123 Main Street
White Plains, New York 10601
914 681.6200

report

NewYorkPower Authority

ORIG-FILES
C 99-F-1627
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MR-J DREXLER
MR-H-TARLER
MR-D-MAY (5)

July 25, 2005

The Honorable Jaclyn Brilling, Secretary
New York State Board on Electric Generation
Siting and the Environment
Three Empire State Plaza
Albany, New York 12223-1350

Subject: Case 99-F-1627, New York Power Authority
Compliance Filing in Accordance with the Article X Certificate

Dear Secretary Brilling:

In accordance with the Opinion and Order granting a Certificate of Environmental Compatibility and Public Need for the New York Power Authority's 500 MW Combined Cycle Project, issued on October 2, 2002, enclosed please find enclosed an original and seven sets of the Protective Relay Coordination Study (Certificate Condition II.M).

Please contact me at 914-287-3438, if you need additional information.

Sincerely,

Ellen Koivisto
Manager, Licensing

cc: James DeWaal Malephyte, DPS (5 copies)
David Macks, DPS
Edward Schrom, DPS
John Cole, DEC (5 copies)
Active Party List

New York Power Authority

123 Main Street
White Plains, NY 10601

Original Issue Date: July 11, 2005
Revision Date:
Revision No.: 0
Document No.: POL-500-PSC

Poletti 500MW Combined Cycle Power Project (CCPP)

Protective Relay Coordination Study Submittal to the Public Service Commission

Prepared by

F. J. Pagano, P.E.
Director, Protection & Control
Engineering – Power Generation

Approved by

C. I. Lipsky, P.E.
Vice President & Chief Engineer
Engineering – Power Generation

POLETTI 500 MW COMBINED CYCLE POWER PROJECT
PROTECTIVE RELAY COORDINATION STUDY
SUBMITTAL TO THE PUBLIC SERVICE COMMISSION

1.0 SCOPE

This report contains the protective relaying design and power system equipment information for the New York Power Authority's (NYPA) 500MW Combined Cycle Power Project 138KV feeder interconnections to the Con Edison (CE) 138KV Astoria West substation. The plant protective relay systems are illustrated on relay and metering one-line diagrams while the major equipment information is represented on the corresponding manufacturers' nameplate drawings. Relay and metering potential transformers (PT) and current transformers (CT) nameplate data as well as CT saturation (SAT) curves are provided. Also included in this report, is a summary of the fault current analysis results conducted at select 138KV Con Edison system busses both with and without the 500MW plant in-service.

2.0 DESCRIPTION OF THE 138KV FEEDER RELAYING

It is NYPA's protection philosophy to provide two (2) separate relaying systems for each zone of protection. Two (2) numerical line current differential relaying systems designated as first-line and second-line protection systems will protect each 138KV feeder to CE. These relays will also provide stub-bus protection for the 138KV busses. The communications media for the two current differential relays consist of two (2) separate fiber optic cables, identified as Route 1 and Route 2. Separate high speed lockout relays will be used for each current differential relay system. At the CE terminal, numerical overcurrent relays have been installed to provide back-up protection of both feeders, and breaker failure protection for each of the associated 138KV feeder circuit breakers.

2.1. First Line Protection System

a. Relay: Alstom Type MiCom P541.

b. Communication: Fiber Optic Cable, Route 1.

c. CT: Inner CTs

2.2. Second-Line Protection System

a. Relay: G.E. Type UR-L90

b. Communication: Fiber Optic Cable, Route 2

c. CT: Outer CT's

2.3. Back-Up Protection System

CE requires a separate overcurrent relay with instantaneous and time elements (50/51) to provide back-up protection. This relay is not required at NYPA terminal.

a. Relay: Basler BE1-851

b. CT: Same CT used for second-line protection system, Item 2.2

2.4 Direct Transfer Trip Systems

Two separate fiber optic cables provide both line relaying systems and direct transfer trip system between the two terminals.

Dual systems will be used for DTT between CE and NYPA terminals. The DTT functions will be accomplished by the line relaying systems described above. The DTT systems will be used for 138KV breaker failure relay, transformer differential relay, and bus differential relay operations.

2.5 138KV Breaker Failure Protection

One breaker relay will be used to provide breaker failure protection.

a. Relay: ABB SBF-1

b. Communication: Fiber optic via first-line and second-line relays

Operation of breaker failure relay will energize a separate lock-out relay. The lock-out relay output contacts will operate the DTT functions of the two line relaying systems.

3.0 DESCRIPTION OF THE 500MW COMBINED CYCLE PLANT RELAYING

The 500MW combine cycle plant consists of two (2) 220.6MVA, 18KV gas turbine generator units (CT7A) & (CT7B) with two (2) 220MVA, 18KV/145KV generator step-up transformers (GSU 7A) & (GSU 7B) respectively, plus two (2) 43.4MVA, 18KV/4.16KV unit auxiliary transformers (UAT 7A & UAT 7B). There is one (1) 231MVA, 18KV steam turbine generator unit with a 234MVA 18KV/145KV generator step-up transformer (GSU 7S).

3.1 Generator Protection

Two (2) state-of-the-art numerical multi-function generator relays, primary and secondary systems from different manufacturers, have been installed for each unit. These relays are connected to the generator CTs, relaying PT's, and the secondary side of the neutral grounding transformer. Each generator relay is wired to trip its own dedicated lockout relay.

The following is a description of the generator protection functions that will be implemented by each relay:

3.1.1. **87G: Generator Differential Protection for Phase Faults.**

The 87G function has variable slope characteristic with a minimum differential current pick-up setting.

3.1.2. **59/27TN: Stator Ground Fault Protection.**

This protection function shall provide 100% ground fault protection for the complete stator winding and the associated neutral grounding system. A conventional 60Hz overvoltage unit (59) will detect ground faults from the generator terminal to about 95% of stator winding (designated as 0-95% protection). A third harmonic undervoltage unit (27TN) will protect the remaining 5% area of the stator winding (designated at 95%-100% protection). This is NYPA's preferred detection scheme to provide 100% stator ground fault protection. It is NYPA's criteria to trip with the operation of the 59 unit and to alarm with the 27TN unit.

3.1.3. **21: Phase Distance Back-Up Protection Function**.

The 21 back-up function utilizes a mho operating characteristic with forward and reverse offset reach settings. Time delay tripping (typical set at 30-60 cycles) will be provided to coordinate with transmission line relaying systems. The relay is designed to accommodate the 30° phase shift between the step-up transformers for system phase faults.

3.1.4. **40: Loss-of-Excitation Protection Function.**

Two independent zones of protection with offset mho characteristic are provided to detect machine loss-of-excitation condition. The

settings of these two zones will coordinate with machine capability curve, minimum excitation limiter curve and steady state stability limit. Independent time delays for each zone are provided. Steady-state stability limits shall be determined using established U.S. relaying practice, factoring in the effect of the GSU transformer.

3.1.5. **46: Negative Sequence Protection Function.**

Two negative sequence overcurrent alarm and trip threshold functions are provided to properly coordinate with the machine I_2^2t characteristic.

3.1.6. **32: Reverse Power Anti-Motoring Protection Function.**

This protection function will detect real power flowing into the generator.

3.1.7. **24: Voltz/Hz Over-excitation Protection Function.**

The V/Hz protection is mainly used to protect the main step-up transformer from over-excitation conditions. Select inverse time characteristics shall be provided to properly coordinate with the permissible short time excitation (V/Hz) curve of the main step-up transformer.

3.1.8. **60: Voltage Transformer Blown Fuse Detection.**

In the event of a blown PT fuse or loss-of-potential to the relay, all the protection functions that require voltage inputs for measurement will be blocked from operation. For example, functions 21, 40, 27 and 81U will be blocked. An alarm output contact shall be provided for the 60 relay operation.

3.1.9. **78: Out-of-Step for Power Swing Detection.**

Two impedance relay functions, an outer unit and inner unit, will track the impedance locus of the generator during an out-of-step swing condition. The objective is to detect that the generator is going out of step and initiate separation from the system during the first swing.

3.1.10. **81-U/O Under/Over Frequency Detection.**

81U (under-frequency) and 81O (over-frequency) protection will back up the manufacturer's generator control system under and over speed protection.

3.2 Generator Step-up (GSU) Transformer Protection

3.2.1. Two (2) numerical transformer differential relays (Device 87TP and 87TS), each with both instantaneous (IOC) and time (TOC) elements, each provide instantaneous protection for phase faults in the step-up transformer zone and back-up protection for transformer faults. Each relay is wired to trip its own dedicated lockout relay.

3.2.2. A separate numerical transformer neutral-ground overcurrent relay provides the ground TOC backup protection for ground faults on the system high side of the GSU. The operating times of TOC elements will be coordinated with both switchyard line relays and generator relays.

3.3 Unit Breaker Protection

3.3.1. A separate numerical breaker failure relay (Device 50/62BF) provides protection for the unit breakers. The phase overcurrent function is set above maximum load current and below the minimum three phase fault current. Each breaker failure relay trip its own dedicated BF lockout relay which sends DTT to trip the respective 138KV feeder at CE.

3.4 Unit Auxiliary Transformer (UAT) Protection

3.4.1. Each UAT transformer 7A & 7B is protected by a numerical transformer differential relay (Device 87T) including both instantaneous (IOC) and time (TOC) overcurrent elements for protection of phase faults in the UAT zone and backup protection for transformer faults. Each relay is wired to trip its associated GSU lockout relay as described in Section 3.1.1.

3.4.2. Two (2) separate numerical transformer neutral-ground overcurrent relays for each UAT transformer provides ground TOC backup protection for ground faults on the 480V station service busses 7A & 7C and 7B & 7D for UAT 7A and UAT 7B respectively.

LEGEND

SYMBOL	APPARATUS
	DISTRIBUTION BUS OR POWER FEED
	LOW VOLTAGE CONTROL, POTENTIAL, OR CURRENT CABLES
	DRAW-OUT DEVICE, PLUG & RECEPTACLE
	RESISTOR
	DISCONNECT SWITCH
	MOTORIZED GROUND SWITCH
	DISCONNECTING SWITCH (MOTOR OPERATED) WITH GROUNDING SWITCH
	FUSE
	POTENTIAL TRANSFORMER
	INSTRUMENT CURRENT TRANSFORMER (WYE CONN.)
Ø1 Ø3 Ø2	AC GENERATOR
	TWO WINDING POWER TRANSFORMER
	THREE WINDING POWER TRANSFORMER
	NEUTRAL GROUNDING TRANSFORMER WITH RESISTOR IN SECONDARY WINDING.
	GAP TYPE SURGE ARRESTOR
52G	GENERATOR CIRCUIT BREAKER
GEN DMM	GENERATOR DIGITAL MULTI-METER
M	MOTOR
A	AMMETER
WH	WATTHOUR METER
REV METER	REVENUE METER
V	VOLTMETER
VAR	VAR METER
VARH	VARH METER
S.A.	SURGE ARRESTOR
	SURGE CAPACITOR
DFR	DIGITAL FAULT RECORDER
	MOTORIZED DOUBLE SIDE BREAK DISCONNECT SWITCH

'8'

PROTECTIVE RELAY & DEVICE FUNCTIONS

27	UNDERVOLTAGE RELAY
50/62BF	BREAKER FAILURE RELAY C60
52G	GENERATOR BREAKER
59BN	BUS GROUND DETECTOR RELAY (ALSTOM P921)
63FP	TRANSFORMER FAULT PRESSURE RELAY (QUALITROL)
63FPX	TRANSFORMER FAULT PRESSURE SWITCH RELAY
86BF	BREAKER FAILURE LOCKOUT RELAY (ELECTROSWITCH)
63BP	TRANSFORMER FAULT PRESSURE RELAY (BUCHHOLZ)
86GRP1	GENERATOR PRIMARY LOCKOUT RELAY (ELECTROSWITCH)
86GRP2	GENERATOR PRIMARY LOCKOUT RELAY (ELECTROSWITCH)
86GRS1	GENERATOR SECONDARY LOCKOUT RELAY (ELECTROSWITCH)
86GRS2	GENERATOR SECONDARY LOCKOUT RELAY (ELECTROSWITCH)
86TP	GSU (PRIMARY PROTECTION) LOCKOUT RELAY (ELECTROSWITCH)
86TS	GSU (SECONDARY PROTECTION) LOCKOUT RELAY (ELECTROSWITCH)
89ND	NEUTRAL GROUND DISCONNECT SWITCH
89SS	LCI STATIC START DISCONNECT SWITCH
96G( )	TRANSDUCER (G)=WATTS/VARS,(W)=WATTS, (P)=POWER FACTOR, (R)=VARS
51TN3	STEP-UP TRANSFORMER NEUTRAL OVERCURRENT (ALSTOM P122)
51N-X	UNIT AUX TRANSFORMER NEUTRAL OVERCURRENT (ALSTOM P122)
51N-Y	UNIT AUX TRANSFORMER NEUTRAL OVERCURRENT (ALSTOM P122)
57G	GROUND SWITCH FOR GCB
89G	DISCONNECT SWITCH FOR GCB
40GSSX	BLOCKING CONTACT FROM TURBINE CONTROL PANEL FOR LOSS OF EXCITATION DURING LCI OPERATION

'8'

EX2100 FUNCTIONS (FOR GENERATOR)

'8'

30EX	GLOBAL ALARM OUTPUT RELAY
94EX	TRIP OUTPUT RELAY

LOCATION OF EQUIPMENT / DEVICES

$\oplus_P$	GENERATOR CONTROL PANEL DEVICE (PRIMARY PROTECTIVE RELAY PANEL)
▣	GENERATOR COMPARTMENT DEVICE
▽	GENERATOR TERMINAL ENCLOSURE
⊖	TURBINE CONTROL PANEL DEVICE (MK-VI TCP)
EX	EX2100
△	BY NYPA
▨	STATIC EXCITATION COMPARTMENT
⊠	LCI / EX2100 COMPARTMENT
$\oplus_1$	PROTECTION PANEL#1 (SECONDARY PROTECTION-GENERATOR 7A, GSU 7A)
$\oplus_2$	PROTECTION PANEL#2 (SECONDARY PROTECTION-GENERATOR 7B, GSU 7B)
$\oplus_3$	PROTECTION PANEL#3 (SECONDARY PROTECTION-GENERATOR 7S, GSU 7S)
$\oplus_4$	PROTECTION PANEL#4 (PRIMARY PROTECTION-138KV LINE 7A)
$\oplus_5$	PROTECTION PANEL#5 (PRIMARY PROTECTION-138KV LINE 7B)
$\oplus_6$	PROTECTION PANEL#6 (PRIMARY PROTECTION-138KV LINE 7S)
$\oplus_7$	PROTECTION PANEL#7 (SECONDARY PROTECTION-138KV LINE 7A)
$\oplus_8$	PROTECTION PANEL#8 (SECONDARY PROTECTION-138KV LINE 7B)
$\oplus_9$	PROTECTION PANEL#9 (SECONDARY PROTECTION-138KV LINE 7S)
$\oplus_{10}$	PROTECTION PANEL#10 (PRIMARY AND SECONDARY PROTECTION UAT7A)
$\oplus_{11}$	PROTECTION PANEL#11 (PRIVARY AND SECONDARY PROTECTION-UAT7B)
⊕	GE MCC
▽	GENERATOR BUSHING

GENERATOR PRIMARY PROTECTION

DGP54AACA OR G60 (MAKE : GE)

50/27	INADVERTENT ENERGISATION
24A / 24T	VOLTS PER Hz ALARM / TRIP
27P	GENERATOR UNDERVOLTAGE
32-1	REVERSE POWER
40-1, 40-2	LOSS OF EXCITATION
46A / 46T	NEGATIVE SEQUENCE ALARM / TRIP
59P	GENERATOR OVER VOLTAGE
64G1	GENERATOR STATOR GROUND FAULT
81U / 81O	UNDER FREQUENCY / OVER FREQUENCY
87S	GENERATOR DIFFERENTIAL RELAY
VTFF	VOLTAGE TRANSFORMER FUSE FAILURE
51V	SYSTEM PHASE FAULT BACKUP
74	DGP ALARM OUTPUT CONTACT
94G	DGP TRIP OUTPUT CONTACT
27TN	THIRD HARMONIC NEUTRAL UNDERVOLTAGE (100% STATOR GROUND FAULT)

GENERATOR STEP-UP TRANSFORMER PRIMARY PROTECTION

'8' T60 (MAKE:GE) '8'

87TP	TRANSFORMER DIFFERENTIAL

GENERATOR STEP-UP TRANSFORMER SECONDARY PROTECTION

P634 (MAKE:ALSTOM)

87TS	TRANSFORMER DIFFERENTIAL
50/51	OVERCURRENT PROTECTION

UNIT AUX TRANSFORMER PRIMARY PROTECTION

T60 (MAKE:GE)

50	INSTANTANEOUS OVERCURRENT (HV)
51	OVERCURRENT (HV)
24	VOLTS PER HERTZ (HV)
50	INSTANTANEOUS OVERCURRENT (LV, X-WINDING)
51	OVERCURRENT (LV, X-WINDING)
50	INSTANTANEOUS OVERCURRENT (LV, Y-WINDING)
51	OVERCURRENT (LV, Y-WINDING)
87T	DIFFERENTIAL

UNIT AUX TRANSFORMER SECONDARY PROTECTION

P122 (MAKE:ALSTOM)

50	INSTANTANEOUS OVERCURRENT (HV)
51	OVERCURRENT (HV)
51GS	GROUND OVERCURRENT (HV)

GENERATOR SECONDARY PROTECTION

P343 (MAKE : ALSTOM)

51V/21	OVERCURRENT/UNDERIMPEDENCE
24	VOLTS PER HERTZ
27	UNDER VOLTAGE
27TN	THIRD HARMONIC NEUTRAL UNDERVOLTAGE (100% STATOR GROUND FAULT)
32	REVERSE POWER
40	LOSS OF EXCITATION
46	NEGATIVE SEQUENCE
50BF	BREAKER FAILURE
50/51	OVERCURRENT
50/27	INADVERTENT ENERGIZATION
59	OVERVOLTAGE
59N	NEUTRAL OVERVOLTAGE
64/67N	RESTRICTED EARTH FAULT
78	POLE SLIP (OUT OF STEP)
81O/81U	FREQUENCY (OVER AND UNDER)
87G	GENERATOR DIFFERENTIAL
VTS	VOLTAGE TRANSFORMER SUPERVISION
CTS	CURRENT TRANSFORMER SUPERVISION

138KV LINE PRIMARY PROTECTION

P541 (MAKE:ALSTOM)

85-1	CURRENT DIFFERENTIAL RELAY WITH DTT1
86-1	SECONDARY LINE PROTECTION LOCKOUT RELAY

138KV LINE SECONDARY PROTECTION

L90 (MAKE:GE)

85-2	CURRENT DIFFERENTIAL RELAY WITH DTT2
86-2	SECONDARY LINE PROTECTION LOCKOUT RELAY

NOTES

1) FOR ONE LINE DIAGRAM OF 4.16KV SWGR REFER TO DWG. E155 & FOR ONE LINE DIAGRAM OF 480V SWGR REFER TO DWG E154.
2) CT7A AND CT7B DRAWINGS ARE BASED ON GE ONE LINE DRAWING NO. 194D6899, REV. E '8'
3) ST7S DRAWING IS BASED ON GE ONE LINE DRAWING NO. 207D1500. REV B.
4) FOR CT7A AND CT7B, 89SS-1 AND 89SS-2 ARE INTERLOCKED SUCH THAT ONLY ONE CAN BE CLOSED AT A TIME.

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
7	07-01-02	VST	RDP/SB	EAC	ISSUED FOR CONSTRUCTION
6	01-31-02	VST	SDB		ISSUED FOR CONFORMED SPEC. F201
5	12-17-01	JT/SR	SDB		FOR BID SPEC F201
4	08-06-03	VST	RDP/AB		CONSTRUCTION REVISION FOR D399

DRAWING RELEASE RECORD

NOTICE TO PURCHASER

THIS DRAWING IS PRELIMINARY UNLESS IT BEARS CERTIFICATION OF THE GENERAL ELECTRIC COMPANY PROJECT ENGINEER. GENERAL ELECTRIC COMPANY HAS MADE EVERY EFFORT TO ASSURE ALL INFORMATION INCORPORATED ON THIS DRAWING IS CORRECT. HOWEVER, BECAUSE IT IS IMPOSSIBLE TO CERTIFY TO THE ACCURACY OF ALL INFORMATION FURNISHED BY OUTSIDE SOURCES, GENERAL ELECTRIC COMPANY MUST DISCLAIM LIABILITY FOR ALL LOSS OR DAMAGE RESULTING FROM ANY INFORMATION INCORPORATED ON THIS DRAWING WHICH IS SUPPLIED FROM INFORMATION FURNISHED BY THE CUSTOMER, ONLY EQUIPMENT MANUFACTURERS OR OTHER CONTRACTORS IN THE EVENT OF A CONFLICT BETWEEN THE CONTRACT AND THIS DRAWING REGARDING MATERIALS AND AMOUNTS OF MATERIALS TO BE SUPPLIED BY GENERAL ELECTRIC COMPANY, THE PROVISIONS OF THE CONTRACT SHALL GOVERN.

DRAWN BY	N/A	CHECKED BY	N/A
DES	N/A	ENGINEER	N/A
REQ NO	N/A		
PPS JOB NO	510X0009	PROJECT NO	

APPROVALS		SCALE	NONE
SYSTEM	N/A	PROJECT ENGINEER	
ELECTRICAL	N/A		
C+I	N/A		
MECH	N/A		

IT IS A VIOLATION OF NEW YORK STATE CONSOLIDATED LAW FOR ANY PERSON, UNLESS HE OR SHE IS ACTING UNDER THE DIRECTION OF A NEW YORK LICENSED PROFESSIONAL ENGINEER, TO ALTER AN ITEM IN ANYWAY. IF AN ITEM IS ALTERED BY OTHERS SHALL BE NOTED AS "ALTERED BY" AND ACCOMPANIED BY THE NEW YORK PROFESSIONAL ENGINEER SEAL, SIGNATURE AND DATE, WITH A SPECIFIC DESCRIPTION OF THE ALTERATION

FILE E15101.DGN

Bergen & Lundy

FOR CONSTRUCTION

TITLE: RELAY & METERING DIAGRAM

PROJECT: POLETT, 500MW COMBINED CYCLE PLANT

CUST: NEW YORK POWER AUTHORITY

GENERAL ELECTRIC
POWER PLANT ENGINEERING
POWER PLANT SYSTEMS DEPARTMENT

SPE SHT NO: 510X0009F | DRAWING NO: E151 | SH 1 OF 2 | REV 8

NYPA POLETTI 500MW CCGD PROTECTIVE RELAY SYSTEM

NYPA POLETTI 500MW CCPP PROTECTIVE RELAY SYSTEM

FGN TO CON EDISON 138KV ASTORIA WEST SUBSTATION

138KV U.G. CABLE

NYPA'S SCOPE

GE'S SCOPE

DETAIL-AA

DETAIL-AB

NOTE:
1) FOR NOTES & LEGEND REFER TO SHEET 1 OF THIS DRAWING.
2) THESE ARE SLIP OVER TYPE CT'S SUPPLIED BY NYPA.

