conditions: GE design HBD submittal 5, design fwhtr ttd's and dca's, 10% reheater pressure drop, design condenser back pressures, 1% cycle makeup, 0.1% blowdown, HP efficiency calc from throttle to exhaust after N2 mix, IP efficiency calc from cold reheat to exhaust after HP packing remix.

IP7010352

High Pressure Turbine Replacement- Benchmark Review

11/10/00

	U1 BENCHMARK Tests		U2 BENCHMARK Tests	
	U1 Benchmark VWO	U1 Benchmark VWO 5% OP	U2 Benchmark VWO	U2 Benchmark VWO 5% OP
Stage Bowl Flow				
HP 1st stg flow (lb/hr)	6,303,438	6,639,302	6,276,426	6,610,850
HP 2-5th stg flow (lb/hr)	6,232,517	6,564,602	6,201,462	6,531,892
HP 6-7th stg flow (lb/hr)	5,643,739	5,927,243	5,595,795	5,876,258
IP 8th stg flow (lb/hr)	5,078,263	5,319,816	5,052,391	5,292,208
IP 9-11th stg flow (lb/hr)	5,095,973	5,338,419	5,069,187	5,309,850
IP 12-14th stg flow (lb/hr)	4,878,042	5,106,532	4,834,930	5,060,660
LP 15th stg flow (lb/hr)	4,475,601	4,682,419	4,468,612	4,674,467
LP 16th stg flow (lb/hr)	4,332,913	4,530,979	4,318,925	4,515,656
LP 17-18th stg flow (lb/hr)	4,041,702	4,223,275	4,026,413	4,206,662
LPA 19th stg flow (lb/hr)	1,294,098	1,351,534	1,290,695	1,347,806
LPB 19th stg flow (lb/hr)	1,294,486	1,351,940	1,291,082	1,282,421
LPC 19th stg flow (lb/hr)	1,294,098	1,351,534	1,290,695	1,347,806
LPA 20th stg flow (lb/hr)	1,243,516	1,296,091	1,240,130	1,292,802
LPB 20th stg flow (lb/hr)	1,231,037	1,282,917	1,230,658	1,282,421
LPC 20th stg flow (lb/hr)	1,235,406	1,287,554	1,235,221	1,287,265
Stage Bowl Pressure				
HP 1st stg press (psia)	2339.83	2456.23	2339.83	2456.23
HP 2-5th stg press (psia)	1953.03	2050.07	1954.47	2051.55
HP 6-7th stg press (psia)	1113.93	1165.43	1092.13	1142.50
IP 8th stg press (psia)	522.84	547.38	513.23	537.28
IP 9-11th stg press (psia)	428.06	448.18	418.88	438.52
IP 12-14th stg press (psia)	240.38	251.50	234.51	245.32
LP 15th stg press (psia)	126.89	132.68	123.59	129.22
LP 16th stg press (psia)	69.25	72.38	67.19	70.22
LP 17-18th stg press (psia)	42.79	44.69	41.17	42.99
LPA 19th stg press (psia)	12.56	13.13	12.13	12.68
LPB 19th stg press (psia)	12.56	13.13	12.13	12.68
LPC 19th stg press (psia)	12.56	13.13	12.13	12.68
LPA 20th stg press (psia)	5.43	5.66	5.17	5.39
LPB 20th stg press (psia)	5.37	5.60	5.13	5.35
LPC 20th stg press (psia)	5.39	5.62	5.15	5.37
Stage Press Drop				
HP 1st stg press drop (psi)	386.80	406.16	385.36	404.68
HP 2-5th stg press drop (psi)	839.10	884.64	862.34	909.05
HP 6-7th stg press drop (psi)	521.15	544.82	510.24	533.34
IP 8th stg press drop (psi)	94.78	99.20	94.35	98.76
IP 9-11th stg press drop (psi)	187.68	196.68	184.37	193.20
IP 12-14th stg press drop (psi)	113.49	118.82	110.92	116.10
LP 15th stg press drop (psi)	57.64	60.30	56.40	59.00
LP 16th stg press drop (psi)	26.46	27.69	26.02	27.23
LP 17-18th stg press drop (psi)	30.23	31.56	29.04	30.31
LPA 19th stg press drop (psi)	7.13	7.47	6.96	7.29
LPB 19th stg press drop (psi)	7.19	7.53	7.00	7.33
LPC 19th stg press drop (psi)	7.17	7.51	6.98	7.31
LPA 20th stg press drop (psi)	3.96	4.19	3.70	3.92
LPB 20th stg press drop (psi)	4.27	4.50	4.03	4.25
LPC 20th stg press drop (psi)	4.57	4.80	4.33	4.55

