SECTION 1

DESCRIPTION

GENERAL ARRANGEMENT

The unit described herein is a 19,700 KW base mounted turbine-gear-generator set, designed and manufactured for the Kes Chateaugay Power Station located in Chateaugay, New York. The turbine driver is a 13 stage condensing unit with four uncontrolled extraction's, designed to operate with the steam conditions shown in the "General Turbine Information," filed at the front of this manual. The general arrangement of the turbine-gear-generator and oil system is shown on the Mechanical Outline, Fig. A01. The internal design of the turbine driver is shown on the Turbine Assembly, Fig. K22. Oil system, control components, and supervisory instruments are listed and described on the Bill of Material, Fig. A23, and are shown schematically on the P&I Diagram, Fig. A54. The oil system is described separately in Section 5. Refer to the "List of Illustrations" in the Index for the complete list of turbine and oil system reference drawings that are contained in this manual under Tab 6. Instructions and Illustrations for the gear and generator are included under their respective tabs in this manual.

The turbine drives the generator through a reduction gear. The turbine rotor and the reduction-gear pinion shaft are connected through a non-lubricated diaphragm type high speed coupling. The combined span is supported by four bearings, two in the turbine and two in the reduction-gear casing. The turbine rotor is located axially in the casing by a pair of tilting pad thrust bearing assemblies located in the front standard. The turbine is supported on the turbine-gear base by two sets of supports, one set at the high pressure end of the turbine casing and one set at the low pressure (exhaust) end. The high pressure casing is supported by flex-legs through the front standard. These supports are rigid in the cross-axis and vertical direction but provide flexibility in the axial direction, thereby permitting the turbine casing and rotor to move with temperature changes in the direction parallel to the rotor. The low pressure (exhaust) end of the turbine is supported by a pair of side supports fabricated integral with the exhaust casing that incorporate a sliding key arrangement that allows for movement in the transverse direction, thus providing for exhaust casing thermal expansion. A centerline key on the exhaust end maintains transverse alignment.

Steam enters the turbine through a steam strainer and, in turn, passes through the trip throttle valve and controlling (governing) valves, then to the first-stage nozzle box. The steam expands in the successive stages* from initial pressure to final (exhaust) pressure.

> * A stage is defined as a set of stationary blading (or nozzles) directing steam onto a set of rotating (wheel) blades. Work is produced in each stage to provide the power needed to drive the generator.

The trip throttle valve is provided with a hand wheel and latch for opening the valve at start-up, after the turbine trip is reset. In emergency tripping, the trip throttle valve closes to shut off steam flow to the turbine upon operation of the emergency (overspeed) governor, or the action of any of the tripping devices inserted in the hydraulic pressure line to the trip throttle valve.

The turbine is controlled through a Woodward 505 Digital Control System. The hydraulic components of the system are mounted at the turbine. The digital governor, at initial start-up, controls the speed of the turbine. Once the generator has been synchronized to the line and the machine loaded, the governor can be placed in the inlet pressure control mode, while the generator holds speed. Note that the Woodward 505 DCS will act as a pre-emergency governor in the event of a circuit breaker opening. For a more detailed description of the operating procedures, see the "Operation" Section, Tab 3.

TURBINE CASINGS

The turbine HP casing is a casting and the exhaust casing, (see Fig. K22), is fabricated from steel plate. The two casings are bolted together at a vertical joint. The combined casing is split at the horizontal centerline to provide access to the rotor and internal parts. The combined casing bore is machined to support the nozzle box and interstage diaphragms. Labyrinth-type packing rings mount in the casing bore, at each end of the casing. The valve chest of the inlet (V1) valve gear assembly mounts against a flanged surface in the upper half turbine casing. The lower half casing has three flanged connections oriented vertically downward, Conns "AF" and "AG" (4"-300#) for the first and second uncontrolled extraction's and Conn "AH" (6"-150#) for the third uncontrolled extraction. The fourth uncontrolled extraction, Conn "AJ" (12"-150#) is located in the lower half exhaust casing front wall facing the HP end of the unit. The exhaust casing has a downward opening for exhausting steam from the turbine casing and is welded to the condenser transition piece. The turbine casing also has a drain connection, Conn "CF", at the first stage for draining moisture from the casing during start-up. Any condensate that may form in the successive stages will drain naturally into the turbine extraction and exhaust openings.

The HP end of the turbine casing is pinned to the turbine HP bearing bracket at two support pads extending one on each side of the casing. A key arrangement between the HP end of the casing and the bearing bracket is located at the bottom vertical centerline of the casing front wall. The support and vertical centerline key arrangement maintains internal alignment between the casing and the bearing bracket. A fabricated support, see Fig. K22, supports the HP bearing bracket and HP end of the casing on the turbine foundation base. The support is arranged to permit the turbine casing and rotor to expand with temperature changes.

The exhaust end of the turbine casing is rigidly supported on the base by two support pads fabricated integral with the exhaust casing, one pad on each side of the casing. A key arrangement, between each support pad and base, maintains the axial position of the casing but permits expansion outward from the shaft centerline. Grease fittings are provided for lubrication of the side supports, see Page 2-3. A center-line alignment key is fitted to the end of the exhaust casing during final alignment at installation.

NOZZLE BOX

A cast steel nozzle box, Fig. L12, locates in grooves machined in the HP casing bore (see Fig. K22) and provides steam entry to the first stage of the turbine. The casing is a doughnut-shaped hollow ring, with port openings extending upward toward the valve chest of the inlet valve gear assembly. The ports are machined to take the steam entry valve seats, with sealing and locking rings installed between the seats and the ports. A labyrinth type packing ring (see Fig. D43 and Fig. K22) is installed in a nozzle box bore, to retard steam leakage back along the turbine shaft at this point. A key is fitted to the bottom of the nozzle box, to hold the nozzle box in vertical alignment within the turbine casing. Since it has no horizontal split, the nozzle box assembles over the end of the turbine rotor shaft, and the rotor and nozzle box are assembled into the turbine casing as a unit.

A series of welded-in nozzle blades extend through the first-stage sidewall of the nozzle box. Steam enters the hollow nozzle box through the valve seats of the valve gear assembly, and passes to the first-stage wheel through the welded-in nozzle blades. The blades are spaced and fitted at the proper angle in a ring so that the steam is directed against the first-stage wheel blades (also called buckets) to rotate the turbine rotor in the direction required.

INTERSTAGE NOZZLE DIAPHRAGMS

The interstage nozzle diaphragms (diaphragm assembly, Fig. FA1) serve as partitions between the wheels of the various turbine stages; and have blades that redirect the steam flow from the wheel blades (buckets) of the one stage to the wheel blades of the next successive stage at the proper angle and velocity. (See Fig. K22 for the assembled locations of the diaphragms in the turbine casings.)

The interstage nozzle diaphragms are supported in the turbine casing from lugs, see Fig. FA1, and set screws installed at the horizontal joint, thus providing true centerline support of the diaphragms in the turbine casing. This support arrangement provides that the diaphragm will remain essentially concentric with the turbine rotor under all temperature conditions. The diaphragms are fitted with welded-on axial crush spots on the mounting flange, and the crush spots are fitted at assembly to provide a close sliding fit of the diaphragm mounting rings in the casing grooves.

A packing ring, which retards steam leakage from stage to stage along the rotor shaft, is assembled in the bore of each diaphragm and held in the correct radial position by springs. Each diaphragm and packing ring is split at the horizontal centerline to facilitate assembly. The top half of each diaphragm is retained so that the upper halves will lift as a unit with the top half of the turbine casing.

ROTOR

The rotor shaft is machined from a solid alloy steel forging. The wheels are an integral part of the shaft. The rotor has a machined coupling flange at the LP end. The rotor assembly, Fig. EA1, complete with blades (also called buckets), bands and trim (thrust runners, emergency governor), is dynamically balanced at the factory. Balancing grooves are machined into the wheel faces, as seen in Fig. EA1, for adding wedge-type weights during factory balancing of the rotor.

Balancing rings are also provided for adding screw-type balancing weights. (See Fig. EA1 for location.) Field balancing of the rotor can be accomplished, if necessary, by adding weights at these balancing rings. Access openings to these balancing rings are provided in the turbine casing.

The wheel blades (buckets) are of corrosion-resisting steel and are attached to the wheels by dovetails. The blades are spaced by skirts machined as an integral part of each blade. Locking pieces are fitted into the wheel dovetail to lock the blades on the wheel. The blades are banded together in sections by steel covers (shroud bands) penned onto the blades.

SHAFT PACKING

Metallic packing rings are installed around the turbine rotor shaft, at the points where the shaft projects through the turbine casing. The packings are included at these points to minimize steam leakage out of, or air leakage into the turbine. Packing rings are also placed in each diaphragm bore to reduce steam leakage along the shaft at these points. The packing rings are shown in their assembled locations in Fig. K22.

The high pressure (HP) packing includes four labyrinth-toothed rings assembled into packing housings that mount in the casing bore, as seen in Fig. D43. The bores of each of the rings are machined into a step-toothed labyrinth; that is, the packing bore has alternate high and low tooth projections that fit over alternating grooves and high surfaces machined on the shaft. Each ring is machined into four matched segments that are held against concentric shoulders in their housings by radially assembled springs. The packing rings are kept from rotating by shoulder screws located in their housings. The outer ring is spring loaded axially to keep the ring against the outer face of its housing.

