

WORLEYPARSONS RESOURCES & ENERGY  
PEDE UNIT 1 PROJECT

- REVIEWED AND ACCEPTED
- REVIEWED AND ACCEPTED AS NOTED  
(RESUBMIT FOR RECORD)
- NOT ACCEPTED (RESUBMIT FOR REVIEW)
- FOR INFORMATION ONLY (REVIEW WAIVED)

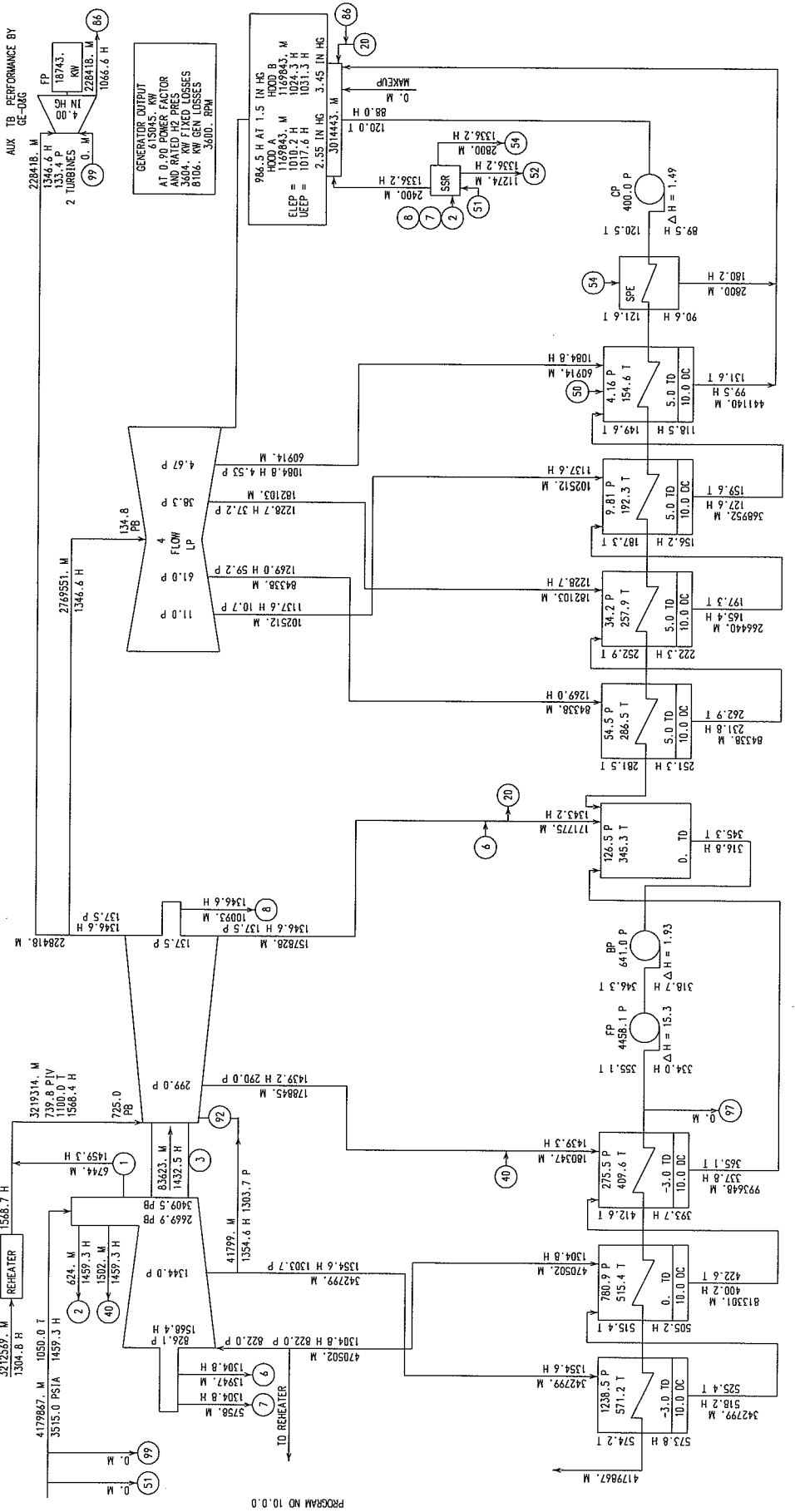
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DATE \_\_\_\_\_ BY \_\_\_\_\_