IP7010353

	Current Operating Conditions- U1		Current Conditions- Varying HP Eff		
	U1 Corr Test VWO	U1 Corr Test VWO 5% OP	U1 Corr Test VWO 91% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 93% HP
Gross Power (Mw)	883.4	924.8	899.5	902.4	905.3
NTCHR (Btu/kwh)	7,943	7,917	7,857	7,841	7,826
Throttle flow (kpph)	6,526	6,874	6,526	6,526	6,526
Throttle press (psia)	2,412.2	2,532.2	2,412.2	2,412.2	2,412.2
Throttle temp (°F)	1,000	1,000	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000	1,000	1,000
Reheater flow (kpph)	5,246.1	5,495.0	5,239.1	5,237.1	5,235.1
% Reheater press drop (%)	10	10	10	10	10
Reheater duty (MBtu/h)	1,078	1,143	1,126	1,135	1,143
High Pressure Turbine					
Efficiency (%)	85.54	85.55	91	92	93
Wheel power (Mw)	266.6	278.4	283.1	286.3	289.5
% Total Wheel power	29.7	29.7	31.0	31.3	31.5
Section press drop (psi)	1,744.1	1,832.6	1,744.9	1,745.1	1,745.4
1st stg shell press (psia)	1,982.3	2,080.8	1,982.9	1,982.9	1,982.9
1st stg press drop (psi)	357.534	375.434	356.934	356.934	356.934
4th stg ext press (psia)	1,136.3	1,188.8	1,133.1	1,133.1	1,133.1
4th stg ext enthalpy (Btu/lb)	1,375.9	1,372.0	1,371.9	1,370.9	1,369.9
Exhaust press (psia)	595.7	623.6	594.9	594.7	594.4
Exhaust enthalpy (Btu/lb)	1,313.1	1,309.8	1,303.6	1,301.8	1,300.0
Intermediate Pressure Turbine					
Efficiency (%)	90.93	91.04	91.12	91.15	91.18
Wheel power (Mw)	271.5	284.2	271.1	271.0	270.9
% Total Wheel power	30.3	30.3	29.7	29.6	29.5
8th stg bowl press (psia)	536.1	561.2	535.4	535.2	535
Section press drop (psi)	409.9	429.3	409.3	409.2	409
Exhaust press (psia)	126.2	131.9	126.1	126	126
Exhaust enthalpy (Btu/lb)	1,339.0	1,338.3	1,339.0	1,339.0	1,339.0
Low Pressure Turbines					
Wheel power (Mw)	359.0	375.8	358.5	358.4	358.2
% Total Wheel power	40.0	40.0	39.3	39.1	39.0
LPA exhaust press ("hg)	2.99	2.99	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66	1.66	1.66

Conditions: GE design HBD submittal 5, design fwhtr ttd's and dca's, 10% reheater pressure drop, design condenser back pressures, 1% cycle makeup, 0.1% blowdown, HP efficiency calc from throttle to exhaust after N2 mix, IP efficiency calc from cold reheat to exhaust after HP packing remix.

IP7010354

	Current Operating Conditions- U1		Current Conditions- Varying HP Eff		
	U1 Corr Test VWO	U1 Corr Test VWO 5% OP	U1 Corr Test VWO 91% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 93% HP
Stage Bowl Flow					
HP 1st stg flow (lb/hr)	6,521,268	6,868,738	6,521,268	6,521,268	6,521,268
HP 2-5th stg flow (lb/hr)	6,449,380	6,793,021	6,449,217	6,449,202	6,449,186
HP 6-7th stg flow (lb/hr)	5,838,429	6,131,386	5,844,540	5,844,525	5,844,509
IP 8th stg flow (lb/hr)	5,248,941	5,497,989	5,241,978	5,239,973	5,237,944
IP 9-11th stg flow (lb/hr)	5,266,714	5,516,656	5,259,761	5,257,753	5,255,721
IP 12-14th stg flow (lb/hr)	5,019,214	5,253,340	5,012,679	5,010,793	5,008,884
LP 15th stg flow (lb/hr)	4,595,717	4,806,970	4,589,638	4,587,886	4,586,113
LP 16th stg flow (lb/hr)	4,464,731	4,667,921	4,458,863	4,457,172	4,455,460
LP 17-18th stg flow (lb/hr)	4,162,836	4,348,680	4,157,426	4,155,868	4,154,291
LPA 19th stg flow (lb/hr)	1,335,859	1,394,930	1,334,132	1,333,635	1,333,132
LPB 19th stg flow (lb/hr)	1,336,260	1,395,348	1,334,532	1,334,035	1,333,532
LPC 19th stg flow (lb/hr)	1,335,859	1,394,930	1,334,132	1,333,635	1,333,132
LPA 20th stg flow (lb/hr)	1,287,165	1,341,435	1,285,547	1,285,083	1,284,615
LPB 20th stg flow (lb/hr)	1,266,655	1,319,789	1,265,086	1,264,635	1,264,179
LPC 20th stg flow (lb/hr)	1,273,742	1,327,392	1,272,159	1,271,704	1,271,244
Stage Bowl Pressure					
HP 1st stg press (psia)	2339.83	2456.23	2339.83	2339.83	2339.83
HP 2-5th stg press (psia)	1982.34	2080.78	1982.91	1982.91	1982.91
HP 6-7th stg press (psia)	1136.32	1188.75	1133.09	1133.09	1133.09
IP 8th stg press (psia)	525.39	549.99	524.70	524.50	524.30
IP 9-11th stg press (psia)	445.14	465.98	444.56	444.39	444.22
IP 12-14th stg press (psia)	246.28	257.59	245.96	245.87	245.78
LP 15th stg press (psia)	123.02	128.58	122.86	122.82	122.77
LP 16th stg press (psia)	64.65	67.54	64.57	64.54	64.52
LP 17-18th stg press (psia)	41.93	43.76	41.88	41.86	41.84
LPA 19th stg press (psia)	12.41	12.95	12.40	12.39	12.39
LPB 19th stg press (psia)	12.41	12.95	12.40	12.39	12.39
LPC 19th stg press (psia)	12.41	12.95	12.40	12.39	12.39
LPA 20th stg press (psia)	5.25	5.48	5.25	5.25	5.24
LPB 20th stg press (psia)	5.85	6.10	5.85	5.85	5.84
LPC 20th stg press (psia)	5.62	5.86	5.61	5.61	5.61
Stage Press Drop					
HP 1st stg press drop (psi)	357.49	375.45	356.92	356.92	356.92
HP 2-5th stg press drop (psi)	846.02	892.03	849.82	849.82	849.82
HP 6-7th stg press drop (psi)	540.64	565.18	538.19	538.42	538.61
IP 8th stg press drop (psi)	80.25	84.01	80.14	80.11	80.08
IP 9-11th stg press drop (psi)	198.86	208.39	198.60	198.52	198.44
IP 12-14th stg press drop (psi)	123.26	129.01	123.10	123.05	123.01
LP 15th stg press drop (psi)	58.37	61.04	58.29	58.28	58.25
LP 16th stg press drop (psi)	22.72	23.78	22.69	22.68	22.68
LP 17-18th stg press drop (psi)	29.52	30.81	29.48	29.47	29.45
LPA 19th stg press drop (psi)	7.16	7.47	7.15	7.14	7.15
LPB 19th stg press drop (psi)	6.56	6.85	6.55	6.54	6.55
LPC 19th stg press drop (psi)	6.79	7.09	6.79	6.78	6.78
LPA 20th stg press drop (psi)	3.78	4.01	3.78	3.78	3.77
LPB 20th stg press drop (psi)	4.75	5.00	4.75	4.75	4.74
LPC 20th stg press drop (psi)	4.80	5.04	4.79	4.79	4.79