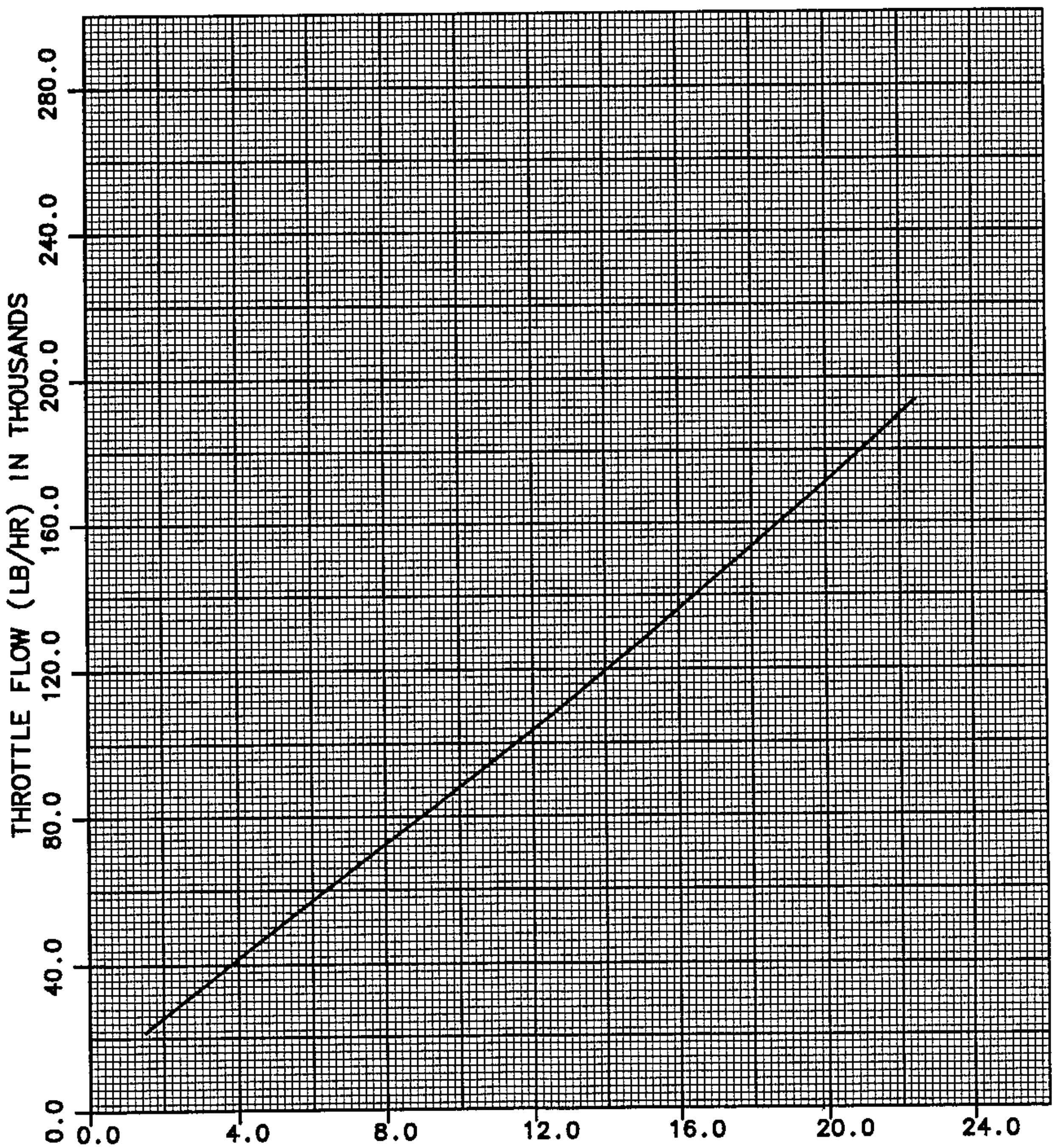
The low pressure (exhaust) end packing rings (Fig. D45) are similar in construction except there are only three labyrinth toothed rings.

The interstage packing rings (Fig. D44) are also labyrinth toothed rings. Each ring is split into four segments and assembles into a groove machined in the diaphragm bore. Springs assembled behind the

```
BMTH          T U R B I N E   H E A D E R   S H E E T
FN:            FOR S.O."S - USE BMPE TRANSACTION ON MLNO
M.L. NO: DEX1323155030       CUSTOMER                 REQUISITION        NOUN
S.O. NO: 155030              CNF/CHATEAUGAY           297-77374          01
         RATING: 19700 KWE                  RPM: 5596
         INLET PRESS: 1250 PSIG             INLET TMP: 950 DEG F

         INLET SIZE: 8"-1500#GMPL TTV       EXH SIZE: 75" SF DOWN
         CONDENSING: YES                    EXH PRESS: 2.0 HGA
         NONCONDENSING: --
         ROTATION: CCW                      ROTOR: SOLID YES BUILT UP --
         VLV GEAR: HFC-GE CYL/WWD ACT       FRONT END: T2
         OIL SYS: LOCAL 1250GAL DROPIN      GOV: WWD 505
                   REMOTE --                CONT SYS: 200 PSIG
                                            BASE MTD: SEE TEXT (BMTX)
         REMARKS: EXTR: UNC 4"-300#, UNC 4"-300#, UNC 6"-150#,
                        UNC 12"-150#; HP CSG: HFC - 4 PC ALLOY;
              ***FOR FURTHER INFO DO BMTX, INQU, TEXT CODE=TL***
                                            ISSUED BY E RANKIN        DATE  02/26/91
+INQUIRY COMPLETE+
```

CUSTOMER——— CNF/CHATEAUGAY
CURVE NO.-155030-1
APPLICATION-
TURBINE NO.- 155030
THROTTLE PRESSURE——— 1250.0 PSIG
THROTTLE TEMPERATURE—— 950.0 F
EXHAUST PRESSURE——— 2.00 IN HG ABS
TURBINE RATED SPEED—— 5600 RPM
GENERATOR RATED OUTPUT- 19700 KWE
*** PREDICTED DATA ***



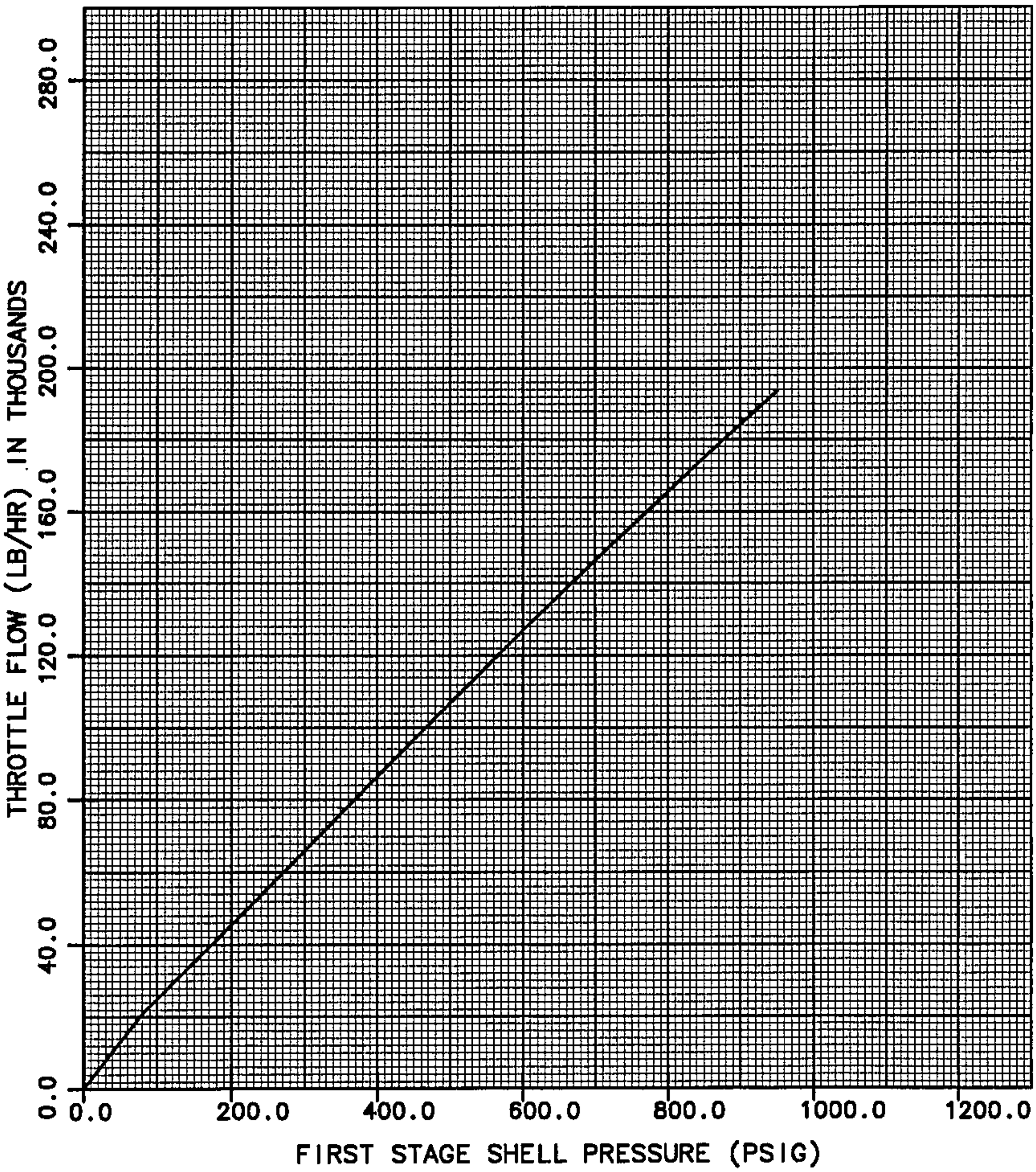
BY-MAT DATE 3-JUN-91

CUSTOMER—— CNF/CHATEAUGAY
APPLICATION—
TURBINE NO.— 155030

CURVE NO.—155030-2

THROTTLE PRESSURE	1250.0	PSIG
THROTTLE TEMPERATURE	950.0	F
EXHAUST PRESSURE	2.00	IN HG ABS
TURBINE RATED SPEED	5600	RPM
GENERATOR RATED OUTPUT	19700	KWE