PEDE-1-DV-011001-HEAT-BALANCE-R1.pdf

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TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY  
 THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR  
 EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED



NET HEAT RATE =  $\frac{4179867 \times (1459.3 - 573.8)}{615045} = 7399$  BTU/KW-HR

VALVE BEST POINT =  $\frac{4179867 \times (1459.3 - 573.8)}{615045} = 7399$  BTU/KW-HR

LEGEND - CALCULATIONS BASED ON 1967 ASME STEAM TABLES  
 M - FLOW-LB/HR  
 P - PRESSURE-PSIA  
 T - TEMPERATURE-DEGREES

615045 KW  
 T04F 30.0 IN  
 LSB / 3600 RPM  
 3515.0 PSIA  
 1050. / 1100. T  
 0.90 PF L10  
 GEN-

0. PCT MW

2.55 / 3.45 IN HG ABS

90204651\_C1

600MW SUPERCRITICAL RATING CASE-1

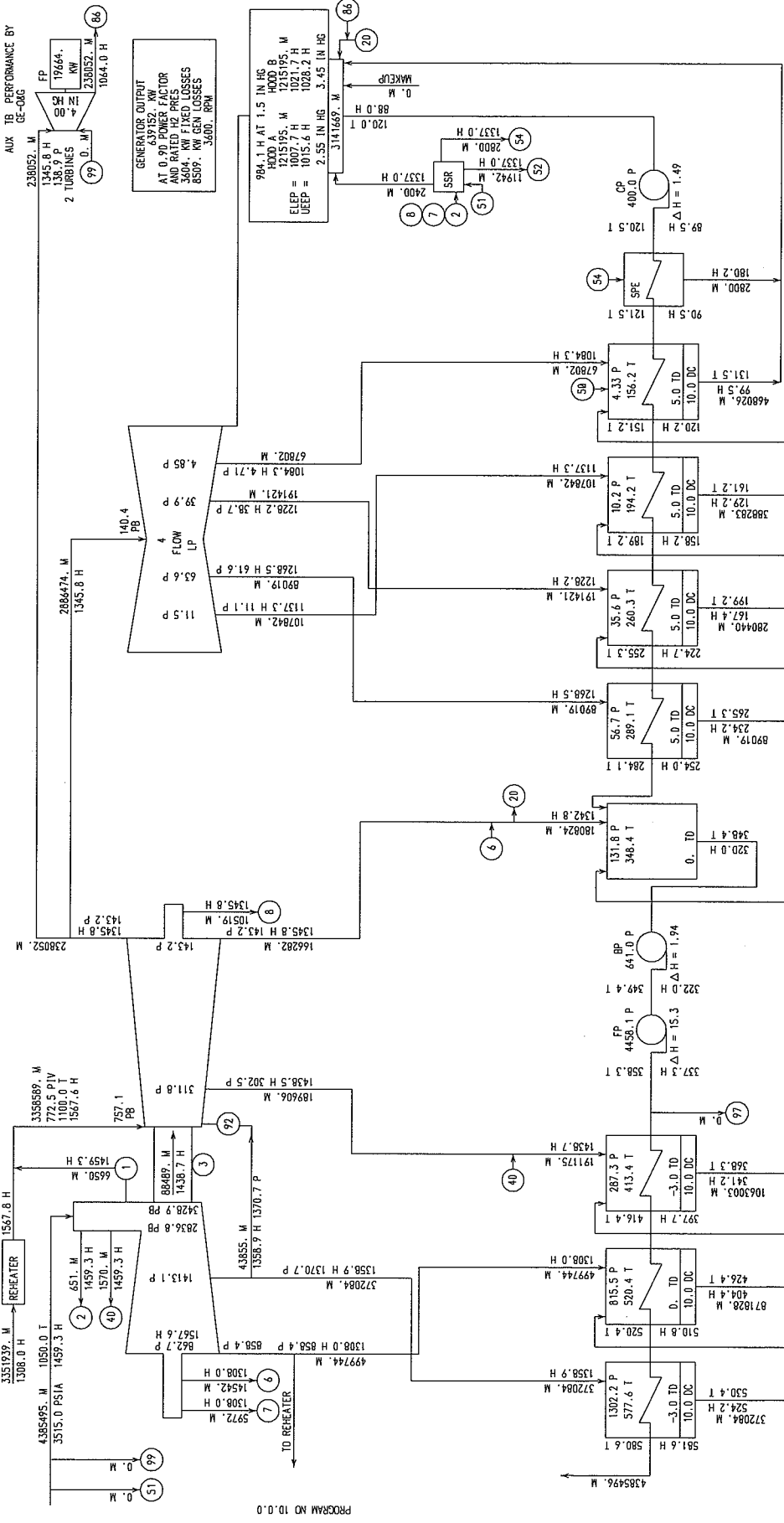
11/09/06

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TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

