ENTERGY

ARKANSAS NUCLEAR ONE
CALCULATION COVER SHEET

Calc No.: 92-E-0065-01 Unit: 2 Category: Q

Calc Title: ANO Unit 2 Degraded Voltage Study for Startup No. 2

System(s): A,B

Topic(s): DVFQ

Calc Type: EG

Component No(s): Plt Area:Bldg Elev

Room Wall

Coordinates:

Abstract (Include Purpose/Results):

PURPOSE:

Provide verification that the ANO Unit 2 safety bus voltages are acceptable when the unit is in accident conditions (MSLB) and Unit 1 is in LOOP by analyzing the system in steady state and transient conditions and applying Millstone voltage criteria.

RESULTS:

All voltages were deemed acceptable.

Rev No.: 0 Verification Method: Design Review: X

Alternate Calculation: Qualification Testing:

Pages Revised and/or Added: All new

Purpose of Revision: Initial Issue

Initiating Document(s)	Resulting Document(s)	Key Design Input Docs.
		86-E-0002-01
		85-S-0002-01
		89-E-0144-01
		92-D-8005-01

Amends Calc(s):

Supercedes Calc(s):

Computer Software (Version): DAPPER Version 3.5

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Check if Additional Revisions:

CONTENTS

1.0 PURPOSE

Provide verification that the ANO Unit 2 safety bus voltages are acceptable when the unit is in accident conditions (MSLB) and Unit 1 is in LOOP by analyzing the system in steady state and transient conditions and applying the Millstone voltage criteria. The conditions analyzed are post trip when ANO Unit 2 and ANO Unit 1 auxiliary power to the safety loads is supplied through Startup Transformer No. 2, assuming Unit 2 with accident loads (ES loads sequencing) and Unit 1 safe shutdown loads (equivalent to LOOP loads). The system configuration represents the worst expected system voltage profile with respect to the Millstone undervoltage relays for Startup Transformer #2.

2.0 REFERENCES

2.1 Calculation 86-E-0002-01, Revision 5, *ANO-1 Diesel Generator #1 and #2 Load Study*

2.2 Calculation 85-S-0002-01, Revision 5, *ANO-2 Diesel Generator #1 (2K4A) and #2 (2K4B) Loading Calculation*

2.3 Arkansas Nuclear One Unit 2 Emergency Operating Procedure 2202.010, *Standard Attachments*

2.4 IEEE Std. 399-1990, *IEEE Recommended Practice for Power System Analysis*, December 15, 1990

2.5 Calculation 92-D-8005-01, Revision 0, *ANO-2 Millstone Analysis Load Centers Tap Change*

2.6 EPRI Power Plant Electrical Reference Series, Volume 6, *Motors*, Reprint December 1991

2.7 IEEE Std. 141-1986, *IEEE Recomended Practice for Electric Power Distribution for Industrial Plants*, October 10, 1986

2.8 Calculation 89-E-0144-01, Revision 2, *ANO 2 Diesel Generator Loading for 2A3 and 2A4 Buses*

2.9 ANO Unit 2 SAR, Amendment No. 9A

3.0 ASSUMPTIONS AND GIVEN CONDITIONS

(1) Unit 2 is in a MSLB accident condition 0-2 hours with ES loads sequencing and loading in accordance with Reference 2.9. And also Reference 2.2 except for MOV loads. The MOV's were not included in Reference 2.2, since they are momentary loads. The load for the MOV's was computed using a power factor of 0.70. The KW load for the MOV's is removed after time T=22.7 seconds, per Reference 2.9, Table 8.3-1.

(2) Unit 1 is in safe shutdown (equivalent to LOOP loads, Maximum assumed, Short Time 0-2hrs).

(3) Manually added loads are only considered at steady state. Starting of manually added loads is neglected, since these starting loads are small (<10KW Running Load).

(4) The auxiliaries for both units are supplied by Startup Transformer No. 2.

(5) Starting KVA is 6.5 times running KVA for 480V motors. (Per Reference 2.4, page 220, plus a 0.5 for conservatism)

(6) HP=KVA for 480V motors. (Per Reference 2.4, page 219)

(7) The starting power factor is 0.20 for 480V motors. (Per Reference 2.4, page 220)

(8) Only one train will be sequenced at a time, per Reference 2.3, page 78. Therefore, the most conservative case will be for the loads of one train to be in steady state with the second train sequencing the normal loads plus the swing loads.

(9) Running loads at time T are loads that have sequenced onto the bus prior to time T. Starting loads at time T are loads that are sequenced onto the bus at time T. Except at T=0 where non-motor loads sequenced on at T=0 are considered as running loads at T=0.

(10) Timers that sequence the motor starts are kept within 10% of their desired setpoint. Therefore, when checking the maximum expected voltage dip and/or the maximum duration of the voltage dip, motor starting times will be adjusted within the ±10% time band to overlap motors starts whenever possible.

(11) The maximum voltage drop from the 4160V bus to the 4000V motors is 2%. And the maximum voltage drop from the 480V bus to the 460V motors is 6%.

(12) The 460V motors are 200% torque machines.

(13) All small loads (less than or equal to 60HP) are assumed to accelerate in less than 3 seconds due to the small size of the motors.

4.0 SYSTEM MODEL

4.1 TRANSFORMER IMPEDANCES

Calculation Methodology

1. The Load Loss values given on the transformer test sheets will be used to calculate the transformer resistance in accordance with Attachment 1 equation 3.1.
2. The impedance of 3 winding transformers will be converted to the system voltage base.
3. When the transformer load losses are not available, the X and R values will be calculated in accordance with Attachment 1 equations 4.3 and 4.4. The X/R ratio will be taken from Reference 2.4, Fig 153, page 316.

4.1.1 UNIT 1

(1) Startup No. 2 Transformer (X-04)

Given: (From Attachment 3)

Serial No. H-409010

$Z_{PS}\% = 5.03$ @ 15MVA, 157kV to 6.9kV

$Z_{PT}\% = 4.84$ @ 12.6MVA, 157kV to 4.16kV

$Z_{ST}\% = 8.91$ @ 12.6MVA, 6.9kV to 4.16kV

Transformer Tap = 157kV (From Attachment 5)

Calculate X/R (Ref. 2.4, Fig 153, pg 316, Using 27MVA)

$$\frac{X}{R} = 24$$

Convert Voltages to Nominal (Attachment 1, eq. 1.3)

$$Z_{PS}\% = 5.03 \times \left(\frac{157\text{kV}}{161\text{kV}}\right)^2$$

$Z_{PS}\% = 4.78$

$$Z_{PT}\% = 4.84 \times \left(\frac{157\text{kV}}{161\text{kV}}\right)^2$$

$Z_{PT}\% = 4.60$

$Z_{ST}\% = 8.91$

Calculate X (Attachment 1, eq 1.3)

$$X_{PS}\% = 4.78\sqrt{\frac{24^2}{24^2+1}}$$

$X_{PS}\% = \underline{4.78}$

$$X_{PT}\% = 4.60\sqrt{\frac{24^2}{24^2+1}}$$

$X_{PT}\% = \underline{4.60}$

$$X_{ST}\% = 8.91\sqrt{\frac{24^2}{24^2+1}}$$

$X_{ST}\% = \underline{8.90}$

Calculate Resistances (Attachment 1, eq 3.4)

$$R_{PS}\% = \frac{4.78}{24}$$

$R_{PS}\% = \underline{0.20}$

$$R_{PT}\% = \frac{4.60}{24}$$

$R_{PT}\% = \underline{0.19}$

$$R_{PS}\% = \frac{8.90}{24}$$

$R_{ST}\% = \underline{0.37}$

Calculate % Primary Tap (Per Attachment 1, eq. 3.3)

$$\%Tap = \left(\frac{157kV}{161kV} - 1\right) \times 100$$

$\%Tap = \underline{-2.5}$

Dapper Input

3 Winding Xfmr Transf in Service
Pri. Bus **200** Name **161kV APL**
Voltage **161000** Conn **YG**

Sec. Bus **1200** Name **H BUSES**
Bus Volts **6900** Conn **YG**

Ter. Bus **2901** Name **ST2-CLR**
Voltage **4160** Conn **YG**

Ground Impedance (OHMS) Primary Tap
R: X: **-2.5** ±10%

	Base KVA	%R	%X
Pri-Sec	15000.0	0.20	4.78
Pri-Ter	12600.0	0.19	4.60
Sec-Ter	12600.0	0.37	8.90

(2) B5 Load Center Transformer (X-5)
Given: (From Attachment 4)
Serial No. 18880
Z% = 8.10 @ 1000KVA, 4160V to 480V, Load Loss = 12.396kW

Transformer Tap = 4055V (From Attachment 6)

Calcv' Resi. ance (Per Attachment !, eq. 3.1)

$$R\% = \frac{(12.396kW)}{(1000kVA)} \times 100$$

$R\% = \underline{1.2396}$

Calculate X (Per Attachment 1, eq. 3.2)

$X\% = \sqrt{8.10^2 - 1.2396^2}$

$X\% = \underline{8.0046}$

Dapper Input

TRANSFORMER	Input Name Plate Data	
	Primary	Secondary
Bus	2008 A3	3105 B5
Bus Voltage	4160	480
Xfmr Voltage	4055	480
Xfmr Connection	D	YG
Nom KVA	1000.0	FL kVA 1000.0
Type Code	DT	Loading DESIGN
Primary Tap(%)		Status EX

% +/- Seq.	% 0 Seq.	Neut. Ohms
R 1.2396	R 1.2396	R
X 8.0046	X 8.0046	X

(3) B6 Load Center Transformer (X-6)

Given: (From Attachment 4)

Serial No. 18881

Z% = 8.11 @ 1000KVA, 4160V to 480V, Load Loss = 12.532kW

Transformer Tap = 4055V (From Attachment 6)

Calculate Resistance (Per Attachment 1, eq. 3.1)

$$R\% = \frac{(12.532\text{kW})}{(1000\text{kVA})} \times 100$$

$R\% = \underline{1.2532}$

Calculate X

$X\% = \sqrt{8.11^2 - 1.2532^2}$ (Per Attachment 1, eq. 3.2)

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$X\% = \underline{8.0126}$

Dapper Input

TRANSFORMER	Input Name Plate Data	
	Primary	Secondary
Bus	2009 A4	3106 B6
Bus Voltage	4160	480
Xfmr Voltage	4055	480
Xfmr Connection	D	YG
Nom KVA	1000.0	FL kVA 1000.0
Type Code	DT	Loading DESIGN
Primary Tap(%)		Status EX

% +/- Seq.	% 0 Seq.	Neut. Ohms
R 1.2532	R 1.2532	R
X 8.0126	X 8.0126	X

4.1.2 UNIT 2

(1) 2B5 Load Center Transformer (2X-25)

Given: (From Attachment 7)

Serial No. 21288-B03

$Z\% = 7.71$ @ 1000KVA, 4160V to 480V, Load Loss = 12.315kW

Transformer Tap = 4055V (From Attachment 6)

Calculate Resistance (Per Attachment 1, eq. 3.1)

$$R\% = \frac{(12.315\text{kW})}{(1000\text{kVA})} \times 100$$

$R\% = \underline{1.2315}$

Calculate X (Per Attachment 1, eq. 3.2)

$X\% = \sqrt{7.71^2 - 1.2315^2}$

$X\% = \underline{7.6110}$

Dapper Input

TRANSFORMER	Input Name Plate Data		
	Primary	Secondary	
Bus	2003 2A3	3005 2B5	
Bus Voltage	4160	480	
Xfmr Voltage	4055	480	
Xfmr Connection	D	YG	
Nom KVA	1000.0	FL kVA	1000.0
Type Code	DT	Loading	DESIGN
Primary Tap(%)		Status	EX
% +/- Seq.		% 0 Seq.	Neut. Ohms
R	1.2315	R 1.2315	R
X	7.6110	X 7.6110	X

(2) 2B6 Load Center Transformer (2X-26)

Given: (From Attachment 8)

Serial No. 18883

Z% = 8.04 @ 1000KVA, 4160V to 480V, Load Loss = 12.438kW

Transformer Tap = 4055V (From Attachment 6)

Calculate Resistance (Per Attachment 1, eq. 3.1)

$$R\% = \frac{(12.438\text{kW})}{(1000\text{kVA})} \times 100$$

$R\% = \underline{1.2438}$

Calculate X (Per Attachment 1, eq. 3.2)

$$X\% = \sqrt{8.04^2 - 1.2438^2}$$

$X\% = \underline{7.9432}$

Dapper Input

TRANSFORMER	Input Name Plate Data	
	Primary	Secondary
Bus	2004 2A4	3006 2B6
Bus Voltage	4160	480
Xfmr Voltage	4055	480
Xfmr Connection	D	YG
Nom KVA	1000.0	FL kVA 1000.0
Type Code	DT	Loading DESIGN
Primary Tap(%)		Status EX

% +/- Seq.	% 0 Seq.	Neut. Ohms
R 1.2438	R 1.2438	R
X 7.9432	X 7.9432	X

4.2 CURRENT LIMITING REACTORS

Calculation Methodology

1. The impedance of the reactors will be converted to per unit values with a 100MVA power base and nominal voltage base in accordance with the base conversion equations listed in Attachment 1.

(1) Startup #2 4160V Current Limiting Phase Reactors (X-05)

Given: (From Attachment 9)

$X = 0.022\Omega$, $I_{Rated} = 3150A$, $V_{Rated} = 4160V$, Load Loss = 14.300kW

$$X_{PU} = \frac{0.022\Omega}{\left(\frac{4.16KV^2}{100MVA}\right)}$$ (Attachment 1, eq. 1.1 & 1.2)

$X_{PU} = \underline{0.1271}$

$$Rated\ KVA = \frac{\sqrt{3} \times 4160V \times 3150A}{1000}$$ (Attachment 1, eq. 3.1)

$Rated\ KVA = 22{,}697KVA$

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$$R_{PU}=\left(\frac{14.300\text{kW}}{22697\text{kVA}}\right)\left(\frac{100\text{MVA}}{22.697\text{MVA}}\right)$$ (Attachment 1, eq. 1.3 & 3.1)

$R_{PU}=\underline{0.00278}$

Dapper Input

FEEDER DATA Input **100 MVA PU BASE**

From Bus **2901** Name **ST2-CLR**
To Bus **2902** Name **ST2-A**

Voltage **4160** Line to Line

MVA Base 100 Length **1000**

Positive Sequence
R Pu **0.00278** X Pu **0.1271**

Zero Sequence
R Pu **0.00278** X Pu **0.1271**

(2) Bus 2A1 to 2A3 Current Limiting Phase Reactors

Given: (From Attachment 10)
Serial No. SCP28471
$R_{A\phi}=.00487\Omega$, $R_{B\phi}=.00429\Omega$, $R_{C\phi}=.00489\Omega$, $X=0.160\Omega$

Convert Values to P.U. on 100MVA and 4160V Base

R=Average Resistance
$R=0.00468\Omega$

$$R_{PU}=\frac{0.00468\Omega}{\left(\frac{4.16\text{KV}^2}{100\text{MVA}}\right)}$$ (Attachment 1, eq. 1.1 & 1.2)

$R_{PU}=\underline{0.0270}$

$$X_{PU} = \frac{0.160\Omega}{\left(\frac{4.16KV^2}{100MVA}\right)}$$ (Attachment 1 eq. 1.1 & 1.2)

$X_{PU} = \underline{0.9246}$

Dapper Input

FEEDER DATA Input **100 MVA PU BASE**	
From Bus **2001**	Name **2A1**
To Bus **2003**	Name **2A3**
Voltage 4160	Line to Line
MVA Base 100	
Positive Sequence	
R Pu **0.0270**	X Pu **0.9246**
Zero Sequence	
R Pu **0.0270**	X Pu **0.9246**

(3) Bus 2A2 to 2A4 Current Limiting Phase Reactors

Given: (From Attachment 10)
Serial No. SCP28472
$R_{A\phi} = .00488\Omega$, $R_{B\phi} = .00428\Omega$, $R_{C\phi} = .00489\Omega$, $X = 0.160\Omega$

Convert Values to P.U. on 100MVA and 4160V Base

R = Average Resistance
$R = 0.00468\Omega$

$$R_{PU} = \frac{0.00468\Omega}{\left(\frac{4.16KV^2}{100MVA}\right)}$$ (Attachment 1, eq. 1.2)

$R_{PU} = \underline{0.0270}$

$$R_{PU}=\frac{0.160\Omega}{\left(\frac{4.16KV^2}{100MVA}\right)}$$ (Attachment 1, eq. 1.2)

$X_{PU}=0.9246$

Dapper Input

FEEDER DATA Input **100 MVA PU BASE**	
From Bus **2002**	Name **2A2**
To Bus **2004**	Name **2A4**
Voltage 4160	Line to Line
MVA Base 100	
Positive Sequence	
R Pu **0.0270**	X Pu **0.9246**
Zero Sequence	
R Pu **0.0270**	X Pu **0.9246**

4.3 MOTORS

Calculation Methodology

1. Motor running KW is calculated using the runout brake horsepower of the load and the efficiency of the motor in Reference 2.1.

(1) Service Water Pump 2P4A, 2P4B & 2P4C

Given: (From Attachment 11 & 12)

General Electric

800Hp, 4000V, Locked Rotor Amps 683, Power Factor (Starting) 24.0

Acceleration Time @ 80% Voltage with 100% Load 1.72 Seconds (Per Attachment 13)

$KW_R=636.9$ & Power Factor=88.0 (Per Reference 2.2)

Calculate Running KVA

$$KVA_R = \frac{636.9KW}{0.880}$$ (Attachment 1, eq. 2.1)

KVA_R=723.8 @ 88.0pf or 636.9+j343.8KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 683A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S=5118 @ 24.0pf or 1228+j4968KVA

(2) Emergency Feedwater Pump 2P7B

Given: (From Attachment 16, 17, & 18)

Allis-Chalmers

600Hp, 4000V, Locked Rotor Amps 546, Power Factor (Starting) 25.0, Acceleration Time @ 80% Voltage with 100% Load 4.5 seconds

KW_R=478.5 & Power Factor=89.0 (Per Reference 2.1)

Calculate Running KVA

$$KVA_R = \frac{478.5KW}{0.890}$$ (Attachment 1, eq. 2.1)

KVA_R=537.6 @ 89.0pf or 478+j245KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 546A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S=4091 @ 25.0pf or 1023+j3961KVA

(3) Containment Spray Pump 2P35A & 2P35B

Given: (From Attachment 19, 20, & 21)

Allis-Chalmers

450Hp, 4000V, Locked Rotor Amps 374, Power Factor (Starting) 24.0, Acceleration Time @ 80% Voltage with 100% Load 2.4 seconds

KW_R=335.0 & Power Factor=89.5 (Per Reference 2.1)

Calculate Running KVA

$$KVA_R = \frac{335.0KW}{0.895}$$ (Attachment 1, eq. 2.1)

KVA_R = 374.3 @ 89.5pf or 335+j167KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 374A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S = 2803 @ 24.0pf or 673+j2721KVA

(4) Low Pressure Safety Injection Pump 2P60A

Given: (From Attachment 22 & 23)

Allis-Chalmers

450Hp, 4000V, Locked Rotor Amps 364, Power Factor (Starting) 28.5, Acceleration Time @ 100% Voltage with 100% Load 1.18 seconds, Acceleration Time @ 75% Voltage with 100% Load 2.44 seconds

KW_R = 194.5 & Power Factor = 84.5 (Per Reference 2.1)

Calculate Running KVA

$$KVA_R = \frac{194.5KW}{0.845}$$ (Attachment 1, eq. 2.1)

KVA_R = 230.2 @ 84.5pf or 194.5+j123.1KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 364A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S = 2728 @ 28.5pf or 777+j2615KVA

(5) Low Pressure Safety Injection Pump 2P60B

Given: (From Attachment 24, 25 & 26)

Allis-Chalmers

500Hp, 4000V, Locked Rotor Amps 410, Power Factor (Starting) 24.0, Acceleration Time @ 100% Voltage with 100% Load 1.06 seconds, Acceleration Time @ 75% Voltage with 100% Load 2.55 seconds

KW_R = 193.5 & Power Factor = 84.5 (Per Reference 2.1)

Calculate Running KVA

$$KVA_R = \frac{193.5KW}{0.845}$$ (Attachment 1, eq. 2.1)

KVA_R=229 @ 84.5pf or 193.5+j122.5KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 410A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S=3072 @ 24.0pf or 737+j2983KVA

(6) High Pressure Safety Injection 2P89A, 2P89B, & 2P89C

Given: (From Attachment 27, 28, 29, & 41)

Allis-Chalmers

600Hp, 4000V, Locked Rotor Amps 490, Power Factor (Starting) 21.5, Acceleration Time @ 100% Voltage with 100% Load 2.6 seconds, Acceleration Time @ 90% Voltage with 100% Load 3.36 seconds

KW_R=368.9 & Power Factor=90.0 (Per Reference 2.1)

Calculate Running KVA

$$KVA_R = \frac{368.9KW}{0.900}$$ (Attachment 1, eq. 2.1)

KVA_R=410 @ 90.0pf or 369+j179KVA

Calculate Starting KVA

$$KVA_S = \left(\frac{\sqrt{3} \times 4000V \times 490A}{1000}\right)\left(\frac{4160V}{4000V}\right)^2$$ (Attachment 1, eq. 2.2)

KVA_S=3672 @ 21.5pf or 789+j3586KVA

4.4 SYSTEM EQUIVALENT IMPEDANCE AND VOLTAGE

Per Attachment 30

V_{SYS}= .9912pu on 161KV base

Z_{SYS}=0.01201+j0.07492pu on 100MVA base

4.5 SYSTEM NETWORK DIAGRAM

The System Network Diagram is shown in Attachment 31.

5.0 RELAY DATA

(1) Under Voltage Relays 27-1/B5, 27-2/B5, 27-1/B6, & 27-2/B6

ITE Model 211R4175

Function: These undervoltage relay monitor the voltage on the 480 V. safety busses B5 and B6. For a sustained degraded voltage condition, these relays will isolate the 4160 Volt safety buses from the non-safety/offsite busses and signal for the diesel to start.

Setting: Dropout 106.8V (Highest as left setting for conservatism, per Workplan 1403.121, 05/02/92.)

Time Delay 8 Seconds (Per Workplan 1403.121, 05/02/92)

Repeatability: 0.5 Volts delta for temperature range of 20-40°C (Per Attach. 32)

0.2 Volts delta for variation in control voltage (Per Attachment 32)

Reset Margin: 2% of pickup (Per Workplan 1403.121, 05/02/92)

Time Delay Tolerance: ±1 Second (Per Tech. Spec.)

Determine Maximum Relay Dropout Voltage

$Relay\ Dropout_{MAX} = 106.8V + 0.5V + 0.2V$

$Relay\ Dropout_{MAX} = 107.5V$

Reflecting to primary

$$Relay\ Dropout_{MAX} = \left(\frac{480V}{120V}\right) \times 107.5V$$

$Relay\ Dropout_{MAX} = 430V$ or 93.5% of Motor base

Determine Maximum Relay Reset Voltage

$Reset\ Voltage_{MAX} = 107.5V \times 1.02$

Reflecting to primary

$$Reset\ Voltage_{MAX} = \left(\frac{480V}{120V}\right) \times 109.7V$$

$Reset\ Voltage_{MAX} = 438.8V$ or 95.4% of Motor base

(2) Under Voltage Relays 27-1/2B5, 27-2/2B5, 27-1/2B6, & 27-2/2B6

ITE Model 211R4175

Function: These undervoltage relay monitor the voltage on the 480 V. safety busses 2B5 and 2B6. For a sustained degraded voltage condition, these relays will isolate the 4160 Volt safety buses from the non-safety/offsite busses and signal for the diesel to start.

Setting: Dropout 105.9V (Highest as left setting for conservatism, per Workplan 1403.121, 03/91.)
Time Delay 8 Seconds (Per Workplan 1403.121, 03/91)

Repeatability: 0.5 Volts delta for temperature range of 20-40°C (Per Attach. 32)
0.2 Volts delta for variation in control voltage (Per Attachment 32)
Reset Margin: 2% of pickup (Per Workplan 1403.121, 03/91)
Time Delay Tolerance: ±0.8 Second (Per Tech. Spec.)

Determine Maximum Relay Dropout Voltage

$Relay\ Dropout_{MAX} = 105.9V + 0.5V + 0.2V$

$Relay\ Dropout_{MAX} = 106.6V$

Reflecting to primary

$$Relay\ Dropout_{MAX} = \left(\frac{480V}{120V}\right) \times 106.6V$$

$Relay\ Dropout_{MAX} = 426.4V$ or 92.7% of Motor base

Determine Maximum Relay Reset Voltage

$Reset\ Voltage_{MAX} = 106.6V \times 1.02$

Reflecting to primary

$$Reset\ Voltage_{MAX} = \left(\frac{480V}{120V}\right) \times 108.8V$$

$Reset\ Voltage_{MAX} = 435.2V$ or 94.6% of Motor base

6.0 DEGRADED VOLTAGE CASE RUNS

ACCEPTANCE CRITERIA

(1) The voltage on Buses B5 and B6 must recover to 95.4% 460V (438.8V) after relay dropout, 93.5% of 460V (430V).

(2) The voltage on Buses 2B5 and 2B6 must recover to 94.6% 460V (435.2V) after relay dropout, 92.7% of 460V (426.4V).
(3) Minimum acceptable momentary voltage on 4160V buses with starting load is 0.82pu of 4000V motor base (3280V) or 0.80pu of 4000V motor base (3200V) at the motor terminals.
(4) Minimum acceptable momentary voltage on 480V buses with starting load is 0.86pu of 460V motor base (395.6V) or 0.80pu of 460V motor base (368.0V) at the motor terminals.
(5) Minimum acceptable momentary 480V bus voltages when motors are starting on other buses is 0.72pu of 460V motor base (331.2V).
(6) Minimum accetable momentary 4160V bus voltages when motors are starting on other buses is 0.80pu of 4000V motor base (3200V).

Methodology

Red Train Steady State
Conditions:
(1) Red Train in Steady State
(2) Swing Loads on Green Train
(3) Green Train Sequencing

Green Train Steady State
Conditions:
(1) Green Train in Steady State
(2) Swing Loads on Red Train
(3) Red Train Sequencing

Unit 1 Safe Shutdown Loads (LOOP) for All Cases

BUS A3
*1400.9+j613.1

BUS A4
*850.9+j394.0

BUS B5
*921.4+j442.3

BUS B6
*546.9+j283.3

*Per Attachment 33 Note: Swing loads are added to bus B5.

6.1 CASE T=0 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

No Load

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	101.7	72.1	0	0
*T>0 Loads	-	0	0	399.4	1957.3
TOTAL		101.7	72.1	399.4	1957.3

*For itemized loads see attachment 2

6.2 CASE T=0 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3
No Load

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P55B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	228.0	148.5	0	0
*T>0 Loads	-	0	0	318.8	1562.0
TOTAL		228.0	148.5	318.8	1562.0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

6.3 CASE T=4.5 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	0	0	1228	4968
TOTAL		0	0	1228	4968

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads (W/Swing Loads)	-	101.7	72.1	0	0
*T>0 Loads (W/Swing Loads)	-	254.4	216.3	0	0
TOTAL		356.1	288.4	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. No motor starting overlap as 2B6 per assumption 13.

6.4 CASE T=4.5 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	0	0	1228	4968
TOTAL		**0**	**0**	**1228**	**4968**

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	228.0	148.5	0	0
*T>0 Loads	-	214.5	189.8	0	0
TOTAL		**442.5**	**338.3**	**0**	**0**

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. No motor starting overlap on Bus 2B5 per assumption 13.

6.5 CASE T=10 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	0	0	789	3586
TOTAL		636.9	343.8	789	3586

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads (W/Swing Loads)	-	101.7	72.1	0	0
*T>0 Loads (W/Swing Loads)	-	254.4	216.3	0	0
TOTAL		356.1	288.4	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A4, the Service Water Pump 2P4C will not overlap with the HPSI Pump 2P89B start, since it will accelerate it's load in 1.72 seconds at 80% voltage.

6.6 CASE T=10 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	0	0	789	3586
TOTAL		636.9	343.8	789	3586

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	228.0	148.5	0	0
*T>0 Loads	-	214.5	189.8	0	0
TOTAL		442.5	338.3	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the Service Water Pump 2P4A will not overlap with the HPSI Pump 2P89A start, since it will accelerate it's load in 1.72 seconds at 80% voltage.

6.7 CASE T=15 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	0	0	789	3586
LPSI Pump 2P60B	500	0	0	737	2983
TOTAL		636.9	343.8	1526	6569

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2P5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads (W/Swing Loads)	-	101.7	72.1	0	0
*T>0 Loads (W/Swing Loads)	-	254.4	216.3	0	0
TOTAL		356.1	288.4	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A4, the HPSI Pump 2P89B may overlap the LPSI Pump 2P60B start, since it will accelerate it's load in 3.36 seconds at 90% voltage (greater than 90% voltage is verified per Attachment 48).

6.8 CASE T=15 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	0	0	789	3586
LPSI Pump 2P60A	450	0	0	777	2615
TOTAL		636.9	343.8	1566	6201

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	228.0	148.5	0	0
*T>0 Loads	-	214.5	189.8	0	0
TOTAL		442.5	338.3	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the HPSI Pump 2P89A may overlap with the LPSI Pump 2P60A start, since it will accelerate it's load in 3.36 seconds at 90% voltage (greater than 90% voltage is verified per Attachment 49).

6.9 CASE T=18.2 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	0	0	737	2983
TOTAL		1005.9	522.8	737	2983

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads	-	101.7	72.1	0	0
*T>0 Loads	-	254.4	216.3	0	0
*T=18.2 Loads	-	0	0	212.4	1040.2
TOTAL		356.1	288.4	212.4	1040.2

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A4, the LPSI Pump 2P60B may still be accelerating, since it will accelerate it's load in 2.55 seconds at 75% voltage (the 80% voltage curve was not available).

6.10 CASE T=18.2 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	0	0	777	2615
TOTAL		1005.9	522.8	777	2615

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Loads (W/Swing Loads)	-	228.0	148.5	0	0
*T>0 Loads (W/Swing Loads)	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	0	0	212.4	1040.2
TOTAL		442.5	338.3	212.4	1040.2

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the LPSI Pump 2P60A may still be accelerating, since it will accelerate it's load in 2.44 seconds at 75% voltage (the 80% voltage curve was not available).

6.11 CASE T=22.7 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	0	0	673	2721
TOTAL		1199.4	645.3	673	2721

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	254.4	216.3	0	0
*T=18.2 Seconds Loads	-	0	0	212.4	1040.2
*T=22.7 Seconds Loads	-	0	0	7.1	34.7
TOTAL		356.1	288.4	219.5	1074.9

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A4, the LPSI Pump 2P60B will be fully accelerated, since it will accelerate it's load in 2.55 at 75% voltage.
2. On Bus 2B6, the 18.2 second loads could overlap the 22.7 second loads, therefore, the 18.2 second loads are modeled as starting.

6.0 CASE T=22.7 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	0	0	673.0	2721.0
TOTAL		1200.4	645.9	673.0	2721.0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	0	0	212.4	1040.2
*T=22.7 Seconds Loads	-	0	0	7.1	34.7
TOTAL		442.5	338.3	219.5	1074.9

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the LPSI Pump 2P60A will be fully accelerated, since it will take 2.44 seconds to accelerate it's load at 75% voltage (80% voltage curves were not available).
2. On Bus 2B5, the 18.2 second loads could overlap the 22.7 second loads, therefore, the 18.2 second loads are modeled as starting.

6.13 CASE T=50 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	254.4	216.3	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	96.0	97.8	0	0
*T=50 Seconds Loads	-	0	0	148.7	728.2
TOTAL		395.5	296.0	148.7	728.2

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A4, the Containment Spray Pump 2P35B will be fully accelerated, since it will accelerate it's load in 2.4 seconds at 80% voltage.

6.14 CASE T=50 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
TOTAL		1535.4	812.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	0	0	148.7	728.2
TOTAL		481.9	345.9	148.7	728.2

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the Containment Spray Pump 2P35A will be fully accelerated, since it will accelerate it's load in 2.4 seconds at 80% voltage.

6.15 CASE T=60 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	254.4	216.3	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	0	0	148.7	728.2
*T=60 Seconds Loads (W/Swing Loads)	-	0	0	148.7	728.2
TOTAL		395.5	296.0	297.4	1456.4

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B6, the 50 seconds loads could overlap the 60 seconds loads, therefore, the 50 seconds loads are modeled as starting.

6.16 CASE T=60 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
TOTAL		1535.4	812.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T = 0 Seconds Loads	-	228.0	148.5	0	0
*T > 0 Seconds Loads	-	214.5	189.8	0	0
*T = 18.2 Seconds Loads	-	135.4	105.4	0	0
*T = 22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T = 50 Seconds Loads	-	0	0	148.7	728.2
*T = 60 Seconds Loads (W/Swing Loads)	-	0	0	148.7	728.2
TOTAL		481.9	345.9	297.4	1456.4

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B5, the 50 seconds loads could overlap the 60 seconds loads, therefore the 50 seconds loads are modeled as starting.

6.17 CASE T=70 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	234.4	216.3	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	0	0	148.7	728.2
*T=70 Seconds Loads	-	0	0	141.6	693.4
TOTAL		456.2	338.6	290.3	1421.6

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B6, the 60 seconds loads could overlap the 70 seconds loads, therefore, the 60 seconds loads are modeled as starting.

6.18 CASE T=70 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
TOTAL		1535.4	812.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	0	0	148.7	728.2
*T=70 Seconds Loads	-	0	0	70.8	346.6
TOTAL		542.6	388.5	219.5	1074.8

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B5, the 60 seconds loads could overlap the 70 seconds loads, therefore, the 60 seconds loads are modeled as starting.

6.19 CASE T=80 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	254.4	216.3	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	60.7	42.6	0	0
*T=70 Seconds Loads	-	0	0	141.5	693.5
*T=80 Seconds Loads		0	0	52.5	256.5
TOTAL		516.9	381.2	194.0	950.0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B6, the 70 seconds loads could overlap the 80 seconds loads, therefore, the 70 seconds loads are modeled as starting.

6.20 CASE T=80 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
TOTAL		1555.4	812.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	149.8	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	60.7	42.6	0	0
*T=70 Seconds Loads	-	0	0	70.8	346.6
*T=80 Seconds Loads	-	0	0	33.9	312.1
TOTAL		603.3	431.1	134.7	658.7

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B5, the 70 second loads could overlap the 80 second loads, therefore, the 70 second loads are modeled as starting.

6.21 CASE T=85 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	0	0	1023.0	3961.0
TOTAL		1535.4	812.9	1023.0	3961.0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	60.7	42.6	0	0
*T=70 Seconds Loads	-	0	0	70.8	346.6
*T=80 Seconds Loads	-	0	0	63.9	312.1
*T=85 Seconds Loads	-	0	0	14.2	69.3
TOTAL		603.3	431.1	148.9	728.0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B5, the 70 second and the 80 second loads could overlap the 85 second loads, therefore, the 70 second and the 80 second loads are modeled as starting.

6.22 CASE T=90 SECONDS, RED TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	101.7	72.1	0	0
*T>0 Seconds Loads	-	254.4	216.3	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	60.7	42.6	0	0
*T=70 Seconds Loads	-	85.6	61.9	0	0
*T=80 Seconds Loads	-	0	0	52.5	256.5
*T=90 Seconds Loads	-	0	0	49.6	242.7
TOTAL		502.5	443.1	102.1	499.2

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2B6, the 80 second loads could overlap the 90 second loads, therefore, the 80 second loads are modeled as starting.

6.23 CASE T=90 SECONDS, GREEN TRAIN STEADY STATE

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	0	0	1023.0	3961.0
TOTAL		1535.4	812.9	1023.0	3961.0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	450	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*T=0 Seconds Loads	-	228.0	148.5	0	0
*T>0 Seconds Loads	-	214.5	189.8	0	0
*T=18.2 Seconds Loads	-	135.4	105.4	0	0
*T=22.7 Seconds Loads	-	-96.0	-97.8	0	0
*T=50 Seconds Loads	-	60.7	42.6	0	0
*T=60 Seconds Loads (W/Swing Loads)	-	60.7	42.6	0	0
*T=70 Seconds Loads	-	43.4	35.1	0	0
*T=80 Seconds Loads	-	0	0	63.9	312.1
*T=85 Seconds Loads	-	0	0	14.2	69.3
*T=90 Seconds Loads	-	0	0	35.4	173.4
TOTAL		646.7	466.2	113.5	554.8

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

CASE NOTES:

1. On Bus 2A3, the Emergency Feedwater Pump 2P7B could still be accelerating it's load, since it will accelerate it's load in 4.5 seconds at 80% voltage.

2. On Bus 2B5, the 80 second and the 85 second loads could overlap the 90 second loads, therefore, the 80 second and the 85 second loads are modeled as starting.

6.24 CASE T=STEADY STATE BUS LOADS, WITH SWING LOADS ON BUS 2B5

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/ Swing Loads)	-	960.7	533.0	0	0
TOTAL		960.7	533.0	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	849.8	462.7	0	0
TOTAL		849.8	462.7	0	0

*For itemized loads see attachment 2

6.23 CASE T=STEADY STATE BUS LOADS, WITH SWING LOADS ON BUS 2B6

BUS 2A3

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8	0	0
HPSI Pump 2P89A	600	369.0	179.0	0	0
LPSI Pump 2P60A	450	194.5	123.1	0	0
Containment Spray Pump 2P35A	450	335.0	167.0	0	0
Emergency Feedwater Pump 2P7B	600	478.0	245.0	0	0
TOTAL		2013.4	1057.9	0	0

BUS 2A4

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
Service Water Pump 2P4C	800	636.9	343.8	0	0
HPSI Pump 2P89B	600	369.0	179.0	0	0
LPSI Pump 2P60B	500	193.5	122.5	0	0
Containment Spray Pump 2P35B	450	335.0	167.0	0	0
TOTAL		1534.4	812.3	0	0

BUS 2B5

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/O Swing Loads)	-	900.0	490.4	0	0
TOTAL		900.0	490.4	0	0

*For itemized loads see attachment 2

BUS 2B6

COMPONENT	HP	RUNNING		STARTING	
		KW	KVAR	KW	KVAR
*Steady State Loads (W/Swing Loads)	-	910.5	505.3	0	0
TOTAL		910.5	505.3	0	0

*For itemized loads see attachment 2

7.0 MINIMUM LOAD CASE RUN

7.1 CASE SYSTEM VOLTAGE=1.05 pu, Minimum Expected Loading

Per Reference 2.5, except where noted.

BUS 2A1

COMPONENT	HP	RUNNING	
		KW	KVAR
Main Chiller 2VCH1A	950	[2]667.0	[2]323.0
[3]Load Centers	-	246.0	171.7
TOTAL		913.0	494.7

BUS 2A3

COMPONENT	HP	RUNNING	
		KW	KVAR
Service Water Pump 2P4A	800	636.9	343.8
LPSI Pump 2P60A	450	194.5	123.1
TOTAL		831.4	466.9

BUS 2A4

No Load

BUS 2B5

COMPONENT	HP	RUNNING	
		KW	KVAR
[3]Ventilation & Lighting		360.8	251.8
TOTAL		360.8	251.8

BUS 2B6

COMPONENT	HP	RUNNING	
		KW	KVAR
[3]Ventilation & Lighting	-	360.8	251.8
TOTAL		360.8	251.8

Notes:

1. Per Attachment 40.
2. Power factor of 0.90 assumed.
3. Power factor of 0.82 assumed.

8.0 CONCLUSION

RESULTS

CALCULATED VOLTAGES (ON MOTOR BASE)									
CASE	BUS	A3	A4	B5	B6	2A3	2A4	2B5	2B6
T=0 Sec, Red SS	V_{PU}	1.022	1.022	0.998	1.020	1.004	1.004	0.978	0.883
T=0 Sec, G. .n SS	V_{PU}	1.025	1.025	1.002	1.024	1.010	1.011	0.911	0.987
T=4.5 Sec, Red SS	V_{PU}	1.002	1.002	0.976	0.998	0.984	0.955	0.954	0.950
T=4.5 Sec, Green SS	V_{PU}	1.004	1.004	0.978	1.000	0.956	0.989	0.948	0.963
T=10 Sec, Red SS	V_{PU}	1.007	1.007	0.983	1.004	0.989	0.968	0.961	0.965
T=10 Sec, Green SS	V_{PU}	1.009	1.009	0.985	1.007	0.969	0.994	0.961	0.967
T=15 Sec, Red SS	V_{PU}	0.991	0.991	0.965	0.987	0.973	0.927	0.943	0.922
T=15 Sec, Green SS	V_{PU}	0.995	0.995	0.967	0.991	0.933	0.980	0.922	0.952
T=18.2 Sec, Red SS	V_{PU}	1.003	1.003	0.978	1.000	0.985	0.959	0.957	0.878
T=18.2 Sec, Green SS	V_{PU}	1.007	1.007	0.983	1.004	0.965	0.993	0.880	0.965
T=22.7 Sec, Red SS	V_{PU}	1.004	1.004	0.978	1.000	0.986	0.959	0.957	0.876
T=22.7 Sec, Green SS	V_{PU}	1.006	1.006	0.980	1.002	0.960	0.991	0.874	0.963
T=50 Sec, Red SS	V_{PU}	1.020	1.020	0.996	1.017	1.003	1.001	0.976	0.941
T=50 Sec, Green SS	V_{PU}	1.022	1.022	0.998	1.020	1.002	1.008	0.939	0.983
T=60 Sec, Red SS	V_{PU}	1.016	1.016	0.991	1.013	0.998	0.991	0.972	0.878
T=60 Sec, Green SS	V_{PU}	1.018	1.018	0.993	1.015	0.992	1.003	0.880	0.978
T=70 Sec, Red SS	V_{PU}	1.016	1.016	0.991	1.013	0.998	0.991	0.972	0.876
T=70 Sec, Green SS	V_{PU}	1.020	1.020	0.996	1.017	0.997	1.005	0.904	0.980
T=80 Sec, Red SS	V_{PU}	1.018	1.018	0.993	1.015	1.000	0.996	0.974	0.909
T=80 Sec, Green SS	V_{PU}	1.022	1.022	0.998	1.020	1.002	1.007	0.935	0.983
T=85 Sec, Green SS	V_{PU}	0.998	0.998	0.972	0.993	0.942	0.983	0.867	0.957
T=90 Sec, Red SS	V_{PU}	1.020	1.020	0.996	1.017	1.003	1.002	0.976	0.941
T=90 Sec, Green SS	V_{PU}	0.999	0.999	0.972	0.993	0.943	0.984	0.876	0.957
SS, Red W/Swing	V_{PU}	1.022	1.022	0.998	1.020	1.004	1.008	0.972	0.983
SS, Green W/Swing	V_{PU}	1.022	1.022	0.998	1.020	1.005	1.007	0.978	0.976
Min. Loading	V_{PU}	-	-	-	-	1.105	1.110	1.115	1.117

This analysis evaluated the impact of severely degraded offsite voltage levels while the second offsite source (Start-up #2 Transformer) was supplying both the Unit 2 safety loads expected during an accident condition and the Unit 1 safe shutdown safety loads. This severely degraded voltage condition assumes the outage of the 500/161 KV autotransformer concurrent with the outage of both ANO nuclear units along with the outage of all four of the nearby hydro-generators during summer peak load hour conditions.