*** PREDICTED DATA ***



BY—MAT DATE 3-JUN-91

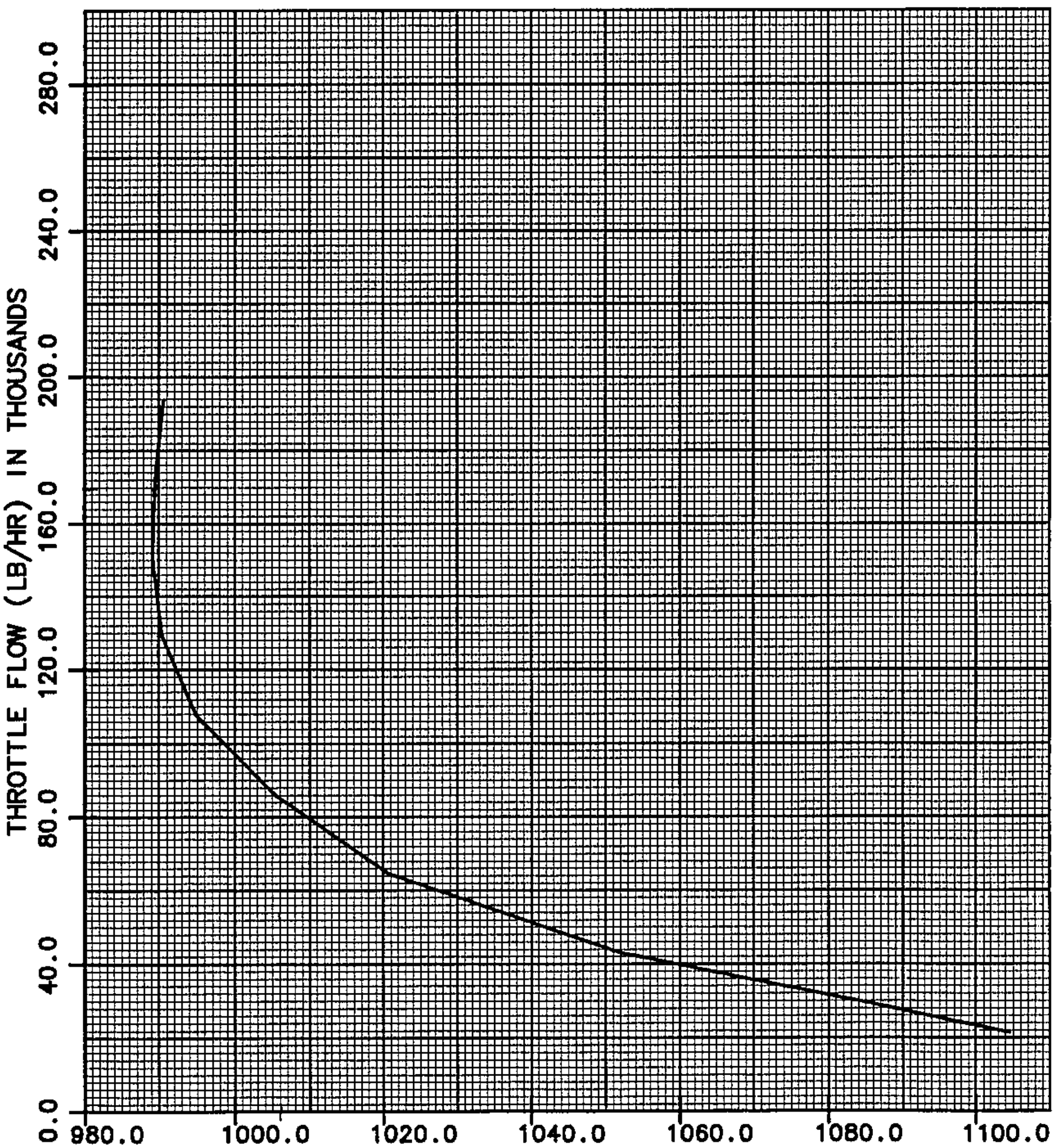
CUSTOMER—— CNF/CHATEAUGAY

CURVE NO.–155030-3

APPLICATION–
TURBINE NO.– 155030

THROTTLE PRESSURE————	1250.0	PSIG
THROTTLE TEMPERATURE——	950.0	F
EXHAUST PRESSURE————	2.00	IN HG ABS
TURBINE RATED SPEED———	5600	RPM
GENERATOR RATED OUTPUT–	19700	KWE

*** PREDICTED DATA ***



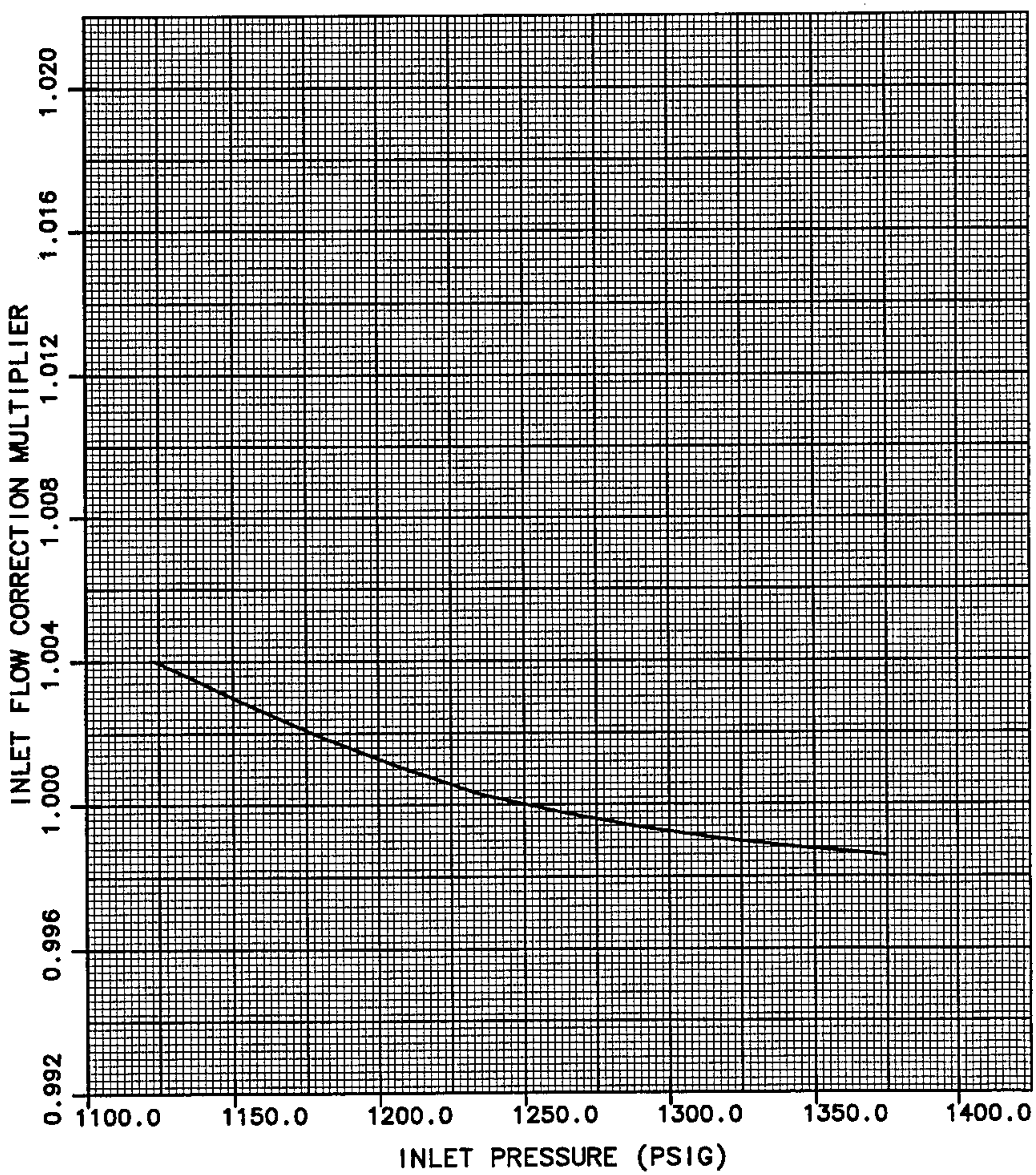
BY–MAT DATE 3-JUN-91

CUSTOMER—— CNF/CHATEAUGAY
APPLICATION—
TURBINE NO.— 155030

CURVE NO.—155030-4

THROTTLE PRESSURE————	1250.0	PSIG
THROTTLE TEMPERATURE——	950.0	F
EXHAUST PRESSURE————	2.00	IN HG ABS
TURBINE RATED SPEED——	5600	RPM
GENERATOR RATED OUTPUT—	19700	KWE
CURVE DRAWN FOR————	19700	KWE

