



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

December 21, 1992

Docket Nos. 50-321  
and 50-366

LICENSEE: Georgia Power Company, et al.

FACILITY: Hatch Nuclear Plant, Units 1 and 2

SUBJECT: MEETING SUMMARY OF NOVEMBER 16, 1992, ON THE DEGRADED GRID VOLTAGE  
SETPOINTS AT HATCH NUCLEAR PLANT (TAC NO. M80948)

Introduction

On November 16, 1992, the NRC staff met with Georgia Power Company (GPC or licensee) representatives and their consultants from Southern Company Services (SCS) in Rockville, Maryland. The meeting was held at NRC's request to discuss the licensee's plan and conclusion regarding the above subject. Enclosure 1 lists the attendees, and Enclosure 2 contains the meeting agenda.

Discussion

In its introduction, the NRC staff noted that this issue resulted from an Electrical Distribution System Functional Inspection which was completed on July 12, 1991. During the inspection, GPC issued an Operating Order which specified certain actions to be performed if the 4160 volt essential busses fell below the minimum acceptable voltages. These actions include initiation of a one hour Limiting Condition of Operation (LCO) to restore safety-related bus voltages, notification of management and NRC, declaration of an unusual event, and an orderly plant shutdown if voltage is not restored. Subsequent to the inspection, the NRC indicated the Operating Order was adequate as an interim measure.

Following NRC staff's remarks, Mr. Bethay, GPC, discussed the degraded grid issues and stated that GPC integrated the requirements for the existing electrical design with plant and system operations. He further stated that the methods currently in place provide a higher level of safety when compared to automatic controls. His statement was based on the reliability of the Southern Electric System, The Southern Company's control and procedures, and the low probability of the event. He also added that an orderly, fast shutdown is preferable to an automatic reactor scram. Thus, GPC concluded that further enhancements are not needed and are not cost beneficial. Enclosure 3 contains a copy of the viewgraphs used for his presentation.

Mr. Miller, SCS, discussed the makeup of the Southern Electric System and Hatch's impact on it. He stated that their Operation Centers provide continuous monitoring and contingency analysis, and enumerated the actions that will be taken if the 230 KV system fell below 101.3%. Enclosure 4 contains a copy of the viewgraphs used for his presentation.

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P PDR

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December 21, 1992

Mr. Anderson, SCS, discussed the conceptual modifications and their approximate costs. Enclosure 5 contains a copy of the viewgraphs used for his presentation.

Mr. Heidt, GPC, provided the licensee's summary and requested NRC approval of an administrative implementation of NRC's Branch Technical Position (BTP) PSB-1. He reiterated that GPC's solution integrates the requirements for the existing electrical design with plant and system operations. He also reiterated GPC's position that the methods in place provide an adequate level of safety, and in some scenarios, a higher level of safety when compared to automatic controls. Therefore, GPC concluded that further enhancements are not cost beneficial. Enclosure 6 contains a copy of the viewgraph used for his presentation.

### Conclusion

The NRC staff stated that it will review the information provided during the meeting, and, in the near future, will transmit to the licensee its position regarding the issue of degraded grid voltage at Hatch.

Original signed by:

Kahtan N. Jabbour, Project Manager  
Project Directorate II-3  
Division of Reactor Projects - I/II  
Office of Nuclear Reactor Regulation

### Enclosures:

1. List of Attendees
2. Meeting Agenda
3. - 6. Viewgraphs Used for Presentations

cc w/enclosures:  
See next page

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\*SEE PREVIOUS CONCURRENCE

PDII-3:LA

PDII-3:PM

BC:SELB\*

D:PDII-3

LBerry

KJabbour:cw

CBerlinger

D:Matthews

12/1/92

12/12/92

12/09/92

12/21/92

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December 21, 1992

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#### Conclusion

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*Kahtan N. Jabbour*

Kahtan N. Jabbour, Project Manager  
Project Directorate 11-3  
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Office of Nuclear Reactor Regulation

#### Enclosures:

1. List of Attendees
2. Meeting Agenda
3. - 6. Viewgraphs Used for Presentations

cc w/enclosures:

See next page

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Docket File

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PD11-3 R/F

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J. Lazevnick, 7E4

C. Morris, 7E4

E. Imbro, 9A1

D. Norkin, 9A1

NOVEMBER 16, 1992

NRC/GPC Meeting

List of Attendees

NRC

D. Matthews  
K. Jabbour  
C. Berlinger  
E. Weiss  
N. Trehan  
J. Lazevnick  
C. Morris  
E. Imbro (part-time)  
D. Norkin (part-time)