The results listed above indicate that adequate voltages will be delivered to the safety busses for the abnormal condition when the offsite transmission voltage levels falls to 0.9912 p.u. (159.6 KV). All of the Millstone voltage criteria, established to assure that all safety equipment (1) has adequate voltage to accelerate its load to rated speed and (2) has adequate steady state voltage to supply the vital safety loads so they car perform their necessary safety functions, are maintained.

The steady state voltages on the safety busses (after all the safety loads are energized) ranges from a lowest voltage of 0.972 p.u. (447 volts) on 2B5 and 0.998 p.u. (459 V) on B5 to a high of 1.022 (4088 V) on A3. These minimum voltage levels are well above the voltage levels required to actuate the Millstone undervoltage relays (0.935 for B5 and B6 and 0.927 for 2B5 and 2B6). Thus adequate steady-state voltage levels are maintained.

The momentary voltages that occur as the safety equipment is sequenced onto the offsite power supply range from a lowest of 0.867 p.u. (399 V) on the 2B5 480 volt bus at time = 85 seconds and another low value of 0.876 p.u.(403 V) on 2B6 480 volt bus at time = 22.7 seconds into the sequencing to a high of 0.987 p.u.(454 V) for 2B6 at time = 0 seconds. These are above the minimum momentary value of 0.86 p.u.(396 V) that is allowed per Millstone Criteria for motors starting on the 480 volt safety busses. The lowest momentary 4160 volt safety bus voltage occurred at time = 15 seconds when 2A4 voltage fell to 0.927 p.u. (3708 V.) and A3 voltage fell to 0.991 p.u. (3964 V.). This is well above the 0.82 p.u. (3280 V.) minimum allowable momentary voltage per the Millstone Criteria while motors are being started. Thus the Millstone voltage criteria is satisfied for the momentary voltage dips that occur as the safety equipment is sequentially started from the offsite power source (Start-up #2 and the 161 KV transmission system).

An analysis was also performed to determine the highest voltage levels that could occur on the onsite auxiliary busses during minimum plant load conditions (Unit 2 in cold shutdown and minimum bus loads during the shutdown) coincident with the offsite transmission system voltage at the maximum expected value (1.05 p.u. or 169 KV.). The results of this analysis indicated that the voltage on Bus 2B6 could rise to 1.117 p.u. This high voltage could only occur for limited periods during an outage when auxiliary loads are at absolute minimum, resulting in little voltage drop on the onsite distribution system. This condition can affect only those busses that have loads energized at this time. Existing operating procedures will prevent any possible prolonged exposure of equipment to overvoltage.

The measures which may be necessary to control overvoltage conditions are: (1) transmission system operator actions such as energization of reactors , de-energization of capacitors, and removal of EHV transmission lines (2) energization of additional load on the onsite distribution system to increase voltage drop (3) placing the safety busses on the EDG's instead of the offsite power source. The third action would be taken only if the other actions did not sufficiently mitigate the high voltage condition. It should be noted that immediate action would not be

required for slight high voltage conditions (i.e. slightly above 110% voltage). Detrimental affects from high voltages occur over extended periods of time (equipment heating effects due to overexcitation etc:). There would be sufficient time to follow procedural steps to mitigate the high voltage. The Unit 2 procedures direct the operator to take the above recommended actions to reduce voltage on the safety busses before placing them on the EDG's. This third action (placing load on the EDG's) has never been required at ANO to this date. The times when the above-mentioned high voltage conditions could be encountered at ANO are deemed to be minimal. Generally, if one of the two nuclear units is operating, the offsite voltages can be controlled by the operating generator. Thus, the frequency and duration of these high voltages would be expected to be very limited and are therefore considered to be acceptable.

9.0 ATTACHMENTS

(1) Equations, 3 pages
(2) 480V Bus Loads, 4 pages
(3) Startup Transformer No. 2 Test Report, 2 pages
(4) Transformer Test Report for Load Centers B5 and B6, 1 page
(5) Transformer Data Sheets, 3 pages
(6) Load Center Transformer Data Sheets, 6 pages
(7) Transformer Test Report for Load Center 2B5, 1 page
(8) Transformer Test Report for Load Center 2B6, 1 page
(9) Startup No. 2 Current Limiting Reactors Performance Specification, 1 page
(10) Bus 2A1 to 2A3 and Bus 2A2 to 2A4 Current Limiting Reactor Test Reports, 1 page
(11) Service Water Pumps 2P4A, 2P4B, & 2P4C, Motor Data Sheet, 1 page
(12) Service Water Pumps 2P4A, 2P4B, & 2P4C, Motor Data Sheet, 1 page
(13) Service Water Pumps 2P4A, 2P4B, & 2P4C, Acceleration Calculation, 1 page
(14) Service Water Pumps 2P4A, 2P4B, & 2P4C, Pump Speed/Torque Curve & Motor Speed/Torque Curve, 1 page
(15) Service Water Pumps 2P4A, 2P4B, & 2P4C, Pump Data Sheet, 1 page
(16) Emergency Feedwater Pump 2P7B, Motor Data Sheet, 1 page
(17) Emergency Feedwater Pump 2P7B, RPM/Time Curve at 100% and 80% Line Voltage, 1 page
(18) Emergency Feedwater Pump 2P7B, RPM/Time & Current/RPM Curves, 1 page
(19) Containment Spray Pump 2P35A & 2P35B, Motor Data Sheet, 1 page
(20) Containment Spray Pump 2P35A & 2P35B, RPM/Current & RPM/Power Factor Curves, 1 page
(21) Containment Spray Pump 2P35A & 2P35B, RPM/Accelerating Time Curves at 100% and 80% Line Voltage, 1 page
(22) Low Pressure Safety Injection Pump 2P60A, Motor Data Sheet, 1 page

(23) Low Pressure Safety Injection Pump 2P60A, Pump Torque/Speed Curve & Motor Torque/Speed Curves at 100% and 75% Line Voltage, 1 page
(24) Low Pressure Safety Injection Pump 2P60B, Motor Data Sheet, 1 page
(25) Low Pressure Safety Injection Pump 2P60B, Motor RPM/Power Factor & RPM/Current Curves, 1 page
(26) Low Pressure Safety Injection Pump 2P60B, Pump Torque/Speed Curve & Motor Torque/Speed Curves at 100% and 75% Line Voltage, 1 page
(27) High Pressure Safety Injection Pump 2P89A, 2P89B, & 2P89C, Motor Data Sheet, 1 page
(28) High Pressure Safety Injection Pump 2P89A, 2P89B, & 2B89C, Motor RPM/Current & RPM/Power Factor Curves, 1 page
(29) High Pressure Safety Injection Pump 2P89A, 2P89B, & 2B89C, Pump Torque/Speed & Motor Torque/Speed Curves at 100% and 75% Line Voltage, 1 page
(30) Table provided by N.K. Saini of Entergy Bulk Transmission Planning documenting system voltage and system impedance, 1 page
(31) System Network Diagram, 1 page
(32) Relay Specification for ITE Model 211R4175, 1 page
(33) Unit 1 LOOP Loads Table, 3 pages
(34) Instrument Transformer 2X13 Load Measurement Work Sheet, 1 page
(35) Instrument Transformer 2X11 Load Measurement Work Sheet, 1 page
(36) Power and Lighting Panel 21PC Load Measurement Work Sheet, 1 page
(37) Instrument Transformer 2X14 Load Measurement Work Sheet, 1 page
(38) Instrument Transformer 2X12 Load Measurement Work Sheet, 1 page
(39) 208/120 Panel 43LA Load Measurement Work Sheet, 1 page
(40) Main Chiller 2VCH1A, Motor Data Sheet, 1 page
(41) High Pressure Safety Injection Pump 2P89A, 2P89B, & 2P89C, Acceleration Calculation, 1 page
(42) High Pressure Safety Injection Pump 2P89A, 2P89B, & 2P89C, Motor Data Sheet, 1 page
(43) Telefax from Ingersoll-Rand stating High Pressure Safety Injection Pump 2P89A, 2P89B, & 2P89C pump inertia, 1 page
(44) Case T=0 seconds, Red Train Steady State, DAPPER Run, 12 pages
(45) Case T=0 seconds, Green Train Steady State, DAPPER Run, 12 pages
(46) Case T=4.5 seconds, Red Train Steady State, DAPPER Run, 12 pages
(47) Case T=4.5 seconds, Green Train Steady State, DAPPER Run, 12 pages
(48) Case T=10 seconds, Red Train Steady State, DAPPER Run, 12 pages
(49) Case T=10 seconds, Green Train Steady State, DAPPER Run, 12 pages
(50) Case T=15 seconds, Red Train Steady State, DAPPER Run, 12 pages
(51) Case T=15 seconds, Green Train Steady State, DAPPER Run, 12 pages
(52) Case T=18.2 seconds, Red Train Steady State, DAPPER Run, 12 pages

(53) Case T=18.2 seconds, Green Train Steady State, DAPPER Run, 12 pages
(54) Case T=22.7 seconds, Red Train Steady State, DAPPER Run, 12 pages
(55) Case T=22.7 seconds, Green Train Steady State, DAPPER Run, 12 pages
(56) Case T=50 seconds, Red Train Steady State, DAPPER Run, 12 pages
(57) Case T=50 seconds, Green Train Steady State, DAPPER Run, 12 pages
(58) Case T=60 seconds, Red Train Steady State, DAPPER Run, 12 pages
(59) Case T=60 seconds, Green Train Steady State, DAPPER Run, 12 pages
(60) Case T=70 seconds, Red Train Steady State, DAPPER Run, 12 pages
(61) Case T=70 seconds, Green Train Steady State, DAPPER Run, 12 pages
(62) Case T=80 seconds, Red Train Steady State, DAPPER Run, 12 pages
(63) Case T=80 seconds, Green Train Steady State, DAPPER Run, 12 pages
(64) Case T=85 seconds, Green Train Steady State, DAPPER Run, 12 pages
(65) Case T=90 seconds, Red Train Steady State, DAPPER Run, 12 pages
(66) Case T=90 seconds, Green Train Steady State, DAPPER Run, 12 pages
(67) Case T=Steady State Bus Loads, 2B5 With Swing Loads, DAPPER Run, 12 pages
(68) Case T=Steady State Bus Loads, 2B6 With Swing Loads, DAPPER Run, 12 pages
(69) Case System Voltage=1.05 pu, Bus B5 W/Swing Loads, DAPPER Run, 11 pages

ATTACHMENT 1

EQUATIONS

1.0 BASE CONVERSION EQUATIONS

Z_{PU} = Per Unit Impedance
Z_{Ω} = Impedance in Ohms
KV_{BASE} = Base KV Line to Line
MVA_{BASE} = Base 3ϕ Power

1.1 $$Z_{BASE} = (KV_{BASE})^2 / MVA_{BASE}$$

1.2 $$Z_{PU} = Z_{\Omega} / Z_{BASE}$$

1.3 $$PU\,Z_{NEW} = PU\,Z_{GIVEN} \times \left(\frac{GIVEN\,KV_{BASE}}{NEW\,KV_{BASE}}\right)^2 \times \left(\frac{NEW\,MVA_{BASE}}{GIVEN\,MVA_{BASE}}\right)$$

2.0 MOTOR EQUATIONS

KVA_R = Running Motor KVA
KVA_S = Starting Motor KVA
KW_R = Running Motor KW
V_R = Rated Motor Voltage
V_{BUS} = Bus Voltage
I_{LR} = Motor Locked Rotor Current
pf = Power Factor

2.1 $$KVA_R = \frac{KW}{pf}$$

2.2 $$KVA_S = \frac{\sqrt{3}\,V_R\,I_{LR}}{1000}\left(\frac{V_{BUS}}{V_R}\right)^2$$

ATTACHMENT 1

3.0 TRANSFORMER EQUATIONS

$R\%$ = Transformer Percent Resistance
$X\%$ = Transformer Percent Reactance
$Z\%$ = Transformer Percent Impedance

3.1 $$R\% = \frac{(Load\ Loss\ kW)}{(Rated\ kVA)} \times 100$$

3.2 $$X\% = \sqrt{Z\%^2 - R\%^2}$$

3.3 $$X\% = Z\% \sqrt{\frac{\left(\frac{X}{R}\right)^2}{\left(\frac{X}{R}\right)^2 + 1}}$$

3.4 $$R\% = \frac{X\%}{\left(\frac{X}{R}\right)}$$

3.5 $$\%Tap = \left(\frac{V_{ACTUAL}}{V_{NOMINAL}} - 1\right) \times 100$$

ATTACHMENT 1

4.0 POWER EQUATIONS

S = Single Phase Power
V_ϕ = Line to Neutral Voltage
$\hat{I}$ = Conjugate of the Line Current
Θ = Angle between V_ϕ and I

4.1 $S = V_\phi \hat{I}$

4.2 $pf = \cos\theta$

2B5 LOAD	HP	FFF	PF	[1]RUNNING		[2]STARTING	
				KW	KVAR	KW	KVAR
Instrument Transformer 2X13	-	96.8	[3]22.0	[3]1.7	[3]7.5	-	-
Instrument Transformer 2X11	-	96.0	[4]76.9	[4]11.9	[4]9.9	-	-
Power & Lighting Panel 27LA	-	-	[5]70.0	25.8	26.3	-	-
Cooling Tower Panel 60PA	-	-	[6]70.0	13.5	13.8	-	-
Battery Charger 2D33	-	75.0	80.0	43.3	32.5	-	-
Boric Acid Make-Up Tank Heater 2M43A	-	100	100	7.0	0	-	-
Boric Acid Make-Up Tank Heater 2M43C	-	100	100	7.0	0	-	-
Boric Acid Heater Trace Transformer 2X95	-	96.0	100	5.0	0	-	-
Boric Acid Heater Trace Transformer 2X94	-	96.0	100	5.0	0	-	-
Power & Lighting Panel 21PC	-	-	[7]99.9	[7]47.6	[7]2.1	-	-
Battery Charger 2D31	-	85.0	73.0	60.2	56.4	-	-
T=0 Subtotal				228.0	148.5	0	0
Post Accident Panel 2C128A	2.0	[8]75.0	[9]75.0	2.0	1.8	2.8	13.9
EDG Room Exhaust Fan Dampers	0.7	[8]75.0	[9]70.0	0.7	0.7	1.0	4.9
EDG Start Air Compressor 2C4A	5.0	83.5	78.5	4.5	3.6	7.1	34.7
EDG Start Air Compressor 2C4B	5.0	83.5	78.5	4.5	3.6	7.1	37.7
EDG Fuel Transfer Pump 2P16A	2.0	80.0	72.0	1.9	1.8	2.8	13.9
Computer Room A/C 2VUC30	38.0	-	[9]80.0	38.0	28.5	53.8	263.5
Control Room Air Filter 2VSF9	5.0	84.0	78.0	4.4	3.5	7.1	34.7
MFW Lube Oil Pump 2P27	20.0	86.5	87.0	17.2	9.7	28.3	138.7
RCP Oil Lift Pump 2P63A1/A2	3.0	81.5	68.5	2.7	2.9	4.2	20.8
RCP Oil Lift Pump 2P63B1/B2	3.0	81.5	68.5	2.7	2.9	4.2	20.8
MFW Pump Turbine Turning Gear 2K7A	1.5	78.5	65.5	1.4	1.6	2.1	10.4
TG Bearing Lift Pump 2P90B	5.0	81.5	69.0	4.6	4.8	7.1	34.7
TG Bearing Lift Pump 2P90D	5.0	81.5	69.0	4.6	4.8	7.1	34.7
TG Bearing Lift Pump 2P90E	5.0	81.5	69.0	4.6	4.8	7.1	34.7
MOV's (various)	100.0	-	70.0	100.0	102.0	141.6	693.5
Switchgear Room Exhaust Fan 2VEF5B	25.0	90.0	85.0	20.7	12.8	35.4	173.4
T>0 Subtotal				214.5	189.8	318.8	1565.0
Containment Cooling Fan 2VSF1A	75.0	93.1	78.9	[10]67.7	52.7	106.2	520.1
Containment Cooling Fan 2VSF1B	75.0	93.1	78.9	[10]67.7	52.7	106.2	520.1
T=18.2 Subtotal				135.4	105.4	212.4	1040.2
NAOH Addition Pump 2P136A	5.0	81.9	68.9	[10]4.0	4.2	7.1	34.7
MOV's (various)	100.0	-	70.0	-100.0	-102.0	0	0
T=22.7 Subtotal				-96.0	-97.8	7.1	34.7
Charging Pump 2P36A	100.0	93.0	82.5	[10]56.1	38.4	141.6	693.5
Charging Pump Room Cooler 2VUC7A-1	5.0	81.1	73.8	4.6	4.2	7.1	34.7
T=50 Subtotal				60.7	42.6	148.7	728.2

2B5 LOAD	HP	EFF	PF	[1]RUNNING		[2]STARTING	
				KW	KVAR	KW	KVAR
Charging Pump 2P36C (Swing)	100.0	93.0	82.5	[10]56.1	38.4	141.6	693.5
Charging Pump Room Cooler 2VUC7C-5 (Swing)	5.0	81.1	73.8	4.6	4.2	7.1	34.7
T=60 Subtotal		W/Swing Loads		**60.7**	**42.6**	**148.7**	**728.2**
		W/O Swing Loads		**0**	**0**	**0**	**0**
EDG Exhaust Fan 2VEF24A	15.0	86.4	72.8	12.9	12.1	21.2	104.0
EDG Exhaust Fan 2VEF24B	15.0	86.4	72.8	12.9	12.1	21.2	104.0
Intake Structure Exhaust Fan 2VEF25A-1	10.0	86.0	85.0	8.7	5.4	14.2	69.3
Pent. Room Exhaust Fan 2VEF38A-1	10.0	83.5	85.0	8.9	5.5	14.2	69.3
T=70 Subtotal				**43.4**	**35.1**	**70.8**	**346.6**
Switchgear Room Unit Cooler 2VUC2C	5.0	81.1	73.8	4.6	4.2	7.1	34.7
Switchgear Room Unit Cooler 2VUC2D	5.0	81.1	73.8	4.6	4.2	7.1	34.7
Shutdown Heat Exchanger Room Cooler 2VUC1A	10.0	89.0	77.7	8.4	6.8	14.2	69.3
Shutdown Heat Exchanger Room Cooler 2VUC1B	10.0	89.0	77.7	8.4	6.8	14.2	69.3
HPSI Pump Room Cooler 2VUC11A	5.0	83.4	79.9	4.5	3.4	7.1	34.7
Electrical Equipment Room Cooler 2VUC19A-1	5.0	81.1	73.8	4.6	4.2	7.1	34.7
Electrical Equipment Room Cooler 2VUC19B-1	5.0	81.1	73.8	4.6	4.2	7.1	34.7
T=80 Subtotal				**39.7**	**33.8**	**63.9**	**312.1**
EFW Pump Room Cooler 2VUC6B-1	10.0	89.0	77.7	8.4	6.8	14.2	69.3
T=85 Subtotal				**8.4**	**6.8**	**14.2**	**69.3**
Electrical Equipment Room Exhaust Fan 2VEF63	25.0	[5]90.0	83.0	20.7	13.9	35.4	173.4
T=90 Subtotal				**20.7**	**13.9**	**35.4**	**173.4**
Pressurizer Proportional Heaters	-	100	100	179.6	0	-	-
Control Room Heater 2VUC27A-1	-	100	100	50.0	0	-	-
Electrical Room Cooler 2VUC25A-1	3.0	77.9	68.1	2.9	3.1	-	-
Control Room Cooling Fan 2VUC27A-1	10.0	84.1	82.7	8.9	6.1	-	-
Pent. Room Radiation Monitor 2RE-8845-1	1.5	-	[9]70.0	1.5	1.5	-	-
Battery Room Exhaust Fan 2VEF61	2.5	81.0	82.0	2.3	1.6	-	-
Manual Subtotal				**245.2**	**12.3**	-	-
Steady State Total		W/Swing Loads		**960.7**	**533.0**	-	-
		W/O Swings Loads		**900.0**	**490.4**	-	-

Notes:
1. Running KW=(HP x 0.7456)/Eff. (Except where actual Running KW has been calculated.)
2. Starting KVA=((480/460)^2 x 6.5)(HP) @ 0.20pf
3. Per Attachment 34 and Attachment 1, equations 4.1 and 4.2.
4. Per Attachment 35 and Attachment 1, equations 4.1 and 4.2.
5. Per Reference 2.7, page 371, using 70% for conservatism.
6. The load consists of lights and valves, for conservatism use 70% per Reference 2.7, page 371 and page 386, Figure 137.
7. Per Attachment 36 and Attachment 1, equations 4.1 and 4.2.
8. Assumed per Reference 2.2, assumption 3.5.
9. Per Reference 2.7, page 386, Figure 137 rounded to lowest 5%.
10. Calculated per Reference 2.8.

2B6 LOAD	HP	EFF	PF	[1]RUNNING		[2]STARTING	
				KW	KVAR	KW	KVAR
Instrument Transformer 2X14	-	96.8	[3]49.9	[3]1.8	[3]3.1	-	-
Instrument Transformer 2X12	-	96.0	[4]61.9	[4]8.2	[4]10.4	-	-
Boric Acid Make-Up Tank Heater 2M43B	-	100	100	7.0	0	-	-
Boric Acid Make-Up Tank Heater 2M43D	-	100	100	7.0	0	-	-
Boric Acid Heater Trace Transformer 2X97	-	96.0	100	5.0	0	-	-
Boric Acid Heater Trace Transformer 2X98	-	96.0	100	5.0	0	-	-
208/120 Panel 43LA	-	-	[5]96.1	[5]7.5	[5]2.2	-	-
Battery Charger 2D32	-	85.0	73.0	60.2	56.4	-	-
T=0 Subtotal				**101.7**	**72.1**	**0**	**0**
Post Accident Panel 2C128B	2.0	[6]75.0	[7]75.0	2.0	1.8	2.8	13.9
EDG Room Exhaust Fan Dampers	0.7	[6]75.0	[7]70.0	0.7	0.7	1.0	4.9
EDG Start Air Compressor 2C4C	5.0	83.5	78.5	4.5	3.6	7.1	34.7
EDG Start Air Compressor 2C4D	5.0	83.5	78.5	4.5	3.6	7.1	34.7
EDG Fuel Transfer Pump 2P16B	2.0	80.0	72.0	1.9	1.8	2.8	13.9
MFW Lube Oil Pump 2P26	20.0	86.5	87.0	17.2	9.7	28.3	138.7
RCP Oil Lift Pump 2P63C1/C2	3.0	81.5	68.5	2.7	2.9	4.2	20.8
TG Turning Gear Oil Pump 2P76	40.0	90.2	80.0	33.1	24.8	56.6	277.4
TG Turning Gear 2K6	60.0	91.0	82.5	49.2	33.7	84.9	416.1
RCP Oil Lift Pump 2P63D1/D2	3.0	81.5	68.5	2.7	2.9	4.2	20.8
MFW Pump Turbine Turning Gear 2K7B	1.5	78.5	65.5	1.4	1.6	2.1	10.4
TG Bearing Lift Pump 2P90A	5.0	81.5	69.0	4.6	4.8	7.1	34.7
TG Bearing Lift Pump 2P90C	5.0	81.5	69.0	4.6	4.8	7.1	34.7
TG Bearing Lift Pump 2P90F	5.0	81.5	69.0	4.6	4.8	7.1	34.7
MOV's (various)	100.0	-	70.0	100.0	102.0	141.6	693.5
Switchgear Room Exhaust Fan 2VEF56A	25.0	90.0	85.0	20.7	12.8	35.4	173.4
T>0 Subtotal				**254.4**	**216.3**	**399.4**	**1957.3**
Containment Cooling Fan 2VSF1C	75.0	93.1	78.9	[8]67.7	52.7	106.2	520.1
Containment Cooling Fan 2VSF1D	75.0	93.1	78.9	[8]67.7	52.7	106.2	520.1
T=18.2 Subtotal				**135.4**	**105.4**	**212.4**	**1040.2**
NAOH Addition Pump 2P136B	5.0	81.9	68.9	[8]4.0	4.2	7.1	34.7
MOV's (various)	100.0	-	70.0	-100	-102.0	0	0
T=22.7 Subtotal				**-96.0**	**-97.8**	**7.1**	**34.7**
Charging Pump 2P36B	100.0	93.0	82.5	[8]56.1	38.4	141.6	693.5
Charging Pump Room Cooler 2VUC7B-2	5.0	81.1	73.8	4.6	4.2	7.1	34.7
T=50 Subtotal				**60.7**	**42.6**	**148.7**	**728.2**
Charging Pump 2P36C (Swing)	100.0	92.0	85.0	[8]56.1	38.4	141.6	693.5
Charging Pump Room Cooler 2VUC7C-5 (Swing)	5.0	81.1	73.8	4.6	4.2	7.1	34.7

2B6 LOAD	HP	EFF	PF	[1]RUNNING		[2]STARTING	
				KW	KVAR	KW	KVAR
T=60 Subtotal W/Swing Loads				**60.7**	**42.6**	**148.7**	**728.2**
W/O Swing Loads				**0**	**0**	**0**	**0**
EDG Exhaust Fan 2VEF24C	15.0	86.4	72.8	12.9	12.1	21.2	104.0
EDG Exhaust Fan 2VEF24D	15.0	86.4	72.8	12.9	12.1	21.2	104.0
Boric Acid Make-Up Pump 2P39B	25.0	88.5	84.5	21.1	13.4	35.4	173.4
Boric Acid Make-Up Pump 2P39A	25.0	88.5	84.5	21.1	13.4	35.4	173.4
Intake Structure Exhaust Fan 2VEF25B-2	10.0	86.0	85.0	8.7	5.4	14.2	69.3
Pent. Room Exhaust Fan 2VEF38B-2	10.0	83.5	85.0	8.9	5.5	14.2	69.3
T=70 Subtotal				**85.6**	**61.9**	**141.6**	**693.4**
Switchgear Room Unit Cooler 2VUC2A	5.0	81.1	73.8	4.6	4.2	7.1	34.7
Switchgear Room Unit Cooler 2VUC2B	5.0	81.1	73.8	4.6	4.2	7.1	34.7
Shutdown Heat Exchanger Room Cooler 2VUC1E	10.0	89.0	77.7	8.4	6.8	14.2	69.3
Shutdown Heat Exchanger Room Cooler 2VUC1D	10.0	89.0	77.7	8.4	6.8	14.2	69.3
HPSI Pump Room Cooler 2VUC11B	5.0	83.4	79.9	4.5	3.4	7.1	34.7
Electrical Equipment Room Cooler 2VUC20A-2	1.0	71.8	66.2	1.0	1.1	1.4	6.9
Electrical Equipment Room Cooler 2VUC20B-2	1.0	76.0	63.0	1.0	1.2	1.4	6.9
T=80 Subtotal				**32.5**	**27.7**	**52.5**	**256.5**
EFW Pump Room Cooler 2VUC6A-2	10.0	89.0	77.7	8.4	6.8	14.2	69.3
Electrical Equipment Room Exhaust Fan 2VEF64	25.0	[6]90.0	83.0	20.7	13.9	35.4	173.4
T=90 Subtotal				**29.1**	**20.7**	**49.6**	**242.7**
Pressurizer Proportional Heaters	-	100	100	179.6	0	-	-
Control Room Heater 2VUC27B-2	-	100	100	50.0	0	-	-
Electrical Room Cooler 2VUC25B-2	3.0	77.9	68.1	2.9	3.1	-	-
Control Room Cooling Fan 2VUC27B-2	10.0	84.1	82.7	8.9	6.1	-	-
Pent. Room Radiation Monitor 2RE-8846-2	1.5	-	70.0	1.5	1.5	-	-
Battery Room Exhaust Fan 2VEF65	2.5	81.0	77.0	2.3	1.9	-	-
Battery Room Exhaust Fan 2VEF49	1.0	[6]75.0	70.0	1.0	1.0	-	-
Manual Subtotal				**246.4**	**13.6**	-	-
Steady State Total W/Swing Loads				**910.5**	**505.1**	-	-
W/O Swings Loads				**849.8**	**462.5**	-	-

Notes:
1. Running KW = (HP x 0.7456)/Eff. (Except where actual Running KW has been calculated.)
2. Starting KVA = $((480/460)^2 \times 6.5)$(HP) @ 0.20pf
3. Per Attachment 37 and Attachment 1, equations 4.1 and 4.2.
4. Per Attachment 38 and Attachment 1, equations 4.1 and 4.2.
5. Per Attachment 39 and Attachment 1, equations 4.1 and 4.2.
6. Assumed per Reference 2.7, assumption 3.5
7. Per Reference 2.7, page 386, Figure 137 rounded to lowest 5%.
8. Calculated per Reference 2.8

POWER TRANSFORMER DEPARTMENT

GENERAL ELECTRIC

PITTSFIELD, MASS.

RT P71-99

Date of Test March 1971

REPORT OF TEST ON TRANSFORMERS

Purchaser Bechtel Corp. For Arkansas Power & Light Co.

RATING **27000/36000/45000KVA

H – Winding	X – Winding	Y – Winding
Volts 15700GRY/9064O	6900Y	4160Y/2400
K-o **	15000/20000/25000	12600/16800/21000

Taps as per attached Nameplate 254522

Purchaser's Order No. 6600-E-3-AC
G. E. Req'n. No. 474-69674
G. E. Contract No.

CHARACTERISTICS

Losses, efficiencies and regulations are based on wattmeter measurements and, unless otherwise stated, on normal rating.
For three phase transformers the resistances given are the sum of the three phases.

Serial	Resistance @85 C H	X	Y	NO LOAD LOSS WATTS AT 100% VOLTAGE	% EXCIT. CURRENT AT 100% VOLTAGE	157GRY Kv To 69Y-4.16Y Kv At 27000 (*) Kvo — LOSS WATTS @85 C	% IMP. @ 75 C	Kv To At Kvo — LOSS WATTS @ 75 C	% IMP. @ 75 C	Kv To At Kvo — LOSS WATTS @ 75 C	% IMP. @ 75 C
B409010	5.413	.01290	.005252	53500	1.29	91880	4.93				
			Stab.								
			.1624								
AVERAGE											
GUARANTEE	———	———	———	72000		———		———		———	
				AVERAGE		165330					
Total Loss Watts @85 C				GUARANTEE		154000					

	EFFICIENCIES AT 75C 100% P.F					REGULATION AT 75C				
	Load	Full Load	¾ Load	½ Load	¼ Load		100% P.F	80% P.F	60% P.F	70% P.F
AGE		99.46	99.48	99.44	99.13	AVERAGE	See Page #2			
GUARANTEE		99.44	99.43	99.33	98.86	GUARANTEE				

TEMPERATURE RISE (Serial No. ***)

Average ultimate temperature rise in deg C corrected to instant of shutdown

	H – Winding		X – Winding		Y – Winding		
Winding Connection	157GRY Y.		6900 Y.		4160 Y.		Method of cooling OA
MVA / Amp.	27	104	15	1255	12	1665	Top oil rise 57.6 C
Rise: Top / Aver.	58.7 C	65 C	55.4 C	65 C	55.7 C	65 C	Ambient 25.0 C
Winding Temp. Ind.	deg C		deg C		deg C		
Winding Connection	157GRY Y.		6900 Y.		4160 Y.		Method of cooling FOA
MVA / Amp.	45	174	25	2090	21	2910	Top oil rise 52.3 C
Rise: Top / Aver.	48.4 C	55 C	53.0 C	65 C	52.3 C	65 C	Ambient 35.0 C
Winding Temp. Ind.	deg C		deg C		deg C		

DIELECTRIC TESTS

APPLIED POTENTIAL TEST	VOLTAGE OF WINDING TESTED	TEST VOLTAGE APPLIED	DURATION IN SECONDS
Voltage applied to each winding in turn with all other windings connected to core and ground.	H	50000	
	X	26000	60 seconds for all tests
Line Terminal To Ground	Y Stab.	19000 34000	

Induced voltage test 275KV/EV ********** for 7200 cycles

Remarks (*)157KV = 27000KVA, 6.9KV = 15000KVA and 4.16KV = 12000KVA

Note: Efficiencies are based on 3 Wdg. loading, H @ 27MVA, X @ 15MVA, Y @ 12MVA, on a 27MVA Base.

**Temperature values are based on design data obtained from thermally similar transformers.

(Continued on Page #2)

I hereby certify that this is a true report based on factory tests made in accordance with the American Standard Test Code for Distribution, Power and Regulating Transformers, C57.12 or latest revision thereof, and that each transformer withstood the above insulation tests.

Signed P.M. Baggett Date 4-12-71 Approved by F. Peronto

POWER TRANSFORMER DEPARTMENT

GENERAL ELECTRIC

PITTSFIELD, MASS.

Page #2
BTP71-99
G.E. Reqn. 474-68574
C/O # 6800-E-3-AC
S/N E409010

Additional Test Data

Voltage	Test
164850	5.689
149150	5.146

Regulation @ 75°C

	H - X @ 15MVA		H - Y @ 12.6MVA		H - X @ 12.6MVA	
	Test	Guar.	Test	Guar.	Test	Guar.
1.0 P.F.	0.451	.5	0.46	.4	0.364	-
.9 P.F.	2.73	2.5	2.40	2.2	2.23	
.8 P.F.	3.48	3.3	3.23	2.8	2.80	

% Impedance Volts

Connection	KVA	Test	Guarantee
157000-6900	15600	5.03	4.85
157000-4160	12600	4.84	4.62
6900-4160	12600	8.91	8.57

Tap Impedances

Connection	% Volts
164850-6900-4160	4.80
160925-6900-4160	5.14
153075-6900-4160	5.34
149150-6900-4160	5.51

Note: Same base as rated - 3 Wdg. loading - 27MVA Base

Insulation Power Factor Tests

HV - Grd.	X - Grd.	Y - Grd.	Temp. °C
0.18	0.25	0.20	33.0

To check the calibration of the winding temperature indicators the following information may be used.

CT	Current To Apply For 30 Minutes	Terminals	Rise Over 25°C Oil	Resistance (Ohms)
A(AWR102)	26.5	X1 - Xo G	31.8	None
(AW402)	26.5	X4 - Xo G	32.5	.170
B(AWR102)	27.2	X2 - Xo G	25.3	.050
(AW402)	27.2	X5 - Xo G	27.0	.042
C(AWR102)	32.7	X3 - Xo G	30.8	.025
(AW402)	32.7	X6 - Xo G	31.2	.020

These values will be approximately 5°C higher in 0°C top oil and 5°C lower in 50°C top oil. The resistors should be in place for all tests.

DISTRIBUTION

TRANSFORMER TEST REPORT

PURCHASER Arkansas Power & Light Co. Russellville, Ark.
DATE OF TEST 3/21/70 PURCHASER'S ORDER NO 6500-E-10 MFR'S. REF. NO. 48-03355
TYPE GA PHASE Three CYCLES 60 INSULATING FLUID
4160 VOLTS 480Y/277 VOLTS ____ VOLTS
WINDING 1 1000 KVA WINDING 2 1000 KVA WINDING 3 ____ KVA

RESISTANCES, EXCITING CURRENT, LOSSES, AND IMPEDANCE ARE BASED ON NORMAL RATING UNLESS OTHERWISE STATED. LOSSES AND REGULATION ARE BASED ON WATTMETER MEASUREMENTS. FOR THREE-PHASE TRANSFORMERS THE RESISTANCES GIVEN ARE THE SUM OF THE THREE PHASES IN SERIES.

SERIAL NO.	RESISTANCE IN OHMS AT 170C (1)	(2)	(3)	EXCITING CURRENT AT 100% RATED VOLTAGE	NO LOAD LOSS WATTS AT 100% RATED VOLTAGE	LOAD LOSS WATTS 170C	% IMP. 170C	LOAD LOSS WATTS 170C	% IMP. 170C	LOAD LOSS WATTS 170C	% IMP. 170C
18879	.453	.0038		.91	2813	11975	8.09				
18880	.450	.0037		.94	2847			12306	8.10		
18881	.463	.0037		.90	2880					12532	8.11
						TOTAL LOSS WATTS 170C	14788	TOTAL LOSS WATTS 170C	15268	TOTAL LOSS WATTS 170C	15412

	100% PF	% PF	80% PF	% PF
AVERAGE	1.50		5.86	
GUARANTEE				

18879
REGULATION AT 170

TEMPERATURE RISES ARE AVERAGE IN RISES IN DEGREES C. CORRECTED TO INSTANT OF SHUTDOWN.
SERIAL NO. ____ WITH WINDINGS CONNECTED AND LOADED AS FOLLOWS:
(1) ____ KV ____ AMP (2) ____ KV ____ AMP
(3) ____ KV ____ AMP UNTIL CONSTANT TEMPERATURE RISE WAS REACHED.

TEMP RISE OF WINDINGS BY RES. DEG C (1)	(2)	(3)	GUARANTEE	TOP FLUID TEMP RISE	AMBIENT TEMP INCOMING WATER	AMBIENT TEMP COOLER AIR ROOM	TEMP RISE DEG C	WATER GALLONS PER MIN	WATER POUNDS PRESSURE
137.0	133.0		150.0			25.0			

DIELECTRIC TESTS

APPLIED POTENTIAL TESTS	VOLTAGE RATING OF WINDING TESTED	TEST VOLTAGE APPLIED IN KV	DURATION OF TEST IN SECONDS
(VOLTAGE APPLIED BETWEEN EACH WINDING AND ALL OTHER WINDINGS CONNECTED TO CORE AND GROUND)	4160	19	60
	480	10	60

INDUCED POTENTIAL TEST
Two TIMES RATED VOLTAGE ACROSS FULL WINDING.
____ KV FROM ____ LINE TERMINAL TO GROUND.
AT 400 CYCLES PER SECOND FOR 7200 CYCLES.

REMARKS:

I HEREBY CERTIFY THAT THIS IS A TRUE REPORT BASED ON FACTORY TESTS MADE IN ACCORDANCE WITH THE American Standard Test Code for Distribution, Power and Regulating Transformers, C57.12, OR LATEST REVISION THEREOF, AND THAT EACH TRANSFORMER WITHSTOOD THE ABOVE INSULATION TESTS.

SIGNED [signature] DATE 4-15-70 APPROVED [signature]
Henry R. Meyers TRANSFORMER ENGINEERING DEPT.
PAGE ____ PAGE 4 William Hutschler
ADOPTED STANDARD 7-22-1965

Temperature is a
taken from a
transformer of
similar design

TRANSFORMER DATA SHEET

UNIT 1

Main Transformer (X-01)

Serial No. 7001702, 7001703, 7001704, & 7001705

AVAILABLE TAPS	DIAL POSITION
537500 KV	1
525000 KV	2
512500 KV	3
500000 KV	4
487500 KV	5

CURRENT DIAL POSITION 4

Unit Auxiliary Transformer (X-02)

Serial No. H409011

AVAILABLE TAPS	DIAL POSITION
22575 KV	1
22037 KV	2
21500 KV	3
20962 KV	4
20425 KV	5

CURRENT DIAL POSITION 3

Startup No. 1 Transformer (X-03)

Serial No. H409012

AVAILABLE TAPS	DIAL POSITION
22575 KV	1
22037 KV	2
21500 KV	3
20962 KV	4
20425 KV	5

CURRENT DIAL POSITION 3

Verified Brian Williams Date 10\24\91

Startup No. 2 Transformer (X-04)
Serial No. H409010

AVAILABLE TAPS	DIAL POSITION
164850 KV	1
160925 KV	2
157000 KV	3
153075 KV	4
149150 KV	5

CURRENT DIAL POSITION 3

UNIT 2
Main Power Transformer (2X-01)
Serial No. H409949, H409950, & H409951

AVAILABLE TAPS	DIAL POSITION
537500 KV	1
525000 KV	2
512500 KV	3
500000 KV	4
487500 KV	5

CURRENT DIAL POSITION 4

Unit Auxiliary Transformer (2X-02)
Serial No. H409966

AVAILABLE TAPS	DIAL POSITION
22570 KV	1
22040 KV	2
21500 KV	3
20960 KV	4
20420 KV	5

CURRENT DIAL POSITION 4

Verified Eric Williams Date 10/29/91

Startup No. 3 Transformer (2X-03)
Serial No. H409965

AVAILABLE TAPS		DIAL POSITION
22571	KV	1
22050	KV	2
21500	KV	3
20960	KV	4
20426	KV	5

CURRENT DIAL POSITION 3

SWITCHYARD
Autotransformer
Serial No. D-596828, D-596829, D-596830, & D-596831

AVAILABLE TAPS		DIAL POSITION
525010	KV	1
512500	KV	2
500000	KV	3
487500	KV	4
475000	KV	5

CURRENT DIAL POSITION 3

Verified Eric J. Miller Date 10/24/91

LOAD CENTER TRANSFORMER DATA SHEET

UNIT 1

B1 Load Center Transformer (X-1)

Serial No. 18879

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

B2 Load Center Transformer (X-2)

Serial No. 18877

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

B3 Load Center Transformer (X-3)

Serial No. 18882

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

Verified Bill Villa Date 4/3/92

Verified Joshua Hoy Date 4/3/92

B4 Load Center Transformer (X-4)
Serial No. 18878

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

B5 Load Center Transformer (X-5)
Serial No. 18880

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION D

B6 Load Center Transformer (X-6)
Serial No. 18881

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION D

Verified Bia Villia Date 4/3/92

Verified John Holtz Date 4/3/92

B7 Load Center Transformer (X-7)
Serial No. 93355E2

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

UNIT 2
2B1 Load Center Transformer (2X-21)
Serial No. 21288-B01

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

2B2 Load Center Transformer (2X-22)
Serial No. 21288-A01

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

Verified Eric Williams Date 4\3\92

Verified John Hosty Date 4\3\92

2B3 Load Center Transformer (2X-23)
Serial No. 21288-A02

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

2B4 Load Center Transformer (2X-24)
Serial No. 21288-B02

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

2B5 Load Center Transformer (2X-25)
Serial No. 21288-B03

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION D

Verified Brian Wilson Date 4/3/92

Verified John W. Hotz Date 4/6/92

2B6 Load Center Transformer (2X-26)
Serial No. 18883

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION D

2B7 Load Center Transformer (2X-27)
Serial No. 21288-C01

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

2B8 Load Center Transformer (2X-28)
Serial No. 21288-B05

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

Verified Bill Villa Date 4/6/92

Verified John W. Hotz Date 4/6/92

2B9 Load Center Transformer (2X-29)
Serial No. 21288-D01

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

2B10 Load Center Transformer (2X-30)
Serial No. 21288-E01

AVAILABLE TAPS	DIAL POSITION
4360V	A
4260V	B
4160V	C
4055V	D
3950V	E

CURRENT DIAL POSITION C

Verified Bill Williams Date 4/6/92

Verified John Hintz Date 4/6/92

TRANSFORMER TEST REPORT

PURCHASER Bechtel-Arkansas Power & Light

DATE OF TEST 11-20-72 PURCHASER'S ORDER NO. _____ MFR'S. REF. NO. 48-21288

TYPE GA PHASE Three CYCLES 60 INSULATING FLUID C2F6

WINDING 1: 4160 VOLTS, 1000 KVA WINDING 2: 480Y/277 VOLTS, 1000 KVA WINDING 3: _____ VOLTS, _____ KVA

RESISTANCES, EXCITING CURRENT, LOSSES, AND IMPEDANCE ARE BASED ON NORMAL RATING UNLESS OTHERWISE STATED. LOSSES AND REGULATION ARE BASED ON WATTMETER MEASUREMENTS. FOR THREE-PHASE TRANSFORMERS THE RESISTANCES GIVEN ARE THE SUM OF THE THREE PHASES IN SERIES.