*** PREDICTED DATA ***



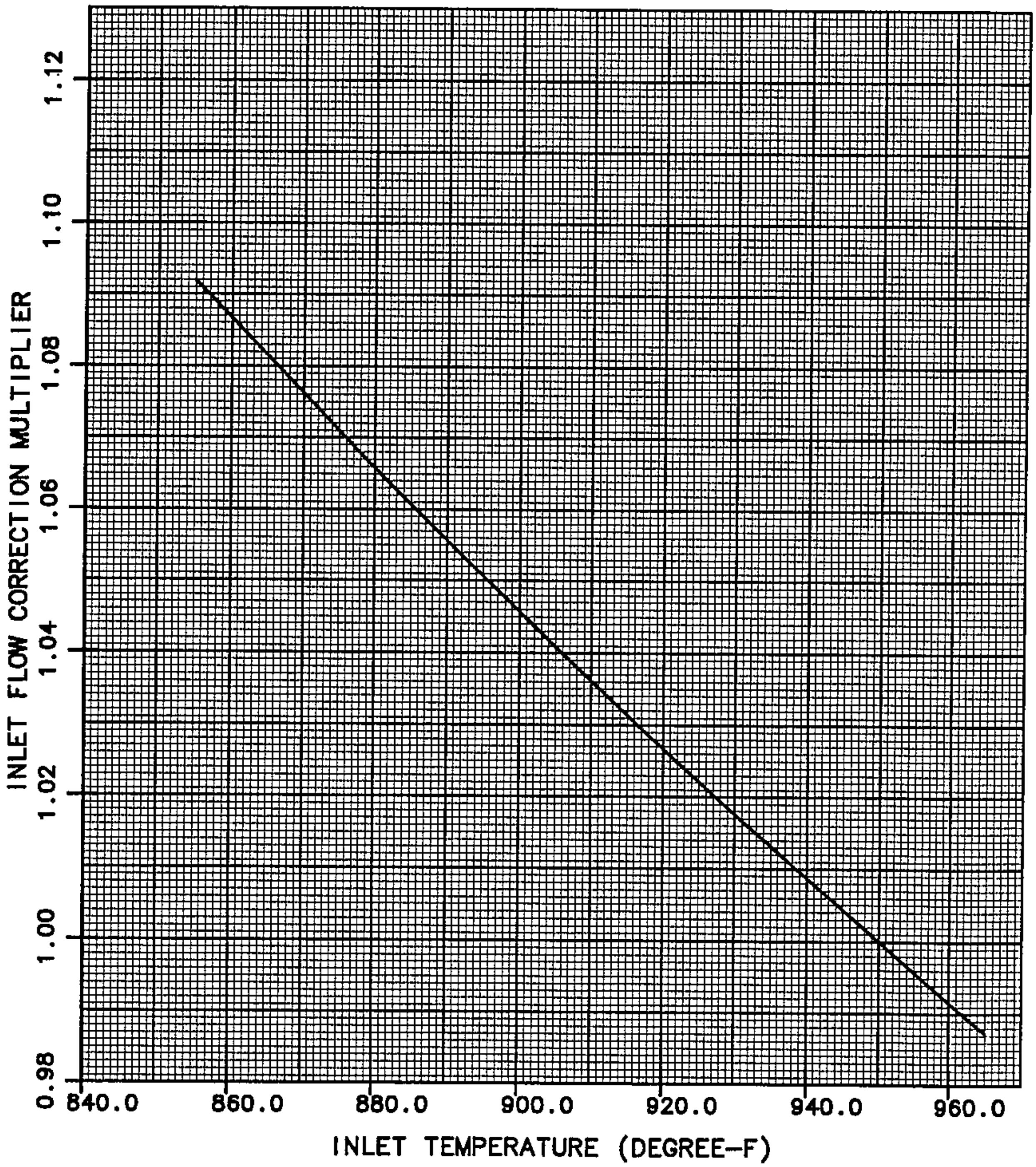
BY—MAT DATE 3—JUN—91

CUSTOMER—— CNF/CHATEAUGAY
APPLICATION—
TURBINE NO.— 155030

CURVE NO.—155030-5

THROTTLE PRESSURE————	1250.0	PSIG
THROTTLE TEMPERATURE——	950.0	F
EXHAUST PRESSURE————	2.00	IN HG ABS
TURBINE RATED SPEED——	5600	RPM
GENERATOR RATED OUTPUT—	19700	KWE
CURVE DRAWN FOR————	19700	KWE

*** PREDICTED DATA ***



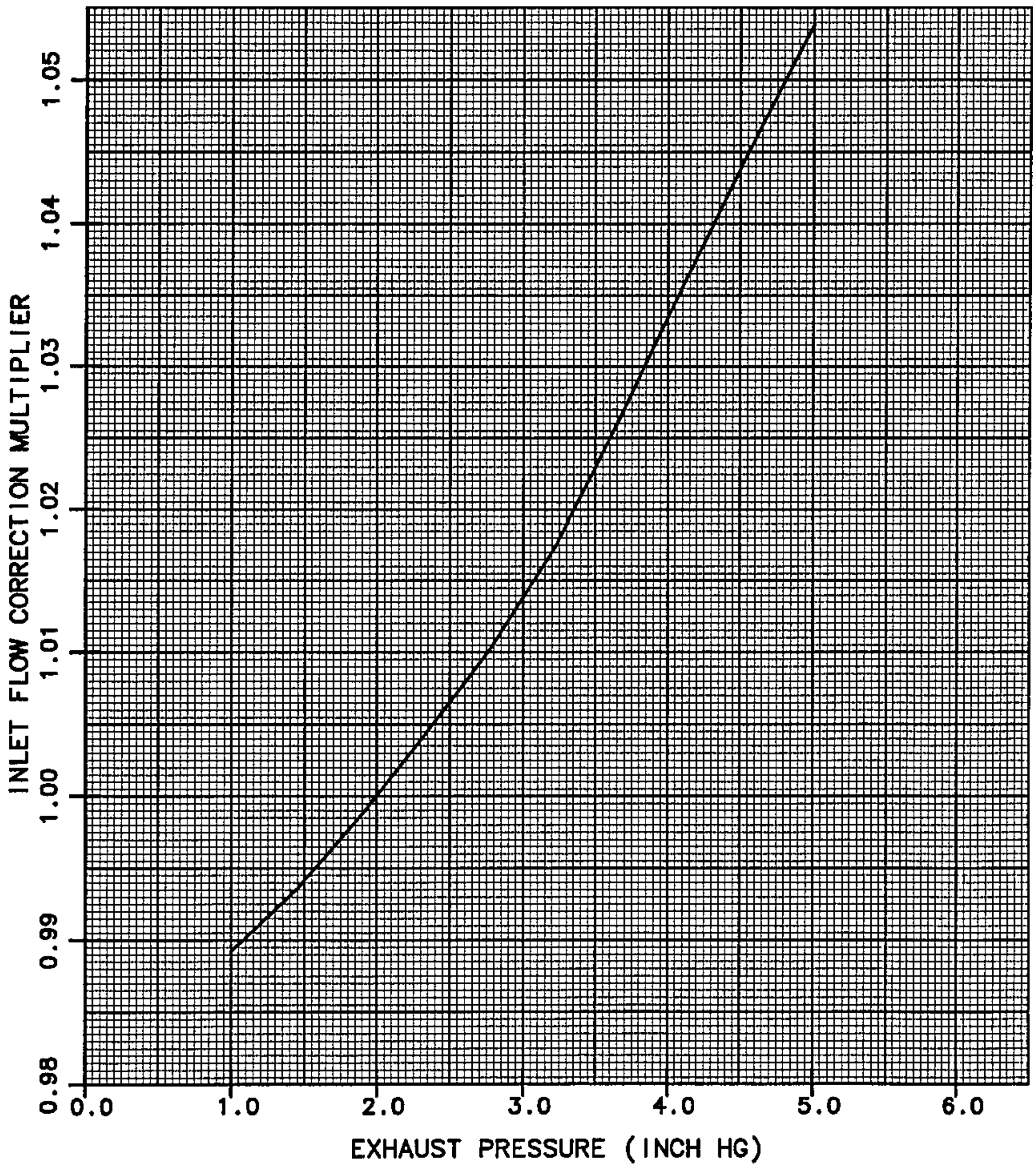
BY—MAT DATE 3—JUN—91

CUSTOMER—— CNF/CHATEAUGAY
APPLICATION—
TURBINE NO.— 155030

CURVE NO.—155030-6

THROTTLE PRESSURE	1250.0	PSIG
THROTTLE TEMPERATURE	950.0	F
EXHAUST PRESSURE	2.00	IN HG ABS
TURBINE RATED SPEED	5600	RPM
GENERATOR RATED OUTPUT	19700	KWE
CURVE DRAWN FOR	19700	KWE