GPC/SCS

J. Heidt  
S. Bethay  
M. Miller  
T. Anderson  
J. Branum  
G. McGaha  
T. Sims  
R. Hayes  
B. Snider



**GEORGIA POWER COMPANY  
PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992**

- |  |                       |
|--|-----------------------|
| <b>I. INTRODUCTION</b>                       | <b>S. J. BETHAY</b>   |
| <b>II. BACKGROUND AND<br/>CURRENT STATUS</b> | <b>S. J. BETHAY</b>   |
| <b>III. OFFSITE POWER SYSTEM</b>             | <b>M. B. MILLER</b>   |
| <b>IV. OPTIONS CONSIDERED</b>                | <b>T. O. ANDERSON</b> |
| <b>V. SUMMARY</b>                            | <b>J. D. HEIDT</b>    |
| <b>VI. OPEN DISCUSSION</b>                   |                       |

GEORGIA POWER COMPANY  
PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992

SUMMARY

- I. GPC'S SOLUTION INTEGRATES THE REQUIREMENTS FOR ELECTRICAL DESIGN, PLANT OPERATIONS AND SYSTEM OPERATIONS.
- II. THE METHODS IN PLACE PROVIDE AN ADEQUATE LEVEL OF SAFETY, AND IN SOME SCENARIOS, A HIGHER LEVEL OF SAFETY WHEN COMPARED TO AUTOMATIC CONTROLS.
  - RELIABILITY OF THE SOUTHERN ELECTRIC SYSTEM
  - SOUTHERN COMPANY SYSTEM CONTROL POLICIES AND PROCEDURES
  - $10^{-8}$  PROBABILITY OF DEGRADED VOLTAGE CONDITIONS ( $<101.3\%$ )
  - AN ORDERLY, FAST SHUTDOWN IS PREFERABLE TO AN AUTOMATIC OR SELF INDUCED REACTOR ISOLATION TRANSIENT
  - ADVERSE SYSTEM IMPACT FROM AUTOMATIC DISCONNECT
  - FURTHER ENHANCEMENTS ARE NOT COST BENEFICIAL