CALCULATED DATA - NOT GUARANTEED

RATING FLOW IS 4176662 M AT INLET STEAM CONDITIONS OF 3515.0 PSIA AND 1050.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 5.0 PERCENT) OF 4385495 M. THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED



PROGRAM NO 10.0.0

$$\text{NET HEAT RATE} = \frac{4385495 \times (1459.3 - 581.6)}{3351937 \times 1308.0} = 736 \text{ BTU/KW-HR}$$

VALVE BEST POINT = 4385495 (1459.3 - 581.6) / 3351937 (1308.0) = 736 BTU/KW-HR

LEGEND - CALCULATIONS BASED ON 1967 ASME STEAM TABLES  
 P - PRESSURE-PSIA  
 T - TEMPERATURE-°F  
 H - ENTHALPY-BTU/LB  
 ΔH - TEMPERATURE-°F DEGREES

615045 KW  
 104F 30.0 IN LSB  
 3515.0 PSIA  
 GEN

2.55 / 3.45 IN HG ABS  
 3600 RPM  
 1050.0  
 0.70 PF L10

0. PCT MW

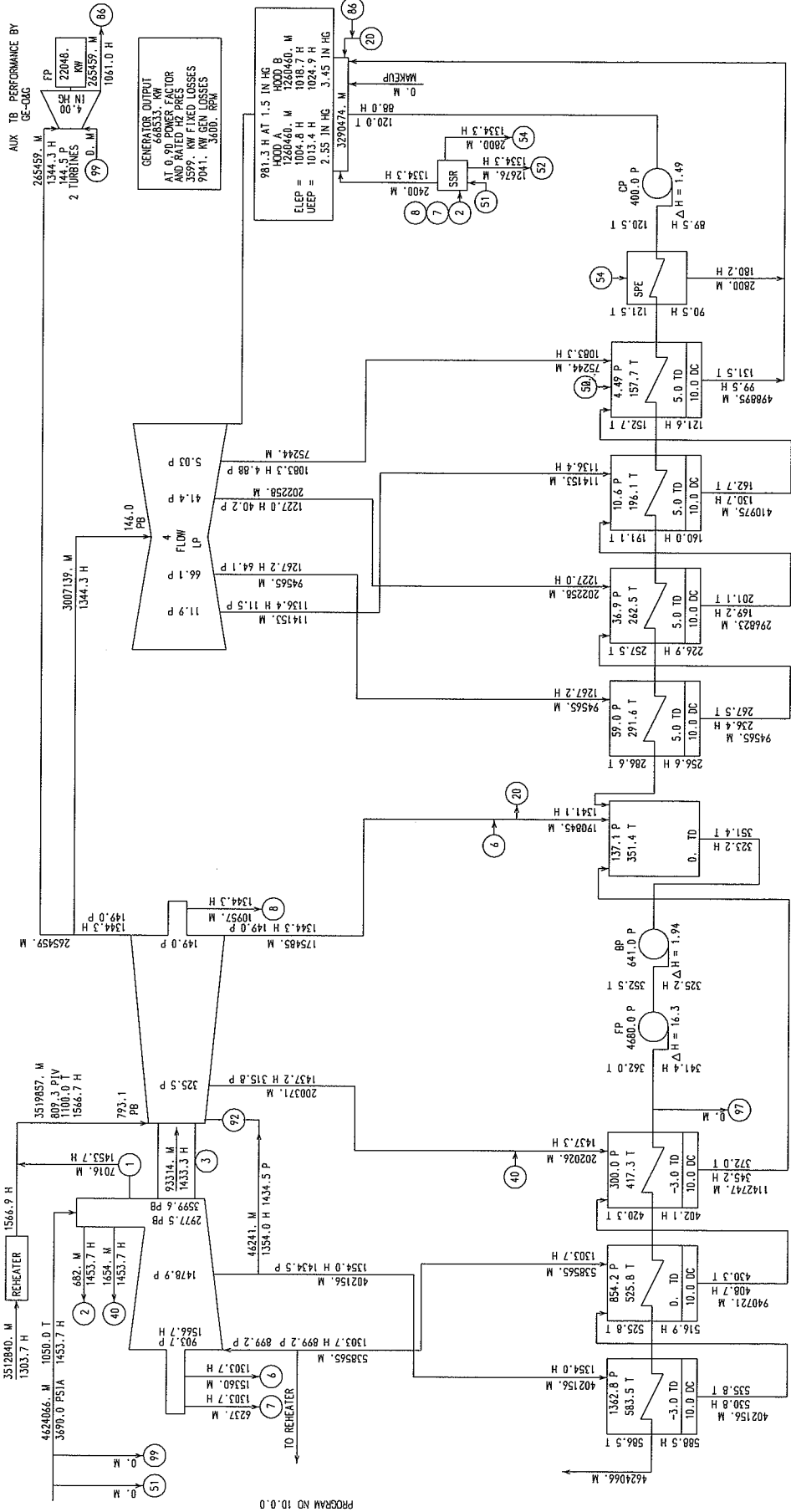
50204651\_CS3

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TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

CALCULATED DATA - NOT GUARANTEED

RATING FLOW IS 4176462 M AT INLET STEAM CONDITIONS OF 3515.0 PSIA AND 1050.0 T TO ASSURE THAT THE TURBINE WILL PASS THIS FLOW, CONSIDERING VARIATIONS IN FLOW COEFFICIENTS FROM EXPECTED VALUES, SHOP TOLERANCES ON DRAWING AREAS, ETC. WHICH MAY AFFECT THE FLOW, THE TURBINE IS BEING DESIGNED FOR A DESIGN FLOW (RATING FLOW PLUS 5.0 PERCENT) OF 4355495 M. THE EQUIVALENT DESIGN FLOW AT 3690.0 PSIA AND 1050.0 T IS 4624066 M. GENERATOR OUTPUT CONDITIONS SHOWN ON THIS HEAVY BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR ADJUSTMENTS HAS BEEN DEDUCTED



PROGRAM NO 10.0.0

NET HEAT RATE =  $\frac{4624066 \text{ (1453.7 - 588.5)} \text{ BTU}}{3512840 \text{ (1453.7 - 1303.7)} \text{ KW-HR}} = 7387$

VALVE BEST POINT = 668533.

