

SPECIAL DATA



OPERATING CONDITIONS

	POWER (KW)	SPEED (RPM) TURBINE/GENERATOR	STEAM FLOW LBS./HR.
Normal Rated:	11 775	5 985/1 800	112 434
Maximum Rated:	13 438	5 985/1 800	127 779

STEAM CONDITIONS

Inlet Pressure (psia):	600
Inlet Temperature (°F):	750
Exhaust Pressure (in. HgA):	2.5

GOVERNOR SETTING

Refer to Operation and Control Setting Diagram in Volume 1, Section I, Part 4.

SERVOMOTOR AND ACTUATOR LINKAGE

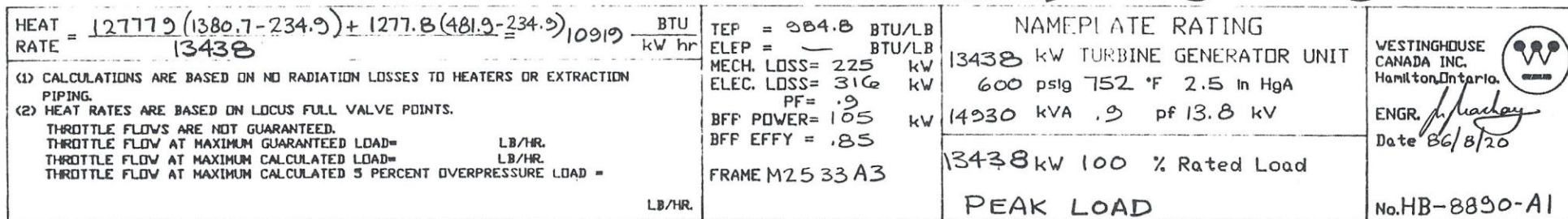
Stroke (inches): 3.62

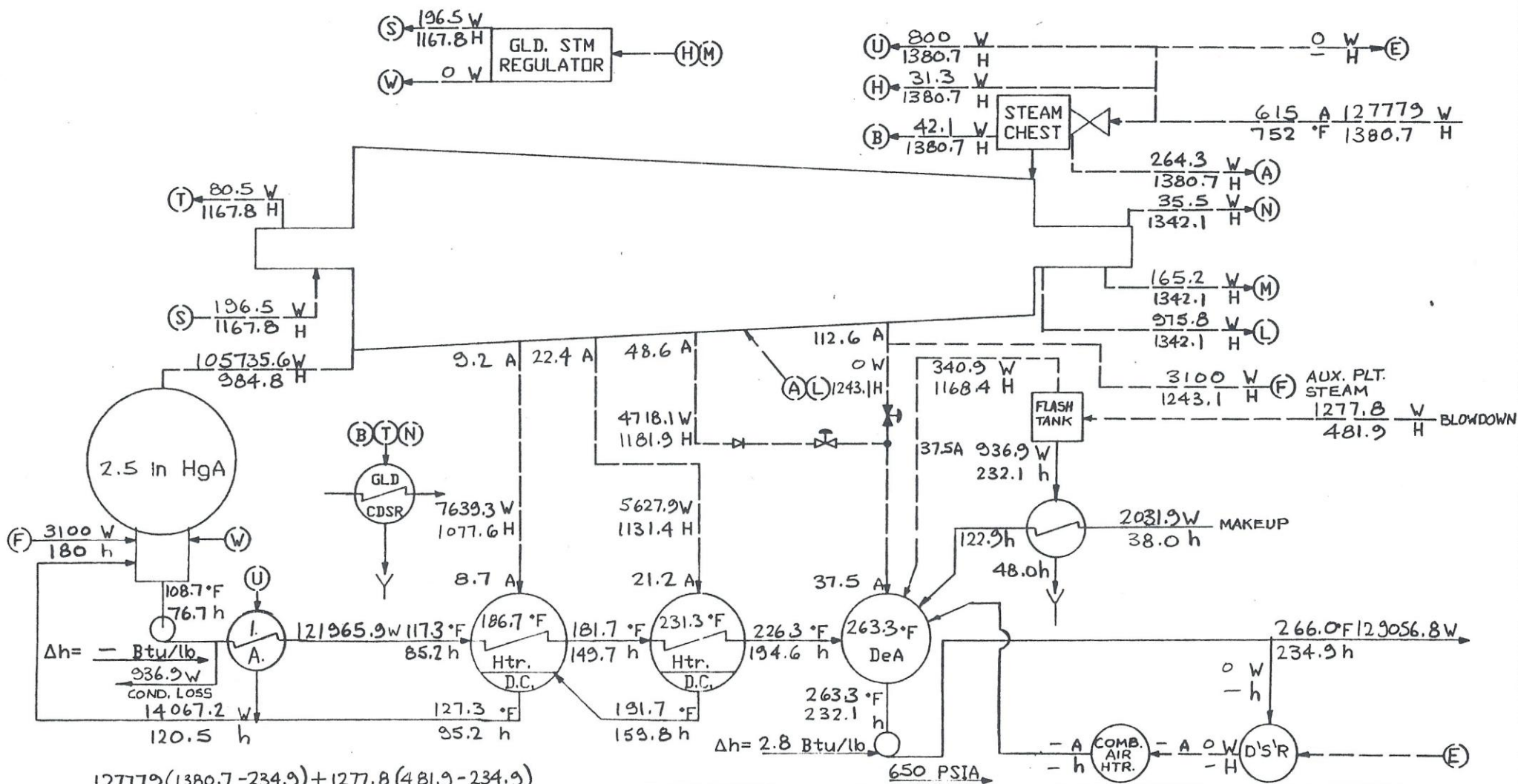
CRITICAL SPEEDS

- NOTES:
- a.) All speeds are turbine rotor speeds.
 - b.) Calculated critical speeds are the speeds at which the frequencies are the same as the natural frequencies of the various drive train rotors (re: turbine rotor, generator rotor). Resonant effects could add to the level of vibration and cause problems at these speeds.

CALCULATED LATERAL CRITICAL SPEEDS

1st Lateral (Turbine):	2 148 RPM
1st Lateral (Generator):	2 008 RPM
1st Torsional:	978 RPM
2nd Torsional:	2 808 RPM
1st Axial:	1 116 RPM





$$\text{HEAT RATE} = \frac{127779(1380.7 - 234.9) + 1277.8(481.9 - 234.9)}{13217} = 10852 \frac{\text{BTU}}{\text{KW HR}}$$

(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING.

(2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS.

THROTTLE FLOWS ARE NOT GUARANTEED.

THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD = LB/HR.

TEF = 984.6 BTU/LB
ELEP = — BTU/LB
MECH. LOSS = 225 KW
ELEC. LOSS = 312 KW
PF = .9
BFF POWER = 104.7 KW
BFF EFFY = .85
FRAME M2533A3