FOR CONSTRUCTION

RELAY & METERING DIAGRAM FOR CT7A & UAT7A

GENERAL ELECTRIC
POWER PLANT ENGINEERING
POWER PLANT SYSTEMS DEPARTMENT

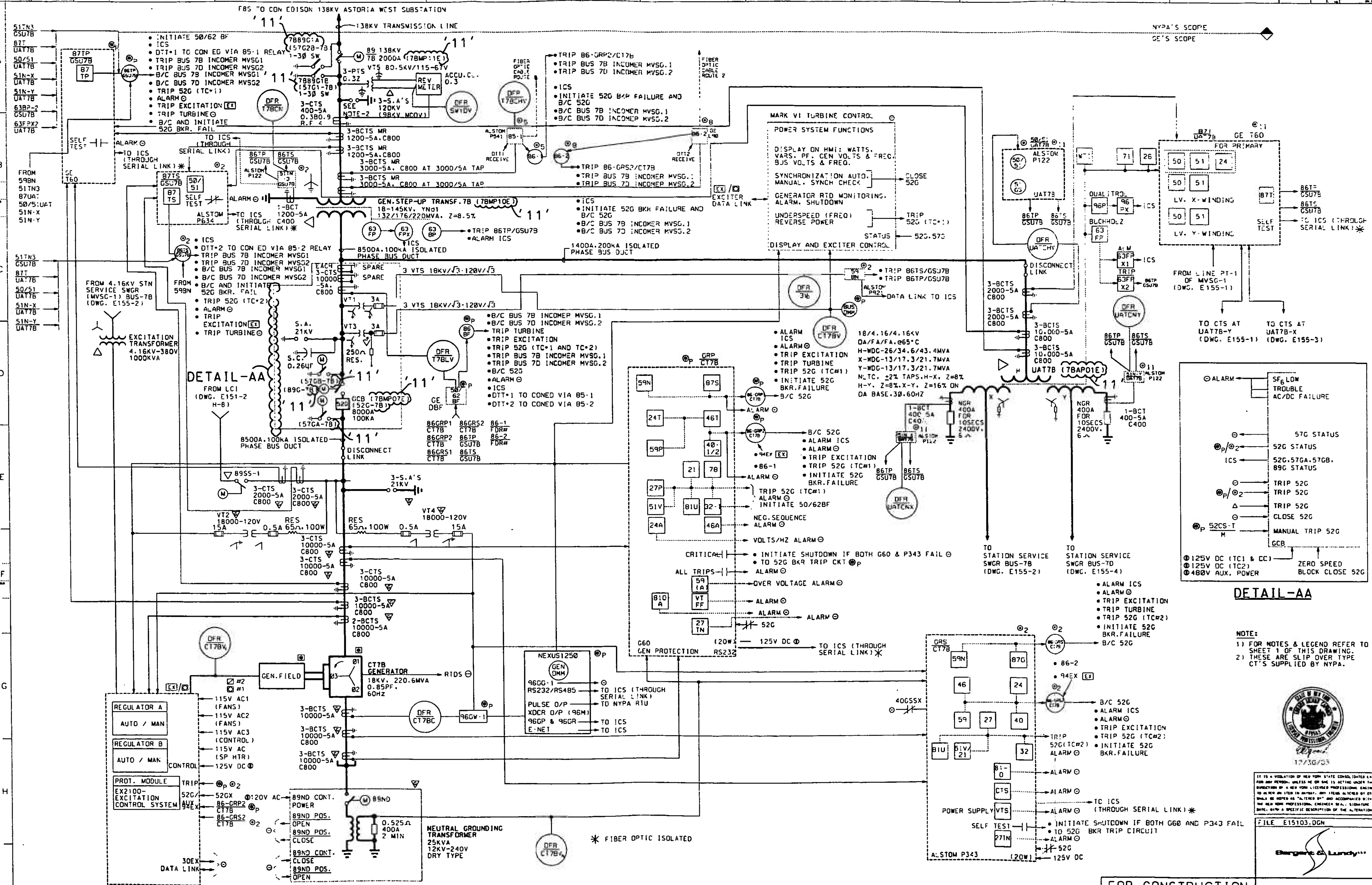
POLETTI 500MW COMBINED CYCLE PLANT
NEW YORK POWER AUTHORITY

510X0009F | E151 | SH 2 OF 3 | REV 11

FILE E15102.DGN

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
8	07-26-03	VST	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
9	08-06-03	VST	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
10	11-07-03	ART	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
11	12-30-03	ART	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999



FILE E15103.DGN

Bergert & Lundy

DRAWING RELEASE RECORD

REV.	DATE REL'D.	PREPARED	REVIEWED	APPROVED	PURPOSE
8	02-26-03	VST	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
9	08-06-03	VST	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
10	11-07-03	ART	RDP/AB	EAC	CONSTRUCTION REVISION FOR D999
11	12-30-03	VST	RDP/AB	[signature]	CONSTRUCTION REVISION FOR D999

NOTICE TO PURCHASER

FOR CONSTRUCTION

RELAY & METERING DIAGRAM FOR CT7B & UAT7B

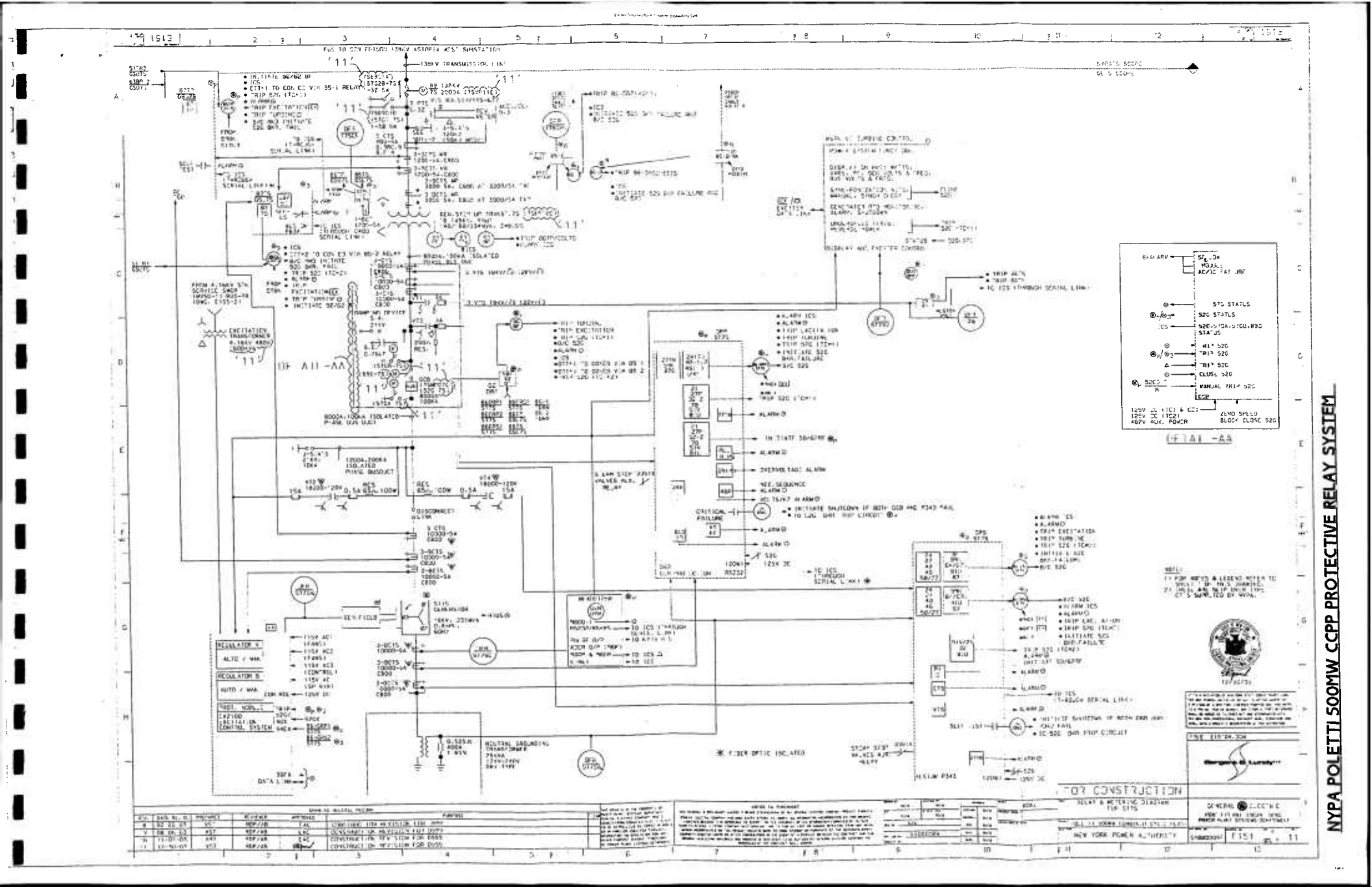
POLETTI 500MW COMBINED CYCLE PLANT

NEW YORK POWER AUTHORITY

GENERAL ELECTRIC
POWER PLANT ENGINEERING
POWER PLANT SYSTEMS DEPARTMENT

510X0009F | E151 | 3 of 4 | 11

NYPA POLETTI 500MW CCPP PROTECTIVE RELAY SYSTEM



NYPA POLETTI 500MW CCPP PROTECTIVE RELAY SYSTEM

SIZE	DWG NO	SH	REV
B	365B7110	1	–

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 365B7110G0001

Hydrogen - Cooled Generator

HYDROGEN-COOLED GENERATOR NO. 337X305	RATING
2 POLES 3 PHASE WYE CONN. 60 HERTZ	3600 RPM GAS 98% PURITY AT 30 PSIG
TOTAL TEMPERATURE AT RATING	KVA: 220600
GUARANTEED NOT TO EXCEED:	ARMATURE AMPS: 7076
100 °C ON ARMATURE BY DETECTOR	ARMATURE VOLTS: 18000
110 °C ON FIELD BY RESISTANCE	FIELD AMPS: 1952
MAXIMUM COLD GAS TEMPERATURE: 40 °C	EXCITATION VOLTS: 315
INLET LIQUID: 33 °C	POWER FACTOR: 0.85

CAUTION BEFORE INSTALLING, OPERATING, OR DISMANTLING, READ INST. GEK- 110103

GE Power Systems
General Electric Company

Schenectady, New York
Made In U.S.A.

G1

	APPLIED PRACTICES	348A9200
IT.	NOMENCLATURE	IDENT
LIST OF COMPLEMENTARY DOCUMENTS		

BOM ISSUED

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ± ✓	DRAWN J. HELGUEROS	02-09-06
	CHECKED F.SCHROEDER	02-09-09
	ENGRG	
	ISSUED F.SCHROEDER	02-09-09
	SIM TO: 361B9497	

GE Power Generation
GENERAL ELECTRIC COMPANY
GENERATOR
Schenectady, NY

DATA PLATE

FIRST MADE FOR 337X305 B7F0

SIZE	CAGE CODE	DWG NO	DISTR TO
B		365B7110	
SCALE NONE		SHEET 1	

THIRD ANGLE PROJECTION

DT-2N

N6DC

NYPA POLETTI 500MW CCPP CTG #1 NAMEPLATE

SIZE B | DWG NO 357B8071 | SH 1 | REV –

FORMAT_WIZARD 2.1

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: GR0767-A004
(SPEC: 357B8071)

NOTE:

1. MAKE FROM N.P. 275800. DATA TO BE ENGRAVED OR ETCHED. LETTER SIZE IS .19 AND STYLE SHALL BE "LEROY" PER NAMEPLATE DRAWING. DO NOT ENGRAVE OR ETCH ENCIRCLED LETTER "A". SUBSTITUTE THE APPROPRIATE TURBINE NUMBER FROM THE "NAMEPLATE UNIT RATING" TABLE. DATA AS IDENTIFIED BELOW MUST BE LOCATED IN APPROXIMATE CENTER OF ALLOCATED SPACE.

GE GAS TURBINE

GREENVILLE, S.C. USA

NO: Ⓐ AIR IN: 59° F ALT: 20 FT

BASE: N/A PEAK: N/A FUEL: NATURAL GAS

TURBINE EXHAUST:BASE: N/A PEAK: N/A PRESS: 17.8 in H20

CPRSR:STAGES: 18 RPM 3600 CPRSR TURBINE:STAGES: 3

POWER TURBINE:STAGES: N/A RPM N/A

CAUTION! BEFORE INSTALLING, OPERATING, OR DISMANTLING-READ GEK 110103

SCHENECTADY, NY - GREENVILLE, SC
N.P. 275800

NAMEPLATE UNIT RATING					
PT	TURBINE NO.Ⓐ	PT	TURBINE NO.Ⓐ	PT	TURBINE NO.Ⓐ
1	298125				
2	298126				

NYPA POLETTI 500MW CCPP GT#1 NAMEPLATE

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± – 3 PL DECIMALS ± – ANGLES ± – – FRACTIONS ± – ✓	DRAWN FRANK J NORTH II	02-12-12
	CHECKED FRANK J NORTH II	02-12-10
	ENGRG NOEL MENDEZ	02-11-27
	ISSUED FRANK J NORTH II	12-12-02
APPLIED PRACTICES 348A9200	QUALITY FRANK J NORTH II	02-12-02
	SIM TO: 357B2889	

GE Power Generation — GENERAL ELECTRIC COMPANY GAS TURBINE Greenville, SC

NAMEPLATE, UNIT RATING

FIRST MADE FOR ML-7A1WFA255-1T2 A004

SIZE B | CAGE CODE | DWG NO 357B8071 | SCALE NONE | SHEET 1 | DISTR TO

DT-IN

SIZE	DWG NO	SH	REV
B	365B7112	1	–

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 365B7112G0001

Hydrogen - Cooled Generator

HYDROGEN-COOLED GENERATOR NO. 337X304		RATING
2 POLES 3 PHASE WYE CONN. 60 HERTZ	3600 RPM GAS 98% PURITY AT 30PSIG	
TOTAL TEMPERATURE AT RATING	KVA:	220600
GUARANTEED NOT TO EXCEED:	ARMATURE AMPS:	7076
100 °C ON ARMATURE BY DETECTOR	ARMATURE VOLTS:	18000
110 °C ON FIELD BY RESISTANCE	FIELD AMPS:	1952
MAXIMUM COLD GAS TEMPERATURE: 40 °C	EXCITATION VOLTS:	315
INLET LIQUID: 33 °C	POWER FACTOR:	0.85

CAUTION BEFORE INSTALLING, OPERATING, OR DISMANTLING, READ INST. GEK- 110103

GE Power Systems
General Electric Company
Schenectady, New York
Made In U.S.A.

	APPLIED PRACTICES	348A9200
IT.	NOMENCLATURE	IDENT
LIST OF COMPLEMENTARY DOCUMENTS		

G1

BOM ISSUED

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ± ✓	DRAWN J.MELGUEROS	02-09-09
	CHECKED F.SCHROEDER	02-09-10
	ENGRG	
	ISSUED F.SCHROEDER	02-09-10
	SIM TO: 36189497	

GE Power Generation
GENERAL ELECTRIC COMPANY
GENERATOR
Schenectady, NY

DATA PLATE
FIRST MADE FOR 337X304 B7F0

SIZE	CAGE CODE	DWG NO	DISTR TO
B		365B7112	
SCALE NONE		SHEET 1	

THIRD ANGLE PROJECTION

DT-2N

N6DC

NYPA POLETTI 500MW CCPP CTG #2 NAMEPLATE

SIZE B | DWG NO 357B8072 | SH 1 | REV –

FORMAT_WIZARD 2.1

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: GR0767-A005
(SPEC: 357B8072)

NOTE:

1. MAKE FROM N.P. 275800. DATA TO BE ENGRAVED OR ETCHED. LETTER SIZE IS .19 AND STYLE SHALL BE "LEROY" PER NAMEPLATE DRAWING. DO NOT ENGRAVE OR ETCH ENCIRCLED LETTER "A". SUBSTITUTE THE APPROPRIATE TURBINE NUMBER FROM THE "NAMEPLATE UNIT RATING" TABLE. DATA AS IDENTIFIED BELOW MUST BE LOCATED IN APPROXIMATE CENTER OF ALLOCATED SPACE.

GE GAS TURBINE

GREENVILLE, S.C. USA

NO: Ⓐ AIR IN: 59° F ALT: 20 FT

BASE: N/A PEAK: N/A FUEL: AVIATION KEROSENE

TURBINE EXHAUST:BASE: N/A PEAK: N/A PRESS: 17.8 in H20

CPRSR:STAGES: 18 RPM 3600 CPRSR TURBINE:STAGES: 3

POWER TURBINE:STAGES: N/A RPM N/A

CAUTION! BEFORE INSTALLING, OPERATING, OR DISMANTLING-READ GEK 110103

SCHENECTADY, NY - GREENVILLE, SC
N.P. 275800

NAMEPLATE UNIT RATING					
PT	TURBINE NO.Ⓐ	PT	TURBINE NO.Ⓐ	PT	TURBINE NO.Ⓐ
1	298125				
2	298126				

NYPA POLETTI 500MW CCPP GT#2 NAMEPLATE

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± – 3 PL DECIMALS ± – ANGLES ± – – FRACTIONS ± – ✓	DRAWN FRANK J NORTH II	02-12-10
	CHECKED FRANK J NORTH II	02-12-10
	ENGRG NOEL MENDEZ	02-11-27
	ISSUED FRANK J NORTH II	12-12-02
	QUALITY FRANK J NORTH II	02-12-02
APPLIED PRACTICES 348A9200		
	SIM TO: 357B2889	

GE Power Generation — GENERAL ELECTRIC COMPANY GAS TURBINE Greenville, SC

NAMEPLATE, UNIT RATING

FIRST MADE FOR ML-7A1WFA255-1T2 A005

SIZE B | CAGE CODE | DWG NO 357B8072

SCALE NONE | SHEET 1

DISTR TO

DT-1N

TRANSFORMER

3 PHASE	60 HZ	CORE FORM	STANDARD IEEE C57.12
TYPE OF COOLING	ONAN/ONAF/ONAF		OUTDOOR USE

WINDING	CONN. TO	CAPACITY (MVA) ONAN	ONAF	ONAF	VOLTAGE RATING (KV)	CURRENT (A) ONAN	ONAF	ONAF	IMPULSE (B I L)
HV	H1, H2, H3	132	176	220	145	526	701	876	650 KV
									NEUTRAL 150 KV
LV	X1, X2, X3				18	4234	5645	7057	150 KV

LOAD CAPABILITY 40°C AMBIENT TEMP.	
WDG. TEMP. RISE BY RESISTANCE	55 °C
OIL TEMP. RISE	65 °C
IMPEDANCE 8.47 % BET. AT 132 MVA	%

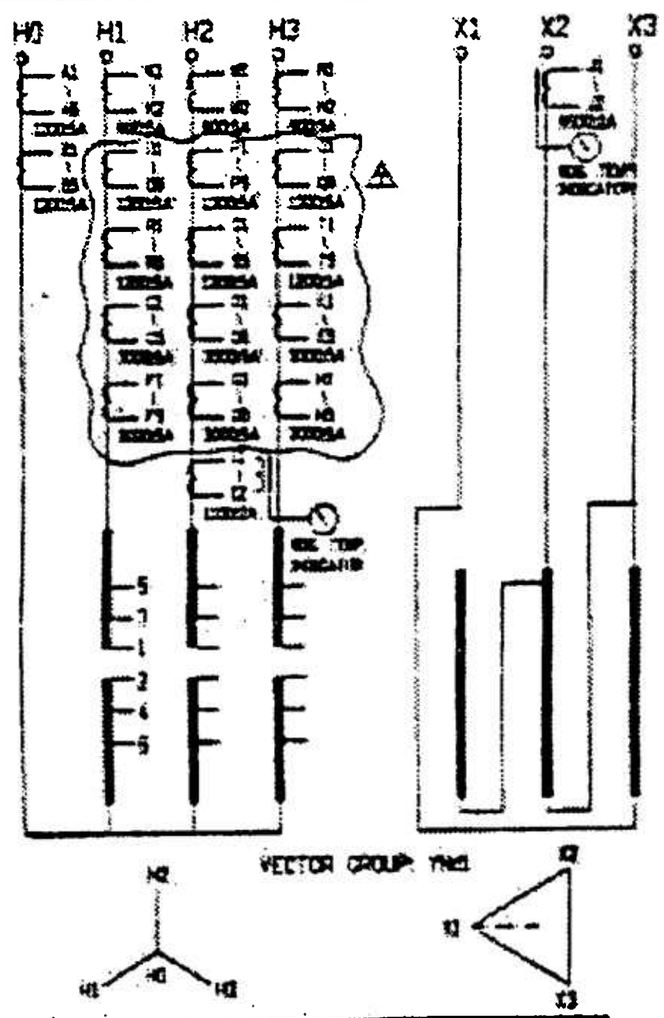
INSULATING OIL	MINERAL OIL
WINDING MATERIAL	COPPER
INSULATING OIL IN MAIN TANK	MINERAL OIL FOR FREE

APPROXIMATE WEIGHTS

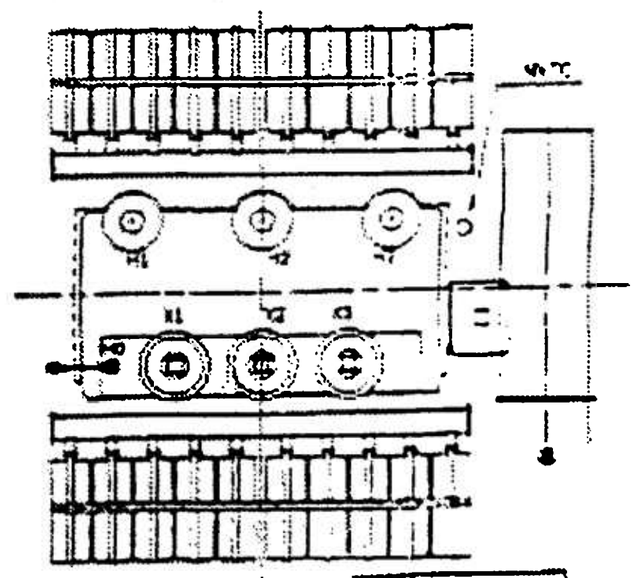
CORE & WINDINGS	174,605 lbs
TANK & FITTINGS	106,710 lbs
OIL 11,200 GALLONS	84,196 lbs
OIL FOR MAIN TANK 8,950 GALLONS	67,249 lbs
OIL FOR RADIATORS 1,800 GALLONS	13,545 lbs
OIL FOR CONSERVATOR 1,050 GALLONS	1,401 lbs
TOTAL WEIGHT	354,516 lbs

POSITION	CT NO	CURRENT MULTI RATIO SECONDARY CONNECTIONS									ACCURACY
H0	A	1200/5A	1000/5A	900/5A	800/5A	500/5A	600/5A	400/5A	300/5A	200/5A	C800
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X3	X1-X2	
H0	B	1200/5A	1000/5A	900/5A	800/5A	500/5A	600/5A	400/5A	300/5A	200/5A	C400
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X3	X1-X2	
H1, H2, H3	X1, X2, X3	3000/5A	2500/5A	2200/5A	2000/5A	1500/5A	1200/5A	1000/5A	800/5A	500/5A	C800
		X1-X5	X2-X4	X1-X3	X2-X5	X2-X4	X2-X3	X1-X2	X3-X5	X4-X5	
X0	I	1100/2A									-
		X1-X2									
X0	J	550/2A									-
		X1-X2									
H1, H2, H3	X, M, N	600/5A									C20
		X1-X2									
H1, H2, H3	Q, P, R	1200/5A	1000/5A	900/5A	800/5A	600/5A	500/5A	400/5A	300/5A	200/5A	100/5A	C800
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X2	X1-X2	X2-X3	

VOLTAGE (KV)	CURRENT (A) ONAN	ONAF	ONAF	NO. VOLTAGE TAP CHANGER INC.	DEC.
152.250	501	667	834	1	1-2
148.625	513	684	855	2	2-3
145.000	526	701	876	3	3-4
141.375	539	719	898	4	4-5
137.750	553	738	922	5	5-6



WITHSTAND: COMPLETE TRANSFORMER 5 PSIG PRESSURE



PURCHASER General Electric Company

PURCHASER'S ORDER NUMBER [illegible]

DATE OF TEST Oct. 2002 YEAR OF MANUFACTURE Oct. 2002 SERIAL NO. [illegible]

FORTUNE ELECTRIC CO., LTD.

MADE IN TAIWAN

INSTRUCTION MANUAL: 24-0505 FE-NO. 22-5776

MATERIAL: STAINLESS STEEL PLATE: 1.6t-304&500

REV.	DESCRIPTION	DATE	APPD.
A	INITIAL ISSUED	07.10.02	SWANG
B	ADD REVISIONS	09.10.02	SWANG
C	ADD REVISIONS	13.10.02	SWANG
D	ADD REVISIONS	16.10.02	SWANG
E	APPROXIMATE WEIGHTS CHANGED	21.10.02	SWANG
F	ADD 115 KV BIL	29.10.02	SWANG

DRWN	Y. C. Hsu 03 — 12 — 01
CHKD	S. M. WANG 03 — 12 — 01
APPD	J. C. CHENG 03 — 12 — 01

SCALE 1:1 UNIT in/[mm] THIRD ANGLE PROJECTION

PRELIMINARY

POLETTI

NAME PLATE

132/176/220MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

POWER PLANT ENGINEERING

GENERAL ELECTRIC INTERNATIONAL, INC.

