

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8711020408 DOC. DATE: 87/10/27 NOTARIZED: NO DOCKET #
 FACIL: 50-250 Turkey Point Plant, Unit 3, Florida Power and Light C 05000250
 50-251 Turkey Point Plant, Unit 4, Florida Power and Light C 05000251
 AUTH. NAME AUTHDR AFFILIATION
 WOODY, C. O. Florida Power & Light Co.
 RECIP. NAME RECIPIENT AFFILIATION
 Document Control Branch (Document Control Desk)

SUBJECT: Provides responses to chemistry survey concerning feedwater
 & condensate sys. Daily chemistry records retrieved from
 microfilm & averaged to determine yearly values, effort
 that needed five man-wks.

DISTRIBUTION CODE: A001D COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 7
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	NRR/DEST/CEB	1 1	NRR/DEST/MTB	1 1
	NRR/DEST/RSB	1 1	NRR/DOEA/TSB	1 1
	NRR/PMAS/ILRB	1 1	OGC/HDS2	1 0
	<u>REG FILE</u> 01	1 1	RES/DE/EIB	1 1
EXTERNAL:	EG&G BRUSKE, S	1 1	LPDR	1 1
	NRC PDR	1 1	NSIC	1 1



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OCTOBER 27 1987

L-87-431

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555


Gentlemen:

Re: Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Water Chemistry Survey

Provided are the responses to the chemistry survey concerning feedwater and condensate system. The chemistry records required retrieval from microfilm and then averaging the daily records for your yearly values. This effort required five man-weeks.

Should there be further questions, please contact us.

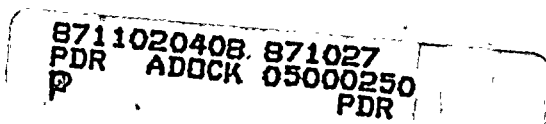
Very truly yours,


C. O. Woody
Group Vice President
Nuclear Energy

COW/RG/gp

Attachment

cc: Dr. J. Nelson Grace, Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant



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PWR EROSION-CORROSION QUESTIONNAIRE
(Check or Circle All Applicable)

ENCLOSURE

Utility Company: Florida Power & Light Co. Unit Name: Turkey Pt. 3 MWe 666

Filled by: R. Gouley Date: 10/20 Phone No. 6943616

In service: 19 72. Water Treatment: AVT with ammonia, morpholine, hydrazine.

Condensate polishers: none, cation, powdex mixed bed; 100% of feedwater flow; installed 19 82.; operated in: H-OH, NH₄-OH form.

Cooling water: fresh, salt, brackish, cooling tower.

Copper alloy condenser tubing: yes, no. Copper alloy FW heater tubes: LP, HP, none.

Boric acid used since: 19 ...; during: operation, layup, low load soaks, other.....

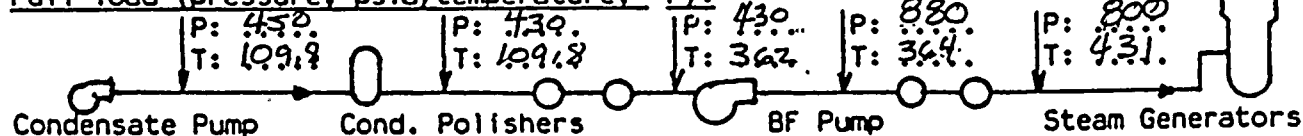
A. EROSION-CORROSION EXPERIENCE

1. Erosion-Corrosion identified in wet steam piping: yes, no.
2. Erosion-Corrosion of MSR Chevrons or mesh: yes, no. IN MESH CHEVRONS JUST INSTALLED
Chevron material: stainless steel, carbon steel, other MSR WAS CARBON STEEL
3. Erosion-Corrosion of feedwater piping: yes, no. Date found SPRING 87.....
Feedwater piping materials: CARBON STEEL.....
4. Erosion-Corrosion of: 32 elbows, 3 Ts, 1 diffusers, 1 reducers,
.... valves, orifices, 4 other components (specify) PIPE HP Joints, Gland
STEAM SEAL JOINT & LP
INNER CYLINDER JOINTS & Blade
5. Erosion-Corrosion of J-Tubes: yes, no.
6. Erosion-Corrosion of feedwater distribution ring: yes, no
7. Erosion-Corrosion of turbine: HP, LP identify components: ROTOR BLADING...
8. Erosion-Corrosion of other cycle components (identify) MSR INTERVALS.....
9. Feedwater temperature range where erosion-corrosion found: from 362 to 370 °F
10. Inspection frequency for feedwater piping 1 1/2 years. Steam lines 1 1/2 years.
11. Inspection methods used: ultrasonic thickness, radiography, visual, other.....