NAMEPLATE RATING

13438 KW TURBINE GENERATOR UNIT
600 psig 752 °F 2.5 in HgA
14930 KVA .9 pf 13.8 KV

13217 KW 98 % Rated Load

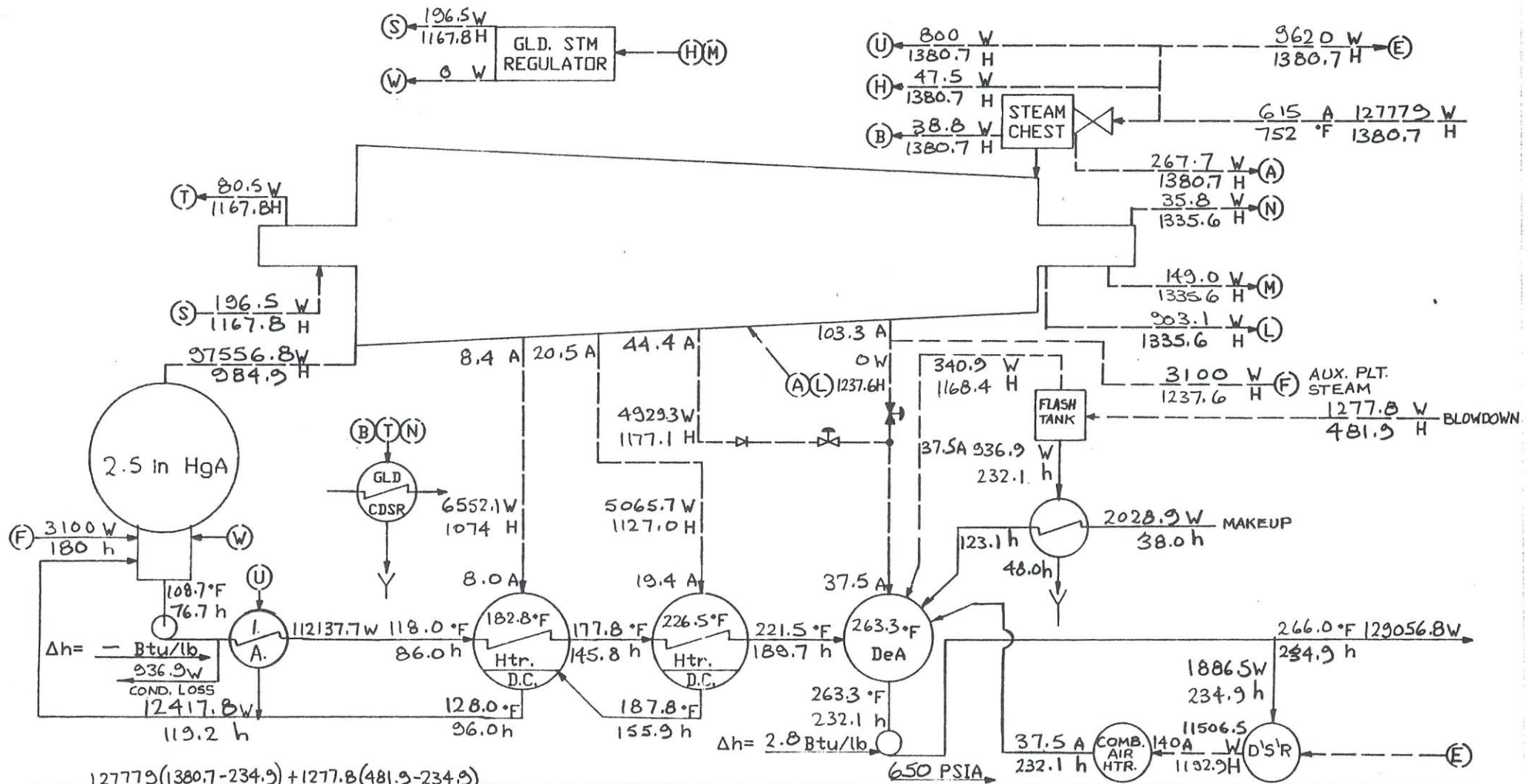
PEAK LOAD + AUX. PLT. STEAM

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CANADA INC.
Hamilton, Ontario.

ENGR. *M. MacKay*
Date 8/6/20

No. HB-8890-A2

REV. 2



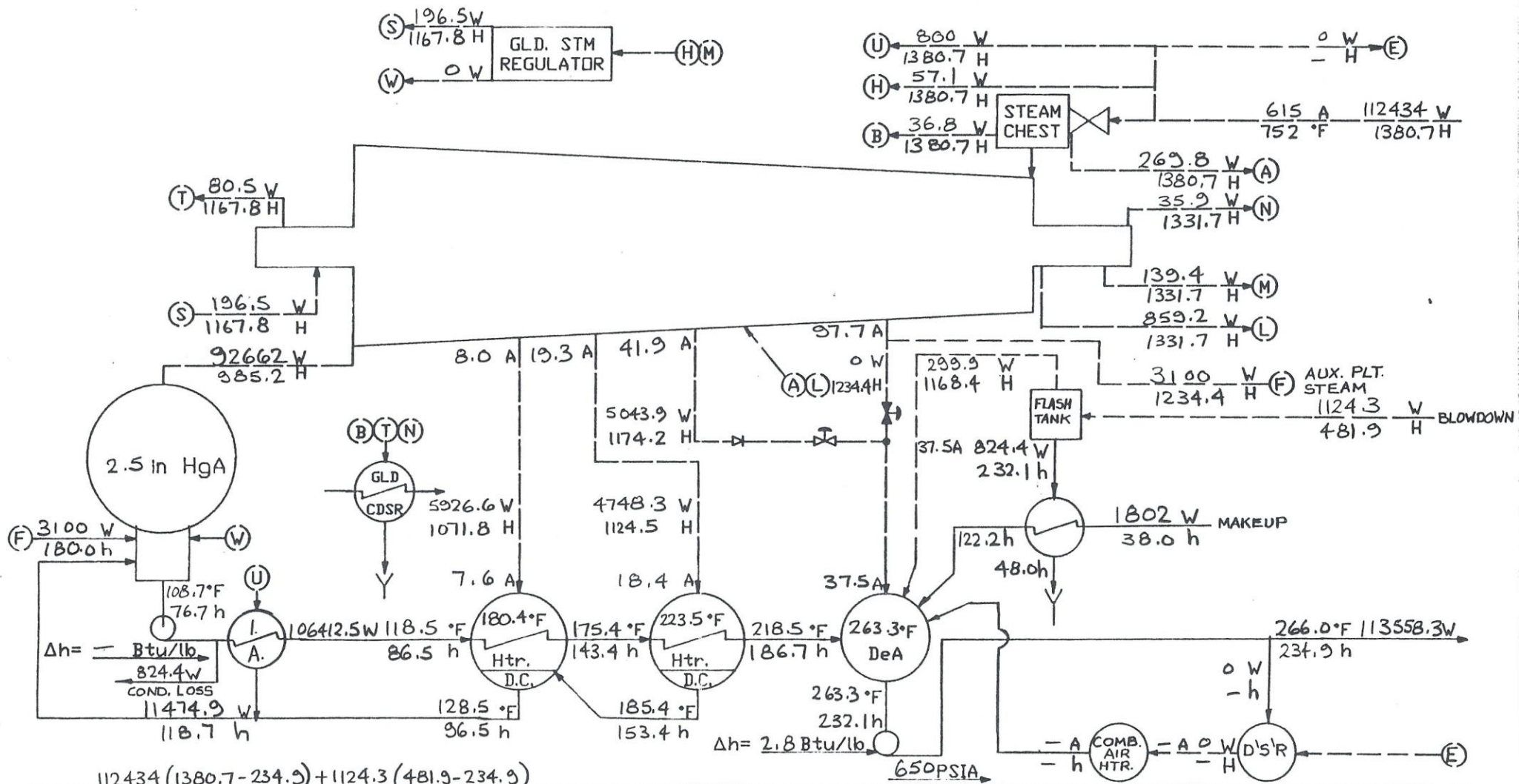
$$\text{HEAT RATE} = \frac{12779(1380.7-234.9) + 1277.8(481.9-234.9)}{-9620(1380.7-232.1) - 3100(1237.6-180)} = 10867 \frac{\text{BTU}}{\text{kW hr}}$$

- (1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING.
 (2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS.
 THROTTLE FLOWS ARE NOT GUARANTEED.
 THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR.
 THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR.
 THROTTLE FLOW AT MAXIMUM CALCULATED 3 PERCENT OVERPRESSURE LOAD = LB/HR.

TEP = 984.7 BTU/LB
 ELEP = — BTU/LB
 MECH. LOSS = 225 kW
 ELEC. LOSS = 294 kW
 PF = .9
 BFF POWER = 106 kW
 BFF EFFY = .85
 FRAME M2533A3
 LB/HR.

NAMEPLATE RATING
 13438 kW TURBINE GENERATOR UNIT
 600 psig 752 °F 2.5 in HgA
 14930 kVA ; .9 pf 13.8 kv
 12183 kW 91 % Rated Load
 PEAK LOAD
 AUX. PLT. STEAM + COMB. AIR HTR.

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 Hamilton, Ontario.
 ENGR. *J. MacKay*
 Date 8/6/20
 No. HB-8890-A4
 DEV. 2



$$\text{HEAT RATE} = \frac{112434(1380.7 - 234.9) + 1124.3(481.9 - 234.9)}{-3100(1234.4 - 180.0)} = 10886 \text{ BTU/kW hr}$$

(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING.

(2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS.

THROTTLE FLOWS ARE NOT GUARANTEED.
 THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR.
 THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR.
 THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD = LB/HR.

TEF = 985.0 BTU/LB
 ELEP = — BTU/LB
 MECH. LOSS = 225 kW
 ELEC. LOSS = 283 kW
 PF = .9
 BFF POWER = 92 kW
 BFF EFFY = .85
 FRAME M2533A3

NAMEPLATE RATING

13438 kW TURBINE GENERATOR UNIT
 600 psig 752 °F 2.5 in HgA
 14930 KVA .9 pf 13.8 kV