POWER PLANT SYSTEMS DEPARTMENT

NEW YORK POWER AUTHORITY

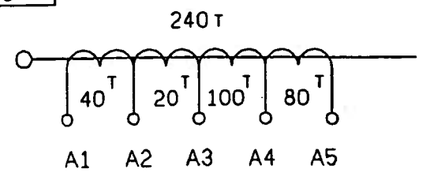
DWG. NO. 22-5776

REV. A

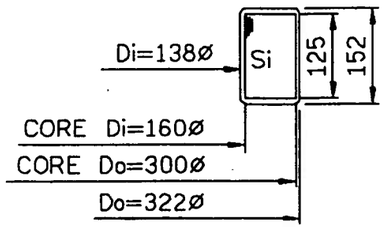
FORTUNE ELECTRIC CO., LTD.

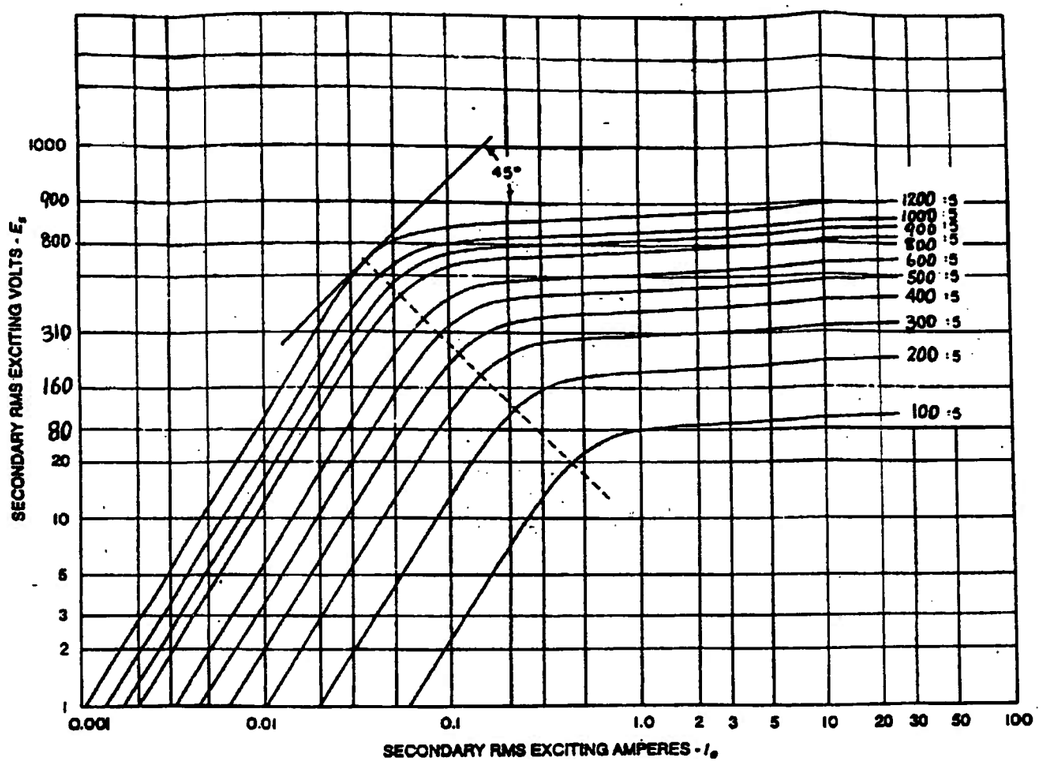
NYPA POLETTI 500MW CCPP CTG GSU 7A & 7B NAMEPLATE

H0



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
A	1200/5A	X1-X5	C800	200
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





SECONDARY RESISTANCE ON MAX.TAP 5.1 Ω (AT 75°C)

CORE AREA 8750 mm²

CORE MEAN LENGTH 730 mm

SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.
△					
△					

SCALE 1:1 UNIT in/[mm]

PROJECTION

DWN.	Y. C. Hsu	03 — 12 — '01
CHKD.	S. M. WANG	03 — 12 — '01
APPD.	I. C. CHENG	03 — 12 — '01

PRELIMINARY

TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE

132/176/220MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

MADE FOR: NEW YORK POWER AUTHORITY

POLETTI

GENERAL ELECTRIC INTERNATIONAL, INC.

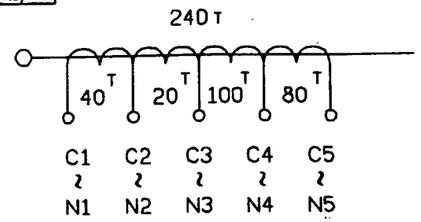
POWER PLANT ENGINEERING

POWER PLANT SYSTEMS DEPARTMENT

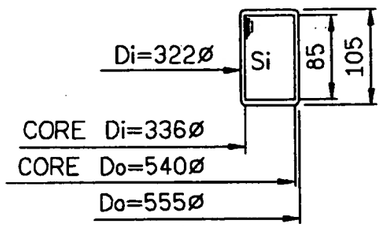
PPE IDENT. NO.	DRAWING NO.	SHEET	CONT. ON SH.	REV.
	23A3368A 2/3			

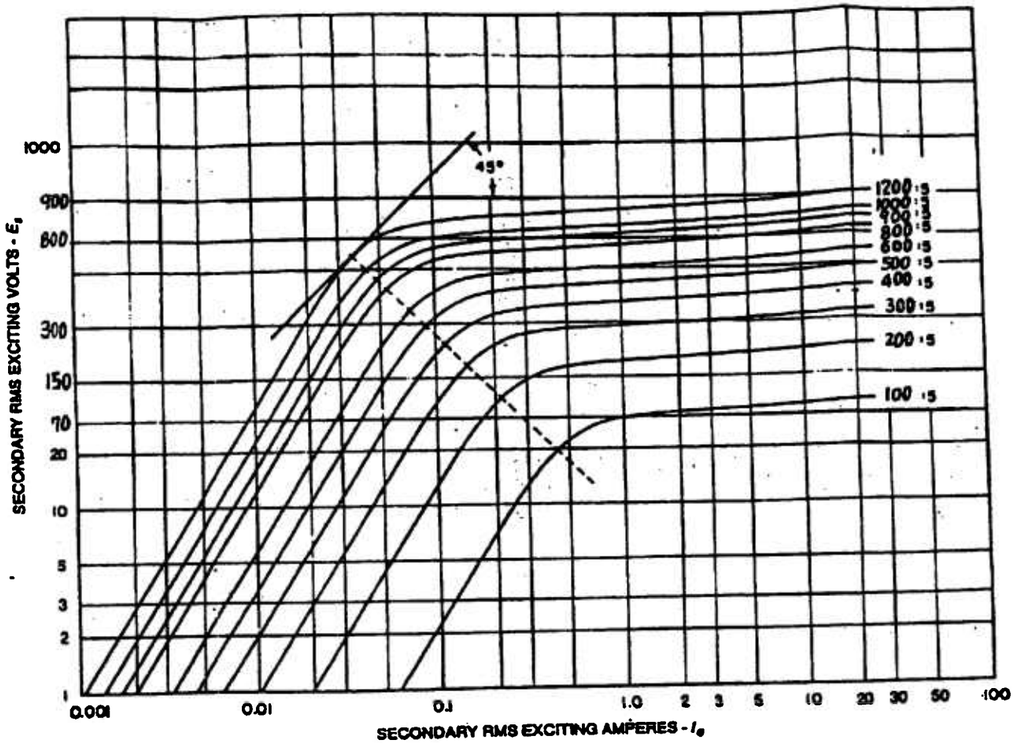
FORTUNE ELECTRIC CO., LTD.

H1,H2,H3



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
C D E F G H I J K L M N	1200/5A	X1-X5	C800	200
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





SECONDARY RESISTANCE ON MAX.TAP 5.0 Ω (AT 75°C)

CORE AREA 8670 mm²

CORE MEAN LENGTH 1380 mm

SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.
△					
△					

SCALE 1:1 UNIT in/[mm]

PROJECTION

PRELIMINARY

TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE

132/176/220MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

MADE FOR: NEW YORK POWER AUTHORITY

DWN.	Y. C. Hsu	03— 12— '01
CHKD.	S. M. WANG	03— 12— '01
APPD.	I. C. CHENG	03— 12— '01

POLETTI

GENERAL ELECTRIC INTERNATIONAL, INC.

POWER PLANT ENGINEERING

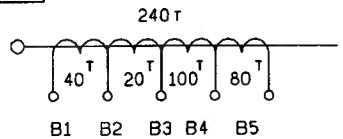
POWER PLANT SYSTEMS DEPARTMENT

PPE IDENT. NO.	DRAWING NO.	SHEET	CONT. ON SH.	REV.
	23A3368A 1/3			

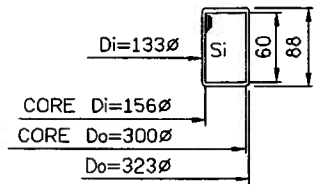
FORTUNE ELECTRIC CO., LTD.

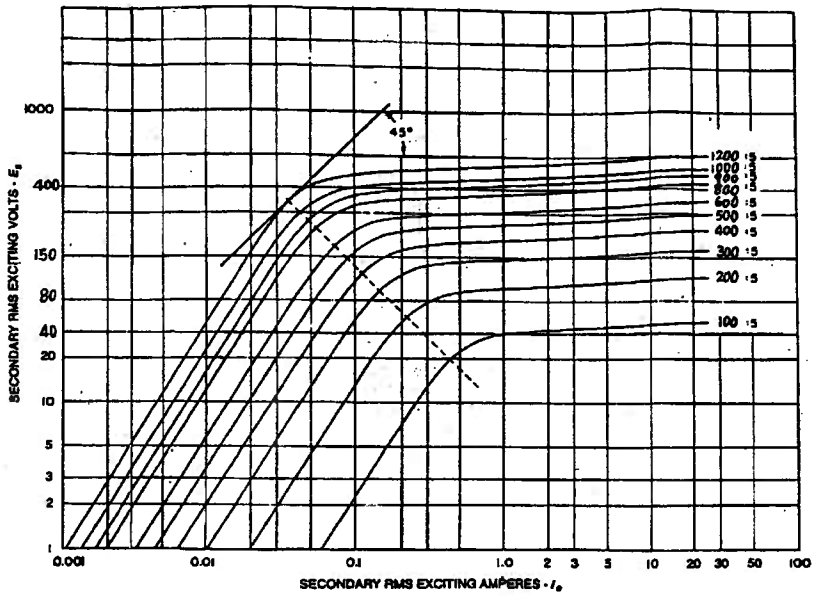
NYPA POLETTI 500MW CCPP CTG GSU 7A & 7B CT SAT CURVES

H0



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
B	1200/5A	X1-X5	C400	100
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





SECONDARY RESISTANCE ON MAX.TAP 2.8 Ω (AT 75°C)

CORE AREA 4320 mm²

CORE MEAN LENGTH 720 mm

SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.
△					
△					

SCALE 1:1 UNIT in/[mm]

PROJECTION

PRELIMINARY

TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE

132/176/220MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

MADE FOR: NEW YORK POWER AUTHORITY

DWN.	Y. C. Hsu	03 — 12 — '01
CHKD.	S. M. WANG	03 — 12 — '01
APPD.	I. C. CHENG	03 — 12 — '01

POLETTI

GENERAL ELECTRIC INTERNATIONAL, INC.

POWER PLANT ENGINEERING

POWER PLANT SYSTEMS DEPARTMENT

PPE IDENT. NO.	DRAWING NO.	SHEET	REV.
	23A3368A 3/3	CONT. ON SH.	

FORTUNE ELECTRIC CO., LTD.

SIZE	DWG NO	SH	REV
B	365B1836	1	—

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED

REVISE ON CAD ONLY
UG PART: 365B1836G0001

Steam Turbine Generator Unit

TURBINE

TURBINE NO.270T606 RATING: 190787 KW 3600 RPM 23 STAGES

STEAM CONDITIONS: PRESSURE 1800 PSIA TEMPERATURE 1050 °F EXHAUST PRESSURE: 2.42"HgA

GENERATOR

HYDROGEN-COOLED GENERATOR NO.290T606		RATING
2 POLES 3 PHASE WYE CONN. 60 HERTZ	GAS 98% PURITY AT	30 PSIG
TOTAL TEMPERATURE AT RATING	KVA:	231000
GUARANTEED NOT TO EXCEED:	ARMATURE AMPS:	7409
100 °C ON ARMATURE BY DETECTOR	ARMATURE VOLTS:	18000
110 °C ON FIELD BY RESISTANCE	FIELD AMPS:	1843
MAXIMUM COLD GAS TEMPERATURE: 42 °C	EXCITATION VOLTS:	350
INLET WATER: 35 °C	POWER FACTOR:	0.85

CAUTION! BEFORE INSTALLING, OPERATING, OR DISMANTLING, READ INST. GEK-110103

GE Power Systems
General Electric Company

Schenectady, New York
Made In U.S.A.

	APPLIED PRACTICES	348A9200
IT.	NOMENCLATURE	IDENT
	LIST OF COMPLEMENTARY DOCUMENTS	

G1

BOM ISSUED

UNLESS OTHERWISE SPECIFIED	SIGNATURES	DATE
DIMENSIONS ARE IN INCHES. TOLERANCES ON: 2 PL DECIMALS ± 3 PL DECIMALS ± ANGLES ± FRACTIONS ± ✓	DRAWN L.MARTINEZ	02-07-11
	CHECKED F.SCHROEDER	02-07-17
	ENGRG	
	ISSUED F.SCHROEDER	02-07-17
	SIM TO: 362B7265	

GE Power Generation — GENERAL ELECTRIC COMPANY GENERATOR Schenectady, NY

DATA PLATE
FIRST MADE FOR 290T606 B7F0

SIZE	CAGE CODE	DWG NO	DISTR TO
B		365B1836	
SCALE NONE		SHEET 1	

THIRD ANGLE PROJECTION

DT-2N

N6DC

NYPA POLETTI 500MW CCPP STG NAMEPLATE

TRANSFORMER

3 PHASE	60 HZ	CORE FORM	STANDARD IEEE C57.12
TYPE OF COOLING	ONAN/ONAF/ONAF		OUTDOOR USE

WINDING	CONN. TO	CAPACITY (MVA) ONAN	ONAF	ONAF	VOLTAGE RATING (kV)	CURRENT (A) ONAN	ONAF	ONAF	IMPULSE (B I L)
HV	H1, H2, H3	140	188	234	145	557	749	932	650 kV
NEUTRAL									150 kV
LV	X1, X2, X3				18	4491	6030	7506	150 kV

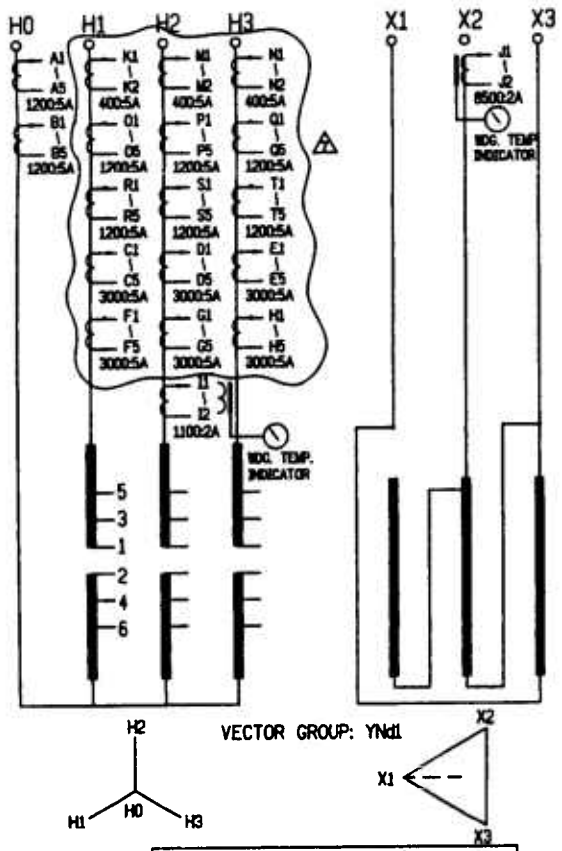
LOAD CAPABILITY 40°C AMBIENT TEMP.	
WDG. TEMP. RISE BY RESISTANCE	65 °C
OIL TEMP. RISE	65 °C
IMPEDANCE	%
85°C AT 140 MVA	

INSULATING OIL	MINERAL OIL
WINDING MATERIAL	COPPER
INSULATING OIL IN MAIN TANK	MINERAL OIL PCB FREE

APPROXIMATE WEIGHTS

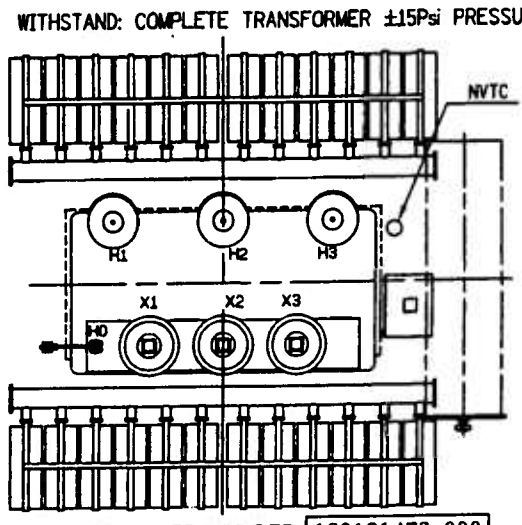
CORE & WINDINGS	183,565 lbs
TANK & FITTINGS	113,260 lbs
OIL 11,950 GALLONS	89,770 lbs
OIL FOR MAIN TANK 6,830 GALLONS	51,275 lbs
OIL FOR RADIATORS 3,870 GALLONS	29,090 lbs
OIL FOR CONSERVATOR 1,250 GALLONS	9,405 lbs
TOTAL WEIGHT	386,595 lbs

POSITION	CT NO	CURRENT MULTI RATIO SECONDARY CONNECTIONS										ACCURACY
H0	A	1200:5A	1000:5A	900:5A	800:5A	600:5A	500:5A	400:5A	300:5A	200:5A	100:5A	C800
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X3	X1-X2	X2-X3	
H0	B	1200:5A	1000:5A	900:5A	800:5A	600:5A	500:5A	400:5A	300:5A	200:5A	100:5A	C400
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X3	X1-X2	X2-X3	
H1, H2, H3	C, D, E F, G, H	3000:5A	2500:5A	2200:5A	2000:5A	1500:5A	1200:5A	1000:5A	800:5A	500:5A	300:5A	C800
		X1-X5	X1-X4	X1-X3	X2-X5	X2-X4	X2-X3	X1-X2	X3-X5	X4-X5	X3-X4	
H2	I	1100:2A										-
		X1-X2										
X2	J	8500:2A										-
		X1-X2										
H1, H2, H3	K, M, N (Slip over existing)	⚠ 400:5A									⚠	0.3B0.9
		X1-X2										
H1, H2, H3	O, P, Q R, S, T	1200:5A	1000:5A	900:5A	800:5A	600:5A	500:5A	400:5A	300:5A	200:5A	100:5A	C800
		X1-X5	X2-X5	X3-X5	X1-X4	X2-X4	X3-X4	X4-X5	X1-X3	X1-X2	X2-X3	



VOLTAGE (kV)	CURRENT (A) ONAN	ONAF	ONAF	NO VOLTAGE TAP CHANGER IND.	CON.
152.250	531	713	887	1	1-2
148.625	544	730	909	2	2-3
145.000	557	749	932	3	3-4
141.375	572	768	956	4	4-5
137.750	587	788	981	5	5-6

WITHSTAND: COMPLETE TRANSFORMER ±15Psi PRESSURE



PURCHASER General Electric Company

PURCHASER'S ORDER NUMBER 180181473-000

DATE OF TEST Oct. 2002 YEAR OF MANUFACTURE Oct. 2002 SERIAL NO. 01009

FORTUNE ELECTRIC CO., LTD.

MADE IN TAIWAN

INSTRUCTION MANUAL: 24-9508 TR-NL22-5777

SYM.	DATE	REVISIONS	REVD.	CHKD.
7	10.7.'02	BCT and ratio Change	M.H.Yang	S.M.WANG
6	8.09.'02	Current multi ratio and Accuracy Change(K,M,N)	M.H.Yang	S.M.WANG
5	6.13.'02	Add BCT(O,P,Q,R,S,T)and plate size change CT NO.(K,M,N) add slip over metering	M.H.Yang	S.M.WANG
4	6.07.'02	Add BCT(K,M,N)-CUSTOMER SUPPLY	M.H.Yang	S.M.WANG
3	1.16.'02	OULINE DRAWING TO ALTER	Y.C.Hsu	S.M.WANG
2	9.21.'01	APPROXIMATE WEIGHTS CHANGED	Y.C.Hsu	S.M.WANG
1	7.23.'01	HV BCT SPEC. CHANGED	Y.C.Hsu	S.M.WANG

MATERIAL: STAINLESS STEEL PLATE: 1.6t-300x500

0.06"-11.81"x19.6"

SCALE 1:1 UNIT in/[mm] PROJECTION

APPR. S.M.WANG

APPD. I. C. CHENG 03— 12— '01

CHKD. S. M. WANG 03— 12— '01

DWN. Y. C. Hsu 03— 12— '01

PRELIMINARY

TITLE: GENERAL ELECTRIC INTERNATIONAL, INC.

NAME PLATE

PROJECT: POWER PLANT ENGINEERING

140/188/234MVA TRANSFORMER

MADE FOR: POWER PLANT SYSTEMS DEPARTMENT

POLETTI 500 MW COMBINED CYCLE PLANT

NEW YORK POWER AUTHORITY

POLETTI

PRE IDENT NO.

DRAWING NO. 22-5777

CONT ON SH.

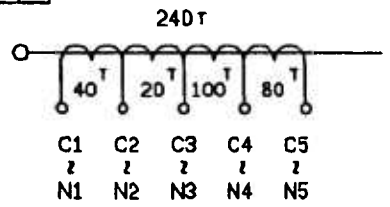
SHEET

REV. ⚠

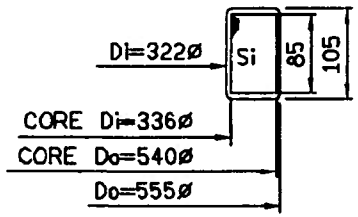
FORTUNE ELECTRIC CO., LTD.

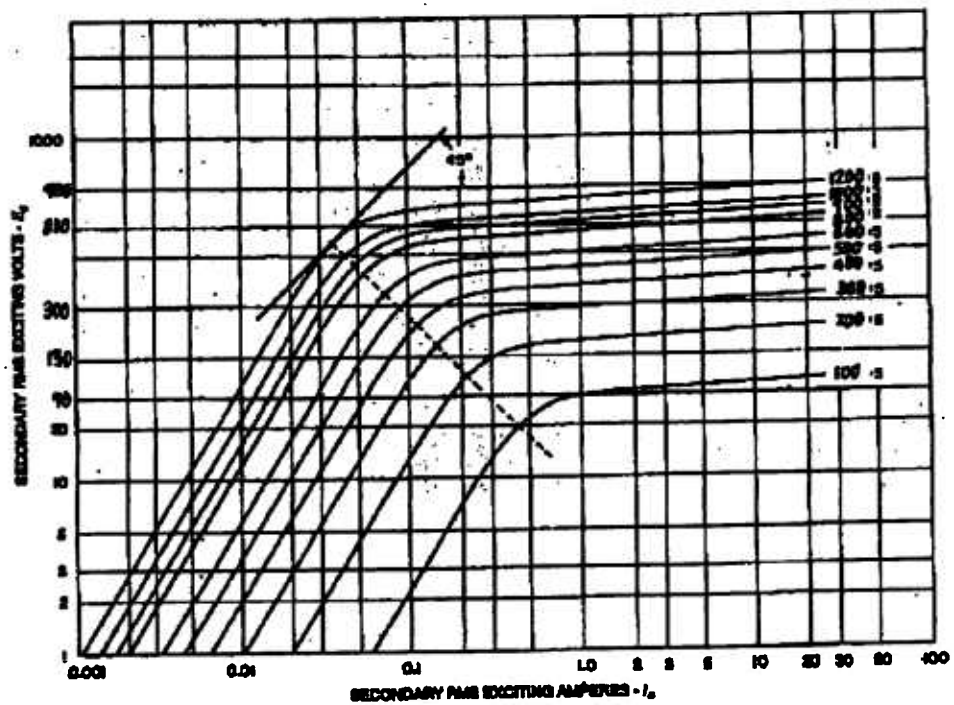
NYPA POLETTI 500MW CCPP STG GSU NAMEPLATE

H1,H2,H3



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
C D E F G H I J K L M N	1200/5A	X1-X5	C800	200
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





SECONDARY RESISTANCE ON MAX.TAP 5.0 Ω (AT 75°C)

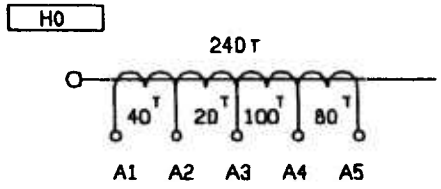
CORE AREA 8670 mm²

CORE MEAN LENGTH 1380 mm

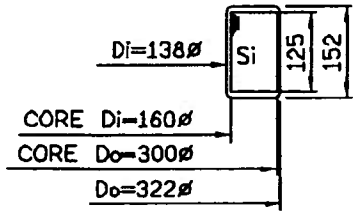
△						SCALE 1:1	UNIT in/[mm]
△						PROJECTION	
SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.		