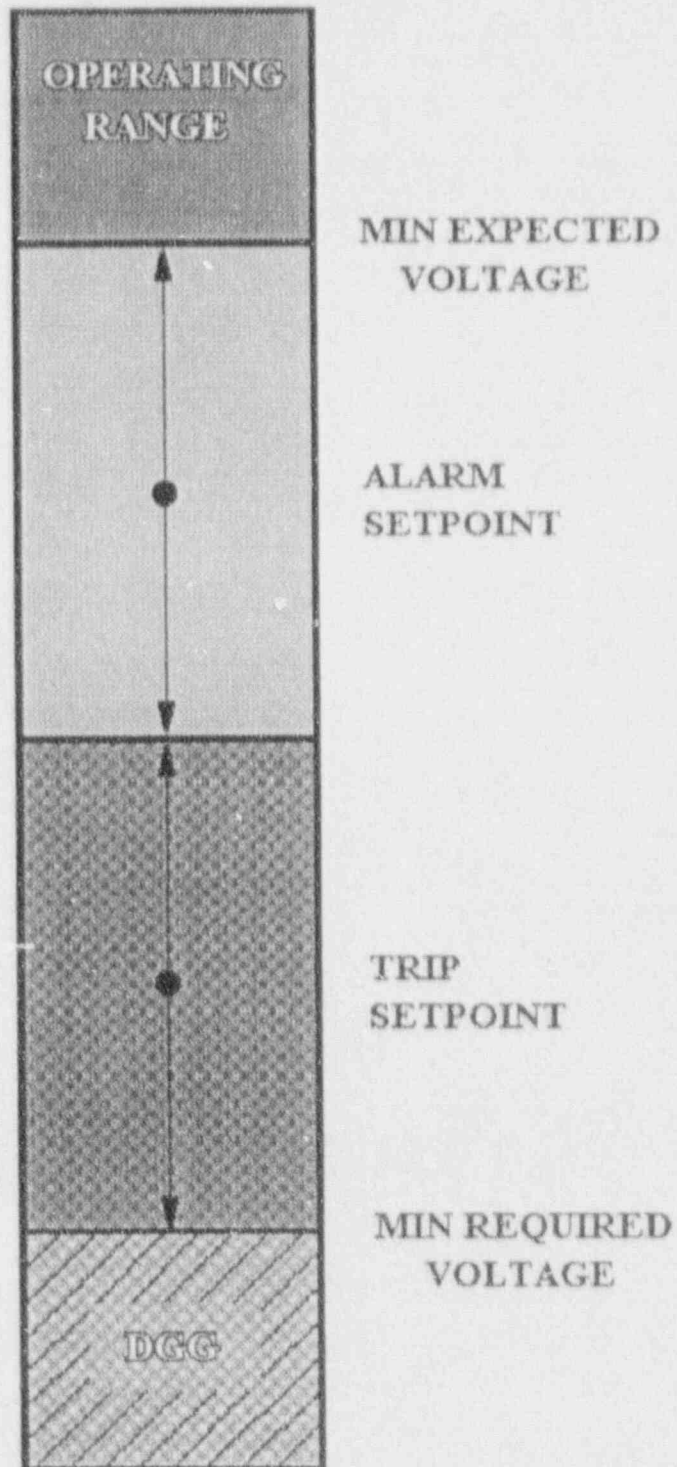


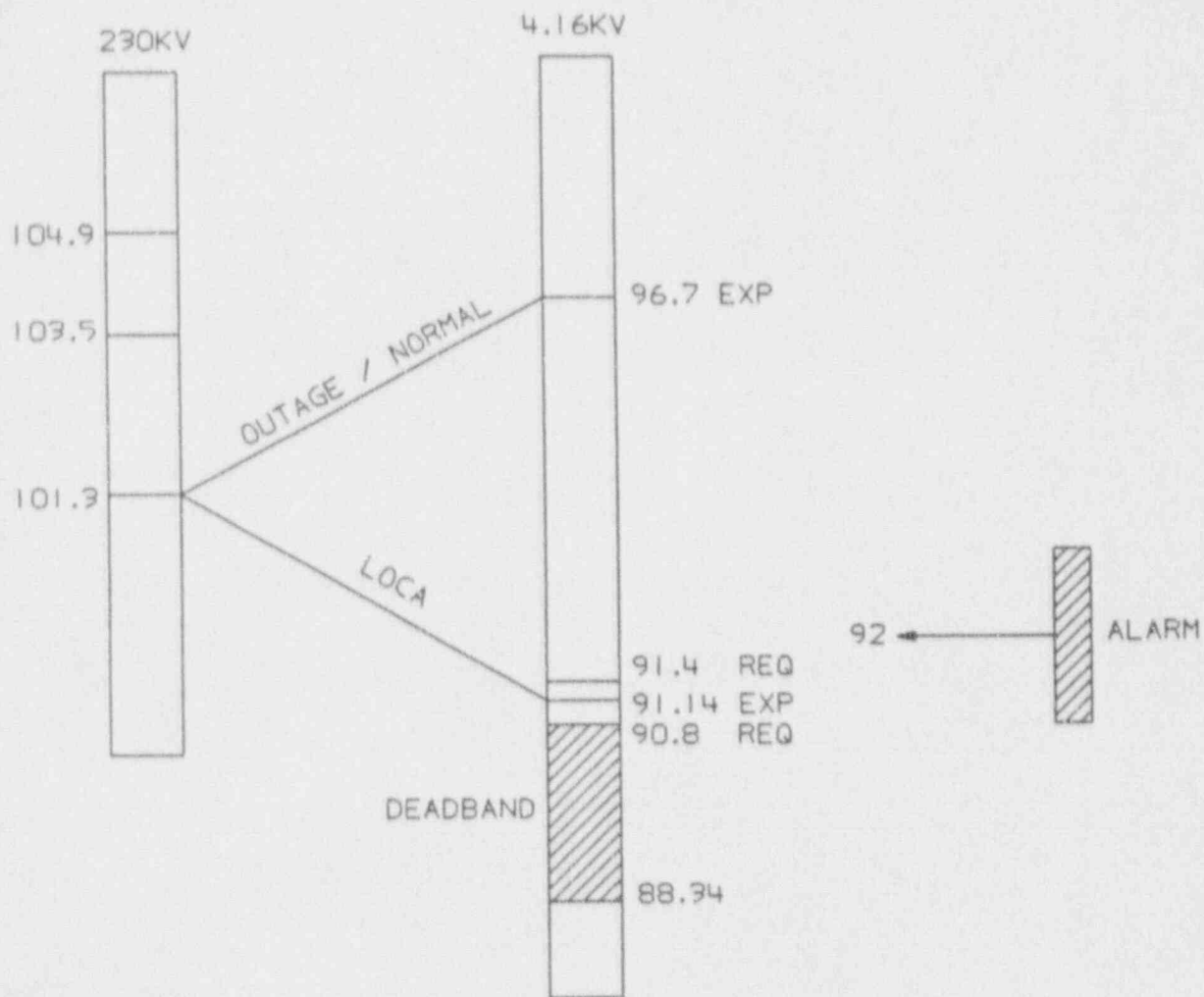
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DEGRADED GRID ISSUES  
NOVEMBER 16, 1992

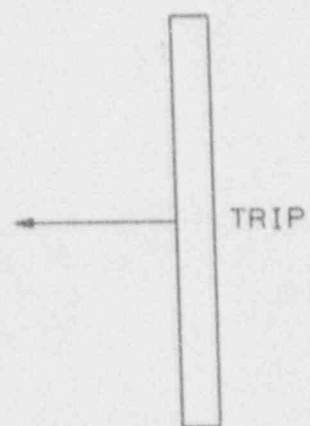
ISSUE SUMMARY

- I. DURING SUSTAINED DEGRADED GRID CONDITIONS AT OR SLIGHTLY ABOVE THE CURRENT SETPOINT, THE UNDERVOLTAGE PROTECTION WAS NOT CONSIDERED ADEQUATE TO ENSURE SAFETY-RELATED EQUIPMENT AT 600 VOLTS AND BELOW WOULD BE SUPPLIED WITH ADEQUATE VOLTAGE.
  - LOCA ACCIDENT CONDITIONS CONCURRENT WITH A DEGRADED GRID.

