High Pressure Turbine Replacement- Proposed Design

11/10/00

U2 Proposed Design Tests, Actual Cond Press

	U2 92% HP VWO 6,750 kpph	U2 92% HP VWO 6,900 kpph	U2 92% HP VWO 6,975 kpph	U2 93% HP VWO 6,750 kpph
Gross Power (Mw)	960.7	979.6	989.0	963.6
NTCHR (Btu/kwh)	7,638	7,644	7,647	7,623
Throttle flow (kpph)	**6,750**	**6,900**	**6,975**	**6,750**
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)	5,483.3	5,619.8	5,688.2	5,481.3
% Reheater press drop (%)	7	7	7	7
Reheater duty (MBtu/h)	1,162	1,175	1,181	1,170
High Pressure Turbine				
Efficiency (%)	92	92	92	93
Wheel power (Mw)	293.2	295.8	297.0	296.4
% Total Wheel power	30.1	29.8	29.6	30.4
Section press drop (psi)	1,722.2	1,707.1	1,699.5	1,722.5
1st stg shell press (psia)	1,933.8	1,933.8	1,933.8	1,933.8
1st stg press drop (psi)	406.1	406.1	406.1	406.1
4th stg ext press (psia)	1,092.5	1,092.5	1,092.5	1,092.5
4th stg ext enthalpy (Btu/lb)	1,366.7	1,366.6	1,366.6	1,365.6
Exhaust press (psia)	617.6	632.7	640.3	617.3
Exhaust enthalpy (Btu/lb)	1,305.4	1,307.8	1,309.0	1,303.7
Intermediat Pressure Turbine				
Efficiency (%)	91.51	91.52	91.53	91.53
Wheel power (Mw)	285.3	292.3	295.8	285.2
% Total Wheel power	29.3	29.4	29.5	29.2
8th stg bowl press (psia)	562.85	576.66	583.58	562.65
Section press drop (psi)	428.76	439.39	444.71	428.61
Exhaust press (psia)	134.09	137.3	138.9	134.04
Exhaust enthalpy (Btu/lb)	1,337.0	1,336.6	1,336.4	1,337.0
Low Pressure Turbines				
Wheel power (Mw)	395.2	404.8	409.6	395.0
% Total Wheel power	40.6	40.8	40.9	40.4
LPA exhaust press ("hg)	3.87	3.97	4.02	3.87
LPB exhaust press ("hg)	2.89	2.95	2.98	2.89
LPC exhaust press ("hg)	2.70	2.75	2.78	2.70

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High Pressure Turbine Replacement- Proposed Design

11/10/00

U1 Proposed Design Tests, Actual Cond Press,

	U1 92% HP VWO 6,750 kpph	U1 92% HP VWO 6,900 kpph	U1 92% HP VWO 6,975 kpph	U1 93% HP VWO 6,750 kpph
Gross Power (Mw)	929.7	947.7	956.7	932.7
NTCHR (Btu/kwh)	7,878	7,886	7,891	7,862
Throttle flow (kpph)	**6,750**	**6,900**	**6,975**	**6,750**
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)	5,440.1	5,575.3	5,643.0	5,438.1
% Reheater press drop (%)	6	6	6	6
Reheater duty (MBtu/h)	1,179	1,193	1,200	1,188
<u>High Pressure Turbine</u>				
Efficiency (%)	92	92	92	93
Wheel power (Mw)	297.0	299.7	301.1	300.2
% Total Wheel power	31.5	31.2	31.1	31.8
Section press drop (psi)	1,748.7	1,734.2	1,726.9	1,748.9
1st stg shell press (psia)	1,982.9	1,982.9	1,982.9	1,982.9
1st stg press drop (psi)	356.9	356.9	356.9	356.9
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	1,369.9
Exhaust press (psia)	591.1	605.6	612.9	590.9
Exhaust enthalpy (Btu/lb)	1,301.3	1,303.6	1,304.8	1,299.5
<u>Intermediat Pressure Turbine</u>				
Efficiency (%)	91.19	91.20	91.20	91.22
Wheel power (Mw)	281.4	288.3	291.7	281.3
% Total Wheel power	29.9	30.0	30.1	29.8
8th stg bowl press (psia)	544.54	557.88	564.57	544.35
Section press drop (psi)	417.22	427.54	432.72	417.08
Exhaust press (psia)	127.32	130.3	131.9	127.27
Exhaust enthalpy (Btu/lb)	1,338.4	1,338.1	1,337.9	1,338.4
<u>Low Pressure Turbines</u>				
Wheel power (Mw)	364.0	372.6	376.9	363.9
% Total Wheel power	38.6	38.8	38.9	38.5
LPA exhaust press ("hg)	3.87	3.97	4.02	3.87
LPB exhaust press ("hg)	2.89	2.95	2.98	2.89
LPC exhaust press ("hg)	2.70	2.75	2.78	2.70

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