IP7010355

	Current Operating Conditions- U1		Current Conditions- Varying HP Eff		
	U2 Corr Test VWO	U2 Corr Test VWO 5% OP	U2 Corr Test VWO 91% HP	U2 Corr Test VWO 92% HP	U2 Corr Test VWO 93% HP
Gross Power (Mw)	878.6	920.2	901.1	904.2	906.9
NTCHR (Btu/kwh)	7,720	7,692	7,611	7,596	7,582
Throttle flow (kpph)	6,301	6,637	6,301	6,301	6,301
Throttle press (psia)	2,412.2	2,532.2	2,412.2	2,412.2	2,412.2
Throttle temp (°F)	1,000	1,000	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000	1,000	1,000
Reheater flow (kpph)	5,081.3	5,323.0	5,078.8	5,076.7	5,074.8
% Reheater press drop (%)	10	10	10	10	10
Reheater duty (MBtu/h)	1,034	1,097	1,094	1,104	1,112
High Pressure Turbine					
Efficiency (%)	84.05	84.01	91	92	93
Wheel power (Mw)	253.6	265.3	276.7	280.1	283.1
% Total Wheel power	28.4	28.4	30.3	30.5	30.8
Section press drop (psi)	1,747.8	1,836.4	1,748.1	1,748.3	1,748.6
1st stg shell press (psia)	1,927.0	2,022.6	1,933.7	1,933.7	1,933.7
1st stg press drop (psi)	412.834	433.634	406.134	406.134	406.134
4th stg ext press (psia)	1,091.2	1,141.7	1,092.5	1,092.5	1,092.5
4th stg ext enthalpy (Btu/lb)	1,386.3	1,382.5	1,367.8	1,366.6	1,365.6
Exhaust press (psia)	592.0	619.8	591.7	591.5	591.2
Exhaust enthalpy (Btu/lb)	1,315.0	1,311.8	1,303.0	1,301.1	1,299.3
Intermediate Pressure Turbine					
Efficiency (%)	91.35	91.43	91.45	91.47	91.49
Wheel power (Mw)	264.7	277.1	264.6	264.5	264.4
% Total Wheel power	29.7	29.7	28.9	28.8	28.7
8th stg bowl press (psia)	532.8	557.8	532.5	532.3	532.1
Section press drop (psi)	408.1	427.4	407.8	407.7	407.5
Exhaust press (psia)	124.7	130.4	124.7	124.6	124.6
Exhaust enthalpy (Btu/lb)	1,338.1	1,337.4	1,338.1	1,338.1	1,338.1
Low Pressure Turbines					
Wheel power (Mw)	373.3	391.3	373.1	372.9	372.8
% Total Wheel power	41.9	41.9	40.8	40.6	40.5
LPA exhaust press ("hg)	2.99	2.99	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66	1.66	1.66