*** PREDICTED DATA ***



BY—MAT DATE 3-JUN-91

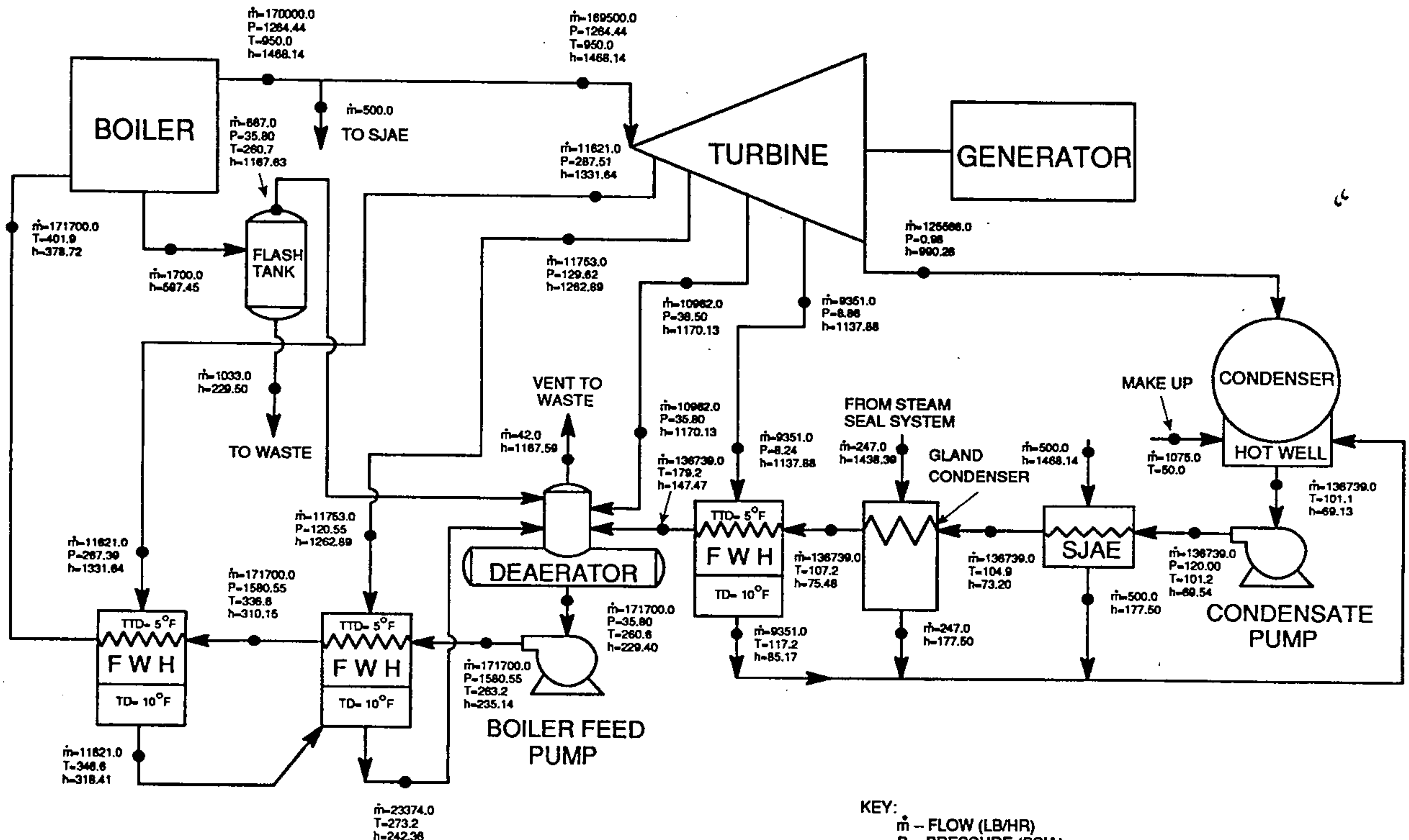
DATE: 1-2-92
REV: 1

HEAT BALANCE DATA

CNF / CHATEAUGAY 155030

HB #1 GUARANTEE POINT

19,863 KWE GEN. OUTPUT @ .9 PF AT 2" HGA EXHAUST PRESSURE



KEY:
ṁ – FLOW (LB/HR)
P – PRESSURE (PSIA)
T – TEMPERATURE (F)
h – ENTHALPY (BTU/LB)

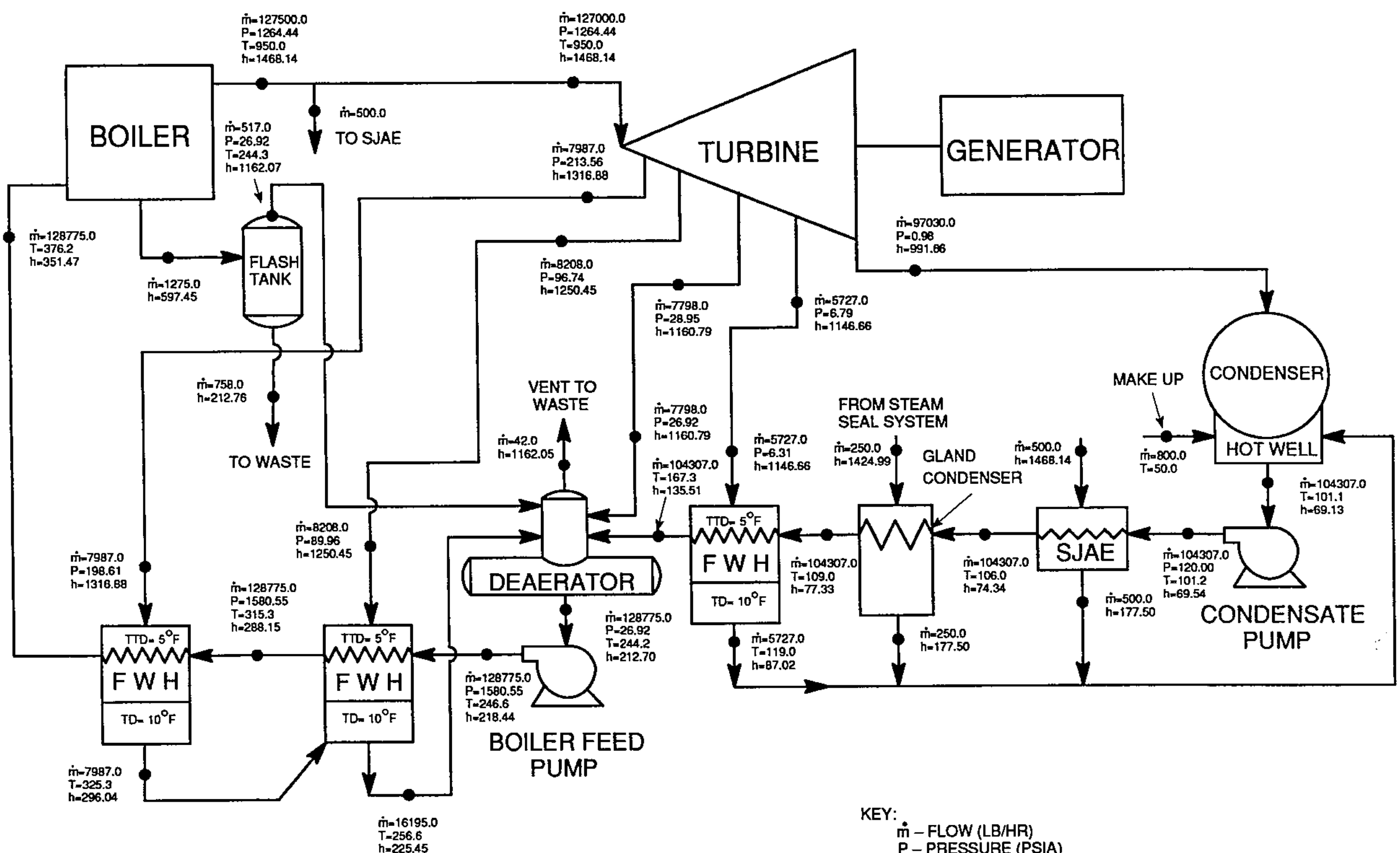
GUARANTEED GROSS HEAT RATE $= \frac{170,000\ (1,468.14 - 377.31)}{19,700} = 9,413$ BTU/KW-HR

DATE: 6-3-
REV: 0

HEAT BALANCE DATA

CNF / CHATEAUGAY 155030

HB #2 75% GUARANTEED THROTTLE FLOW
14,982 KWE GEN. OUTPUT @ .9 PF AT 2" HGA EXHAUST PRESSURE



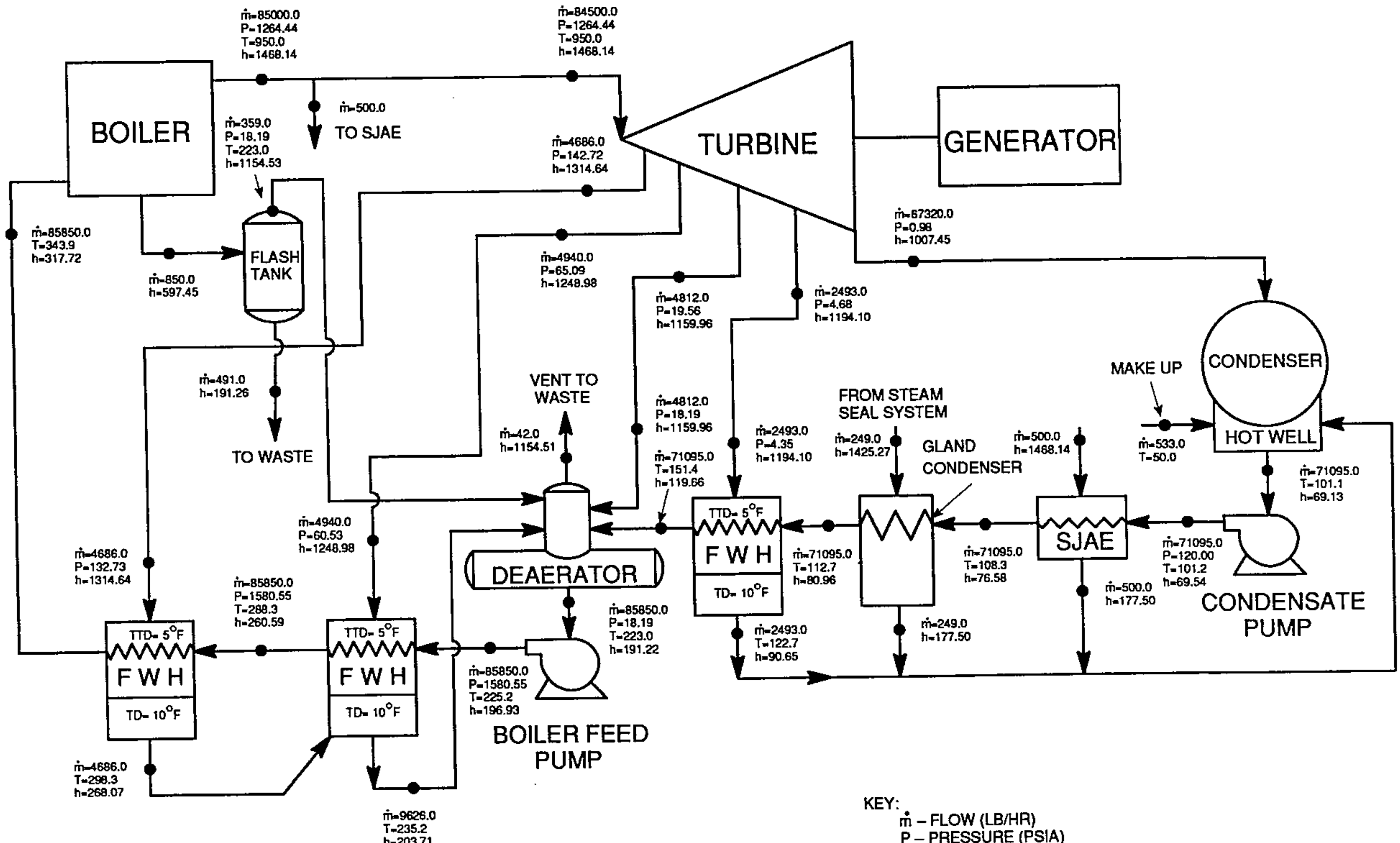
KEY:
- ṁ – FLOW (LB/HR)
- P – PRESSURE (PSIA)
- T – TEMPERATURE (F)
- h – ENTHALPY (BTU/LB)