# HYPOTHETICAL ALARM / TRIP RANGES







**GEORGIA POWER COMPANY  
PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992**

**GPC OBJECTIVES**

- I. ENSURE THE PLANT IS ADEQUATELY PROTECTED FROM UNDERVOLTAGE CONDITIONS.**
  - ASSESS THE LEVEL OF SAFETY PROVIDED BY THE CURRENT SYSTEM
  - IDENTIFY AVAILABLE OPTIONS
  - DETERMINE IF IMPROVEMENTS ARE FEASIBLE
- II. ENSURE OFFSITE POWER IS PRESERVED AS THE PREFERRED SOURCE.**
- III. DEVELOP AN INTEGRATED APPROACH CONSIDERING THE ELECTRICAL DESIGN REQUIREMENTS, SYSTEM OPERATION AND PLANT OPERATION.**
- IV. AN UNDERVOLTAGE RELAY SETPOINT WITHIN THE NORMAL SYSTEM OPERATING RANGE IS UNACCEPTABLE.**

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PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992**

**GPC OBJECTIVES (CONTINUED)**

- V. AN ORDERLY, FAST REACTOR SHUTDOWN IS PREFERABLE TO AN AUTOMATIC ISOLATION OR SELF INDUCED REACTOR ISOLATION TRANSIENT WITHOUT OFFSITE POWER.
- SYSTEM OPERATORS SHOULD BE ALLOWED TO QUICKLY MITIGATE A DEGRADED GRID TRANSIENT TO AVOID AN UNNECESSARY ISOLATION TRANSIENT AND A FURTHER CHALLENGE TO GRID STABILITY.
  - SYSTEM OPERATIONS SHOULD ASSESS THE CHALLENGE TO THE GRID AND DETERMINE IF QUALITY OFFSITE POWER CAN BE MAINTAINED.
- VI. ENSURE RESOLUTION DOES NOT RESULT IN AN ACTUAL DECREASE IN OVERALL SAFETY.



**GEORGIA POWER COMPANY  
PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992**

**CRITERIA**

- I. RISKS ASSOCIATED WITH AN AUTOMATIC SHUTDOWN MUST BE BALANCED WITH THE RISKS ASSOCIATED WITH CONTINUED OPERATION.
- II. RISKS ARE ASSIGNED AS A FUNCTION OF:
  - THE RELIABILITY OF THE SOUTHERN ELECTRIC SYSTEM'S GRID VS. RELIABILITY OF ONSITE POWER
  - THE SOUTHERN ELECTRIC SYSTEM'S GRID MONITORING AND SINGLE FAILURE ANALYSIS CAPABILITIES VS. SETPOINT CONTROLS
  - THE EXTREMELY LOW PROBABILITY OF DEGRADED VOLTAGE AT PLANT HATCH VS. THE POSSIBILITY OF SPURIOUS REACTOR ISOLATION TRANSIENTS ON THE PLANT
  - THE PROBABILITY OF OFFSITE VOLTAGE FALLING BELOW 101.3% IS  $4.3 \times 10^{-8}$
  - THE ANTICIPATED DURATION OF A DEGRADED GRID CONDITION
  - THE POTENTIAL EFFECT OF BRIEF DEGRADED VOLTAGE ON PLANT EQUIPMENT VS. THE EFFECT FROM AN ISOLATION TRANSIENT WITH 3 BUSES AVAILABLE ON ONE UNIT AND 2 BUSES ON THE OTHER
  - THE SYSTEM IMPACT OF SEPARATING 1600MW FROM A DEGRADED GRID

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PLANT E. I. HATCH  
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NOVEMBER 16, 1992**

**ACTIONS COMPLETED**

- I.    HARDWARE AND SETPOINT CHANGES HAVE BEEN INVESTIGATED.
- II.   WORKED WITH SYSTEM OPERATIONS TO GAIN AN UNDERSTANDING OF:
  - THE GRID MONITORING AND SINGLE FAILURE ANALYSIS CAPABILITIES
  - SYSTEM OPERATING PROCEDURES THAT ENSURE ADEQUATE VOLTAGE IS MAINTAINED
  - THE SYSTEM CONDITIONS WHICH WOULD HAVE TO OCCUR TO PRODUCE DEGRADED VOLTAGE AT PLANT HATCH
- III.  INSTALL ANTICIPATORY ALARMS.
- IV.  FORMALIZED ANTICIPATORY ACTION - BOTH ONSITE AND OFFSITE.
- V.   FORMALIZED COMMUNICATIONS WITH SYSTEM OPERATIONS.
- VI.  IMPLEMENTED AN OPERATING ORDER TO ENSURE THE REACTOR IS QUICKLY BROUGHT TO A CONDITION OF GREATER SAFETY.
  - PROVIDES ACTIONS CONSISTENT WITH TECHNICAL SPECIFICATIONS ACTIONS FOR FAILURE OF ALL DIESEL GENERATORS