LEGEND - CALCULATIONS BASED ON 1947 ASME STEAM TABLES  
 M - FLOW-LB/HR  
 P - PRESSURE-PSIA  
 T - TEMPERATURE-DEGREES

615945 KW 2.55 / 3.45 IN HG ABS  
 TCAF 30.0 IN L56 3600 RPM  
 3515.0 PSIA 1050.0 T  
 GEN- 742800. KVA 0.90 PF LIO

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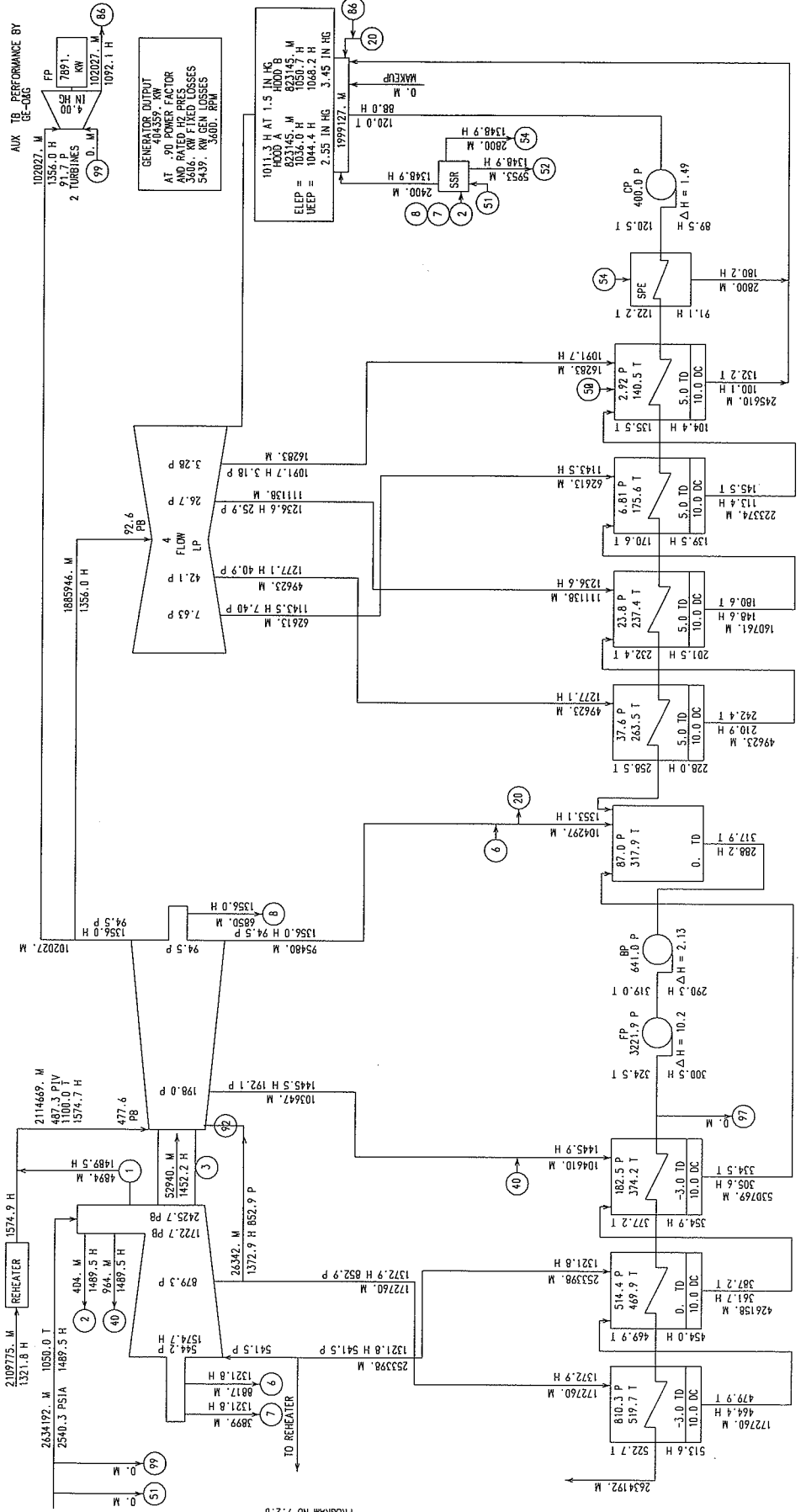
SMITCE COOPER 612-4F30

600MW SUPERCRITICAL WID-OP CASE-3  
 50204651\_CS3

11/21/06

TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE-GENERATOR AUXILIARIES HAS BEEN DEDUCTED



$$\text{VALVE BEST POINT} = 2634192.1 \text{ (1489.5 - 513.6)}$$

$$\text{NET HEAT RATE} = 2109775.1 \text{ (1574.9 - 1321.8)} = 7678 \text{ BTU/KW-HR}$$

$$= 404359.1$$

415045 KW 2.55 / 3.45 IN HG ABS  
 1046 30.0 IN LSR 3400 RPM  
 3515.0 PSIA 1050. / 1100. T  
 GEN-743700. KVA .90 PF L10  
 GEN-743700. KVA .90 PF L10