SERIAL NO.	RESISTANCE IN OHMS AT 170 C (1)	(2)	(3)	% EXCITING CURRENT AT 100% RATED VOLTAGE	NO LOAD LOSS WATTS AT 100% RATED VOLTAGE	_____ KV To _____ KV _____ KVA: LOAD LOSS WATTS 170° C	% IMP 170° C	_____ KV To _____ KV _____ KVA: LOAD LOSS WATTS 170° C	% IMP 170° C	_____ KV To _____ KV _____ KVA: LOAD LOSS WATTS 170° C	% IMP 170° C
B-01	.980	.00345		.99	3120	12257	7.74				
B-02	.992	.00348		.93	3000			12390	7.70		
B-03	.985	.00348		1.01	2920					12315	7.71
						TOTAL LOSS WATTS 170° C	15377	TOTAL LOSS WATTS 170° C	15390	TOTAL LOSS WATTS 170° C	15235

S/N B-01 REGULATION AT 170C

	100% PF	% PF	80% PF	% PF
AVERAGE	1.52		5.68	
GUARANTEE				

TEMPERATURE RISES ARE AVERAGE IN RISES IN DEGREES C, CORRECTED TO INSTANT OF SHUTDOWN.

SERIAL NO. B-01 WITH WINDINGS CONNECTED AND LOADED AS FOLLOWS:

(1) .302 KV 146 AMP. (2) SHORT CIRCUITED AMP.

(3) _____ KV _____ AMP. UNTIL CONSTANT TEMPERATURE RISE WAS REACHED.

TEMP RISE OF WINDINGS BY RES. DEG C (1)	(2)	(3)	GUARANTEE	TOP ~~OIL~~ Gas TEMP RISE	AMBIENT TEMP INGOING WATER	AMBIENT TEMP IDLER OR ROOM	AMBIENT TEMP TEMP RISE Deg C	WATER GALLONS PER MIN	WATER POUNDS PRESSURE
137.0	129.6		150.0	97.01		26.0			

DIELECTRIC TESTS

	VOLTAGE RATING OF WINDING TESTED	TEST VOLTAGE APPLIED IN KV	DURATION OF TEST IN SECONDS
APPLIED-POTENTIAL TESTS (VOLTAGE APPLIED BETWEEN EACH WINDING AND ALL OTHER WINDINGS CONNECTED TO CORE AND GROUND)	4160	19	60
	480Y/277	10	60
INDUCED-POTENTIAL TEST	Two TIMES RATED VOLTAGE ACROSS FULL WINDING: _____ KV FROM _____ KV LINE TERMINAL TO GROUND: AT 400 CYCLES PER SECOND FOR 7200 CYCLES.		

REMARKS:

I HEREBY CERTIFY THAT THIS IS A TRUE REPORT BASED ON FACTORY TESTS MADE IN ACCORDANCE WITH THE *American Standard Test Code for Distribution, Power and Regulating Transformers*, C57.22, OR LATEST REVISION THEREOF; AND THAT EACH TRANSFORMER WITHSTOOD THE ABOVE INSULATION TESTS.

SIGNED Henry R. Meyers DATE 5/31/73 APPROVED _____ TRANSFORMER ENGINEERING DEPT.

Henry R. Meyers

PAGES 4 PAGE 2 William H. Mutschler, Jr.

ADOPTED STANDARD 7-22-1943.

TRANSFORMER TEST REPORT

PURCHASER Arkansas Power & Light Co. Russellville, Arkansas
DATE OF TEST 3/20/70 PURCHASER'S ORDER NO [illegible] MFR'S. REF. NO. [illegible]
TYPE OA PHASE Three CYCLES 60 INSULATING FLUID [illegible]
WINDING 1 4160 VOLTS 1000 KVA WINDING 2 480Y/277 VOLTS 1000 KVA WINDING 3 VOLTS KVA

RESISTANCES, EXCITING CURRENT, LOSSES, AND IMPEDANCE ARE BASED ON NORMAL RATING UNLESS OTHERWISE STATED. LOSSES AND REGULATION ARE BASED ON [illegible] MEASUREMENTS. FOR THREE-PHASE TRANSFORMERS THE RESISTANCES GIVEN ARE THE SUM OF THE THREE PHASES IN SERIES.

SERIAL NO.	RESISTANCE IN OHMS AT 170C (1)	(2)	(3)	% EXCITING CURRENT AT 100% RATED VOLTAGE	NO-LOAD LOSS WATTS AT 100% RATED VOLTAGE	LOAD LOSS WATTS 170C	% IMP. 170C	LOAD LOSS WATTS	% IMP.	LOAD LOSS WATTS	% IMP.
18863	.902	.0037		.92	2693	12438	8.04				
						TOTAL LOSS WATTS 170C	15123	TOTAL LOSS WATTS		TOTAL LOSS WATTS	

		100% PF	% PF	80% PF	% PF
REGULATION AT 170C	AVERAGE	1.24	[illegible]	5.86	
	GUARANTEED	[illegible]			

TEMPERATURE RISES ARE AVERAGE IN RISES IN DEGREES C, CORRECTED TO INSTANT OF SHUTDOWN.
SERIAL NO. WITH WINDINGS CONNECTED AS FOLLOWS:
(1) KV AMP (2) KV AMP
(3) KV AMP UNTIL CONSTANT TEMPERATURE WAS REACHED.

TEMP RISE OF WINDINGS BY RES. DEG C (1)	(2)	(3)	GUARANTEED	TOP FLUID TEMP RISE	AMBIENT TEMP COOLING WATER	AMBIENT TEMP COLLS. OR ROOM	WATER TEMP RISE DEG C	WATER GALLONS PER MIN.	WATER POUNDS PRESSURE
137.0	131.0		150.0			35			

DIELECTRIC TESTS

APPLIED POTENTIAL TESTS (VOLTAGE APPLIED BETWEEN EACH WINDING AND ALL OTHER WINDINGS CONNECTED TO CORE AND GROUND)	VOLTAGE RATING OF WINDING TESTED	TEST VOLTAGE APPLIED IN KV	DURATION OF TEST IN SECONDS
	4160	19	60
	480	10	60

INDUCED POTENTIAL TEST: TWO TIMES RATED VOLTAGE ACROSS [illegible] WINDING; KV FROM LINE TERMINAL TO GROUND; AT 400 CYCLES PER SECOND FOR [illegible] CYCLES

REMARKS:

I HEREBY CERTIFY THAT THIS IS A TRUE REPORT BASED ON FACTORY TESTS MADE IN ACCORDANCE WITH THE *American Standard Test Code for Distribution, Power and Regulating Transformers*, [illegible] OR LATEST REVISION THEREOF, AND THAT EACH TRANSFORMER WITHSTOOD THE ABOVE INSULATION TESTS.

SIGNED [signature] DATE 4/15/70
Henry R. Meyers

[signature]
TRANSFORMER ENGINEERING DEPT.
William Kutschler

PAGE 4 PAGE 3

APPROVED STANDARD 7-12-1933

Temperature data taken from a transformer of similar design.

1813.10

Westinghouse

REACTOR PERFORMANCE SPECIFICATION

FOR BECHTEL - ARKANSAS POWER AND LIGHT

REQ. NO. NSFU-4201 SPECIFICATION NO. 294576 DATE 6-24-69

RATING

CLASS	KVA	PHASE	CYCLES	INDUCTIVE DROP-VOLTS	AMPERES	OHMS REACTANCE	INSULATING MEDIUM	SERVICE
B	655	3	60	69	3150	0.022	Air	Indoor

CONDITIONS OF OPERATION

REACTORS IN GROUP	SYSTEM				PERCENT REACTANCE	APPLICATION
	K-A	PHASE	LINE VOLTAGE	NEUTRAL		
1		3	4160	Grounded	2.9	Current Limiting

TEMPERATURE RISE

LOAD IN % RATED KVA	TIME	MAX. RISE BY RESIST.	METHOD OF COOLING
100	Continuous	80 °C	Self

LOSSES-Reactor only

TOTAL WATTMETER LOSS AT 75°C
14300 WATTS

DIELECTRIC TESTS

INSULATION CLASS	APPLIED VOLTAGE TESTS		INDUCED VOLTAGE TEST IN EACH WINDING	BIL - REACTOR
	BETWEEN PHASES	WINDING TO GROUND		
5 KV	26 KV	26 KV	26 KV	75 KV

BIL - Bus - 60 KV

SHORT CIRCUIT

AMPERES	SECONDS	FINAL TEMPERATURE	
50000	3	350°C	

ARRESTER

PROTECTIVE SHUNT ARRESTER

DIMENSIONS Copper wound with silver plated copper terminals

OUTLINE DS 47-805-2 Fig. 1

TERMINAL FIG.

A=92 B=24 C=40 D=19 F=6
G=35 H=65 K=86 θ=0°

Approximate Reactor weight = 4250 lbs.

Outdoor housing with incoming and outgoing copper bus terminating inside housing throat flanges located on same side of housing.

Approximate housing dimensions: 80 wide X 100 Deep X 120 High
Weight - 2800 lbs.

Total losses reactor plus housing - 28000 watts.

To R.C. Prince

EDSK2U223F

DEC 15 1972

WESTINGHOUSE ELECTRIC CORPORATION
C.L. REACTOR TEST REPORT

Customer ARKANSAS POWER AND LIGHT COMPANY Order No. 6600-2-E-2009 AC

Date of Tests 10-10-72 G.O. JK-19335 S.O. SCP2847 E-Spec. 887915

Type CLIR Phase 3 Cycles 60 Class B Insulating Fluid AIR

Volts Drop 96 ✓ KVA 173 ✓ Amperes 600 ✓ % Reactance 0.16 ohms

Time Rating continuous For connection in line of a 4160 Volt Circuit indoor Service

RESISTANCE, LOSSES, AND IMPEDANCE are based on normal rating unless otherwise stated. Losses are based on watt-meter measurements.

SERIAL NO.	RESISTANCE AT 95° C.			TOTAL LOSS WATTS 95° C.	IMPEDANCE		
	PHASE A	PHASE B	PHASE C		VOLTS	OHMS	% IX
SCP28471	.00487	.00429	.00489	5510	99.6	0.166	
SCP28472	.00488	.00428	.00489	5519	99.6	0.166	
Average				5515 ✓	99.6	0.166	
Guarantee Maximum				6500	102.7	0.171	
Guarantee Minimum					93.1	0.155	

TEMPERATURE RISE in degrees Centigrade corrected to instant of shutdown, calculated

SERIAL NO.	PHASE	AMPERES	RISE BY RESISTANCE		GUARANTEE
	1	600 ✓	40.6°C		80°C

INSULATION TESTS—High potential tests were made on each reactor. Voltage was applied between winding and ground and between phases of a polyphase reactor. Voltage was induced in each winding to test turn to turn strength. Duration of each test was 60 seconds.

Voltage Rating of Winding 5000 ✓

Applied Voltage Phase to Phase 26000 ✓

Applied Voltage Winding to Ground 26000 ✓ 6600-E2009-3-1

Induced Voltage in Each Winding 26000 ✓

REMARKS:

I hereby certify that this is a true report based on factory tests made in accordance with American standard Current-Limiting Reactors C-57.16 or Standard for Neutral Grounding Devices AIEE-32 or latest revision thereof, and that each reactor withstood the above insulation tests.

Approved G.H. Goolsby Date Nov. 22, 1972 Signed W.G. Schneider

G.H. Goolsby/Sect Mgr. W.G. Schneider/Design Engr.

Attachment 11
Calc 92-E-0065-01
Page 1 of 1

MOTOR NUMBER	2PM-4A 2PM-4B 2PM-4C
SERVICE	Service Water Pumps
MANUFACTURER	GE
TYPE	Vertical
FRAME DESIGNATION	6346P
HORSEPOWER OUTPUT	800
TIME RATING/TEMP. RISE °C	Cont/70
RPM AT FULL LOAD	885
VOLTAGE	4000
FULL LOAD AMPS	105
*ENCLOSURE	DP
VERTICAL OR HORIZONTAL	Vert
BEARINGS (SLEEVE OR BALL)	Ball
TYPE OF LUBRICATION	Oil
INSULATION CLASS	B
ROTATION (VIEWED FROM END OPP.SHFT)	CCW
FULL LOAD TORQUE	4750
STARTING TORQUE-% OF FULL LOAD	100
EFFICIENCY - 100% LOAD	93.0
- 75% LOAD	92.5
- 50% LOAD	91.5
SERVICE FACTOR	1.00
IS THERMAL PROTECTION PROVIDED	Yes
WEIGHT	8500
PHASE	3
FREQUENCY	60
LOCKED ROTOR CURRENT	683
POWERFACTOR - 100% LOAD	88.0
- 75% LOAD	85.0
- 50% LOAD	76.0
NEMA DESIGN LETTER	B
SECONDARY AMPS @ FULL LOAD	-
SECONDARY VOLTAGE	-
SECONDARY OHMS	-
BREAKDOWN OR PULLOUT TORQUE-%	200
RATED FIELD CURRENT	-
RATED EXCITER VOLTAGE	-
RATED POWER FACTOR	-
PULL IN TORQUE - % OF FULL LOAD	-
TYPE OF WINDING	Form
SHUNT FIELD CURRENT	-
ALLOWABLE WK^2 OF LOAD	
SPACE HEATERS - WATTS/VOLTS	1000/230
TWO SPEED MOTORS-NO OF WINDINGS	-
TORQUE	-
THRUST BEARING CAPACITY-UP (LBS)	
CAPACITY-DOWN (LBS)	

Side margin labels: A.C. MOTORS; SQ. CAGE OR WOUND R.; SYNCH.; D-C; SPECIAL FEATURES

*ENCLOSURE: DRIPPROOF (DP), SPLASHPROOF (SP), WEATHER PROTECTED (WP), TOTALLY ENCLOSED NON-VENTILATED (TENV), TOTALLY ENCLOSED FAN COOLED (TEFC), TOTALLY ENCLOSED PIPE VENTILATED (TEPV) ETC., EXPLOSIONPROOF XP. TO INDICATE GUARDED ADD "G".

REV.	DESCRIPTION	DR	CHK	SUPV	MATL	APPROVALS	DATE
	Per Design Specification						

BECHTEL POWER DIVISION ENGINEERING

ELECTRIC MOTOR DATA SHEET

MOTORS FOR SERVICE WATER PUMPS
ARKANSAS NUCLEAR ONE - UNIT 2
ARKANSAS POWER & LIGHT CO.
APPENDIX - 7

JOB No 6600-2
FORM-G-162
6600-M-2011-DS-2
REV. 3

OUTLINE (INDUCTION MOTOR)
FIRST MADE FOR 6339P36 ΔH=7 1/2
SPECIFICATION FOR MODEL 5K6339XC134A

NUCLEAR

G.E. REQ NO: 409-58283
ITEM NO: 1
CUSTOMER: COLT INDUSTRIES/ARKANSAS POWER & LIGHT CO.
ORDER NO: P-070020A-5
INSTALLATION SITE: ARKANSAS NUCLEAR ONE UNIT NO. 2 LONDON, ARKANSAS
APPLICATION: SERVICE WATER PUMPS 2P4A, B&C
CUST. SPEC. NO: BECHTEL NO. 6600-M-2011

MOTOR RATING & DESCRIPTION

TYPE: K - SQUIRREL CAGE INDUCTION
FRAME: 6339P36
HORSEPOWER: 800
TIME RATING: CONTINUOUS
TEMP. RISE BY THERMOMETER: 70 DEG. C.

F.L. SPEED: 885 RPM
RATED VOLTAGE: 4000 VOLTS
F.L. CURRENT: 106 AMPS
SERVICE FACTOR: 1.0
RATED FREQ: 60 CPS (HERTZ)
INSTRUCTION BOOK:

NO. OF PHASES: 3
CODE LETTER: G
DESIGN LETTER: —
ROTOR INERTIA 860 LB. FT.²
ALL OPENINGS ARE SCREENED

WINDING TYPE: FORM COIL ☑ RANDOM COIL ☐
INSULATION CLASS & SERVICE CONDITIONS: CLASS B POWERHOUSE
ENCLOSURE & VENTILATION: OPEN DRIPPROOF
MOTOR LEAD TERMINAL LUGS (INTERNAL) BLACKBURN L-125-2H FOR MOTOR #2 AWG LEADS

ROTATION DIRECTION: CCW LOOKING DOWN ON TOP

MOTOR PERFORMANCE CHARACTERISTICS AT RATED VOLTAGE & FREQUENCY

	FULL LOAD	3/4 LOAD	1/2 LOAD
%EFFICIENCY*	93	92.5	91.5
%POWER FACTOR	87	84	77

*EXCLUSIVE OF 35 KW BRG. LOSS DUE TO EXTERNAL THRUST

LOCKED ROTOR CURRENT: 690 AMPS
LOCKED ROTOR P.F. (APPROX.): ~24 %
LOCKED ROTOR TORQUE: 100 % F.L. TORQUE
MAXIMUM TORQUE: ~200 % F.L. TORQUE
FULL LOAD TORQUE: 4750 LB. FT.

MAXIMUM ALLOWABLE STALL TIME: 14 SEC FROM 80°C OR 20 SEC FROM 30°C INITIAL TEMPERATURE
STATOR WINDING RESISTANCE - LINE TO LINE: .53 OHMS AT 25°C (APPROX.)

SOUND PRESSURE LEVEL: 85 db-C MAX. AVERAGE OVERALL
ACCELERATION TIME - UNDER 4 SECONDS

MOTOR BEARING & LUBRICATION DATA

	UPPER BEARING	LOWER BEARING
BEARING TYPE:	INSULATED ANGULAR CONTACT BALL	RADIAL BALL
BEARING CATALOGUE NO:	629A230G2 (2) 7230 DT	289 2334P25 (226-5)
LUBRICANT TYPE:	OIL	OIL
QUANTITY OF LUBRICANT:	48 QUARTS	5 QUARTS

RECOMMENDED LUBRICANT: OXIDATION & CORROSION INHIBITED TURBINE OIL
WITH VISCOSITY AT 100°F 150 SUS — 150 SUS
VISCOSITY AT 210°F 45 SUS — 45 SUS
THRUST BEARING RATED CAPACITY & RATED LIFE (EXTERNAL LOAD):
CONTINUOUS DOWN-THRUST: 10,000 LBS. OVER 4 YRS MIN. LIFE
CONTINUOUS UP-THRUST: ——— LBS. ——— LIFE
MAX MOMENTARY DOWN-THRUST: 15,000 LBS.
MAX MOMENTARY UP-THRUST: 3,000 LBS.
MINIMUM ALLOWABLE CONTINUOUS DOWN - THRUST TO PREVENT DAMAGE TO GUIDE BRG. 0 LBS.
MOMENTARY PERIODS OF UP-THRUST OR LIGHTER DOWN-THRUST ARE PERMISSIBLE.
THRUST BEARING COOLING WATER: ——— GPM (REQUIRED) ——— GPM (MAX) ——— PSI MAX. (INLET) ——— °F MAX. (INLET)
PRESSURE DROP ACROSS COIL ——— PSI FOR ——— FLOW
TOTAL AXIAL ENDPLAY: .005 INCHES

MOTOR ACCESSORY EQUIPMENT DATA

SPACE HEATERS: 120 VOLT 5.45 AMPS 655 WATTS (SINGLE-PHASE)
WINDING TEMP. DEVICE: (6) 100 OHM PLATINUM RESISTANCE TEMPERATURE DETECTORS

BEARING TEMP. DEVICE: (1) DUAL ELEMENT CHROMEL CONSTANTAN THERMOCOUPLE EACH BRG.

SYSTEM CRITICAL REED FREQUENCY CALCULATION DATA

IN ORDER TO AVOID EXCESSIVE VIBRATION IT IS NECESSARY THAT THE REED CRITICAL FREQUENCY (CPM) OF THE MOTOR-PUMP SYSTEM BE NUMERICALLY AT LEAST 25% ABOVE OR BELOW MOTOR OPERATING SPEED (RPM). DESIGN OF COMPLETE SYSTEM (MOTOR, PUMP, FOUNDATIONS & PIPING) MUST PROVIDE FOR THIS. MOTOR DATA FOR SYSTEM CRITICAL CALCULATIONS ARE BELOW. REED CRITICAL FREQUENCY AND DEFLECTION OF MOTOR AT CENTER OF GRAVITY (C.G.) ARE SHOWN FOR MOTOR BOLTED TO A RIGID MASS AND CONSIDERED AS A HORIZONTAL CANTILEVER BEAM. DEFLECTION OF MOTOR AT C.G. IS THAT CAUSED BY WEIGHT OF MOTOR ONLY, AT STANDSTILL.

MOTOR WEIGHT	7200	LBS.
DIST. FROM MOTOR BASE TO C.G.	33	INCHES
MOTOR REED CRITICAL FREQ.	2230	CPM
DEFLECTION OF MOTOR AT C.G.	.0071	INCHES
SUGGESTED SYSTEM REED CRITICAL FREQ.	1125	CPM

PROPOSED DEPARTURES FROM SPECIFICATIONS

6600-2-M2011-6-6

REVISIONS

3 — CH. T. DOWN. THRUST ... 2100 LBS.
1 — ... 10 OHM, ADDED ... SERVICE, ADDED SPACE HEATER ... LEADS.
2 — ADD. INSTRUMENT TAG NOS. ADD "DUAL ELEMENT" TO BRG. T/C. LOWER BRG. WAS 228-S. ADD 2P4A, B&C & ADD "NUCLEAR"

PRINTS TO: 15, 8, 3, 28, 2

234C788DF
REV NO. 3

3/25/94

VMPS

ATTACHMENT 13

SERVICE WATER PUMP ACCELERATION CALCULATION

Motor & Pump $WK^2 = 994 lb\text{-}ft^2$ (Per Attachments 12 & 15)
RPM (Synchronous) = 900 (Per Attachments 11 & 15)

$$NT_i = \frac{(MT_i + MT_{i-1})}{2} - \frac{(LT_i + LT_{i-1})}{2}$$

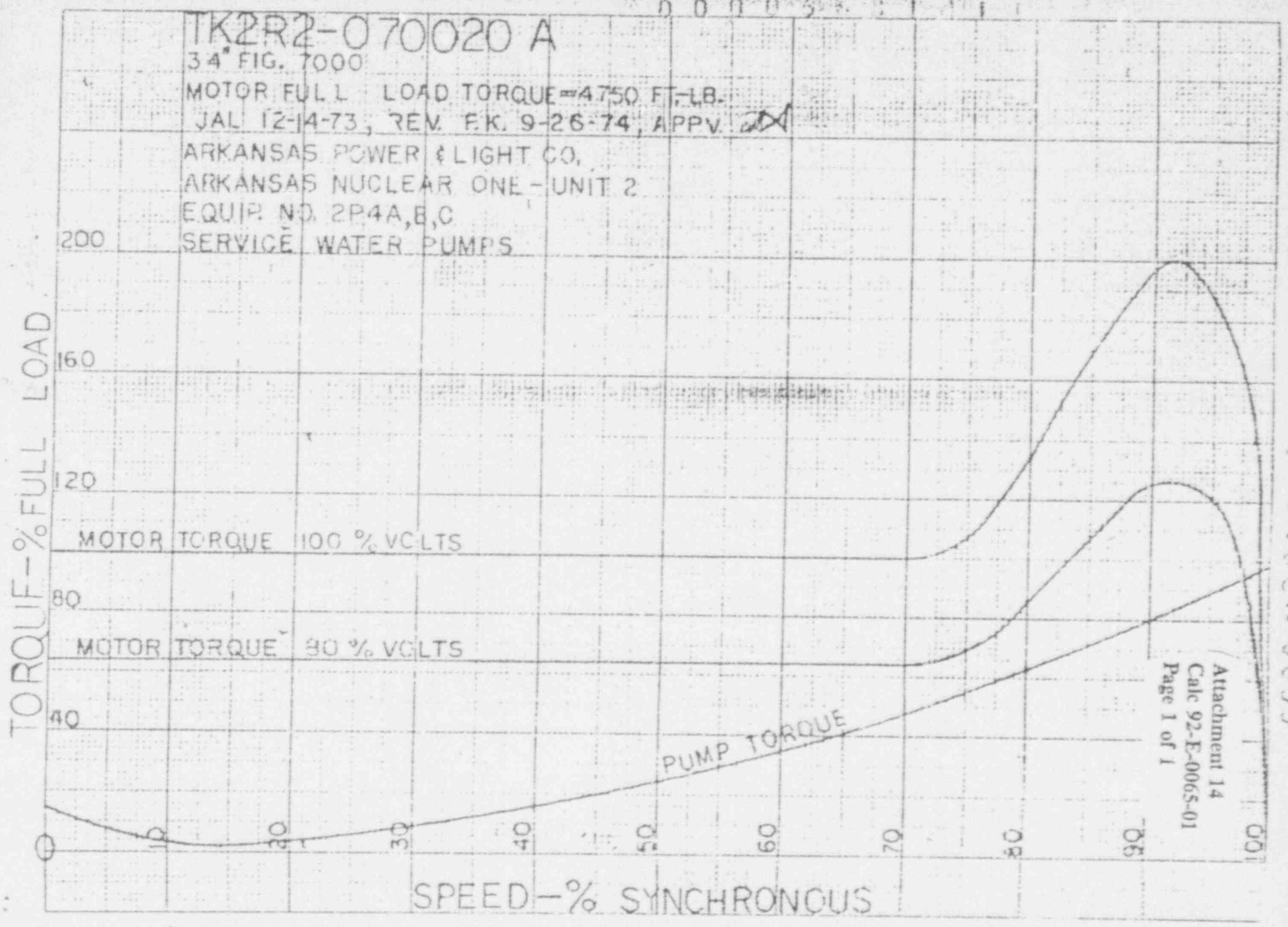
(Per Reference 2.6, pages 6-38 thru 6-39)

$$TIME_i = \frac{(WK^2 \times (RPM_i - RPM_{i-1}))}{(308 \times NT_i)}$$

(Per Reference 2.6, page 6-38)

% SYNCH. SPEED	MOTOR[1] TORQUE (MT)	LOAD[1] TORQUE (LT)	NET TORQUE (NT)	TIME (SECONDS)
0	3040	665	------	----------
5	3040	285	2562	0.056618
10	3040	143	2826	0.051389
15	3040	71	2933	0.049514
20	3040	143	2933	0.049514
25	3040	261	2838	0.051172
30	3040	380	2719.5	0.053402
35	3040	523	2588.5	0.056104
40	3040	760	2398.5	0.060549
45	3040	903	2208.5	0.065758
50	3040	1140	2018.5	0.071948
55	3040	1378	1781	0.081542
60	3040	1615	1543.5	0.094089
65	3040	1900	1282.5	0.113237
70	3040	2233	973.5	0.149180
75	3268	2613	731	0.198669
80	4104	2945	907	0.160118
85	5092	3420	1415.5	0.102597
90	5928	3800	1900	0.076435
95	5700	4180	1824	0.079620
98	4560	4560	760	0.103187
				Total 1.724642

1. Per Attachment 14



Attachment 14
Calc 92-E-0065-01
Page 1 of 1

Attachment 15
Calc 92-E-0065-01
Page 1 of 1

Service	SERVICE WATER
Req'n. No.	
Plant	
Spec. No.	
Location	
P.O. No.	
Drawin Ref.	
(Layout)	
Item No.	2P4A,B,C
No. Req'd	3
Cost Code	
Mfr	FAIRBANKS MORSE

No.	Item	Data
1	Liquid Pumped	RIVER WATER
2	Viscosity (SSU) / Vapor Pressure (PSIA)	NA / NA
3	Temperature (°F): Max. / Min. // Specific Gravity @ °F	120° / 35° / 1.00
4	Flow: Rating / Min. / Max. (GPM)	12,000 / 3200 / NA
5	Suction Pressure @ Flange / (Water Level) (PSIA)	NA
6	Discharge Pressure @ Flange (PSIA)	NA
7	Diff. Press.: Rating / Shutoff (Feet)	205' / 330'
8	Submergence: Available / Req'd @ ___ Elev. (Ft)	12'-5½" / 7'-6"
9	Type of Pump / Model / No. Stgs.	VERT TURBINE / 24"-7000 / 2
10	RPM / Rotation (View from Motor Facing Pump)	880 / CCW
11	Efficiency / BHP at Rating / BHP Max. @ ___ GPM	83 / 748 / 780
12	Impeller Diameter: Std. / Max. / Min.	21¼" / 22" / 18½"
13	Impeller: Eye Area / Periph. Vel.	219 sq in / 98 FPS
14	Working Press. Max./Hydrotest PSIG	175 PSIG / 346 PSIG
15	Clearance: Wear Ring / Bearing / Impeller	.024-.028 / .010-.012 / NA
16	Hydraulic Thrust: Rating / Max. / Up	9646 LBS / 14274 LBS / 3000 LBS (Max)
17	WK² / Speed-Torque: Rating / Speed-Torque Max. (Lb.Ft²)/(Lb.Ft.)	134 / 4465 / 4655
18	Suction: Size / Rating / Facing / Position	32" / BELL / NA / NA
19	Discharge: Size / Rating / Facing / Position	20" / 150# / R.F. / NA
20	Base Plate / Sole Plate	2½" x 54" Sq / 1½" x 54 Sq
21	Coupling: Type / Mfr. / Furn. By	SOLID ADJ. / F.M. / F.M.
22	Suction Strainer Mtl. / Splitter Mtl.	N.A. / N.A.
23	Bearing Lube: Type / GPM / Pressure / Max. Micron	WATER / N.A. / NA / N.A.
24	Shaft Seal: Type / Sealing Conn. / Cooling (GPM)	STD. PACKING / N.A. / N.A.
25	Coupling Guard Type (Horiz. only)	N.A.
26	Material: Case or Bowl	SA-216 GR. WCB.
27	(& Size) Barrel	NA
28	Shaft: Case or Bowl / (Dia.)	SA-479 TY 410 / 3 3/16"
29	Shaft: Sleeve: Brg. / Stuff. Box	N.A. / A-296 CA 15
30	Wear Ring: Case / Impeller	B-147 AL 865 / B-144 AL 937
31	Impellers / Liners	SS-144 AL 937 / NA
32	VERT. ONLY: Disch. Head / Column (Dia. x Thickness)	SA-53 GR B. SA-106 GR B SA-516 GR 70
33	VERT. ONLY: Shaft Encl. Tube / (Dia. x Thickness)	N.A. / N.A.
34	VERT. ONLY: Lineshaft / (Dia.) / (Brg. Spacing)	SA-479 TY 410 / 3 3/16" / 120"
35	VERT. ONLY: Sleeve Bearing: Bottom / Bowl / Lineshaft	B-144 AL 937 / B-144 AL 937 / RUBBER
36	Driver: Type (Motor—Turbine) (Solid—Hollow) / RPM / HP	MOTOR / SOLID / 900 / 800
37	Furn. By / Weight / Dwg. Ref. / Mfr.	FM / 7200# / 1234C789 / G.E.
38	Bearing Description / Thrust Rating	BALL BRG. / 10,000#
39	Lubrication: Thrust / Radial / Cooling	OIL / OIL / NA
40	Drawing No.: Outline / Sectional / Performance Curve	SK2R2-070020 / 5MD-4864 / SK2S2-070020
41	Net Weight: Pump / Removable / Rotating Elem.	13,162# / NA / 1799#
42	Inspection: Std. / Nuc. Class I, II or III / ASME III or VIII	No / CLASS III / ASME III
43	Testing: Ultrasonic / Eddy Cur. / Mag. Part. / Liq. Pen. / Radio.	YES (1) / No / YES (2) / YES (2) / YES (3)
44	Hydrostatic / Witness // NPSH / Witness	YES / YES / NO / No
45	Performance / Witness / Field	YES / YES / YES (4)
46	Quality Assurance: Mfr. Std. / Documented	NO / YES
47	Seismic Design Req'st: Class I / Class II	CLASS I

FILL IN ALL BLANKS: IF NOT APPLICABLE MARK "NA" (4) By BECHTEL

NO.	DATE	REVISIONS
1	7/13/71	ISSUED FOR QUOTATIONS E.G.V.
0	6/17/71	Issued for Client Approval

NOTES:
(1) UT - SHAFT
(2) MT or PT OF WELDS IN FABRICATION
(3) RT - 10% OF WELDS IN FABRICATION AT RANDOM SELECTION

ORIGIN: BECHTEL

CENTRIFUGAL PUMP DATA SHEET

SERVICE WATER PUMPS 2P4A,B&C
ARKANSAS NUCLEAR ONE - UNIT 2
ARKANSAS POWER & LIGHT CO.

6600-2
DATA SHEET NUMBER

FORM M-307E
6600-M-2011-DST

REV. 1

Attachment 16
Calc 92-E-0065-01
Page 1 of 1

POOR ORIGINAL

Motor Tag Number	2P-7B				
SERVICE	Emerg. Feed.				
MANUFACTURER	Allis Chalmers				
TYPE	RG				
FRAME DESIGNATION	588 US				
HORSEPOWER OUTPUT	600				
TIME RATING/TEMP. RISE °C	cont / 80	/	/	/	/
RPM AT FULL LOAD	3575 3575				
VOLTAGE	4000				
FULL LOAD AMPS	77.5				
*ENCLOSURE	ODP				
VERTICAL OR HORIZONTAL	H				
BEARINGS (SLEEVE OR BALL)	sleeve				
TYPE OF LUBRICATION	oil				
INSULATION CLASS	B Power House				
ROTATION (VIEWED FROM END OPP. SHFT	either				
FULL LOAD TORQUE	8883				
STARTING TORQUE - % OF FULL LOAD	75%				
EFFICIENCY - 100% LOAD	93.5				
- 75% LOAD	93.5				
- 50% LOAD	92				
SERVICE FACTOR	1.0				
IS THERMAL PROTECTION PROVIDED	stator RTD's				
WEIGHT	4200				
PHASE	3				
FREQUENCY	60				
LOCKED ROTOR CURRENT	546				
POWERFACTOR - 100% LOAD	89				
- 75% LOAD	89				
- 50% LOAD	84				
NEMA DESIGN LETTER					
SECONDARY AMPS @ FULL LOAD					
SECONDARY VOLTAGE					
SECONDARY OHMS					
BREAKDOWN OR PULLOUT TORQUE - %	200%				
RATED FIELD CURRENT					
RATED EXCITER VOLTAGE					
RATED POWER FACTOR					
PULL IN TORQUE - % OF FULL LOAD					
TYPE OF WINDING	form				
SHUNT FIELD CURRENT					
ALLOWABLE WK^2 OF LOAD	443 lb ft2				
SPACE HEATERS - WATTS/VOLTS	500 / 115	/	/	/	/
TWO SPEED MOTORS - NO OF WINDINGS					
TORQUE					
THRUST BEARING CAPACITY - UP (LBS)					
CAPACITY - DOWN (LBS)					

*ENCLOSURE; DRIPPROOF (DP), SPLASHPROOF (SP), WEATHER PROTECTED (WP), TOTALLY ENCLOSED NON-VENTILATED (TENV), TOTALLY ENCLOSED FAN COOLED (TEFC), TOTALLY ENCLOSED PIPE VENTILATED (TEPV) ETC., EXPLOSIONPROOF XP, TO INDICATE GUARDED ADD "G".

ELECTRIC MOTOR DATA SHEET
2PM7B
Emergency Feedwater Pump Motor
Arkansas Power and Light Company
Arkansas Nuclear One - Unit 2

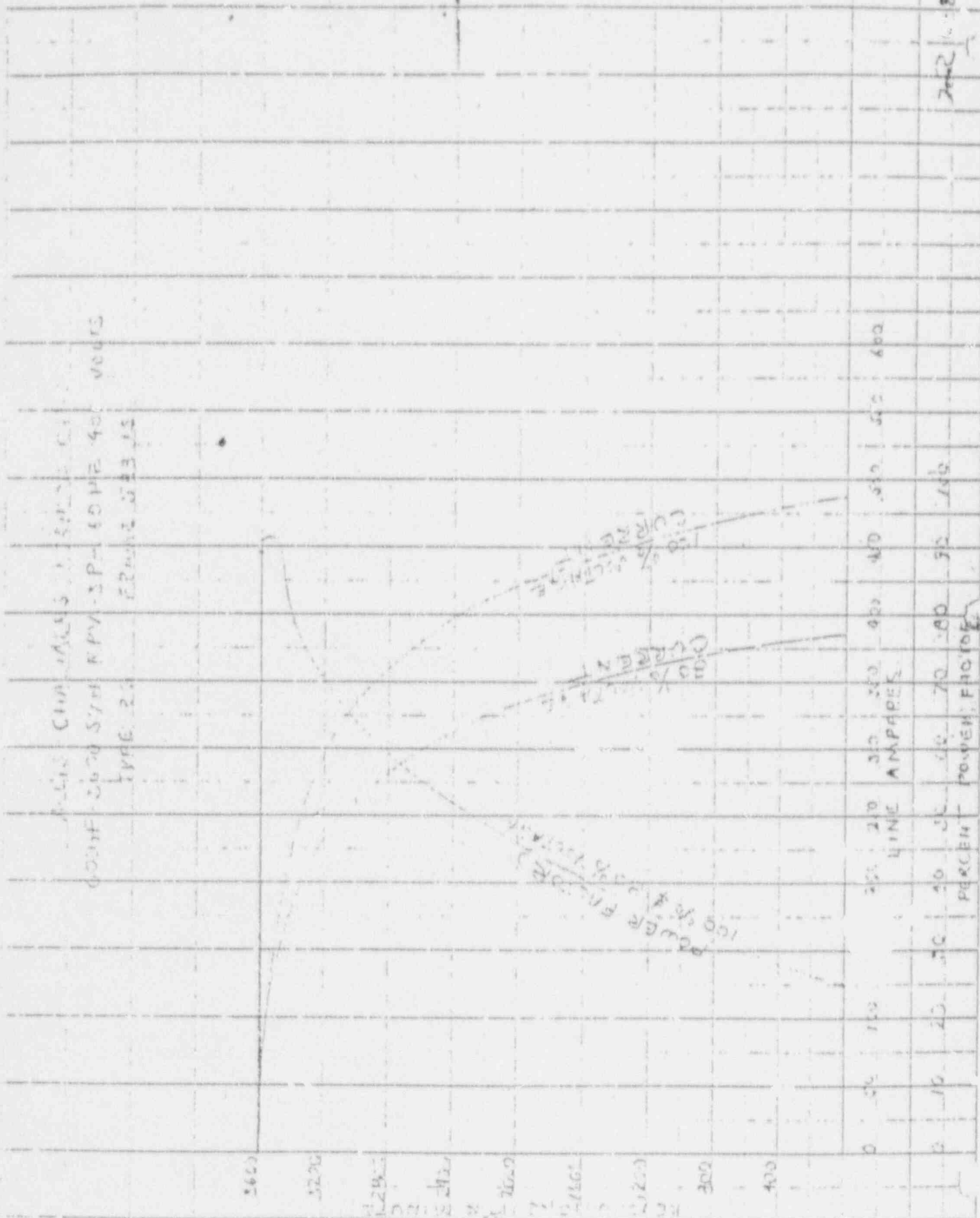
6600-M-2018-3

OCT 2 1970

0001474230

Issued for Purchase

REVOLUTIONS PER MINUTE
0
400
800
1200
1600
2000
2400
2800
3200
3600
0
4
8
12
16
20
24
28
32
36
40
44
48
52
TIME IN SECONDS
100% VOLTAGE
80% VOLTAGE
ACCELERATION TIME
TYPE B


LINE AMPERES
PERCENT POWER FACTOR

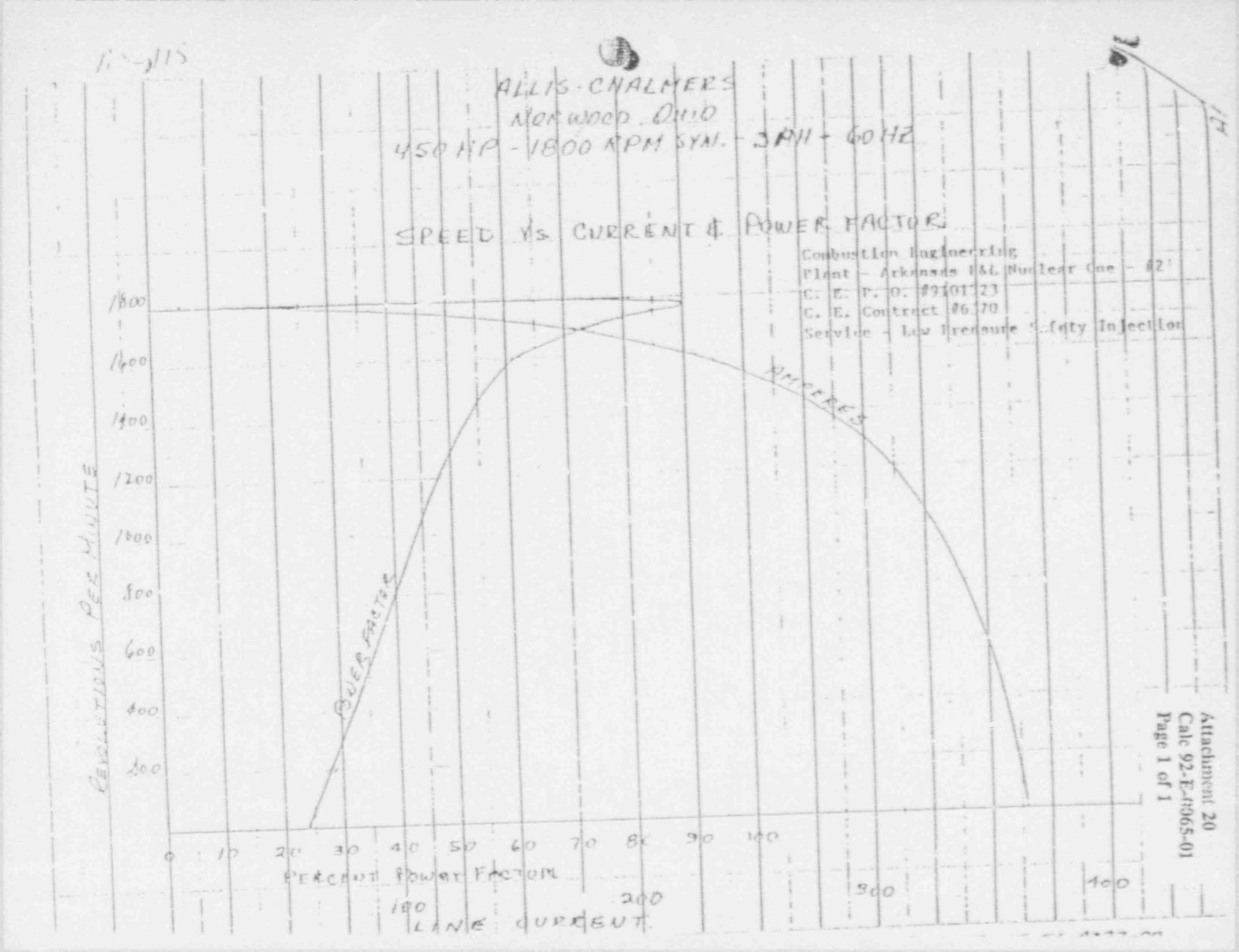
				1-5117-49200	
SERVICE	Cont. Spray			Cont. Spray	
MANUFACTURER				Allis-Chalmers	
TYPE	AC Induction			GV	
FRAME DESIGNATION				580BSB	
HORSEPOWER OUTPUT				450	
TIME RATING/TEMP. RISE °C	/	/	/	Cont.90	at 1.1
RPM AT FULL LOAD				1780	
VOLTAGE	4000			4000	
FULL LOAD AMPS				57.5	
*ENCLOSURE	DP			DP	
VERTICAL OR HORIZONTAL				VERTICAL	
BEARINGS (SLEEVE OR BALL)				BALL	
TYPE OF LUBRICATION				OIL THRUST/gre	
INSULATION CLASS				B-PH	qui
ROTATION (VIEWED FROM END OPP. SHFT)				EITHER	
FULL LOAD TORQUE lb.ft.				1325	
STARTING TORQUE-% OF FULL LOAD				100	
EFFICIENCY - 100% LOAD				93.5	
- 75% LOAD				93.5	
- 50% LOAD				92.5	
SERVICE FACTOR	1.15			1.15	
IS THERMAL PROTECTION PROVIDED	Yes			YES	
WEIGHT				4500#	
PHASE				3	
FREQUENCY				60	
LOCKED ROTOR CURRENT				374	
POWERFACTOR - 100% LOAD				89.5	
- 75% LOAD				88.5	
- 50% LOAD				84.5	
NEMA DESIGN LETTER				N/A	
SECONDARY AMPS @ FULL LOAD				--	
SECONDARY VOLTAGE				--	
SECONDARY OHMS				--	
BREAKDOWN OR PULLOUT TORQUE-%				200	
RATED FIELD CURRENT				--	
RATED EXCITER VOLTAGE				--	
RATED POWER FACTOR				--	
PULL IN TORQUE - % OF FULL LOAD				--	
TYPE OF WINDING				--	
SHUNT FIELD CURRENT				--	
ALLOWABLE WK^2 OF LOAD lb.ft²				120	
SPACE HEATERS - WATTS/VOLTS	/	/	/	500/120	/
TWO SPEED MOTORS-NO OF WINDINGS				--	
TORQUE				--	
THRUST BEARING CAPACITY-UP (LBS)				2500	
CAPACITY-DOWN (LBS)				2500	

*ENCLOSURE: DRIPPROOF (DP), SPLASHPROOF (SP), WEATHER PROTECTED (WP), TOTALLY ENCLOSED NON-VENTILATED (TENV), TOTALLY ENCLOSED FAN COOLED (TEFC), TOTALLY ENCLOSED PIPE VENTILATED (TEPV) ETC., EXPLOSIONPROOF XP, TO INDICATE GUARDED ADD "G".