11559 kW 86 % Rated Load

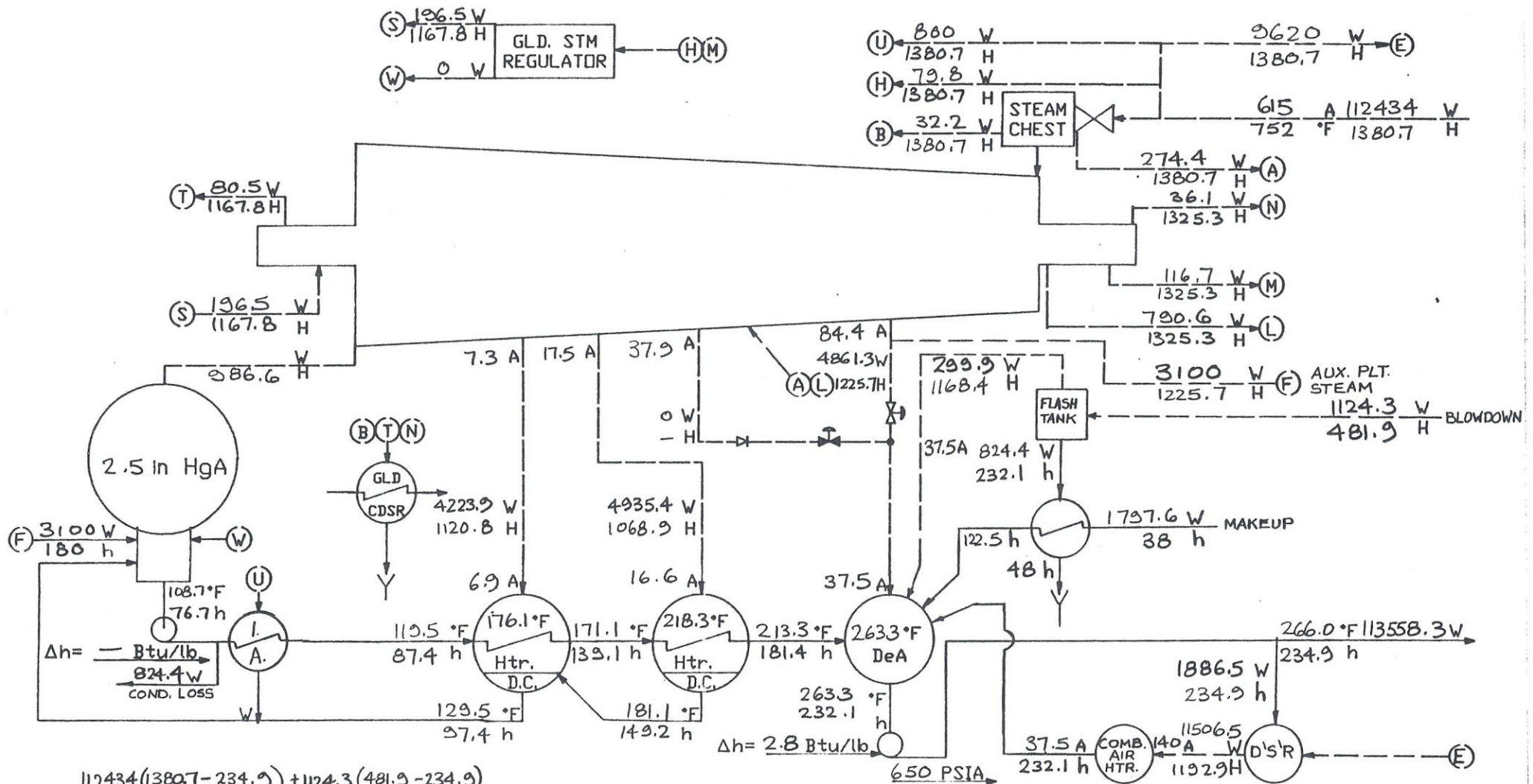
MCR LOAD + Aux. PLT. STEAM

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 Hamilton, Ontario.

ENGR. *W. J. Maday*
 Date 86/8/20

No. HB-8890-B2

REV. 7



$$\text{HEAT RATE} = \frac{112434(1380.7 - 234.9) + 1124.3(481.9 - 234.9)}{10427} = 11011 \text{ BTU/kW hr}$$

(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING.

(2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS.

THROTTLE FLOWS ARE NOT GUARANTEED.

THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD =

LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED LOAD =

LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD =

LB/HR.

TEF = 386.4 BTU/LB
ELEP = — BTU/LB
MECH. LOSS = 225 kW
ELEC. LOSS = 266 kW
PF = .9
BFF POWER = 94 kW
BFF EFFY = .85

FRAME M253A3

NAMEPLATE RATING

13438 kW TURBINE GENERATOR UNIT

600 psig 752 °F 2.5 in HgA

14930 kVA .9 pf 13.8 kV

10427 kW 78 % Rated Load

MCR LOAD + AUX. PLT. STM. + COMB.

AIR HTR.

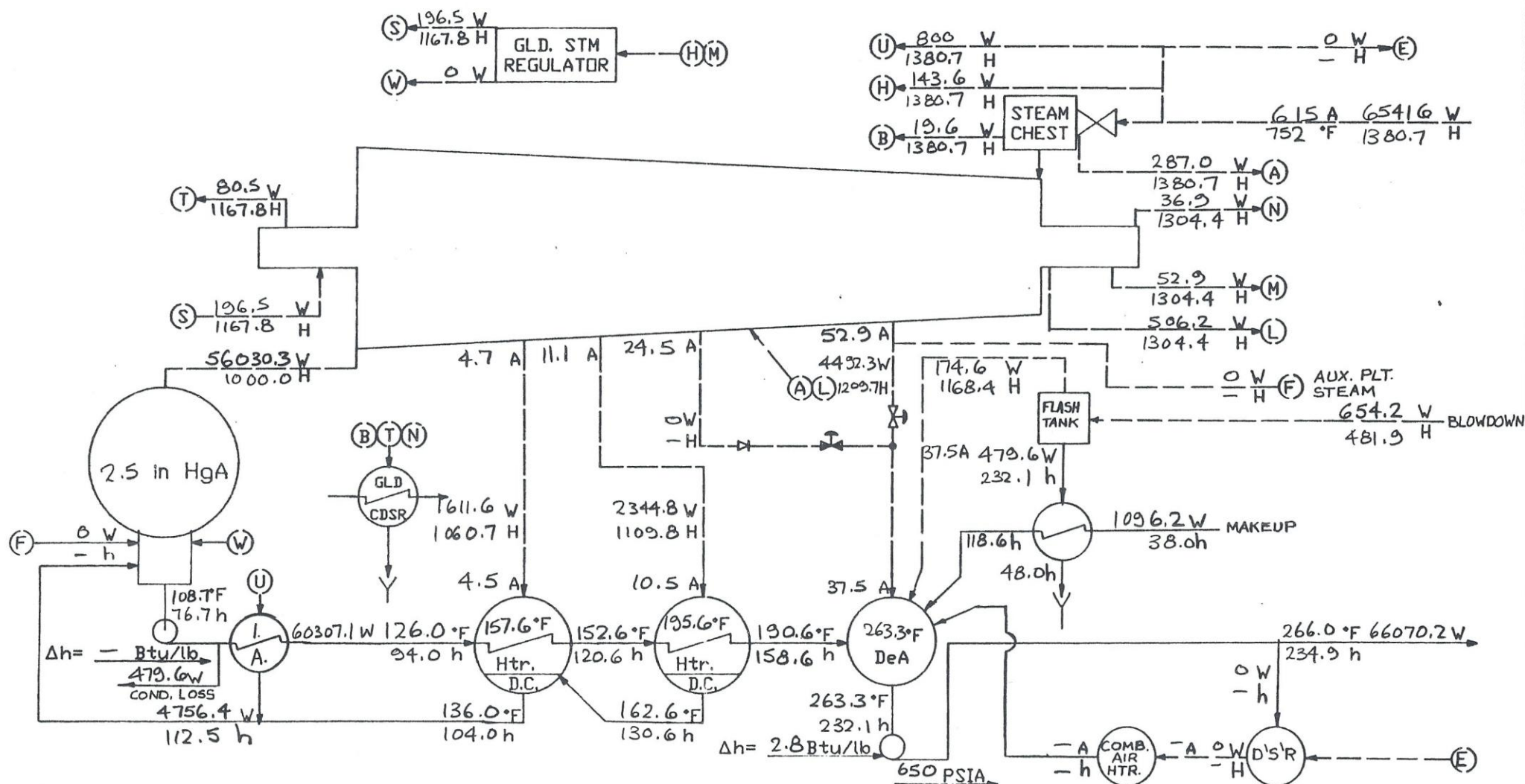
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ENGR. J. J. MacKay