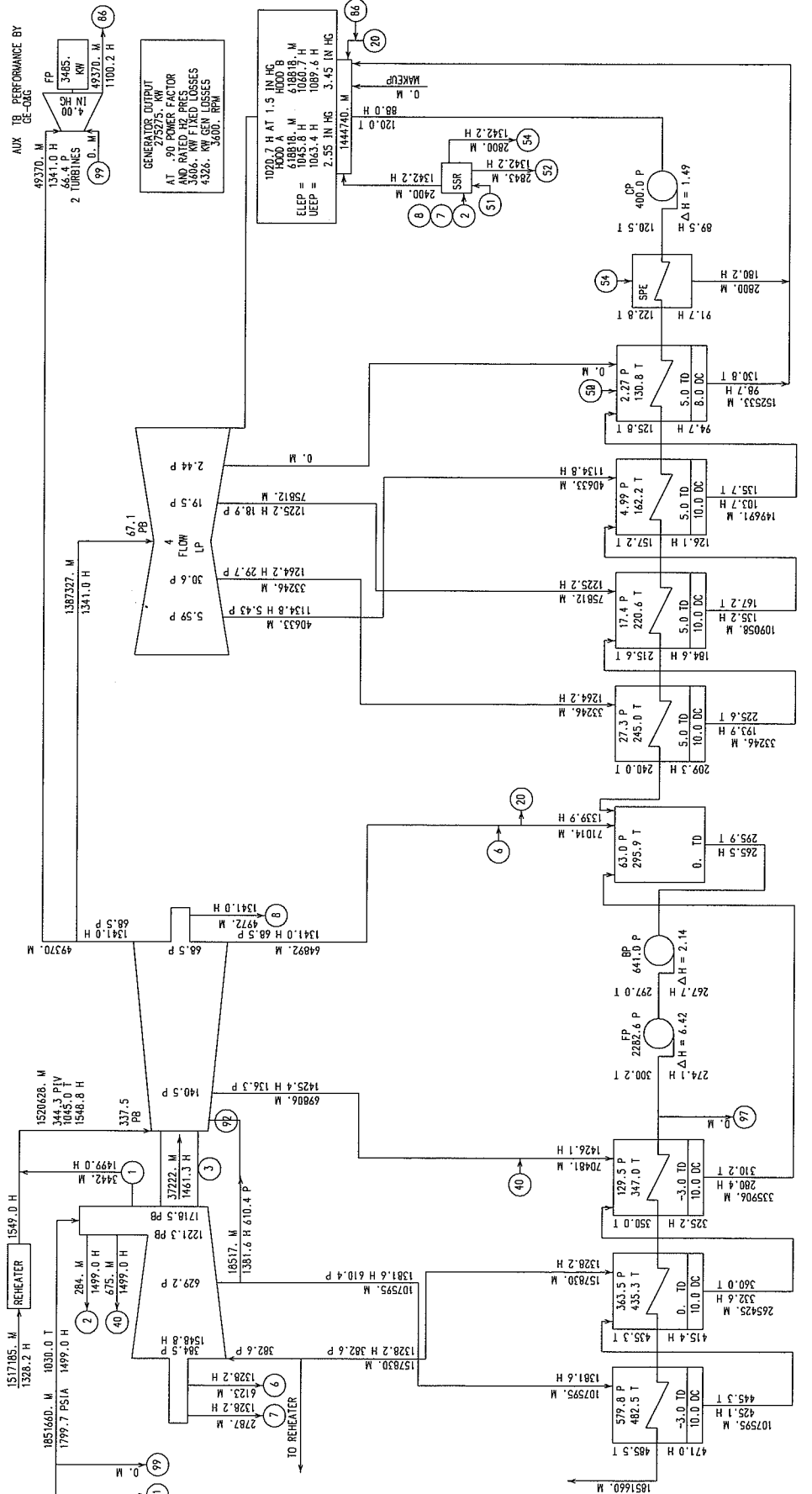
0. PCT MU  
 1050. / 1100. T  
 .90 PF L10

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TURBINE AND EXTRACTOR ARRANGEMENT IS SCHEMATIC ONLY

THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE GENERATOR AUXILIARIES HAS BEEN DEDUCTED



PROGRAM NO 9.3.0

1851660. ( 1499.0 - 471.0 )  
VALVE BEST POINT = 1517185. ( 1549.0 - 1328.2 ) = 8132 BTU/KWH  
NET HEAT RATE = 275275.