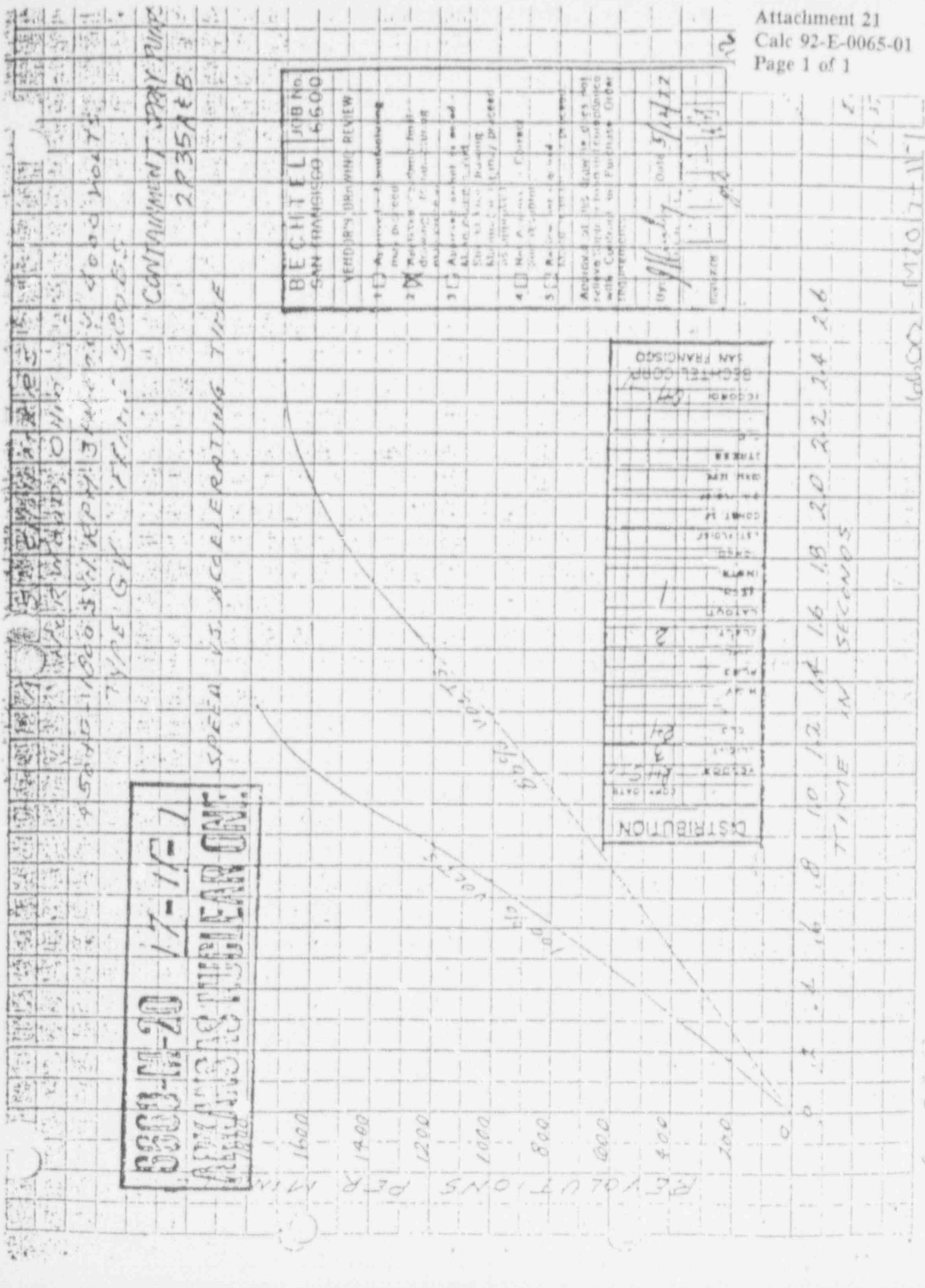
REV.	DESCRIPTION
4	REVISED AS INDICATED
	Issued for Quotation

ELECTRIC MOTOR DATA SHEET
ARKANSAS POWER & LIGHT COMPANY
ARKANSAS NUCLEAR ONE - UNIT 2
EQUIP. NOs. 2P35A & 2P35B

JOB No 6600-02
6600-M-2017
REV. 4



Attachment 20
Calc 92-E-0065-01
Page 1 of 1


6600-M-20 17-1F-1
ARKANSAS NUCLEAR ONE
4000 VOLTS
TYPE GY
CONTAINMENT SPRAY PUMP
2P35A&B
SPEED VS. ACCELERATING TIME
REVOLUTIONS PER MIN
1600
1400
1200
1000
800
600
400
200
0
100% VOLTS
80% VOLTS
0
.2
.4
.6
.8
1.0
1.2
1.4
1.6
1.8
2.0
2.2
2.4
2.6
TIME IN SECONDS
BECHTEL
SAN FRANCISCO
JOB No.
6600
VENDOR'S DRAWING REVIEW
DISTRIBUTION
BECHTEL CORP
SAN FRANCISCO

SYSTEM: [illegible]

SERVICE: LOW PRESSURE SAFETY INJECTION PUMPS

DESCRIPTION: Squirrel-cage, induction motor for 4000 volts, 3 phase, 60 cycle service. Enclosure to be drip-proof, insulation to be Class B NEMA, and service factor 1.15.

QUANTITY: 4

ACCESSORIES: Space heater, 120 vac, single phase.
Main terminal box, splice compartment size larger than normal.
Separate space heater terminal box.
Separate RTD terminal box for 1 inch conduit.
200 ohm RTD temperature detectors in sleeve bearings and stator.
Grounding pads on conduit side (drive end), tapped for 5/8" - 11 bronze bolts.

SPECIAL REQUIREMENTS:
Motor shall accelerate to rated RPM at rated load on 3000 volts
Acceleration time, 3000 volts, 6 secs. rated volts 4 secs.
Routine MEA tests.
Curves: Speed-Torque/Current/Power factor

DATA BY SUPPLIER

Motor Manufacturer	Allis-Chalmers	Frame No.	580BS-8	H. P.	450
Service factor	1.15	RPM	1800/1780	Volts	4000
Amps - full load	58.5	locked rotor	364		
Torque: starting % F.L.	100	Pull-out % F.L.	N/A	Breakdown % F.L.	
Losses: F.L. %	7%	3/4 load % 7.0	1/2 load % 8.0	No Load	10400W
Power factor: F.L. %	89.5	3/4 load % 88.5	1/2 load % 84.5	Start	28.5
Temp. rise by res.	90 at 1.15 load		Safe locked rotor time		15 secs. @
NEMA design	N/A	Enclosure	ODP		
Space htr. - watts	500W				
Bearing type	AF	Anti-Friction			
Motor weight	4500#				
Permissable starts	2 cold, 1 hot				
Motor WK²	200 # Ft.²				
Terminal box size	Dwg. 51-751-405				
Insulation	Class B				
Direction of rotation	CCW looking down on motor				

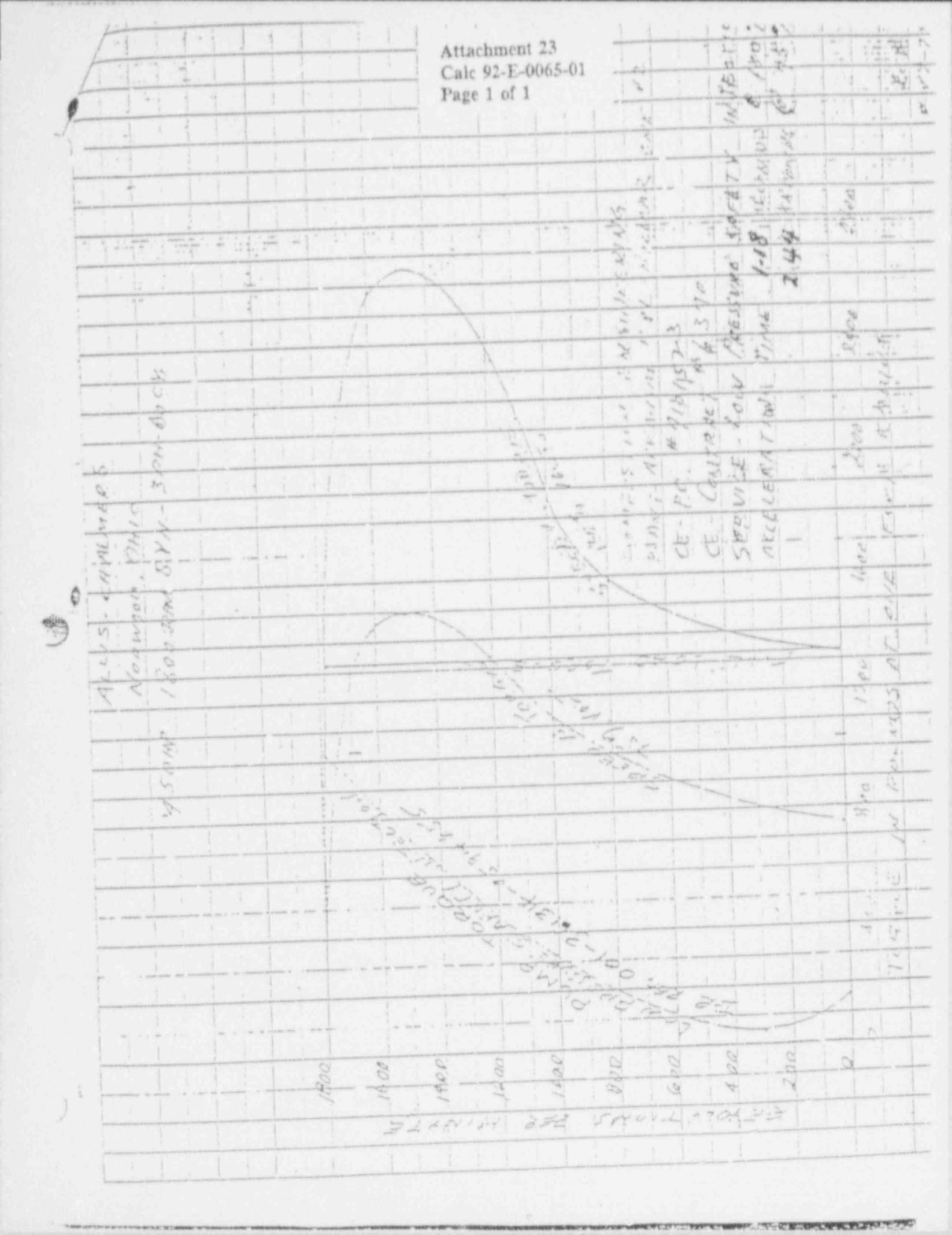
C.E.I. P.O. No. 9101523
C.E.I. Contract No. 6370
I-K Order No. 001-36134
Customer: Arkansas P&L
Component Code: 31 15-54-4322-
Plant Site: Ark. Nuclear One-
LPSI Pumps

MOTOR DATA SHEET

SHEET 2

Attachment 22
Calc 92-E-0065-01
Page 1 of 1

Attachment 23
Calc 92-E-0065-01
Page 1 of 1



CUSTOMER: Johnson Rod Co

CUSTOMER'S ORDER NO.: C594-657N

SERIAL NO.: 1-5117-4-7924-1

TYPE: GK

HORSEPOWER: 500

VOLTS: 4000 MOTOR

PHASE: 3 BORROWED OR

CYCLES: 60 BOUGHT FROM

FRAME: 580 C 5.8 L PAL

SYNC. R.P.M.: 1800 TO REPLACE

F.L. R.P.M.: 1780 2PM 60 B

EFFICIENCY: 1/2 92.5

3/4 93.5

F.L. 93.5

POWER FACTOR: 1/2 84.5

3/4 88.5

F.L. 89.5

F.L. AMPS: 64

L.R. AMPS: 410

MAX. LOAD WK-SQ.FT.: 1480

STARTING WK-SQ.FT.: 1480

PULLOUT WK-SQ.FT.:

INSULATION: B

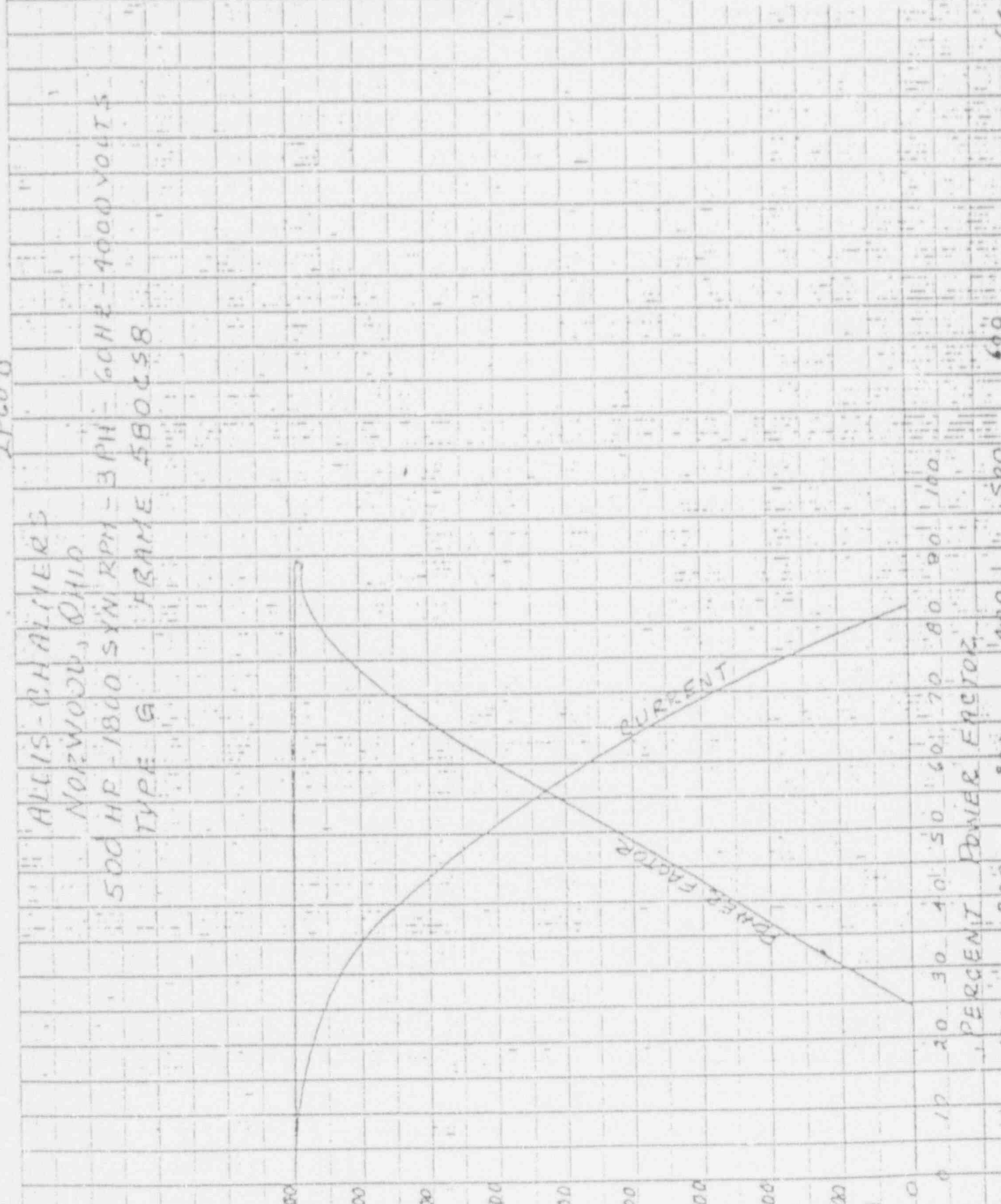
SERVICE FACTOR: 1.15

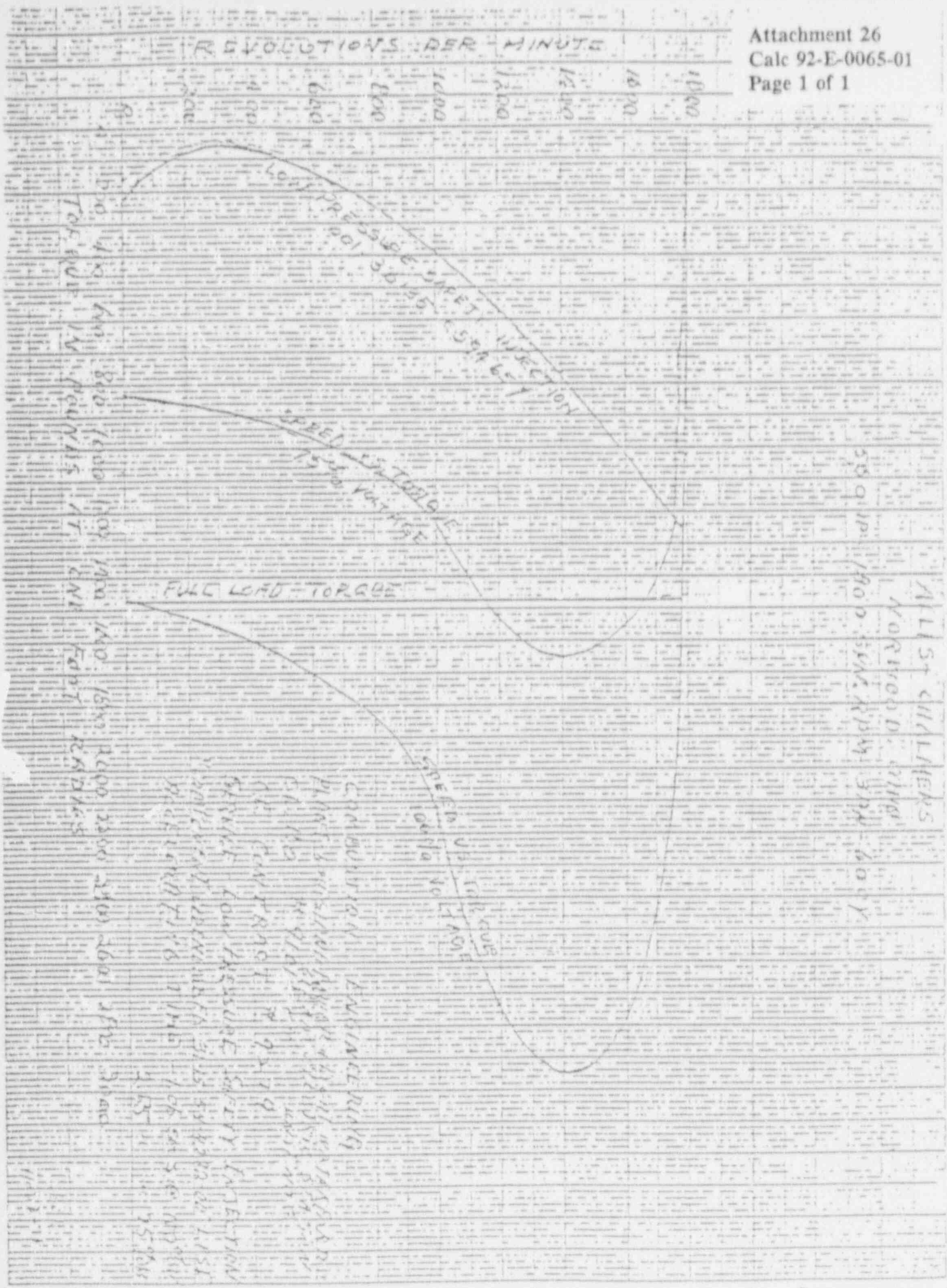
AMBIENT TEMP.: 40°C

CERTIFIED PRINT
CUSTOMER INITIATED
CHANGES MAY AFFECT
PRICE AND DELIVERY

8-5117-90203 REF. N000136135
COMBUSTION ENGINEERING
PLANT-LOUISIANA POWER & LIGHT WATERFORD STEAM ELECTRIC STA UNIT NO 3
C.E. PO # 9101524 C.E. CONTRACT P9279
SERVICE-LOW PRESSURE SAFETY INJECTION
"COMPONENT CODE NUMBER 31 15-54-4322-00" LPSI

Attachment 25
Calc 92-E-0065-01
Page 1 of 1





A-8518

51-2350-92L

SPACE HEATERS

100 OHM)
GROUND SCR.

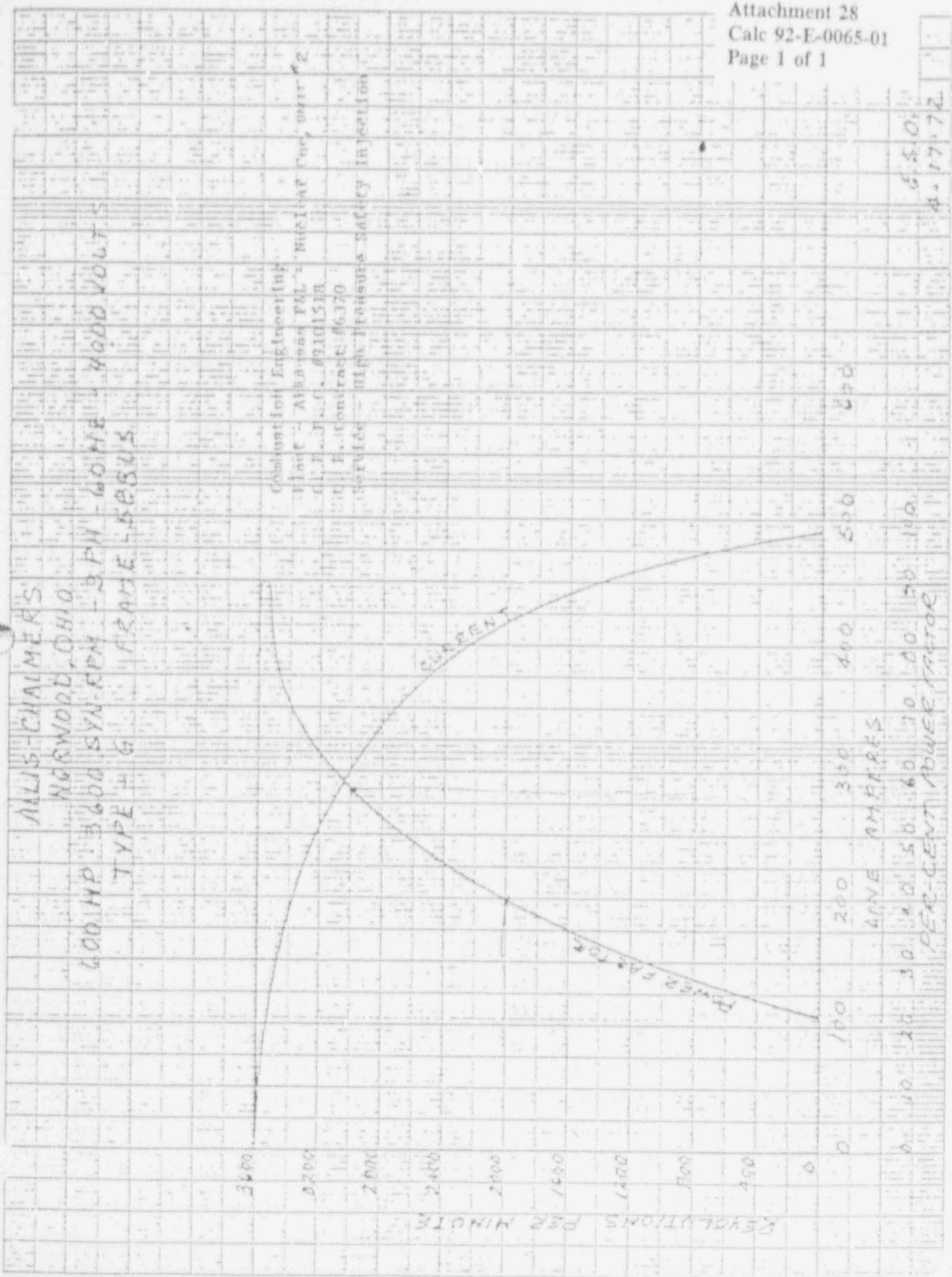
ALLIS-CHALMERS

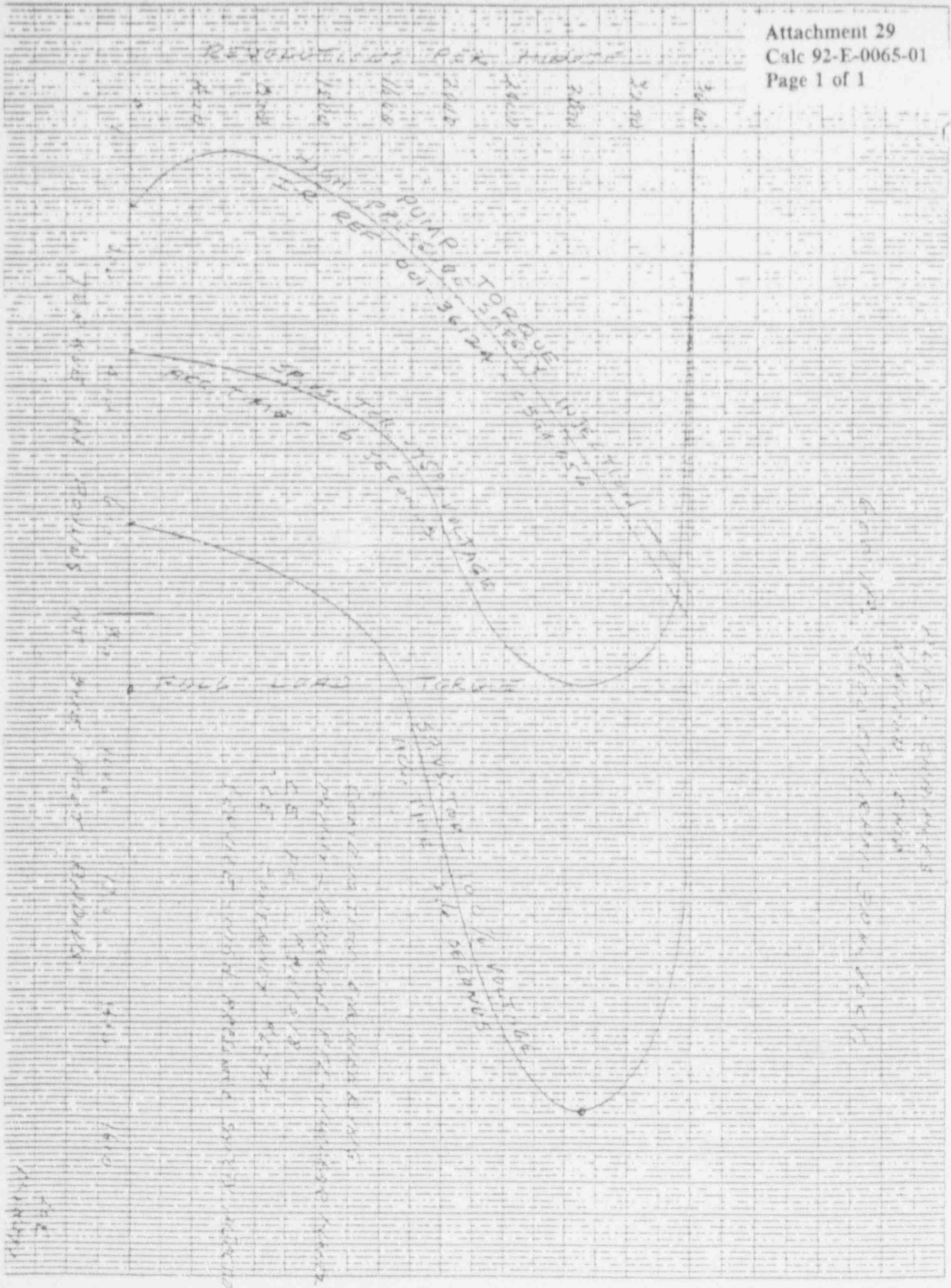
ELECTRICAL MOTOR DATA

UNIT MFR.:	Ingersoll Rand Co
CUSTOMER'S ORDER #:	C 594654 K
SERIAL NO.:	1-5114-47923-1
TYPE:	G
HORSEPOWER:	600
VOLTS	4000
PHASE:	3
HERTZ:	60
FRAME:	588US
SYN. R.P.M.:	3600
F.L. R.P.M.:	3575
EFFICIENCY: 1/2	94.6
3/4	95.5
F.L.	95
POWER FACTOR: 1/2	85.5
3/4	89
F.L.	90
F.L. AMPS:	75.5
L.R. AMPS.	490
[illegible]	885 full load torque lb ft
[illegible]	644 Starting torque lb-ft
[illegible]	1770 pull out torque lb ft
INSULATION:	F
SERVICE FACTOR:	1.15
AMBIENT TEMP.:	40°C

CERTIFIED PRINT
CUSTOMER INITIATED
CHANGES MAY AFFECT
PRICE AND DELIVERY

B-51AS-90205 REF. NO. 00176724
COMBUSTION ENGINEERING
PLANT-ARKANSAS P&L ONE UNIT #2
C.E. P.O. #910518 C.E. CONTRACT #6370
SERVICE-HIGH PRESSURE SAFETY INJECTION
COMPONENT CODE NBR. 31 15 54 4222-00


-8701
ALLIS-CHALMERS
NORWOOD, OHIO
600 HP 3600 SYN-RPM - 3PH - 60HZ - 4000 VOLTS
TYPE - G FRAME-5856S
Combustion Engineering
Plant - Arkansas P&L - Nuclear One, unit #2
C. E. P. O. #9101518
C. E. Contract #6370
Service - High Pressure Safety Injection
CURRENT
POWER FACTOR
REVOLUTIONS PER MINUTE
3600
3200
2800
2400
2000
1600
1200
800
400
0
0 100 200 300 400 500 600
LINE AMPERES
0 10 20 30 40 50 60 70 80 90 100
PER-CENT POWER FACTOR
G.S.O.
4-17-72



A-8520

TABLE 1

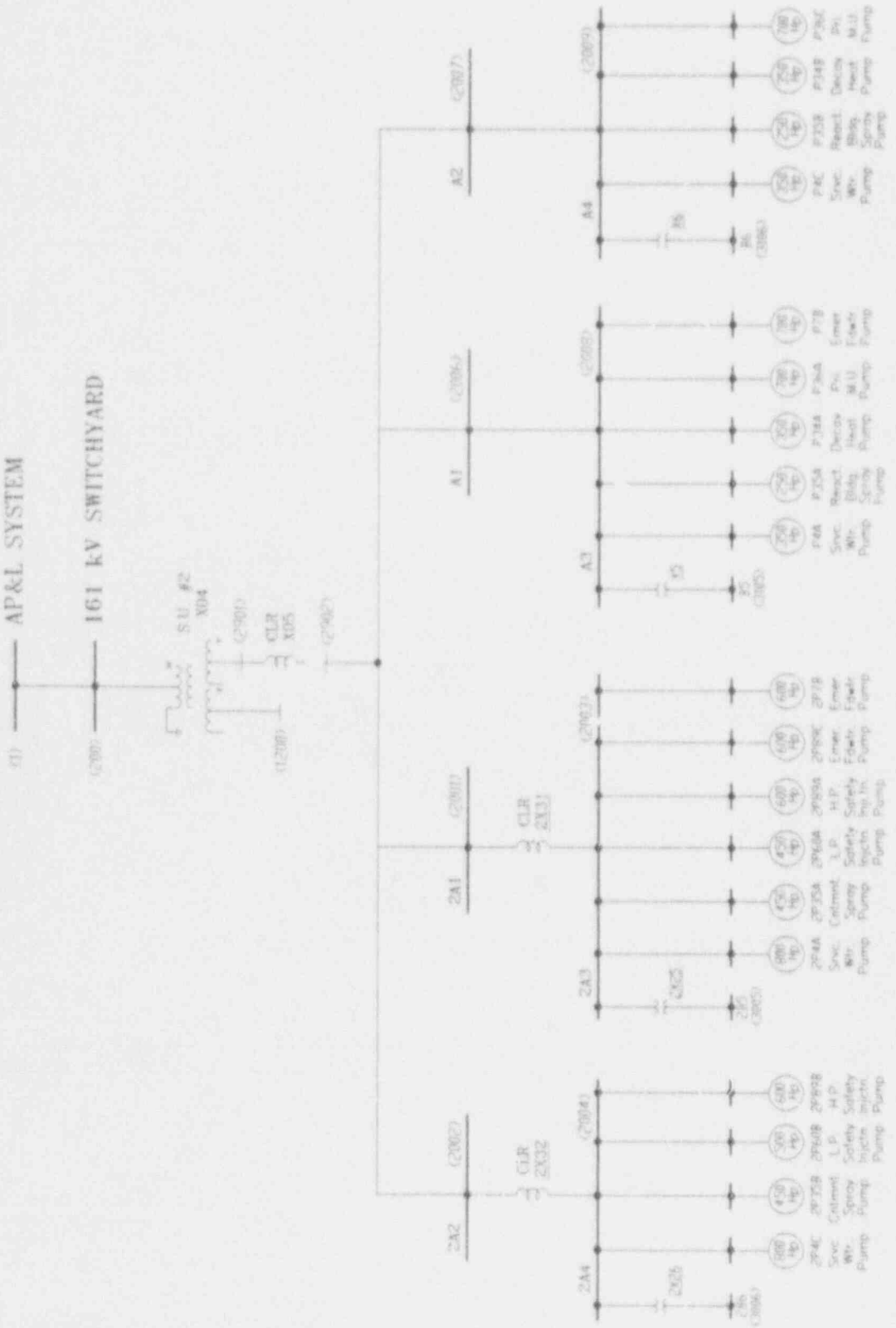
DATA FOR ANO 161 kV BUS

ASSUMED CONDITION	3 PHASE FAULT MVA (MVA)	POSITIVE SEQ. THEVENIN IMPEDENCE (pu) (1)	VOLTAGE V thevenin (pu) (2)
1. Normal Condition (3)	4664.0	0.00102 + j0.02142	1.0290
2. Outage Condition (4)	4111.0	0.00152 + j0.02428	1.0375
3. ANO Units and 500/161 kV auto out of service.	1413.0	0.01007 + j0.07005	1.0203
4. ANO Units, 500/161 kV auto, and ANO Russellville East 161 kV line out of service.	608.0	0.02395 + j0.16273	1.0441
5. ANO Units, 500/161 kV auto, and Dardanelle Dam out of service.	1316.0	0.01201 + j0.07492	0.9912

(1) Thevenin impedance values given in per unit on 100 MVA base.
(2) Voltage at the ANO 161 kV bus for the assumed condition using 1992 summer peak conditions with no ANO plant load modeled on the ANO 161 kV bus. The two proposed 161 kV capacitor banks (ANO & Russ. E.) and autotransformer tap change at Mayflower is assumed in service.
(3) Normal conditions assume ANO units are on line and transmission facilities are in service.
(4) Outage conditions assume ANO units are off line and transmission facilities are in service.

ATTACHMENT 31

SYSTEM NETWORK DIAGRAM



SPECIFICATIONS

Input Circuit:

Rating: 160V, 50/60 Hz. continuous.
300V, 10 seconds.

Burden: 1.2 VA, 1.0 pf at 120 volts.

Taps: available models include:

Types 27, -27D, -27H :	60, 70, 80, 90, 100, 110v
Types 27D, -27H:	30, 35, 40, 45, 50, 55v
	15, 18, 21, 24, 27, 30v
Types 59D, -59H:	100, 110, 120, 130, 140, 150v
	60, 65, 70, 75, 80, 90v

Differential between Operate and Reset Voltages:
Type 27: less than 0.5 percent.
Types 27D, -27H, ITE-59D, -59H: approximately 3 percent.

Operating Time: See Time-Voltage characteristic curves that follow.

Output Circuit:

Each contact @ 125 Vdc: 30 ampere tripping duty.
5 ampere continuous.
0.3 ampere break.

Operating Temperature Range: -30 to +70 deg. C.

Control Power:

Models available for 48/125 vdc @ 0.08 A max.
48/110 vdc @ 0.08 A max.
24/ 32 vdc @ 0.08 A max.
120 vac 50/60 Hz. @ 0.08 A.

Allowable variation:	24vdc nominal:	19- 29 vdc
	32vdc "	25- 38
	48vdc "	38- 58
	110vdc "	88-125
	125vdc "	100-140
	120vac "	95-135 vac

Tolerances:

Operating Voltage:	+/- 5%	These tolerances are based on the printed dial markings. By using the calibration procedures given later in this book, the relay may be set precisely to the desired values of operating voltage and delay with excellent repeatability.
Operating Time:	+/-10%	

Repeatability: variation in operating voltage for a 10 volt variation in control voltage: 0.2 volt, typical.

variation in operating voltage over the temperature range 20-40 deg C: 0.5 volt, typical.

Dielectric Strength:

1500 vac, 50/60 Hz., all circuits to ground.