DATE: 6-3-
REV: 0

HEAT BALANCE DATA

CNF / CHATEAUGAY 155030

HB #3 50% GUARANTEED THROTTLE FLOW
9,618 KWE GEN. OUTPUT @ .9 PF AT 2" HGA EXHAUST PRESSURE



KEY:
ṁ – FLOW (LB/HR)
P – PRESSURE (PSIA)
T – TEMPERATURE (F)
h – ENTHALPY (BTU/LB)

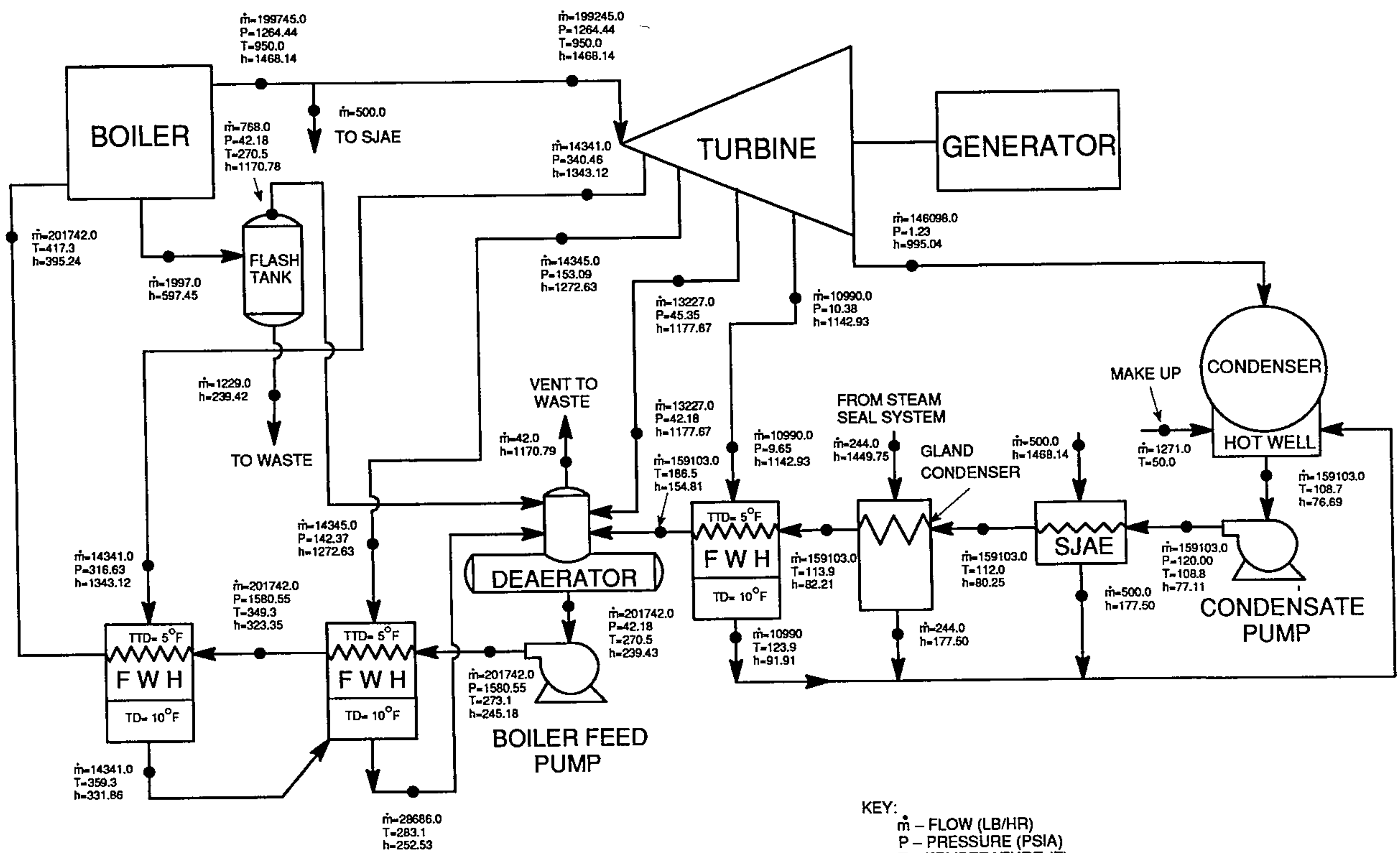
DATE: 6-3-
REV: 0

HEAT BALANCE DATA

CNF / CHATEAUGAY 155030

HB #4 VALVES WIDE OPEN

22,992 KWE GEN. OUTPUT @ .9 PF AT 2.5" HGA EXHAUST PRESSURE



KEY:
ṁ – FLOW (LB/HR)
P – PRESSURE (PSIA)
T – TEMPERATURE (F)
h – ENTHALPY (BTU/LB)

VOLUME 2
LIST OF BULLETINS

ITEM*	DESCRIPTION	VENDOR	MODEL NUMBER	INSTRUCTION NO
TAB #1				
ACCM500	Accumulator	Nacol	10 Gal	Maint. Manual
AE500	Electro-Hydraulic Act.	Woodward	5 1/4"	89015B
BG500	Grounding Brush	G E	See Fig. B50	GEI-85803E
CGL400	Gland Condenser	Basco	Type AEP	30A05A08072
CLR500	Lube Oil Cooler	Basco	Type OP (BEW)	Bulletin 772/72A13A12108
CPLG500	HS Coupling	Lucas	67F516	Inst. Manual 67F516-5439
CPLG501	LS Coupling	Lucas	67E526	67E526-5440
FILT501	Filter (Control Oil)	Filterdyne	DFV72783	Later
FILT502	Filter (Lube Oil)	Filterdyne	DFV72784	Later
TAB #2				
GDIG500	Digital Governor	Woodward	505	85007G
HE500	Heater (Oil Tank)	Chromolox	TMO-6155VWE472	PD406-5
LSH/LSL500	Level Switch	Magnetrol	XT20-1B2C-BDG	44-604.7/42-683.1
TAB #3				
P500&501	Main Oil Pump	Carver	WKL-65	D-999-2105-0-09
	Motor (AC)	G E	50HP (TEFC)	GEH-2301K
P502	Emer. Oil Pump	Carver	L & H	180/D-000-OLH-0-99052
	Motor (DC)	G E	5HP (TEFC)	GEH-3967J
PDI500&501	Diff Press Indicator	Orange Research	1201PG	Instructions SF-04
PT420 A&B	Pressure Trans.	Rosemount	1151GP9E22B1	4260/4261
SD500	Tach/Zero Speed Ind.	Airpax	4-20 mA	Tach Pak 3
SI500	Tach Indicator	NES	IPM7201/SM90112	106-0155-03n, 106-0192-00
TAB #4				
TG500	Turning Gear	Koenig	KE70-36T-15	No. M164/E-91-0311
	Motor	G E	15HP	1150 / 4002B5825JJ
	Clutch	SSS Gears Ltd.	36T	IB 609/SM17523
VEB400	Gland Exhauster Blower	Lamson	3105-5-0-AD	086-10-, 077-04, R076-07
VEB500	Vapor Extractor Blower	Cincinnati	PB Series	PMA-289
VNR500	Non-ReturnValve	Atwood & Morril	4"-300#	16293-04
VNR501	Non-Return Valve	Atwood & Morril	4"-150#	16293-05
VNR502&503	Non-Return Valve	Atwood & Morril	6"-150#	16293-06
VPC500	Low Press Cont Va	Fisher	655ED	1292/5032
VRS500	Reset Solenoid	Oil Gear	BECN 303	980125C
TAB #5				
VSSD400	Press Cont Valve	Fisher	ES	5030
	Actuator	Fisher	667-131	1203
	Positioner	Fisher	3582GR	5054
	Air Set	Fisher	67FR	5144
VSSS400	Controller	Fisher	4162R	5177
VTR501	Trip Relay Valve	G E	Oil To Air	GEK-81512
VTS500	Trip Solenoid Valve	Oil Gear	BECN 303	See VRS500
VTT400	Trip Throttle Valve	Gimpel	8"-1500#	NP1680, NP1660, GC-135
	Grouting Spec	G E		GEK-50805A
	Cond / Exh Welding	G E		GEK-89968
	Steam Purity	G E		Instructions
	Insulation Sketches	Claremont	155030	
TAB #6				
MON500	Vib. & Thr. Keyphasor & Valve Pos.	Bently Nevada	3300 Series	Instructions
MON501	Temp Monitor	Bently Nevada	3300 Series	Instructions

* Bill of material item designation

graham
Vacuum and Heat Transfer

SURFACE CONDENSER SPECIFICATIONS

Customer :	CNF CONSTRUCTORS	Ref.No. :	EG217NJ91
Cust.Ref.:	KES CHATEAUGAY PWR	Date :	10-31-91
Location :	CHATEAUGAY, NEW YORK	Item :	ALTERNATE #6
Quantity :	1	Engineer :	P217N

PERFORMANCE

Absolute Pressure @ Steam Inlet (in.HgA)	2.00
Steam Condensed (lb./hr.)	126000.
Heat Rejected (Btu/hr.)	119700000.
Circulating Water (gpm)	**21700.**
Water Inlet / Outlet (deg.F)	**85.00 / 96.03**
Water Pressure Loss : (ft.Water / psi)	23.8 / 10.3
Percent Clean	90.
Tube Velocity (fps)	8.50