IP7010356

	Current Operating Conditions- U1		Current Conditions- Varying HP Eff		
	U2 Corr Test VWO	U2 Corr Test VWO 5% OP	U2 Corr Test VWO 91% HP	U2 Corr Test VWO 92% HP	U2 Corr Test VWO 93% HP
Stage Bowl Flow					
HP 1st stg flow (lb/hr)	6,295,978	6,631,445	6,295,978	6,295,978	6,295,978
HP 2-5th stg flow (lb/hr)	6,221,959	6,553,482	6,221,749	6,221,729	6,221,710
HP 6-7th stg flow (lb/hr)	5,639,270	5,922,646	5,644,727	5,643,632	5,642,625
IP 8th stg flow (lb/hr)	5,084,145	5,325,914	5,081,620	5,079,527	5,077,604
IP 9-11th stg flow (lb/hr)	5,101,259	5,343,892	5,098,715	5,096,619	5,094,694
IP 12-14th stg flow (lb/hr)	4,867,827	5,095,444	4,865,429	4,863,457	4,861,646
LP 15th stg flow (lb/hr)	4,441,509	4,646,021	4,439,273	4,437,433	4,435,744
LP 16th stg flow (lb/hr)	4,312,029	4,508,551	4,309,869	4,308,095	4,306,465
LP 17-18th stg flow (lb/hr)	4,019,813	4,199,504	4,017,817	4,016,183	4,014,681
LPA 19th stg flow (lb/hr)	1,287,428	1,344,408	1,286,792	1,286,271	1,285,793
LPB 19th stg flow (lb/hr)	1,287,814	1,344,812	1,287,178	1,286,657	1,286,179
LPC 19th stg flow (lb/hr)	1,287,428	1,344,408	1,286,792	1,286,271	1,285,793
LPA 20th stg flow (lb/hr)	1,235,171	1,287,601	1,234,638	1,234,165	1,233,730
LPB 20th stg flow (lb/hr)	1,228,979	1,280,684	1,228,393	1,227,917	1,227,479
LPC 20th stg flow (lb/hr)	1,232,649	1,284,592	1,232,061	1,231,583	1,231,144
Stage Bowl Pressure					
HP 1st stg press (psia)	2339.83	2456.23	2339.83	2339.83	2339.83
HP 2-5th stg press (psia)	1926.96	2022.62	1933.75	1933.75	1933.75
HP 6-7th stg press (psia)	1091.15	1141.72	1092.51	1092.51	1092.51
IP 8th stg press (psia)	522.14	546.65	521.89	521.67	521.48
IP 9-11th stg press (psia)	419.41	439.10	419.21	419.04	418.88
IP 12-14th stg press (psia)	236.11	246.98	235.99	235.90	235.81
LP 15th stg press (psia)	124.71	130.36	124.65	124.60	124.55
LP 16th stg press (psia)	62.69	65.50	62.66	62.64	62.61
LP 17-18th stg press (psia)	41.04	42.84	41.02	41.00	40.99
LPA 19th stg press (psia)	11.97	12.49	11.97	11.96	11.96
LPB 19th stg press (psia)	11.97	12.49	11.97	11.96	11.96
LPC 19th stg press (psia)	11.97	12.49	11.97	11.96	11.96
LPA 20th stg press (psia)	5.22	5.45	5.22	5.22	5.22
LPB 20th stg press (psia)	4.94	5.15	4.94	4.93	4.93
LPC 20th stg press (psia)	5.04	5.26	5.04	5.04	5.04
Stage Press Drop					
HP 1st stg press drop (psi)	412.87	433.61	406.08	406.08	406.08
HP 2-5th stg press drop (psi)	835.81	880.90	841.24	841.24	841.24
HP 6-7th stg press drop (psi)	499.15	521.94	500.80	501.04	501.27
IP 8th stg press drop (psi)	102.73	107.55	102.68	102.63	102.60
IP 9-11th stg press drop (psi)	183.30	192.12	183.22	183.14	183.07
IP 12-14th stg press drop (psi)	111.40	116.62	111.34	111.30	111.26
LP 15th stg press drop (psi)	62.02	64.86	61.99	61.96	61.94
LP 16th stg press drop (psi)	21.65	22.66	21.64	21.64	21.62
LP 17-18th stg press drop (psi)	29.07	30.35	29.05	29.04	29.03
LPA 19th stg press drop (psi)	6.75	7.04	6.75	6.74	6.74
LPB 19th stg press drop (psi)	7.03	7.34	7.03	7.03	7.03
LPC 19th stg press drop (psi)	6.93	7.23	6.93	6.92	6.92
LPA 20th stg press drop (psi)	3.75	3.98	3.75	3.75	3.75
LPB 20th stg press drop (psi)	3.84	4.05	3.84	3.83	3.83
LPC 20th stg press drop (psi)	4.22	4.44	4.22	4.22	4.22

IP7010357

	Current Conditions- Varying Throttle Flows			
	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP
Gross Power (Mw)	874.4	911.5	929.8	948.0
NTCHR (Btu/kwh)	7,832	7,845	7,852	7,859
Throttle flow (kpph)	6,300	6,600	6,750	6,900
Throttle press (psia)	2,412.2	2,412.2	2,412.2	2,412.2
Throttle temp (°F)	1,000	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000	1,000
Reheater flow (kpph)	5,034.2	5,303.7	5,439.2	5,575.3
% Reheater press drop (%)	10	10	10	10
Reheater duty (MBtu/h)	1,113	1,142	1,156	1,169
High Pressure Turbine				
Efficiency (%)	92	92	92	92
Wheel power (Mw)	282.2	287.6	290.1	292.4
% Total Wheel power	31.8	31.1	30.7	30.4
Section press drop (psi)	1,767.9	1,737.7	1,722.5	1,707.3
1st stg shell press (psia)	1,982.9	1,982.9	1,982.9	1,982.9
1st stg press drop (psi)	356.934	356.934	356.934	356.934
4th stg ext press (psia)	1,133.1	1,133.1	1,133.1	1,133.1
4th stg ext enthalpy (Btu/lb)	1,370.9	1,370.9	1,370.9	1,370.8
Exhaust press (psia)	571.9	602.1	617.3	632.5
Exhaust enthalpy (Btu/lb)	1,298.0	1,303.0	1,305.5	1,307.9
Intermediate Pressure Turbine				
Efficiency (%)	91.14	91.15	91.15	91.16
Wheel power (Mw)	260.7	274.4	281.3	288.3
% Total Wheel power	29.4	29.7	29.8	30.0
8th stg bowl press (psia)	514.7	541.9	555.6	569.3
Section press drop (psi)	393.4	414.4	424.9	435.5
Exhaust press (psia)	121.3	127.5	130.7	133.8
Exhaust enthalpy (Btu/lb)	1,339.6	1,338.8	1,338.5	1,338.1
Low Pressure Turbines				
Wheel power (Mw)	344.5	362.9	372.1	381.2
% Total Wheel power	38.8	39.2	39.4	39.6
LPA exhaust press ("hg)	2.99	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66	1.66