Seismic Capability:

More that 6g ZPA biaxial broadband multifrequency vibration without damage or malfunction. (ANSI C37.98-1978)

UNIT 1 LOOP LOADS

*A3 LOAD	HP	PF	RUNNING	
			KW	KVAR
Service Water Pump P4A	350	88.5	280.9	147.8
Primary Make-Up P36A	700	91.8	570.0	246.2
Emergency Feedwater Pump P7B	700	92.9	550.0	219.1
Total			**1400.9**	**613.1**

*B5 LOAD	HP	EFF	PF	RUNNING	
				KW	KVAR
Pressurizer Proportional Heaters Group #13	-	100	100	84.0	0
Inverter Y11	-	92.0	85.0	7.0	4.3
Piping H/T Xfrm XL15	-	95.0	95.0	30.0	9.9
Battery Charger D03	-	85.0	70.0	36.0	36.7
Instrument AC Xfmr X6A	-	95.0	95.0	30.0	9.9
Inverter Y13	-	92.0	85.0	7.0	4.3
*Computer Power Supply Y26	-	92.0	90.0	9.0	4.4
*Instrument Air Dryer M1	-	100	100	2.4	0
*Cr. Air Em. Unit CLR VUC9	-	**	**	15.0	0
*Power Supply Inverter Y25	-	92.0	85.0	7.0	4.3
Instrument AC Panel Y3	-	96.9	75.0	4.5	4.0
*AB Lighting Panel 1PC	-	100	100	33.0	0
*Pressurizer Proportional Htr. Rub. 14&15	-	100	100	84.0	0
*Lighting Xfmr XL7	-	96.9	75.0	23.1	20.4
EDG Room Exhaust Fan VEF24A	7.5	84.5	80.5	6.6	4.9
EDG Room Exhaust Fan VEF24B	7.5	84.5	80.5	6.6	4.9
Diesel Generator 1 Oil Circulating Pump PM106A3	0.75	72.0	69.0	0.8	0.8
Elect. Room Emergency Chiller VCH4B	40.0	90.0	85.0	33.1	20.5
Diesel Generator 1 Soak Back Pump PM106A2	1.0	72.0	69.0	1.0	1.0
Diesel Fuel Xfer. Pump PM16A	0.5	70.0	58.0	0.5	0.7
PMU Pump Auxiliary Lube Oil Pump P64A	0.5	70.0	58.0	0.5	0.7
Relay Room Unit Clr VUC4A	0.75	72.0	66.0	0.8	0.9
S DC Room Unit Clr VUC14C	1.5	77.5	69.5	1.4	1.4
S Electrical Room Unit Clr VUC14D	0.5	75.5	61.0	0.5	0.6
Battery Room Exhaust Fan VEPM33	1.0	78.5	73.0	1.0	0.9

*B5 LOAD	HP	EFF	PF	RUNNING	
				KW	KVAR
Pr.u Pump Room Clr VUC7A	7.5	84.0	78.5	6.7	5.3
SW System Radiation Monitor RE3814	3.0	78.6	88.8	2.8	1.4
Switchgear Room Unit Clr VUC2B	2.0	84.0	85.7	1.8	1.1
*Electrical Equipment Room Evap. VUC13B	0.75	72.0	69.0	0.8	0.8
*Electrical Equipment Room Evap. VUC13A	0.75	72.0	69.0	0.8	0.8
*Electrical Equipment Room Cond. VE1B	10.0	85.5	80.5	8.7	6.4
*Electrical Equipment Room Cond. VE1A	10.0	85.5	80.5	8.7	6.4
*AB Switchgear Room Clr VUCM2A	2.0	84.0	85.7	1.8	1.1
*AB Switchgear Room Clr VUCM2C	2.0	84.0	85.7	1.8	1.1
*RCP BU B/S Lube Oil Pump PM82A	0.5	70.0	58.0	0.5	0.7
*RCP BU B/S Lube Oil Pump PM82B	0.5	70.0	58.0	0.5	0.7
*RCP BU B/S Lube Oil Pump PM82C	0.5	70.0	58.0	0.5	0.7
*RCP BU B/S Lube Oil Pump PM82D	0.5	70.0	58.0	0.5	0.7
*CR Air EM Unit CLR VUCM9	18	**	**	15.5	12.1
Pent. Room Exhaust Fan VEF38A	10.0	84.0	87.0	8.9	5.0
*PMU Pump Room Clr VUC7B	7.5	84.0	78.5	6.7	5.3
D/H System R/M RE3809	3.0	78.6	88.8	2.8	1.4
DHR Room Unit CLR VUCM1A	10.0	87.5	79.0	8.5	6.6
Reactor Building CLR Fan VSFM1B	125.0	92.0	88.0	82.6	44.6
Reactor Building CLR Fan VSFM1A	125.0	92.0	88.0	82.6	44.6
*Turbine Turning Gear KM6	50.0	90.7	86.0	41.1	24.4
*T/G Bearing Lift Oil Pump PM76	20.0	88.5	84.0	16.9	10.9
*T/G Emergency Bearing Oil Pump PM20	60.0	90.3	84.0	49.5	32.0
*Boric Acid Pump PM39A	2.0	83.0	88.0	1.8	1.0
*Boric Acid Pump PM39B	2.0	83.0	88.0	1.8	1.0
Dis Flume Rad. Monitor RE3618	3.0	80.0	91.5	2.8	1.2
Int. Clg. System R/M RE2236	3.0	78.6	88.8	2.8	1.4
Spent Fuel Pool Circulating Pump PM40A	40.0	87.8	85.3	34.0	20.8
Instrument Air Compressor CM2A	50.0	91.1	82.9	40.9	27.6
Control Room Chiller VCH2A	75.0	90.9	84.0	61.5	39.7
Total				921.4	442.3

*A4 LOAD	HP	PF	RUNNING	
			KW	KVAR
Service Water Pump P4C	350	88.5	280.9	147.8
Primary Make-Up P36C	700	91.8	570.0	246.2
Total			850.9	394.0

*B6 LOAD	HP	EFF	PF	RUNNING	
				KW	KVAR
Inverter Y22	-	92.0	85.0	6.0	3.7
Inverter Y28	-	-	85.0	3.0	1.9
Battery Charger D04	-	85.0	70.0	39.0	39.8
Instrument AC Xfmr. X6B	-	95.0	95.0	30.0	9.9
Pressurizer Proportional Heaters Group #14	-	100	100	84.0	0
inverter Y24	-	92.0	85.0	6.0	3.7
Piping Ht. Transformer XL16	-	95.0	95.0	30.0	9.9
Instrument AC Panel Y4	-	96.9	75.0	4.5	4.0
EDG Room Exhaust Fan VEF24C	7.5	84.5	80.5	6.6	4.9
EDG Room Exhaust Fan VEF24D	7.5	84.5	80.5	6.6	4.9
Diesel Generator 2 Oil Circulating Pump PM106B3	0.75	72.0	69.0	0.8	0.8
Emergency Chiller VCH4A	40.0	90.0	85.0	33.1	20.5
Diesel Generator 2 Soak Back Pump PM106B2	1.0	72.0	69.0	1.0	1.0
Diesel Fuel Xfer. Pump PM16B	0.5	70.0	58.0	0.5	0.7
Relay Room Unit Clr VUCM4B	0.75	72.0	66.0	0.8	0.9
N DC Room Unit Clr VUC14A	1.0	78.5	73.0	1.0	0.9
PMU Pump Auxiliary Lube Oil Pump PM64C	0.5	70.0	58.0	0.5	0.7
N EL Room Unit Clr VUC14B	0.5	75.5	61.0	0.5	0.6
PMU Pump Room Clr VUC7C	7.5	84.0	78.5	6.7	5.3
Battery Room Exhaust Fan VEFM34	1.0	78.5	73.0	0.9	0.9
SW System R/M RE3815	3.0	80.0	88.5	2.8	1.5
Switchgear Room Unit Clr VUC2D	2.0	84.0	85.7	1.8	1.1
DHR System R/M RE3810	3.0	78.6	88.8	2.8	1.4
DHR Room Unit CLR VUCM1C	10.0	87.5	79.0	8.5	6.6
Reactor Building CLR Fan VSFM1C	125.0	92.0	88.0	82.6	44.6
Reactor Building CLR Fan VSFM1D	125.0	92.0	88.0	82.6	44.6
Stack Rad Monitor RE7400	2.0	80.0	84.0	1.9	1.2
Instrument Air Compressor CM2B	50.0	91.1	82.9	40.9	27.6
Control Room Chiller VCH2B	75.0	90.9	84.0	61.5	39.7
Total				546.9	283.3

*Swing Loads

Note: Running Loads = (HP x 0.7456)/Eff.

** 2-7.5 Hp 78.5% pf
1-3.0 Hp 80.0% pf

▲ Obtained from Ref. 2.1 with the exception of Battery Room Exhaust Fans VEFM33 (1KW) & VEFM34 (0.9KW) and Electrical Equipment Room Evaps. VUC13A & VUC13B, 0.8KW each which are added since they could be running although very intermittently. Primary Makeup Pump Aux Lube Oil Pump PM64B, 0.5KW which is removed since it only runs, if the swing pump P36B is running. Load Center Transformer losses are also removed, since DAPPER calculates it and Control Room Emergency Heater/Cooler 2VUC27B-2 (58.4KW) is removed since it is only fed from Unit 1, if Unit 2 is in an outage (not MSLB).

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

JO# 00855618 JR# 871068 Work Center MNTC ATTACHMENT ____ OF ____
Work Desc CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER, DESIGN ENGINEERING. SEE JOB ORDER ATTACHMENT
Comp 2B-51A3 CKTBRK
Comp Desc 2X13, INSTRUMENTATION TRANSFORMER Loc RAB-374-C-3.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B51-A3.

   LEFT PHASE

   VOLTAGE 273 VAC CURRENT 8.2 AMPS POWER FACTOR 27.8

   MIDDLE PHASE

   VOLTAGE 271 VAC CURRENT 10.1 AMPS POWER FACTOR 6.2

   RIGHT PHASE

   VOLTAGE 270 VAC CURRENT 10.8 AMPS POWER FACTOR 31.9

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED.

REVIEWED AND AGREED TO BY Michael P. Baldwin DATE 11/11/91
ENGINEERING SIGNATURE

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

JO# 00855703 JR# 871069 Work Center MNTC ATTACHMENT ____ OF ____
Work Desc CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER, DESIGN ENGINEERING. SEE JOB ORDER ATTACHMENT
Comp 2B-51D1 CKTBRK
Comp Desc 2X-11 INSTRUMENTATION TRANSFORMER Loc RAB-374-C-3.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B51-D1.

   LEFT PHASE

   VOLTAGE 271 VAC CURRENT 16.2 AMPS POWER FACTOR 82.2

   MIDDLE PHASE

   VOLTAGE 272 VAC CURRENT 21.8 AMPS POWER FACTOR 83.1

   RIGHT PHASE

   VOLTAGE 271 VAC CURRENT 19.5 AMPS POWER FACTOR 63.5

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED. DOCUMENTED ON JOB ORDER 855618.

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

JO# 00855706 JR# 871065 Work Center MNTC ATTACHMENT ____ OF ____
Work Desc CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER, DESIGN ENGINEERING. SEE JOB ORDER ATTACHMENT
Comp 2B-54J1 CKTBRK
Comp Desc POWER & LIGHTING PANEL 2S01/21PC Loc RAB-372-E-5.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B54-J1.

   LEFT PHASE

   VOLTAGE 271 VAC CURRENT 62.6 AMPS POWER FACTOR 99.7

   MIDDLE PHASE

   VOLTAGE 272 VAC CURRENT 61.5 AMPS POWER FACTOR 99.9

   RIGHT PHASE

   VOLTAGE 271 VAC CURRENT 51.4 AMPS POWER FACTOR 100

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED. DOCUMENTED ON JOB ORDER 855618.

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

JO# 00855702 JR# 871066 Work Center MNTC ATTACHMENT ____ OF ____
Work Desc CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER, DESIGN ENGINEERING. SEE JOB ORDER ATTACHMENT
Comp 2B-61C6 CKTBRK
Comp Desc INSTRUMENTATION XFMR 2X14 Loc RAB-386-C-2.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B61-C6.

   LEFT PHASE

   VOLTAGE 272 VAC CURRENT 3.5 AMPS POWER FACTOR 15.6

   MIDDLE PHASE

   VOLTAGE 273 VAC CURRENT 4.3 AMPS POWER FACTOR 80.1

   RIGHT PHASE

   VOLTAGE 272 VAC CURRENT 5.8 AMPS POWER FACTOR 43

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED. DOCUMENTED ON JOB ORDER 855618.

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

JO# 00855704 JR# 871067 Work Center MNTC ATTACHMENT ____ OF ____
Work Des CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS
ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER,
DESIGN ENGINEERING. SEE JOB ORDER ATTACHMENT
Comp 2B-61D1 CKTBRK
Comp Desc INSTRUMENTATION XFMR 2X12 Loc RAB-386-C-2.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B61-D1.

   LEFT PHASE

   VOLTAGE_____VAC CURRENT_____AMPS POWER FACTOR_____

   MIDDLE PHASE

   VOLTAGE 274 VAC CURRENT 16.8 AMPS POWER FACTOR 61.3

   RIGHT PHASE

   VOLTAGE 272 VAC CURRENT 14.6 AMPS POWER FACTOR 63.2

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED. DOCUMENTED ON JOB ORDER 855618.

ARKANSAS NUCLEAR ONE
SIMS JOB ORDER ATTACHMENT
THIS DOCUMENT IS PART OF A JOB ORDER
PACKAGE AND IS NOT TO BE SEPARATED FROM IT

ATTACHMENT ____ OF ____

JO# 00[illegible]5705 JR# 871062 Work Center MNTC
Work Desc CRAFT IS TO TAKE VOLTAGE, CURRENT, AND POWER FACTOR READINGS ON EACH LOAD PHASE, AND SUPPLY RESULTS TO BRAD RISNER, DESIGN ENGINEERING.
SEE JOB ORDER ATTACHMENT
Comp 2B-64D2
Comp Desc 43LA, 208/120 PANEL
CKTBRK
Loc RAB-372-D-5.5
Work Type CM

PLANNERS NOTES

BRAD RISNER, (8512) HAS REQUESTED THAT THESE READINGS BE TAKEN AND THE RESULTS GIVEN TO HIM. THIS JOB ORDER IS FOR THE CRAFT TO PERFORM THIS WORK.

NO LEADS ARE TO BE LIFTED, AND ELECTRICAL ISOLATION CAN NOT BE OBTAINED, THE CRAFT ARE TO USE THE SAFETY PRECAUTIONS AS DIRECTED BY THE SUPERVISOR IN PERFORMING THIS WORK.

WORK SCOPE

1. TAKE, RECORD, AND SUPPLY RESULTS, OF THE VOLTAGE, CURRENT, AND POWER FACTOR OF CIRCUIT BREAKER 2B64-D2.

   LEFT PHASE

   VOLTAGE 272 VAC CURRENT 11.6 AMPS POWER FACTOR 95.5

   MIDDLE PHASE

   VOLTAGE 274 VAC CURRENT 8.5 AMPS POWER FACTOR 88.8

   RIGHT PHASE

   VOLTAGE 272 VAC CURRENT 9.0 AMPS POWER FACTOR 99.8

   SUPPLY A COPY OF RESULTS TO BRAD RISNER, GSB-3E.

POST MAINTENANCE TEST

NO CORRECTIVE MAINTENANCE PERFORMED BY THIS JOB ORDER, NO PMT REQUIRED. DOCUMENTED ON JOB ORDER 855618.

CARRIER	TRANE	CHRYSLER AIRTEMP	YORK
480 AMPS	730 AMPS	475 (LOCKED ROTOR)	572 AMPS
113 AMPS	120 AMPS	103 AMPS	127 "
3600 RPM	3600 RPM	3600 RPM	3600 RPM
752 KW	817 KW	667 KW	780 KW
3600 RPM	3600	3600	
991 TONS	980	940	980 TONS
1028 TONS	980	940	980 TONS
2600 GPM	3000 GPM	2600 GPM	2600 GPM
11°F	9.4°F	10°F	11.1°F
11.4 FT H_2O	13 FT H_2O	2 PASS 16.5 FT H_2O	16.8 FT H_2O
8 FPS	7.6 FPS	8 FPS	8.9 FPS
1370 GPM WTR	1370 GPM	1370 GPM	1320 GPM
18.4 FT H_2O	7 FT H_2O	3 PASS 10 FT H_2O	21.7 FT H_2O
8 FPS	5.1 FPS	7 FPS	7.2 FPS
1/2 HP	1/4 HP	1/3 HP	1 1/2 HP
460/3/60	460-3-60	1φ - 115 V - 60	115/1/60
	1750	1750	1730 RPM
	WILL ADVISE	5.4 GPM	12 GPM
	FROM CHILLED WTR. CIRCUIT	NA REFRIGERANT COOLED MTR	N/A REFRIGERANT COOLED
15 GAL	10 GAL	11 GAL COAST DOWN RESERVOIR	12 GAL
		(6 GAL OIL CHARGE)	
1/6 HP	1/4 HP	1/3 HP	N/A
115/1/60	115-1-60	115-1-60	
3550	1750	900 RPM	
	WILL ADVISE	.5 CFM	
DIRECT	BELT	BELT	
		125 HP T-FRAME MOTOR	
		908 AMPS	1225 AMPS
348 AMPS	WILL ADVISE	146	180 AMPS
184 AMPS	" "	1800 RPM	1800 RPM
1750 RPM	1750 RPM	76.5 KW	160 KW
128 KW	WILL ADVISE		
95 TONS	95 TONS	95 TONS	95 TONS
95 TONS	95 TONS	106.5 TONS	95 TONS

SUMMARY OF BIDS WATER CHILLERS SHT 2 OF 5	BECHTEL POWER AND INDUSTRIAL DIVISION	JOB No 6600-2 P.O. NO. 6600-M-2055	REVISION

CARRIER	TRANE	CHRYSLER AIRTEMP	YORK
480 AMPS	730 AMPS	475 (LOCKED ROTOR)	572 AMPS
113 AMPS	120 AMPS	103 AMPS	127 "
3600 RPM	3600 RPM	3600 RPM	3600 RPM
752 KW	817 KW	667 KW	780 KW
3600 RPM	360	3600	
991 TONS	980	940	950 TONS
1028 TONS	980	940	980 TONS
2600 GPM	3000 GPM	2600 GPM	2600 GPM
11°F	9.9°F	10°F	11.1°F
16.4 FT H_2O	13 FT H_2O	2 PASS 16.5 FT H_2O	16.8 FT H_2O
8 FPS	7.6 FPS	8 FPS	8.9 FPS
1370 GPM WTR	1370 GPM	1370 GPM	1320 GPM
18.4 FT H_2O	7 FT H_2O	3 PASS 10 FT H_2O	21.7 FT H_2O
8 FPS	5.1 FPS	7 FPS	7.2 FPS
1/2 HP	1/6 HP	1/3 HP	1 1/2 HP
460/3/60	460-3-60	1 Φ - 115 V - 60	115/1/60
	1750	1750	1750 RPM
	WILL ADVISE	3.4 GPM	12 GPM
	FROM CHILLED WTR. CIRCUIT	NA REFRIGERANT COOLED MTR	N/A REFRIGERANT COOLED
15 GAL	10 GAL	1.1 GAL COAST DOWN RESERVOIR	12 GAL
		(6 GAL OIL CHARGE)	
1/6 HP	1/6 HP	1/3 HP	N/A
115/1/60	115-1-60	115-1-60	
1750	1750	900 RPM	
	WILL ADVISE	.5 CFM	
DIRECT	BELT	BELT	?
		125 HP T-FRAME MOTOR	
348 AMPS	WILL ADVISE	90% PF/ES	1225 AMPS
184 AMPS	" "	196	180 AMPS
1750 RPM	1750 RPM	1800 RPM	1800 RPM
128 KW	WILL ADVISE	76.5 KW	100 KW
95 TONS	95 TONS	95 TONS	95 TONS
95 TONS	95 TONS	106.5 TONS	95 TONS

SUMMARY OF BIDS

WATER CHILLERS

SHT 2 OF 5

BECHTEL

POWER AND INDUSTRIAL DIVISION

JOB NO 6600-2

P.O.NO. 6600-M-2055

REVISION

ATTACHMENT 41

HPSI PUMP 2P89A,B,& C ACCELERATION CALCULATION

Acceleration Time at 90% Voltage
Motor & Pump $WK^2 = 155.2 lb\text{-}ft^2$ (Per Attachments 42 & 43)
RPM (Synchronous) = 3600 (Per Attachment 29)

$$NT_i = \frac{(MT_i + MT_{i-1})}{2} - \frac{(LT_i + LT_{i-1})}{2}$$ (Per Reference 2.6, pages 6-38 thru 6-39)

$$TIME_i = \frac{(WK^2 \times (RPM_i - RPM_{i-1}))}{(308 \times NT_i)}$$ (Per Reference 2.6, page 6-38)

% SYNCH. SPEED	(90% Voltage) MOTOR[1] TORQUE (MT)	LOAD[1] TORQUE (LT)	NET TORQUE (NT)	TIME (SECONDS)
0	504	120	------	----------
200	511	70	412.5	0.244313
400	518	40	459.5	0.219323
600	533	30	490.5	0.205462
800	547	40	505	0.199562
1000	576	60	511.5	0.197026
1200	605	85	518	0.194544
1400	634	115	519.5	0.193992
1600	677	150	523	0.192694
1800	749	190	543	0.185597
2000	878	235	601	0.167685
2200	1037	285	697.5	0.144486
2400	1152	340	782	0.128873
2600	1210	400	811	0.124265
2800	1246	470	793	0.127086
3000	1246	540	741	0.136004
3200	1224	620	655	0.153861
3400	1138	690	526	0.191595
3500	1066	730	392	0.128544
3575	760	760	168	0.224953
			Total	3.359875

1. Per Attachment 29

TO DAVID SHEHADEH
501-377-4359 ~ wrong #.

~~From~~ Attention: Mr. Frank Glandorf
Phone 841-3421
Telecopy Number : 1-513-841-3290

We need the wk^2 for all motors, some of these motors wk^2 are questionable. Also, we need the torque speed curve for 2P7B. Please note that 2P60B motor was obtained from the Waterford Plant and its hp is 500 replacing the 450 hp.

Motor I.D.	Serial Number.	hP	RPM	Frame	Volt	wk^2	Service	WK^2 lb-FT^2
2P35A	8-5117-90208-1-1	450	1780	580 BS	4000	48	Spray	200.0
2P35B	8-5117-90251-1-1	450	1780	580 BS	4000	48	Spray	
2P7B	8-5114-90209-1-1	600	3575	588 US	4000	443	EFW	138.0
2P89A	8-5114-90206-1-2	600	3575	588 US R	4000	?	HPI	
2P89B	8-5114-90206-1-3	600	3575	588 US	4000	?	HPI	
2P89C	8-5114-90206-1-1	600	3575	588 US	4000	?	HPI	
2P60A	8-5117-90202-1-1	450	1780	580 B	4000	?	LPSI	200.0
2P60B	8-5117-90203-1-1*	500	1780	580 CS	4000	200	LPSI	216.9

Note: We are interested in any information you may have on the wk^2 of the pumps. We appreciate your efforts in satisfying this request.

David Shehadeh 501 377-3857 (telecopy 501 377-4319)
Arkansas Power and Light Company
P.O.Box 551
Little Rock, AR. 72203

WE DO NOT HAVE ANY INFORMATION ON THE WK^2 OF THE PUMPS.

THE SPEED TORQUE CURVE FOR 2P7B ~~WILL BE SENT SEPARATELY~~ A-22314 IS ATTACHED

Frank Glandorf
4/3/90

RECEIVED
APR 11 1990
ARKANSAS POWER & LIGHT CO.
ELECTRICAL I & C DESIGN

INGERSOLL-RAND

CUSTOMER SERVICE DEPT.
942 MEMORIAL PARKWAY
PHILLIPSBURG, NEW JERSEY

DATE: 5-23-90

TO: B Ryan Disher

COMPANY LOCATION Fairmass P&D

TELECOPIER NUMBER (501) 377-5997

FROM: T. H. BROWN

TELEPHONE: (201) 859-7069

NUMBER OF PAGES BEING SENT 1 (INCLUDING COVER)

SPECIAL INSTRUCTIONS:

Ref: High Pressure Safety Injection pump and Low Pressure Safety Injection pump WR^2 Values.

1. I-R model 8x20WD LPSI Pump = 6.5 lb-ft^2

2. I-R model 4x9C-9 HPSI Pump = 1.2 lb-ft^2

Regret
Thomas H. Brown

LOCATION: THIRD FLOOR BENTLEY BUILDING

AUTOMATIC ANSWER NUMBER (201) 859-8528

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 8 31 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 8 31 PM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	DESCRIPTION TYPE	DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 8 31 PM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7 9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 8 31 PM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 8 31 PM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	125	-82.0					
2002 2A2								
2004 2A4	FEEDER	125	-82.0					
2902 ST2-A	FEEDER	125	-82.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	125	-82.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	125	-82.0					
2004 2A4								
3006 2B6	TRANS.	125	-82.0					

DATE:23 JUL 92 TIME: 8 31 PM PAGE 6
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	399.	1957.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 8 31 PM PAGE 7
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2274.45 KVA
CONVERGENCE CRITERIA: .114 KVA

LARGEST BUS MISMATCH	2003	2A3	139.791 KVA
LARGEST BUS MISMATCH	3005	2B5	15.080 KVA
LARGEST BUS MISMATCH	3005	2B5	1.956 KVA
LARGEST BUS MISMATCH	3005	2B5	.249 KVA
LARGEST BUS MISMATCH	3005	2B5	.031 KVA

DATE:23 JUL 92 TIME: 8 31 PM PAGE 8
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 33 VOLTAGE DROP: 848. %VD: .53
PROJECTED POWER FLOW: 7125. KW 5838. KVAR 9212. KVA PF: .77 LAGGING
LOSSES THRU FEEDER: 10. KW 65. KVAR 66. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 33 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 7125. KW 5838. KVAR 9212. KVA PF: .77 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158735 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 33 VOLTAGE DROP: 848. %VD: .53
PROJECTED POWER FLOW: 7115. KW 5773. KVAR 9163. KVA PF: .78 LAGGING
LOSSES THRU FEEDER: 10. KW 65. KVAR 66. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 33
PROJECTED POWER FLOW: 7115. KW 5774. KVAR 9163. KVA PF: .78 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 482 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 482 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 256 VOLTAGE DROP: 69. %VD: 1.67
PROJECTED POWER FLOW: 430. KW 1763. KVAR 1815. KVA PF: .24 LAGGING
LOSSES THRU FEEDER: 1. KW 32. KVAR 32. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 256 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 430. KW 1763. KVAR 1815. KVA PF: .24 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4017 %VD: 3.4
VOLTAGE ANGLE: -3.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 482 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2928. KW 1639. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 156 VOLTAGE DROP: 120. %VD: 2.89
PROJECTED POWER FLOW: 915. KW 501. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.7 KW 91.1 KVAR 92.3 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4017 %VD: 3.4
VOLTAGE ANGLE: -2.4 DEGREES
LOAD FROM: 2002 2A2 FEEDER AMPS: 256 VOLTAGE DROP: 69. %VD: 1.67
PROJECTED POWER FLOW: 429. KW 1732. KVAR 1784. KVA PF: .24 LAGGING
LOSSES THRU FEEDER: 1. KW 32. KVAR 32. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 256 VOLTAGE DROP: 496. %VD:11.91$
PROJECTED POWER FLOW: 429. KW 1732. KVAR 1784. KVA PF: .24 LAGGING
LOSSES THRU TRANSF: 40.3 KW 257.6 KVAR 260.7 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 108. %VD: 2.60
PROJECTED POWER FLOW: 935. KW 533. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.3 KVAR 92.4 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 23. %VD: .56
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.9 KVAR 32.2 KVA

DATE:23 JUL 92 TIME: 8 31 PM PAGE 11
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4117 %VD: 1.0
VOLTAGE ANGLE: -1.7 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1258 VOLTAGE DROP: 30. %VD: .72
PROJECTED POWER FLOW: 7102. KW 5474. KVAR 8967. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 2. KW 104. KVAR 104. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1258
PROJECTED POWER FLOW: 7102. KW 5474. KVAR 8967. KVA PF: .79 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 482 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 256 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 430. KW 1763. KVAR 1815. KVA PF: .24 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1258 VOLTACE DROP: 30. %VD: .72
PROJECTED POWER FLOW: 7100. KW 5369. KVAR 8902. KVA PF: .80 LAGGING
LOSSES THRU FEEDER: 2. KW 104. KVAR 104. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.3$
VOLTAGE ANGLE: -7.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1316 VOLTAGE DROP: 14. %VD: 2.89
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.7 KW 91.1 KVAR 92.3 KVA

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 406 %VD: 15.3$
VOLTAGE ANGLE: -3.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 286. KW 1403. KVAR
NET BRANCH DIVERSITY LOAD: 103. KW 72. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 2166 VOLTAGE DROP: 57. %VD:11.91$
PROJECTED POWER FLOW: 388. KW 1474. KVAR 1525. KVA PF: .25 LAGGINC
LOSSES THRU TRANSF: 40.3 KW 257.6 KVAR 260.7 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.4
VOLTAGE ANGLE: -6.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1285 VOLTAGE DROP: 12. %VD: 2.60
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.3 KVAR 92.4 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 469 %VD: 2.3
VOLTAGE ANGLE: -4.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 758 VOLTAGE DROP: 3. %VD: .56
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.9 KVAR 32.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
103. KW 1084. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 10 37 AM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME:10 37 AM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M FEET						
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220		OHMS/M FEET						
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME:10 37 AM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME:10 37 AM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME:10 37 AM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	272	-84.0					
2001 2A1								
2003 2A3	FEEDER	272	-84.0					
2902 ST2-A	FEEDER	272	-84.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	272	-84.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	272	-84.0					
2003 2A3								
3005 2B5	TRANS.	272	-84.0					

DATE:23 JUL 92 TIME:10 37 AM
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	319.	1562.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME:10 37 AM PAGE 7
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 1735.66 KVA
CONVERGENCE CRITERIA: .087 KVA

LARGEST BUS MISMATCH	3006	2B6	89.043 KVA
LARGEST BUS MISMATCH	3006	2B6	11.792 KVA
LARGEST BUS MISMATCH	3006	2B6	1.449 KVA
LARGEST BUS MISMATCH	3006	2B6	.175 KVA
LARGEST BUS MISMATCH	3006	2B6	.021 KVA

DATE:23 JUL 92 TIME:10 37 AM PAGE 8
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 31 VOLTAGE DROP: 767. %VD: .48
PROJECTED POWER FLOW: 5664. KW 5248. KVAR 8482. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 9. KW 55. KVAR 56. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 31 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 6664. KW 5248. KVAR 8482. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158816 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 31 VOLTAGE DROP: 767. %VD: .48
PROJECTED POWER FLOW: 6655. KW 5193. KVAR 8442. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 9. KW 55. KVAR 56. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 31
PROJECTED POWER FLOW: 6655. KW 5193. KVAR 8442. KVA PF: .79 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 231 VOLTAGE DROP: 62. %VD: 1.48
PROJECTED POWER FLOW: 505. KW 1564. KVAR 1643. KVA PF: .31 LAGGING
LOSSES THRU FEEDER: 1. KW 26. KVAR 26. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 231 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 505. KW 1564. KVAR 1643. KVA PF: .31 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME:10 37 AM PAGE 9
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 393 VOLTAGE DROP: 58. %VD: 1.38
PROJECTED POWER FLOW: 2399. KW 1433. KVAR 2794. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 74. KVAR 74. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 393 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1433. KVAR 2794. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4039 %VD: 2.9
VOLTAGE ANGLE: -2.3 DEGREES
LOAD FROM: 2001 2A1 FEEDER AMPS: 231 VOLTAGE DROP: 62. %VD: 1.48
PROJECTED POWER FLOW: 504. KW 1538. KVAR 1618. KVA PF: .31 LAGGING
LOSSES THRU FEEDER: 1. KW 26. KVAR 26. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 231 VOLTAGE DROP: 409. %VD: 9.84$
PROJECTED POWER FLOW: 504. KW 1538. KVAR 1618. KVA PF: .31 LAGGING
LOSSES THRU TRANSF: 32.5 KW 200.9 KVAR 203.5 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4043 %VD: 2.8
VOLTAGE ANGLE: -3.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 393 VOLTAGE DROP: 58. %VD: 1.38
PROJECTED POWER FLOW: 2397. KW 1358. KVAR 2755. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 74. KVAR 74. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 146 VOLTAGE DROP: 113. %VD: 2.71
PROJECTED POWER FLOW: 863. KW 546. KVAR 1021. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.1 KW 83.4 KVAR 84.4 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 366 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 366 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 221 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 221 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 366 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 151 VOLTAGE DROP: 107. %VD: 2.57
PROJECTED POWER FLOW: 935. KW 533. KVAR 1076. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.0 KW 90.6 KVAR 91.7 K A

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 221 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 89 VOLTAGE DROP: 23. %VD: .54
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 4.9 KW 31.6 KVAR 32.0 KVA

T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4128 %VD: .8
VOLTAGE ANGLE: -1.6 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1158 VOLTAGE DROP: 27. %VD: .65
PROJECTED POWER FLOW: 6645. KW 4939. KVAR 8279. KVA PF: .80 LAGGING
LOSSES THRU FEEDER: 2. KW 88. KVAR 89. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1158
PROJECTED POWER FLOW: 6645. KW 4939. KVAR 8279. KVA PF: .80 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4101 %VD: 1.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 231 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 505. KW 1564. KVAR 1643. KVA PF: .31 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 393 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1433. KVAR 2794. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 366 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 221 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1158 VOLTAGE DROP: 27. %VD: .65
PROJECTED POWER FLOW: 6643. KW 4850. KVAR 8225. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 2. KW 88. KVAR 89. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 419 %VD: 12.7$
VOLTAGE ANGLE: -3.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 243. KW 1189. KVAR
NET BRANCH DIVERSITY LOAD: 228. KW 148. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1954 VOLTAGE DROP: 47. %VD: 9.84$
PROJECTED POWER FLOW: 471. KW 1337. KVAR 1418. KVA PF: .33 LAGGING
LOSSES THRU TRANSF: 32.5 KW 200.9 KVAR 203.5 KVA

DATE:23 JUL 92 TIME:10 37 AM PAGE 12
T=0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 454 %VD: 5.5$
VOLTAGE ANGLE: -7.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1232 VOLTAGE DROP: 13. %VD: 2.71
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.1 KW 83.4 KVAR 84.4 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 461 %VD: 4.0
VOLTAGE ANGLE: -6.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1280 VOLTAGE DROP: 12. %VD: 2.57
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.0 KW 90.6 KVAR 91.7 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 471 %VD: 2.0
VOLTAGE ANGLE: -4.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 756 VOLTAGE DROP: 3. %VD: .54
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 4.9 KW 31.6 KVAR 32.0 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
89. KW 904. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 8 52 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

LAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 8 52 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M	FEET					
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220		OHMS/M	FEET					
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 8 52 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 8 52 PM PAGE 4
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 8 52 PM PAGE 5
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9913, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.

T=4.5 SECONDS, ΔT #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1228.	4968.	CONSTANT Z LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	356.	288.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 8 52 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 5117.52 KVA
CONVERGENCE CRITERIA: .256 KVA
LARGEST BUS MISMATCH 2003 2A3 216.125 KVA
LARGEST BUS MISMATCH 3005 2B5 21.684 KVA
LARGEST BUS MISMATCH 3005 2B5 3.014 KVA
LARGEST BUS MISMATCH 3005 2B5 .406 KVA
LARGEST BUS MISMATCH 3005 2B5 .054 KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 44 VOLTAGE DROP: 1274. %VD: .79
PROJECTED POWER FLOW: 8117. KW 9186. KVAR 12259. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 18. KW 115. KVAR 116. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 44 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8117. KW 9186. KVAR 12259. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158309 %VD: 1.7
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 44 VOLTAGE DROP: 1274. %VD: .79
PROJECTED POWER FLOW: 8099. KW 9072. KVAR 12161. KVA PF: .67 LAGGING
LOSSES THRU FEEDER: 18. KW 115. KVAR 116. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 44
PROJECTED POWER FLOW: 8099. KW 9072. KVAR 12161. KVA PF: .67 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 493 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3420. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3 KW 116. KVAR 117. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 493 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3420. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 711 VOLTAGE DROP: 190. %VD: 4.58$
PROJECTED POWER FLOW: 1401. KW 4736. KVAR 4938. KVA PF: .28 LAGGING
LOSSES THRU FEEDER: 7. KW 243. KVAR 243. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 711 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1401. KW 4736. KVAR 4938. KVA PF: .28 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3936 %VD: 5.4$
VOLTAGE ANGLE: -4.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1056. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 493 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2929. KW 1643. KVAR 3358. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 116. KVAR 117. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 159 VOLTAGE DROP: 128. %VD: 3.07
PROJECTED POWER FLOW: 915. KW 585. KVAR 1087. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.4 KVAR 96.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3818 %VD: 8.2$
VOLTAGE ANGLE: -3.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 1034. KW 4185. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 711 VOLTAGE DROP: 190. %VD: 4.58$
PROJECTED POWER FLOW: 1393. KW 4493. KVAR 4704. KVA PF: .30 LAGGING
LOSSES THRU FEEDER: 7. KW 243. KVAR 243. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 72 VOLTAGE DROP: 27. %VD: .66
PROJECTED POWER FLOW: 359. KW 308. KVAR 473. KVA PF: .76 LAGGING
LOSSES THRU TRANSF: 3.1 KW 20.1 KVAR 20.3 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 115. %VD: 2.78
PROJECTED POWER FLOW: 936. KW 537. KVAR 1079. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.8 KW 95.4 KVAR 96.5 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 28. %VD: .68
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.2 KVAR 33.6 KVA

T=4.5 SECONDS, ST #2 Unit 2 MSIB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4055 %VD: 2.5
VOLTAGE ANGLE: -1.9 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1674 VOLTAGE DROP: 47. %VD: 1.13
PROJECTED POWER FLOW: 8077. KW 8541. KVAR 11755. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 4. KW 185. KVAR 185. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1674
PROJECTED POWER FLOW: 8077. KW 8541. KVAR 11755. KVA PF: .69 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4008 %VD: 3.6
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 493 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3420. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 711 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1401. KW 4736. KVAR 4938. KVA PF: .28 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1674 VOLTAGE DROP: 47. %VD: 1.13
PROJECTED POWER FLOW: 8073. KW 8356. KVAR 11619. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 4. KW 185. KVAR 185. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 439 %VD: 8.5$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1346 VOLTAGE DROP: 15. %VD: 3.07
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.4 KVAR 96.6 KVA

DATE:23 JUL 92 TIME: 8 52 PM PAGE 12
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 437 %VD: 8.9$
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 356. KW 288. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 604 VOLTAGE DROP: 3. %VD: .66
PROJECTED POWER FLOW: 356. KW 238. KVAR 458. KVA PF: .78 LAGGING
LOSSES THRU TRANSF: 3.1 KW 20.1 KVAR 20.3 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 449 %VD: 6.4$
VOLTAGE ANGLE: -6.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1313 VOLTAGE DROP: 13. %VD: 2.78
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.8 KW 95.4 KVAR 96.5 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.3
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 774 VOLTAGE DROP: 3. %VD: .68
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.2 KVAR 33.6 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
93. KW 1434. KVAR

WARNING STUDY CONTAINS 7 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 1 59 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	260	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	% IMPEDANCE X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1228.	4968.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	443.	338.	CONSTANT KVA LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 1 59 PM PAGE 7
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 5117.52 KVA
CONVERGENCE CRITERIA: .256 KVA

LARGEST BUS MISMATCH	2004	2A4	151.409 KVA
LARGEST BUS MISMATCH	3006	2B6	18.012 KVA
LARGEST BUS MISMATCH	3006	2B6	2.378 KVA
LARGEST BUS MISMATCH	3006	2B6	.306 KVA
LARGEST BUS MISMATCH	3006	2B6	.039 KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 42 VOLTAGE DROP: 1228. %VD: .76
PROJECTED POWER FLOW: 7672. KW 8874. KVAR 11731. KVA PF: .65 LAGGING
LOSSES THRU FEEDER: 17. KW 105. KVAR 106. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 42 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 7672. KW 8874. KVAR 11731. KVA PF: .65 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158355 %VD: 1.6
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 42 VOLTAGE DROP: 1228. %VD: .76
PROJECTED POWER FLOW: 7655. KW 8769. KVAR 11640. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 17. KW 105. KVAR 106. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 42
PROJECTED POWER FLOW: 7655. KW 8769. KVAR 11641. KVA PF: .66 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 725 VOLTAGE DROP: 193. %VD: 4.64$
PROJECTED POWER FLOW: 1492. KW 4813. KVAR 5039. KVA PF: .30 LAGGING
LOSSES THRU FEEDER: 7. KW 252. KVAR 252. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 725 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1492. KW 4813. KVAR 5039. KVA PF: .30 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 1 59 PM
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 402 VOLTAGE DROP: 59. %VD: 1.42
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 78. KVAR 78. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 402 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3823 %VD: 8.1$
VOLTAGE ANGLE: -3.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 1037. KW 4195. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 725 VOLTAGE DROP: 193. %VD: 4.64$
PROJECTED POWER FLOW: 1484. KW 45[illegible] KVAR 4797. KVA PF: .31 LAGGING
LOSSES THRU FEEDER: 7. KW 252. KVAR 252. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 87 VOLTAGE DROP: 46. %VD: 1.11
PROJECTED POWER FLOW: 448. KW 367. KVAR 579. KVA PF: .77 LAGGING
LOSSES THRU TRANSF: 4.6 KW 28.7 KVAR 29.1 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3957 %VD: 4.9
VOLTAGE ANGLE: -3.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 402 VOLTAGE DROP: 59. %VD: 1.42
PROJECTED POWER FLOW: 2398. KW 1362. KVAR 2758. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 78. KVAR 78. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 149 VOLTAGE DROP: 121. %VD: 2.90
PROJECTED POWER FLOW: 864. KW 550. KVAR 1024. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.7 KW 87.5 KVAR 88.6 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 115. %VD: 2.76
PROJECTED POWER FLOW: 936. KW 537. KVAR 1079. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.0 KVAR 96.1 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 91 VOLTAGE DROP: 28. %VD: .67
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4061 %VD: 2.4
VOLTAGE ANGLE: -1.8 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1601 VOLTAGE DROP: 46. %VD: 1.10
PROJECTED POWER FLOW: 7635. KW 8283. KVAR 11265. KVA PF: .68 LAGGING
LOSSES THRU FEEDER: 4. KW 169. KVAR 169. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1601
PROJECTED POWER FLOW: 7635. KW 8283. KVAR 11265. KVA PF: .68 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -2.4 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 725 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1492. KW 4813. KVAR 5039. KVA PF: .30 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 402 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1601 VOLTAGE DROP: 46. %VD: 1.10
PROJECTED POWER FLOW: 7632. KW 8114. KVAR 11139. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 4. KW 169. KVAR 169. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 436 %VD: 9.2$
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 443. KW 338. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 738 VOLTAGE DROP: 5. %VD: 1.11
PROJECTED POWER FLOW: 443. KW 338. KVAR 557. KVA PF: .80 LAGGING
LOSSES THRU TRANSF: 4.6 KW 28.7 KVAR 29.1 KVA

DATE:23 JUL 92 TIME: 1 59 PM PAGE 12
T=4.5 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = 0.9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 443 %VD: 7.8$
VOLTAGE ANGLE: -7.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1263 VOLTAGE DROP: 14. %VD: 2.90
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.7 KW 87.5 KVAR 88.6 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.2$
VOLTAGE ANGLE: -6.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1310 VOLTAGE DROP: 13. %VD: 2.76
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.0 KVAR 96.1 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 460 %VD: 4.1
VOLTAGE ANGLE: -4.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 773 VOLTAGE DROP: 3. %VD: .67
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
89. KW 1334. KVAR