DESIGN

MODEL :	78 92 / 18.75 TBTD
Surface Area (sq.ft.) Total / Effective	19770. / 19348.
Number of Water Passes	2.
Number of Tubes	6444.
Outside Tube Diameter (in.) - BWG	0.6250 - 22 AW
Total Tube Length (ft.)	18.75
Design / Test Pressure (psig) : Shell	FV& 15.0 /Flooded
Tubes	75.0 / 112.5
Design Temperature (deg.F) : Shell	250.0
Tubes	150.0
Hotwell : bathtub ....supply (min.)	3.
Steam Inlet (rectangular) (in.) (FF)	42. x 104.
Water Connections (in.)	2. - 36.
Condensate Outlet (in.)	1. - 10.0

MATERIALS

Shell	(A-516-70)	Carbon Steel
Water Boxes	(A-516-70)	Carbon Steel
Water Box Covers	(A-516-70)	Carbon Steel
Baffles	(A-516-70)	Carbon Steel
Tube Support Plates	(A-516-70)	Carbon Steel
Tubes	(A-249-TP316)	316SS
Tube Sheets	(A-516-70)	Carbon Steel

Remarks : Design per HEI, Eighth Edition
Steam Inlet Impingement Protection Included
Inlet Tube Ends are Belled
Ejector Package Not Mounted on the Main Condenser

graham
Vacuum and Heat Transfer

Customer : CNF CONSTRUCTORS	Ref.No. : EG217NJ91
Customer Ref: KES CHATEAUGAY PWR	Date : 10-8 -91
Location : CHATEAUGAY, NEW YORK	Item : 7-1/2 SCFM
	Engineer: P217N

STEAM JET EJECTOR PERFORMANCE:

Pressure maintained (inches HgA)*........................ 1.0
Total Fluid Evacuated (lbs/hr)........................ 108.1
Dry air evacuated (lbs/hr)........................ 33.8
Motive steam required per element (lbs/hr)............ 385.0
Operating steam pressure (psig)........................ 150.0
Operating steam temperature (deg.F)........................ 587
Inter condenser cooling water temp. (deg.F)............ CONDENSATE
Inter condenser cooling water required (gpm)............ CONDENSATE
Cooling water pressure drop thru I/A condenser (psi)... 0.5
....
....
....

STEAM JET EJECTOR DESIGN:

Model designation........................ 2-4A2-108-1/3H
Number of stages........................ TWO
Number of elements for parallel operation.......... TWO
Material of diffuser and suction chamber.......... SA-36/SA-216-WCB
Material of steam nozzles........................ 416SS
Type of inter and after condenser........................ IN-LINE
Material of inter and after condenser shell........ SA-53-B
Tube sheets........................ SA-240-304
Tubes ....0.7500 - 20 BWG AW SA-249-TP304
Nozzle Extension & Steam Chest........................ Stl
M.A.W.P/ Test Pressure (psig) : Shell......... FV + 20 / 30
Tubes......... 300 / 450
Design Temperature (deg.F) : Shell......... 250
Tubes......... 150

APPURTENANCES INCLUDED:

Steam strainer........................ Included
Interconnecting steam piping........................ Included
Air leakage meter........................ Included
Priming ejector - Size........................ 3H(14C)
Steam consumption (lbs/hr)............ 835.0
Drainers or traps........................ Included
Design per HEI Construction of I/AC per HEI........................
Isolation valve(s) at 1st stage discharge........................Included
...Included
Isolation valve(s) at 2nd stage suction........................Included
Isolation valve at hogger suction........................Included
Hogging Ejector silencer........................Included
Motive steam stop valve for each jet........................Included
Pressure relief valve on each element........................Included
***Measured at condenser inlet.**

GRAHAM MFG. CO., INC.

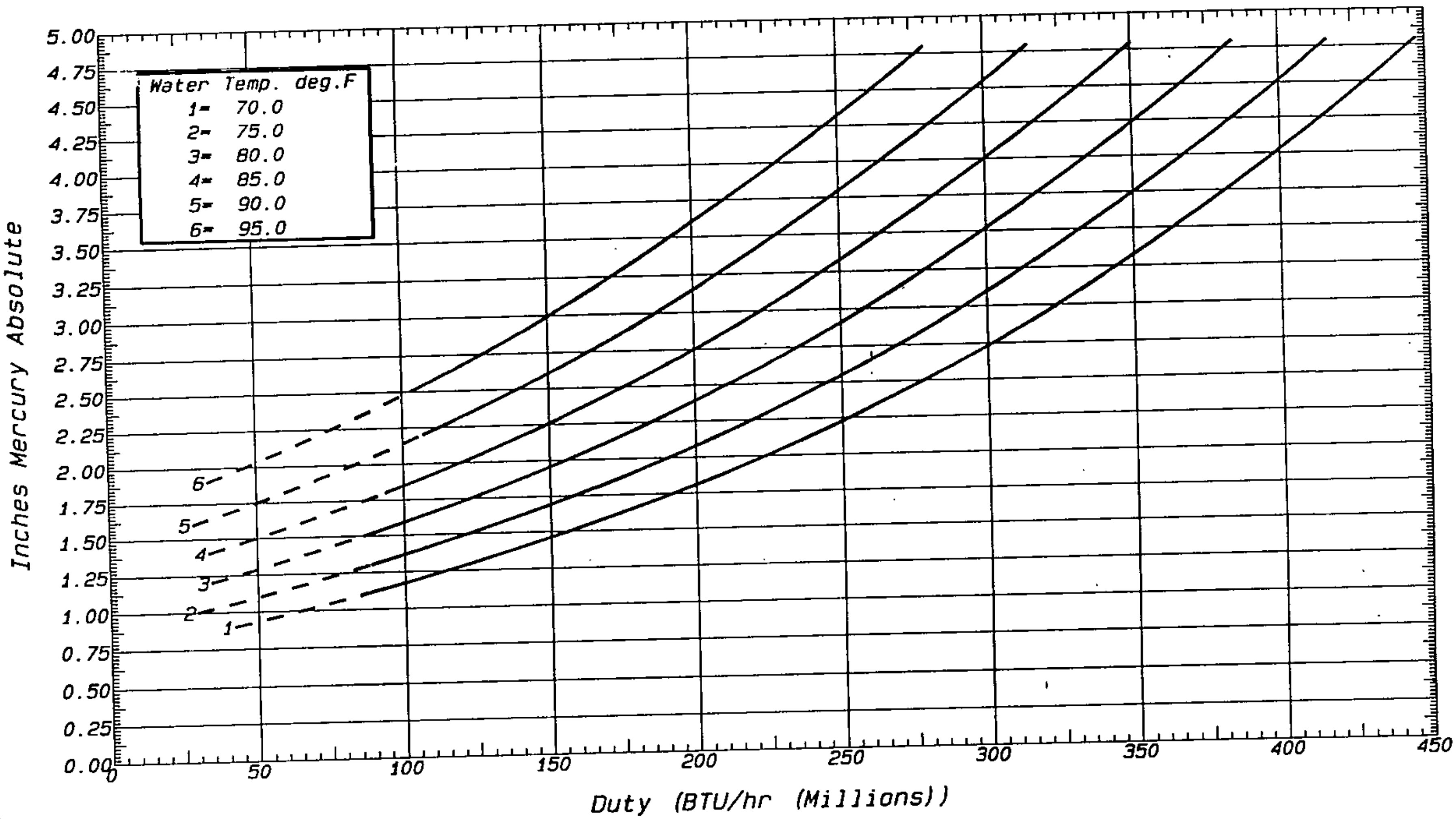
PREDICTED CONDENSER PERFORMANCE

7/23/92

Engineer: TLC

Customer: CNF
Job: 94368M
Model 78 92 / 18.75TBTD
Surface Area (sq.ft.) 19348 EFF
Water Flow Rate (gpm) 21700.0

Dashed lines indicate less than HEI requirement of a 5 deg.F approach.



Instruction Manual

PGEI -12311

4 Pole, 19700 KW, 21890 KVA, 0.90 PF, 1800 RPM, 13800V, 3 PH, 60 HZ

EN139863 , Serial No. 139863-1

Horizontal Synchronous Generator

with Brushless Exciter and PMG

Customer: **NDTSD/CNF/CHATEAUGAY**

Customers Order No.: 091-P58610
GE Canada Requisition: 9285-94354

General Electric Canada
Industrial Motor Business
107 Park Street North
Peterborough, Ontario
K9J 7B5

Date: November, 1991

CGE

BRUSHLESS SYNCHRONOUS GENERATOR CONTROL DATA SHEET

CANADIAN GENERAL ELECTRIC COMPANY LIMITED

CUSTOMER ... NDTS/CNF/Chateaugay ... Requisition. 9285-79-94354 ...

GENERATOR ... Eng'g Notice. 139863 ... Serial No. 139863-1 ... Control Req. ...

RATING

Type ... ATB ... Poles ... 4 ... KW ... 19700 ... KVA ... 21889 ... RPM 1800 ... Volts 13800 ... Phases ... 3 ...

Hz ... 60 ... PF 0.9 ... Amps ... 916 ... Temperature rise ... 80 ... °C by RTD/Resistance ...

Overload ... - ... % for ... - ... Hours Driven by ... Steam Turbine Through Gear ...

EXCITER FIELD DATA

Field amps at rated load ... 4.0 ... Resistance at 25°C ... 22.27 ... Ohms

Rated Excitation Volts ... 121.6 ... Ceiling Volts ... 180 ...

Minimum Field amps † ... 1.2 ... Minimum Field volts (cold) ... 26.7 ...

Overload field amps ... - ... Overload Field volts (hot) ... - ...