IP7010358

	Current Conditions- Varying Throttle Flows			
	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP
Stage Bowl Flow				
HP 1st stg flow (lb/hr)	6,295,167	6,595,167	6,745,167	6,895,167
HP 2-5th stg flow (lb/hr)	6,223,102	6,523,101	6,673,101	6,823,100
HP 6-7th stg flow (lb/hr)	5,621,586	5,917,391	6,065,294	6,213,197
IP 8th stg flow (lb/hr)	5,037,080	5,306,526	5,442,001	5,577,962
IP 9-11th stg flow (lb/hr)	5,054,178	5,324,530	5,460,461	5,596,877
IP 12-14th stg flow (lb/hr)	4,819,854	5,073,381	5,200,728	5,328,445
LP 15th stg flow (lb/hr)	4,414,994	4,644,527	4,759,721	4,875,182
LP 16th stg flow (lb/hr)	4,290,681	4,511,696	4,622,556	4,733,632
LP 17-18th stg flow (lb/hr)	4,003,230	4,205,824	4,307,347	4,409,002
LPA 19th stg flow (lb/hr)	1,285,063	1,349,527	1,381,817	1,414,140
LPB 19th stg flow (lb/hr)	1,285,448	1,349,932	1,382,232	1,414,565
LPC 19th stg flow (lb/hr)	1,285,063	1,349,527	1,381,817	1,414,140
LPA 20th stg flow (lb/hr)	1,240,485	1,299,655	1,329,237	1,358,816
LPB 20th stg flow (lb/hr)	1,220,789	1,278,961	1,308,040	1,337,103
LPC 20th stg flow (lb/hr)	1,227,453	1,286,164	1,315,521	1,344,869
Stage Bowl Pressure				
HP 1st stg press (psia)	2339.83	2339.83	2339.83	2339.83
HP 2-5th stg press (psia)	1982.91	1982.91	1982.91	1982.91
HP 6-7th stg press (psia)	1133.09	1133.09	1133.09	1133.09
IP 8th stg press (psia)	504.43	531.08	544.46	557.88
IP 9-11th stg press (psia)	427.39	449.96	461.30	472.67
IP 12-14th stg press (psia)	236.64	248.90	255.05	261.22
LP 15th stg press (psia)	118.26	124.31	127.34	130.38
LP 16th stg press (psia)	62.17	65.32	66.90	68.48
LP 17-18th stg press (psia)	40.35	42.35	43.36	44.36
LPA 19th stg press (psia)	11.95	12.54	12.83	13.12
LPB 19th stg press (psia)	11.95	12.54	12.83	13.12
LPC 19th stg press (psia)	11.95	12.54	12.83	13.12
LPA 20th stg press (psia)	5.06	5.31	5.43	5.55
LPB 20th stg press (psia)	5.64	5.91	6.05	6.19
LPC 20th stg press (psia)	5.41	5.67	5.81	5.94
Stage Press Drop				
HP 1st stg press drop (psi)	356.92	356.92	356.92	356.92
HP 2-5th stg press drop (psi)	849.82	849.82	849.82	849.82
HP 6-7th stg press drop (psi)	561.17	530.96	515.78	500.57
IP 8th stg press drop (psi)	77.04	81.12	83.16	85.21
IP 9-11th stg press drop (psi)	190.75	201.06	206.25	211.45
IP 12-14th stg press drop (psi)	118.38	124.59	127.71	130.84
LP 15th stg press drop (psi)	56.09	58.99	60.44	61.90
LP 16th stg press drop (psi)	21.82	22.97	23.54	24.12
LP 17-18th stg press drop (psi)	28.40	29.81	30.53	31.24
LPA 19th stg press drop (psi)	6.89	7.23	7.40	7.57
LPB 19th stg press drop (psi)	6.31	6.63	6.78	6.93
LPC 19th stg press drop (psi)	6.54	6.87	7.02	7.18
LPA 20th stg press drop (psi)	3.59	3.84	3.96	4.08
LPB 20th stg press drop (psi)	4.54	4.81	4.95	5.09
LPC 20th stg press drop (psi)	4.59	4.85	4.99	5.12

IP7010359

	Curr Conds- 5OP Vary Throttle F		Current Conditions- Varying Throttle Pressure		
	U1 5% OP	U1 5% OP	U1 Corr Test	U1 Corr Test	U1 Corr Test
	VWO 92% HP	VWO 92% HP	VWO 92% HP	VWO 92% HP	VWO 92% HP
Gross Power (Mw)	944.8	972.2	902.4	893.5	884.6
NTCHR (Btu/kwh)	7,811	7,821	7,841	7,848	7,855
Throttle flow (kpph)	6,874	7,100	6,526	6,454	6,382
Throttle press (psia)	2,532.2	2,532.2	2,412.2	2,387.2	2,362.2
Throttle temp (°F)	1,000	1,000	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000	1,000	1,000
Reheater flow (kpph)	5,477.2	5,680.7	5,237.1	5,186.9	5,136.5
% Reheater press drop (%)	10	10	10	10	10
Reheater duty (MBtu/h)	1,202	1,223	1,135	1,121	1,107
High Pressure Turbine					
Efficiency (%)	92	92	92	92	92
Wheel power (Mw)	300.8	304.5	286.3	283.3	280.3
% Total Wheel power	31.4	30.9	31.3	31.2	31.2
Section press drop (psi)	1,834.6	1,811.9	1,745.1	1,726.6	1,707.9
1st stg shell press (psia)	2,081.6	2,081.6	1,982.9	1,962.4	1,941.8
1st stg press drop (psi)	374.634	374.634	356.934	353.184	349.534
4th stg ext press (psia)	1,189.5	1,189.5	1,133.1	1,121.3	1,109.6
4th stg ext enthalpy (Btu/lb)	1,367.5	1,367.5	1,370.9	1,371.6	1,372.3
Exhaust press (psia)	621.6	644.3	594.7	589	583.4
Exhaust enthalpy (Btu/lb)	1,298.4	1,301.9	1,301.8	1,302.5	1,303.2
Intermediate Pressure Turbine					
Efficiency (%)	91.26	91.27	91.15	91.13	91.1
Wheel power (Mw)	283.3	293.7	271.0	268.4	265.9
% Total Wheel power	29.6	29.8	29.6	29.6	29.6
8th stg bowl press (psia)	559.4	579.9	535.2	530.1	525.0
Section press drop (psi)	427.9	443.7	409.2	405.2	401.3
Exhaust press (psia)	131.5	136.2	126.0	124.9	123.7
Exhaust enthalpy (Btu/lb)	1,338.3	1,337.8	1,339.0	1,339.1	1,339.3
Low Pressure Turbines					
Wheel power (Mw)	374.6	388.2	358.4	355.0	351.6
% Total Wheel power	39.1	39.4	39.1	39.2	39.2
LPA exhaust press ("hg)	2.99	2.99	2.99	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24	2.24	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66	1.66	1.66	1.66