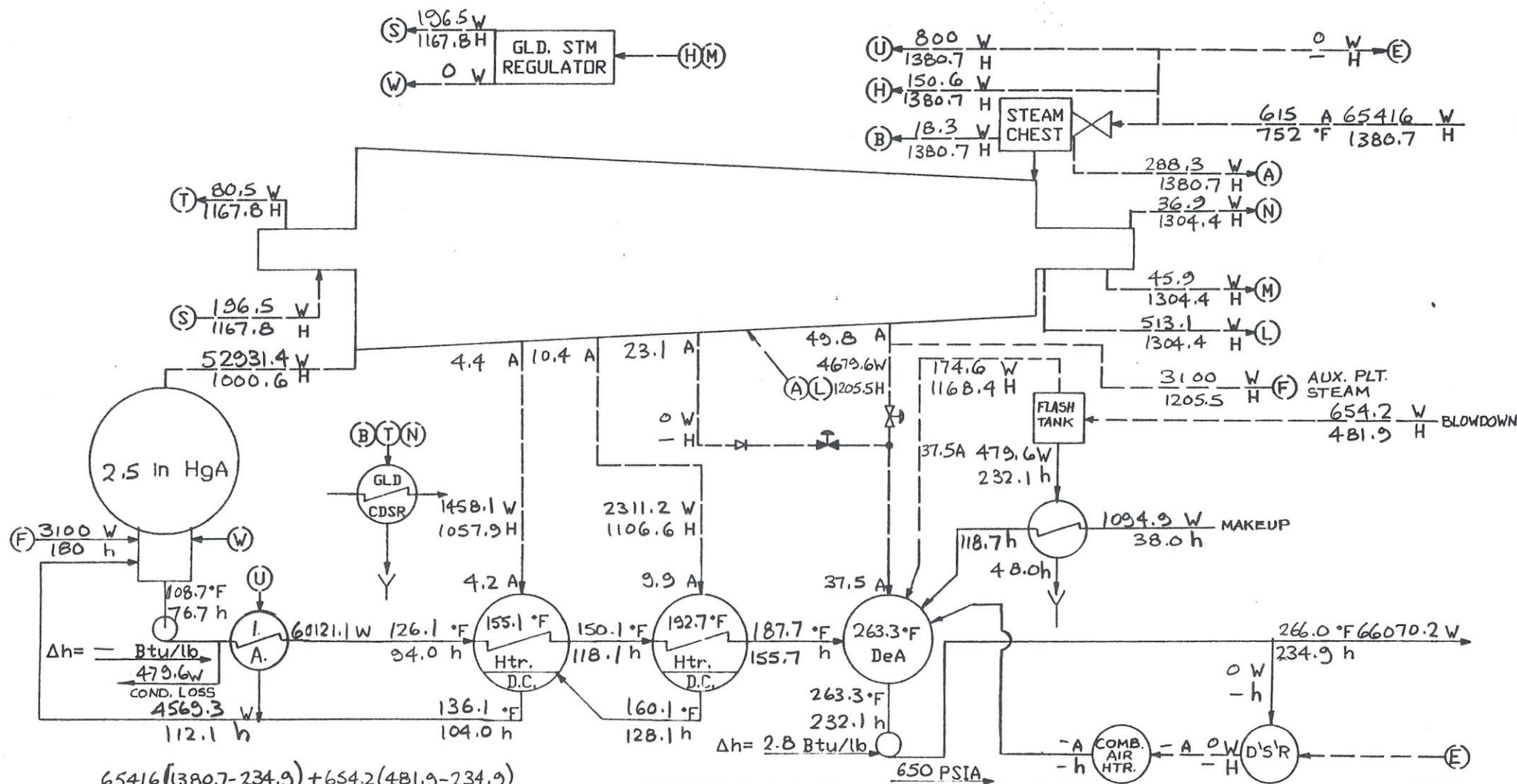
Date 8/6/20

No. HB-8890-84

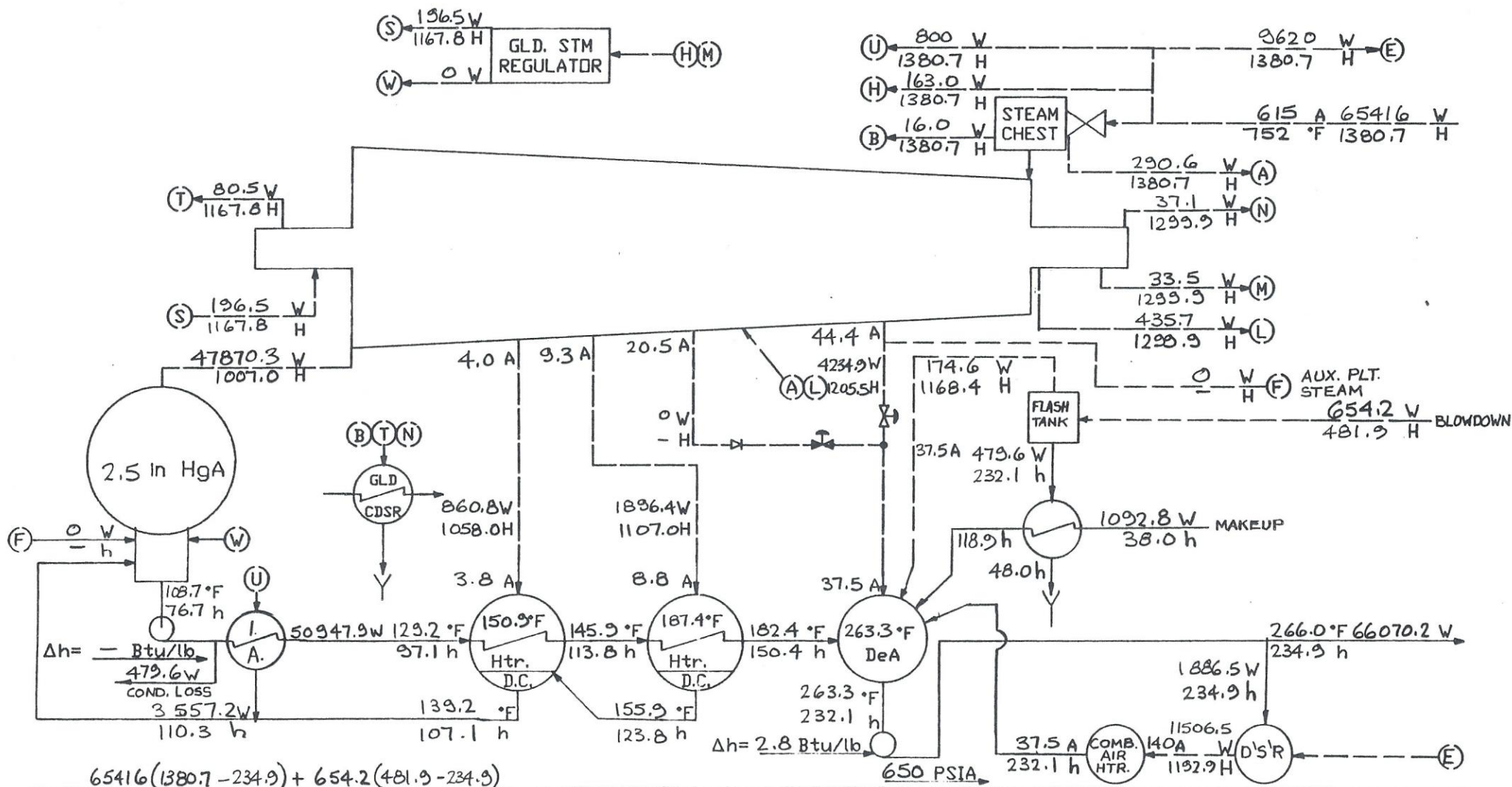
DEV 1



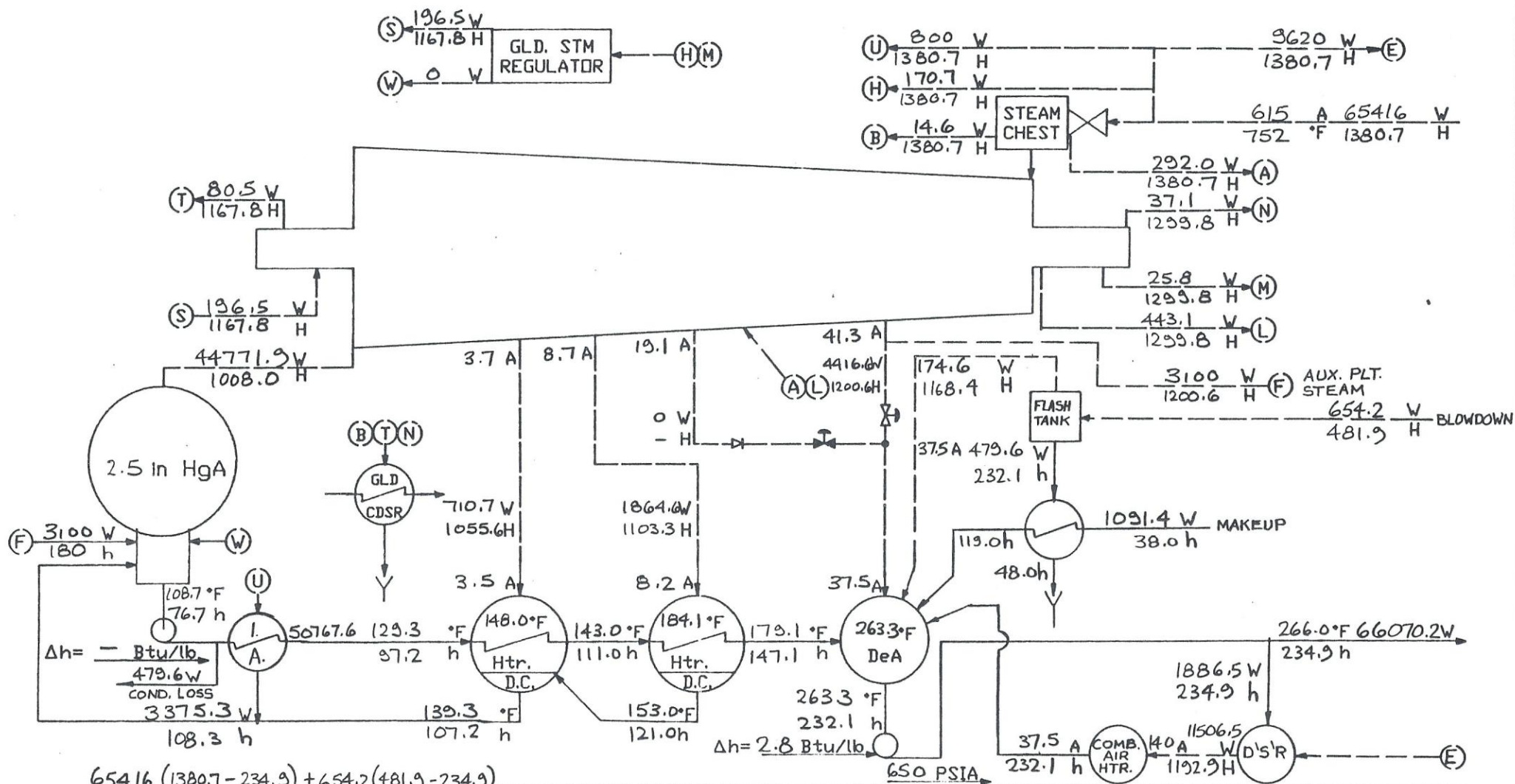
HEAT RATE = $\frac{65416(1380.7 - 234.9) + 654.2(481.9 - 234.9)}{6386} = 11762$ BTU/kW hr	TEF = 999.6 BTU/LB ELEP = — BTU/LB MECH. LOSS = 225 kW ELEC. LOSS = 210 kW PF = .9 BFF POWER = 54 kW BFF EFFY = .85 FRAME M2533A3	NAMEPLATE RATING 13438 kW TURBINE GENERATOR UNIT 600 psig 752 °F 2.5 in HgA 14930 KVA .9 pf 13.8 kv 6386 kW 47. % Rated Load MIN LOAD	WESTINGHOUSE CANADA INC. Hamilton, Ontario. ENGR. <i>[Signature]</i> Date 86/8/20 No. HB-8890-C1
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HEAT RATE = $\frac{65416(1380.7-234.9) + 654.2(481.9-234.9)}{-3100(1205.5-180.)} = 11638$ BTU/kW hr		TEF = 1000.2 BTU/LB ELEP = - BTU/LB MECH. LOSS = 225 kW ELEC. LOSS = 209 kW PF = .9 BFF POWER = 54 kW BFF EFFY = .85		NAMEPLATE RATING 13438 kW TURBINE GENERATOR UNIT 600 psig 752 °F 2.5 in HgA 14930 KVA .9 pf 13.8 kV 6181 kW 46 % Rated Load MIN LOAD + Aux PLT. STEAM	
(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING. (2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS. THROTTLE FLOWS ARE NOT GUARANTEED. THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED 3 PERCENT OVERPRESSURE LOAD = LB/HR.		FRAME M2533A3		WESTINGHOUSE CANADA INC. Hamilton, Ontario. ENGR. <i>A. MacKay</i> Date 86/8/20 No. HB-8890-C2	