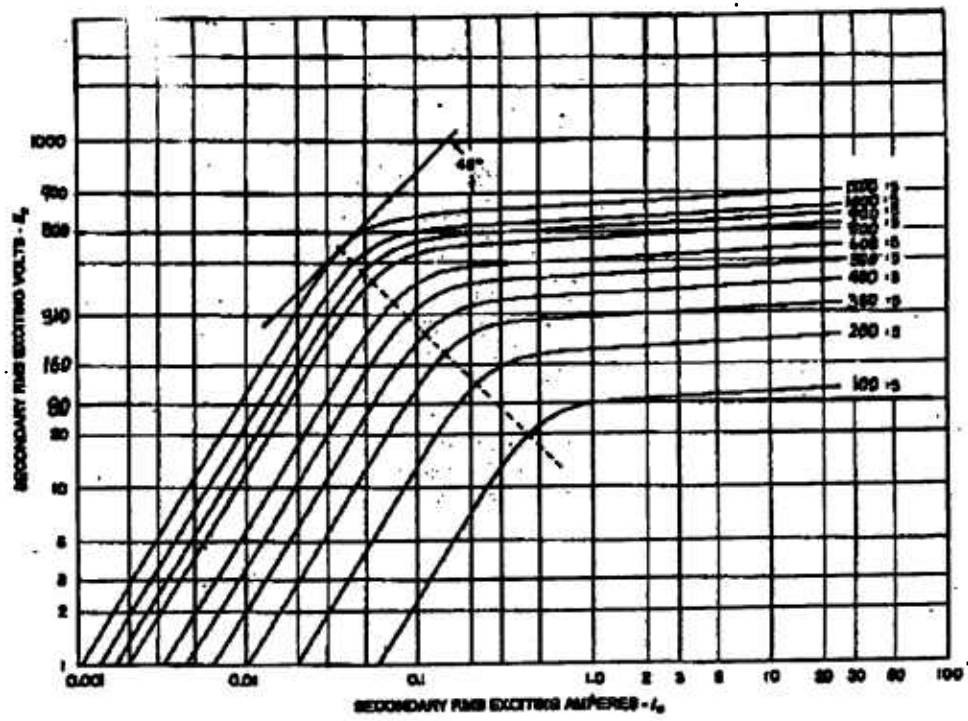
PRELIMINARY	POLETTI
TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE	GENERAL ELECTRIC INTERNATIONAL, INC.
140/188/234MVA TRANSFORMER	POWER PLANT ENGINEERING
PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT	POWER PLANT SYSTEMS DEPARTMENT
MADE FOR: NEW YORK POWER AUTHORITY	PRESIDENT. NO. / DRAWING NO. 23A33688 1/3 / SHEET / CONT. OF SHT. / REV.
DWN. Y. C. Hsu 03— 12 — '01	FORTUNE ELECTRIC CO., LTD.
CHKD. S. M. WANG 03— 12 — '01	
APPD. I. C. CHENG 03— 12 — '01	

NYPA POLETTI 500MW CCPP STG GSU CT SAT CURVES



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
A	1200/5A	X1-X5	C800	200
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





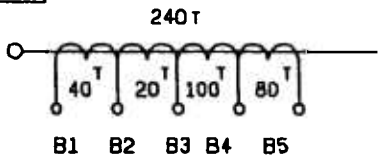
SECONDARY RESISTANCE ON MAX.TAP 5.1 Ω (AT 75°C)

CORE AREA 8750 mm²

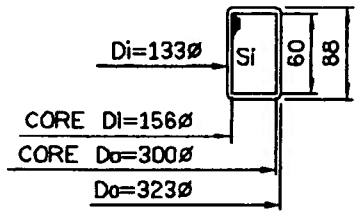
CORE MEAN LENGTH 730 mm

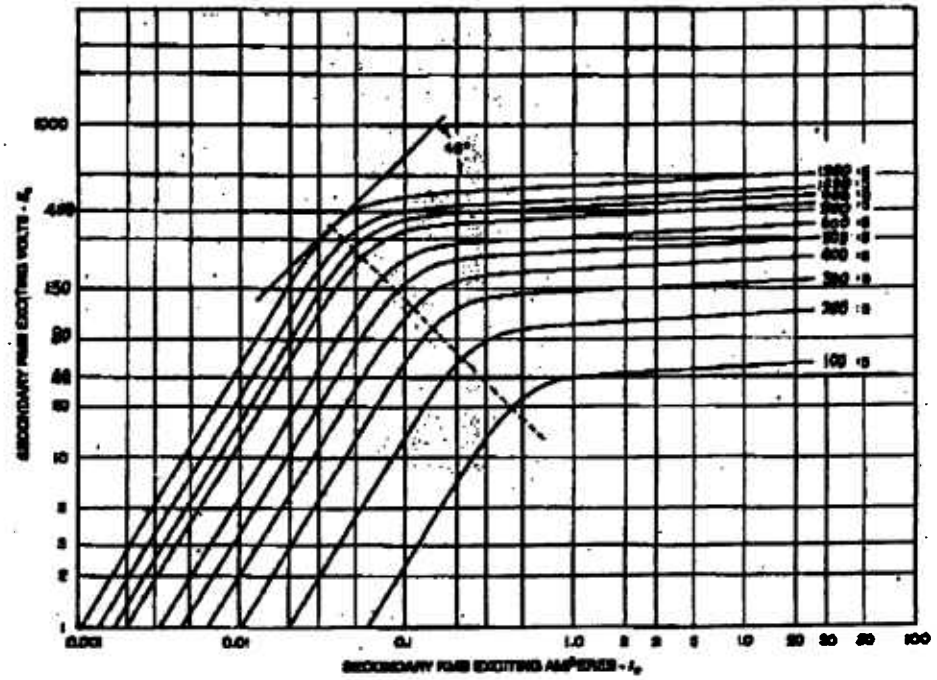
PRELIMINARY							POLETTI	
TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE							GENERAL ELECTRIC INTERNATIONAL, INC.	
140/188/234MVA TRANSFORMER							POWER PLANT ENGINEERING	
PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT							POWER PLANT SYSTEMS DEPARTMENT	
MADE FOR: NEW YORK POWER AUTHORITY							PR'EDENT. NO.	DRAWING NO. 23A3368B 2/3 SHEET CONT. DR'SH. REV.
SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.	SCALE 1:1 UNIT in/(mm) PROJECTION	DWN. Y. C. Hsu 03—12—'01	
							CHKD. S. M. WANG 03—12—'01	
							APPD. I. C. CHENG 03—12—'01	FORTUNE ELECTRIC CO., LTD.

H0



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
B	1200/5A	X1-X5	C400	100
	1000/5A	X2-X5		
	900/5A	X3-X5		
	800/5A	X1-X4		
	600/5A	X2-X4		
	500/5A	X3-X4		
	400/5A	X4-X5		
	300/5A	X1-X3		
	200/5A	X1-X2		
	100/5A	X2-X3		





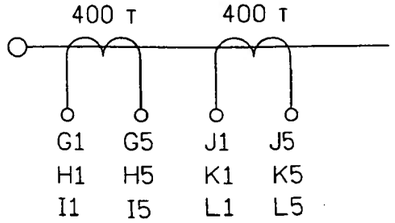
SECONDARY RESISTANCE ON MAX.TAP 2.8 Ω (AT 75°C)

CORE AREA 4320 mm²

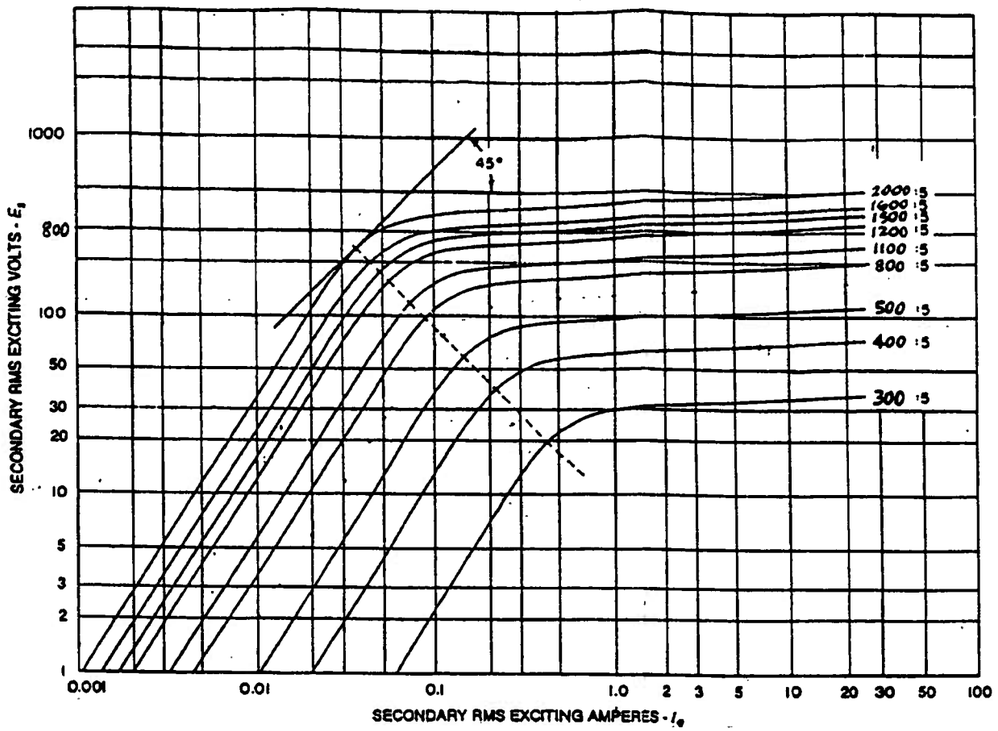
CORE MEAN LENGTH 720 mm

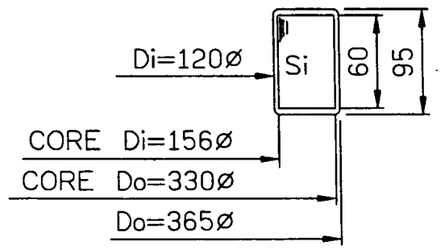
PRELIMINARY							POLETTI	
TITLE: CURRENT TRANSFORMER DATA AND EXCITATION CURVE							GENERAL ELECTRIC INTERNATIONAL, INC.	
140/188/234MVA TRANSFORMER							POWER PLANT ENGINEERING	
PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT							POWER PLANT SYSTEMS DEPARTMENT	
MADE FOR: NEW YORK POWER AUTHORITY							PPE IDENT. NO	DRAWING NO. 23A3368B 3/3 SHEET QTY. OF SHT. REV.
△						SCALE 1:1 UNIT in/[mm]	DWN. Y. C. Hsu 03— 12— '01	FORTUNE ELECTRIC CO., LTD.
△						PROJECTION	CHKD. S. M. WANG 03— 12— '01	
SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.		APPD. I. C. CHENG 03— 12— '01	

H1, H2, H3



CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
G H I J K L	2000:5A	X1-X5	C800	200
	1600:5A	X2-X5		
	1500:5A	X1-X4		
	1200:5A	X1-X3		
	1100:5A	X2-X4		
	800:5A	X2-X3		
	500:5A	X4-X5		
	400:5A	X1-X2		
	300:5A	X3-X4		

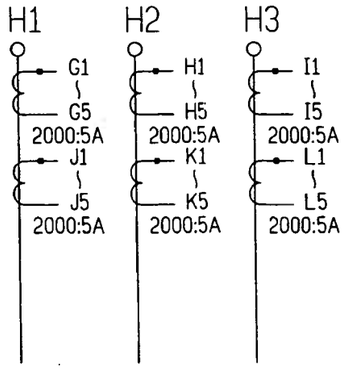




SECONDARY RESISTANCE ON MAX.TAP 1.1 Ω (AT 75°C)

CORE AREA 5220 mm^2

CORE MEAN LENGTH 770 mm

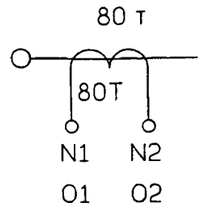


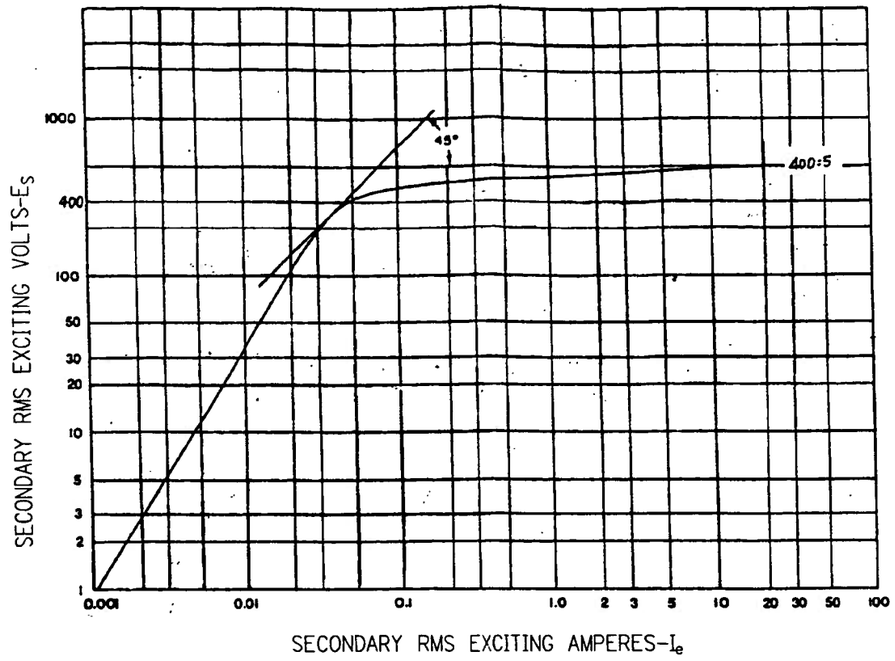
						SCALE 1:1	UNIT in/[mm]	DWN. M. H. Yang 7 — 9 — '02
						PROJECTION		CHKD. S. M. Wang 7 — 9 — '02
SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.			APPD. S. M. Wang 7 — 9 — '02

PRELIMINARY		POLETTI		
TITLE				
BCT EXCITATION CURRENT CURVES		GENERAL ELECTRIC INTERNATIONAL, INC.		
26/34.6/43.4MVA TRANSFORMER		POWER PLANT ENGINEERING		
PROJECT				
POLETTI 500 MW COMBINED CYCLE PLANT		POWER PLANT SYSTEMS DEPARTMENT		
MADE FOR		PPE IDENT. NO.	DRAWING NO.	SHEET 2 / CONT. ON SH. 15 / REV.
NEW YORK POWER AUTHORITY			23A3992 3/3	

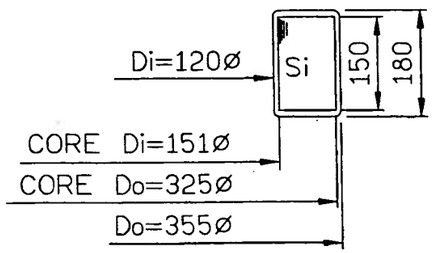
FORTUNE ELECTRIC CO., LTD.

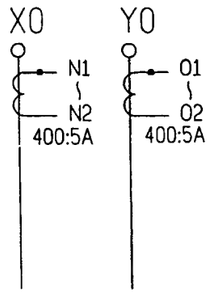
X0, Y0





CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
N O	400:5A	X1-X2	C400	100





SECONDARY RESISTANCE ON MAX.TAP 0.8 Ω (AT 75°C)

CORE AREA 13050 mm^2

CORE MEAN LENGTH 800 mm

SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.
B	07.09.'02	Page change	M.H.Yang	S.M.Wang	S.M.Wang
A	11.12.'01	PROVIDE LEGIBLE CORVE CHANGED	Y.C.Hsu	S.M.Wang	S.M.Wang

SCALE 1:1 | UNIT in/[mm] | PROJECTION

DWN.	Y. C. Hsu	9 — 4 — '01
CHKD.	S. M. Wang	9 — 4 — '01
APPD.	S. M. Wang	9 — 4 — '01

PRELIMINARY

TITLE: BCT EXCITATION CURRENT CURVES
26/34.6/43.4MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

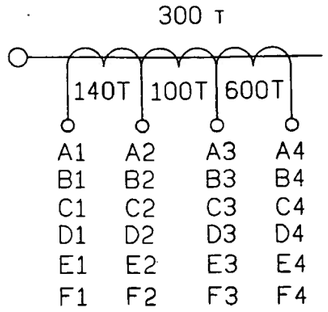
MADE FOR: NEW YORK POWER AUTHORITY

POLETTI

GENERAL ELECTRIC INTERNATIONAL, INC.
POWER PLANT ENGINEERING
POWER PLANT SYSTEMS DEPARTMENT

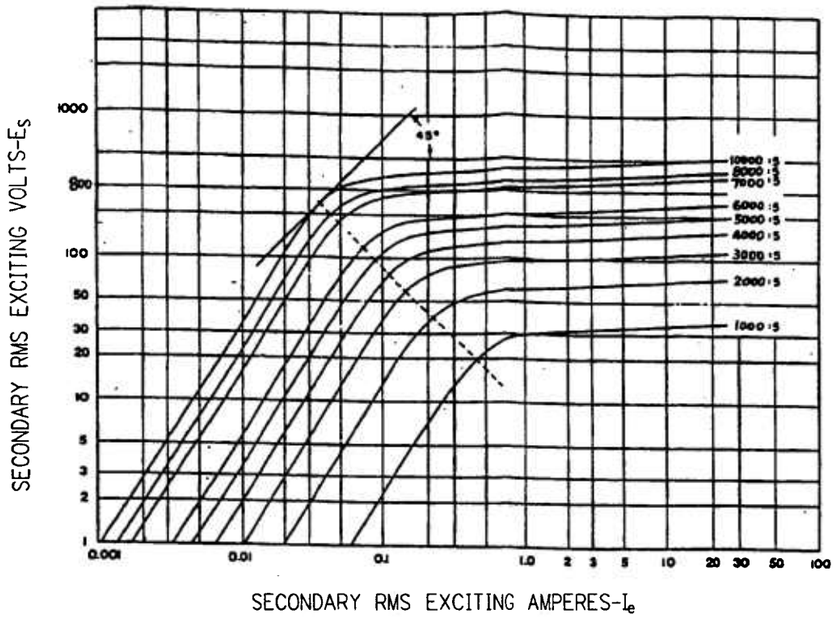
PPE IDENT. NO.	DRAWING NO.	SHEET	REV.
	23A3992 B 2/3	2	B
		CONT. ON SH. 15	

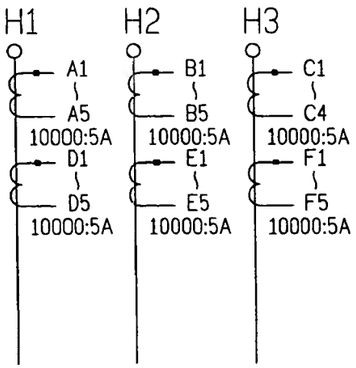
FORTUNE ELECTRIC CO., LTD.

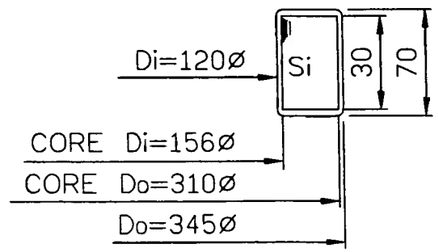


H1, H2, H3

CT NO.	MULTI RATIO	SECONDARY CONNECTIONS	ACCURACY	CAPACITY (VA)
A B C D E F	10000:5A	X1-X5	C800	200
	8000:5A	X1-X4		
	7000:5A	X2-X5		
	6000:5A	X3-X5		
	5000:5A	X2-X4		
	4000:5A	X3-X4		
	3000:5A	X1-X2		
	2000:5A	X4-X5		
	1000:5A	X2-X3		







SECONDARY RESISTANCE ON MAX.TAP 1.6 Ω (AT 75°C)

CORE AREA 6930 mm²

CORE MEAN LENGTH 750 mm

SYM.	DATE	REVISIONS	REVD.	CHKD.	APPD.
C	07.09.'02	Page change	M.H.Yang	S.M.Wang	S.M.Wang
B	12.10.'01	MULTI RATIO CHANGED	Y.C.Hsu	S.M.Wang	S.M.Wang
A	11.12.'01	MULTI RATIO CHANGED	Y.C.Hsu	S.M.Wang	S.M.Wang

SCALE 1:1 | UNIT in/[mm] | PROJECTION

PRELIMINARY

TITLE: BCT EXCITATION CURRENT CURVES
26/34.6/43.4MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

MADE FOR: NEW YORK POWER AUTHORITY

POLETTI
GENERAL ELECTRIC INTERNATIONAL, INC.
POWER PLANT ENGINEERING
POWER PLANT SYSTEMS DEPARTMENT

PPE IDENT. NO.	DRAWING NO.	SHEET	REV.
	23A3992 1/3	2	C
	CONT. ON SH.	15	

DWN. Y. C. Hsu 9 — 4 — '01
CHKD. S. M. Wang 9 — 4 — '01
APPD. S. M. Wang 9 — 4 — '01

FORTUNE ELECTRIC CO., LTD.