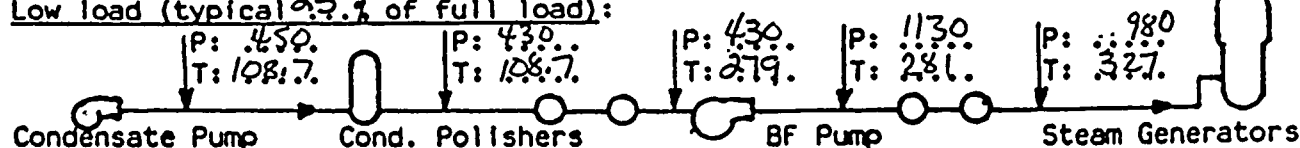
B. PIPING DESIGN

1. Maximum feedwater flow velocity 12.8 feet/second.
2. No. of feed pumps operating at 100% load 2.... second pump On at 60% load.
3. Maximum flow velocity when only 1 pump is operating 14.3 feet/second.
4. No. of feedwater piping components: 120 elbows, 2 Ts, 1 diffusers,
22 reducers, 46 valves, 2 orifices, From Heater Drain Pump Discharge to
..... other components (specify) STEAM GENERATORS.....
5. Maximum flow velocity in wet steam piping 125 feet/second. Pressure ± 30 psi
6. Feedwater pressures and temperatures (actual (preferred) or design):

Full load (pressure, psia/temperature, °F):



Low load (typical 25% of full load):



Please attach copies of the heat balance diagrams for your actual full load and typical low load.



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C. FEEDWATER AND CONDENSATE CHEMISTRY

1. Please complete the attached Table.
2. Feedwater chemistry history (average or typical values, final feedwater):

Year of oper.:	1st	1974	1976	1978	1980	1982	1983	1985	1986	1987
pH of FW maximum	9.65	9.62	9.63	10.05	9.46	9.65	9.90	11.0	9.87	9.51
minimum	7.20	6.88	7.92	8.38	6.98	7.32	7.80	5.15	7.73	9.20
average	8.94	8.95	9.03	9.00	8.99	9.04	9.30	9.41	9.30	9.43
pH of condensate maximum	9.10	9.26	9.58	9.38	9.40	9.45	9.80	9.83	9.72	9.60
minimum	7.55	7.61	7.25	8.40	7.02	8.53	8.60	6.58	9.01	9.22
average	8.84	8.82	9.07	8.99	8.97	9.05	9.31	9.43	9.41	9.44
DO, ppb maximum	>100	50	>100	40	>100	>100	80	40	40	50
minimum	5	1	<5	<5	<5	<5	<5	<5	<5	<5
average	47.5	7.4	<5	<5	<5	<5	<5	10	5	<5
Cat. Cond. uS/cm	N/A								0.52	0.16
Spec. Cond. uS/cm	487	3.48	3.95	3.34	3.21	3.04	6.30	7.71	9.50	9.29
NH ₃ , ppb	456	258	520	298	N/A	556	1442	1604	2522	2210
N ₂ H ₄ , ppb	29.35	22.81	32.17	26.20	34.98	38.34	42.15	79.48	111.46	69.92
Boron, ppb	N/A									
Air Inleakage, SCFM	N/A							23.1	23.4	28.6

Please send any water chemistry summary reports and data.

3. Chemical additions

- 3.1 Ammonia: typical concentration in feedwater ~~2000~~ ppb; added at ~~FEEDWATER~~
- 3.2 Hydrazine: typical concentration in feedwater ~~50~~ ppb; added at ~~FEEDWATER~~
- 3.3 Boric acid: typical concentration in feedwater ~~N/A~~ ppb as B;
added at ~~N/A~~.....

D. MATERIALS

Fitting: A-105 and A-234 Gr WPB, UPC
A-106 Gr B&C

1. Feedwater piping - list ASTM or other specification numbers
2. Wet steam piping: A-106 Gr B and A-53 Gr B
Fitting: A-105 and A 234 Gr WPB
3. Attach results of chemical analysis by you or pipe vendors.