$\text{HEAT RATE} = \frac{65416(1380.7 - 234.9) + 654.2(481.9 - 234.9)}{5264} = 12171 \text{ BTU/kW hr}$		$\text{TEF} = 1006.6 \text{ BTU/LB}$ $\text{ELEP} = - \text{BTU/LB}$ $\text{MECH. LOSS} = 225 \text{ kW}$ $\text{ELEC. LOSS} = 200 \text{ kW}$ $\text{PF} = .9$ $\text{BFF POWER} = 54 \text{ kW}$ $\text{BFF EFFY} = .85$ FRAME M2533A3		NAMEPLATE RATING 13438 kW TURBINE GENERATOR UNIT 600 psig 752 °F 2.5 in HgA 14930 kVA .9 pf 13.8 kv 5264 kW 39 % Rated Load MIN LOAD + COMB. AIR HTR.		WESTINGHOUSE CANADA INC. Hamilton, Ontario. ENGR. <i>[Signature]</i> Date 86/8/20 No. HB-8890-C3 REV 2	
(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING. (2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS. THROTTLE FLOWS ARE NOT GUARANTEED. THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD = LB/HR.							



$$\text{HEAT RATE} = \frac{65416(1380.7 - 234.9) + 654.2(481.9 - 234.9)}{5077} = 11936 \frac{\text{BTU}}{\text{KW HR}}$$

(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING.

(2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS.

THROTTLE FLOWS ARE NOT GUARANTEED.

THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD =

LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED LOAD =

LB/HR.

THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD =

LB/HR.

TEF = 1007.6 BTU/LB
ELEP = — BTU/LB

MECH. LOSS = 225 KW

ELEC. LOSS = 139 KW

PF = .9

BFF POWER = 54 KW

BFF EFFY = .85

FRAME M2533A33

NAMEPLATE RATING

13438 KW TURBINE GENERATOR UNIT

600 psig 752 °F 2.5 in HgA

14930 KVA .8 pf 13.8 kV

5077 KW 38 % Rated Load

MIN LOAD

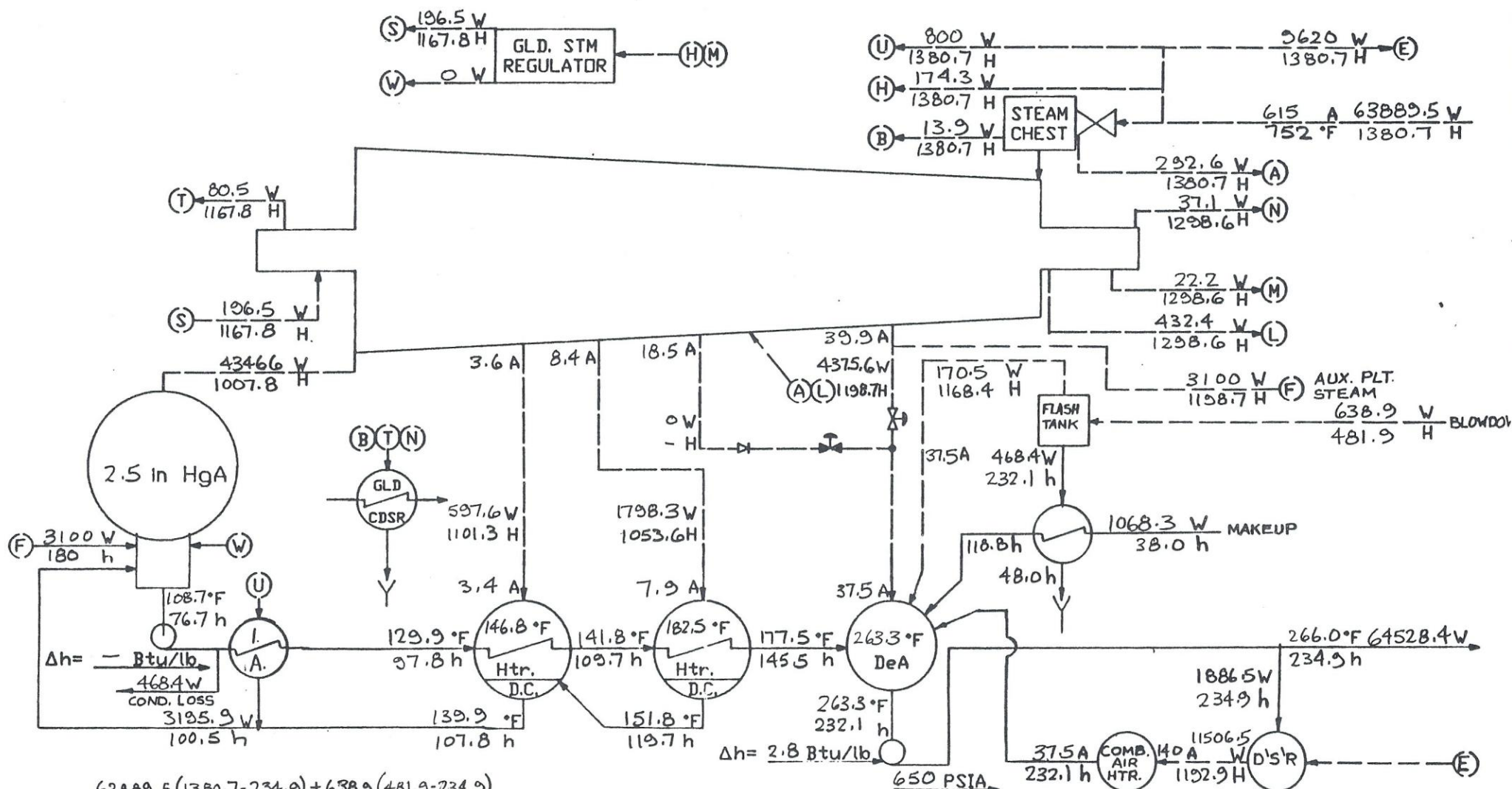
AUX. PLT. STEAM + COMB. AIR HTR.

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Hamilton, Ontario.

ENGR. *M. Hachay*

Date 86/8/20

No. HB-8890-C4



$\text{HEAT RATE} = \frac{-9620(1380.7 - 232.1) - 3100(1198.7 - 180)}{4923} = 12016 \frac{\text{BTU}}{\text{kW hr}}$		$\text{TEF} = 1007.4 \frac{\text{BTU}}{\text{LB}}$ $\text{ELEC. LOSS} = 225 \text{ kW}$ $\text{PF} = .9$ $\text{BFF POWER} = 53.9 \text{ kW}$ $\text{BFF EFFY} = .85$		NAMEPLATE RATING 13438 kW TURBINE GENERATOR UNIT 600 psig 752 °F 2.5 in HgA 14930 kVA .9 pf 13.8 kV	
(1) CALCULATIONS ARE BASED ON NO RADIATION LOSSES TO HEATERS OR EXTRACTION PIPING. (2) HEAT RATES ARE BASED ON LOCUS FULL VALVE POINTS. THROTTLE FLOWS ARE NOT GUARANTEED. THROTTLE FLOW AT MAXIMUM GUARANTEED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED LOAD = LB/HR. THROTTLE FLOW AT MAXIMUM CALCULATED 5 PERCENT OVERPRESSURE LOAD = LB/HR.		FRAME M2533A3		WESTINGHOUSE CANADA INC. Hamilton, Ontario. ENGR. <i>J. MacKay</i> Date 86/9/30	
		4923 kW 37 % Rated Load ONE BOILER IN OPERATION AUX PLT. STEAM + COMB. AIR HTR.		No. HB-8890-E4	

EXHAUST ENTHALPY VS. FLOW

FOR A 13.4 MW M2533A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,
LIMITED PARTNERSHIP

CONTRACT: 97004-5

WECAN S.O.: 25S8890-82

EXHAUST FLOW - 10000 lb/hr

11

10

9

8

7

6

5

4

3

#3 EXT'N CUTOFF POINT

CURVE LEGENDA - EXHAUST ENTHALPY,
NO AUX. PLANT STEAMB - EXHAUST ENTHALPY WITH
AUX. PLANT STEAM FROM
#4 EXT'NOPERATING CONDITIONS