WARNING STUDY CONTAINS 6 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 11 32 AM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME:11 32 AM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

T-10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME:11 32 AM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME:11 32 AM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

F R O M / T O B U S / B U S	BR. TYPE	CONSTANT KVA KVA	KVA %PF	CONSTANT Z KVA	Z %PF	CONSTANT I KVA	I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	724	-88.0					
2002 2A2								
2004 2A4	FEEDER	724	-88.0					
2902 ST2-A	FEEDER	724	-88.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	724	-88.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	724	-88.0					

DATE:23 JUL 92 TIME:11 32 AM PAGE 6
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	789.	3586.	CONSTANT Z LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	356.	288.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME:11 32 AM PAGE 7
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 3671.77 KVA
CONVERGENCE CRITERIA: .184 KVA

LARGEST BUS MISMATCH	2003	2A3	195.318 KVA
LARGEST BUS MISMATCH	3005	2B5	20.461 KVA
LARGEST BUS MISMATCH	3005	2B5	2.858 KVA
LARGEST BUS MISMATCH	3005	2B5	.386 KVA
LARGEST BUS MISMATCH	3005	2B5	.051 KVA

DATE:23 JUL 92 TIME:11 32 AM PAGE 8
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 43 VOLTAGE DROP: 1175. %VD: .73
PROJECTED POWER FLOW: 8397. KW 8326. KVAR 11825. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 17. KW 107. KVAR 108. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 43 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8397. KW 8326. KVAR 11825. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158408 %VD: 1.6
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 43 VOLTAGE DROP: 1175. %VD: .73
PROJECTED POWER FLOW: 8380. KW 8219. KVAR 11738. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 17. KW 107. KVAR 108. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 43
PROJECTED POWER FLOW: 8380. KW 8220. KVAR 11738. KVA PF: .71 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 490 VOLTAGE DROP: 72. %VD: 1.72
PROJECTED POWER FLOW: 2932. KW 1758. KVAR 3418. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 115. KVAR 115. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 490 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1758. KVAR 3418. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 41[illegible] LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 614 VOLTAGE DROP: 158. %VD: 3.79
PROJECTED POWER FLOW: 1684. KW 3936. KVAR 4282. KVA PF: .39 LAGGING
LOSSES THRU FEEDER: 5. KW 181. KVAR 181. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 614 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1684. KW 3936. KVAR 4282. KVA PF: .39 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3957 %VD: 4.9
VOLTAGE ANGLE: -4.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 490 VOLTAGE DROP: 72. %VD: 1.72
PROJECTED POWER FLOW: 2928. KW 1643. KVAR 3357. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 115. KVAR 115. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 158 VOLTAGE DROP: 126. %VD: 3.03
PROJECTED POWER FLOW: 915. KW 585. KVAR 1086. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.3 KW 94.3 KVAR 95.5 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3871 %VD: 7.0$
VOLTAGE ANGLE: -3.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 683. KW 3104. KVAR
NET BRANCH DIVERSITY LOAD: 637. KW 344. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 614 VOLTAGE DROP: 158. %VD: 3.79
PROJECTED POWER FLOW: 1679. KW 3756. KVAR 4114. KVA PF: .41 LAGGING
LOSSES THRU FEEDER: 5. KW 181. KVAR 181. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 71 VOLTAGE DROP: 24. %VD: .58
PROJECTED POWER FLOW: 359. KW 307. KVAR 473. KVA PF: .76 LAGGING
LOSSES THRU TRANSF: 3.1 KW 19.5 KVAR 19.7 KVA

DATE:23 JUL 92 TIME:11 32 AM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 23[illegible] KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 114. %VD: 2.73
PROJECTED POWER FLOW: 936. KW 536. KVAR 1078. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.6 KW 94.3 KVAR 95. KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 91 VOLTAGE DROP: 27. %VD: .65
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THPU TRANSF: 5.1 KW 32.8 KVAR 33.2 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4071 %VD: 2.1
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1614 VOLTAGE DROP: 42. %VD: 1.02
PROJECTED POWER FLOW: 8360. KW 7725. KVAR 11383. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 4. KW 172. KVAR 172. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1614
PROJECTED POWER FLOW: 8360. KW 7725. KVAR 11383. KVA PF: .73 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 490 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1758. KVAR 3418. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 614 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1684. KW 3936. KVAR 4282. KVA PF: .39 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1614 VOLTAGE DROP: 42. %VD: 1.02
PROJECTED POWER FLOW: 8356. KW 7554. KVAR 11264. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 4. KW 172. KVAR 172. KVA

DATE:23 JUL 92 TIME:11 32 AM PAGE 12
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 442 %VD: 7.9$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1339 VOLTAGE DROP: 15. %VD: 3.03
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 15.3 KW 94.3 KVAR 95.5 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 444 %VD: 7.5$
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 356. KW 288. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 596 VOLTAGE DROP: 3. %VD: .58
PROJECTED POWER FLOW: 356. KW 288. KVAR 458. KVA PF: .78 LAGGING
LOSSES THRU TRANSF: 3.1 KW 19.5 KVAR 19.7 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 452 %VD: 5.9$
VOLTAGE ANGLE: -6.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1306 VOLTAGE DROP: 13. %VD: 2.73
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.6 KW 94.3 KVAR 95.4 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 462 %VD: 3.8
VOLTAGE ANGLE: -5.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 770 VOLTAGE DROP: 3. %VD: .65
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.1 KW 32.8 KVAR 33.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
88. KW 1310. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 2 18 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M FEET						
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220		OHMS/M FEET						
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	724	-88.0					
2001 2A1								
2003 2A3	FEEDER	724	-88.0					
2902 ST2-A	FEEDER	724	-88.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	724	-88.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	724	-88.0					

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	789.	3586.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	443.	338.	CONSTANT KVA LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 3671.77 KVA
CONVERGENCE CRITERIA: .184 KVA

LARGEST BUS MISMATCH	2004	2A4	135.391 KVA
LARGEST BUS MISMATCH	3006	2B6	16.940 KVA
LARGEST BUS MISMATCH	3006	2B6	2.251 KVA
LARGEST BUS MISMATCH	3006	2B6	.290 KVA
LARGEST BUS MISMATCH	3006	2B6	.037 KVA

T=10 SECONDS, ST #2 Unit 2 MSLF Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 41 VOLTAGE DROP: 1128. %VD: .70
PROJECTED POWER FLOW: 7952. KW 8012. KVAR 11288. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 16. KW 97. KVAR 98. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 41 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 7952. KW 8012. KVAR 11288. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158455 %VD: 1.6
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 41 VOLTAGE DROP: 1128. %VD: .70
PROJECTED POWER FLOW: 7936. KW 7914. KVAR 11208. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 16. KW 97. KVAR 98. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 41
PROJECTED POWER FLOW: 7936. KW 7915. KVAR 11208. KVA PF: .71 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 627 VOLTAGE DROP: 161. %VD: 3.86
PROJECTED POWER FLOW: 1775. KW 4011. KVAR 4386. KVA PF: .40 LAGGING
LOSSES THRU FEEDER: 6. KW 189. KVAR 189. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 627 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1775. KW 4011. KVAR 4386. KVA PF: .40 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

****

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 400 VOLTAGE DROP: 59. %VD: 1.41
PROJECTED POWER FLOW: 2400. KW 1438. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 77. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 400 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1438. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3875 %VD: 6.8$
VOLTAGE ANGLE: -3.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 685. KW 3112. KVAR
NET BRANCH DIVERSITY LOAD: 637. KW 344. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 627 VOLTAGE DROP: 161. %VD: 3.86
PROJECTED POWER FLOW: 1769. KW 3822. KVAR 4211. KVA PF: .42 LAGGING
LOSSES THRU FEEDER: 6. KW 189. KVAR 189. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 86 VOLTAGE DROP: 43. %VD: 1.03
PROJECTED POWER FLOW: 447. KW 366. KVAR 578. KVA PF: .77 LAGGING
LOSSES THRU TRANSF: 4.5 KW 27.8 KVAR 28.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3977 %VD: 4.4
VOLTAGE ANGLE: -3.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 400 VOLTAGE DROP: 59. %VD: 1.41
PROJECTED POWER FLOW: 2397. KW 1361. KVAR 2757. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 77. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 149 VOLTAGE DROP: 119. %VD: 2.86
PROJECTED POWER FLOW: 864. KW 549. KVAR 1024. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.5 KW 86.5 KVAR 87.6 KVA

DATE:23 JUL 92 TIME: 2 18 PM PAGE 10
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 372 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 372 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 372 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 154 VOLTAGE DROP: 113. %VD: 2.71
PROJECTED POWER FLOW: 936. KW 536. KVAR 1078. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.5 KW 93.9 KVAR 95.1 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 2 18 PM PAGE 11
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 91 VOLTAGE DROP: 27. %VD: .64
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.1 KW 32.7 KVAR 33.1 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4077 %VD: 2.0
VOLTAGE ANGLE: -1.9 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1541 VOLTAGE DROP: 41. %VD: .99
PROJECTED POWER FLOW: 7918. KW 7464. KVAR 10881. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 3. KW 157. KVAR 157. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1541
PROJECTED POWER FLOW: 7918. KW 7464. KVAR 10881. KVA PF: .73 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4036 %VD: 3.0
VOLTAGE ANGLE: -2.5 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 627 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1775. KW 4011. KVAR 4386. KVA PF: .40 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 400 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1438. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 372 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1541 VOLTAGE DROP: 41. %VD: .99
PROJECTED POWER FLOW: 7914. KW 7308. KVAR 10772. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 3. KW 157. KVAR 157. KVA

DATE:23 JUL 92 TIME: 2 18 PM
T=10 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 442 %VD: 7.9$
VOLTAGE ANGLE: -5.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 443. KW 338. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 727 VOLTAGE DROP: 5. %VD: 1.03
PROJECTED POWER FLOW: 443. KW 338. KVAR 557. KVA PF: .80 LAGGING
LOSSES THRU TRANSF: 4.5 KW 27.8 KVAR 28.2 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 445 %VD: 7.3$
VOLTAGE ANGLE: -7.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1255 VOLTAGE DROP: 14. %VD: 2.86
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.5 KW 86.5 KVAR 87.6 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 453 %VD: 5.7$
VOLTAGE ANGLE: -6.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1303 VOLTAGE DROP: 13. %VD: 2.71
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.5 KW 93.9 KVAR 95.1 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 463 %VD: 3.6
VOLTAGE ANGLE: -4.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 769 VOLTAGE DROP: 3. %VD: .64
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.1 KW 32.7 KVAR 33.1 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
83. KW 1211. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 9 33 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 9 33 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M	FEET					
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220		OHMS/M	FEET					
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 9 33 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2296 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 9 33 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	% IMPEDANCE X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 9 5 PM PAGE 5
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	724	-88.0					
2002 2A2								
2004 2A4	FEEDER	724	-88.0					
2902 ST2-A	FEEDER	724	-88.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	724	-88.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	724	-88.0					

DATE:23 JUL 92 TIME: 9 33 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2012.	1058.	CONSTANT KVA LOAD
2004	2A4	1526.	6569.	CONSTANT Z LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	356.	288.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 6743.92 KVA
CONVERGENCE CRITERIA: .337 KVA

LARGEST BUS MISMATCH	2003	2A3	25t.446 KVA
LARGEST BUS MISMATCH	3005	2B5	26.302 KVA
LARGEST BUS MISMATCH	3005	2B5	3.853 KVA
LARGEST BUS MISMATCH	3005	2B5	.543 KVA
LARGEST BUS MISMATCH	3005	2B5	.075 KVA

DATE:23 JUL 92 TIME: 9 33 PM
T=15 SECONDS, ST #2 Unit 2 MSL Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA. BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 52 VOLTAGE DROP: 1520. %VD: .94
PROJECTED POWER FLOW: 8954. KW 11077. KVAR 14243. KVA PF: .63 LAGGING
LOSSES THRU FEEDER: 25. KW 155. KVAR 157. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 52 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8954. KW 11077. KVAR 14243. KVA PF: .63 LAGGING
LOSSES THRU FEEDER: 0. KW . KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158063 %VD: 1.8
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 52 VOLTAGE DROP: 1520. %VD: .94
PROJECTED POWER FLOW: 8930. KW 10922. KVAR 14108. KVA PF: .63 LAGGING
LOSSES THRU FEEDER: 25. KW 155. KVAR 157. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 52
PROJECTED POWER FLOW: 8930. KW 10922. KVAR 14108. KVA PF: .63 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 499 VOLTAGE DROP: 73. %VD: 1.75
PROJECTED POWER FLOW: 2933. KW 1765. KVAR 3423. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 119. KVAR 119. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 499 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2933. KW 1765. KVAR 3423. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 9 33 PM PAGE 9
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 977 VOLTAGE DROP: 257. %VD: 6.18$
PROJECTED POWER FLOW: 2221. KW 6327. KVAR 6706. KVA PF: .33 LAGGING
LOSSES THRU FEEDER: 13. KW 458. KVAR 458. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 977 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2221. KW 6327. KVAR 6706. KVA PF: .33 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3891 %VD: 6.5$
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 499 VOLTAGE DROP: 73. %VD: 1.75
PROJECTED POWER FLOW: 2929. KW 1546. KVAR 3360. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 119. KVAR 119. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 161 VOLTAGE DROP: 132. %VD: 3.18
PROJECTED POWER FLOW: 916. KW 588. KVAR 1088. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.8 KW 97.9 KVAR 99.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3707 %VD: 10.9$
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1212. KW 5216. KVAR
NET BRANCH DIVERSITY LOAD: 637. KW 344. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 977 VOLTAGE DROP: 257. %VD: 6.18$
PROJECTED POWER FLOW: 2208. KW 5869. KVAR 6271. KVA PF: .35 LAGGING
LOSSES THRU FEEDER: 13. KW 458. KVAR 458. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 74 VOLTAGE DROP: 34. %VD: .83
PROJECTED POWER FLOW: 359. KW 309. KVAR 474. KVA PF: .76 LAGGING
LOSSES THRU TRANSF: 3.3 KW 21.4 KVAR 21.6 KVA

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 380 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1153. KVAR 2606. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 380 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1153. KVAR 2606. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 229 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 229 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 380 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1153. KVAR 2606. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 157 VOLTAGE DROP: 120. %VD: 2.88
PROJECTED POWER FLOW: 936. KW 540. KVAR 1081. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 15.1 KW 97.8 KVAR 99.0 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 229 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 9 33 PM PAGE 11
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 93 VOLTAGE DROP: 31. %VD: .75
PROJECTED POWER FLOW: 552. KW 317. KVAR 637. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.3 KW 34.0 KVAR 34.4 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4021 %VD: 3.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1944 VOLTAGE DROP: 57. %VD: 1.36
PROJECTED POWER FLOW: 8900. KW 10205. KVAR 13541. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 5. KW 249. KVAR 250. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1944
PROJECTED POWER FLOW: 8900. KW 10205. KVAR 13541. KVA PF: .66 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3964 %VD: 4.7
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 499 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2933. KW 1765. KVAR 3423. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 977 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2222. KW 6327. KVAR 6706. KVA PF: .33 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 380 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1153. KVAR 2606. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 229 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1944 VOLTAGE DROP: 57. %VD: 1.36
PROJECTED POWER FLOW: 8895. KW 9956. KVAR 13350. KVA PF: .67 LAGGING
LOSSES THRU FEEDER: 5. KW 249. KVAR 250. KVA

DATE:23 JUL 92 TIME: 9 33 PM PAGE 12
T=15 SECONDS ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3003 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 434 %VD: 9.6$
VOLTAGE ANGLE: -8.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1364 VOLTAGE DROP: 15. %VD: 3.18
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 15.8 KW 97.9 KVAR 99.2 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 424 %VD: 11.7$
VOLTAGE ANGLE: -5.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 356. KW 288. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 624 VOLTAGE DROP: 4. %VD: .83
PROJECTED POWER FLOW: 356. KW 288. KVAR 458. KVA PF: .78 LAGGING
LOSSES THRU TRANSF: 3.3 KW 21.4 KVAR 21.6 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 444 %VD: 7.6$
VOLTAGE ANGLE: -7.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1330 VOLTAGE DROP: 14. %VD: 2.88
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 15.1 KW 97.8 KVAR 99.0 KVA

LOAD BUS: B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 454 %VD: 5.5$
VOLTAGE ANGLE: -5.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 784 VOLTAGE DROP: 4. %VD: .75
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.3 KW 34.0 KVAR 34.4 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
116. KW 1949. KVAR

WARNING STUDY CONTAINS 8 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 2 41 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.[illegible] + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.
1 SYSTEM									
	200 161KV APL	FEEDER	724	-88.0					
2001 2A1									
	2003 2A3	FEEDER	724	-88.0					
	2902 ST2-A	FEEDER	724	-88.0					REV
2901 ST2-CLR									
	2902 ST2-A	FEEDER	724	-88.0					
200 161KV APL									
	2901 ST2-CLR	TRANS.	724	-88.0					

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1566.	6201.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	443.	338.	CONSTANT KVA LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 2 41 PM
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 6395.68 KVA
CONVERGENCE CRITERIA: .320 KVA

LARGEST BUS MISMATCH	2004	2A4	177.151 KVA
LARGEST BUS MISMATCH	3006	2B6	21.544 KVA
LARGEST BUS MISMATCH	3006	2B6	2.990 KVA
LARGEST BUS MISMATCH	3006	2B6	.400 KVA
LARGEST BUS MISMATCH	3006	2B6	.053 KVA

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 49 VOLTAGE DROP: 1436. %VD: .89
PROJECTED POWER FLOW: 8551. KW 10448. KVAR 13501. KVA PF: .63 LAGGING
LOSSES THRU FEEDER: 22. KW 139. KVAR 141. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 49 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8551. KW 10448. KVAR 13501. KVA PF: .63 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158147 %VD: 1.8
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 49 VOLTAGE DROP: 1436. %VD: .89
PROJECTED POWER FLOW: 8529. KW 10309. KVAR 13380. KVA PF: .64 LAGGING
LOSSES THRU FEEDER: 22. KW 139. KVAR 141. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 49
PROJECTED POWER FLOW: 8529. KW 10309. KVAR 13380. KVA PF: .64 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 954 VOLTAGE DROP: 248. %VD: 5.97$
PROJECTED POWER FLOW: 2357. KW 6135. KVAR 6572. KVA PF: .36 LAGGING
LOSSES THRU FEEDER: 13. KW 437. KVAR 437. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 954 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2357. KW 6135. KVAR 6572. KVA PF: .36 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 406 VOLTAGE DROP: 60. %VD: 1.44
PROJECTED POWER FLOW: 2400. KW 1444. KVAR 2801. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 406 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1444. KVAR 2801. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3730 %VD: 10.3$
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1259. KW 4986. KVAR
NET BRANCH DIVERSITY LOAD: 637. KW 344. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 954 VOLTAGE DROP: 248. %VD: 5.97$
PROJECTED POWER FLOW: 2344. KW 5698. KVAR 6161. KVA PF: .38 LAGGING
LOSSES THRU FEEDER: 13. KW 437. KVAR 437. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 90 VOLTAGE DROP: 53. %VD: 1.27
PROJECTED POWER FLOW: 448. KW 368. KVAR 580. KVA PF: .77 LAGGING
LOSSES THRU TRANSF: 4.9 KW 30.2 KVAR 30.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3919 %VD: 5.8$
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 406 VOLTAGE DROP: 60. %VD: 1.44
PROJECTED POWER FLOW: 2398. KW 1364. KVAR 2759. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD TO: 3006 2B5 TRANSF AMPS: 151 VOLTAGE DROP: 124. %VD: 2.99
PROJECTED POWER FLOW: 864. KW 552. KVAR 1025. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.0 KW 89.4 KVAR 90.5 KVA

DATE:23 JUL 92 TIME: 2 41 PM PAGE 10
T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 378 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1152. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 378 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1152. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 228 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 228 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 378 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1152. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 157 VOLTAGE DROP: 118. %VD: 2.84
PROJECTED POWER FLOW: 936. KW 539. KVAR 1080. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 15.0 KW 97.0 KVAR 98.2 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 228 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 30. %VD: .73
PROJECTED POWER FLOW: 552. KW 317. KVAR 637. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.3 KW 33.7 KVAR 34.1 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4032 %VD: 3.1
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1843 VOLTAGE DROP: 53. %VD: 1.29
PROJECTED POWER FLOW: 8502. KW 9665. KVAR 12873. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 5. KW 224. KVAR 224. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1843
PROJECTED POWER FLOW: 8502. KW 9665. KVAR 12873. KVA PF: .66 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3979 %VD: 4.4
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 954 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2357. KW 6135. KVAR 6572. KVA PF: .36 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 406 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1444. KVAR 2801. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 378 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1152. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 228 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 711. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1843 VOLTAGE DROP: 53. %VD: 1.29
PROJECTED POWER FLOW: 8497. KW 9441. KVAR 12702. KVA PF: .67 LAGGING
LOSSES THRU FEEDER: 5. KW 224. KVAR 224. KVA

T=15 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 424 %VD: 11.6$
VOLTAGE ANGLE: -6.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 443. KW 338. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 758 VOLTAGE DROP: 6. %VD: 1.27
PROJECTED POWER FLOW: 443. KW 338. KVAR 557. KVA PF: .80 LAGGING
LOSSES THRU TRANSF: 4.9 KW 30.2 KVAR 30.6 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 438 %VD: 8.8$
VOLTAGE ANGLE: -8.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1276 VOLTAGE DROP: 14. %VD: 2.99
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.0 KW 89.4 KVAR 90.5 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 445 %VD: 7.2$
VOLTAGE ANGLE: -7.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1324 VOLTAGE DROP: 14. %VD: 2.84
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 15.0 KW 97.0 KVAR 98.2 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 456 %VD: 5.1$
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 780 VOLTAGE DROP: 3. %VD: .73
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.3 KW 33.7 KVAR 34.1 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
108. KW 1773. KVAR

WARNING STUDY CONTAINS 8 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 11 40 AM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200	OHMS/M FEET							
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600	OHMS/M FEET							
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600	OHMS/M FEET							
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220	OHMS/M FEET							
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	`MPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME:11 40 AM PAGE 4
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	1585	-86.1					
2002 2A2								
2004 2A4	FEEDER	1585	-86.1					
2902 ST2-A	FEEDER	1585	-86.1					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	1585	-86.1					
200 161KV APL								
2901 ST2-CLR	TRANS.	1585	-86.1					
2004 2A4								
3006 2B6	TRANS.	458	-77.9					

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	737.	2983.	CONSTANT Z LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	212.	1040.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME:11 40 AM PAGE 7
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:		3072.70 KVA	
CONVERGENCE CRITERIA:		.154 KVA	
LARGEST BUS MISMATCH	2003 2A3		207.619 KVA
LARGEST BUS MISMATCH	3005 2B5		22.383 KVA
LARGEST BUS MISMATCH	3005 2B5		3.245 KVA
LARGEST BUS MISMATCH	3005 2B5		.451 KVA
LARGEST BUS MISMATCH	3005 2B5		.061 KVA

DATE:23 JUL 92 TIME:11 40 AM PAGE 8
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 46 VOLTAGE DROP: 1262. %VD: .78
PROJECTED POWER FLOW: 8891. KW 8964. KVAR 12626. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 19. KW 122. KVAR 123. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 46 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8891. KW 8964. KVAR 12626. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158321 %VD: 1.7
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 46 VOLTAGE DROP: 1262. %VD: .78
PROJECTED POWER FLOW: 8872. KW 8842. KVAR 12526. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 19. KW 122. KVAR 123. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 46
PROJECTED POWER FLOW: 8872. KW 8843. KVAR 12526. KVA PF: .71 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 492 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 116. KVAR 116. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 492 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 714 VOLTAGE DROP: 180. %VD: 4.32$
PROJECTED POWER FLOW: 2173. KW 4463. KVAR 4964. KVA PF: .44 LAGGING
LOSSES THRU FEEDER: 7. KW 245. KVAR 245. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 714 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2173. KW 4463. KVAR 4964. KVA PF: .44 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3941 %VD: 5.3$
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 492 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2928. KW 1643. KVAR 3358. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 116. KVAR 116. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 159 VOLTAGE DROP: 128. %VD: 3.07
PROJECTED POWER FLOW: 915. KW 585. KVAR 1087. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.1 KVAR 96.3 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3834 %VD: 7.8$
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 626. KW 2533. KVAR
NET BRANCH DIVERSITY LOAD: 1009. KW 517. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 714 VOLTAGE DROP: 180. %VD: 4.32$
PROJECTED POWER FLOW: 2165. KW 4219. KVAR 4742. KVA PF: .46 LAGGING
LOSSES THRU FEEDER: 7. KW 245. KVAR 245. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 193 VOLTAGE DROP: 336. %VD: 8.07$
PROJECTED POWER FLOW: 530. KW 1168. KVAR 1283. KVA PF: .41 LAGGING
LOSSES THRU TRANSF: 22.9 KW 146.. KVAR 148.0 KVA

DATE:23 JUL 92 TIME:11 40 AM PAGE 10
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 115. %VD: 2.76
PROJECTED POWER FLOW: 936. KW 537. KVAR 1079. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.1 KVAR 96.3 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME:11 40 AM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 28. %VD: .67
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4059 %VD: 2.4
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1724 VOLTAGE DROP: 46. %VD: 1.10
PROJECTED POWER FLOW: 8849. KW 8279. KVAR 12118. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 4. KW 196. KVAR 196. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1724
PROJECTED POWER FLOW: 8849. KW 8279. KVAR 12118. KVA PF: .73 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 492 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1760. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 714 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2173. KW 4463. KVAR 4964. KVA PF: .44 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1724 VOLTAGE DROP: 46. %VD: 1.10
PROJECTED POWER FLOW: 8844. KW 8083. KVAR 11982. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 4. KW 196. KVAR 196. KVA

DATE:23 JUL 92 TIME:11 40 AM PAGE 12
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 440 %VD: 8.3$
VOLTAGE ANGLE: -8.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1345 VOLTAGE DROP: 15. %VD: 3.07
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.1 KVAR 96.3 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 404 %VD: 15.9$
VOLTAGE ANGLE: -6.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 150. KW 735. KVAR
NET BRANCH DIVERSITY LOAD: 357. KW 287. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1632 VOLTAGE DROP: 39. %VD: 8.07$
PROJECTED POWER FLOW: 507. KW 1022. KVAR 1141. KVA PF: .44 LAGGING
LOSSES THRU TRANSF: 22.9 KW 146.2 KVAR 148.0 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.3$
VOLTAGE ANGLE: -7.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1311 VOLTAGE DROP: 13. %VD: 2.76
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.1 KVAR 96.3 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 460 %VD: 4.2
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 773 VOLTAGE DROP: 3. %VD: .67
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
116. KW 1611. KVAR

WARNING STUDY CONTAINS 9 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 3 18 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 3 18 PM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M FEET						
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J	.1600	OHMS/M FEET						
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J	.1600	OHMS/M FEET						
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J	.0220	OHMS/M FEET						
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 3 18 PM PAGE 3
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 3 18 PM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 3 18 PM PAGE 5
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	1684	-86.0					
2001 2A1								
2003 2A3	FEEDER	1684	-86.0					
2902 ST2-A	FEEDER	1684	-85.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	1684	-86.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	1684	-86.0					
2003 2A3								
3005 2B5	TRANS.	557	-79.0					

DATE:23 JUL 92 TIME: 3 18 PM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	77?.	2615.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	212.	1040.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2727.99 KVA
CONVERGENCE CRITERIA: .136 KVA

LARGEST BUS MISMATCH	3005	2B5	146.006 KVA
LARGEST BUS MISMATCH	3006	2B6	18.096 KVA
LARGEST BUS MISMATCH	3006	2B6	2.499 KVA
LARGEST BUS MISMATCH	3006	2B6	.332 KVA
LARGEST BUS MISMATCH	3006	2B6	.043 KVA

T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 43 VOLTAGE DROP: 1176. %VD: .73
PROJECTED POWER FLOW: 8483. KW 8320. KVAR 11882. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 17. KW 108. KVAR 109. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 43 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8483. KW 8320. KVAR 11882. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158407 %VD: 1.6
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 43 VOLTAGE DROP: 1176. %VD: .73
PROJECTED POWER FLOW: 8466. KW 8212. KVAR 11795. KVA PF: .72 LAGGING
LOSSES THRU FEEDER: 17. KW 108. KVAR 109. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 43
PROJECTED POWER FLOW: 8466. KW 8213. KVAR 11795. KVA PF: .72 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 692 VOLTAGE DROP: 170. %VD: 4.09$
PROJECTED POWER FLOW: 2302. KW 4242. KVAR 4826. KVA PF: .48 LAGGING
LOSSES THRU FEEDER: 7. KW 230. KVAR 230. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 692 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2302. KW 4242. KVAR 4826. KVA PF: .48 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 401 VOLTAGE DROP: 59. %VD: 1.41
PROJECTED POWER FLOW: 2400. KW 1439. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 77. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 401 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1439. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3858 %VD: 7.3$
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 668. KW 2249. KVAR
NET BRANCH DIVERSITY LOAD: 1009. KW 517. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 692 VOLTAGE DROP: 170. %VD: 4.09$
PROJECTED POWER FLOW: 2295. KW 4012. KVAR 4622. KVA PF: .50 LAGGING
LOSSES THRU FEEDER: 7. KW 230. KVAR 230. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 208 VOLTAGE DROP: 345. %VD: 8.30$
PROJECTED POWER FLOW: 618. KW 1246. KVAR 1390. KVA PF: .44 LAGGING
LOSSES THRU TRANSF: 26.3 KW 162.5 KVAR 164.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3970 %VD: 4.6
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 401 VOLTAGE DROP: 59. %VD: 1.41
PROJECTED POWER FLOW: 2398. KW 1362. KVAR 2757. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 77. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 149 VOLTAGE DROP: 119. %VD: 2.87
PROJECTED POWER FLOW: 864. KW 550. KVAR 1024. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.6 KW 86.9 KVAR 87.9 KVA

DATE:23 JUL 92 TIME: 3 18 PM PAGE 10
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 114. %VD: 2.73
PROJECTED POWER FLOW: 936. KW 536. KVAR 1078. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.6 KW 94.3 KVAR 95.4 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 3 18 PM
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 91 VOLTAGE DROP: 27. %VD: .65
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.1 KW 32.8 KVAR 33.2 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4071 %VD: 2.1
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1622 VOLTAGE DROP: 42. %VD: 1.02
PROJECTED POWER FLOW: 8445. KW 7714. KVAR 11438. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 4. KW 174. KVAR 174. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1622
PROJECTED POWER FLOW: 8445. KW 7714. KVAR 11438. KVA PF: .74 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4029 %VD: 3.2
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 692 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2302. KW 4242. KVAR 4826. KVA PF: .48 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 401 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1439. KVAR 2798. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 373 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1149. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 225 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1622 VOLTAGE DROP: 42. %VD: 1.02
PROJECTED POWER FLOW: 8441. KW 7540. KVAR 11319. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 4. KW 174. KVAR 174. KVA

DATE:23 JUL 92 TIME: 3 18 PM PAGE 12
T=18.2 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 405 %VD: 15.5$
VOLTAGE ANGLE: -6.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 151. KW 742. KVAR
NET BRANCH DIVERSITY LOAD: 440. KW 342. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1758 VOLTAGE DROP: 40. %VD: 8.30$
PROJECTED POWER FLOW: 591. KW 1083. KVAR 1234. KVA PF: .48 LAGGING
LOSSES THRU TRANSF: 26.3 KW 162.5 KVAR 164.6 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 444 %VD: 7.4$
VOLTAGE ANGLE: -7.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1258 VOLTAGE DROP: 14. %VD: 2.87
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.6 KW 86.9 KVAR 87.9 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 452 %VD: 5.9$
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1306 VOLTAGE DROP: 13. %VD: 2.73
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.6 KW 94.3 KVAR 95.4 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 462 %VD: 3.8
VOLTAGE ANGLE: -5.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 770 VOLTAGE DROP: 3. %VD: .65
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.1 KW 32.8 KVAR 33.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
110. KW 1463. KVAR

WARNING STUDY CONTAINS 8 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 3 31 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DATE:23 JUL 92 TIME: 3 31 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 3 31 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 3 31 PM PAGE 4
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 3 31 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	1814	-85.7					
2002 2A2								
2004 2A4	FEEDER	1814	-85.7					
2902 ST2-A	FEEDER	1814	-85.7					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	1814	-85.7					
200 161KV APL								
2901 ST2-CLR	TRANS.	1814	-85.7					
2004 2A4								
3006 2B6	TRANS.	458	-77.9					

DATE:23 JUL 92 TIME: 3 31 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	673.	2721.	CONSTANT Z LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	220.	1075.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

< PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2802.99 KVA
CONVERGENCE CRITERIA: .140 KVA

LARGEST BUS MISMATCH	2003	2A3	205.907 KVA
LARGEST BUS MISMATCH	3005	2B5	22.427 KVA
LARGEST BUS MISMATCH	3005	2B5	3.[illegible]5 KVA
LARGEST BUS MISMATCH	3005	2B5	.458 KVA
LARGEST BUS MISMATCH	3005	2B5	.063 KVA

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 46 VOLTAGE DROP: 1258. %VD: .78
PROJECTED POWER FLOW: 9034. KW 8913. KVAR 12691. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 20. KW 123. KVAR 124. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 46 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 9034. KW 8913. KVAR 12691. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158325 %VD: 1.7
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 46 VOLTAGE DROP: 1258. %VD: .78
PROJECTED POWER FLOW: 9014. KW 8790. KVAR 12591. KVA PF: .72 LAGGING
LOSSES THRU FEEDER: 20. KW 123. KVAR 124. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 46
PROJECTED POWER FLOW: 9014. KW 8791. KVAR 12591. KVA PF: .72 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 492 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2932. KW 1759. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 116. KVAR 116. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 492 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1759. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 3 31 PM PAGE 9
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 716 VOLTAGE DROP: 177. %VD: 4.26$
PROJECTED POWER FLOW: 2314. KW 4404. KVAR 4975. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 7. KW 246. KVAR 246. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 716 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2314. KW 4404. KVAR 4975. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3943 %VD: 5.2$
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 492 VOLTAGE DROP: 72. %VD: 1.73
PROJECTED POWER FLOW: 2929. KW 1643. KVAR 3358. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 116. KVAR 116. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 159 VOLTAGE DROP: 127. %VD: 3.06
PROJECTED POWER FLOW: 915. KW 585. KVAR 1086. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.0 KVAR 96.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3837 %VD: 7.8$
VOLTAGE ANGLE: -4.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 573. KW 2315. KVAR
NET BRANCH DIVERSITY LOAD: 1199 KW 647. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 716 VOLTAGE DROP: 177. %VD: 4.26$
PROJECTED POWER FLOW: 2307. KW 4159. KVAR 4756. KVA PF: .49 LAGGING
LOSSES THRU FEEDER: 7. KW 246. KVAR 246. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 197 VOLTAGE DROP: 346. %VD: 8.31$
PROJECTED POWER FLOW: 536. KW 1196. KVAR 1311. KVA PF: .41 LAGGING
LOSSES THRU TRANSF: 23.9 KW 152.5 KVAR 154.3 KVA

DATE:23 JUL 92 TIME: 3 31 PM PAGE 10
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 115. %VD: 2.76
PROJECTED POWER FLOW: 936. KW 537. KVAR 1079. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.1 KVAR 96.2 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 3 31 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

****

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 28. %VD: .67
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4060 %VD: 2.4
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1733 VOLTAGE DROP: 45. %VD: 1.09
PROJECTED POWER FLOW: 8991. KW 8222. KVAR 12183. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 4. KW 198. KVAR 198. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1733
PROJECTED POWER FLOW: 8991. KW 8222. KVAR 12183. KVA PF: .74 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4015 %VD: 3.5
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 492 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1759. KVAR 3419. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 716 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2314. KW 4404. KVAR 4975. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 375 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1733 VOLTAGE DROP: 45. %VD: 1.09
PROJECTED POWER FLOW: 8986. KW 8023. KVAR 12047. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 4. KW 198. KVAR 198. KVA

DATE:23 JUL 92 TIME: 3 31 PM PAGE 12
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 440 %VD: 8.3$
VOLTAGE ANGLE: -8.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1344 VOLTAGE DROP: 15. %VD: 3.06
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 15.4 KW 95.0 KVAR 96.2 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 403 %VD: 16.1$
VOLTAGE ANGLE: -6.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 155. KW 757. KVAR
NET BRANCH DIVERSITY LOAD: 357. KW 287. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1666 VOLTAGE DROP: 40. %VD: 8.31$
PROJECTED POWER FLOW: 512. KW 1044. KVAR 1163. KVA PF: .44 LAGGING
LOSSES THRU TRANSF: 23.9 KW 152.5 KVAR 154.3 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.3$
VOLTAGE ANGLE: -7.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1311 VOLTAGE DROP: 13. %VD: 2.75
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.7 KW 95.1 KVAR 96.2 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 460 %VD: 4.2
VOLTAGE ANGLE: -5.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 773 VOLTAGE DROP: 3. %VD: .67
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.1 KVAR 33.5 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
117. KW 1627. KVAR

WARNING STUDY CONTAINS 9 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 10 13 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME:10 13 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161 V APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME:10 13 PM PAGE 3
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME:10 13 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	% IMPEDANCE X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME:10 13 PM
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA	KVA %PF	CONSTANT Z KVA	Z %PF	CONSTANT I KVA	I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	1914	-85.6					
2001 2A1								
2003 2A3	FEEDER	1914	-85.6					
2902 ST2-A	FEEDER	1914	-85.6					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	1914	-85.6					
200 161KV APL								
2901 ST2-CLR	TRANS.	1914	-85.6					
2003 2A3								
3005 2B5	TRANS.	557	-79.0					

DATE:23 JUL 92 TIME:10 13 PM PAGE 6
T=22.7 SECONDS, ST #? Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIO'.S INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	673.	2721.	CO''STANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	220.	1075.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2802.99 KVA
CONVERGENCE CRITERIA: .140 KVA
LARGEST BUS MISMATCH 2003 2A3 186.793 KVA
LARGEST BUS MISMATCH 3006 2B6 18.804 KVA
LARGEST BUS MISMATCH 3006 2B6 2.634 KVA
LARGEST BUS MISMATCH 3006 2B6 .354 KVA
LARGEST BUS MISMATCH 3006 2B6 .047 KVA

DATE:23 JUL 92 TIME:10 13 PM PAGE 8
T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 44 VOLTAGE DROP: 1212. %VD: .75
PROJECTED POWER FLOW: 8586. KW 8605. KVAR 12156. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 18. KW 113. KVAR 114. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 44 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8586. KW 8605. KVAR 12156. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158371 %VD: 1.6
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 44 VOLTAGE DROP: 1212. %VD: .75
PROJECTED POWER FLOW: 8568. KW 8493. KVAR 12064. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 18. KW 113. KVAR 114. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 44
PROJECTED POWER FLOW: 8568. KW 8493. KVAR 12064. KVA PF: .71 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 731 VOLTAGE DROP: 180. %VD: 4.34$
PROJECTED POWER FLOW: 2403. KW 4490. KVAR 5092. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 7. KW 257. KVAR 257. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 731 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2403. KW 4490. KVAR 5092. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 402 VOLTAGE DROP: 59. %VD: 1.42
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 78. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 402 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3841 %VD: 7.7$
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 574. KW 2320. KVAR
NET BRANCH DIVERSITY LOAD: 1199. KW 647. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 731 VOLTAGE DROP: 180. %VD: 4.34$
PROJECTED POWER FLOW: 2395. KW 4233. KVAR 4864. KVA PF: .49 LAGGING
LOSSES THRU FEEDER: 7. KW 257. KVAR 257. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 212 VOLTAGE DROP: 354. %VD: 8.52$
PROJECTED POWER FLOW: 622. KW 1265. KVAR 1410. KVA PF: .44 LAGGING
LOSSES THRU TRANSF: 27.3 KW 168.6 KVAR 170.8 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3963 %VD: 4.7
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 402 VOLTAGE DROP: 59. %VD: 1.42
PROJECTED POWER FLOW: 2398. KW 1362. KVAR 2758. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 77. KVAR 78. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 149 VOLTAGE DROP: 120. %VD: 2.89
PROJECTED POWER FLOW: 864. KW 550. KVAR 1024. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.7 KW 87.2 KVAR 88.3 KVA

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 155 VOLTAGE DROP: 114. %VD: 2.74
PROJECTED POWER FLOW: 936. KW 537. KVAR 1079. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.7 KW 94.7 KVAR 95.8 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 91 VOLTAGE DROP: 27. %VD: .66
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.0 KVAR 33.4 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4066 %VD: 2.3
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1660 VOLTAGE DROP: 44. %VD: 1.05
PROJECTED POWER FLOW: 8546. KW 7971. KVAR 11686. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 4. KW 182. KVAR 182. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1660
PROJECTED POWER FLOW: 8546. KW 7971. KVAR 11686. KVA PF: .73 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4022 %VD: 3.3
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 731 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2403. KW 4490. KVAR 5092. KVA PF: .47 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 402 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1440. KVAR 2799. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 [illegible] FEEDER AMPS: 374 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1150. KVAR 2604. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 226 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1660 VOLTAGE DROP: 44. %VD: 1.05
PROJECTED POWER FLOW: 8542. KW 7789. KVAR 11560. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 4. KW 182. KVAR 182. KVA

T=22.7 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 402 %VD: 16.2$
VOLTAGE ANGLE: -6.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 155. KW 755. KVAR
NET BRANCH DIVERSITY LOAD: 440. KW 342. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1790 VOLTAGE DROP: 41. %VD: 8.52$
PROJECTED POWER FLOW: 595. KW 1097. KVAR 1248. KVA PF: .48 LAGGING
LOSSES THRU TRANSF: 27.3 KW 168.6 KVAR 170.8 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 443 %VD: 7.6$
VOLTAGE ANGLE: -8.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1260 VOLTAGE DROP: 14. %VD: 2.89
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.7 KW 87.2 KVAR 88.3 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 451 %VD: 6.1$
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1308 VOLTAGE DROP: 13. %VD: 2.74
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.7 KW 94.7 KVAR 95.8 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 461 %VD: 4.0
VOLTAGE ANGLE: -5.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 771 VOLTAGE DROP: 3. %VD: .66
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.0 KVAR 33.4 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
114. KW 1534. KVAR