NYPA POLETTI 500MW CCPP UAT CT SAT CURVES

TRANSFORMER

3 PHASE	60 HZ	CORE FORM	STANDARD IEEE C57.12
TYPE OF COOLING	ONAN/ONAF/ONAF		OUTDOOR USE

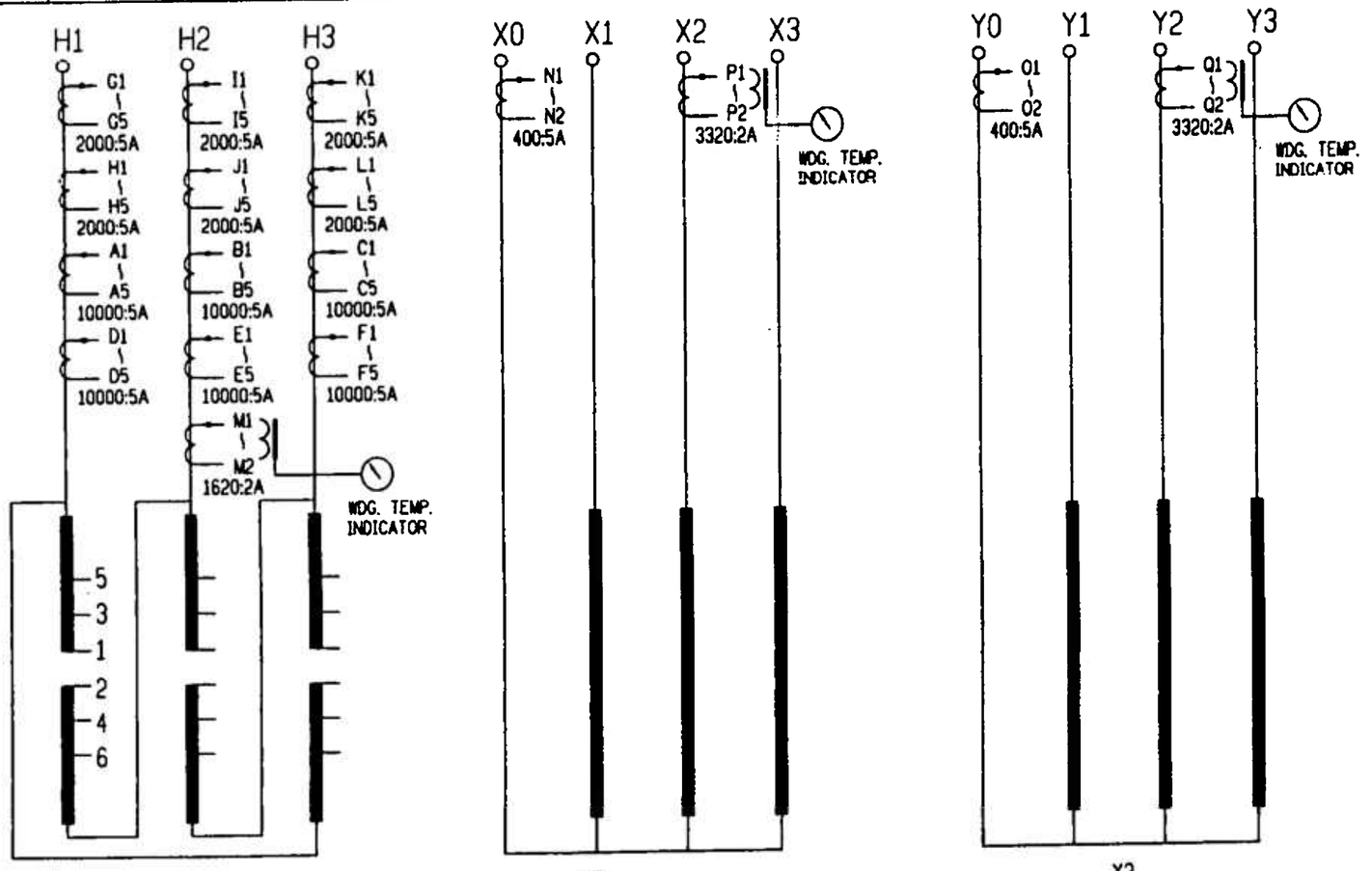
WINDING	CONN. TO	CAPACITY (MVA) ONAN	ONAF	ONAF	VOLTAGE RATING (kV)	CURRENT (A) ONAN	ONAF	ONAF	IMPULSE (BIL)
HV	H1, H2, H3	26	34.6	43.4	18	834	1110	1392	150 kV
LV1	X1, X2, X3	13	17.3	21.7	4.16	1804	2401	3012	75 kV
LV2	Y1, Y2, Y3	13	17.3	21.7					NEUTRAL 75 kV

LOAD CAPABILITY 40°C AMBIENT TEMP.	
WDG. TEMP. RISE BY RESISTANCE	65 °C
OIL TEMP. RISE	65 °C
IMPEDANCE [ ]% AT 18-4.16kV-13MVA 85°C (HV-LV1)	
IMPEDANCE [ ]% AT 18-4.16kV-13MVA 85°C (HV-LV2)	

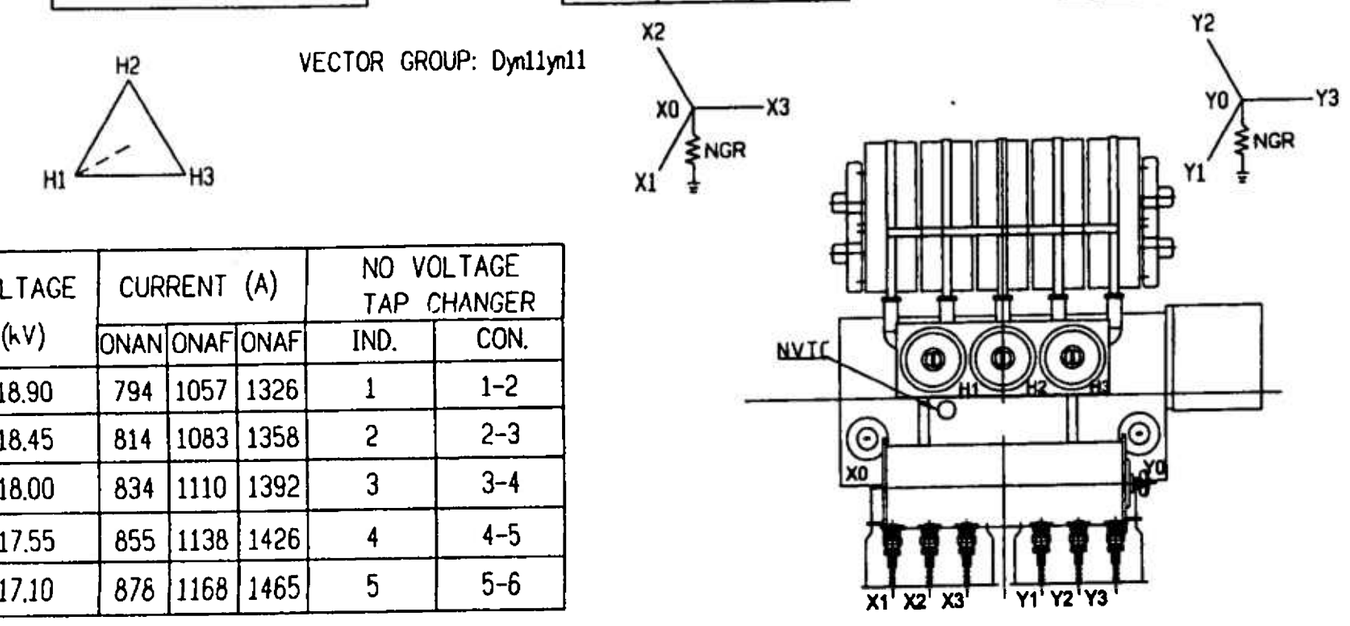
INSULATING OIL	MINERAL OIL
WINDING MATERIAL	COPPER
WITHSTAND: COMPLETE TRANSFORMER ±15Psi PRESSURE	

APPROXIMATE WEIGHTS	
CORE & WINDINGS	52,000 lbs
TANK & FITTINGS	29,800 lbs
OIL 3,500 GALLONS	26,200 lbs
TOTAL WEIGHT	108,000 lbs

POSITION	CT NO	CURRENT MULTI RATIO / SECONDARY CONNECTIONS									ACCURACY
H1, H2, H3	A, B, C D, E, F	10000:5A	8000:5A	7000:5A	6000:5A	5000:5A	4000:5A	3000:5A	2000:5A	1000:5A	C800
		X1-X5	X1-X4	X2-X5	X3-X5	X2-X4	X3-X4	X1-X2	X4-X5	X2-X3	
H2	M	1620:2A (FOR WTI)									-
		X1-X2									
X0, Y0	N, O	400:5A									C400
		X1-X2									
X2, Y2	P, Q	3320:2A (FOR WTI)									-
		X1-X2									
H1, H2, H3	G, I, K H, J, L	2000:5A	1600:5A	1500:5A	1200:5A	1100:5A	800:5A	500:5A	400:5A	300:5A	C800
		X1-X5	X2-X5	X1-X4	X1-X3	X2-X4	X2-X3	X4-X5	X1-X2	X3-X4	



VECTOR GROUP: Dyn11yn11



VOLTAGE (kV)	CURRENT (A) ONAN	ONAF	ONAF	NO VOLTAGE TAP CHANGER IND.	CON.
18.90	794	1057	1326	1	1-2
18.45	814	1083	1358	2	2-3
18.00	834	1110	1392	3	3-4
17.55	855	1138	1426	4	4-5
17.10	878	1168	1465	5	5-6

YEAR OF MANUFACTURE [Sep. 2002] SERIAL NO. [01072] INSTRUCTION MANUAL: 24A0231

FORTUNE ELECTRIC CO., LTD.

MADE IN TAIWAN

TR-NL22-5483

MATERIAL: STAINLESS STEEL PLATE: 1.6t-300x500

0.06"-11.81"x19.68"

REVISIONS	SYM.	DATE	REVD.	CHKD.	APPD.
BCT and Type of cooling Change	A	11.12.'01	M.H.Yang	S.M.Wang	S.M.Wang
Add BCT (G,H,I,J,K,L) and outline drawing of fan	B	12.10.'01	M.H.Yang	S.M.Wang	S.M.Wang
SECONDARY CON. H1, H2, H3 changed	C	07.03.'02	Y.C.Hsu	S.M.Wang	S.M.Wang
POSITION H1, H2, H3 changed	D	10.07.'02	Y.C.Hsu	S.M.Wang	S.M.Wang

SCALE 1:1 UNIT in/[mm] PROJECTION

DWN. Y. C. Hsu 03—12—'01

CHKD. S. M. WANG 03—12—'01

APPD. I. C. CHENG 03—12—'01

PRELIMINARY

TITLE: NAME PLATE

26/34.6/43.4MVA TRANSFORMER

PROJECT: POLETTI 500 MW COMBINED CYCLE PLANT

MADE FOR: NEW YORK POWER AUTHORITY

POLETTI

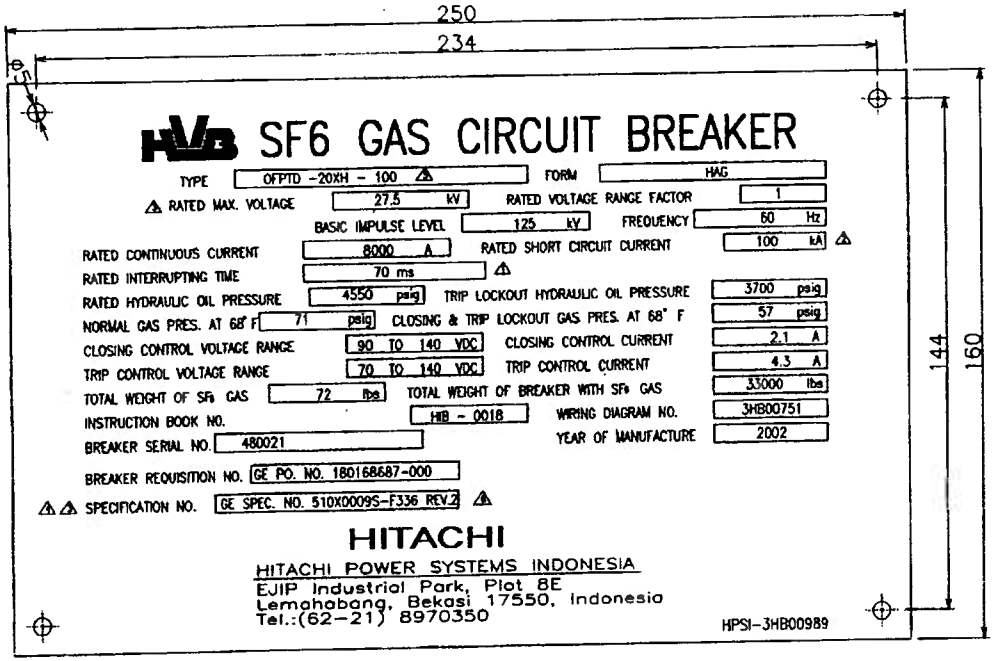
GENERAL ELECTRIC INTERNATIONAL, INC.

POWER PLANT ENGINEERING

POWER PLANT SYSTEMS DEPARTMENT

PPE IDENT. NO. | DRAWING NO. 22-5483 | SHEET 1 | CONT. ON SH. 02 | REV. D

FORTUNE ELECTRIC CO., LTD.



SF6 GAS CIRCUIT BREAKER

TYPE	OFPTD -20XH - 100 ⚠	FORM	HAG
⚠ RATED MAX. VOLTAGE	27.5 kV	RATED VOLTAGE RANGE FACTOR	1
BASIC IMPULSE LEVEL	125 kV	FREQUENCY	60 Hz
RATED CONTINUOUS CURRENT	8000 A	RATED SHORT CIRCUIT CURRENT	100 kA ⚠
RATED INTERRUPTING TIME	70 ms ⚠		
RATED HYDRAULIC OIL PRESSURE	4550 psig	TRIP LOCKOUT HYDRAULIC OIL PRESSURE	3700 psig
NORMAL GAS PRES. AT 68° F	71 psig	CLOSING & TRIP LOCKOUT GAS PRES. AT 68° F	57 psig
CLOSING CONTROL VOLTAGE RANGE	90 TO 140 VDC	CLOSING CONTROL CURRENT	2.1 A
TRIP CONTROL VOLTAGE RANGE	70 TO 140 VDC	TRIP CONTROL CURRENT	4.3 A
TOTAL WEIGHT OF SF_6 GAS	72 lbs	TOTAL WEIGHT OF BREAKER WITH SF_6 GAS	33000 lbs
INSTRUCTION BOOK NO.	HIB - 0018	WIRING DIAGRAM NO.	3HB00751
BREAKER SERIAL NO.	480021	YEAR OF MANUFACTURE	2002
BREAKER REQUISITION NO.	GE PO. NO. 180168687-000		
⚠⚠ SPECIFICATION NO.	GE SPEC. NO. 510X0009S-F336 REV.2 ⚠		

HITACHI

HITACHI POWER SYSTEMS INDONESIA
EJIP Industrial Park, Plot 8E
Lemahabang, Bekasi 17550, Indonesia
Tel.:(62-21) 8970350

HPSI-3HB00989

NOTE
1. MATERIAL : SUS 304-CP
2. THICKNESS : 0.6 mm

REV NO.	SYM.	DWG ZONE	REVISION	DATE	REVD.	CHKD.	APPD.
0	⚠		CORRECTION REVISION SPEC. NO.	03.08.21	EDY	RHM	GOTO
1	⚠		CORRECTION OF GMCB FORM TYPE	03.02.13	EDY	RHM	GOTO
2	⚠		REVISED SPECIFICATION NO. AND	03.01.13	EDY	RHM	GOTO
3	⚠		REVISE AS COMMENTS & FOR CORRECTION	02.11.20	EDY	RHM	GOTO
4	⚠		REVISED TA VALUE TO 900A AS CUST.COMMENTS	02.08.05	EDY	RHM	GOTO
5	⚠		REVISED AS CUST.COMMENTS	02.06.18	EDY	RHM	GOTO

PROJECT NAME :			POLETTI 500MW COMBINED CYCLE PLANT STEAM TURBINE GENERATOR STG NEW YORK POWER AUTHORITY
CUSTOMER NAME :			GENERAL ELECTRIC COMPANY GE POWER SYSTEMS
PURCHASE ORDER NO. :			180168687-000
SPECIFICATION NO. :			510X0009S-F336 REV.2
DRN.	EDY	01.12.31	REQD.
CHKD.	RHM/MAT	01.12.31	
CHKD.	HIRO	01.12.31	
APPD.	K.GOTO	01.12.31	

HITACHI POWER SYSTEMS INDONESIA

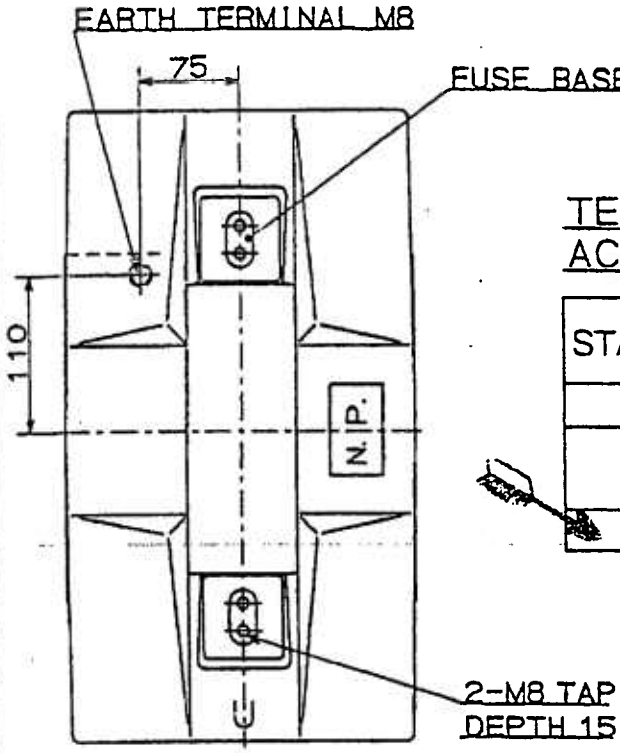
TITLE : NYPA POLETTI STG MAIN NAME PLATE GENERATOR BREAKER

DWG. NO. HPSI-3HB00989

REV. 0 SHEET 1 OF 1

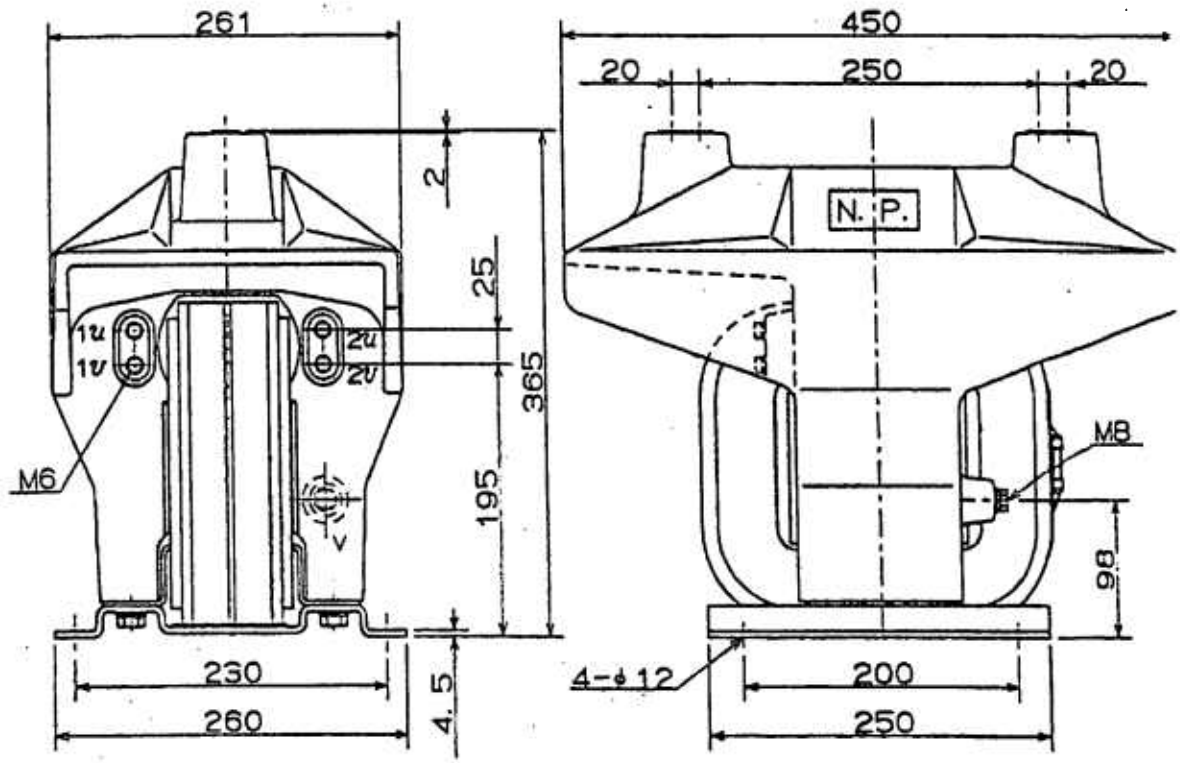
NYPA POLETTI 500MW CCPP CTG 7A & 7B CB NAMEPLATE

INDOOR MOLDING TYPE	
TYPE	GE-6
PHASE	1
MASS	55kg



TERMINAL MARK
ACCORDING TO STANDARD

STANDARD	TERMINAL MARK		
	PRIM.	SEC.	
JEC	U. V	1u.1v	2u.2v
IEC BS	A. N	1a.1n	2a.2n
ANSI	H1. H2	X1. X2	Y1. Y2



NYPA POLETTI 500MW CCPP CTG/STG PT1 & PT3 NAMEPLATE INFORMATION

APP	5-Feb.'99	M. Furuya	MAR	REVISION
CHD	5-Feb-'99	M. Inoue	TOKO ELECTRIC	D414950-01-000
DSN	4-Feb.-'99	J. Matsunaga	OUTLINE DRAWING FOR	

INDOOR MOLDING TYPE

TYPE GE-6

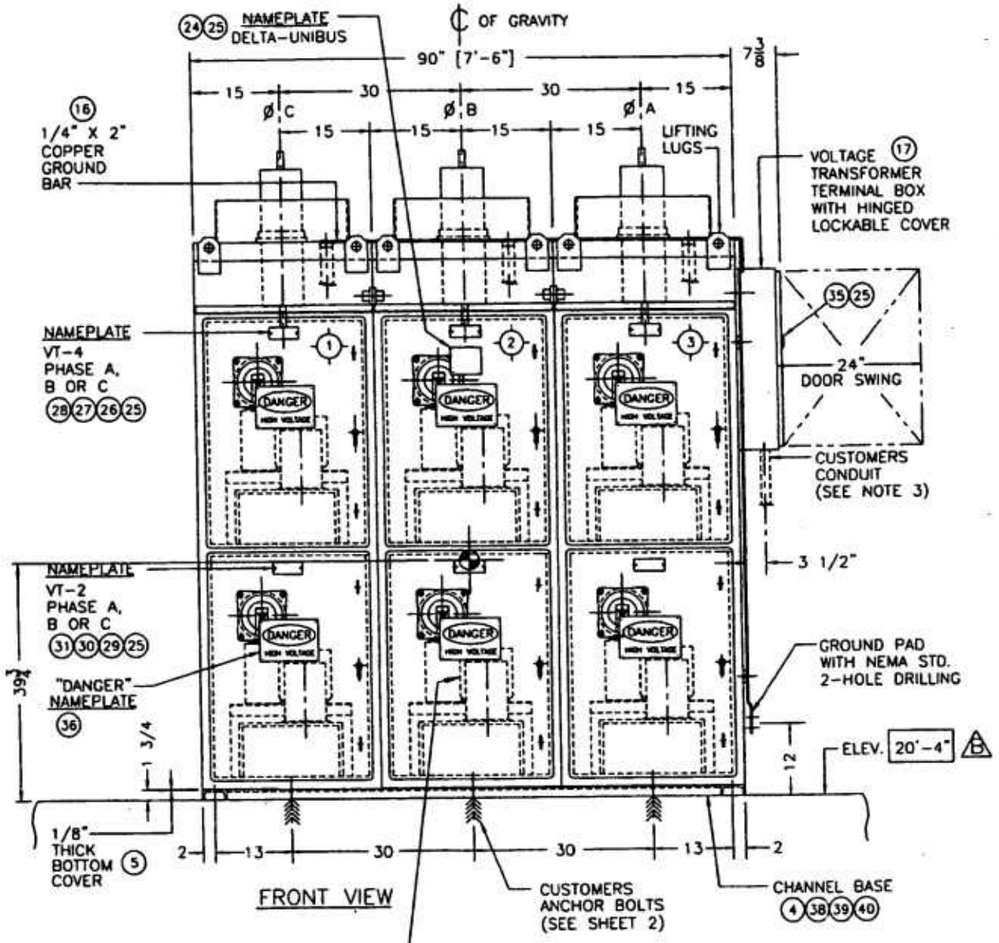
STANDARD ANSI C 57.13

POS. NO.	FREQ.	B.I.L. (kv)	PRIM. VOLTAGE (kv)	RATIO	ACCURACY CLASS
2	60	125	18 / √3	150:1	0.3 Z
3	60	125	18 / √3	150&150:1	0.3 Y *

* CLASS 0.3 Y (75VA) ~~and 100VA~~

@ GUARANTEE BURDEN 100VA P.F. 0.8

APP	30 Nov. '98	M. Fujiwara	@	Changed "@"	1-Mar.-99 J. Mitsunaga
CHD	27-Nov-98	M. Asami	MAR	REVISION	
DSN	27-Nov.-98	J. Mitsunaga	TOKO ELECTRIC	KI-1527-2a	
				SPECIFICATION	