INLET: 600 psig; 752°F

EXHAUST: 2.5 IN HgA

SPEED: 6000 RPM

980

990

1000

1010

1020

1030

1040

EXHAUST ENTHALPY - BTU/lbm

SIGNATURE

[Signature]

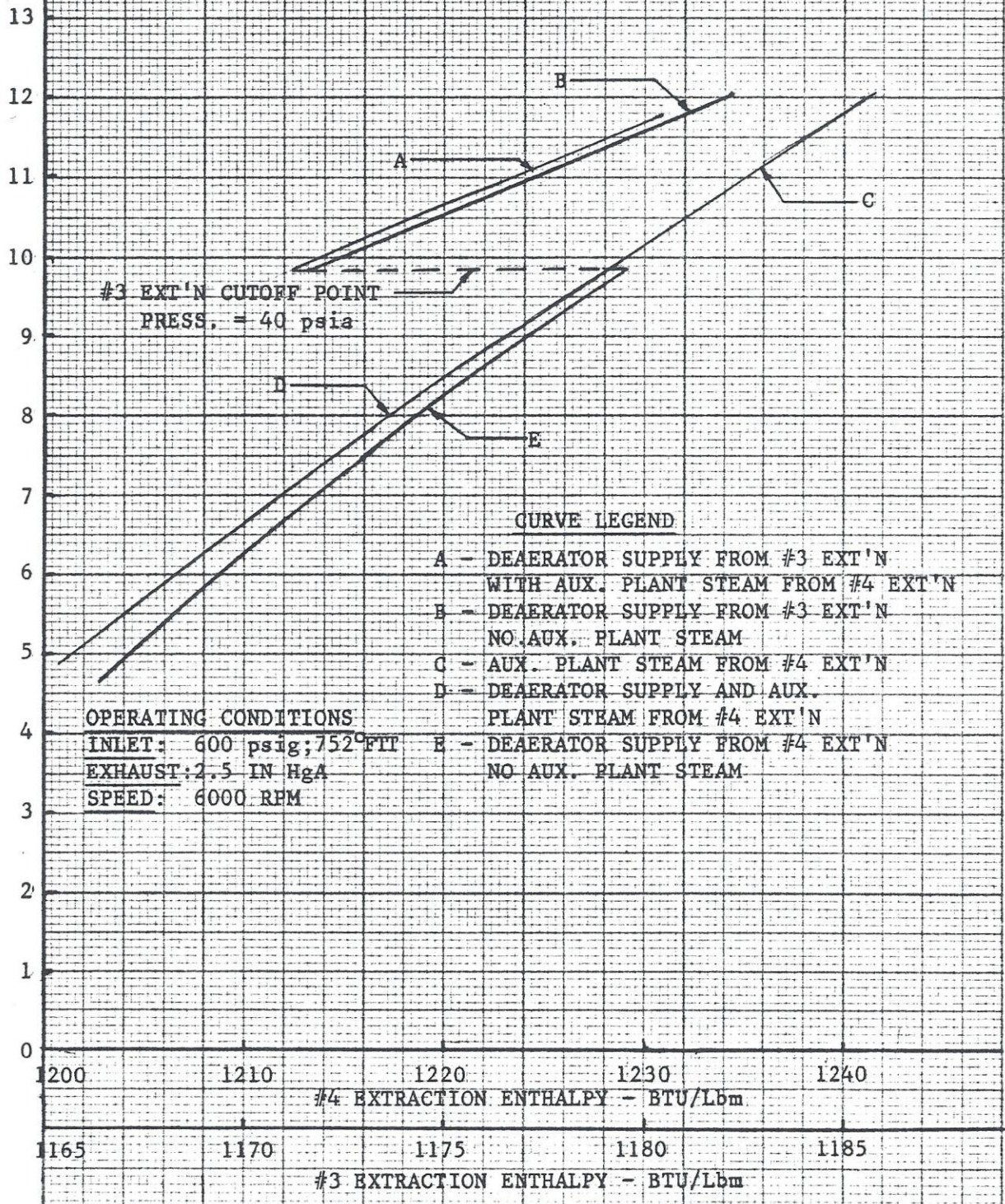
DATE 86/7/18

CURVE NO. PC-8890-D1

EXTRACTION ENTHALPY VS. DOWNSTREAM FLOW
FOR A 13.4 MW M2533A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,
 LIMITED PARTNERSHIP
CONTRACT: 97004-5
WEGAN S.O.: 25S8890-82

DOWNSTREAM FLOW - 10000 Lb/hr



SIGNATURE

[Signature]

DATE 86/7/18

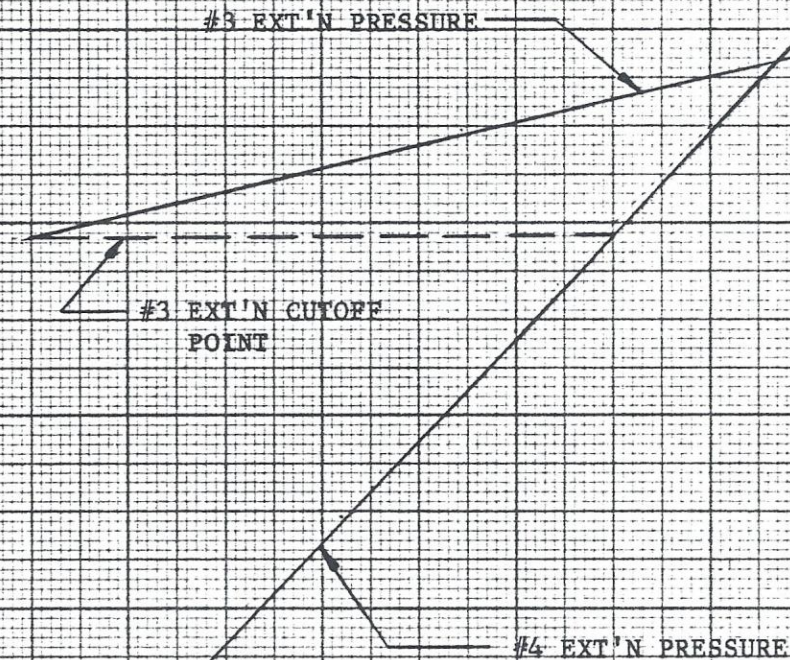
CURVE NO. PC-8890-D2

EXTRACTION PRESSURE VS. DOWNSTREAM FLOW
FOR A 13.4 MW M2533A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,
 LIMITED PARTNERSHIP
CONTRACT: 97004-5
WECAN S.O.: 25S8890-82

DOWNSTREAM FLOW - 10000 Lb/hr

13
12
11
10
9
8
7
6
5
4
3
2
1
0



OPERATING CONDITIONS

INLET: 600 psig; 752°F TT
EXHAUST: 2.5 IN HgA
SPEED: 6000 RPM

30 40 50 60 70 80 90 100 110 120

#4 EXTRACTION PRESSURE - PSIA

40 41 42 43 44 45 46 47 48 49 50

#3 EXTRACTION PRESSURE - PSIA

SIGNATURE *[Signature]*

DATE 86/7/18

CURVE NO. PC-8890-D3

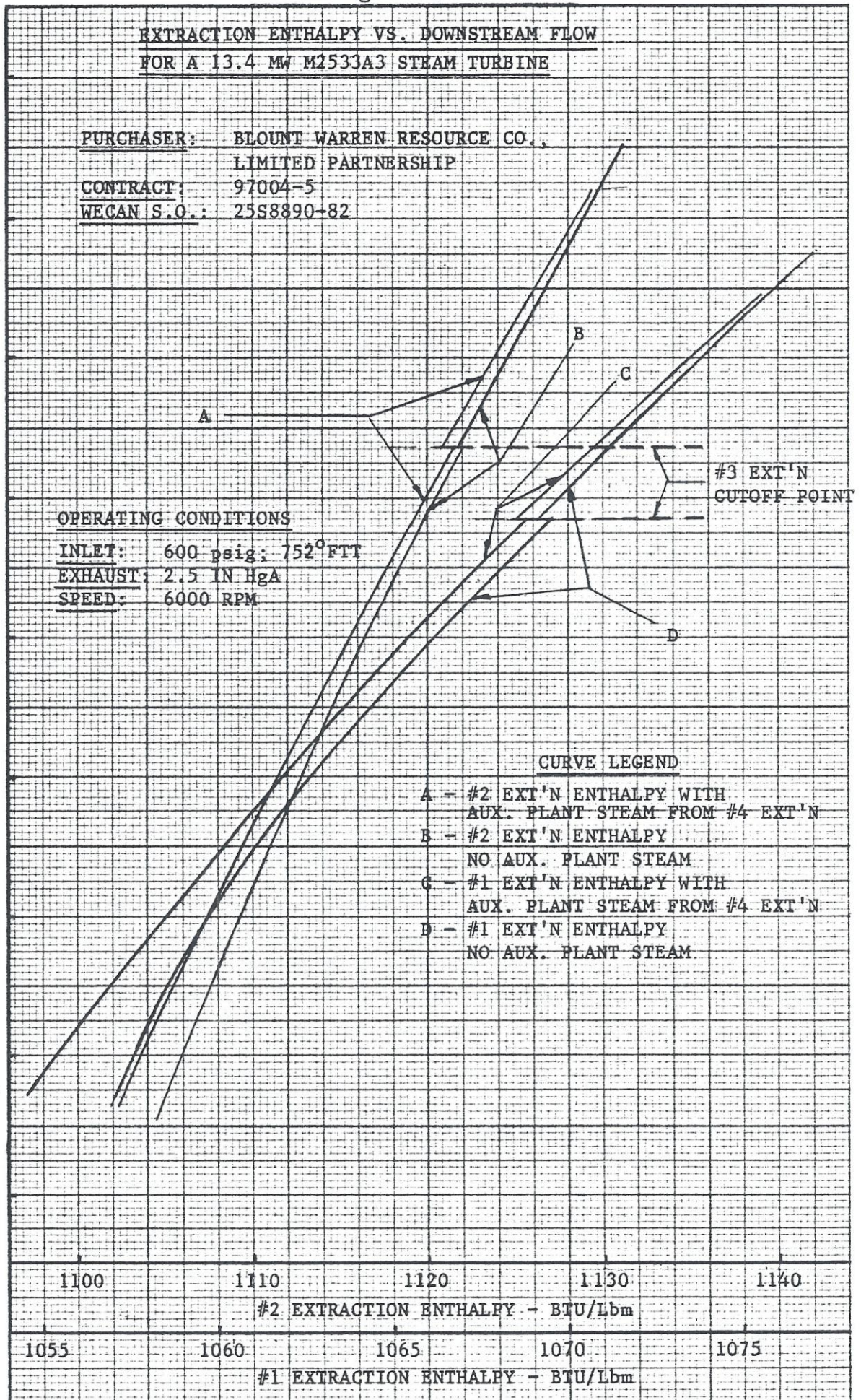
EXTRACTION ENTHALPY VS. DOWNSTREAM FLOW FOR A 13.4 MW M253A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,
LIMITED PARTNERSHIP
CONTRACT: 97004-5
WECAN S.O.: 2588890-82