# THE SOUTHERN ELECTRIC SYSTEM (SES)

---

- 5 OPERATING COMPANIES  
ALABAMA POWER  
GEORGIA POWER  
GULF POWER  
MISSISSIPPI POWER  
SAVANNAH ELECTRIC
- TOTAL GENERATION
- HATCH'S IMPACT ON SYSTEM

# SOUTHERN ELECTRIC SYSTEM (SES) SECURITY

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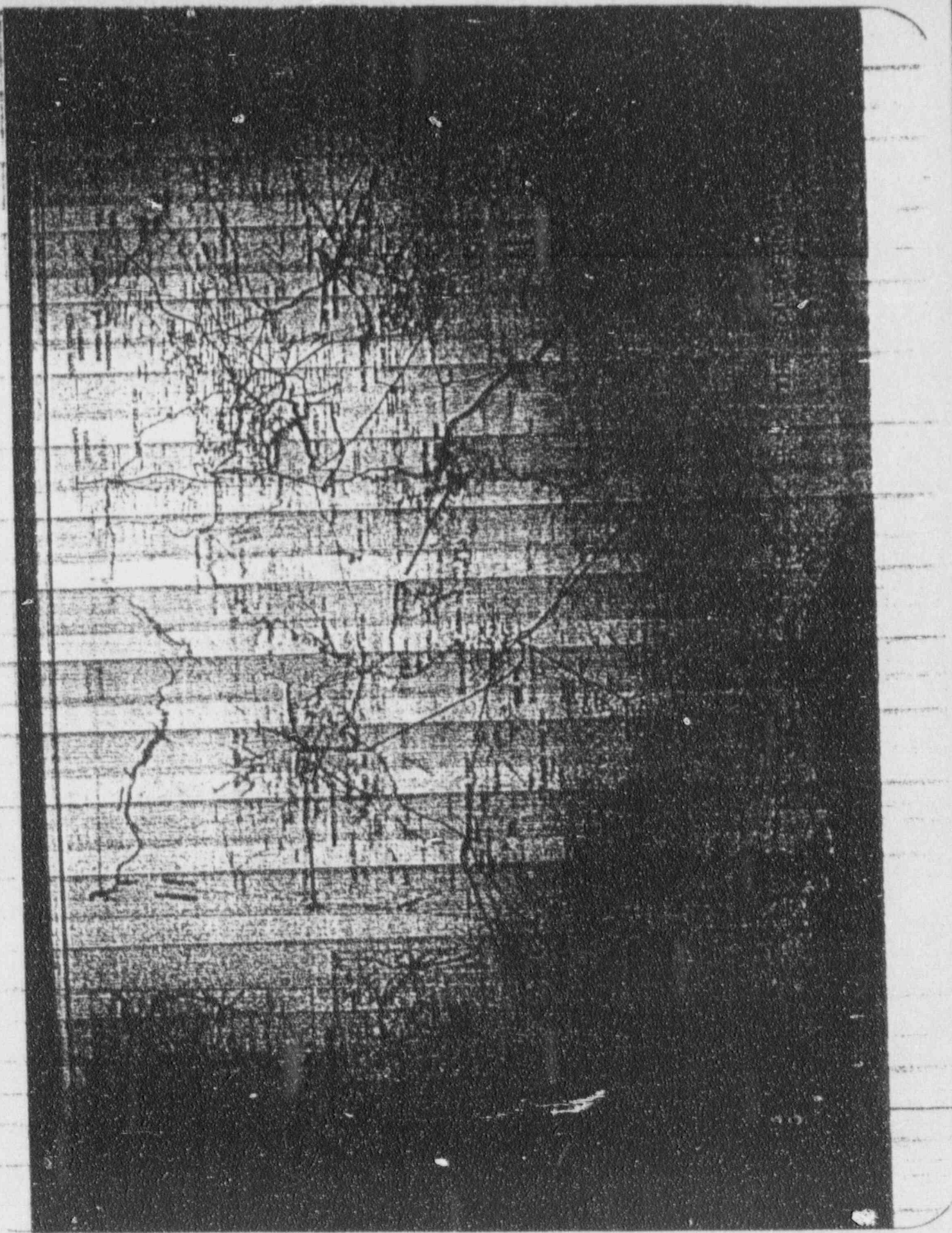
- OPERATION CENTERS
  - ON LINE COMPUTERIZED  
LIBRARY OF REGIONAL AND  
SUBSTATION SINGLE LINES
  - CONTINUOUS MONITORING AND  
CONTINGENCY ANALYSIS
-