WARNING STUDY CONTAINS 8 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 9
TIME: 3 48 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)
COPYRIGHT SKM SYSTEMS ANALYSIS, INC. 1983

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA	KVA %PF	CONSTANT Z KVA	Z %PF	CONSTANT I KVA	I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	494	-80.0					
2002 2A2								
2004 2A4	FEEDER	494	-80.0					
2902 ST2-A	FEEDER	494	-80.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	494	-80.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	494	-80.0					
2004 2A4								
3006 2B6	TRANS.	494	-80.0					

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME	* KW	* KVAR	* LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	2.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	149.	728.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:		2274.45 KVA	
CONVERGENCE CRITERIA:		.114 KVA	
LARGEST BUS MISMATCH	2003	2A3	143.615 KVA
LARGEST BUS MISMATCH	3005	2B5	16.490 KVA
LARGEST BUS MISMATCH	3005	2B5	2.297 KVA
LARGEST BUS MISMATCH	3005	2B5	.311 KVA
LARGEST BUS MISMATCH	3005	2B5	.041 KVA

DATE:23 JUL 92 TIME: 3 48 PM PAGE 8
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 39 VOLTAGE DROP: 913. %VD: .57
PROJECTED POWER FLOW: 8773. KW 6118. KVAR 10696. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 14. KW 87. KVAR 88. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 39 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8773. KW 6118. KVAR 10696. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158670 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 39 VOLTAGE DROP: 913. %VD: .57
PROJECTED POWER FLOW: 8759. KW 6030. KVAR 10635. KVA PF: .82 LAGGI
LOSSES THRU FEEDER: 14. KW 87. KVAR 88. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 39
PROJECTED POWER FLOW: 8759. KW 6031. KVAR 10635. KVA PF: .82 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 483 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 483 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 3 48 PM
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 395 VOLTAGE DROP: 75. %VD: 1.81
PROJECTED POWER FLOW: 2069. KW 1878. KVAR 2795. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2002 ST2-A FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2069. KW 1878. KVAR 2795. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4010 %VD: 3.6
VOLTAGE ANGLE: -4.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 483 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2928. KW 1639. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 156 VOLTAGE DROP: 121. %VD: 2.91
PROJECTED POWER FLOW: 915. KW 581. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.8 KW 91.5 KVAR 92.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4005 %VD: 3.7
VOLTAGE ANGLE: -3.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 75. %VD: 1.81
PROJECTED POWER FLOW: 2067. KW 1803. KVAR 2743. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 162 VOLTAGE DROP: 254. %VD: 6.10$
PROJECTED POWER FLOW: 532. KW 991. KVAR 1125. KVA PF: .47 LAGGING
LOSSES THRU TRANSF: 16.1 KW 103.1 KVAR 104.4 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 3 48 PM PAGE 10
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 109. %VD: 2.62
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.7 KVAR 92.8 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .57
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

DATE:23 JUL 92 TIME: 3 48 PM PAGE 11
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4111 %VD: 1.2
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1460 VOLTAGE DROP: 31. %VD: .74
PROJECTED POWER FLOW: 8743. KW 5626. KVAR 10397. KVA PF: .84 LAGGING
LOSSES THRU FEEDER: 3. KW 141. KVAR 141. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1460
PROJECTED POWER FLOW: 8743. KW 5626. KVAR 10397. KVA PF: .84 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 483 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2069. KW 1878. KVAR 2795. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1460 VOLTAGE DROP: 31. %VD: .74
PROJECTED POWER FLOW: 8740. KW 5486. KVAR 10319. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 3. KW 141. KVAR 141. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 449 %VD: 6.5$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1319 VOLTAGE DROP: 14. %VD: 2.91
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.8 KW 91.5 KVAR 92.6 KVA

DATE:23 JUL 92 TIME: 3 48 PM PAGE 12
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 433 %VD: 9.8$
VOLTAGE ANGLE: -5.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 121. KW 592. KVAR
NET BRANCH DIVERSITY LOAD: 395. KW 276. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1371 VOLTAGE DROP: 29. %VD: 6.10$
PROJECTED POWER FLOW: 516. KW 888. KVAR 1027. KVA PF: .50 LAGGING
LOSSES THRU TRANSF: 16.1 KW 103.1 KVAR 104.4 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 458 %VD: 4.5
VOLTAGE ANGLE: -6.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1287 VOLTAGE DROP: 13. %VD: 2.62
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.7 KVAR 92.8 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 468 %VD: 2.5
VOLTAGE ANGLE: -5.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 760 VOLTAGE DROP: 3. %VD: .57
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
89. KW 1137. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 4 5 -M

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 4 5 -M
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M	FEET					
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600		OHMS/M	FEET					
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220		OHMS/M	FEET					
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000		OHMS/M	FEET					

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 4 5 -M
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 4 5 -M PAGE 4
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 4 5 -M
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA	KVA %PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.
1 SYSTEM									
	200 161KV APL	FEEDER	593	-81.0					
2001 2A1									
	2003 2A3	FEEDER	593	-81.0					
	2902 ST2-A	FEEDER	593	-81.0					REV
2901 ST2-CLR									
	2902 ST2-A	FEEDER	593	-81.0					
200 161KV APL									
	2901 ST2-CLR	TRANS.	593	-81.0					
2003 2A3									
	3005 2B5	TRANS.	593	-81.0					

DATE:23 JUL 92 TIME: 4 5 -M
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1535.	813.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	149.	728.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:		1737.01 KVA	
CONVERGENCE CRITERIA:		.087 KVA	
LARGEST BUS MISMATCH	2003	2A3	111.430 KVA
LARGEST BUS MISMATCH	3006	2B6	13.492 KVA
LARGEST BUS MISMATCH	3006	2B6	1.804 KVA
LARGEST BUS MISMATCH	3006	2B6	.234 KVA
LARGEST BUS MISMATCH	3006	2B6	.030 KVA

DATE:23 JUL 92 TIME: 4 5 -M PAGE 8
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 37 VOLTAGE DROP: 867. %VD: .54
PROJECTED POWER FLOW: 8326. KW 5807. KVAR 10151. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 13. KW 79. KVAR 80. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 37 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8326. KW 5807. KVAR 10151. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158716 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 37 VOLTAGE DROP: 867. %VD: .54
PROJECTED POWER FLOW: 8314. KW 5728. KVAR 10096. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 13. KW 79. KVAR 80. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 37
PROJECTED POWER FLOW: 8314. KW 5729. KVAR 10096. KVA PF: .82 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 411 VOLTAGE DROP: 78. %VD: 1.87
PROJECTED POWER FLOW: 2157. KW 1949. KVAR 2907. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 2. KW 81. KVAR 81. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 411 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2157. KW 1949. KVAR 2907. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4009 %VD: 3.6
VOLTAGE ANGLE: -3.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1535. KW 813. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 411 VOLTAGE DROP: 78. %VD: 1.87
PROJECTED POWER FLOW: 2155. KW 1868. KVAR 2852. KVA PF: .76 LAGGING
LOSSES THRU FEEDER: 2. KW 81. KVAR 81. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 176 VOLTAGE DROP: 263. %VD: 6.33$
PROJECTED POWER FLOW: 620. KW 1055. KVAR 1223. KVA PF: .51 LAGGING
LOSSES THRU TRANSF: 18.9 KW 116.5 KVAR 118.0 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4030 %VD: 3.1
VOLTAGE ANGLE: -3.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2397. KW 1359. KVAR 2756. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 146 VOLTAGE DROP: 114. %VD: 2.74
PROJECTED POWER FLOW: 863. KW 547. KVAR 1022. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.2 KW 84.0 KVAR 85.0 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 4 5 -M
T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 108. %VD: 2.60
PROJECTED POWER FLOW: 935. KW 533. KVAR 1076. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.3 KVAR 92.4 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 23. %VD: .56
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4117 %VD: 1.0
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1386 VOLTAGE DROP: 29. %VD: .71
PROJECTED POWFR FLOW: 8299. KW 5364. KVAR 9881. KVA PF: .84 LAGGING
LOSSES THRU FEEDER: 3. KW 127. KVAR 127. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1386
PROJECTED POWER FLOW: 8299. KW 5364. KVAR 9881. KVA PF .84 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4087 %VD: 1.7
VOLTAGE ANGLE: -2.6 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 411 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2157. KW 1949. KVAR 2907. KVA PF: .74 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1386 VOLTAGE DROP: 29. %VD: .71
PROJECTED POWER FLOW: 8296. KW 5238. KVAR 9811. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 3. KW 127. KVAR 127. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 432 %VD: 9.9$
VOLTAGE ANGLE: -6.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 121. KW 590. KVAR
NET BRANCH DIVERSITY LOAD: 480. KW 348. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1488 VOLTAGE DROP: 30. %VD: 6.33$
PROJECTED POWER FLOW: 601. KW 938. KVAR 1114. KVA PF: .54 LAGGING
LOSSES THRU TRANSF: 18.9 KW 116.5 KVAR 118.0 KVA

T=50 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 452 %VD: 5.9$
VOLTAGE ANGLE: -7.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1237 VOLTAGE DROP: 13. %VD: 2.74
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.2 KW 84.0 KVAR 85.0 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.3
VOLTAGE ANGLE: -6.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1285 VOLTAGE DROP: 12. %VD: 2.60
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.3 KVAR 92.4 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 469 %VD: 2.3
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 758 VOLTAGE DROP: 3. %VD: .56
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
86. KW 1049. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 4 10 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 4 10 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	[illegible]	2009	A4	1	4160.	1000. FT				
	DANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 4 10 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 4 10 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 4 10 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	494	-80.0					
2002 2A2								
2004 2A4	FEEDER	494	-80.0					
2902 ST2-A	FEEDER	494	-80.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	494	-80.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	494	-80.0					
2004 2A4								
3006 2B6	TRANS.	494	-80.0					

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	297.	1456.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:			2274.45 KVA
CONVERGENCE CRITERIA:			.114 KVA
LARGEST BUS MISMATCH	2003	2A3	157.704 KVA
LARGEST BUS MISMATCH	3005	2B5	18.146 KVA
LARGEST BUS MISMATCH	3005	2B5	2.600 KVA
LARGEST BUS MISMATCH	3005	2B5	.359 KVA
LARGEST BUS MISMATCH	3005	2B5	.048 KVA

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 40 VOLTAGE DROP: 997. %VD: .62
PROJECTED POWER FLOW: 8888. KW 6788. KVAR 11184. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 15. KW 95. KVAR 97. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 40 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8888. KW 6788. KVAR 11184. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158586 %VD: 1.5
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 40 VOLTAGE DROP: 997. %VD: .62
PROJECTED POWER FLOW: 8873. KW 6693. KVAR 11114. KVA PF: .80 LAGGING
LOSSES THRU FEEDER: 15. KW 95. KVAR 97. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 40
PROJECTED POWER FLOW: 6873. KW 6693. KVAR 11115. KVA PF: .80 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 485 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 485 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 470 VOLTAGE DROP: 100. %VD: 2.39
PROJECTED POWER FLOW: 2181. KW 2487. KVAR 3308. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 3. KW 106. KVAR 106. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 470 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2181. KW 2487. KVAR 3308. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3993 %VD: 4.0
VOLTAGE ANGLE: -4.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 485 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2928. KW 1640. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 157 VOLTAGE DROP: 122. %VD: 2.94
PROJECTED POWER FLOW: 915. KW 582. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.9 KW 92.3 KVAR 93.5 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3965 %VD: 4.7
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 470 VOLTAGE DROP: 100. %VD: 2.39
PROJECTED POWER FLOW: 2178. KW 2381. KVAR 3227. KVA PF: .67 LAGGING
LOSSES THRU FEEDER: 3. KW 106. KVAR 103. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 247 VOLTAGE DROP: 459. %VD:11.04$
PROJECTED POWER FLOW: 644. KW 1569. KVAR 1696. KVA PF: .38 LAGGING
LOSSES THRU TRANSF: 37.4 KW 239.1 KVAR 242.0 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 4 10 PM PAGE 10
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANAIYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 406. %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 P5 TRANSF AMPS: 153 VOLTAGE DROP: 110. %VD: 2.65
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.5 KVAR 93.6 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 25. %VD: .60
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.2 KVAR 32.6 KVA

DATE:23 JUL 92 TIME: 4 10 PM PAGE 11
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4099 %VD: 1.5
VOLTAGE ANGLE: -2.1 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1527 VOLTAGE DROP: 34. %VD: .82
PROJECTED POWER FLOW: 8855. KW 6251. KVAR 10839. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 3. KW 154. KVAR 154. KVA

LOAD FROM: 200 161KV AFL AND: 1200 H BUSES 3WXFMR AMPS: 1527
PROJECTED POWER FLOW: 8855. KW 6251. KVAR 10839. KVA PF: .82 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4064 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 485 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 470 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2181. KW 2487. KVAR 3308. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1527 VOLTAGE DROP: 34. %VD: .82
PROJECTED POWER FLOW: 8852. KW 6097. KVAR 10748. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 3. KW 154. KVAR 154. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 447 %VD: 6.9$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 20[illegible] 2A3 TRANSF AMPS: 1324 VOLTAGE DROP: 14. %VD: 2.94
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.9 KW 92.3 KVAR 93.5 KVA

DATE:23 JUL 92 TIME: 4 10 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 404 %VD: 15.7$
VOLTAGE ANGLE: -6.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 211. KW 1034. KVAR
NET BRANCH DIVERSITY LOAD: 395. KW 296. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 2087 VOLTAGE DROP: 53. %VD:11.04$
PROJECTED POWER FLOW: 606. KW 1330. KVAR 1462. KVA PF: .41 LAGGING
LOSSES THRU TRANSF: 37.4 KW 239.1 KVAR 242.0 KVA

LOAD BUS. 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 456 %VD: 5.0
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1293 VOLTAGE DROP: 13. %VD: 2.65
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.5 KVAR 93.6 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 466 %VD: 2.9
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 763 VOLTAGE DROP: 3. %VD: .60
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.2 KVAR 32.6 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
115. KW 1366. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 10 38 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	DESCRIPTION TYPE	DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M FEET						
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J .1600		OHMS/M FEET						
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J .0220		OHMS/M FEET						
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J .0000		OHMS/M FEET						

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7300	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	593	-81.0					
2001 2A1								
2003 2A3	FEEDER	593	-81.0					
2902 ST2-A	FEEDER	593	-81.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	593	-81.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	593	-81.0					
2003 2A3								
3005 2B5	TRANS.	593	-81.0					

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Re: Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1535.	813.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	297.	1456.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:			1737.01 KVA
CONVERGENCE CRITERIA:			.087 KVA
LARGEST BUS MISMATCH	3005	2B5	157.271 KVA
LARGEST BUS MISMATCH	3006	2B6	15.023 KVA
LARGEST BUS MISMATCH	3006	2B6	2.077 KVA
LARGEST BUS MISMATCH	3006	2B6	.277 KVA
LARGEST BUS MISMATCH	3006	2B6	.036 KVA

DATE:23 JUL 92 TIME:10 38 PM PAGE 8
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 39 VOLTAGE DROP: 951. %VD: .59
PROJECTED POWER FLOW: 8443. KW 6482. KVAR 10644. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 14. KW 86. KVAR 88. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 39 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8443. KW 6482. KVAR 10644. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158632 %VD: 1.5
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 39 VOLTAGE DROP: 951. %VD: .59
PROJECTED POWER FLOW: 8429. KW 6396. KVAR 10581. KVA PF: .80 LAGGING
LOSSES THRU FEEDER: 14. KW 86. KVAR 88. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 39
PROJECTED POWER FLOW: 8429. KW 6396. KVAR 10581. KVA PF: .80 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 486 VOLTAGE DROP: 102. %VD: 2.46
PROJECTED POWER FLOW: 2271. KW 2565. KVAR 3426. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 486 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2271. KW 2565. KVAR 3426. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 396 VOLTAGE DROP: 58. %VD: 1.40
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 396 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3969 %VD: 4.6
VOLTAGE ANGLE: -3.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1535. KW 813. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 486 VOLTAGE DROP: 102. %VD: 2.46
PROJECTED POWER FLOW: 2268. KW 2451. KVAR 3339. KVA PF: .68 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 261 VOLTAGE DROP: 462. %VD:11.11$
PROJECTED POWER FLOW: 733. KW 1638. KVAR 1795. KVA PF: .41 LAGGING
LOSSES THRU TRANSF: 41.4 KW 255.9 KVAR 259.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4013 %VD: 3.5
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 396 VOLTAGE DROP: 58. %VD: 1.40
PROJECTED POWER FLOW: 2397. KW 1360. KVAR 2756. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: [illegible]6 2B6 TRANSF AMPS: 147 VOLTAGE DROP: 115. %VD: 2.77
PROJECTED POWER FLOW: 863. KW 548. KVAR 1022. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.3 KW 84.8 KVAR 85.8 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME:10 38 PM PAGE 10
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4071 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 153 VOLTAGE DROP: 110. %VD: 2.64
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.1 KVAR 93.2 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .59
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.1 KVAR 32.5 KVA

DATE:23 JUL 92 TIME:10 38 PM
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4104 %VD: 1.3
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1453 VOLTAGE DROP: 33. %VD: .79
PROJECTED POWER FLOW: 8413. KW 5995. KVAR 10330. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 3. KW 139. KVAR 139. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1453
PROJECTED POWER FLOW: 8413. KW 5995. KVAR 10330. KVA PF: .81 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 486 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2271. KW 2565. KVAR 3426. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 396 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1453 VOLTAGE DROP: 33. %VD: .79
PROJECTED POWER FLOW: 8410. KW 5856. KVAR 10248. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 3. KW 139. KVAR 139. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 405 %VD: 15.7$
VOLTAGE ANGLE: -6.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 211. KW 1035. KVAR
NET BRANCH DIVERSITY LOAD: 480. KW 348. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 2205 VOLTAGE DROP: 53. %VD:11.11$
PROJECTED POWER FLOW: 691. KW 1382. KVAR 1546. KVA PF: .45 LAGGING
LOSSES THRU TRANSF: 41.4 KW 255.9 KVAR 259.2 KVA

T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.3$
VOLTAGE ANGLE: -7.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1242 VOLTAGE DROP: 13. %VD: 2.77
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.3 KW 84.8 KVAR 85.8 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 457 %VD: 4.8
VOLTAGE ANGLE: -6.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1290 VOLTAGE DROP: 13. %VD: 2.64
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.1 KVAR 93.2 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 467 %VD: 2.7
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 761 VOLTAGE DROP: 3. %VD: .59
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.1 KVAR 32.5 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
113. KW 1280. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 4 48 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 4 48 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	TO NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLP	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 4 48 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 4 48 PM PAGE 4
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 4 48 PM PAGE 5
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	568	-80.0					
2002 2A2								
2004 2A4	FEEDER	568	-80.0					
2902 ST2-A	FEEDER	568	-80.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	568	-80.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	568	-80.0					
2004 2A4								
3006 2B6	TRANS.	568	-80.0					

DATE:23 JUL 92 TIME: 4 48 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	290.	1422.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 4 48 PM PAGE 7
T=70 SECONDS, ST #2 Unit 2 MSL Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2274.45 KVA
CONVERGENCE CRITERIA: .114 KVA

LARGEST BUS MISMATCH	3006	2B6	153.420 KVA
LARGEST BUS MISMATCH	3005	2B5	18.327 KVA
LARGEST BUS MISMATCH	3005	2B5	2.656 KVA
LARGEST BUS MISMATCH	3005	2B5	.371 KVA
LARGEST BUS MISMATCH	3005	2B5	.051 KVA

DATE:23 JUL 92 TIME: 4 48 PM PAGE 8
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Load Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 41 VOLTAGE DROP: 1002. %VD: .62
PROJECTED POWER FLOW: 8944. KW 6826. KVAR 11251. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 15. KW 97. KVAR 98. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 41 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8944. KW 6826. KVAR 11251. KVA PF: .79 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158581 %VD: 1.5
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 41 VOLTAGE DROP: 1002. %VD: .62
PROJECTED POWER FLOW: 8928. KW 6730. KVAR 11181. KVA PF: .80 LAGGING
LOSSES THRU FEEDER: 15. KW 97. KVAR 98. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 41
PROJECTED POWER FLOW: 8928. KW 6730. KVAR 11181. KVA PF: .80 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 485 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 485 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 4 48 PM PAGE 9
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 478 VOLTAGE DROP: 101. %VD: 2.42
PROJECTED POWER FLOW: 2235. KW 2517. KVAR 3366. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 3. KW 110. KVAR 110. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 478 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2235. KW 2517. KVAR 3366. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3993 %VD: 4.0
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 485 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2928. KW 1640. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 157 VOLTAGE DROP: 122. %VD: 2.94
PROJECTED POWER FLOW: 915. KW 582. KVAR 1084. KVA PF .84 LAGGING
LOSSES THRU TRANSF: 14.9 KW 92.3 KVAR 93.5 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3963 %VD: 4.7
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 478 VOLTAGE DROP: 101. %VD: 2.42
PROJECTED POWER FLOW: 2232. KW 2407. KVAR 3283. KVA PF: .68 LAGGING
LOSSES THRU FEEDER: 3. KW 110. KVAR 110. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 254 VOLTAGE DROP: 470. %VD:11.31$
PROJECTED POWER FLOW: 698. KW 1595. KVAR 1741. KVA PF: .40 LAGGING
LOSSES THRU TRANSF: 39.5 KW 252.2 KVAR 255.3 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 153 VOLTAGE DROP: 110. %VD: 2.65
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.5 KVAR 93.6 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 25. %VD: .60
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF. 5.0 KW 32.2 KVAR 32.6 KVA

DATE:23 JUL 92 TIME: 4 48 PM
T=70 SECONDS, SI #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4098 %VD: 1.5
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1536 VOLTAGE DROP: 34. %VD: .83
PROJECTED POWER FLOW: 8910. KW 6283. KVAR 10902. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 3. KW 156. KVAR 156. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1536
PROJECTED POWER FLOW: 8910. KW 6283. KVAR 10902. KVA PF: .82 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4063 %VD: 2.3
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 485 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2932. KW 1753. KVAR 3416. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 478 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2235. KW 2517. KVAR 3366. KVA PF: .66 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 370 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1149. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1536 VOLTAGE DROP: 34. %VD: .83
PROJECTED POWER FLOW: 8906. KW 6127. KVAR 10810. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 3. KW 156. KVAR 156. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 447 %VD: 7.0$
VOLTAGE ANGLE: -8.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1325 VOLTAGE DROP: 14. %VD: 2.94
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.9 KW 92.3 KVAR 93.5 KVA

DATE:23 JUL 92 TIME: 6 48 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 403 %VD: 16.1$
VOLTAGE ANGLE: -6.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 204. KW 1002. KVAR
NET BRANCH DIVERSITY LOAD: 454. KW 341. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 2143 VOLTAGE DROP: 54. %VD:11.31$
PROJECTED POWER FLOW: 659. KW 1343. KVAR 1496. KVA PF: .44 LAGGING
LOSSES THRU TRANSF: 39.5 KW 252.2 KVAR 255.3 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 456 %VD: 5.0
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1293 VOLTAGE DROP: 13. %VD: 2.65
PROJECTED POWER FLOW: 921. KW 442. VAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 4.3 KW 92.5 KVAR 93.6 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 466 %VD: 2.9
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 763 VOLTAGE DROP: 3. %VD: .60
PROJECTED POWER FLOW 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.2 KVAR 32.6 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
118. KW 1392. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 5 11 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 5 11 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200	OHMS/M FEET							
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600	OHMS/M FEET							
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600	OHMS/M FEET							
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220	OHMS/M FEET							
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000	OHMS/M FEET							

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 5 11 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOCP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 5 11 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2300	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 5 11 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM / TO BUS / BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	667	-81.0					
2001 2A1								
2003 2A3	FEEDER	667	-81.0					
2902 ST2-A	FEEDER	667	-81.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	667	-81.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	667	-81.0					
2003 2A3								
3005 2B5	TRANS.	667	-81.0					

DATE:23 JUL 92 TIME: 5 11 PM PAGE 6
T=70 SECONDS, ST #1 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1535.	813.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	220.	1075.	CONSTANT Z LOAD
3006	2B6	650.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 5 11 PM PAGE 7
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 1737.01 KVA
CONVERGENCE CRITERIA: .087 KVA
LARGEST BUS MISMATCH 3005 2B5 150.040 KVA
LARGEST BUS MISMATCH 3005 2B5 13.817 KVA
LARGEST BUS MISMATCH 3006 2B6 1.995 KVA
LARGEST BUS MISMATCH 3006 2B6 .267 KVA
LARGEST BUS MISMATCH 3006 2B6 .035 KVA

DATE:23 JUL 92 TIME: 5 11 PM PAGE 8
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159563 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 38 VOLTAGE DROP: 917. %VD: .57
PROJECTED POWER FLOW: 8446. KW 6206. KVAR 10481. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 13. KW 84. KVAR 85. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 38 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8446. KW 6206. KVAR 10481. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158666 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 38 VOLTAGE DROP: 917. %VD: .57
PROJECTED POWER FLOW: 8433. KW 6122. KVAR 10421. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 13. KW 84. KVAR 85. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 38
PROJECTED POWER FLOW: 8433. KW 6122. KVAR 10421. KVA PF: .81 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 459 VOLTAGE DROP: 92. %VD: 2.22
PROJECTED POWER FLOW: 2275. KW 2309. KVAR 3241. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 3. KW 101. KVAR 101. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 459 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2275. KW 2309. KVAR 3241. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 396 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 396 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3986 %VD: 4.2
VOLTAGE ANGLE: -3.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1535. KW 813. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 459 VOLTAGE DROP: 92. %VD: 2.22
PROJECTED POWER FLOW: 2272. KW 2207. KVAR 3168. KVA PF: .72 LAGGING
LOSSES THRU FEEDER: 3. KW 101. KVAR 101. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 228 VOLTAGE DROP: 381. %VD: 9.15$
PROJECTED POWER FLOW: 737. KW 1394. KVAR 1577. KVA PF: .47 LAGGING
LOSSES THRU TRANSF: 31.7 KW 196.0 KVAR 198.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4020 %VD: 3.4
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 396 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2397. KW 1359. KVAR 2756. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 147 VOLTAGE DROP: 115. %VD: 2.76
PROJECTED POWER FLOW: 863. KW 547. KVAR 1022. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.2 KW 84.4 KVAR 85.5 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 109. %VD: 2.62
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.8 KVAR 92.9 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .58
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

DATE:23 JUL 92 TIME: 5 11 PM PAGE 11
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4109 %VD: 1.2
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1431 VOLTAGE DROP: 31. %VD: .76
PROJECTED POWER FLOW: 8417. KW 5734. KVAR 10184. KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 3. KW 135. KVAR 135. KVA

LOAD FROM: 200 161KV APL AND 1200 H BUSES 3WXFMR AMPS: 1431
PROJECTED POWER FLOW: 8417. KW 5734. KVAR 10184. KVA PF: .83 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4078 %VD: 2.0
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 459 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2275. KW 2309. KVAR 3241. KVA PF: .70 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 396 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1435. KVAR 2796. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1431 VOLTAGE DROP: 31. %VD: .76
PROJECTED POWER FLOW: 8414. KW 5599. KVAR 101 KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 3. KW 135. KVAR 135. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 416 %VD: 13.3$
VOLTAGE ANGLE: -6.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 165. KW 807. KVAR
NET BRANCH DIVERSITY LOAD: 540. KW 391. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1930 VOLTAGE DROP: 44. %VD: 9.15$
PROJECTED POWER FLOW: 705. KW 1198. KVAR 1391. KVA PF: .51 LAGGING
LOSSES THRU TRANSF: 31.7 KW 196.0 KVAR 198.6 KVA

DATE:23 JUL 92 TIME: 5 11 PM
T=70 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 451 %VD: 6.1$
VOLTAGE ANGLE: -7.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1240 VOLTAGE DROP: 13. %VD: 2.76
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.2 KW 84.4 KVAR 85.5 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 458 %VD: 4.6
VOLTAGE ANGLE: -6.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1288 VOLTAGE DROP: 13. %VD: 2.62
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.8 KVAR 92.9 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 468 %VD: 2.5
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 760 VOLTAGE DROP: 3. %VD: .58
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
102. KW 1187. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 5 17 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 5 17 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO NAME	FEEDER TO NO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1 SYSTEM	200 161KV APL	1	161000.	1000.	FT			
IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET							
2001 2A1	2003 2A3	1	4160.	1000.	FT			
IMPEDANCE:	.0047 + J .1600 OHMS/M FEET							
2001 2A1	2902 ST2-A	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							
2002 2A2	2004 2A4	1	4160.	1000.	FT			
IMPEDANCE:	.0047 + J .1600 OHMS/M FEET							
2002 2A2	2902 ST2-A	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							
2006 A1	2008 A3	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							
2007 A2	2009 A4	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							
2901 ST2-CLR	2902 ST2-A	1	4160.	1000.	FT			
IMPEDANCE:	.0005 + J .0220 OHMS/M FEET							
2902 ST2-A	2006 A1	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							
2902 ST2-A	2007 A2	1	4160.	1000.	FT			
IMPEDANCE:	.0000 + J .0000 OHMS/M FEET							

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 5 17 PM PAGE 3
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 5 17 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 5 17 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	642	-80.0					
2002 2A2								
2004 2A4	FEEDER	642	-80.0					
2902 ST2-A	FEEDER	642	-80.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	642	-80.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	642	-80.0					
2004 2A4								
3006 2B6	TRANS.	642	-80.0					

DATE:23 JUL 92 TIME: 5 17 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME	* KW	* KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	194.	950.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:		2274.45 KVA	
CONVERGENCE CRITERIA:		.114 KVA	
LARGEST BUS MISMATCH	3006	2B6	139.092 KVA
LARGEST BUS MISMATCH	3005	2B5	17.491 KVA
LARGEST BUS MISMATCH	3005	2B5	2.518 KVA
LARGEST BUS MISMATCH	3005	2B5	.351 KVA
LARGEST BUS MISMATCH	3005	2B5	.048 KVA

DATE.23 JUL 92 TIME: 5 17 PM PAGE 8
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM T=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
TO: 200 161KV APL FEEDER AMPS: 40 VOLTAGE DROP: 958. %VD: .60
POWER FLOW: 8931. KW 6466. KVAR 11026. KVA PF: .81 LAGGING
THRU FEEDER: 15. KW 93. KVAR 94. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 40 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8931. KW 6466. KVAR 11026. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158625 %VD: 1.5
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 40 VOLTAGE DROP: 958 %VD: .60
PROJECTED POWER FLOW: 8917. KW 6374. KVAR 10960. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 15. KW 93. KVAR 94. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 40
PROJECTED POWER FLOW: 8917. KW 6374. KVAR 10960. KVA PF: .81 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A3 FEEDER AMPS: 484 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 484 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 5 17 PM PAGE 9
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 44[illegible] VOLTAGE DROP: 88. %VD: 2.10
PROJECTED POWER FLOW: 2225. KW 2186. KVAR 3119. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 3. KW 94. KVAR 94. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 442 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2225. KW 2186. KVAR 3119. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4001 %VD: 3.8
VOLTAGE ANGLE: -4.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 484 VOLTAGE DROP: 71. %VD: 1.70
PROJECTED POWER FLOW: 2928. KW 1640. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 113. KVAR 113. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 156 VOLTAGE DROP: 122. %VD: 2.92
PROJECTED POWER FLOW: 915. KW 582. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.9 KW 91.9 KVAR 93.1 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3984 %VD: 4.2
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 442 VOLTAGE DROP: 88. %VD: 2.10
PROJECTED POWER FLOW: 2222. KW 2092. KVAR 3052. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 3. KW 94. KVAR 94. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 211 VOLTAGE DROP: 360. %VD: 8.65$
PROJECTED POWER FLOW: 688. KW 1280. KVAR 1453. KVA PF: .47 LAGGING
LOSSES THRU TRANSF: 27.2 KW 173.8 KVAR 175.9 KVA

LOAD BUS: 2006 [illegible] DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603 KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW [illegible]. KVAR 0. KVA

DATE:23 JUL 92 TIME: 5 17 PM PAGE 10
T=60 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 153 VOLTAGE DROP: 110. %VD: 2.63
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.3 KW 93.1 KVAR 93.2 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .59
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.1 KVAR 32.5 KVA

DATE:23 JUL 92 TIME: 5 17 PM PAGE 11
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOCA
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4104 %VD: 1.3
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1505 VOLTAGE DROP: 33. %VD: .78
PROJECTED POWER FLOW: 8899. KW 5944. KVAR 10701. KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 3. KW 150. KVAR 150. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1505
PROJECTED POWER FLOW: 8899. KW 5944. KVAR 10701. KVA PF: .83 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4072 %VD: 2.1
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 484 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 442 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2225. KW 2186. KVAR 3119. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 369 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2603. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 223 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1505 VOLTAGE DROP: 33. %VD: .78
PROJECTED POWER FLOW: 8896. KW 5795. KVAR 10616. KVA PF: .84 LAGGING
LOSSES THRU FEEDER: 3. KW 150. KVAR 150. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 448 %VD: 6.7$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1322 VOLTAGE DROP: 14. %VD: 2.92
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.9 KW 91.9 KVAR 93.1 KVA

DATE:23 JUL 92 TIME: 5 17 PM PAGE 12
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 418 %VD: 12.9$
VOLTAGE ANGLE: -6.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 147. KW 721. KVAR
NET BRANCH DIVERSITY LOAD: 514. KW 385. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1779 VOLTAGE DROP: 42. %VD: 8.65$
PROJECTED POWER FLOW: 661. KW 1106. KVAR 1289. KVA PF: .51 LAGGING
LOSSES THRU TRANSF: 27.2 KW 173.8 KVAR 175.9 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 457 %VD: 4.8
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1290 VOLTAGE DROP: 13. %VD: 2.63
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.3 KW 92.1 KVAR 93.2 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 467 %VD: 2.7
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 761 VOLTAGE DROP: 3. %VD: .59
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.1 KVAR 32.5 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
103. KW 1268. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 8 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV ANL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, CT #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	741	-81.0					
2001 2A1								
2003 2A3	FEEDER	741	-81.0					
2902 ST2-A	FEEDER	741	-81.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	741	-81.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	741	-81.0					
2003 2A3								
3005 2B5	TRANS.	741	-81.0					

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BUS SPECIAL STUDY DATA

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1535.	813.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	135.	659.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD:			1737.01 KVA
CONVERGENCE CRITERIA:			.087 KVA
LARGEST BUS MISMATCH	3005	2B5	130.717 KVA
LARGEST BUS MISMATCH	3005	2B5	13.275 KVA
LARGEST BUS MISMATCH	3006	2B6	1.880 KVA
LARGEST BUS MISMATCH	3006	2B6	.251 KVA
LARGEST BUS MISMATCH	3006	2B6	.033 KVA

T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 37 VOLTAGE DROP: 877. %VD: .54
PROJECTED POWER FLOW: 8437. KW 5872. KVAR 10280. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 13. KW 81. KVAR 82. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 37 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8437. KW 5872. KVAR 10280. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158706 %VD: 1.4
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 37 VOLTAGE DROP: 877. %VD: .54
PROJECTED POWER FLOW: 8425. KW 5791. KVAR 10223. KVA PF: .82 LAGGING
LOSSES THRU FEEDER: 13. KW 81. KVAR 82. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 37
PROJECTED POWER FLOW: 8425. KW 5792. KVAR 10223. KVA PF: .82 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 427 VOLTAGE DROP: 80. %VD: 1.92
PROJECTED POWER FLOW: 2268. KW 1999. KVAR 3023. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 0. KW 88. KVAR 88. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 427 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2268. KW 1999. KVAR 3023. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4006 %VD: 3.7
VOLTAGE ANGLE: -3.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1535. KW 813. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 427 VOLTAGE DROP: 80. %VD: 1.92
PROJECTED POWER FLOW: 2265. KW 1911. KVAR 2964. KVA PF: .76 LAGGING
LOSSES THRU FEEDER: 3. KW 88. KVAR 88. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 190 VOLTAGE DROP: 282. %VD: 6.78$
PROJECTED POWER FLOW: 730. KW 1098. KVAR 1319. KVA PF: .55 LAGGING
LOSSES THRU TRANSF: 22.0 KW 135.7 KVAR 137.4 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -4.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2397. KW 1359. KVAR 2756. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 146 VOLTAGE DROP: 114. %VD: 2.74
PROJECTED POWER FLOW: 863. KW 547. KVAR 1022. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.2 KW 84.1 KVAR 85.1 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

****

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 108. %VD: 2.60
PROJECTED POWER FLOW: 935. KW 533. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.4 KVAR 92.5 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .57
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.9 KVAR 32.3 KVA

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT 0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4116 %VD: 1.1
VOLTAGE ANGLE: -2.0 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1403 VOLTAGE DROP: 30. %VD: .71
PROJECTED POWER FLOW: 8409. KW 5418. KVAR 10003. KVA PF: .84 LAGGING
LOSSES THRU FEEDER: 3. KW 130. KVAR 130. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1403
PROJECTED POWER FLOW: 8409. KW 5418. KVAR 10003. KVA PF: .84 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4086 %VD: 1.8
VOLTAGE ANGLE: -2.7 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 427 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2268. KW 1999. KVAR 3023. KVA PF: .75 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1403 VOLTAGE DROP: 30. %VD: .71
PROJECTED POWER FLOW: 8406. KW 5288. KVAR 9931. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 3. KW 130. KVAR 130. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 430 %VD: 10.5$
VOLTAGE ANGLE: -6.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 108. KW 528. KVAR
NET BRANCH DIVERSITY LOAD: 600. KW 435. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1606 VOLTAGE DROP: 33. %VD: 6.78$
PROJECTED POWER FLOW: 708. KW 963. KVAR 1195. KVA PF: .59 LAGGING
LOSSES THRU TRANSF: 22.0 KW 135.7 KVAR 137.4 KVA

DATE:23 JUL 92 TIME: 7 8 PM
T=80 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 452 %VD: 5.9$
VOLTAGE ANGLE: -7.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1237 VOLTAGE DROP: 13. %VD: 2.74
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.2 KW 84.1 KVAR 85.1 KVA

LOAD BUS: 3005 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.4
VOLTAGE ANGLE: -6.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1285 VOLTAGE DROP: 13. %VD: 2.60
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.4 KVAR 92.5 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 469 %VD: 2.3
VOLTAGE ANGLE: -5.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 759 VOLTAGE DROP: 3. %VD: .57
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.9 KVAR 32.3 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
90. KW 1089. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 14 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 7 14 PM
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .0000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 14 PM
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

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SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV AIL	161000.	*	PRI-SEC	.2000 + J	4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900 + J	4.6000	12600.0
TERTIARY	2301	ST2-CLR	4160.	*	SEC-TER	.3700 + J	8.0000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 14 PM PAGE 5
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA %PF	CONSTANT Z KVA %PF	CONSTANT I KVA %PF	FLOW DIR.
1 SYSTEM					
200 161KV APL	FEEDER	2473 -86.0			
2001 2A1					
2003 2A3	FEEDER	2473 -86.0			
2902 ST2-A	FEEDER	2473 -86.0			REV
2901 ST2-CLR					
2902 ST2-A	FEEDER	2473 -86.0			
200 161KV APL					
2901 ST2-CLR	TRANS.	2473 -86.0			
2003 2A3					
3005 2B5	TRANS.	741 -81.0			

DATE:23 JUL 92 TIME: 7 14 PM
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME	* KW	* KVAR *	LOAD/GENERATION
2003	2A3	1023.	3961.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	149.	728.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 7 14 PM
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

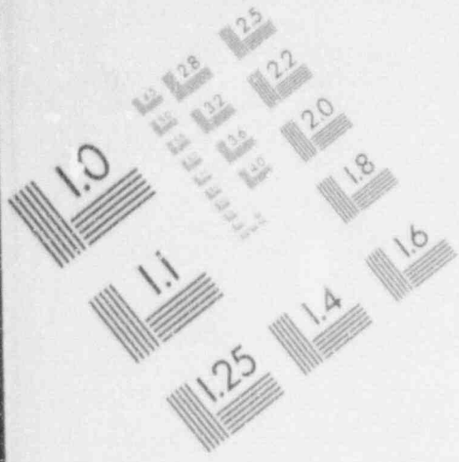
TOP SIZE: 58

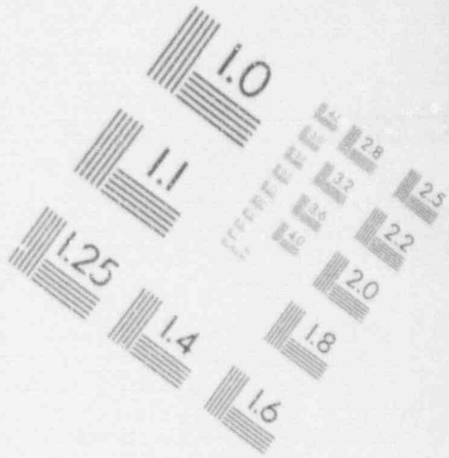
LARGEST LOAD: 4090.97 KVA
CONVERGENCE CRITERIA: .205 KVA

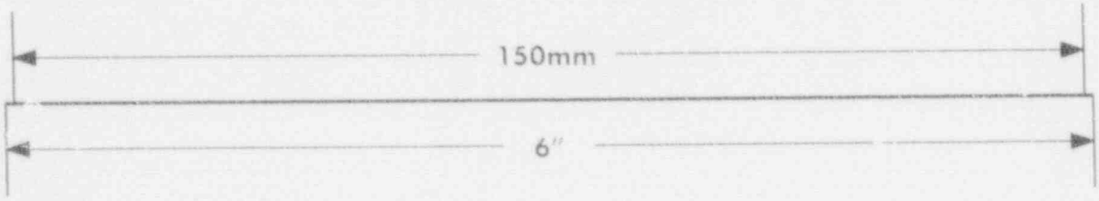
LARGEST BUS MISMATCH	2003	2A3	289.293 KVA
LARGEST BUS MISMATCH	3005	2B5	24.329 KVA
LARGEST BUS MISMATCH	3006	2B6	3.240 KVA
LARGEST BUS MISMATCH	3006	2B6	.462 KVA
LARGEST BUS MISMATCH	3006	2B6	.064 KVA