OPERATING CONDITIONS

INLET: 600 psig; 752°F
EXHAUST: 2.5 IN HgA
SPEED: 6000 RPM

DOWNSTREAM FLOW - 10000 Lb/hr



SIGNATURE

[Signature]

DATE 8/7/18

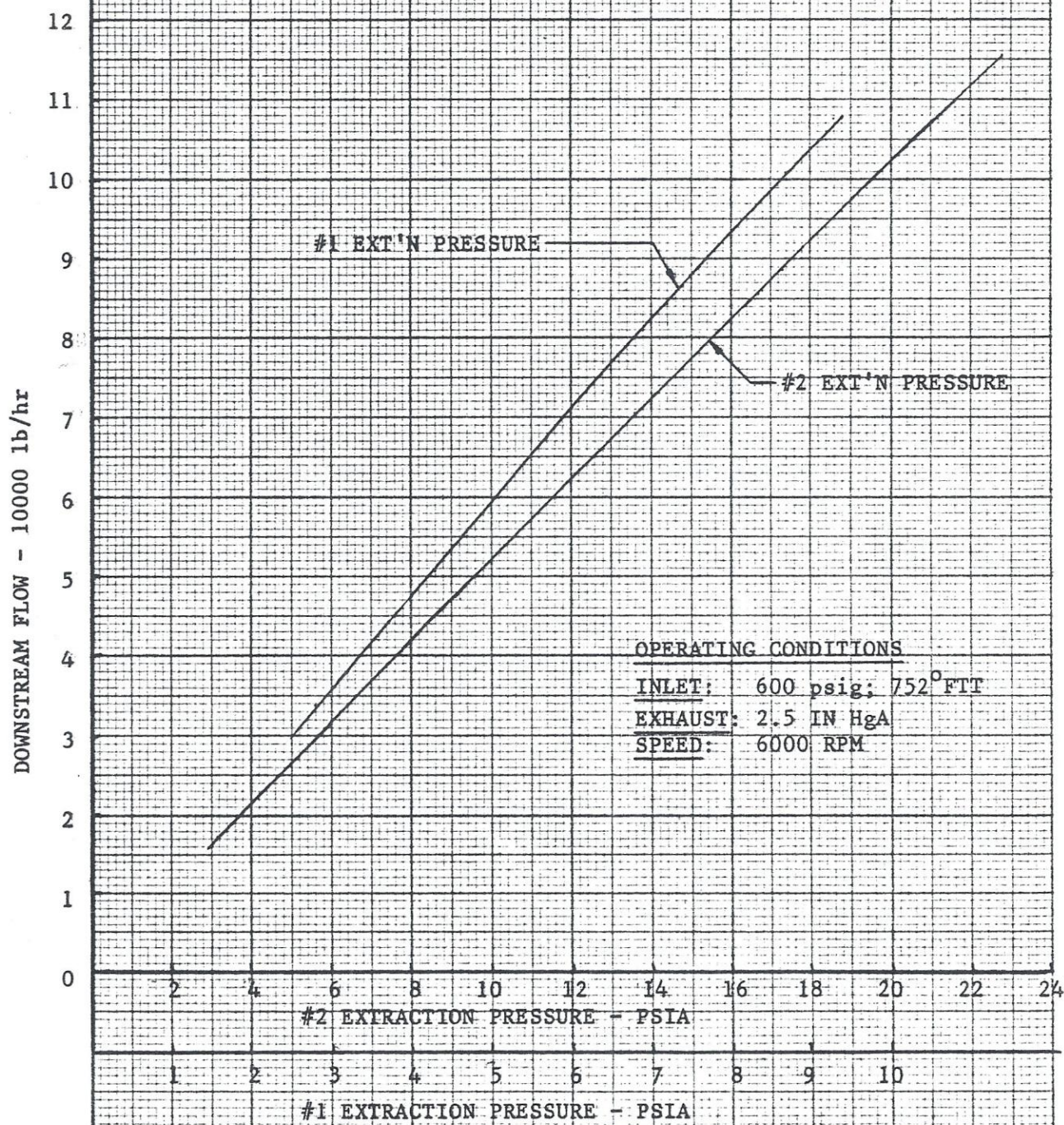
CURVE NO. PC-8890-D4

EXTRACTION PRESSURE VS. DOWNSTREAM FLOW
FOR A 13.4 MW M2533A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,
LIMITED PARTNERSHIP