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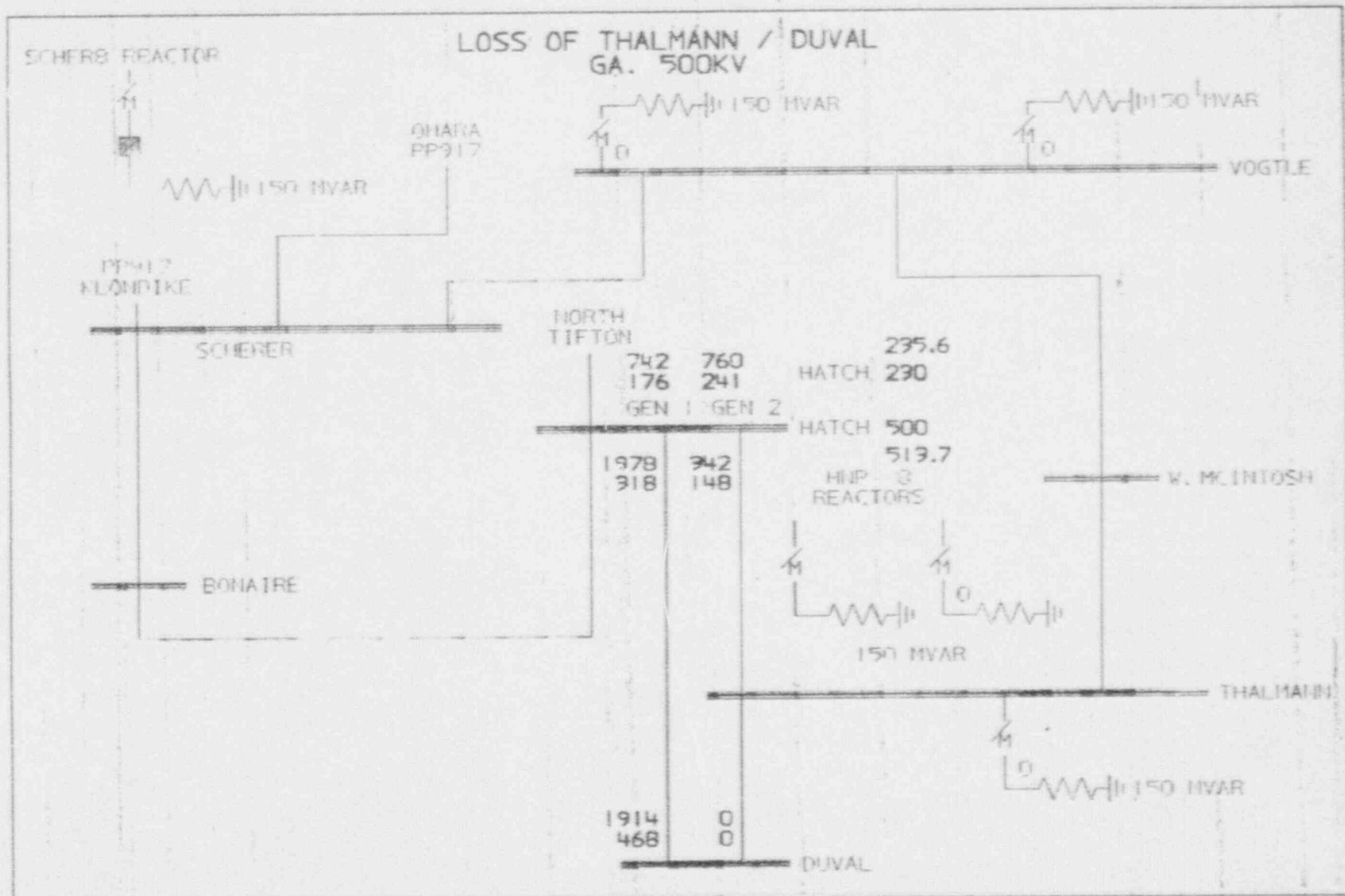
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# LOSS OF THALMANN \ DUVAL, LOSS OF UNIT 1 GA. 500KV