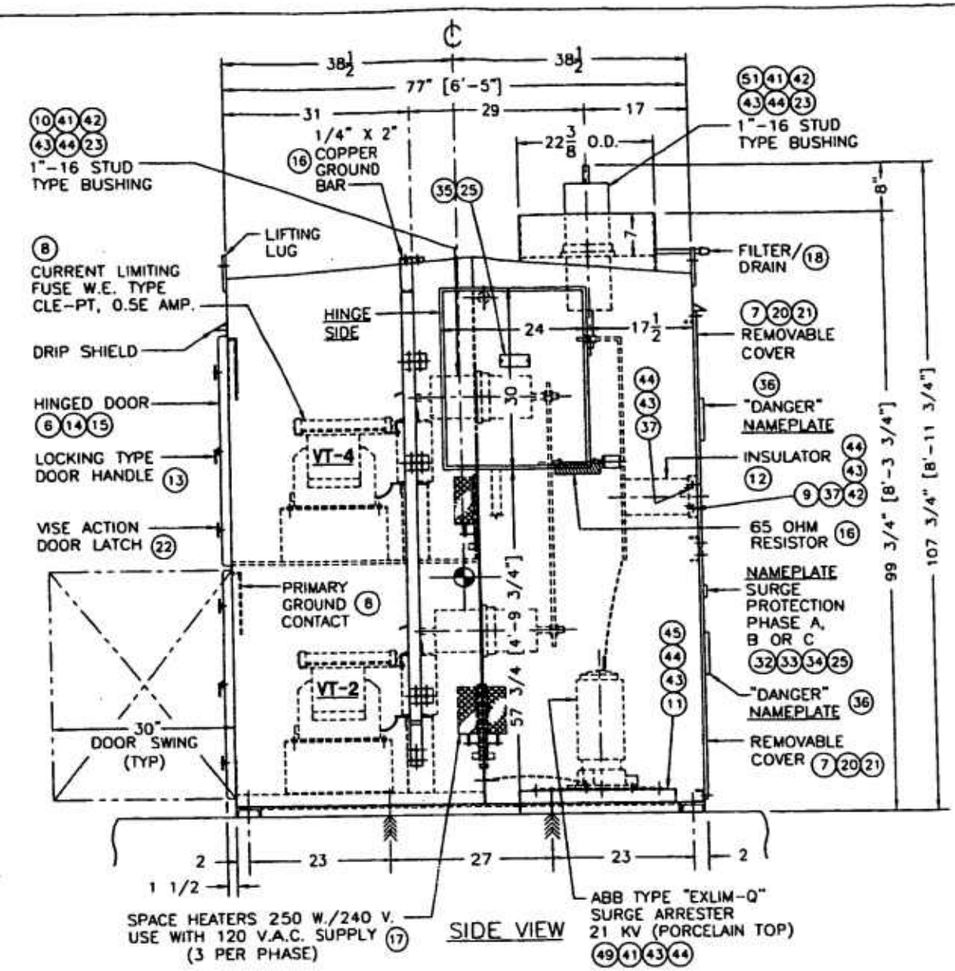


ABB TYPE "VIZ-12G" VOLTAGE TRANSFORMERS 18,000/120 V., 60 HZ., SINGLE PHASE, RATIO 150:1, 125 KV BIL

ACCURACY CLASS:

LINE TO LINE	0.3 W, X, M, Y & Z
LINE TO NEUTRAL	0.3 W, X, M, Y & 1.2 Z

THERMAL RATINGS:

LINE TO LINE	1500 VA. @ 55° C
LINE TO NEUTRAL	1000 VA. @ 55° C

CONNECTIONS:

VT-4 & VT-2: PRIMARY: Y-GROUNDED

VT-4 & VT-2: SECONDARY: Y-GROUNDED

NOTES:

1. FOR WIRING DIAGRAM SEE DWG. T-171147X150
2. FOR LIST OF MATERIALS SEE DWG. T-140014X234-M
3. CUSTOMERS CONDUIT MAY ENTER THE V.T. TERMINAL BOX AT ANY POINT ON THE TOP, BOTTOM OR SIDES. TO BE DETERMINED BY CUSTOMER.
4. CUBICLE IS CONSTRUCTED OF 11GA. STEEL.
5. VOLTAGE TRANSFORMERS ARE GROUNDED BY AN INTERNAL GRID.
6. WHEN V.T.'S ARE IN THE DISCONNECT POSITION THE PRIMARY OF THE V.T. IS GROUNDED.
7. ⊕ = CENTER OF GRAVITY

REV.	DATE	DESCRIPTION	DWN	APP'D.	RCD
B	10-22-02	REVISED PER CUSTOMER APPROVAL RECEIVED ON 10-17-02	RD	RJR	
A	8-30-02	REVISED PHASE PHASING, REMOVE CAPACITOR & RATING OF L.A. WAS 18 KV.	OVYD	RJR	

REVISION RECORD

NEXT ASS'Y. | USED ON

APPLICATION

MATERIAL: SEE NOTE 2

FINISH: LIGHT GRAY ENAMEL PER ANSI # 61

WEIGHT: 6000#

SCALE: 3/4" = 12"

F.M.F. J.O. #D-4589

DWG. DATE 6-05-02 DWN. BY OVYD

CHK. RJR

APPVL

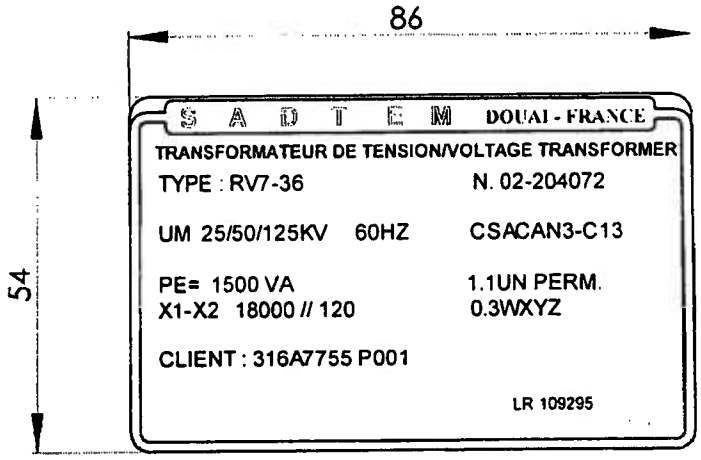
DELTA-UNIBUS CORP.
CHICAGO, ILLINOIS 60131

VOLTAGE TRANSFORMER & SURGE PROTECTION CUBICLE ASSEMBLY DRAWING

SIZE C | DWG. NO T - 140014X234 | REV. B

AutoCAD# P0142341.DWG | SHEET 1 OF 2

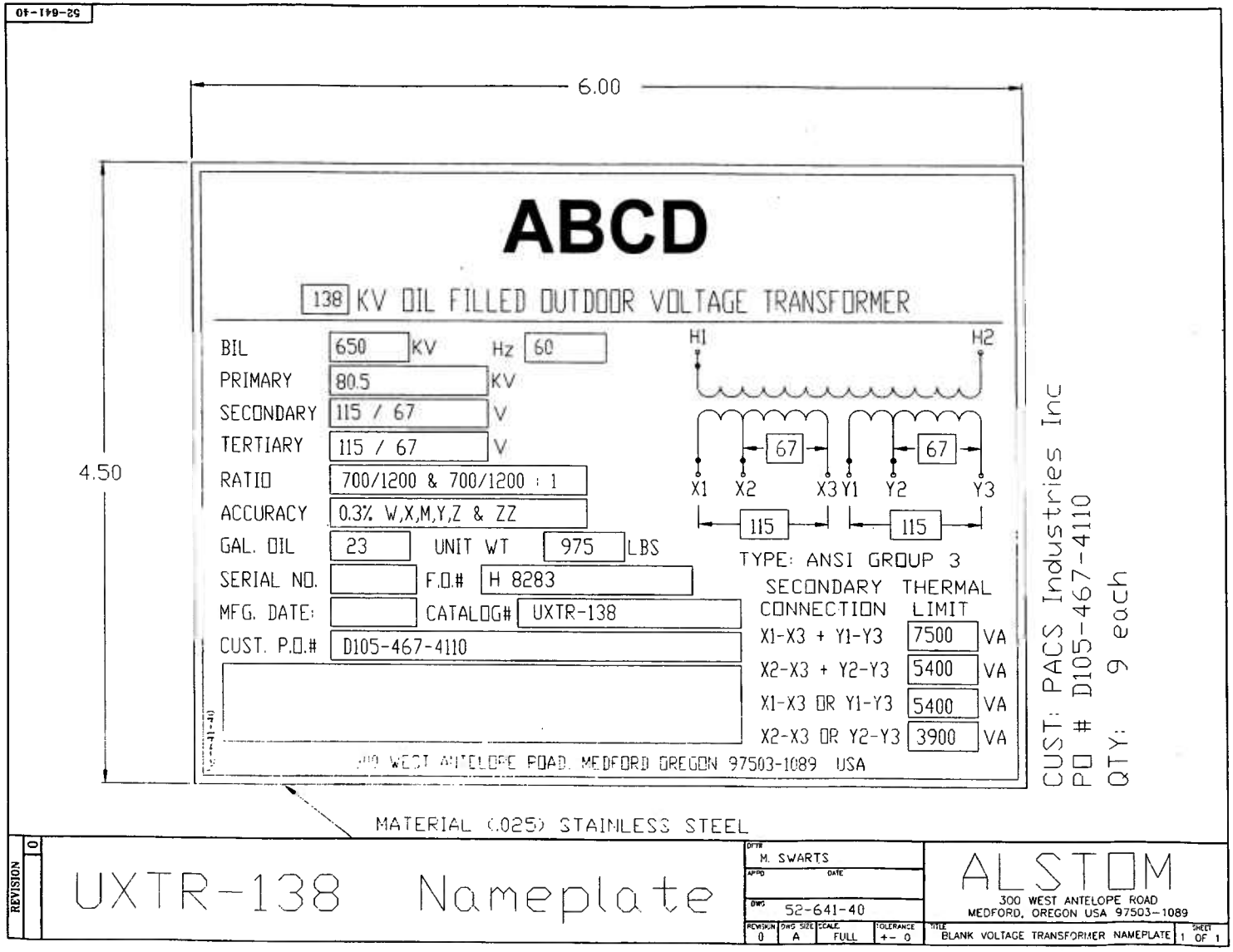
NYPA POLETTI 500MW CCPP STG PT2 & PT4 NAMEPLATE INFORMATION



A		Création				

Date: 8 July. 05	*Echelle: Scale:* 1	*Appareil:* RV7-36	*Format:* A4
Dessiné: DRN: B. LAPEYRE		*Matière:* **POLYESTER**	*Finition:*
Vérifié par: CHK'D:		NAMEPLATE	
SADTEM RV7-26 18000 - 120 A		*Destination:* **BE-U5**	

Feuille: 1/1

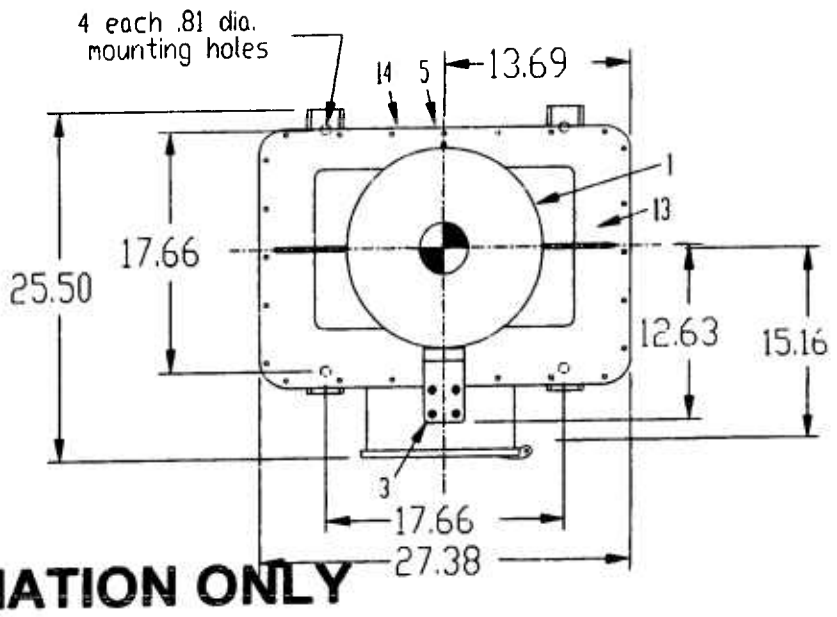


NYPA POLETTI 500MW CCPP 138KV PTS NAMEPLATE

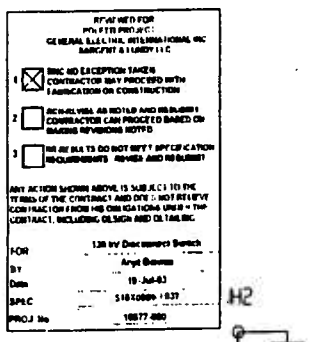
ABCD

VOLTAGE TRANSFORMER
138kV CLASS 650kV BIL

1 . ALUMINUM WEATHER DOME WITH OIL LEVEL INDICATOR
2 . SECONDARY TERMINALS FOR CONNECTION WITH Cu or Al
3 . ONE PIECE CAST ALUMINUM HEAD CEMENTED TO PORCELAIN WITH REMOVABLE PRIMARY FOUR HOLE SPADE TERMINAL (.56 DIA. HOLES ON 1.75 SQUARE)
4 . NEMA GROUND PAD
5 . 0.38" OIL SAMPLE VALVE
6 . JUNCTION BOX WITH (2) 1.50" CONDUIT HUBS
7 . WET PROCESSED PORCELAIN (ASA#70 LT. GREY)
8 . CAST ALUMINUM TANK
9 . LIFTING PROVISIONS
10 . H2 BUSHING WITH GROUND BAR
11 . STAINLESS STEEL NAMEPLATE
12 . LV IDENTIFICATION PLATE
13 . CAST ALUMINUM TANK COVER CEMENTED TO PORCELAIN
14 . NON-PCB LABEL



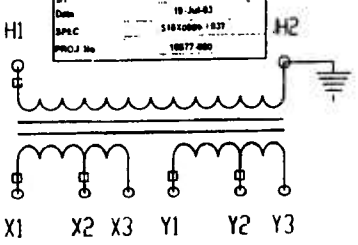
FOR INFORMATION ONLY



NOTE: ALL STAINLESS STEEL HARDWARE

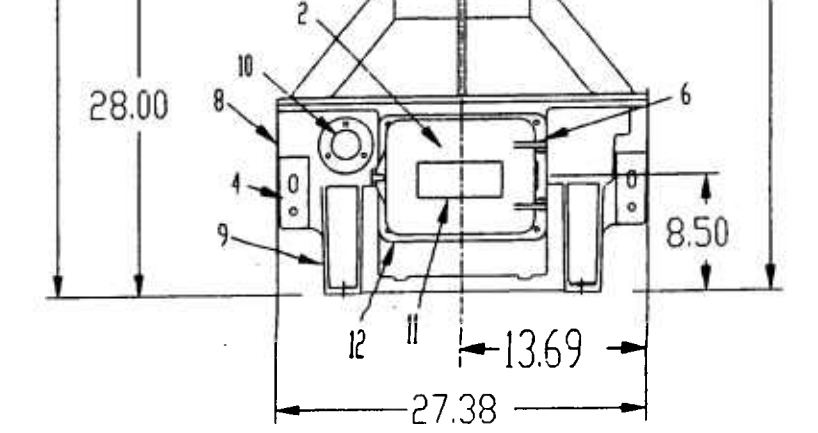
CHARACTERISTICS

ACCURACY : 0.30% W,X,Y,Z,ZZ



CONNECTION DIAGRAM:

DUAL TAPPED SECONDARY



Catalog Number.....UXTR-138
Ratio (pri/sec).....700/1200 & 700/1200 :1
Primary Volts (L-G)...80500
Sec/Tert Volts.....115/67
Creep.....150"
Oil.....23gal
Weight.....975 lbs.
Color.....ASA #70
Strike.....48"
Untanking Height.....145"
Thermal VA.....7500 TOTAL
simultaneous max per winding....3750
max per tapped winding.....2700
max, one winding.....5400
max, one tapped winding.....3900

Cust: PACS UIndustries

PO # D105-467-4110

ALSTOM USA INC.
300 WEST ANTELOPE ROAD MEDFORD, OREGON U.S.A.

PART # UXTR-138	SO # H 8283	SHEET 1 OF 1
DATE 1 JUNE 1998	DRAWN BY M Dickinson	CHECKED BY
		SCALE: N.T.S. TOLERANCE: +/-.25"

Poletti 500MW Combined Cycle Power Project
Fault Current Results Summary

The table below summarizes the fault current levels at the connection point of the Poletti CCPP units into the Con Edison system at the Astoria West 138kV bus. The short circuit analysis was performed both with and without the Poletti CCPP in service for select Con Edison 138kV busses. The results show an increase, on average, of about 40% in fault current levels at the Astoria West 138kV bus, and approximately 2-3% in the Con Edison 138kV system two busses away at East 179th Street and Vernon East 138kV.

Faulted Station Bus	**Total Bus Fault Current Levels**[1]					
	* * * * * * * * * (Symmetrical RMS kA) * * * * * * * * *					
	W/O Poletti 500MW CCPP			***W/Poletti 500MW CCPP***		
	3LG	2LG	1LG	3LG	2LG	1LG
Astoria West 138kV	24.9	26.9	27.4	34.2	37.5	38.8
East 179th Street 138kV	39.8	41.7	38.2	40.5	42.4	38.8
Vernon East 138kV	33.7	35.3	36.0	34.7	36.3	37.0

[1] Fault Study was performed on the latest issue of the NYISO Short Circuit Database using Aspen OneLiner V9.7 Short Circuit program.

Summary of fault being displayed:

1. 3LG Bus fault on:
   AST-WEST 138. kV

FAULT CURRENT (A : DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
24949.8@ -88.9	0.0@ 0.0	0.0@ 0.0	24949.8@ -88.9	24949.8@ 151.1	24949.8@ 31.1

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.06222+j3.21375	0.0671+j3.21148	0.21911+j2.35422

SHORT CIRCUIT MVA= 6002.7 X/R RATIO= 51.6473 R0/X1= 0.06818 X0/X1= 0.73254

BUS 64 AST-WEST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.0 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)	>		0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0
BRANCH CURRENT (A) TO	>													
752 ASTW-DUM	138.	1L	1944.1@	91.2	0.0@	0.0	0.0@	0.0	1944.1@	91.2	1944.1@	-28.8	1944.1@	-148.8
129 QUEENSBG	138.	2L	1938.6@	92.1	0.0@	0.0	0.0@	0.0	1938.6@	92.1	1938.6@	-27.9	1938.6@	-147.9
129 QUEENSBG	138.	15L	1887.3@	91.8	0.0@	0.0	0.0@	0.0	1887.3@	91.8	1887.3@	-28.2	1887.3@	-148.2
129 QUEENSBG	138.	14L	3584.6@	91.1	0.0@	0.0	0.0@	0.0	3584.6@	91.1	3584.6@	-28.9	3584.6@	-148.9
129 QUEENSBG	138.	1L	4031.8@	89.3	0.0@	0.0	0.0@	0.0	4031.8@	89.3	4031.8@	-30.7	4031.8@	-150.7
0 HG 5	138.	2L	3052.7@	92.2	0.0@	0.0	0.0@	0.0	3052.7@	92.2	3052.7@	-27.8	3052.7@	-147.8
102 HG 6	138.	1L	3070.8@	92.0	0.0@	0.0	0.0@	0.0	3070.8@	92.0	3070.8@	-28.0	3070.8@	-148.0
100 HG3TAP	138.	1L	25.6@	81.8	0.0@	0.0	0.0@	0.0	25.6@	81.8	25.6@	-38.2	25.6@	-158.2
99 HG2TAP	138.	1L	25.5@	81.7	0.0@	0.0	0.0@	0.0	25.5@	81.7	25.5@	-38.3	25.5@	-158.3
166 AST G3	20.	2T	2696.6@	90.9	0.0@	0.0	0.0@	0.0	2696.6@	90.9	2696.6@	-29.1	2696.6@	-149.1
166 AST G3	20.	1T	2696.6@	90.9	0.0@	0.0	0.0@	0.0	2696.6@	90.9	2696.6@	-29.1	2696.6@	-149.1
CURRENT TO FAULT (A)	>		24949.8@	-88.9	0.0@	0.0	0.0@	0.0	24949.8@	-88.9	24949.8@	151.1	24949.8@	31.1
THEVENIN IMPEDANCE (OHM)	>		3.21435@	88.9	3.21218@	88.8	2.36439@	84.7						

Summary of fault being displayed:

2. 2LG Bus fault on:
AST-WEST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
17524.7@ -88.1	7434.9@ 89.5	10100.8@ 93.6	0.0@ 0.0	26919.7@ 147.0	25857.1@ 37.0

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.06222+j3.21375	0.0671+j3.21148	0.21911+j2.35422

SHORT CIRCUIT MVA= 6476.7 X/R RATIO= 31.0955 R0/X1= 0.06818 X0/X1= 0.73254

BUS 64 AST-WEST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.0 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>		23.882@ -1.7	23.882@ -1.7	23.882@ -1.7	71.647@ -1.7	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO	>							
752 ASTW-DUM	138.	1L	1361.8@ 92.0	582.7@ -90.5	1115.0@ -89.7	339.8@ -97.8	2256.5@ -40.6	2259.3@-137.0
129 QUEENSBG	138.	2L	1362.3@ 92.9	577.3@ -89.5	1175.4@ -83.8	390.5@ -80.7	2368.5@ -39.2	2224.7@-133.1
129 QUEENSBG	138.	15L	1326.2@ 92.5	562.0@ -89.8	586.6@ -84.1	179.5@ 88.7	1950.2@ -27.9	1849.7@-146.6
129 QUEENSBG	138.	14L	2518.9@ 91.9	1067.5@ -90.5	1175.4@ -83.8	283.6@ 83.0	3752.7@ -29.2	3526.3@-146.3
129 QUEENSBG	138.	1L	2833.2@ 90.0	1200.7@ -92.4	586.6@ -84.1	1050.1@ 89.4	3857.9@ -22.0	3667.7@-158.3
0 HG 5	138.	2L	2149.2@ 93.0	904.8@ -89.4	794.7@ -80.4	459.1@ 86.1	3110.3@ -24.7	2885.0@-148.5
102 HG 6	138.	1L	2162.0@ 92.7	910.1@ -89.6	796.0@ -80.4	465.9@ 85.6	3129.4@ -24.8	2897.9@-148.7
100 HG3TAP	138.	1L	18.3@ 82.6	7.4@-100.2	0.1@ 79.7	11.0@ 84.4	23.1@ -21.7	22.6@-174.4
99 HG2TAP	138.	1L	18.2@ 82.5	7.3@-100.2	0.1@ 79.7	11.0@ 84.3	23.0@ -21.8	22.5@-174.4
166 AST G3	20.	2T	1888.8@ 91.7	808.3@ -90.7	1946.5@ -90.1	869.4@ -94.5	3404.1@ -46.0	3418.5@-132.4
166 AST G3	20.	1T	1888.8@ 91.7	808.3@ -90.7	1946.5@ -90.1	869.4@ -94.5	3404.1@ -46.0	3418.5@-132.4
CURRENT TO FAULT (A)	>		17524.7@ -88.1	7434.9@ 89.5	10100.8@ 93.6	0.0@ 0.0	26919.7@ 147.0	25857.1@ 37.0
THEVENIN IMPEDANCE (OHM)	>		3.21435@ 88.9	3.21218@ 88.8	2.36439@ 84.7			

Summary of fault being displayed:

3. 1LG Bus fault on:
AST-WEST 138. kV

	+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
FAULT CURRENT (A @ DEG)	9127.5@ -87.7	9127.5@ -87.7	9127.5@ -87.7	27382.5@ -87.7	0.0@ 0.0	0.0@ 0.0
THEVENIN IMPEDANCE (OHM)	0.06222+j3.21375	0.0671+j3.21148	0.21911+j2.35422			

SHORT CIRCUIT MVA= 6588.0 X/R RATIO= 25.1973 R0/X1= 0.06818 X0/X1= 0.73254

BUS 64 AST-WEST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.0 PU)