Records are not available.

Detailed results were not required at time of procurement, 1967.

PWR EROSION-CORROSION QUESTIONNAIRE
(Check or Circle All Applicable)

ENCLOSURE

Utility Company: Florida Power & Light Co. Unit Name: Turkey Pt. 4 MWE 1666

Filled by: R. Groudy Date: 10/20/87 Phone No. 694 3616

In service: 19 73. Water Treatment: AVT with ammonia, morpholine, hydrazine.

Condensate polishers: none, cation, powdex, mixed bed; 100% of feedwater flow; installed 19 83; operated in: H-OH, NH4-OH form.

Cooling water: fresh, salt, brackish, cooling tower.

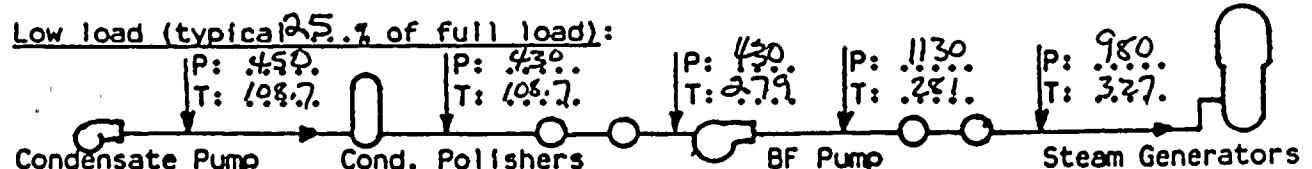
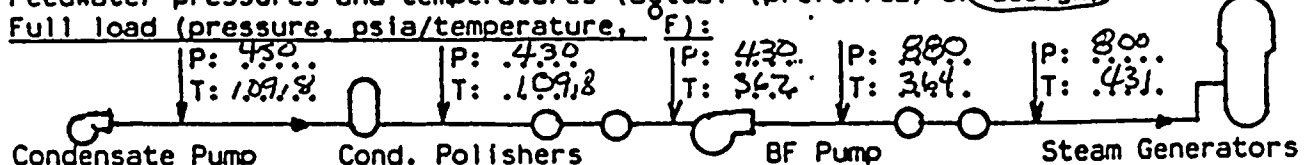
Copper alloy condenser tubing: yes, no Copper alloy FW heater tubes: LP, HP, none. Boric acid used since: 19 ...; during: operation, layup, low load soaks, other.....

A. EROSION-CORROSION EXPERIENCE

1. Erosion-Corrosion identified in wet steam piping: yes no.
2. Erosion-Corrosion of MSR Chevrons or mesh: yes, no. IN MESH, Chevrons Replaid in 1986
Chevron material: stainless steel, carbon steel other
3. Erosion-Corrosion of feedwater piping: yes, no. Date found DEC. 1986.....
Feedwater piping materials: CARBON STEEL.....
4. Erosion-Corrosion of: 97 elbows, ... Ts, ... diffusers, ... reducers, ... valves, ... orifices, 5 other components (specify) PIPE, HP JOINT, Gland Steam SEAL JOINT, LP INNER CYLINDER JOINTS, SLIDES
5. Erosion-Corrosion of J-Tubes: yes, no.
6. Erosion-Corrosion of feedwater distribution ring: yes, no.
7. Erosion-Corrosion of turbine: HP, LP; identify components: ROTOR BLADING.....
8. Erosion-Corrosion of other cycle components (identify) MSR INTERNALS.....
9. Feedwater temperature range where erosion-corrosion found: from 360 to 370 °F
10. Inspection frequency for feedwater piping 1 1/2 years. Steam lines 1 1/2 years.
11. Inspection methods used: ultrasonic thickness, radiography, visual, other.....

B. PIPING DESIGN

1. Maximum feedwater flow velocity 12.8 feet/second.
2. No. of feed pumps operating at 100% load 2..., second pump On at 60% load.
3. Maximum flow velocity when only 1 pump is operating 17.3 feet/second.
4. No. of feedwater piping components: 120 elbows, 21 Ts, ... diffusers, 22 reducers, 46 valves, 2 orifices, From Heater Discharge to Steam GENERATORS other components (specify)
5. Maximum flow velocity in wet steam piping 125 feet/second.
6. Feedwater pressures and temperatures (actual (preferred) or design): Pressure ± 30 psi



Please attach copies of the heat balance diagrams for your actual full load and typical low load.