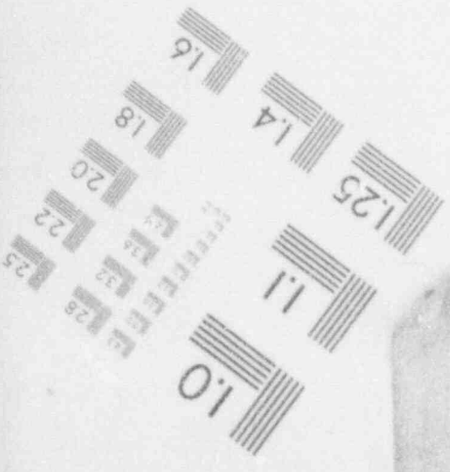
1

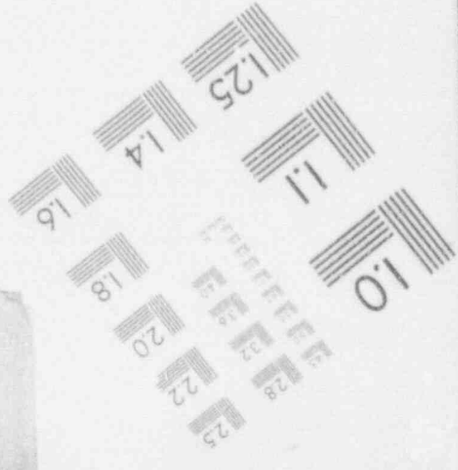
IMAGE EVALUATION TEST TARGET (MT-3)











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T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 49 VOLTAGE DROP: 1382. %VD: .86
PROJECTED POWER FLOW: 9301. KW 9892. KVAR 13578. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 23. KW 141. KVAR 142. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 49 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 9301. KW 9892. KVAR 13578. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158200 %VD: 1.7
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 49 VOLTAGE DROP: 1382. %VD: .86
PROJECTED POWER FLOW: 9279. KW 9752. KVAR 13461. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 23. KW 141. KVAR 142. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 49
PROJECTED POWER FLOW: 9279. KW 9752. KVAR 13461. KVA PF: .69 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 922 VOLTAGE DROP: 225. %VD: 5.41$
PROJECTED POWER FLOW: 3107. KW 5569. KVAR 6377. KVA PF: .49 LAGGING
LOSSES THRU FEEDER: 12. KW 408. KVAR 409. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 922 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 3107. KW 5569. KVAR 6377. KVA PF: .49 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 405 VOLTAGE DROP: 59. %VD: 1.43
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 405 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3767 %VD: 9.5$
VOLTAGE ANGLE: -4.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 839. KW 3247. KVAR
NET BRANCH DIVERSITY LOAD: 1529. KW 825. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 922 VOLTAGE DROP: 225. %VD: 5.41$
PROJECTED POWER FLOW: 3095. KW 5161. KVAR 6018. KVA PF: .51 LAGGING
LOSSES THRU FEEDER: 12. KW 408. KVAR 409. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 201 VOLTAGE DROP: 309. %VD: 7.42$
PROJECTED POWER FLOW: 728. KW 1089. KVAR 1310. KVA PF: .56 LAGGING
LOSSES THRU TRANSF: 24.5 KW 151.3 KVAR 153.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3932 %VD: 5.5$
VOLTAGE ANGLE: -4.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 912. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 405 VOLTAGE DROP: 59. %VD: 1.43
PROJECTED POWER FLOW: 2398. KW 1364. KVAR 2758. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 150 VOLTAGE DROP: 123. %VD: 2.96
PROJECTED POWER FLOW: 864. KW 552. KVAR 1025. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.9 KW 88.7 KVAR 89.8 KVA

DATE:23 JUL 92 TIME: 7 14 PM PAGE 10
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 156 VOLTAGE DROP: 117. %VD: 2.81
PROJECTED POWER FLOW: 936. KW 538. KVAR 1080. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.9 KW 96.3 KVAR 97.4 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 29. %VD: .71
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.5 KVAR 33.9 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4042 %VD: 2.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1854 VOLTAGE DROP: 50. %VD: 1.21
PROJECTED POWER FLOW: 9252. KW 9100. KVAR 12978. KVA PF: .71 LAGGING
LOSSES THRU FEEDER: 5. KW 227. KVAR 227. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1854
PROJECTED POWER FLOW: 9252. KW 9100. KVAR 12978. KVA PF: .71 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3992 %VD: 4.0
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 922 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 3107. KW 5569. KVAR 6377. KVA PF: .49 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 405 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1854 VOLTAGE DROP: 50. %VD: 1.21
PROJECTED POWER FLOW: 9247. KW 8874. KVAR 12816. KVA PF: .72 LAGGING
LOSSES THRU FEEDER: 5. KW 227. KVAR 227. KVA

DATE:23 JUL 92 TIME: 7 14 PM PAGE 12
T=85 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 399 %VD: 16.9$
VOLTAGE ANGLE: -7.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 103. KW 503. KVAR
NET BRANCH DIVERSITY LOAD: 600. KW 435. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1696 VOLTAGE DROP: 36. %VD: 7.42$
PROJECTED POWER FLOW: 703. KW 938. KVAR 1172. KVA PF: .60 LAGGING
LOSSES THRU TRANSF: 24.5 KW 151.3 KVAR 153.2 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 440 %VD: 8.4$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1271 VOLTAGE DROP: 14. %VD: 2.9$
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.9 KW 88.7 KVAR 89.8 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 447 %VD: 6.9$
VOLTAGE ANGLE: -7.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1319 VOLTAGE DROP: 14. %VD: 2.81
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.9 KW 96.3 KVAR 97.4 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 457 %VD: 4.8
VOLTAGE ANGLE: -5.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 778 VOLTAGE DROP: 3. %VD: .71
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.5 KVAR 33.9 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
127. KW 1876. KVAR

WARNING STUDY CONTAINS 9 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 18 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 7 18 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0006 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 18 PM PAGE 3
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 7 18 PM PAGE 4
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOC
SYSTEM VOLT=0.9912, Red Train Steady State Green Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 18 PM PAGE 5
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	748	-81.0					
2002 2A2								
2004 2A4	FEEDER	748	-81.0					
2902 ST2-A	FEEDER	748	-81.0					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	748	-81.0					
200 161KV APL								
2901 ST2-CLR	TRANS.	748	-81.0					
2004 2A4								
3006 2B6	TRANS.	748	-81.0					

DATE:23 JUL 92 TIME: 7 18 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=(9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME	* KW	* KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	102.	499.	CONSTANT Z LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 7 18 PM PAGE 7
T=90 SECONDS ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2274.45 KVA
CONVERGENCE CRITERIA: .114 KVA

LARGEST BUS MISMATCH	2003	2A3	142.567 KVA
LARGEST BUS MISMATCH	3005	2B5	16.655 KVA
LARGEST BUS MISMATCH	3005	2B5	2.381 KVA
LARGEST BUS MISMATCH	3005	2B5	.332 KVA
LARGEST BUS MISMATCH	3005	2B5	.046 KVA

DATE:23 JUL 92 TIME: 7 18 PM PAGE 8
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 39 VOLTAGE DROP: 915. %VD: .57
PROJECTED POWER FLOW: 8949. KW 6110. KVAR 10836. KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 14. KW 90. KVAR 91. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 39 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 8949. KW 6110. KVAR 10836. KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158668 %VD: 1.4
VOLTAGE ANGLE: -.4 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 39 VOLTAGE DROP: 915. %VD: .57
PROJECTED POWER FLOW: 8934. KW 6021. KVAR 10774. KVA PF: .83 LAGGING
LOSSES THRU FEEDER: 14. KW 90. KVAR 91. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 39
PROJECTED POWER FLOW: 8934. KW 6021. KVAR 10774. KVA PF: .83 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 483 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 483 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 7 18 PM PAGE 9
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 412 VOLTAGE DROP: 74. %VD: 1.79
PROJECTED POWER FLOW: 2244. KW 1855. KVAR 2911. KVA PF: .77 LAGGING
LOSSES THRU FEEDER: 2. KW 81. KVAR 81. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 412 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2244. KW 1855. KVAR 2911. KVA PF: .77 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4010 %VD: 3.6
VOLTAGE ANGLE: -4.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 483 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2928. KW 1639. KVAR 3356. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 156 VOLTAGE DROP: 121. %VD: 2.91
PROJECTED POWER FLOW: 915. KW 581. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.8 KW 91.4 KVAR 92.6 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4006 %VD: 3.7
VOLTAGE ANGLE: -4.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 412 VOLTAGE DROP: 74. %VD: 1.79
PROJECTED POWER FLOW: 2241. KW 1773. KVAR 2858. KVA PF: .78 LAGGING
LOSSES THRU FEEDER: 2. KW 81. KVAR 81. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 172 VOLTAGE DROP: 250. %VD: 6.02$
PROJECTED POWER FLOW: 707. KW 961. KVAR 1193. KVA PF: .59 LAGGING
LOSSES THRU TRANSF: 18.2 KW 115.9 KVAR 117.3 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 7 18 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 109. %VD: 2.62
PROJECTED POWER FLOW: 935. KW 534. KVAR 1077. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.7 KVAR 92.8 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 24. %VD: .57
PROJECTED POWER FLOW: 552. KW 315. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

DATE:23 JUL 92 TIME: 7 18 PM
T=7.0 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4111 %VD: 1.2
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1479 VOLTAGE DROP: 31. %VD: .74
PROJECTED POWER FLOW: 8917. KW 5606. KVAR 10533. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1479
PROJECTED POWER FLOW: 8917. KW 5606. KVAR 10533. KVA PF: .85 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4080 %VD: 1.9
VOLTAGE ANGLE: -2.8 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 483 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1752. KVAR 3415. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 412 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2244. KW 1855. KVAR 2911. KVA PF: .77 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 368 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1147. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1479 VOLTAGE DROP: 31. %VD: .74
PROJECTED POWER FLOW: 8914. KW 5462. KVAR 10454. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 449 %VD: 6.5$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1318 VOLTAGE DROP: 14. %VD: 2.91
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.8 KW 91.4 KVAR 92.6 KVA

DATE:23 JUL 92 TIME: 7 18 PM PAGE 12
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Red Train Steady State, Green Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 433 %VD: 9.7$
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 83. KW 407. KVAR
NET BRANCH DIVERSITY LOAD: 606. KW 439. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1453 VOLTAGE DROP: 29. %VD: 6.02$
PROJECTED POWER FLOW: 689. KW 845. KVAR 1091. KVA PF: .63 LAGGING
LOSSES THRU TRANSF: 18.2 KW 115.9 KVAR 117.3 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 458 %VD: 4.5
VOLTAGE ANGLE: -6.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1287 VOLTAGE DROP: 13. %VD: 2.62
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.2 KW 91.7 KVAR 92.8 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 468 %VD: 2.5
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 760 VOLTAGE DROP: 3. %VD: .57
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 32.0 KVAR 32.4 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
92. KW 1173. KVAR

WARNING STUDY CONTAINS 4 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 23 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200 OHMS/M FEET								
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J .1600 OHMS/M FEET								
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J .0220 OHMS/M FEET								
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J .0000 OHMS/M FEET								

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE:	1.2315 + J 7.6110 PERCENT						
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE:	1.2438 + J 7.9432 PERCENT						
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE:	1.2396 + J 8.0046 PERCENT						
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE:	1.2532 + J 8.0126 PERCENT						

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS / TO BUS	BR. TYPE	CONSTANT KVA KVA	CONSTANT KVA %PF	CONSTANT Z KVA	CONSTANT Z %PF	CONSTANT I KVA	CONSTANT I %PF	FLOW DIR.
1 SYSTEM								
200 161KV APL	FEEDER	2529	-85.9					
2001 2A1								
2003 2A3	FEEDER	2529	-85.9					
2902 ST2-A	FEEDER	2529	-85.9					REV
2901 ST2-CLR								
2902 ST2-A	FEEDER	2529	-85.9					
200 161KV APL								
2901 ST2-CLR	TRANS.	2529	-85.9					
2003 2A3								
3005 2B5	TRANS.	796	-81.0					

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	1023.	3961.	CONSTANT Z LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	114.	555.	CONSTANT Z LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 4090.97 KVA
CONVERGENCE CRITERIA: .205

LARGEST BUS MISMATCH	2003	2A3	284.551 KVA
LARGEST BUS MISMATCH	3005	2B5	26.156 KVA
LARGEST BUS MISMATCH	3005	2B5	3.270 KVA
LARGEST BUS MISMATCH	3006	2B6	.463 KVA
LARGEST BUS MISMATCH	3006	2B6	.065 KVA

DATE:23 JUL 92 TIME: 7 23 PM PAGE 8
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 49 VOLTAGE DROP: 1371. %VD: .85
PROJECTED POWER FLOW: 9324. KW 9792. KVAR 13521. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 22. KW 139. KVAR 141. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 49 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 9324. KW 9792. KVAR 13521. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158212 %VD: 1.7
VOLTAGE ANGLE: -.3 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 49 VOLTAGE DROP: 1371. %VD: .85
PROJECTED POWER FLOW: 9301. KW 9652. KVAR 13405. KVA PF: .69 LAGGING
LOSSES THRU FEEDER: 22. KW 139. KVAR 141. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 49
PROJECTED POWER FLOW: 9301. KW 9653. KVAR 13405. KVA PF: .69 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
LOAD TO: 2003 2A3 FEED. AMPS: 912 VOLTAGE DROP: 221. %VD: 5.32$
PROJECTED POWER FLOW: 3130. KW 5478. KVAR 6309. KVA PF: .50 LAGGING
LOSSES THRU FEEDER: 12. KW 399. KVAR 399. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 912 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 3130. KW 5478. KVAR 6309. KVA PF: .50 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 405 VOLTAGE DROP: 59. %VD: 1.43
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 405 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3773 %VD: 9.3$
VOLTAGE ANGLE: -4.8 DEGREES
PROJECTED SPECIAL BUS LOAD: 841. KW 3258. KVAR
NET BRANCH DIVERSITY LOAD: 1529. KW 825. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 912 VOLTAGE DROP: 221. %VD: 5.32$
PROJECTED POWER FLOW: 3113. KW 5079. KVAR 5959. KVA PF: .52 LAGGING
LOSSES THRU FEEDER: 12. KW 399. KVAR 399. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 191 VOLTAGE DROP: 277. %VD: 6.65$
PROJECTED POWER FLOW: 748. KW 996. KVAR 1245. KVA PF: .60 LAGGING
LOSSES THRU TRANSF: 22.1 KW 136.4 KVAR 138.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3935 %VD: 5.4$
VOLTAGE ANGLE -4.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 405 VOLTAGE DROP: 59. %VD: 1.43
PROJECTED POWER FLOW: 2398. KW 1364. KVAR 2758. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 150 VOLTAGE DROP: 123. %VD: 2.95
PROJECTED POWER FLOW: 864. KW 552. KVAR 1025. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 13.9 KW 88.6 KVAR 89.7 KVA

DATE:23 JUL 92 TIME: 7 23 PM
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

****

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 156 VOLTAGE DROP: 117. %VD: 2.81
PROJECTED POWER FLOW: 936. KW 538. KVAR 1080. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.9 KW 96.2 KVAR 97.3 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 7 23 PM PAGE 11
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD TO: 3106 B6 TRANSF AMPS: 92 VOLTAGE DROP: 29. %VD: .70
PROJECTED POWER FLOW: 552. KW 316. KVAR 636. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.5 KVAR 33.9 KVA

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4044 %VD: 2.8
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1846 VOLTAGE DROP: 50. %VD: 1.20
PROJECTED POWER FLOW: 9275. KW 9006. KVAR 12928. KVA PF: .72 LAGGING
LOSSES THRU FEEDER: 5. KW 225. KVAR 225. KVA

LOAD FROM: 200 161KV AFL AND: 1200 H BUSES 3WXFMR AMPS: 1846
PROJECTED POWER FLOW: 9275. KW 9006. KVAR 12928. KVA PF: .72 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 3994 %VD: 4.0
VOLTAGE ANGLE: -3.0 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 912 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 3130. KW 5478. KVAR 6309. KVA PF: .50 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 405 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2400. KW 1442. KVAR 2800. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 377 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2337. KW 1151. KVAR 2605. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 227 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 710. KVAR 1573. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1846 VOLTAGE DROP: 50. %VD: 1.20
PROJECTED POWER FLOW: 9270. KW 8782. KVAR 12769. KVA PF: .73 LAGGING
LOSSES THRU FEEDER: 5. KW 225. KVAR 225. KVA

DATE:23 JUL 92 TIME: 7 23 PM PAGE 12
T=90 SECONDS, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 403 %VD: 16.0$
VOLTAGE ANGLE: -8.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 81. KW 392. KVAR
NET BRANCH DIVERSITY LOAD: 646. KW 467. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1610 VOLTAGE DROP: 32. %VD: 6.65$
PROJECTED POWER FLOW: 726. KW 859. KVAR 1125. KVA PF: .65 LAGGING
LOSSES THRU TRANSF: 22.1 KW 136.4 KVAR 138.2 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 440 %VD: 8.4$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1271 VOLTAGE DROP: 14. %VD: 2.95
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.9 KW 88.6 KVAR 89.7 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 447 %VD: 6.8$
VOLTAGE ANGLE: -7.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1318 VOLTAGE DROP: 13. %VD: 2.81
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.9 KW 96.2 KVAR 97.3 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 457 %VD: 4.7
VOLTAGE ANGLE: -5.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 777 VOLTAGE DROP: 3. %VD: .70
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.2 KW 33.5 KVAR 33.9 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
124. KW 1843. KVAR

WARNING STUDY CONTAINS 9 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

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T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.


DATE: 23 JUL 92
TIME:  1 11 PM

------------------------------------------------------------------------------
ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY
------------------------------------------------------------------------------
DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)
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DATE:23 JUL 92 TIME: 1 11 PM PAGE 2
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	DESCRIPTION TYPE	DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000.	FT			
	IMPEDANCE:	3.1131 + J19.4200		OHMS/M FEET						
2001	2A1	2003	2A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J	.1600	OHMS/M FEET						
2001	2A1	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2002	2A2	2004	2A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0047 + J	.1600	OHMS/M FEET						
2002	2A2	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2006	A1	2008	A3	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2007	A2	2009	A4	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2901	ST2-CLR	2902	ST2-A	1	4160.	1000.	FT			
	IMPEDANCE:	.0005 + J	.0220	OHMS/M FEET						
2902	ST2-A	2006	A1	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						
2902	ST2-A	2007	A2	1	4160.	1000.	FT			
	IMPEDANCE:	.0000 + J	.0000	OHMS/M FEET						

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 1 11 PM
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
FNTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 1 11 PM PAGE 4
T=Steady State, ST #2 Unit 2 MSL Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE: [illegible] 92 TIME: 1 11 PM PAGE 5
[illegible]Steady [illegible]tate, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VO[illegible]0.9912, Green Train Steady State, Red Train SS W/Swing Loads
[illegible]ATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.

DATE:23 JUL 92 TIME: 1 11 PM PAGE 6
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	961.	533.	CONSTANT KVA LOAD
3006	2B6	850.	463.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE	:	.9912
BRANCH VOLTAGE CRITERIA	:	4.00 %
BUS VOLTAGE CRITERIA	:	5.00 %
EXACT(ITERATIVE) SOLUTION	:	YES
TRANSFORMERS MODELED	:	YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 2274.10 KVA
CONVERGENCE CRITERIA: .114 KVA

LARGEST BUS MISMATCH	2003	2A3	136.699 KVA
LARGEST BUS MISMATCH	3005	2B5	18.899 KVA
LARGEST BUS MISMATCH	3005	2B5	2.801 KVA
LARGEST BUS MISMATCH	3005	2B5	.410 KVA
LARGEST BUS MISMATCH	3005	2B5	.060 KVA

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 39 VOLTAGE DROP: 875. %VD: .54
PROJECTED POWER FLOW: 9167. KW 5750. KVAR 10821. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 14. KW 89. KVAR 90. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 39 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 9167. KW 5750. KVAR 10821. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158708 %VD: 1.4
VOLTAGE ANGLE: -.4 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 39 VOLTAGE DROP: 875. %VD: .54
PROJECTED POWER FLOW: 9153. KW 5661. KVAR 10762. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 14. KW 89. KVAR 90. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 39
PROJECTED POWER FLOW: 9153. KW 5661. KVAR 10762. KVA PF: .85 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 494 VOLTAGE DROP: 73. %VD: 1.75
PROJECTED POWER FLOW: 2994. KW 1814. KVAR 3501. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 117. KVAR 117. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 494 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2994. KW 1814. KVAR 3501. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 1 11 PM PAGE 9
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4016 %VD: 3.5
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 494 VOLTAGE DROP: 73. %VD: 1.75
PROJECTED POWER FLOW: 2991. KW 1697. KVAR 3439. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 117. KVAR 117. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 168 VOLTAGE DROP: 141. %VD: 3.33
PROJECTED POWER FLOW: 978. KW 639. KVAR 1168. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 17.1 KW 105.9 KVAR 107.3 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4031 %VD: 3.1
VOLTAGE ANGLE: -4.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 58. %VD: 1.39
PROJECTED POWER FLOW: 2397. KW 1359. KVAR 2755. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 75. KVAR 75. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 146 VOLTAGE DROP: 114. %VD: 2.74
PROJECTED POWER FLOW: 863. KW 547. KVAR 1022. KVA PF: .34 LAGGING
LOSSES THRU TRANSF: 13.1 KW 83.9 KVAR 85.0 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 1 11 PM PAGE 10
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0 KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 108. %VD: 2.60
PROJECTED POWER FLOW: 935. KW 533. KVAR 1076. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.2 KVAR 92.3 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 23. %VD: .56
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4117 %VD: 1.0
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1477 VOLTAGE DROP: 29. %VD: .69
PROJECTED POWER FLOW: 9136. KW 5247. KVAR 10536. XVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1477
PROJECTED POWER FLOW: 9136. KW 5247. KVAR 10536. KVA PF: .87 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 494 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2994. KW 1814. KVAR 3501. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 395 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2399. KW 1434. KVAR 2795. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1477 VOLTAGE DROP: 29. %VD: .69
PROJECTED POWER FLOW: 9133. KW 5103. KVAR 10462. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 447 %VD: 6.9$
VOLTAGE ANGLE: -8.7 DEGREES
PROJECTED SPECIAL BUS LOAD: 961. KW 533. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1419 VOLTAGE DROP: 16. %VD: 3.38
PROJECTED POWER FLOW: 961. KW 533. KVAR 1099. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 17.1 KW 105.9 KVAR 107.3 KVA

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train SS W/Swing Loads
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 452 %VD: 5.8$
VOLTAGE ANGLE: -8.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 850. KW 463. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1236 VOLTAGE DROP: 13. %VD: 2.74
PROJECTED POWER FLOW: 850. KW 463. KVAR 968. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 13.1 KW 83.9 KVAR 85.0 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.3
VOLTAGE ANGLE: -7.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1284 VOLTAGE DROP: 12. %VD: 2.60
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.2 KVAR 92.3 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 469 %VD: 2.3
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 758 VOLTAGE DROP: 3. %VD: .56
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
90. KW 1152. KVAR

WARNING STUDY CONTAINS 2 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 27 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DATE:23 JUL 92 TIME: 7 27 PM
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VCLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER FROM NO	NAME	FEEDER TO NO	NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	TYPE	DESCRIPTION DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	3.1131 + J19.4200			OHMS/M FEET					
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J	.1600		OHMS/M FEET					
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J	.1600		OHMS/M FEET					
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J	.0220		OHMS/M FEET					
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000		OHMS/M FEET					

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 27 PM
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 7 27 PM
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	ST2-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 27 PM PAGE 5
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

FROM BUS	/ TO BUS	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.

DATE:23 JUL 92 TIME: 7 27 PM PAGE 6
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2003	2A3	2013.	1058.	CONSTANT KVA LOAD
2004	2A4	1534.	812.	CONSTANT KVA LOAD
2008	A3	1401.	613.	CONSTANT KVA LOAD
2009	A4	851.	394.	CONSTANT KVA LOAD
3005	2B5	900.	490.	CONSTANT KVA LOAD
3006	2B6	911.	505.	CONSTANT KVA LOAD
3105	B5	921.	442.	CONSTANT KVA LOAD
3106	B6	547.	283.	CONSTANT KVA LOAD

DATE:22 OCT 92 TIME: 7 27 PM PAGE 7
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : .9912
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOP SIZE: 38

LARGEST LOAD: 2274.10 KVA
CONVERGENCE CRITERIA: .114 KVA

LARGEST BUS MISMATCH	2002	2A3	134.711 KVA
LARGEST BUS MISMATCH	3006	2B6	16.433 KVA
LARGEST BUS MISMATCH	3006	2B6	2.394 KVA
LARGEST BUS MISMATCH	3006	2B6	.346 KVA
LARGEST BUS MISMATCH	3006	2B6	.050 KVA

DATE: 23 JUL 92 TIME: 7 27 PM PAGE 8
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:159583 %VD: .9
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 39 VOLTAGE DROP: 875. %VD: .54
PROJECTED POWER FLOW: 9167. KW 5747. KVAR 10820. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 14. KW 89. KVAR 90. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 39 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 9167. KW 5747. KVAR 10820. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:158708 %VD: 1.4
VOLTAGE ANGLE: -.4 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 39 VOLTAGE DROP: 875. %VD: .54
PROJECTED POWER FLOW: 9153. KW 5658. KVAR 10760. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 14. KW 89. KVAR 90. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 39
PROJECTED POWER FLOW: 9153. KW 5658. KVAR 10761. KVA PF: .85 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4069 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2003 2A3 FEEDER AMPS: 482 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 482 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 407 VOLTAGE DROP: 60. %VD: 1.45
PROJECTED POWER FLOW: 2463. KW 1495. KVAR 2881. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 407 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2463. KW 1495. KVAR 2881. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4018 %VD: 3.4
VOLTAGE ANGLE: -4.5 DEGREES
PROJECTED SPECIAL BUS LOAD: 2013. KW 1058. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 482 VOLTAGE DROP: 70. %VD: 1.69
PROJECTED POWER FLOW: 2928. KW 1639. KVAR 3355. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 112. KVAR 112. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 156 VOLTAGE DROP: 120. %VD: 2.89
PROJECTED POWER FLOW: 915. KW 581. KVAR 1084. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 14.7 KW 91.0 KVAR 92.2 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4028 %VD: 3.2
VOLTAGE ANGLE: -4.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 1534. KW 812. KVAR
LOAD FROM: 2002 2A2 FEEDER AMPS: 407 VOLTAGE DROP: 60. %VD: 1.45
PROJECTED POWER FLOW: 2460. KW 1415. KVAR 2783. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 2. KW 79. KVAR 79. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 158 VOLTAGE DROP: 135. %VD: 3.24
PROJECTED POWER FLOW: 926. KW 603. KVAR 1106. KVA PF: .84 LAGGING
LOSSES THRU TRANSF: 15.4 KW 98.4 KVAR 99.6 KVA

LOAD BUS: 2006 A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2008 A3 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)
****
VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD FROM: 2902 ST2-A FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2007 A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2009 A4 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2008 A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 1401. KW 613. KVAR
LOAD FROM: 2006 A1 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3105 B5 TRANSF AMPS: 152 VOLTAGE DROP: 108. %VD: 2.60
PROJECTED POWER FLOW: 935. KW 533. KVAR 1076. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.2 KVAR 92.3 KVA

LOAD BUS: 2009 A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
PROJECTED SPECIAL BUS LOAD: 851. KW 394. KVAR
LOAD FROM: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 3106 B6 TRANSF AMPS: 90 VOLTAGE DROP: 23. %VD: .56
PROJECTED POWER FLOW: 552. KW 315. KVAR 635. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

DATE:23 JUL 92 TIME: 7 27 PM
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4117 %VD: 1.0
VOLTAGE ANGLE: -2.2 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 1477 VOLTAGE DROP: 29. %VD: .69
PROJECTED POWER FLOW: 9136. KW 5244. KVAR 10534. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 1477
PROJECTED POWER FLOW: 9136. KW 5244. KVAR 10534. KVA PF: .87 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4089 %VD: 1.7
VOLTAGE ANGLE: -2.9 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 482 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2931. KW 1751. KVAR 3414. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 407 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2463. KW 1495. KVAR 2881. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2006 A1 FEEDER AMPS: 367 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2336. KW 1146. KVAR 2602. KVA PF: .90 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: 222 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 1403. KW 709. KVAR 1572. KVA PF: .89 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 1477 VOLTAGE DROP: 29. %VD: .69
PROJECTED POWER FLOW: 9133. KW 5100. KVAR 10460. KVA PF: .87 LAGGING
LOSSES THRU FEEDER: 3. KW 144. KVAR 144. KVA

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 450 %VD: 6.3$
VOLTAGE ANGLE: -8.4 DEGREES
PROJECTED SPECIAL BUS LOAD: 900. KW 490. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 1315 VOLTAGE DROP: 14. %VD: 2.89
PROJECTED POWER FLOW: 900. KW 490. KVAR 1025. KVA PF: .88 LAGGING
LOSSES THRU TRANSF: 14.7 KW 91.0 KVAR 92.2 KVA

DATE:23 JUL 92 TIME: 7 27 PM PAGE 12
T=Steady State, ST #2 Unit 2 MSLB Unit 1 LOOP
SYSTEM VOLT=0.9912, Green Train Steady State, Red Train Sequencing
ENTERGY OPERATIONS INC

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = .9912

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 449 %VD: 6.4$
VOLTAGE ANGLE: -8.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 911. KW 505. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 1338 VOLTAGE DROP: 16. %VD: 3.24
PROJECTED POWER FLOW: 911. KW 505. KVAR 1042. KVA PF: .87 LAGGING
LOSSES THRU TRANSF: 15.4 KW 98.4 KVAR 99.6 KVA

LOAD BUS: 3105 B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 459 %VD: 4.3
VOLTAGE ANGLE: -7.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 921. KW 442. KVAR
LOAD FROM: 2008 A3 TRANSF AMPS: 1284 VOLTAGE DROP: 12. %VD: 2.60
PROJECTED POWER FLOW: 921. KW 442. KVAR 1022. KVA PF: .90 LAGGING
LOSSES THRU TRANSF: 14.1 KW 91.2 KVAR 92.3 KVA

LOAD BUS: 3106 B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 469 %VD: 2.3
VOLTAGE ANGLE: -5.2 DEGREES
PROJECTED SPECIAL BUS LOAD: 547. KW 283. KVAR
LOAD FROM: 2009 A4 TRANSF AMPS: 758 VOLTAGE DROP: 3. %VD: .56
PROJECTED POWER FLOW: 547. KW 283. KVAR 616. KVA PF: .89 LAGGING
LOSSES THRU TRANSF: 5.0 KW 31.8 KVAR 32.2 KVA

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
89. KW 1150. KVAR

WARNING STUDY CONTAINS 2 VOLTAGE CRITERIA VIOLATIONS
VIOLATIONS DENOTED BY ($) AT BUS AND BRANCH %VD LOCATIONS

Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

DATE: 23 JUL 92
TIME: 7 36 PM

ALL INFORMATION PRESENTED IS FOR REVIEW, APPROVAL
INTERPRETATION AND APPLICATION BY A REGISTERED
ENGINEER ONLY

DAPPER (LOAD FLOW AND VOLTAGE DROP MINI/MICRO VERSION 3.5 LEVEL 2.1)

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

F E E D E R D A T A

FEEDER NO	FROM NAME	FEEDER NO	TO NAME	QTY /PH	VOLTS L-L	LENGTH	FEEDER SIZE	DESCRIPTION TYPE	DUCT	INSUL
1	SYSTEM	200	161KV APL	1	161000.	1000. FT				
	IMPEDANCE:	.2592 + J	.2592 OHMS/M FEET							
2001	2A1	2003	2A3	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J	.1600 OHMS/M FEET							
2001	2A1	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							
2002	2A2	2004	2A4	1	4160.	1000. FT				
	IMPEDANCE:	.0047 + J	.1600 OHMS/M FEET							
2002	2A2	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							
2006	A1	2008	A3	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							
2007	A2	2009	A4	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							
2901	ST2-CLR	2902	ST2-A	1	4160.	1000. FT				
	IMPEDANCE:	.0005 + J	.0220 OHMS/M FEET							
2902	ST2-A	2006	A1	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							
2902	ST2-A	2007	A2	1	4160.	1000. FT				
	IMPEDANCE:	.0000 + J	.0000 OHMS/M FEET							

SOURCE BUS THEVENIN EQUIVALENT IMPEDANCE: .000000000 + J .000000000 OHMS
Calculated From Largest 3-PHASE Fault Contribution

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A

PRIMARY RECORD NO	NAME	VOLTS L-L	PRI FLA	* SECONDARY RECORD NO	NAME	VOLTS L-L	SEC FLA	NOMINAL KVA
2003	2A3	4055.	142.	3005	2B5	480.	1203.	1000.0
	IMPEDANCE: 1.2315 + J 7.6110 PERCENT							
2004	2A4	4055.	142.	3006	2B6	480.	1203.	1000.0
	IMPEDANCE: 1.2438 + J 7.9432 PERCENT							
2008	A3	4055.	142.	3105	B5	480.	1203.	1000.0
	IMPEDANCE: 1.2396 + J 8.0046 PERCENT							
2009	A4	4055.	142.	3106	B6	480.	1203.	1000.0
	IMPEDANCE: 1.2532 + J 8.0126 PERCENT							

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

T R A N S F O R M E R D A T A (THREE WINDING)

BUS DATA	NO	NAME	VOLTS L-L	*	BRANCH DATA	% IMPEDANCE R	X	NOMINAL KVA
PRIMARY	200	161KV APL	161000.	*	PRI-SEC	.2000	+ J 4.7800	15000.0
SECONDARY	1200	H BUSES	6900.	*	PRI-TER	.1900	+ J 4.6000	12600.0
TERTIARY	2901	S22-CLR	4160.	*	SEC-TER	.3700	+ J 8.9000	12600.0

PRIMARY FIXED TAP: -2.5 %

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

B R A N C H L O A D D A T A

F R O M / T O B U S / B U S	BR. TYPE	CONSTANT KVA KVA	%PF	CONSTANT Z KVA	%PF	CONSTANT I KVA	%PF	FLOW DIR.

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

B U S S P E C I A L S T U D Y D A T A

* NO *	NAME *	KW *	KVAR *	LOAD/GENERATION
2001	2A1	913.	495.	CONSTANT KVA LOAD
2003	2A3	831.	467.	CONSTANT KVA LOAD
3005	2B5	361.	252.	CONSTANT KVA LOAD
3006	2B6	361.	252.	CONSTANT KVA LOAD

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

*** SOLUTION COMMENTS ***

SOLUTION PARAMETERS

PER UNIT DRIVING VOLTAGE : 1.0500
BRANCH VOLTAGE CRITERIA : 4.00 %
BUS VOLTAGE CRITERIA : 5.00 %
EXACT(ITERATIVE) SOLUTION : YES
TRANSFORMERS MODELED : YES

<<PERCENT VOLTAGE DROPS ARE BASED ON NOMINAL DESIGN VOLTAGES>>

TOF SIZE: 58

LARGEST LOAD: 1038.55 KVA
CONVERGENCE CRITERIA: .052 KVA

LARGEST BUS MISMATCH	2001	2A1	146.964 KVA
LARGEST BUS MISMATCH	3005	2B5	3.117 KVA
LARGEST BUS MISMATCH	3005	2B5	.138 KVA
LARGEST BUS MISMATCH	3005	2B5	.006 KVA

Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

****

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = 1.0500

LOAD BUS: 1 SYSTEM DESIGN VOLTAGE:161000 LOAD VOLTAGE:169050 %VD: -5.0
VOLTAGE ANGLE: .0 DEGREES
LOAD TO: 200 161KV APL FEEDER AMPS: 10 VOLTAGE DROP: 6. %VD: .00
PROJECTED POWER FLOW: 2472. KW 1546. KVAR 2916. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: **** SOURCE FEEDER AMPS: 10 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2472. KW 1546. KVAR 2916. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 200 161KV APL DESIGN VOLTAGE:161000 LOAD VOLTAGE:169044 %VD: -5.0
VOLTAGE ANGLE: .0 DEGREES
LOAD FROM: 1 SYSTEM FEEDER AMPS: 10 VOLTAGE DROP: 6. %VD: .00
PROJECTED POWER FLOW: 2472. KW 1546. KVAR 2916. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 1200 H BUSES AND: 2901 ST2-CLR 3WXFMR AMPS: 10
PROJECTED POWER FLOW: 2472. KW 1547. KVAR 2916. KVA PF: .85 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 1200 H BUSES *** NO LOAD SPECIFIED ***

LOAD BUS: 2001 2A1 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4449 %VD: -6.9
VOLTAGE ANGLE: -.6 DEGREES
PROJECTED SPECIAL BUS LOAD: 913. KW 495. KVAR
LOAD TO: 2003 2A3 FEEDER AMPS: 183 VOLTAGE DROP: 28. %VD: .67
PROJECTED POWER FLOW: 1195. KW 748. KVAR 1409. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 16. KVAR 16. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 318 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2108. KW 1243. KVAR 2447. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

DATE:23 JUL 92 TIME: 7 36 PM PAGE 9
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = 1.0500

LOAD BUS: 2002 2A2 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4449 %VD: -6.9
VOLTAGE ANGLE: -.6 DEGREES
LOAD TO: 2004 2A4 FEEDER AMPS: 58 VOLTAGE DROP: 10. %VD: .24
PROJECTED POWER FLOW: 363. KW 267. KVAR 451. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 2. KVAR 2. KVA

LOAD FROM: 2902 ST2-A FEEDER AMPS: 58 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 363. KW 267. KVAR 451. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD BUS: 2003 2A3 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4421 %VD: -6.3
VOLTAGE ANGLE: -1.1 DEGREES
PROJECTED SPECIAL BUS LOAD: 831. KW 467. KVAR
LOAD FROM: 2001 2A1 FEEDER AMPS: 183 VOLTAGE DROP: 28. %VD: .67
PROJECTED POWER FLOW: 1194. KW 732. KVAR 1401. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 16. KVAR 16. KVA

LOAD TO: 3005 2B5 TRANSF AMPS: 59 VOLTAGE DROP: -21. %VD: -.52
PROJECTED POWER FLOW: 363. KW 265. KVAR 449. KVA PF: .81 LAGGING
LOSSES THRU TRANSF: 2.1 KW 12.9 KVAR 13.1 KVA

LOAD BUS: 2004 2A4 DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4439 %VD: -6.7
VOLTAGE ANGLE: -.8 DEGREES
LOAD FROM: 2002 2A2 FEEDER AMPS: 58 VOLTAGE DROP: 10. %VD: .24
PROJECTED POWER FLOW: 363. KW 265. KVAR 450. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 2. KVAR 2. KVA

LOAD TO: 3006 2B6 TRANSF AMPS: 58 VOLTAGE DROP: -19. %VD: -.45
PROJECTED POWER FLOW: 363. KW 265. KVAR 450. KVA PF: .81 LAGGING
LOSSES THRU TRANSF: 2.1 KW 13.4 KVAR 13.6 KVA

LOAD BUS: 2006 A1 *** NO LOAD SPECIFIED ***

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

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VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = 1.0500

LOAD BUS: 2007 A2 *** NO LOAD SPECIFIED ***

LOAD BUS: 2008 A3 *** NO LOAD SPECIFIED ***

LOAD BUS: 2009 A4 *** NO LOAD SPECIFIED ***

LOAD BUS: 2901 ST2-CLR DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4457 %VD: -7.1
VOLTAGE ANGLE: -.4 DEGREES
LOAD TO: 2902 ST2-A FEEDER AMPS: 376 VOLTAGE DROP: 8. %VD: .19
PROJECTED POWER FLOW: 2471. KW 1519. KVAR 2901. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 9. KVAR 9. KVA

LOAD FROM: 200 161KV APL AND: 1200 H BUSES 3WXFMR AMPS: 376
PROJECTED POWER FLOW: 2471. KW 1519. KVAR 2901. KVA PF: .85 LAGGING
XFMR TAPS -2.5%

LOAD BUS: 2902 ST2-A DESIGN VOLTAGE: 4160 LOAD VOLTAGE: 4449 %VD: -6.9
VOLTAGE ANGLE: -.6 DEGREES
LOAD TO: 2001 2A1 FEEDER AMPS: 318 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 2108. KW 1243. KVAR 2447. KVA PF: .86 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2002 2A2 FEEDER AMPS: 58 VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 363. KW 267. KVAR 451. KVA PF: .81 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2006 A1 FEEDER AMPS: VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 0. KW 0. KVAR 0. KVA PF: .00 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD TO: 2007 A2 FEEDER AMPS: VOLTAGE DROP: 0. %VD: .00
PROJECTED POWER FLOW: 0. KW 0. KVAR 0. KVA PF: .00 LAGGING
LOSSES THRU FEEDER: 0. KW 0. KVAR 0. KVA

LOAD FROM: 2901 ST2-CLR FEEDER AMPS: 376 VOLTAGE DROP: 8. %VD: .19
PROJECTED POWER FLOW: 2471. KW 1510. KVAR 2896. KVA PF: .85 LAGGING
LOSSES THRU FEEDER: 0. KW 9. KVAR 9. KVA

DATE:23 JUL 92 TIME: 7 36 PM
Minimum Loading Conditions (Unit 2 Outage)
SYSTEM VOLT=1.05
ENTERGY OPERATIONS INC.

BALANCED VOLTAGE DROP AND LOAD FLOW ANALYSIS (SPECIAL BUS LOAD REPORT)

VOLTAGE EFFECT ON LOADS MODELED TRANSFORMER VOLTAGE DROP MODELED
VOLTAGE DROP CRITERIA: BRANCH = 4.00 % BUS = 5.00
PER UNIT DRIVING VOLTAGE = 1.0500

LOAD BUS: 3005 2B5 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 513 %VD: -6.8
VOLTAGE ANGLE: -2.3 DEGREES
PROJECTED SPECIAL BUS LOAD: 361. KW 252. KVAR
LOAD FROM: 2003 2A3 TRANSF AMPS: 496 VOLTAGE DROP: -2. %VD: -.52
PROJECTED POWER FLOW: 361. KW 252. KVAR 440. KVA PF: .82 LAGGING
LOSSES THRU TRANSF: 2.1 KW 12.9 KVAR 13.1 KVA

LOAD BUS: 3006 2B6 DESIGN VOLTAGE: 480 LOAD VOLTAGE: 514 %VD: -7.2
VOLTAGE ANGLE: -2.0 DEGREES
PROJECTED SPECIAL BUS LOAD: 361. KW 252. KVAR
LOAD FROM: 2004 2A4 TRANSF AMPS: 494 VOLTAGE DROP: -2. %VD: -.45
PROJECTED POWER FLOW: 361. KW 252. KVAR 440. KVA PF: .82 LAGGING
LOSSES THRU TRANSF: 2.1 KW 13.4 KVAR 13.6 KVA

LOAD BUS: 3105 B5 *** NO LOAD SPECIFIED ***

LOAD BUS: 3106 B6 *** NO LOAD SPECIFIED ***

17 BUSES

*** T O T A L S Y S T E M L O S S E S ***
6. KW 80. KVAR