January 21, 1998

South Carolina Electric & Gas Company
ATTN: Mr. Gary J. Taylor
Vice President, Nuclear Operations
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

SUBJECT: MEETING SUMMARY - V. C. SUMMER EMERGENCY DIESEL GENERATOR ISSUES

Dear Mr. Taylor:

This letter refers to the meeting conducted at your request at the NRC Region II office in Atlanta on January 14, 1998. The purpose of the meeting was to allow South Carolina Electric & Gas Company (SCE&G) to make a presentation on V. C. Summer's Emergency Diesel Generator issues. Although not discussed, your staff also provided an information handout on Refuel 10.

It is our opinion that this meeting was beneficial and provided a better understanding of the issues and status of the Emergency Diesel Generator.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosures will be placed in the NRC Public Document Room.

Should you have any question concerning this letter, please let us know.

Sincerely,

Orig signed by Robert C. Haag

Robert C. Haag, Chief
Reactor Projects Branch 5
Division of Reactor Projects

Docket No. 50-395
License No. NPF-12

Enclosures: 1. List of Attendees
2. SCE&G Presentation Slides
3. Refuel 10 Handout

OFFICIAL COPY

040065

IE45

cc w/encls:
R. J. White
Nuclear Coordinator Mail Code 802
S.C. Public Service Authority
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

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Winston and Strawn
1400 L Street, NW
Washington, D. C. 20005-3502

Chairman
Fairfield County Council
P. O. Box 60
Winnsboro, SC 29180

Virgil R. Autry, Director
Radioactive Waste Management
Bureau of Solid and Hazardous
Waste Management
S. C. Department of Health
and Environmental Control
2600 Bull Street
Columbia, SC 29201

R. M. Fowlkes, Manager
Operations (Mail Code 303)
South Carolina Electric & Gas Company
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

April Rice, Manager
Nuclear Licensing & Operating
Experience (Mail Code 830)
Virgil C. Summer Nuclear Station
P. O. Box 88
Jenkinsville, SC 29065

Distribution w/encls:
M. Padovan, NRR
R. Aiello, RII
P. Fillion, RII
R. Gibbs, RII
D. Jones, RII
L. Garner, RII
M. King, RII
PUBLIC

NRC Resident Inspector
U.S. Nuclear Regulatory Commission
Route 1, Box 64
Jenkinsville, SC 29065

OFFICE	RII	RII:DRP						
SIGNATURE		LW. Garner						
NAME	PHopkins	LGarner						
DATE	1/ 2 /98	1/ 2 /98	1/ /98	1/ /98	1/ /98	1/ /98	1/ /98	1/ /98
COPY?	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO

OFFICIAL RECORD COPY DOCUMENT NAME:G:\SUMMTG14.SUM

LIST OF ATTENDEES

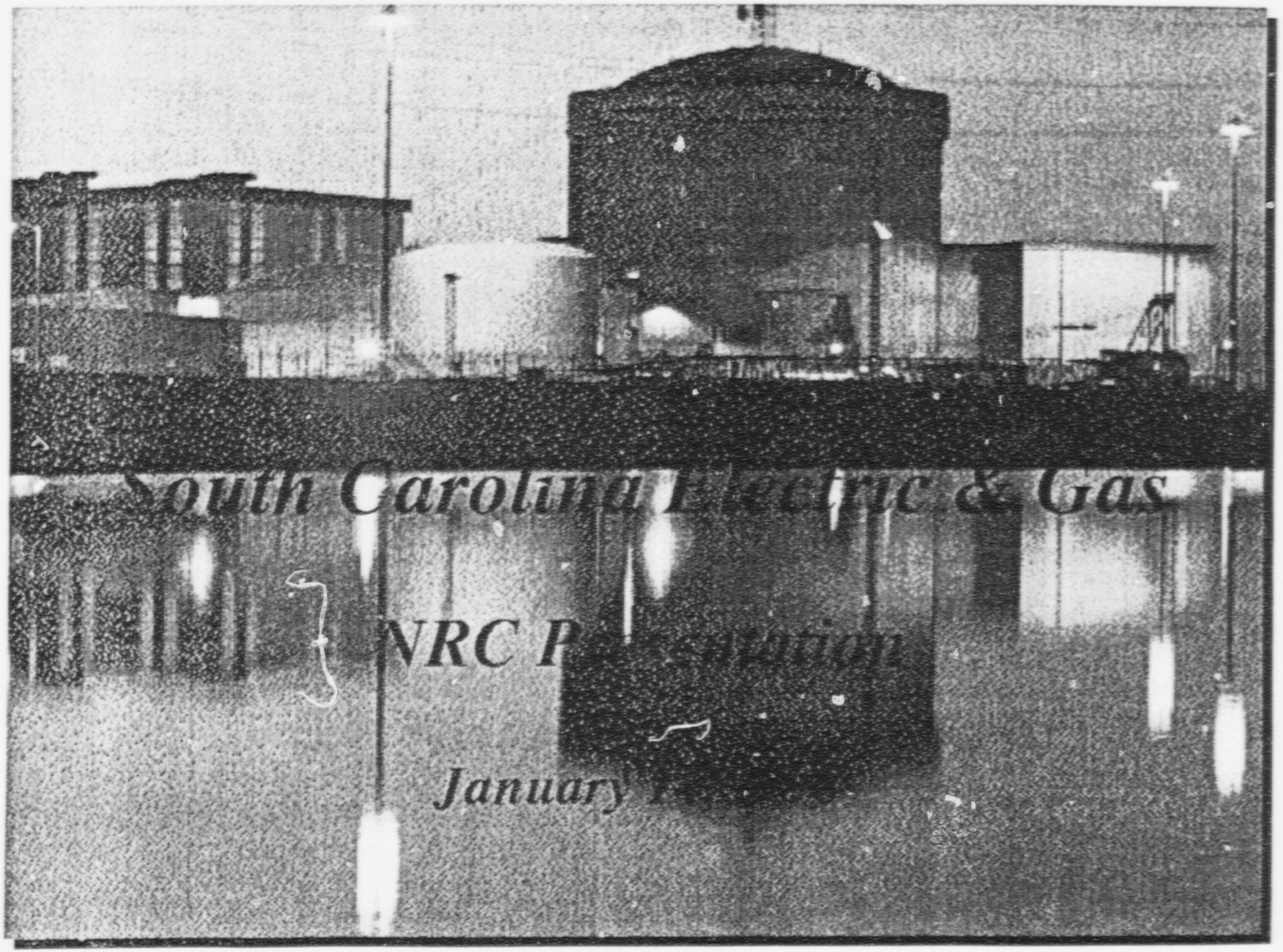
Nuclear Regulatory Commission

L. Reyes, Regional Administrator, Region II (RII)
J. Johnson, Director, Division of Reactor Projects (DRP), RII
J. Jaudon, Director, Division of Reactor Safety, RII
M. Padovan, Project Manager, Project Directorate II-1, Office of Nuclear Reactor Regulation
R. Haag, Chief, Branch 5, DRP, RII
B. Bonser, Senior Resident Inspector, V. C. Summer
P. Hopkins, Project Engineer, Branch 5, DRP, RII
M. King, Project Engineer, Branch 5, DRP, RII

South Carolina Electric and Gas Company

S. Byrne, Plant Manager
B. Williams, General Manager, Engineering
B. Waselus, Manager, System Engineering
M. Fowlkes, Operations Manager
R. Slone, System Engineer
D. Gatlin, Engineering Analyst
A. Rice, Manager, Licensing

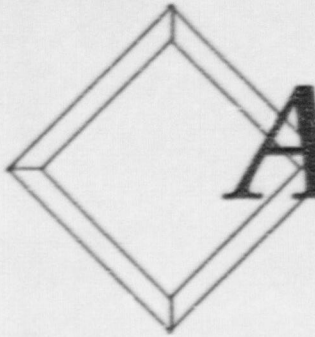
Enclosure 1



Enclosure 2

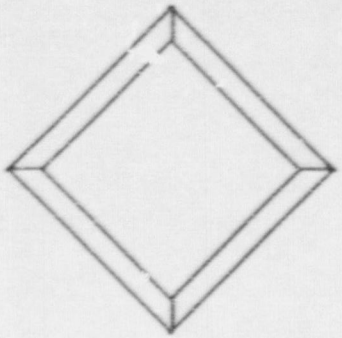
Participants

- Steve Byrne — Plant Manager
- Bruce Williams — Gen. Mgr. Engineering
- Bob Waselus — Mgr. Syst. Engineering
- Mike Fowlkes — Operations Mgr.
- Richard Slone — System Engineer
- Dan Gatlin — Engineering Analyst
- April Rice — Mgr. Licensing