IP7010360

	Curr Conds- 5OP Vary Throttle F		Current Conditions- Varying Throttle Pressure		
	U1 5% OP VWO 92% HP	U1 5% OP VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP	U1 Corr Test VWO 92% HP
Stage Bowl Flow					
HP 1st stg flow (lb/hr)	6,868,738	7,094,910	6,521,268	6,449,194	6,377,229
HP 2-5th stg flow (lb/hr)	6,792,826	7,018,997	6,449,202	6,377,926	6,306,757
HP 6-7th stg flow (lb/hr)	6,183,346	6,406,355	5,844,525	5,774,245	5,704,071
IP 8th stg flow (lb/hr)	5,480,202	5,683,590	5,239,973	5,189,675	5,139,291
IP 9-11th stg flow (lb/hr)	5,498,849	5,702,922	5,257,753	5,207,274	5,156,710
IP 12-14th stg flow (lb/hr)	5,236,641	5,427,631	5,010,793	4,963,475	4,916,065
LP 15th stg flow (lb/hr)	4,791,482	4,964,074	4,587,886	4,545,193	4,502,404
LP 16th stg flow (lb/hr)	4,652,985	4,818,988	4,457,172	4,416,093	4,374,916
LP 17-18th stg flow (lb/hr)	4,334,938	4,486,805	4,155,868	4,118,273	4,080,577
LPA 19th stg flow (lb/hr)	1,390,547	1,438,827	1,333,635	1,321,682	1,309,696
LPB 19th stg flow (lb/hr)	1,390,964	1,439,259	1,334,035	1,322,079	1,310,089
LPC 19th stg flow (lb/hr)	1,390,547	1,438,827	1,333,635	1,321,682	1,309,696
LPA 20th stg flow (lb/hr)	1,337,377	1,381,548	1,285,083	1,274,085	1,263,050
LPB 20th stg flow (lb/hr)	1,315,825	1,359,191	1,264,635	1,253,868	1,243,064
LPC 20th stg flow (lb/hr)	1,323,391	1,367,186	1,271,704	1,260,834	1,249,928
Stage Bowl Pressure					
HP 1st stg press (psia)	2456.23	2456.23	2339.83	2315.58	2291.33
HP 2-5th stg press (psia)	2081.55	2081.55	1982.91	1962.36	1941.81
HP 6-7th stg press (psia)	1189.46	1189.46	1133.09	1121.35	1109.60
IP 8th stg press (psia)	548.23	568.30	524.50	519.53	514.55
IP 9-11th stg press (psia)	464.50	481.50	444.39	440.17	435.95
IP 12-14th stg press (psia)	256.78	266.00	245.87	243.59	241.29
LP 15th stg press (psia)	128.17	132.71	122.82	121.69	120.56
LP 16th stg press (psia)	67.33	69.69	64.54	63.96	63.37
LP 17-18th stg press (psia)	43.63	45.13	41.86	41.49	41.12
LPA 19th stg press (psia)	12.91	13.35	12.39	12.28	12.17
LPB 19th stg press (psia)	12.91	13.35	12.39	12.28	12.17
LPC 19th stg press (psia)	12.91	13.35	12.39	12.28	12.17
LPA 20th stg press (psia)	5.46	5.65	5.25	5.20	5.15
LPB 20th stg press (psia)	6.09	6.29	5.85	5.79	5.74
LPC 20th stg press (psia)	5.84	6.04	5.61	5.56	5.51
Stage Press Drop					
HP 1st stg press drop (psi)	374.68	374.68	356.92	353.22	349.52
HP 2-5th stg press drop (psi)	892.09	892.09	849.82	841.01	832.21
HP 6-7th stg press drop (psi)	568.18	545.12	538.42	532.32	526.21
IP 8th stg press drop (psi)	83.73	86.80	80.11	79.36	78.60
IP 9-11th stg press drop (psi)	207.72	215.50	198.52	196.58	194.66
IP 12-14th stg press drop (psi)	128.61	133.29	123.05	121.90	120.73
LP 15th stg press drop (psi)	60.84	63.02	58.28	57.73	57.19
LP 16th stg press drop (psi)	23.70	24.56	22.68	22.47	22.25
LP 17-18th stg press drop (psi)	30.72	31.78	29.47	29.21	28.95
LPA 19th stg press drop (psi)	7.45	7.70	7.14	7.08	7.02
LPB 19th stg press drop (psi)	6.82	7.06	6.54	6.49	6.43
LPC 19th stg press drop (psi)	7.07	7.31	6.78	6.72	6.66
LPA 20th stg press drop (psi)	3.99	4.18	3.78	3.73	3.68
LPB 20th stg press drop (psi)	4.99	5.19	4.75	4.69	4.64
LPC 20th stg press drop (psi)	5.02	5.22	4.79	4.74	4.69