CONTRACT: 97004-5

WECAN S.O.: 2588890-82



SIGNATURE *[Signature]*

DATE 86/7/18

CURVE NO. PC-8890-D5

INLET STEAM FLOW VS. LEAKAGE EFFICIENCY
FOR A 13.4 MW M2533A3 STEAM TURBINE

PURCHASER: BLOUNT WARREN RESOURCE CO.,

LIMITED PARTNERSHIP

CONTRACT: 97004-5

MECAN S.O.: 25S8890-82

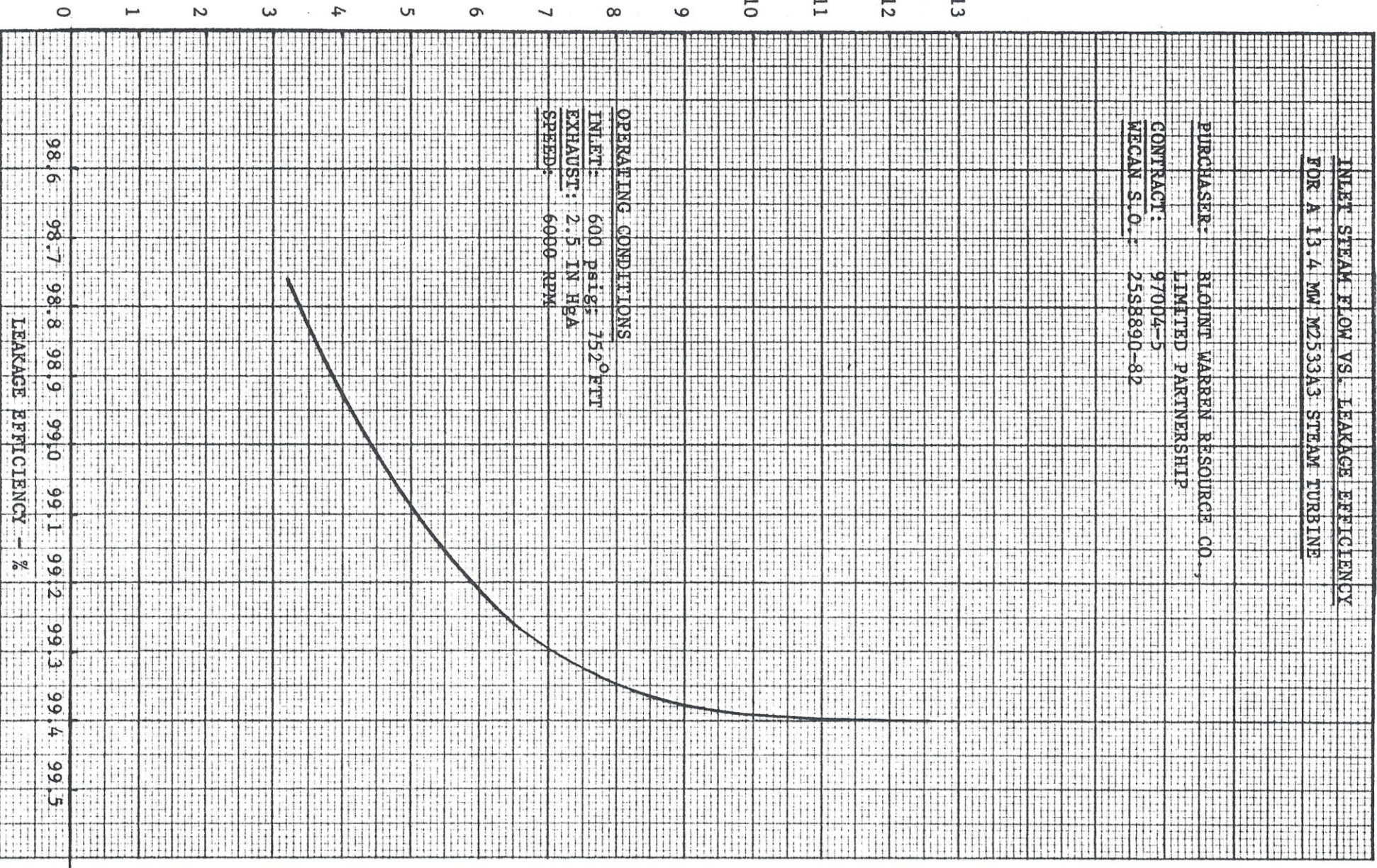
OPERATING CONDITIONS

INLET: 600 psig, 752°F FT

EXHAUST: 2.5 IN HgA

SPEED: 6000 RPM

INLET FLOW - 10000 lb/hr



SIGNATURE

A. H. H. H.

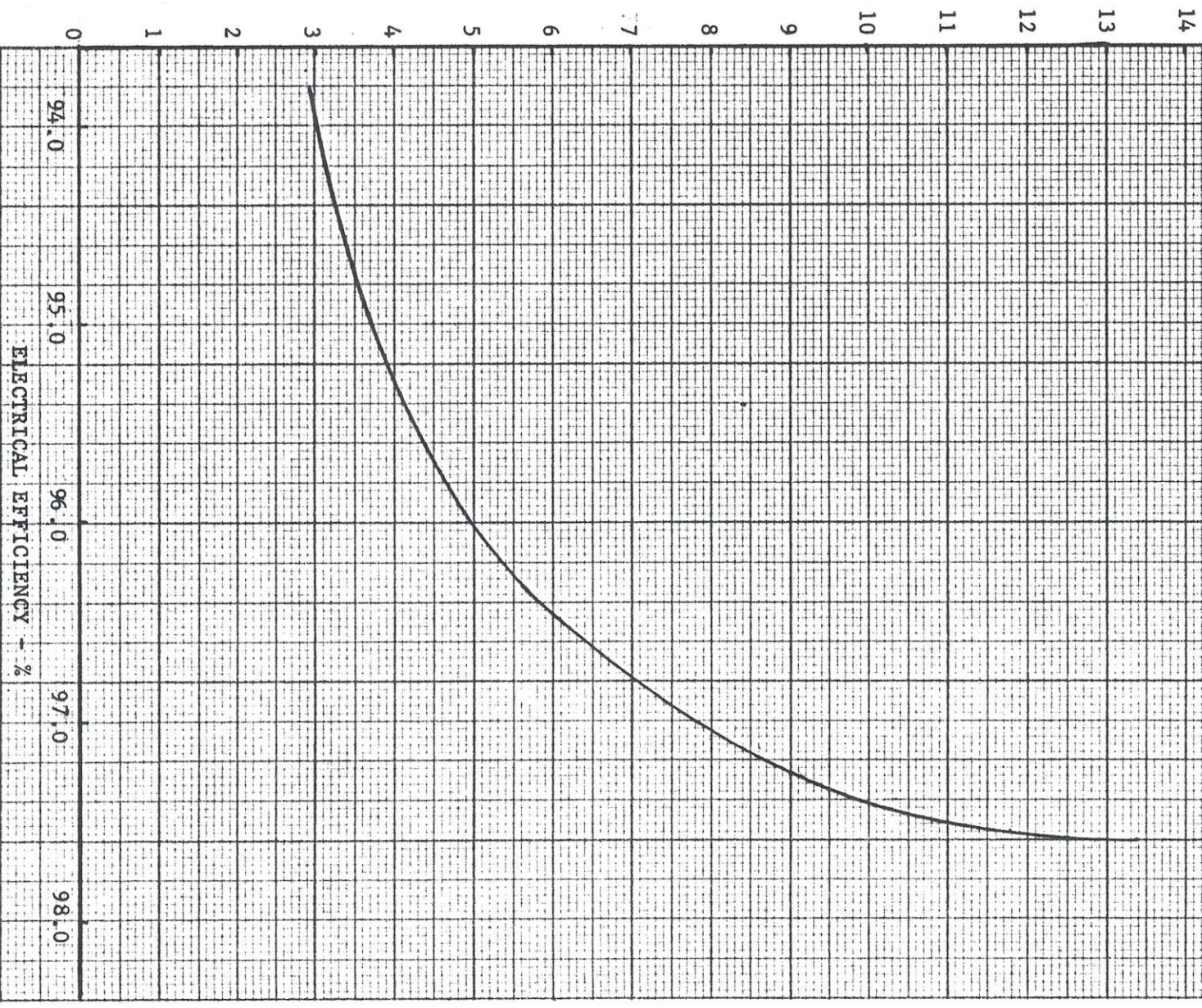
DATE 86/7/18

CURVE NO. PC-8890-D6

NET POWER VS. ELECTRICAL EFFICIENCY
FOR A BRUSH BSCMM 118-220/4 GENERATOR

PURCHASER: BLOUNT WARREN RESOURCE CO.,
LIMITED PARTNERSHIP
CONTRACT: 97004-5
MECAN S.O.: 2588890-82

NET POWER AT GENERATOR TERMINALS - MW

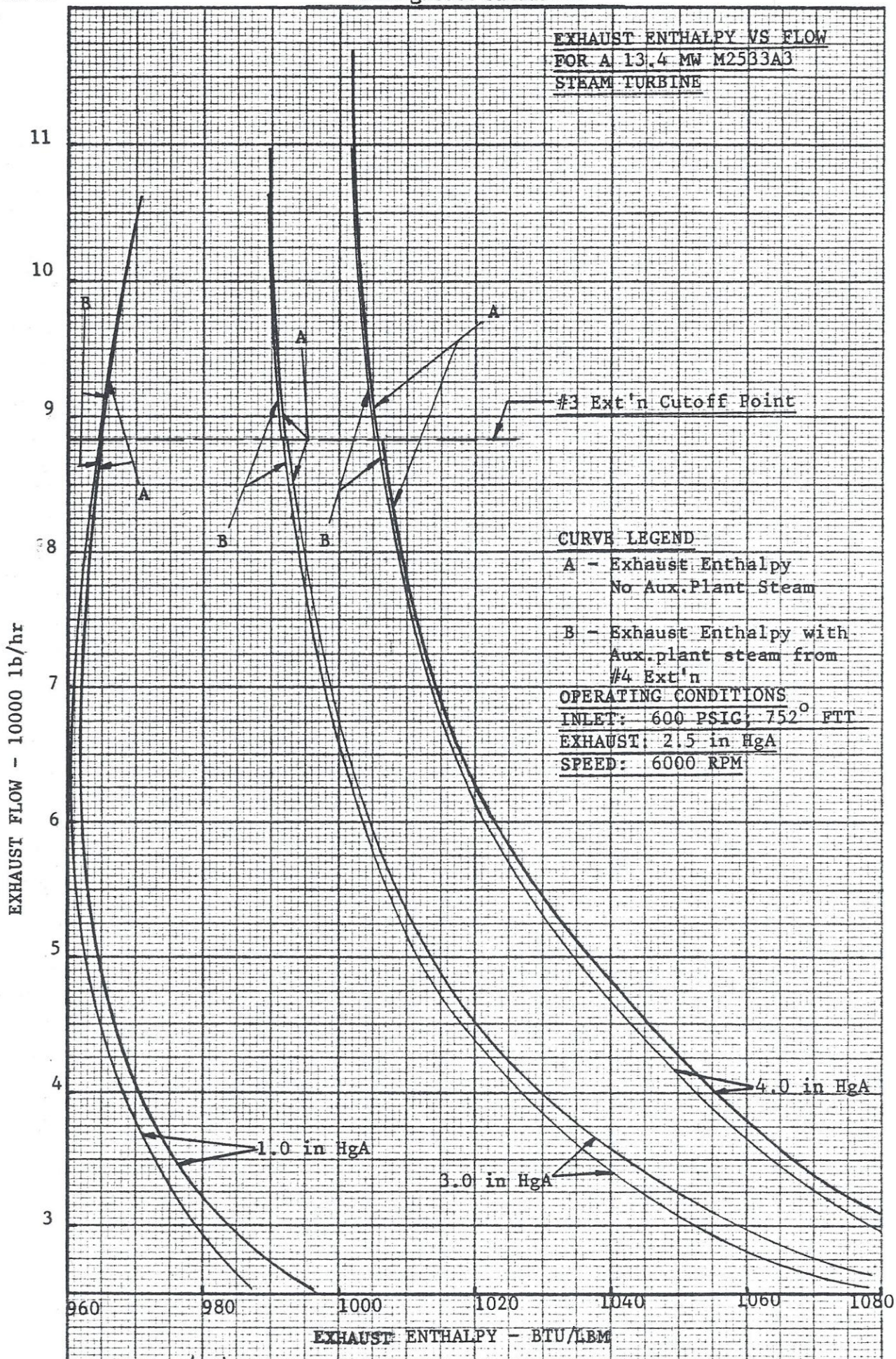


SIGNATURE

A. Hurdley

DATE 8/7/8

CURVE NO PC-8890-D7



SIGNATURE

[Signature]

DATE 86/3/30

CURVE NO. PC-8890-DB