REGULATOR DATA

Manufacturer ... Basler ...

Type ... Auto/Auto SR9A with reactive droop, Excitation Limiter and UFOV ...
Input Control Power from Shaft Mounted Permanent Magnet Generator. ...

GENERATOR STATOR DATA

Stator amps at rated load ... 916 ... Stator amps at overload ... - ...

Suggested temperature settings for protection equipment using embedded stator RTD's **

alarm ... 125 ... °c, trip ... 130 ... °c

SPECIAL DATA *

Xd ... 1.56 ... X'd 0.29 ... Xd'(sat) 0.26 ... X"d 0.20 X"d(sat) 0.18 ...

Xq ... 0.87 ... X"q 0.18 ... X"q(sat) 0.16 ... Xo 0.08 ... X2 ... 0.19 ... SCR 0.70 ...

T'do ... 7.4 ... sec T'd ... 0.93 ... sec T"d ... 0.027 ... sec Tao ... 0.24 ... sec (25°C)

Open and Short Circuit Saturation Characteristics - 513HA141 ...

Rated Voltage "V" Curves - 513HA142 ...

Rated Voltage Reactive Capability Diagram - 513HA143 ...

Notes: † Minimum excitation volts is that required to give 80% rated AC volts at no load rated speed with cold field unless some other requirement is stated.

* All reactances and time constants are for unsaturated conditions unless otherwise noted.

** Based on 40°C ambient cooling air and temperature rise by RTD, at full or S.F. load whichever is greater

Prepared by ... W.J. Jackson/D. Derr ... [signature] ... Date 91.03.22 ...
Rev. 91 05 02

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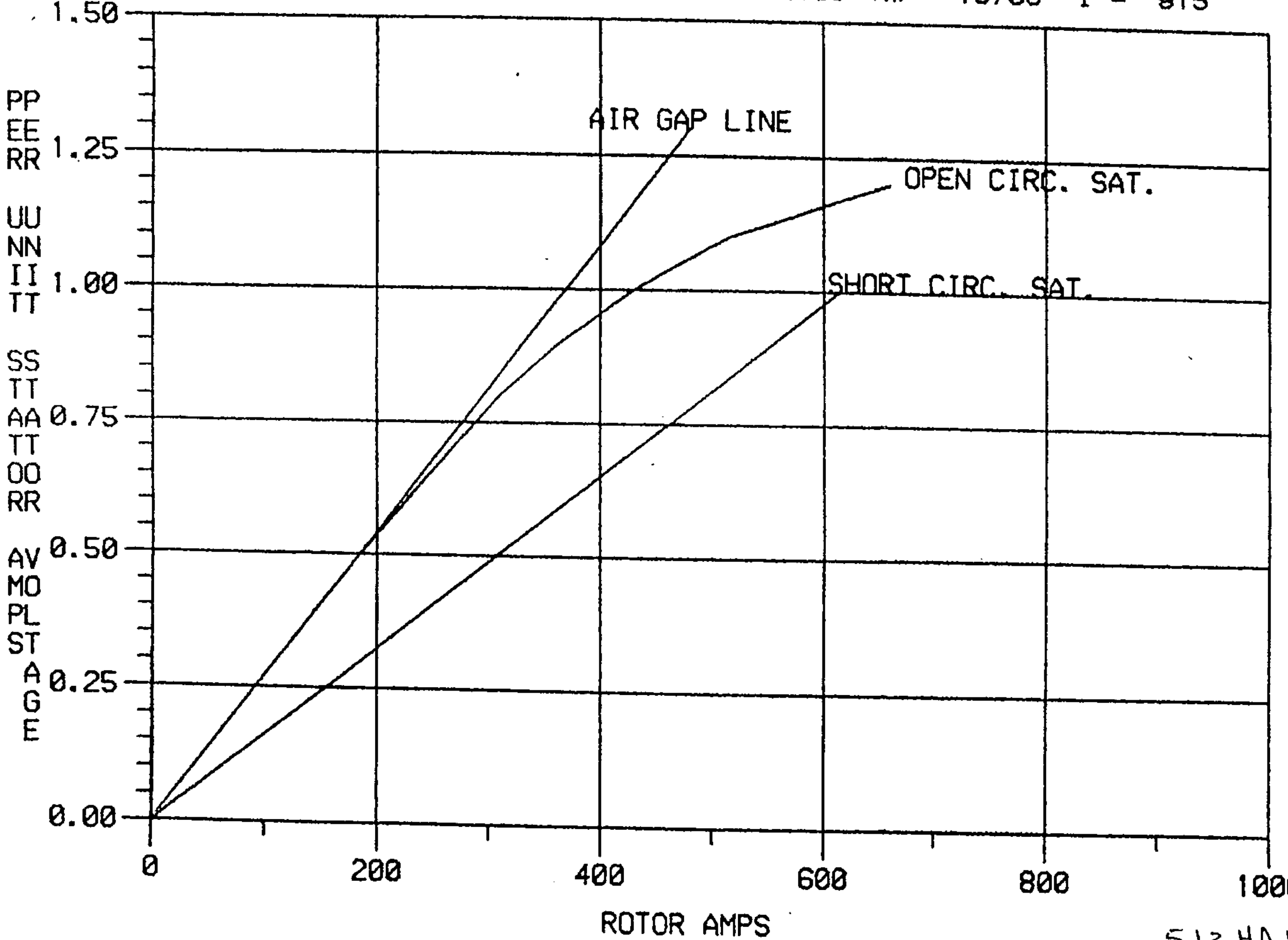
CALCULATED OPEN AND SHORT CIRCUIT SATURATION CURVES

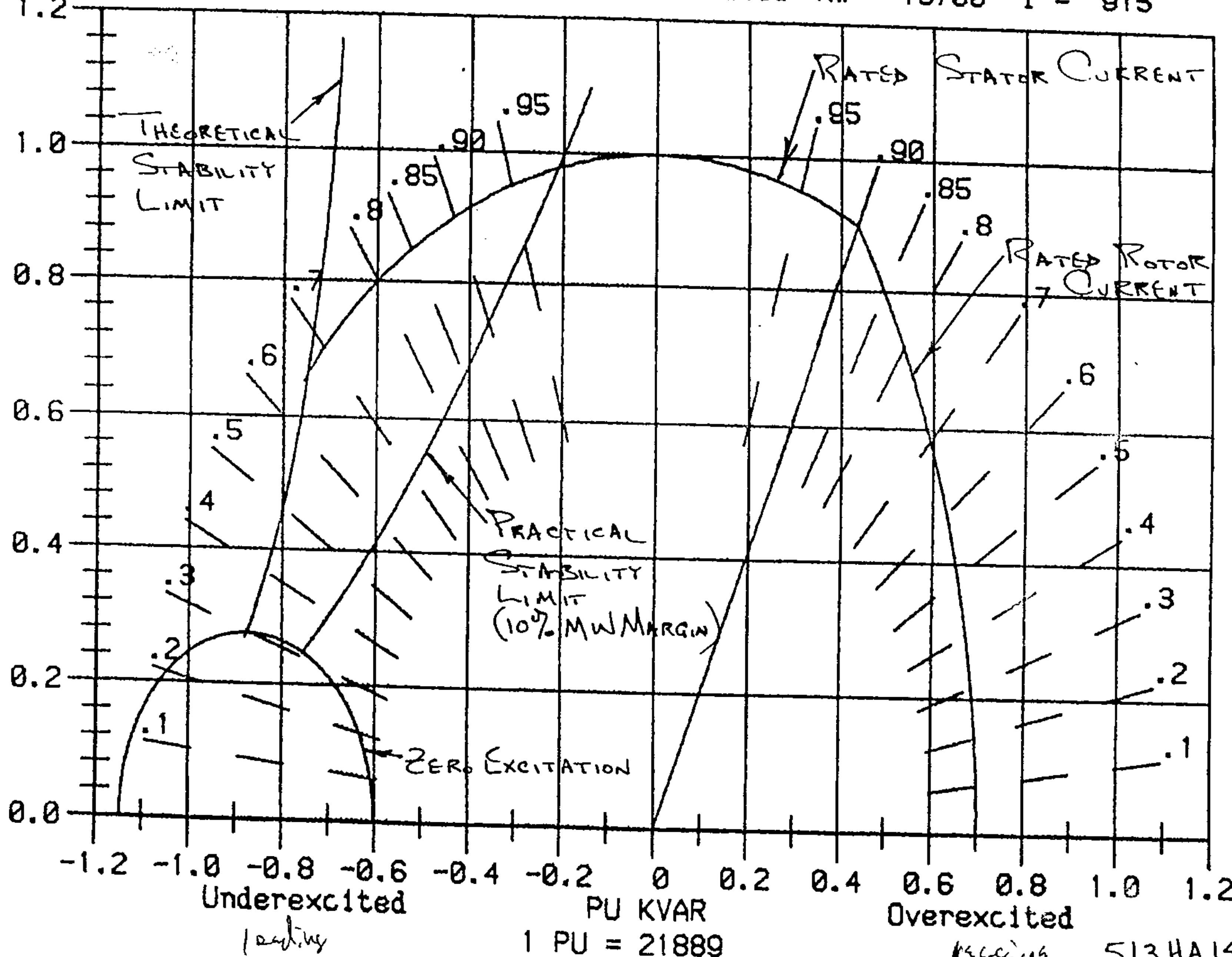
NDTS/CNF/CHATEAUGAY 9285-94354 EN139863
KVA = 21889 PFACT = 0.9000 VOLTS = 13800 KW = 19700 I = 915



513HA141
REV. 91 05 02

RATED VOLTAGE REACTIVE CAPABILITY DIAGRAM

NDTS/CNF/CHATEAUGAY 9285-94354 EN139863
KVA =21889 PFACT = 0.9000 VOLTS = 13800 KW = 19700 I = 915



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