SCHIEBE REACTOR

OHARA  
P2017

150 MVAR

P2017  
KLODDE

SCHERER

HIGHTH  
TIFTON

232.4  
HATCH 290

0 763  
0 301  
GEN 1 GEN 2

HATCH 500  
510.4  
HIP @  
REACTORS

1953  
291

BOHAIRE

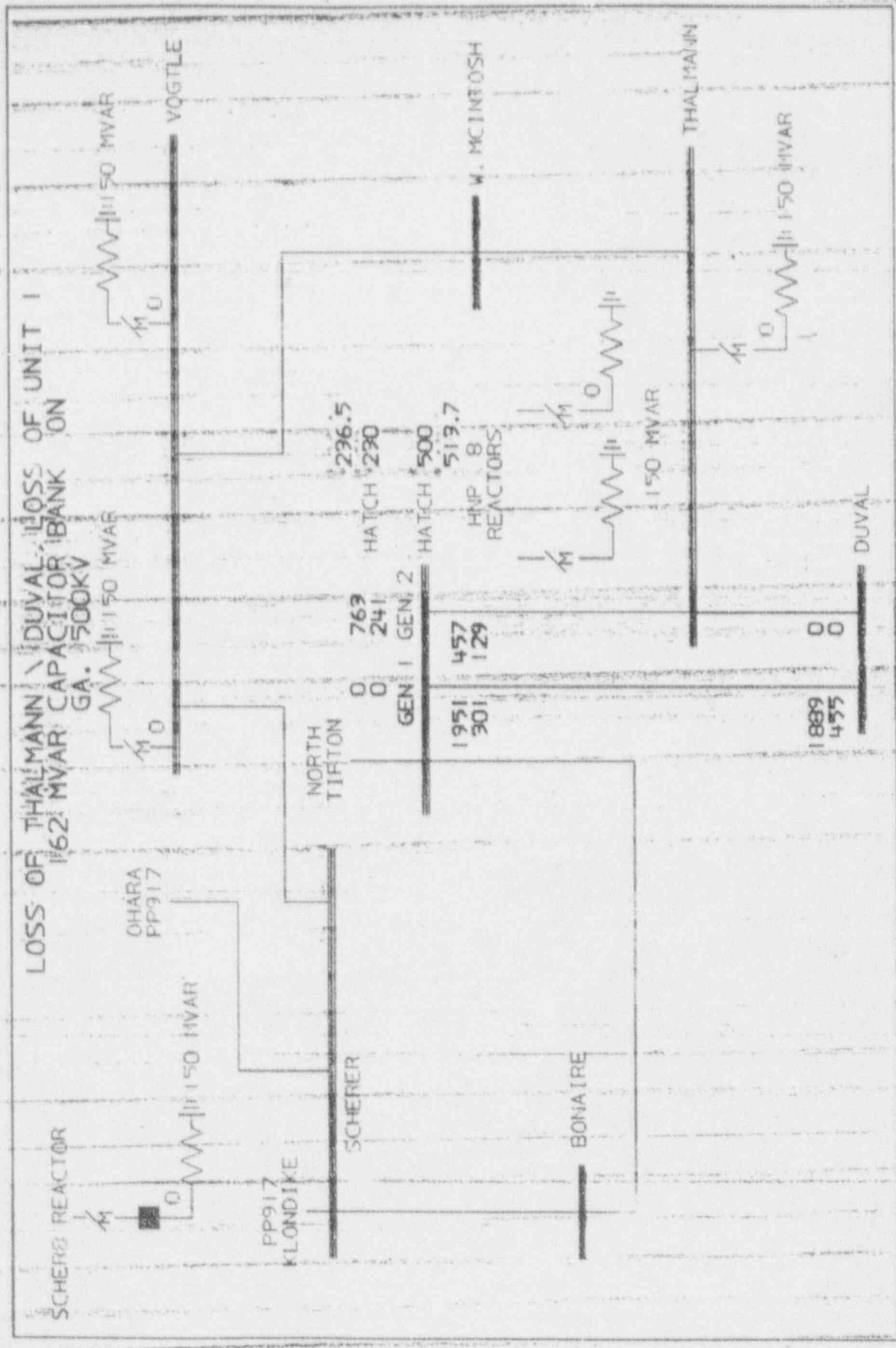
V. MCINTOSH

THALMANN

150 MVAR

DUVAL

1890  
479



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PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992