C. FEEDWATER AND CONDENSATE CHEMISTRY

1. Please complete the attached Table.
2. Feedwater chemistry history (average or typical values, final feedwater):

Year of oper.:	1st	1974	1976	1978	1980	1982	1983	1985	1986	1987
pH of FW maximum	9.35	9.92	9.44	9.52	9.63	9.81	9.74	9.78	9.71	9.47
minimum	8.50	6.70	6.62	7.10	7.02	8.20	7.87	6.81	9.03	8.17
average	9.03	8.88	8.98	8.89	8.97	9.23	9.35	9.42	9.40	9.15
pH of condensate maximum	9.42	10.05	9.40	9.32	9.50	9.84	9.67	9.78	9.68	9.54
minimum	8.55	7.10	7.52	7.66	7.36	8.65	8.12	6.84	6.84	8.00
average	8.98	8.76	9.00	8.92	8.97	9.24	9.38	9.42	9.37	9.10
DO, ppb maximum	45	50	7100	7100	7100	7100	<5	60	40	20
minimum	<5	<5	<5	<5	<5	<5	<5	<5	<5	<10
average	<5	32.5	<5	<5	<5	<5	<5	5	<5	<5
Cat. Cond. uS/cm	N/A								0.21	0.77
Spec. Cond. uS/cm	3.61	3.50	6.58	3.34	3.35	5.55	7.04	8.37	N/A	8.83
NH ₃ , ppb	N/A	260	445	459	N/A	942	1754	2070	2650	2925
N ₂ H ₄ , ppb	49.88	22.83	23.15	25.45	31.64	42.78	45.51	131	119	183
Boron, ppb	N/A									
Air Inleakage, SCFM	N/A							17	22	25

Please send any water chemistry summary reports and data.

3. Chemical additions

- 3.1 Ammonia: typical concentration in feedwater 2000 ppb; added at Feedwater.
- 3.2 Hydrazine: typical concentration in feedwater 50 ppb; added at Feedwater
- 3.3 Boric acid: typical concentration in feedwater N/A ppb as B;
added at

D. MATERIALS

Fitting: A-105 and A-234 Gr WPB, 1

1. Feedwater piping - list ASTM or other specification numbers A-106 Gr B & C.....
A-106 Gr B and A-53 Gr B
2. Wet steam piping:
Fitting: A-105 and A-234 Gr WPB
3. Attach results of chemical analysis by you or pipe vendors.

Records are not available.

Detailed results were not required at time of procurement, 1967.

LCD-1263

CALCULATIONS BASED ON
NO RADIATION LOSSES TO
HEATER OR EXTRACTION PIPING
LOCATED IN CONDENSER NECK.

PRIMARY VALVE AND ABOVE
HEAT RATES ARE CALCULATED
ON LOCUS OF VALVE POINTS.

DOOR'S DRAWING REVIEW

TYPE - M.E. only present.

DATE - 5/24/54 EAF: M.E. only present.

THIS REVIEW IS BASED ON THE DRAWING AND THE DATA SUBMITTED.

REMARKS - See 1st and 2nd sheets.

BY - M.E. only present.

THIS REVIEW IS BASED ON THE DRAWING AND THE DATA SUBMITTED.

DATE - 5/24/54 EAF: M.E. only present.

REMARKS - See 1st and 2nd sheets.

BY - M.E. only present.