IP7010361

	Design Corrtns U1 Corr Test VWO 91% HP	Actual Cond U1 Corr Test VWO 91% HP	Actual Cond- w U1 Corr Test VWO 91% HP
Gross Power (Mw)	920.0	920.0	920.0
NTCHR (Btu/kwh)	7,865	7,886	7,861
Throttle flow (kpph)	6,694	6,691	6,694
Throttle press (psia)	2,412.2	2,412.2	2,479.4
Throttle temp (°F)	1,000	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000	1,000
Reheater flow (kpph)	5,390.3	5,386.6	5,348.1
% Reheater press drop (%)	10	6	6
Reheater duty (MBtu/h)	1,142	1,164	1,182
High Pressure Turbine			
Efficiency (%)	91	91	91
Wheel power (Mw)	285.9	293.3	298.0
% Total Wheel power	30.6	31.5	32.0
Section press drop (psi)	1,728.0	1,754.4	1,823.7
1st stg shell press (psia)	1,982.9	1,982.9	2,038.2
1st stg press drop (psi)	356.934	356.934	366.818
4th stg ext press (psia)	1,133.1	1,133.1	1,164.7
4th stg ext enthalpy (Btu/lb)	1,371.9	1,372.0	1,370.1
Exhaust press (psia)	611.8	585.4	581.3
Exhaust enthalpy (Btu/lb)	1,306.3	1,302.1	1,297.1
Intermediate Pressure Turbine			
Efficiency (%)	91.13	91.16	91.21
Wheel power (Mw)	278.8	278.7	276.7
% Total Wheel power	29.9	29.9	29.7
8th stg bowl press (psia)	550.6	550.3	546.4
Section press drop (psi)	421.1	420.9	417.9
Exhaust press (psia)	129.5	129.4	128.5
Exhaust enthalpy (Btu/lb)	1,338.6	1,338.6	1,338.7
Low Pressure Turbines			
Wheel power (Mw)	368.8	360.6	357.9
% Total Wheel power	39.5	38.7	38.4
LPA exhaust press ("hg)	2.99	3.84	3.84
LPB exhaust press ("hg)	2.24	2.87	2.87
LPC exhaust press ("hg)	1.66	2.67	2.68

IP7010362

	Design Corrtns U1 Corr Test VWO 91% HP	Actual Cond U1 Corr Test VWO 91% HP	Actual Cond- w U1 Corr Test VWO 91% HP
Stage Bowl Flow			
HP 1st stg flow (lb/hr)	6,688,839	6,686,648	6,688,872
HP 2-5th stg flow (lb/hr)	6,616,789	6,614,598	6,614,672
HP 6-7th stg flow (lb/hr)	6,009,769	6,007,609	6,007,682
IP 8th stg flow (lb/hr)	5,393,099	5,389,429	5,351,050
IP 9-11th stg flow (lb/hr)	5,411,390	5,406,927	5,368,456
IP 12-14th stg flow (lb/hr)	5,154,768	5,150,526	5,114,462
LP 15th stg flow (lb/hr)	4,718,200	4,713,701	4,680,691
LP 16th stg flow (lb/hr)	4,582,606	4,578,273	4,546,435
LP 17-18th stg flow (lb/hr)	4,270,777	4,266,888	4,237,586
LPA 19th stg flow (lb/hr)	1,370,189	1,369,536	1,360,189
LPB 19th stg flow (lb/hr)	1,370,600	1,369,947	1,360,597
LPC 19th stg flow (lb/hr)	1,370,189	1,369,536	1,360,189
LPA 20th stg flow (lb/hr)	1,318,596	1,329,897	1,321,359
LPB 20th stg flow (lb/hr)	1,297,575	1,308,876	1,300,361
LPC 20th stg flow (lb/hr)	1,304,955	1,316,091	1,307,518
Stage Bowl Pressure			
HP 1st stg press (psia)	2339.83	2339.83	2405.05
HP 2-5th stg press (psia)	1982.91	1982.91	2038.18
HP 6-7th stg press (psia)	1133.09	1133.09	1164.67
IP 8th stg press (psia)	539.63	539.27	535.48
IP 9-11th stg press (psia)	457.21	456.83	453.62
IP 12-14th stg press (psia)	252.83	252.62	250.88
LP 15th stg press (psia)	126.25	126.13	125.25
LP 16th stg press (psia)	66.33	66.27	65.81
LP 17-18th stg press (psia)	43.00	42.96	42.67
LPA 19th stg press (psia)	12.73	12.72	12.63
LPB 19th stg press (psia)	12.73	12.72	12.63
LPC 19th stg press (psia)	12.73	12.72	12.63
LPA 20th stg press (psia)	5.38	5.43	5.40
LPB 20th stg press (psia)	6.00	6.05	6.01
LPC 20th stg press (psia)	5.76	5.81	5.77
Stage Press Drop			
HP 1st stg press drop (psi)	356.92	356.92	366.87
HP 2-5th stg press drop (psi)	849.82	849.82	873.51
HP 6-7th stg press drop (psi)	521.26	547.69	583.39
IP 8th stg press drop (psi)	82.42	82.44	81.86
IP 9-11th stg press drop (psi)	204.38	204.21	202.74
IP 12-14th stg press drop (psi)	126.58	126.49	125.63
LP 15th stg press drop (psi)	59.92	59.86	59.44
LP 16th stg press drop (psi)	23.33	23.31	23.14
LP 17-18th stg press drop (psi)	30.27	30.24	30.04
LPA 19th stg press drop (psi)	7.35	7.29	7.23
LPB 19th stg press drop (psi)	6.73	6.67	6.62
LPC 19th stg press drop (psi)	6.97	6.91	6.86
LPA 20th stg press drop (psi)	3.91	3.54	3.51
LPB 20th stg press drop (psi)	4.90	4.64	4.60
LPC 20th stg press drop (psi)	4.94	4.50	4.45