		+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>	50.868@ -0.6	29.319@-178.9	21.581@ 177.0	0.000@ 0.0	75.054@-115.5	78.138@ 114.4
BRANCH CURRENT (A) TO	>						
752 ASTW-DUM 138. 1L		703.3@ 92.4	715.3@ 92.4	1007.6@ 88.9	2425.1@ 90.9	300.6@ 82.9	304.7@ 79.0
129 QUEENSBG 138. 2L		710.5@ 93.3	708.7@ 93.3	1062.1@ 94.8	2481.2@ 94.0	353.2@ 97.6	353.3@ 98.1
129 QUEENSBG 138. 15L		691.7@ 93.0	690.0@ 93.0	530.1@ 94.6	1911.6@ 93.4	161.5@ -91.9	161.9@ -93.0
129 QUEENSBG 138. 14L		1313.8@ 92.3	1310.5@ 92.3	1062.1@ 94.8	3685.7@ 93.1	254.6@ -97.5	255.9@ -98.7
129 QUEENSBG 138. 1L		1477.7@ 90.5	1474.0@ 90.5	530.1@ 94.6	3480.6@ 91.1	947.6@ -91.7	948.2@ -92.1
0 HG 5 138. 2L		1127.5@ 93.4	1110.7@ 93.4	718.1@ 98.3	2954.4@ 94.6	406.7@ -93.2	410.2@ -97.2
102 HG 6 138. 1L		1134.1@ 93.2	1117.3@ 93.2	719.3@ 98.3	2968.6@ 94.4	412.7@ -93.7	416.4@ -97.7
100 HG3TAP 138. 1L		10.0@ 83.2	9.0@ 82.6	0.1@-101.6	18.9@ 83.0	9.5@ -92.1	9.7@-101.9
99 HG2TAP 138. 1L		9.9@ 83.2	9.0@ 82.6	0.1@-101.6	18.8@ 82.9	9.5@ -92.1	9.6@-102.0
166 AST G3 20. 2T		975.3@ 92.1	992.3@ 92.1	1758.9@ 88.6	3724.8@ 90.4	777.3@ 85.3	781.3@ 83.2
166 AST G3 20. 1T		975.3@ 92.1	992.3@ 92.1	1758.9@ 88.6	3724.8@ 90.4	777.3@ 85.3	781.3@ 83.2
CURRENT TO FAULT (A)	>	9127.5@ -87.7	9127.5@ -87.7	9127.5@ -87.7	27382.5@ -87.7	0.0@ 0.0	0.0@ 0.0
THEVENIN IMPEDANCE (OHM)	>	3.21435@ 88.9	3.21218@ 88.8	2.36439@ 84.7			

Summary of fault being displayed:

1. 3LG Bus fault on:
   E 179 ST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
39826.9@ -87.5	0.0@ 0.0	0.0@ 0.0	39826.9@ -87.5	39826.9@ 152.5	39826.9@ 32.5

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.08761+j 2.0189	0.10122+j2.01188	0.6975+j2.23418

SHORT CIRCUIT MVA= 9616.1 X/R RATIO= 23.045 R0/X1= 0.34548 X0/X1= 1.10663

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.010@ 0.0 PU)

		+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO	>						
0 E 179 SR 138. 2L		5293.7@ 91.6	0.0@ 0.0	0.0@ 0.0	5293.7@ 91.6	5293.7@ -28.4	5293.7@-148.4
134 SHM CRK 138. 13L		3824.9@ 93.5	0.0@ 0.0	0.0@ 0.0	3824.9@ 93.5	3824.9@ -26.5	3824.9@-146.5
134 SHM CRK 138. 1L		3824.9@ 93.5	0.0@ 0.0	0.0@ 0.0	3824.9@ 93.5	3824.9@ -26.5	3824.9@-146.5
121 TREMNT12 138. 13L		1930.0@ 92.0	0.0@ 0.0	0.0@ 0.0	1930.0@ 92.0	1930.0@ -28.0	1930.0@-148.0
121 TREMNT12 138. 1L		1930.0@ 92.0	0.0@ 0.0	0.0@ 0.0	1930.0@ 92.0	1930.0@ -28.0	1930.0@-148.0
120 TREMNT11 138. 14L		1930.0@ 92.0	0.0@ 0.0	0.0@ 0.0	1930.0@ 92.0	1930.0@ -28.0	1930.0@-148.0
120 TREMNT11 138. 1L		1930.0@ 92.0	0.0@ 0.0	0.0@ 0.0	1930.0@ 92.0	1930.0@ -28.0	1930.0@-148.0
101 HG TR#4 138. 1L		6753.9@ 92.4	0.0@ 0.0	0.0@ 0.0	6753.9@ 92.4	6753.9@ -27.6	6753.9@-147.6
98 HG TR#1 138. 1L		6768.9@ 92.4	0.0@ 0.0	0.0@ 0.0	6768.9@ 92.4	6768.9@ -27.6	6768.9@-147.6
74 DUN-E179 138. 1L		5642.9@ 93.1	0.0@ 0.0	0.0@ 0.0	5642.9@ 93.1	5642.9@ -26.9	5642.9@-146.9
CURRENT TO FAULT (A)	>	39826.9@ -87.5	0.0@ 0.0	0.0@ 0.0	39826.9@ -87.5	39826.9@ 152.5	39826.9@ 32.5
THEVENIN IMPEDANCE (OHM)	>	2.0208@ 87.5	2.01443@ 87.1	2.34053@ 72.7			

Summary of fault being displayed:

2. 2LG Bus fault on:
E 179 ST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
25906.4@ -85.0	14034.1@ 88.3	12078.7@ 102.8	0.0@ 0.0	41724.1@ 157.4	36070.5@ 32.3

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.08761+j 2.0189	0.10122+j2.01188	0.6975+j2.23418

SHORT CIRCUIT MVA= 10074.2 X/R RATIO= 11.5083 R0/X1= 0.34548 X0/X1= 1.10663

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.010@ 0.0 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)		>	28.271@ -4.6	28.271@ -4.6	28.271@ -4.6	84.812@ -4.6	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO		>						
0 E 179 SR	138. 2L		3434.1@ 94.1	1869.4@ -93.0	1877.7@ -86.1	380.2@-124.1	5496.5@ -27.3	5107.2@-147.0
134 SHM CRK	138. 13L		2495.9@ 95.9	1335.9@ -91.1	682.3@ -57.1	581.0@ 81.4	3935.2@ -13.9	3101.0@-154.3
134 SHM CRK	138. 1L		2495.9@ 95.9	1335.9@ -91.1	682.3@ -57.1	581.0@ 81.4	3935.2@ -13.9	3101.0@-154.3
121 TREMNT12	138. 13L		1259.5@ 94.4	674.1@ -92.6	584.6@ -87.8	105.9@-179.0	1938.1@ -24.9	1838.4@-149.5
121 TREMNT12	138. 1L		1259.5@ 94.4	674.1@ -92.6	593.6@ -87.9	107.4@-174.2	1941.0@ -25.2	1843.9@-149.3
120 TREMNT11	138. 14L		1259.5@ 94.4	674.1@ -92.6	592.7@ -87.9	106.7@-174.6	1941.3@ -25.2	1842.9@-149.3
120 TREMNT11	138. 1L		1259.5@ 94.4	674.1@ -92.6	584.0@ -87.7	105.3@-179.3	1938.4@ -24.9	1837.6@-149.5
101 HG TR#4	138. 1L		4376.0@ 94.9	2410.7@ -91.0	2479.7@ -71.7	540.9@ -48.4	7496.4@ -23.9	6069.6@-143.4
98 HG TR#1	138. 1L		4385.7@ 94.9	2416.1@ -91.0	2503.1@ -71.7	559.2@ -49.1	7525.1@ -24.0	6088.7@-143.2
74 DUN-E179	138. 1L		3682.3@ 95.6	1971.0@ -91.5	1684.0@ -85.0	263.0@ 176.3	5697.9@ -23.4	5320.1@-148.4
CURRENT TO FAULT (A)		>	25906.4@ -85.0	14034.1@ 88.3	12078.7@ 102.8	0.0@ 0.0	41724.1@ 157.4	36070.5@ 32.3
THEVENIN IMPEDANCE (OHM)		>	2.0208@ 87.5	2.01443@ 87.1	2.34053@ 72.7			

Summary of fault being displayed:

3. 1LG Bus fault on:
E 179 ST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
12719.7@ -81.9	12719.7@ -81.9	12719.7@ -81.9	38159.2@ -81.9	0.0@ 0.0	0.0@ 0.0

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.08761+j 2.0189	0.10122+j2.01188	0.6975+j2.23418

SHORT CIRCUIT MVA= 9213.4 X/R RATIO= 7.06847 R0/X1= 0.34548 X0/X1= 1.10663

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.010@ 0.0 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)	>		54.956@	-2.6	25.623@	-174.8	29.771@	170.8	0.000@	0.0	76.517@	-125.3	88.511@	119.8
BRANCH CURRENT (A) TO	>													
0 E 179 SR	138.	2L	1672.6@	97.2	1694.3@	96.8	1977.4@	89.2	5332.8@	94.1	379.7@	56.1	390.0@	49.7
134 SHM CRK	138.	13L	1237.0@	98.9	1210.8@	98.6	718.5@	118.3	3134.4@	103.2	582.5@	-103.1	611.5@	-106.6
134 SHM CRK	138.	1L	1237.0@	98.9	1210.8@	98.6	718.5@	118.3	3134.4@	103.2	582.5@	-103.1	611.5@	-106.6
121 TREMNT12	138.	13L	624.3@	97.5	610.9@	97.2	615.6@	87.5	1844.8@	94.1	116.6@	3.4	94.2@	-1.2
121 TREMNT12	138.	1L	624.3@	97.5	610.9@	97.2	625.1@	87.4	1854.1@	94.0	119.3@	7.8	96.3@	4.4
120 TREMNT11	138.	14L	624.3@	97.5	610.9@	97.2	624.2@	87.5	1853.3@	94.0	118.5@	7.5	95.5@	4.0
120 TREMNT11	138.	1L	624.3@	97.5	610.9@	97.2	615.0@	87.6	1844.3@	94.1	115.9@	3.1	93.6@	-1.5
101 HG TR#4	138.	1L	2123.5@	98.1	2184.9@	98.7	2611.3@	103.6	6912.9@	100.4	514.6@	132.8	502.6@	119.9
98 HG TR#1	138.	1L	2128.2@	98.1	2189.8@	98.8	2636.0@	103.6	6947.1@	100.4	532.2@	131.8	522.3@	119.3
74 DUN-E179	138.	1L	1824.9@	98.6	1786.4@	98.3	1773.3@	90.3	5372.6@	95.8	287.8@	0.1	226.0@	-6.7
CURRENT TO FAULT (A)	>		12719.7@	-81.9	12719.7@	-81.9	12719.7@	-81.9	38159.2@	-81.9	0.0@	0.0	0.0@	0.0
THEVENIN IMPEDANCE (OHM)	>		2.0208@	87.5	2.01443@	87.1	2.34053@	72.7						

Summary of fault being displayed:

1. 3LG Bus fault on:
   VERNON E 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
33743.4@ -88.6	0.0@ 0.0	0.0@ 0.0	33743.4@ -88.6	33743.4@ 151.4	33743.4@ 31.4

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.05572+j2.37797	0.07193+j 2.3677	0.11194+j1.93888

SHORT CIRCUIT MVA= 8125.0 X/R RATIO= 42.6745 R0/X1= 0.04707 X0/X1= 0.81535

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.1 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)	>		0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0
BRANCH CURRENT (A) TO	>													
963 38MO6	138.	1L	392.2@	91.4	0.0@	0.0	0.0@	0.0	392.2@	91.4	392.2@	-28.6	392.2@	-148.6
962 38MO4	138.	1L	745.8@	91.2	0.0@	0.0	0.0@	0.0	745.8@	91.2	745.8@	-28.8	745.8@	-148.8
960 38MO5	138.	1L	392.2@	91.4	0.0@	0.0	0.0@	0.0	392.2@	91.4	392.2@	-28.6	392.2@	-148.6
801 GLENDALE0801	138.	1L	501.3@	92.5	0.0@	0.0	0.0@	0.0	501.3@	92.5	501.3@	-27.5	501.3@	-147.5
800 GLENDALE0800	138.	1L	499.4@	92.6	0.0@	0.0	0.0@	0.0	499.4@	92.6	499.4@	-27.4	499.4@	-147.4
142 VERQBGR2	138.	1L	5101.8@	90.6	0.0@	0.0	0.0@	0.0	5101.8@	90.6	5101.8@	-29.4	5101.8@	-149.4
141 VERGRNR2	138.	1L	5865.0@	92.6	0.0@	0.0	0.0@	0.0	5865.0@	92.6	5865.0@	-27.4	5865.0@	-147.4
131 RNY TR8E	138.	1L	7303.3@	91.5	0.0@	0.0	0.0@	0.0	7303.3@	91.5	7303.3@	-28.5	7303.3@	-148.5
1251 RAVSW G4 GT	18.	1X	4765.9@	90.7	0.0@	0.0	0.0@	0.0	4765.9@	90.7	4765.9@	-29.3	4765.9@	-149.3
1261 RAVSW G4 ST	13.8	1X												
170 RAVSW G2	20.	1T	4143.2@	91.3	0.0@	0.0	0.0@	0.0	4143.2@	91.3	4143.2@	-28.7	4143.2@	-148.7
169 RAVSW G1	20.	1T	4035.6@	91.4	0.0@	0.0	0.0@	0.0	4035.6@	91.4	4035.6@	-28.6	4035.6@	-148.6
CURRENT TO FAULT (A)	>		33743.4@	-88.6	0.0@	0.0	0.0@	0.0	33743.4@	-88.6	33743.4@	151.4	33743.4@	31.4
THEVENIN IMPEDANCE (OHM)	>		2.37862@	88.7	2.36879@	88.3	1.94211@	86.7						

Summary of fault being displayed:

2. 2LG Bus fault on:
VERNON E 138. kV

FAULT CURRENT (A @ DEG)				
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
23293.6@ -88.2	10495.0@ 90.9	12800.7@ 92.5	0.0@ 0.0	35269.6@ 148.5	34725.2@ 35.1

THEVENIN IMPEDANCE (OHM)

0.05572+j2.37797 0.07193+j 2.3677 0.11194+j1.93888

SHORT CIRCUIT MVA= 8492.5 X/R RATIO= 33.0752 R0/X1= 0.04707 X0/X1= 0.81535

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.1 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>		24.860@ -0.8	24.860@ -0.8	24.860@ -0.8	74.581@ -0.8	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO	>							
963 38MO6	138.	1L	270.8@ 91.7	121.5@ -89.4	166.7@ -89.0	18.0@-103.1	417.0@ -34.0	416.4@-143.2
962 38MO4	138.	1L	515.8@ 91.6	230.1@ -89.5	0.1@ 89.2	285.8@ 92.5	664.5@ -11.2	658.5@-166.2
960 38MO5	138.	1L	270.7@ 91.7	121.5@ -89.4	166.7@ -89.0	18.0@-103.1	417.0@ -34.0	416.4@-143.2
801 GLENDALE0801	138.	1L	346.1@ 92.9	155.4@ -88.2	0.1@ 89.2	190.8@ 93.8	446.6@ -9.8	442.5@-165.0
800 GLENDALE0800	138.	1L	344.7@ 93.0	154.8@ -88.2	0.1@ 89.2	190.1@ 93.9	444.9@ -9.7	440.8@-165.0
142 VERQBGR2	138.	1L	3519.8@ 90.9	1582.6@ -90.2	1874.1@ -87.3	70.0@ 67.9	5332.1@ -31.6	5175.2@-146.1
141 VERGRNR2	138.	1L	4045.4@ 93.0	1822.5@ -88.2	1211.5@ -69.3	1119.2@ 75.9	5934.0@ -19.8	5196.0@-151.6
131 RNY TR8E	138.	1L	5070.3@ 91.9	2238.2@ -89.4	2006.6@ -89.4	832.2@ 98.5	7197.5@ -26.9	7192.7@-150.1
1251 RAVSW G4 GT	18.	1X	3279.0@ 91.0	1522.7@ -87.8	3270.9@ -90.8	1514.3@ -91.8	5768.0@ -44.5	5978.8@-134.7
1261 RAVSW G4 ST	13.8	1X						
170 RAVSW G2	20.	1T	2853.4@ 91.7	1290.2@ -89.5	2125.3@ -89.2	564.7@ -94.4	4616.3@ -37.7	4619.6@-139.7
169 RAVSW G1	20.	1T	2779.3@ 91.7	1256.7@ -89.4	2048.5@ -89.1	528.5@ -94.4	4483.7@ -37.4	4485.1@-139.8
CURRENT TO FAULT (A)	>		23293.6@ -88.2	10495.0@ 90.9	12800.7@ 92.5	0.0@ 0.0	35269.6@ 148.5	34725.2@ 35.1
THEVENIN IMPEDANCE (OHM)	>		2.37862@ 88.7	2.36879@ 88.3	1.94211@ 86.7			

Summary of fault being displayed:

3. 1LG Bus fault on:
VERNON E 138. kV

FAULT CURRENT (A @ DEG)				
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE / C PHASE
11999.5@ -87.9	11999.5@ -87.9	11999.5@ -87.9	35998.6@ -87.9	0.0@ 0.0 / 0.0@ 0.0

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.05572+j2.37797	0.07193+j 2.3677	0.11194+j1.93888

SHORT CIRCUIT MVA= 8668.1 X/R RATIO= 27.8995 R0/X1= 0.04707 X0/X1= 0.81535

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.007@ 0.1 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>		51.724@ -0.3	28.424@-179.6	23.304@ 178.8	0.000@ 0.0	77.108@-117.0	78.317@ 116.4
BRANCH CURRENT (A) TO	>							
963 38MO6	138.	1L	139.5@ 92.1	138.9@ 91.8	156.3@ 90.6	434.7@ 91.5	18.0@ 78.5	16.8@ 81.1
962 38MO4	138.	1L	267.3@ 91.9	263.1@ 91.7	0.0@ 0.0	530.3@ 91.8	264.3@ -87.4	266.1@ -89.0
960 38MO5	138.	1L	139.5@ 92.1	138.9@ 91.8	156.3@ 90.6	434.6@ 91.5	18.0@ 78.5	16.8@ 81.1
801 GLENDALE0801	138.	1L	178.2@ 93.2	177.6@ 92.9	0.0@ 0.0	355.8@ 93.1	177.3@ -86.8	178.6@ -87.1
800 GLENDALE0800	138.	1L	177.5@ 93.3	176.9@ 93.0	0.0@ 0.0	354.4@ 93.1	176.6@ -86.7	177.9@ -87.0
142 VERQBGR2	138.	1L	1810.1@ 91.2	1809.5@ 90.9	1756.8@ 92.4	5376.0@ 91.5	60.3@-129.0	72.5@-122.2
141 VERGRNR2	138.	1L	2078.8@ 93.4	2083.7@ 92.9	1135.7@ 110.4	5258.2@ 96.8	1039.2@-105.9	1063.6@-105.0
131 RNY TR8E	138.	1L	2656.9@ 92.3	2559.1@ 91.8	1881.0@ 90.2	7096.2@ 91.5	723.3@ -76.4	747.6@ -89.9
1251 RAVSW G4 GT	18.	1X	1672.1@ 91.3	1741.0@ 93.4	3066.2@ 88.8	6475.5@ 90.7	1305.8@ 86.6	1430.9@ 82.3
1261 RAVSW G4 ST	13.8	1X						
170 RAVSW G2	20.	1T	1459.3@ 91.9	1475.1@ 91.7	1992.3@ 90.4	4926.3@ 91.2	531.3@ 87.9	522.6@ 84.8
169 RAVSW G1	20.	1T	1421.4@ 92.0	1436.9@ 91.8	1920.2@ 90.5	4778.1@ 91.3	497.2@ 88.0	488.8@ 84.8
CURRENT TO FAULT (A)	>		11999.5@ -87.9	11999.5@ -87.9	11999.5@ -87.9	35998.6@ -87.9	0.0@ 0.0	0.0@ 0.0
THEVENIN IMPEDANCE (OHM)	>		2.37862@ 88.7	2.36879@ 88.3	1.94211@ 86.7			

Summary of fault being displayed:

1. 3LG Bus fault on:
   AST-WEST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
34191.7@ -88.9	0.0@ 0.0	0.0@ 0.0	34191.7@ -88.9	34191.7@ 151.1	34191.7@ 31.1

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.04637+j2.37204	0.08445+j2.37225	0.10272+j 1.5192

SHORT CIRCUIT MVA= 8320.8 X/R RATIO= 51.1541 R0/X1= 0.0433 X0/X1= 0.64046

BUS 64 AST-WEST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.018@ 0.0 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)	>		0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0
BRANCH CURRENT (A) TO	>													
752 ASTW-DUM	138.	1L	1944.1@	91.2	0.0@	0.0	0.0@	0.0	1944.1@	91.2	1944.1@	-28.8	1944.1@	-148.8
129 QUEENSBG	138.	2L	1938.6@	92.1	0.0@	0.0	0.0@	0.0	1938.6@	92.1	1938.6@	-27.9	1938.6@	-147.9
129 QUEENSBG	138.	15L	1887.3@	91.8	0.0@	0.0	0.0@	0.0	1887.3@	91.8	1887.3@	-28.2	1887.3@	-148.2
129 QUEENSBG	138.	14L	3584.6@	91.1	0.0@	0.0	0.0@	0.0	3584.6@	91.1	3584.6@	-28.9	3584.6@	-148.9
129 QUEENSBG	138.	1L	4031.8@	89.3	0.0@	0.0	0.0@	0.0	4031.8@	89.3	4031.8@	-30.7	4031.8@	-150.7
0 HG 5	138.	2L	3052.7@	92.2	0.0@	0.0	0.0@	0.0	3052.7@	92.2	3052.7@	-27.8	3052.7@	-147.8
102 HG 6	138.	1L	3070.8@	92.0	0.0@	0.0	0.0@	0.0	3070.8@	92.0	3070.8@	-28.0	3070.8@	-148.0
100 HG3TAP	138.	1L	25.6@	81.8	0.0@	0.0	0.0@	0.0	25.6@	81.8	25.6@	-38.2	25.6@	-158.2
99 HG2TAP	138.	1L	25.5@	81.7	0.0@	0.0	0.0@	0.0	25.5@	81.7	25.5@	-38.3	25.5@	-158.3
15811 NYPA POL ST1	18.	1T	3120.7@	91.1	0.0@	0.0	0.0@	0.0	3120.7@	91.1	3120.7@	-28.9	3120.7@	-148.9
15711 NYPA POL GT2	18.	1T	3059.7@	91.2	0.0@	0.0	0.0@	0.0	3059.7@	91.2	3059.7@	-28.8	3059.7@	-148.8
15611 NYPA POL GT1	18.	1T	3061.5@	91.2	0.0@	0.0	0.0@	0.0	3061.5@	91.2	3061.5@	-28.8	3061.5@	-148.8
166 AST G3	20.	2T	2696.6@	90.9	0.0@	0.0	0.0@	0.0	2696.6@	90.9	2696.6@	-29.1	2696.6@	-149.1
166 AST G3	20.	1T	2696.6@	90.9	0.0@	0.0	0.0@	0.0	2696.6@	90.9	2696.6@	-29.1	2696.6@	-149.1
CURRENT TO FAULT (A)	>		34191.7@	-88.9	0.0@	0.0	0.0@	0.0	34191.7@	-88.9	34191.7@	151.1	34191.7@	31.1
THEVENIN IMPEDANCE (OHM)	>		2.37249@	88.9	2.37375@	88.0	1.52267@	86.1						

Summary of fault being displayed:

2. 2LG Bus fault on:
AST-WEST 138. kV

+ SEQ	- SEQ	0	LT CURRE	A @ DEG) A PHASE	B PHASE	C PHASE
24583.0@ -88.3	9607.9@ 90.6	1497	92.4	0.0@ 0.0	37487.9@ 144.6	36845.7@ 39.0
			VENIN IM	CE (OHM)		
0.04637+j2.37204	0.08445+j2.37225	0.10272	.5192			