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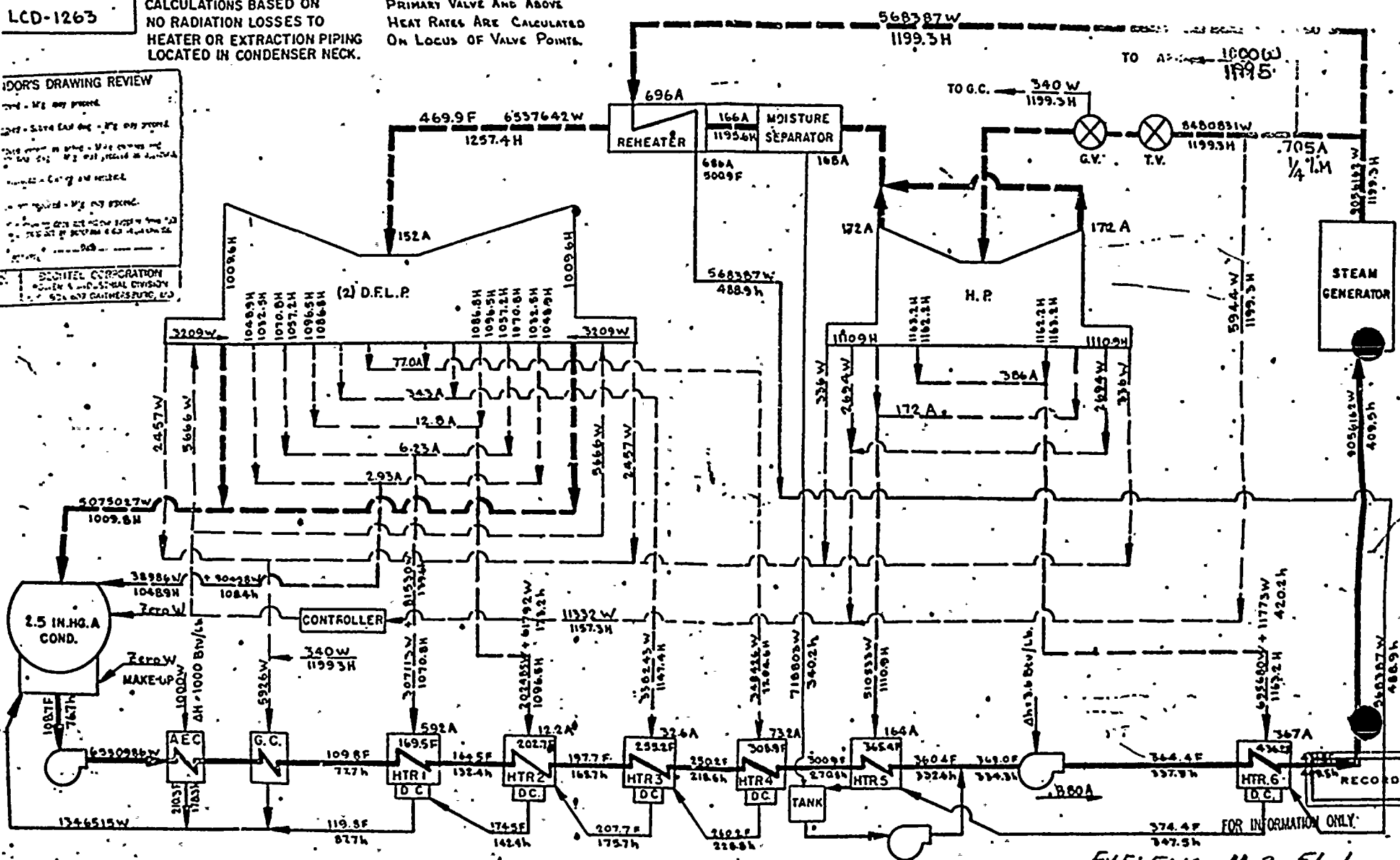
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REMARKS - See 1st and 2nd sheets.

BY - M.E. only present.

THIS REVIEW IS BASED ON THE DRAWING AND THE DATA SUBMITTED.

DATE - 5/24/54 EAF: M.E. only present.



HEAT RATE $\frac{9056162 (1199.3 - 409.5)}{688415}$

10390 BTU
KWH

726317 KW TURBINE GENERATOR UNIT
894082 KVA 0.85 PF 22000 VOLTS 75 #H
745 PSIA 510 FTT. 2.5 IN Hg. ABS.
688415 KW LOAD HEAT BALANCE TC4F-44
INITIAL GUARANTEE AT 705A INLET
(LOW PRESSURE)

WESTINGHOUSE ELECTRIC CORP.
LESTER, PENNA.