LEGEND - CALCULATIONS BASED ON 1947 ASME STEAM TABLES  
M - FLOW-LEAVING  
P - ENERGY-OUT  
H - TEMPERATURE-DEGREES

REV-40% LOAD OF VWO-OP

615045. KW 2.55 / 3.45 IN HG ABS  
TCH 30.0 IN LBS 3600 RPM  
3515.0 PSIA 1050. / 1100. T  
GEN - 745700. KVA .90 PF LIO

GENERAL ELECTRIC COMPANY, SCHENECTADY NY

SANTIE COOPER 612-4F30

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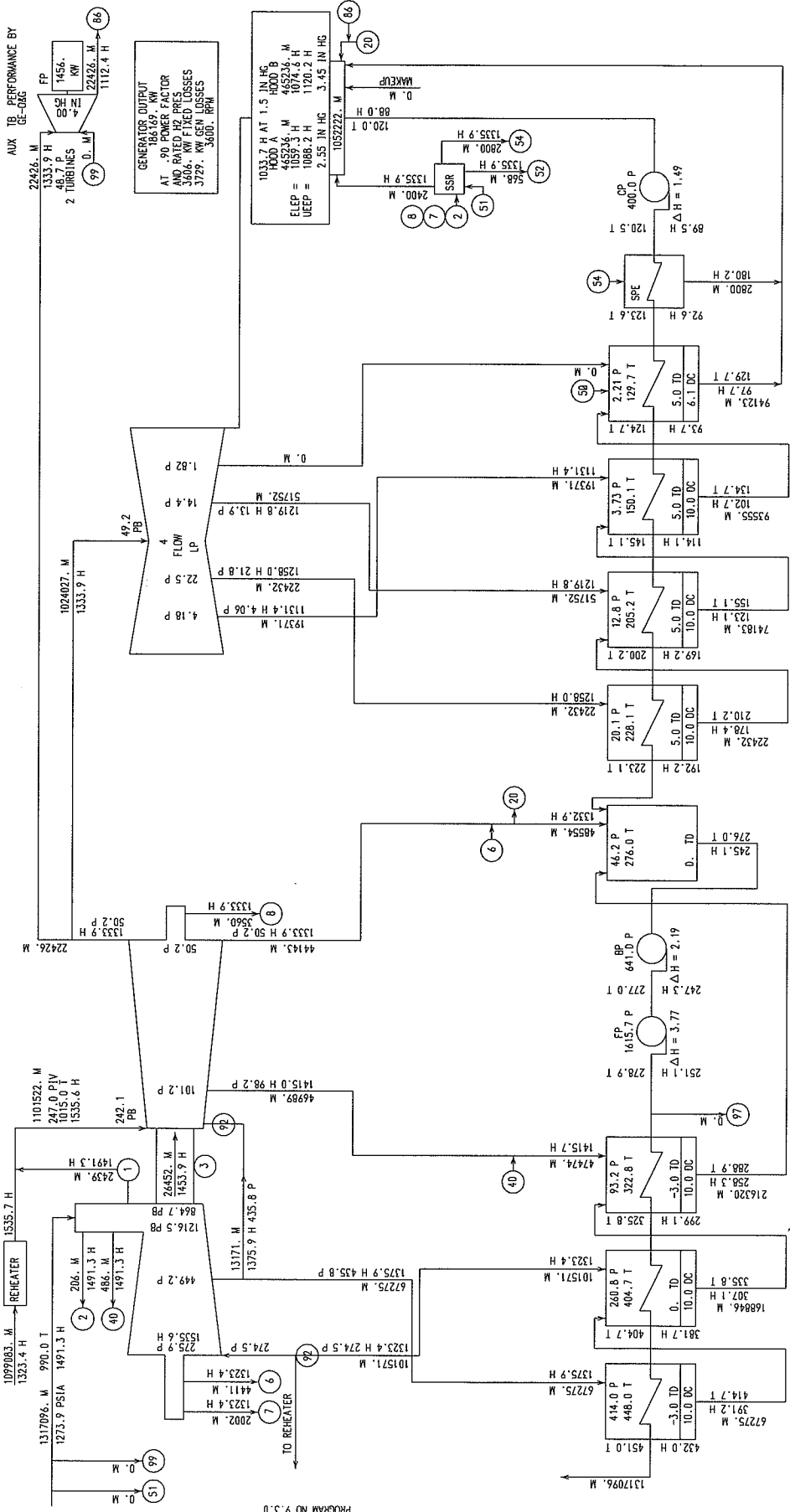
10/03/06

502046s 1-PL-5

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TURBINE AND EXTRACTION ARRANGEMENT IS SCHEMATIC ONLY

THE VALUE OF GENERATOR OUTPUT SHOWN ON THIS HEAT BALANCE IS AFTER ALL POWER FOR EXCITATION AND OTHER TURBINE GENERATOR ADJUSTMENTS HAS BEEN DEDUCTED



1317086. (1491.3 - 432.0) = 8747 BTU/KW-HR  
 VALVE BEST POINT = + 1092083. (1535.7 - 1323.4)  
 NET HEAT RATE = 186187.

LEGEND - CALCULATIONS BASED ON 1947 ASME STEAM TABLES  
 M - FLOW-CHART  
 H - ENTHALPY-ENTHALPY  
 T - TEMPERATURE-DEGREES

615045. KW 2.55 / 3.45 IN HG ABS  
 104F 30.0 IN LBS 3600 RPM  
 3515.0 PSIA 1050. / 1100.  
 GEN - 745700. KVA .90 PF L10

REV-30% LOAD OF VWO-NP