SHORT CIRCUIT MVA= 9123.0 X/R = 33.8638 0/X1= 0.0433 X0/X1= 0.64046

BUS 64 AST-WEST	138.KV	AREA 2	ZONE 10	TIE 0	(PREF. V=1.018@ 0.0 PU)			
		+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE	
VOLTAGE (KV, L-G)	>	22.807@ -1.4	22.807@	4 22.807@ -1	68.420@ -1.4	0.000@ 0.0	0.000@ 0.0	
BRANCH CURRENT (A) TO	>							
752 ASTW-DUM	138. 1L	1387.9@ 91.8	556.4@ -89.2	1064.8@ -89.3	236.7@ -98.8	2242.4@ -40.1	2241.6@-137.4	
129 QUEENSBG	138. 2L	1388.1@ 92.7	551.3@ -89.2	1122.5@ -83.6	288.0@ -76.6	2349.2@ -38.7	2206.9@-133.7	
129 QUEENSBG	138. 15L	1351.4@ 92.4	536.7@ -89.6	560.2@ -83.8	256.8@ 88.1	1947.3@ -27.9	1851.1@-146.7	
129 QUEENSBG	138. 14L	2566.7@ 91.7	1019.4@ -90.2	1122.5@ -83.6	432.9@ 84.2	3745.2@ -29.2	3528.1@-146.4	
129 QUEENSBG	138. 1L	2887.0@ 89.9	1146.6@ -92.1	560.2@ -83.8	1184.5@ 88.7	3861.1@ -22.4	3684.8@-157.9	
0 HG 5	138. 2L	2189.8@ 92.8	864.0@ -89.1	758.9@ -80.1	576.5@ 86.5	3106.8@ -24.8	2892.7@-148.4	
102 HG 6	138. 1L	2202.7@ 92.6	869.1@ -89.4	760.2@ -80.1	583.8@ 86.1	3125.9@ -25.0	2905.8@-148.7	
100 HG3TAP	138. 1L	18.6@ 82.4	7.0@ -99.9	0.1@ 80.0	11.7@ 83.8	23.1@ -22.6	22.7@-173.6	
99 HG2TAP	138. 1L	18.5@ 82.4	7.0@ -99.9	0.1@ 80.0	11.6@ 83.8	23.0@ -22.6	22.6@-173.6	
15811 NYPA POL ST1	18. 1T	2270.9@ 91.7	847.8@ -87.0	1818.7@ -90.2	396.3@ -94.1	3637.8@ -42.0	3762.9@-135.7	
15711 NYPA POL GT2	18. 1T	2226.5@ 91.7	831.2@ -87.0	1761.1@ -90.2	366.8@ -94.4	3553.3@ -41.7	3672.7@-136.0	
15611 NYPA POL GT1	18. 1T	2227.9@ 91.7	831.7@ -87.0	1761.1@ -90.2	365.9@ -94.4	3554.8@ -41.7	3674.2@-136.0	
166 AST G3	20. 2T	1925.0@ 91.5	771.9@ -90.5	1858.9@ -89.8	708.2@ -94.2	3370.5@ -45.3	3377.7@-132.9	
166 AST G3	20. 1T	1925.0@ 91.5	771.9@ -90.5	1858.9@ -89.8	708.2@ -94.2	3370.5@ -45.3	3377.7@-132.9	
CURRENT TO FAULT (A)	>	24583.0@ -88.3	9607.9@ 90.6	14978.2@ 92.4	0.0@ 0.0	37487.9@ 144.6	36845.7@ 39.0	
THEVENIN IMPEDANCE (OHM)	>	2.37249@ 88.9	2.37375@ 88.0	1.52267@ 86.1				

Summary of fault being displayed:

3. 1LG Bus fault on:
AST-WEST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
12942.2@ -87.8	12942.2@ -87.8	12942.2@ -87.8	38826.5@ -87.8	0.0@ 0.0	0.0@ 0.0

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.04637+j2.37204	0.08445+j2.37225	0.10272+j 1.5192

SHORT CIRCUIT MVA= 9448.8 X/R RATIO= 26.8206 R0/X1= 0.0433 X0/X1= 0.64046

BUS 64 AST-WEST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.018@ 0.0 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)		>	50.422@	-0.6	30.722@	-179.9	19.707@	178.3	0.000@	0.0	75.574@	-113.3	76.891@	112.3
BRANCH CURRENT (A) TO		>												
752 ASTW-DUM	138.	1L	714.1@	92.3	749.5@	91.4	920.1@	90.2	2383.4@	91.2	197.8@	93.5	186.6@	74.5
129 QUEENSBG	138.	2L	721.2@	93.2	742.6@	92.3	969.9@	96.1	2432.7@	94.1	257.5@	109.8	229.7@	102.4
129 QUEENSBG	138.	15L	702.2@	92.9	723.0@	92.0	484.1@	95.9	1908.5@	93.3	224.8@	-99.8	239.3@	-90.4
129 QUEENSBG	138.	14L	1333.6@	92.2	1373.2@	91.3	969.9@	96.1	3674.5@	92.9	383.4@	-104.6	406.5@	-93.8
129 QUEENSBG	138.	1L	1500.0@	90.4	1544.5@	89.5	484.1@	95.9	3526.2@	90.7	1024.1@	-95.1	1061.5@	-90.8
0 HG 5	138.	2L	1144.3@	93.3	1163.9@	92.4	655.8@	99.6	2960.3@	94.3	496.6@	-98.0	521.4@	-93.8
102 HG 6	138.	1L	1151.1@	93.1	1170.7@	92.2	656.8@	99.6	2974.8@	94.2	503.1@	-98.5	527.8@	-94.2
100 HG3TAP	138.	1L	10.1@	83.1	9.5@	81.7	0.1@	-100.3	19.5@	82.4	9.6@	-94.2	10.1@	-100.8
99 HG2TAP	138.	1L	10.1@	83.1	9.4@	81.6	0.1@	-100.3	19.4@	82.4	9.6@	-94.2	10.0@	-100.9
15811 NYPA POL ST1	18.	1T	1241.4@	92.0	1142.0@	94.6	1571.5@	89.5	3952.3@	91.8	380.8@	63.6	422.9@	91.1
15711 NYPA POL GT2	18.	1T	1217.1@	92.0	1119.7@	94.5	1521.7@	89.6	3856.1@	91.8	356.7@	62.5	394.3@	91.3
15611 NYPA POL GT1	18.	1T	1217.9@	92.1	1120.4@	94.5	1521.7@	89.6	3857.5@	91.8	356.0@	62.5	393.7@	91.3
166 AST G3	20.	2T	990.3@	92.0	1039.7@	91.1	1606.2@	89.9	3635.8@	90.8	604.2@	91.3	583.5@	82.9
166 AST G3	20.	1T	990.3@	92.0	1039.7@	91.1	1606.2@	89.9	3635.8@	90.8	604.2@	91.3	583.5@	82.9
CURRENT TO FAULT (A)		>	12942.2@	-87.8	12942.2@	-87.8	12942.2@	-87.8	38826.5@	-87.8	0.0@	0.0	0.0@	0.0
THEVENIN IMPEDANCE (OHM)		>	2.37249@	88.9	2.37375@	88.0	1.52267@	86.1						

Summary of fault being displayed:

1. 3LG Bus fault on:
   E 179 ST 138. kV

FAULT CURRENT (A @ DEG)					
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
40515.0@ -87.5	0.0@ 0.0	0.0@ 0.0	40515.0@ -87.5	40515.0@ 152.5	40515.0@ 32.5

THEVENIN IMPEDANCE (OHM)

0.08635+j1.98891 0.10074+j1.98214 0.68561+j2.20636

SHORT CIRCUIT MVA= 9803.4 X/R RATIO= 23.0332 R0/X1= 0.34472 X0/X1= 1.10933

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.012@ 0.0 PU)

		+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO	>						
0 E 179 SR 138. 2L		5949.9@ 91.7	0.0@ 0.0	0.0@ 0.0	5949.9@ 91.7	5949.9@ -28.3	5949.9@-148.3
134 SHM CRK 138. 13L		3829.9@ 93.4	0.0@ 0.0	0.0@ 0.0	3829.9@ 93.4	3829.9@ -26.6	3829.9@-146.6
134 SHM CRK 138. 1L		3829.9@ 93.4	0.0@ 0.0	0.0@ 0.0	3829.9@ 93.4	3829.9@ -26.6	3829.9@-146.6
121 TREMNT12 138. 13L		1932.5@ 92.0	0.0@ 0.0	0.0@ 0.0	1932.5@ 92.0	1932.5@ -28.0	1932.5@-148.0
121 TREMNT12 138. 1L		1932.5@ 92.0	0.0@ 0.0	0.0@ 0.0	1932.5@ 92.0	1932.5@ -28.0	1932.5@-148.0
120 TREMNT11 138. 14L		1932.5@ 92.0	0.0@ 0.0	0.0@ 0.0	1932.5@ 92.0	1932.5@ -28.0	1932.5@-148.0
120 TREMNT11 138. 1L		1932.5@ 92.0	0.0@ 0.0	0.0@ 0.0	1932.5@ 92.0	1932.5@ -28.0	1932.5@-148.0
101 HG TR#4 138. 1L		6756.0@ 92.4	0.0@ 0.0	0.0@ 0.0	6756.0@ 92.4	6756.0@ -27.6	6756.0@-147.6
98 HG TR#1 138. 1L		6771.0@ 92.4	0.0@ 0.0	0.0@ 0.0	6771.0@ 92.4	6771.0@ -27.6	6771.0@-147.6
74 DUN-E179 138. 1L		5650.4@ 93.1	0.0@ 0.0	0.0@ 0.0	5650.4@ 93.1	5650.4@ -26.9	5650.4@-146.9
CURRENT TO FAULT (A)	>	40515.0@ -87.5	0.0@ 0.0	0.0@ 0.0	40515.0@ -87.5	40515.0@ 152.5	40515.0@ 32.5
THEVENIN IMPEDANCE (OHM)	>	1.99078@ 87.5	1.9847@ 87.1	2.31043@ 72.7			

Summary of fault being displayed:

2. 2LG Bus fault on:
E 179 ST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
26345.6@ -85.0	14283.0@ 88.4	12269.4@ 102.7	0.0@ 0.0	42410.8@ 157.4	36704.5@ 32.3

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.08635+j1.98891	0.10074+j1.98214	0.68561+j2.20636

SHORT CIRCUIT MVA= 10262.1 X/R RATIO= 11.5244 R0/X1= 0.34472 X0/X1= 1.10933

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.012@ 0.0 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)		>	28.348@ -4.5	28.348@ -4.5	28.348@ -4.5	85.043@ -4.5	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO		>						
0 E 179 SR	138. 2L		3884.3@ 94.1	2075.4@ -92.6	2037.6@ -85.8	323.7@-134.4	6147.0@ -26.8	5722.8@-147.3
134 SHM CRK	138. 13L		2495.8@ 95.9	1341.1@ -91.1	684.6@ -57.0	574.2@ 81.1	3940.4@ -13.9	3103.5@-154.3
134 SHM CRK	138. 1L		2495.8@ 95.9	1341.1@ -91.1	684.6@ -57.0	574.2@ 81.1	3940.4@ -13.9	3103.5@-154.3
121 TREMNT12	138. 13L		1259.4@ 94.4	676.7@ -92.6	586.6@ -87.8	105.7@-176.5	1940.5@ -24.9	1840.5@-149.5
121 TREMNT12	138. 1L		1259.4@ 94.4	676.7@ -92.6	595.6@ -87.9	107.6@-171.7	1943.4@ -25.2	1846.0@-149.3
120 TREMNT11	138. 14L		1259.4@ 94.4	676.7@ -92.6	594.8@ -87.8	106.9@-172.1	1943.7@ -25.2	1845.0@-149.3
120 TREMNT11	138. 1L		1259.4@ 94.4	676.7@ -92.6	586.0@ -87.7	105.1@-176.8	1940.8@ -24.9	1839.7@-149.5
101 HG TR#4	138. 1L		4370.9@ 94.9	2417.9@ -91.0	2486.5@ -71.7	557.3@ -49.4	7500.2@ -23.9	6069.4@-143.4
98 HG TR#1	138. 1L		4380.6@ 94.9	2423.3@ -91.0	2510.0@ -71.7	575.8@ -50.0	7529.0@ -24.0	6088.4@-143.2
74 DUN-E179	138. 1L		3682.0@ 95.6	1978.7@ -91.5	1689.6@ -85.0	261.2@ 179.2	5705.0@ -23.4	5326.0@-148.4
CURRENT TO FAULT (A)		>	26345.6@ -85.0	14283.0@ 88.4	12269.4@ 102.7	0.0@ 0.0	42410.8@ 157.4	36704.5@ 32.3
THEVENIN IMPEDANCE (OHM)		>	1.99078@ 87.5	1.9847@ 87.1	2.31043@ 72.7			

Summary of fault being displayed:

3. 1LG Bus fault on:
E 179 ST 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
12928.3@ -81.9	12928.3@ -81.9	12928.3@ -81.9	38784.9@ -81.9	0.0@ 0.0	0.0@ 0.0

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.08635+j1.98891	0.10074+j1.98214	0.68561+j2.20636

SHORT CIRCUIT MVA= 9384.7 X/R RATIO= 7.07845 R0/X1= 0.34472 X0/X1= 1.10933

BUS 82 E 179 ST 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.012@ 0.0 PU)

		+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>	55.096@ -2.6	25.659@-174.8	29.870@ 170.8	0.000@ 0.0	76.760@-125.3	88.693@ 119.8
BRANCH CURRENT (A) TO	>						
0 E 179 SR	138. 2L	1928.3@ 97.1	1878.5@ 97.1	2147.1@ 89.5	5941.9@ 94.4	396.1@ 41.7	328.5@ 50.2
134 SHM CRK	138. 13L	1232.5@ 99.0	1213.9@ 98.6	721.4@ 118.3	3135.5@ 103.2	581.6@-104.0	607.7@-106.3
134 SHM CRK	138. 1L	1232.5@ 99.0	1213.9@ 98.6	721.4@ 118.3	3135.5@ 103.2	581.6@-104.0	607.7@-106.3
121 TREMNT12	138. 13L	622.0@ 97.5	612.5@ 97.1	618.1@ 87.6	1846.6@ 94.1	112.7@ 5.0	96.9@ 0.4
121 TREMNT12	138. 1L	622.0@ 97.5	612.5@ 97.1	627.6@ 87.5	1855.9@ 94.0	115.8@ 9.6	99.3@ 5.9
120 TREMNT11	138. 14L	622.0@ 97.5	612.5@ 97.1	626.7@ 87.5	1855.1@ 94.0	114.9@ 9.3	98.4@ 5.4
120 TREMNT11	138. 1L	622.0@ 97.5	612.5@ 97.1	617.5@ 87.6	1846.1@ 94.1	112.0@ 4.8	96.3@ 0.1
101 HG TR#4	138. 1L	2112.6@ 98.1	2188.5@ 98.7	2620.0@ 103.7	6914.2@ 100.4	536.0@ 133.3	508.4@ 118.6
98 HG TR#1	138. 1L	2117.2@ 98.1	2193.4@ 98.7	2644.8@ 103.7	6948.4@ 100.4	553.6@ 132.4	528.3@ 118.1
74 DUN-E179	138. 1L	1818.2@ 98.6	1791.0@ 98.2	1780.4@ 90.3	5377.6@ 95.8	275.7@ 1.9	232.8@ -4.6
CURRENT TO FAULT (A)	>	12928.3@ -81.9	12928.3@ -81.9	12928.3@ -81.9	38784.9@ -81.9	0.0@ 0.0	0.0@ 0.0
THEVENIN IMPEDANCE (OHM)	>	1.99078@ 87.5	1.9847@ 87.1	2.31043@ 72.7			

Summary of fault being displayed:

1. 3LG Bus fault on:
   VERNON E 138. kV

FAULT CURRENT (A @ DEG)

+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
34772.6@ -88.6	0.0@ 0.0	0.0@ 0.0	34772.6@ -88.6	34772.6@ 151.4	34772.6@ 31.4

THEVENIN IMPEDANCE (OHM)

+ SEQ	- SEQ	0 SEQ
0.05294+j2.31488	0.07076+j2.30522	0.11213+j 1.91

SHORT CIRCUIT MVA= 8399.2 X/R RATIO= 43.7266 R0/X1= 0.04844 X0/X1= 0.8251

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.011@ 0.1 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)		>	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0	0.000@	0.0
BRANCH CURRENT (A) TO		>												
963 38MO6	138.	1L	405.7@	91.3	0.0@	0.0	0.0@	0.0	405.7@	91.3	405.7@	-28.7	405.7@	-148.7
962 38MO4	138.	1L	771.4@	91.2	0.0@	0.0	0.0@	0.0	771.4@	91.2	771.4@	-28.8	771.4@	-148.8
960 38MO5	138.	1L	405.6@	91.3	0.0@	0.0	0.0@	0.0	405.6@	91.3	405.6@	-28.7	405.6@	-148.7
801 GLENDALE0801	138.	1L	518.6@	92.4	0.0@	0.0	0.0@	0.0	518.6@	92.4	518.6@	-27.6	518.6@	-147.6
800 GLENDALE0800	138.	1L	516.6@	92.5	0.0@	0.0	0.0@	0.0	516.6@	92.5	516.6@	-27.5	516.6@	-147.5
142 VERQBGR2	138.	1L	5906.0@	90.5	0.0@	0.0	0.0@	0.0	5906.0@	90.5	5906.0@	-29.5	5906.0@	-149.5
141 VERGRNR2	138.	1L	5890.9@	92.6	0.0@	0.0	0.0@	0.0	5890.9@	92.6	5890.9@	-27.4	5890.9@	-147.4
131 RNY TR8E	138.	1L	7329.7@	91.5	0.0@	0.0	0.0@	0.0	7329.7@	91.5	7329.7@	-28.5	7329.7@	-148.5
1251 RAVSW G4 GT	18.	1X	4765.9@	90.7	0.0@	0.0	0.0@	0.0	4765.9@	90.7	4765.9@	-29.3	4765.9@	-149.3
1261 RAVSW G4 ST	13.8	1X												
170 RAVSW G2	20.	1T	4186.9@	91.3	0.0@	0.0	0.0@	0.0	4186.9@	91.3	4186.9@	-28.7	4186.9@	-148.7
169 RAVSW G1	20.	1T	4077.8@	91.4	0.0@	0.0	0.0@	0.0	4077.8@	91.4	4077.8@	-28.6	4077.8@	-148.6
CURRENT TO FAULT (A)		>	34772.6@	-88.6	0.0@	0.0	0.0@	0.0	34772.6@	-88.6	34772.6@	151.4	34772.6@	31.4
THEVENIN IMPEDANCE (OHM)		>	2.31548@	88.7	2.3063@	88.2	1.91329@	86.6						

Summary of fault being displayed:

2. 2LG Bus fault on:
VERNON E 138. kV

	+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
FAULT CURRENT (A @ DEG)	23954.8@ -88.2	10862.9@ 90.9	13094.2@ 92.5	0.0@ 0.0	36271.2@ 148.7	35697.1@ 34.9
THEVENIN IMPEDANCE (OHM)	0.05294+j2.31488	0.07076+j2.30522	0.11213+j 1.91			

SHORT CIRCUIT MVA= 8761.2 X/R RATIO= 33.2656 R0/X1= 0.04844 X0/X1= 0.8251

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.011@ 0.1 PU)

			+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
VOLTAGE (KV, L-G)	>		25.053@ -0.9	25.053@ -0.9	25.053@ -0.9	75.159@ -0.9	0.000@ 0.0	0.000@ 0.0
BRANCH CURRENT (A) TO	>							
963 38MO6	138.	1L	279.6@ 91.7	126.2@ -89.4	171.1@ -89.0	18.3@-103.1	430.3@ -33.8	429.5@-143.4
962 38MO4	138.	1L	532.5@ 91.6	239.0@ -89.5	0.1@ 89.1	293.6@ 92.5	687.2@ -11.1	680.9@-166.3
960 38MO5	138.	1L	279.5@ 91.7	126.2@ -89.4	171.0@ -89.0	18.3@-103.1	430.3@ -33.8	429.5@-143.4
801 GLENDALE0801	138.	1L	357.3@ 92.8	161.4@ -88.3	0.1@ 89.1	196.0@ 93.8	461.8@ -9.7	457.6@-165.1
800 GLENDALE0800	138.	1L	355.9@ 92.9	160.7@ -88.2	0.1@ 89.1	195.3@ 93.8	460.0@ -9.7	455.8@-165.1
142 VERQBGR2	138.	1L	4087.4@ 90.9	1818.7@ -90.1	2071.9@ -87.0	204.1@ 77.4	6127.4@ -31.0	5944.4@-146.8
141 VERGRNR2	138.	1L	4050.0@ 93.0	1843.8@ -88.3	1222.4@ -69.3	1093.1@ 75.5	5959.8@ -19.7	5213.0@-151.6
131 RNY TR8E	138.	1L	5072.1@ 91.9	2262.9@ -89.5	2025.9@ -89.5	791.2@ 99.4	7221.4@ -26.9	7216.5@-150.1
1251 RAVSW G4 GT	18.	1X	3267.5@ 91.1	1534.5@ -87.8	3296.3@ -90.9	1563.1@ -91.9	5775.9@ -44.7	5990.5@-134.6
1261 RAVSW G4 ST	13.8	1X						
170 RAVSW G2	20.	1T	2874.9@ 91.7	1312.3@ -89.5	2141.8@ -89.3	582.2@ -94.6	4655.1@ -37.6	4659.8@-139.8
169 RAVSW G1	20.	1T	2800.0@ 91.8	1278.2@ -89.5	2064.3@ -89.2	545.4@ -94.7	4521.3@ -37.3	4523.9@-140.0
CURRENT TO FAULT (A)	>		23954.8@ -88.2	10862.9@ 90.9	13094.2@ 92.5	0.0@ 0.0	36271.2@ 148.7	35697.1@ 34.9
THEVENIN IMPEDANCE (OHM)	>		2.31548@ 88.7	2.3063@ 88.2	1.91329@ 86.6			

Summary of fault being displayed:

3. 1LG Bus fault on:
VERNON E 138. kV

FAULT CURRENT (A @ DEG)					
+ SEQ	- SEQ	0 SEQ	A PHASE	B PHASE	C PHASE
12321.9@ -87.9	12321.9@ -87.9	12321.9@ -87.9	36965.6@ -87.9	0.0@ 0.0	0.0@ 0.0

THEVENIN IMPEDANCE (OHM)		
0.05294+j2.31488	0.07076+j2.30522	0.11213+j 1.91

SHORT CIRCUIT MVA= 8928.9 X/R RATIO= 27.6902 R0/X1= 0.04844 X0/X1= 0.8251

BUS 139 VERNON E 138.KV AREA 2 ZONE 10 TIER 0 (PREFAULT V=1.011@ 0.1 PU)

			+ SEQ		- SEQ		0 SEQ		A PHASE		B PHASE		C PHASE	
VOLTAGE (KV, L-G)		>	51.988@	-0.4	28.418@	-179.6	23.575@	178.8	0.000@	0.0	77.472@	-117.3	78.718@	116.6
BRANCH CURRENT (A) TO		>												
963 38MO6	138.	1L	143.9@	92.1	143.1@	91.8	161.0@	90.6	448.0@	91.5	18.4@	78.0	17.2@	81.4
962 38MO4	138.	1L	275.6@	91.9	271.1@	91.7	0.0@	0.0	546.7@	91.8	272.6@	-87.4	274.3@	-89.0
960 38MO5	138.	1L	143.9@	92.1	143.1@	91.8	160.9@	90.6	447.9@	91.5	18.4@	78.0	17.2@	81.4
801 GLENDALE0801	138.	1L	183.8@	93.2	183.0@	93.0	0.0@	0.0	366.8@	93.1	182.8@	-86.7	184.1@	-87.1
800 GLENDALE0800	138.	1L	183.1@	93.3	182.3@	93.0	0.0@	0.0	365.4@	93.2	182.1@	-86.6	183.4@	-87.1
142 VERQBGR2	138.	1L	2131.8@	91.2	2063.0@	91.2	1949.7@	92.6	6144.0@	91.6	148.8@	-85.1	184.2@	-125.3
141 VERGRNR2	138.	1L	2070.4@	93.4	2091.4@	92.9	1150.3@	110.3	5271.9@	96.9	1029.4@	-107.1	1048.3@	-104.6
131 RNY TR8E	138.	1L	2644.3@	92.3	2566.8@	91.8	1906.4@	90.1	7116.7@	91.5	690.9@	-77.1	721.9@	-88.2
1251 RAVSW G4 GT	18.	1X	1656.3@	91.4	1740.6@	93.4	3101.8@	88.8	6494.9@	90.7	1350.4@	87.1	1475.0@	81.8
1261 RAVSW G4 ST	13.8	1X												
170 RAVSW G2	20.	1T	1464.0@	92.0	1488.6@	91.7	2015.4@	90.3	4967.6@	91.2	546.1@	88.5	536.9@	83.9
169 RAVSW G1	20.	1T	1425.8@	92.1	1449.9@	91.8	1942.6@	90.4	4817.8@	91.3	511.5@	88.6	502.6@	83.8
CURRENT TO FAULT (A)		>	12321.9@	-87.9	12321.9@	-87.9	12321.9@	-87.9	36965.6@	-87.9	0.0@	0.0	0.0@	0.0
THEVENIN IMPEDANCE (OHM)		>	2.31548@	88.7	2.3063@	88.2	1.91329@	86.6						