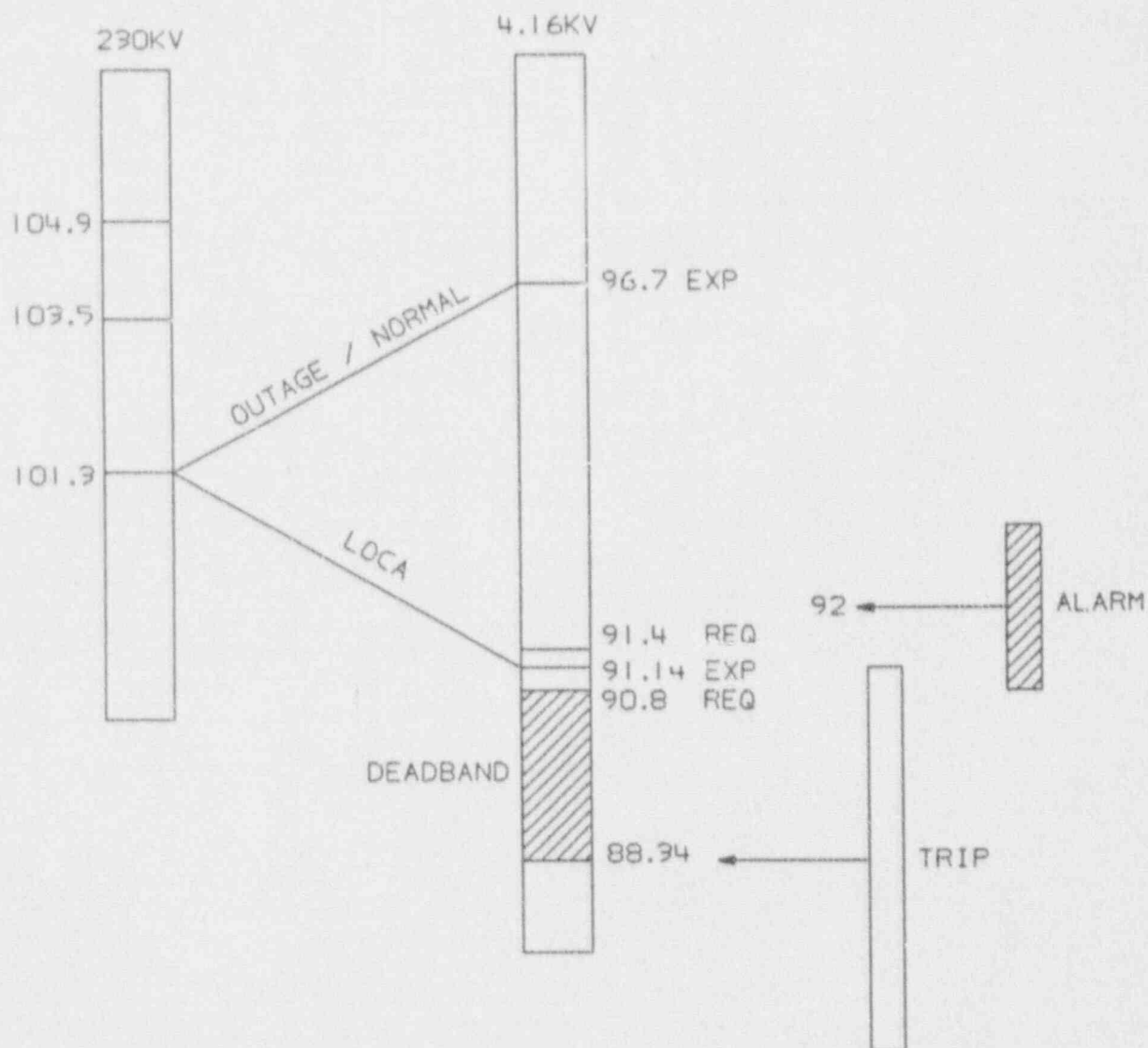
IF 230KV SYSTEM FAILS BELOW 101.3%

- RECEIVE LOW VOLTAGE ALARM
- NOTIFY CONTROL ROOM AT PLANT HATCH
- PUT CAPACITOR BANKS ON
- TURN SHUNT REACTORS OFF
- PUT COMBUSTION TURBINES ( McMANUS ) IN SERVICE
- BRING OUT OF SERVICE ELEMENTS BACK TO SERVICE
- REDUCE LOAD

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PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
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<u>CONCEPTUAL MODIFICATIONS</u>	<u>APPROXIMATE COST</u>
---------------------------------	-------------------------

- |   |                          |
|---|--------------------------|
| I. TAP CHANGES  | \$ 250,000               |
| II. NEW RELAYS, CABLE<br>AND / OR EQUIPMENT<br>CHANGE OUT | \$ 500,000 - \$1 MILLION |
| III. NEW LOAD SHED / BUS<br>TRANSFER SCHEMES              | \$ 1 - 2 MILLION         |
| IV. RE ANALYSIS OF EXISTING<br>LOAD AT LOWER VOLTAGE      | \$ 1 - 2 MILLION         |
| V. NEW MAJOR EQUIPMENT                                    | \$ 10 MILLION            |





GEORGIA POWER COMPANY  
PLANT E. I. HATCH  
DEGRADED GRID ISSUES  
NOVEMBER 16, 1992

SUMMARY

- I. GPC REQUESTS NRC APPROVAL OF ADMINISTRATIVE IMPLEMENTATION OF BRANCH TECHNICAL POSITION PSB-1.
- II. GPC'S SOLUTION INTEGRATES THE REQUIREMENTS FOR ELECTRICAL DESIGN, PLANT OPERATIONS AND SYSTEM OPERATIONS.
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  - ADVERSE SYSTEM IMPACT FROM AUTOMATIC DISCONNECT
- IV. FURTHER ENHANCEMENTS ARE NOT COST BENEFICIAL