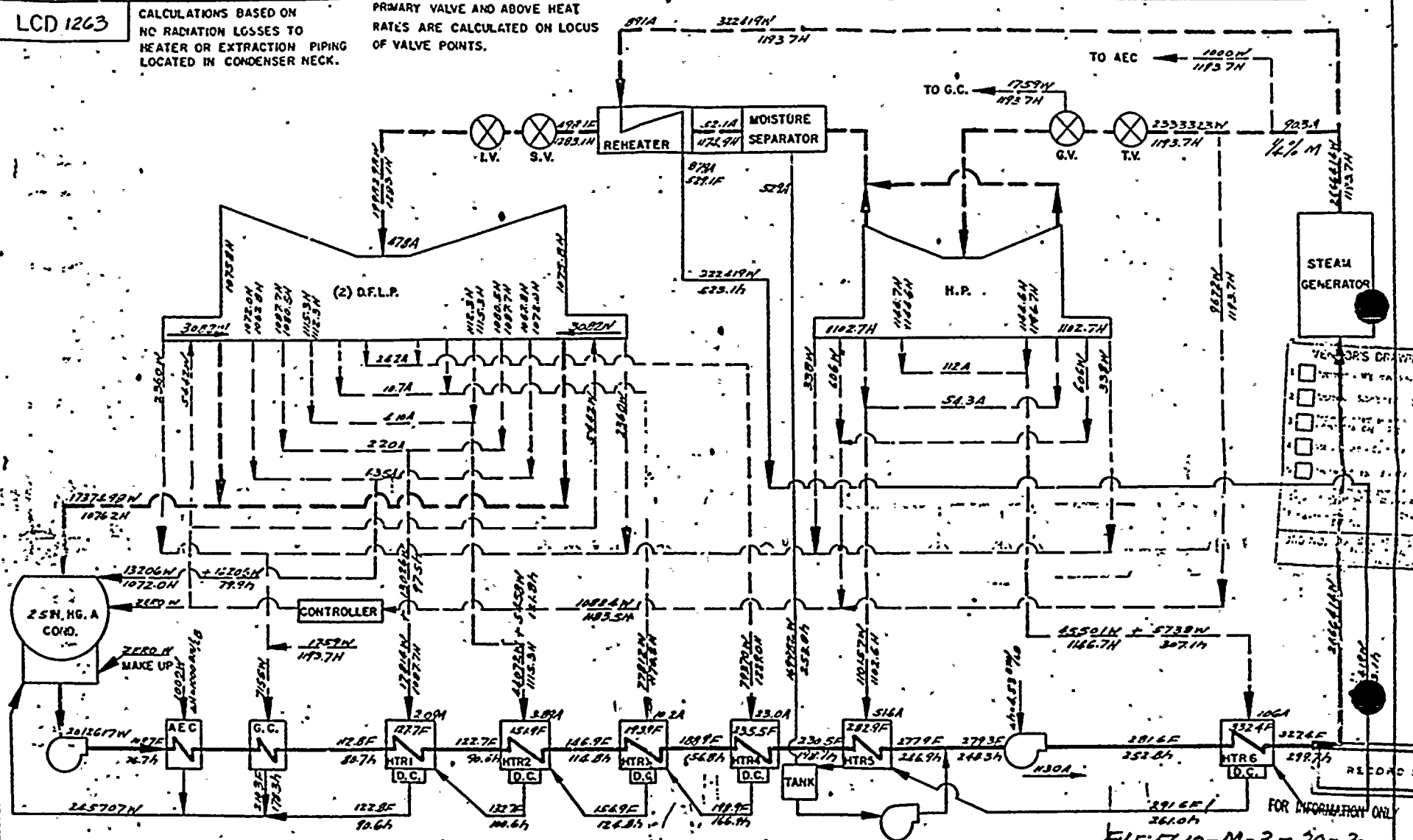
CALC. BY JPF	DATE 4/25/54	CT-18220

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LCD 1263

CALCULATIONS BASED ON
NO RADIATION LOSSES TO
HEATER OR EXTRACTION PIPING
LOCATED IN CONDENSER NECK.

PRIMARY VALVE AND ABOVE HEAT
RATES ARE CALCULATED ON LOCUS
OF VALVE POINTS.



GROSS
HEAT RATE $\frac{2666414(1193.7-299.7)}{182075} = 13092$

BTU
KWH

728317 KW TURBINE GENERATOR UNIT
894082 KVA 0.85 PF 2200VOLTS 75 #H
745 PSIA 510 F.T. 2.5 IN. Hg ABS.
182075 KW LOAD HEAT BALANCE 70.1544
25%

WESTINGHOUSE ELECTRIC CORP.
LESTER, PENNA.

CALC BY 9/29/66 DATE JRK CT-18992

FILE: 5610-M-3-20-2

FOR INFORMATION ONLY