IP7010363

	Study- HP FW Heater Strings o/s	
	U1 VWO Test	U1 VWO 5% OP
	1 htr string o/s	1 htr string o/s
Gross Power (Mw)	954.8	1001.1
NTCHR (Btu/kwh)	8,121	8,101
Throttle flow (kpph)	6,526	6,874
Throttle press (psia)	2,412.2	2,532.2
Throttle temp (°F)	1,000	1,000
Hot Reheat temp (°F)	1,000	1,000
Reheater flow (kpph)	5,862.9	6,159.8
% Reheater press drop (%)	10	10
Reheater duty (MBtu/h)	1,133	1,204
High Pressure Turbine		
Efficiency (%)	85.27	85.28
Wheel power (Mw)	252.5	264.0
% Total Wheel power	26.1	26.0
Section press drop (psi)	1,675.1	1,758.4
1st stg shell press (psia)	1,982.3	2,080.8
1st stg press drop (psi)	357.534	375.434
4th stg ext press (psia)	1,205.6	1,263.5
4th stg ext enthalpy (Btu/lb)	1,382.5	1,378.8
Exhaust press (psia)	664.7	697.8
Exhaust enthalpy (Btu/lb)	1,323.6	1,320.5
Intermediate Pressure Turbine		
Efficiency (%)	91.03	91.14
Wheel power (Mw)	300.3	315.3
% Total Wheel power	31.0	31.0
8th stg bowl press (psia)	598.2	628.1
Section press drop (psi)	453	475.8
Exhaust press (psia)	145.2	152.3
Exhaust enthalpy (Btu/lb)	1,340.9	1,340.2
Low Pressure Turbines		
Wheel power (Mw)	415.9	436.5
% Total Wheel power	42.9	43.0
LPA exhaust press ("hg)	2.99	2.99
LPB exhaust press ("hg)	2.24	2.24
LPC exhaust press ("hg)	1.66	1.66

Conditions: GE design HBD submittal 5, design fwhtr ttd's and dca's, 10% reheater pressure drop, design condenser back pressures, 1% cycle makeup, 0.1% blowdown, HP efficiency calc from throttle to exhaust after N2 mix, IP efficiency calc from cold reheat to exhaust after HP packing remix.

IP7010364

	Study- HP FW Heater Strings o/s	
	U1 VWO Test	U1 VWO 5% OP
	1 htr string o/s	1 htr string o/s
Stage Bowl Flow		
HP 1st stg flow (lb/hr)	6,521,268	6,868,738
HP 2-5th stg flow (lb/hr)	6,449,380	6,793,021
HP 6-7th stg flow (lb/hr)	6,158,519	6,477,887
IP 8th stg flow (lb/hr)	5,865,471	6,162,496
IP 9-11th stg flow (lb/hr)	5,885,308	6,183,393
IP 12-14th stg flow (lb/hr)	5,756,362	6,045,976
LP 15th stg flow (lb/hr)	5,278,887	5,540,438
LP 16th stg flow (lb/hr)	5,123,528	5,374,742
LP 17-18th stg flow (lb/hr)	4,768,904	4,998,151
LPA 19th stg flow (lb/hr)	1,528,911	1,601,693
LPB 19th stg flow (lb/hr)	1,529,370	1,602,173
LPC 19th stg flow (lb/hr)	1,528,911	1,601,693
LPA 20th stg flow (lb/hr)	1,464,308	1,530,804
LPB 20th stg flow (lb/hr)	1,440,781	1,505,771
LPC 20th stg flow (lb/hr)	1,449,500	1,515,191
Stage Bowl Pressure		
HP 1st stg press (psia)	2339.83	2456.23
HP 2-5th stg press (psia)	1982.34	2080.78
HP 6-7th stg press (psia)	1205.60	1263.46
IP 8th stg press (psia)	586.24	615.50
IP 9-11th stg press (psia)	496.69	521.48
IP 12-14th stg press (psia)	282.85	296.86
LP 15th stg press (psia)	141.55	148.45
LP 16th stg press (psia)	74.32	77.90
LP 17-18th stg press (psia)	48.11	50.38
LPA 19th stg press (psia)	14.23	14.89
LPB 19th stg press (psia)	14.23	14.89
LPC 19th stg press (psia)	14.23	14.89
LPA 20th stg press (psia)	6.00	6.27
LPB 20th stg press (psia)	6.68	6.99
LPC 20th stg press (psia)	6.41	6.71
Stage Press Drop		
HP 1st stg press drop (psi)	357.49	375.45
HP 2-5th stg press drop (psi)	776.74	817.32
HP 6-7th stg press drop (psi)	540.93	565.62
IP 8th stg press drop (psi)	89.55	94.02
IP 9-11th stg press drop (psi)	213.84	224.62
IP 12-14th stg press drop (psi)	141.30	148.41
LP 15th stg press drop (psi)	67.23	70.55
LP 16th stg press drop (psi)	26.21	27.52
LP 17-18th stg press drop (psi)	33.88	35.49
LPA 19th stg press drop (psi)	8.23	8.62
LPB 19th stg press drop (psi)	7.55	7.90
LPC 19th stg press drop (psi)	7.82	8.18
LPA 20th stg press drop (psi)	4.53	4.80
LPB 20th stg press drop (psi)	5.58	5.89
LPC 20th stg press drop (psi)	5.59	5.89

IP7010365