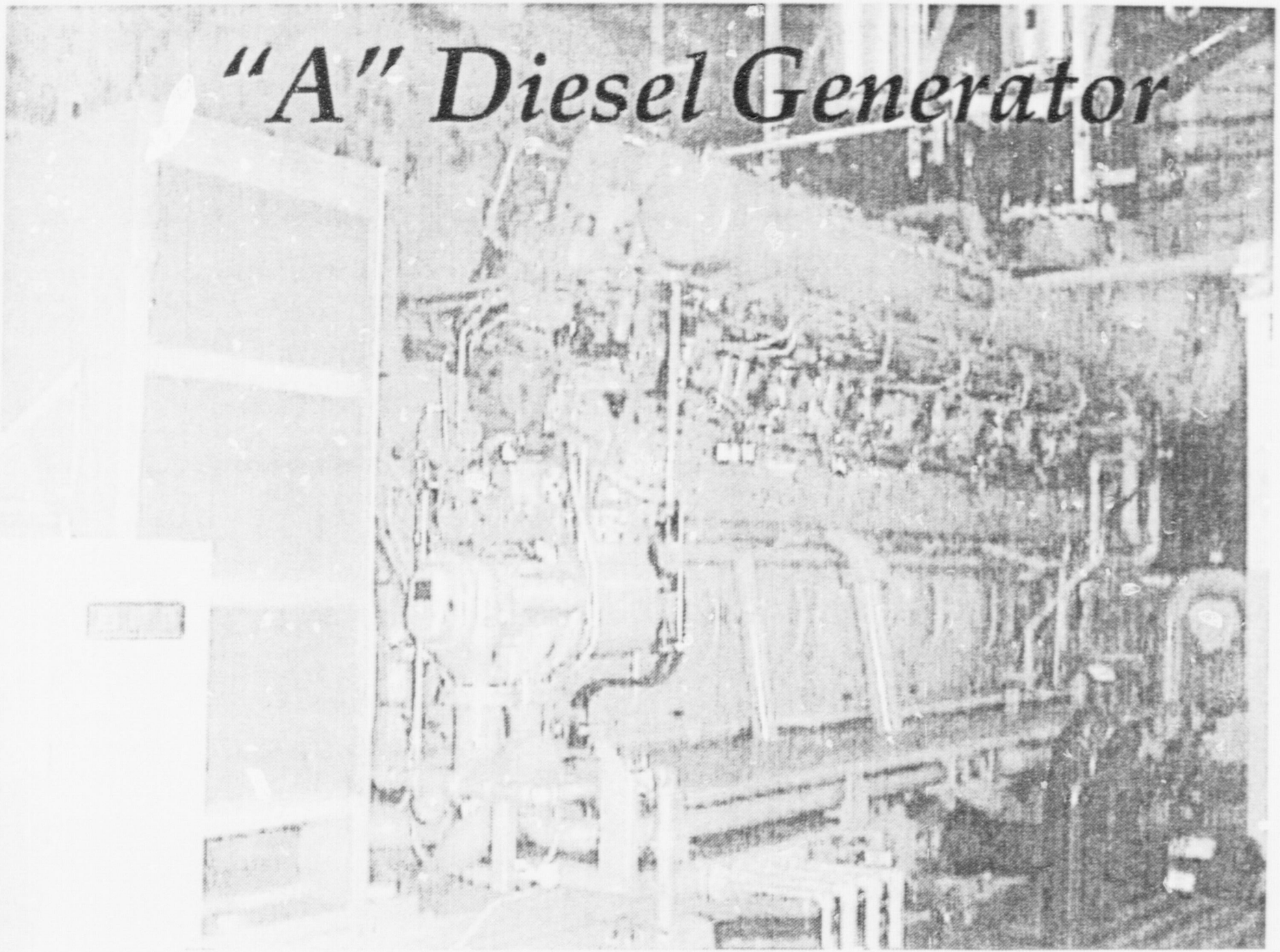
Agenda

- Introduction and Overview
- DG Monthly Operability Testing
- DG Equipment Overview
- History of DG Operation
- Actions Completed
- DG Operability Retesting
- Future Plans
- Summary



"A"

Diesel Generator Issues


"A" Diesel Generator

Issues

- Parts
  - Aging
  - Vendor testing of refurbished components
- Upgrade to next generation or digital?
- Objective overview
- Not each failure counted under GL 94-01
  - Possible T.S. change

Points

- Failures were distinctly different
  - Electrical Governor (EGA) #1
  - ID relay (not valid test failure)
  - EGA #2
  - "Mechanical" Governor (EGB)
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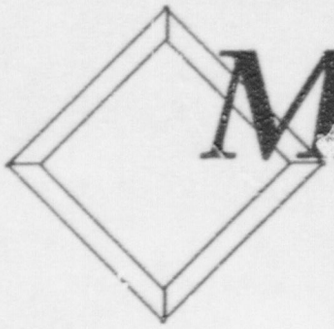
- DG reliability still good
- No start failures
- Retesting more comprehensive than most
- Conservative decision to S/D



Monthly Operability Test Description

Mike Fowlkes

Operability Test

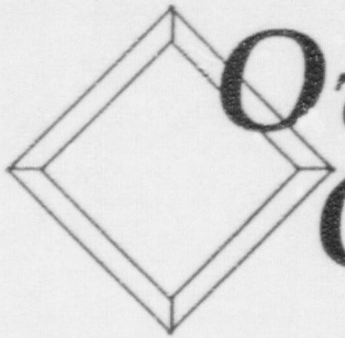
- Perform Emergency Start of EDG
- Record Time to Reach Speed, Voltage, and Frequency
- Perform Test Start of EDG
- Run at No Load for Stabilization

Operability Test

- Parallel to Bus and Run Loaded for One Hour
- Reduce Load To 50 kW and Open EDG Feeder Breaker to Bus
- Verify Steady State - No Load Voltage
- Stop and Align EDG for Automatic Start

Diesel Generator Equipment Overview

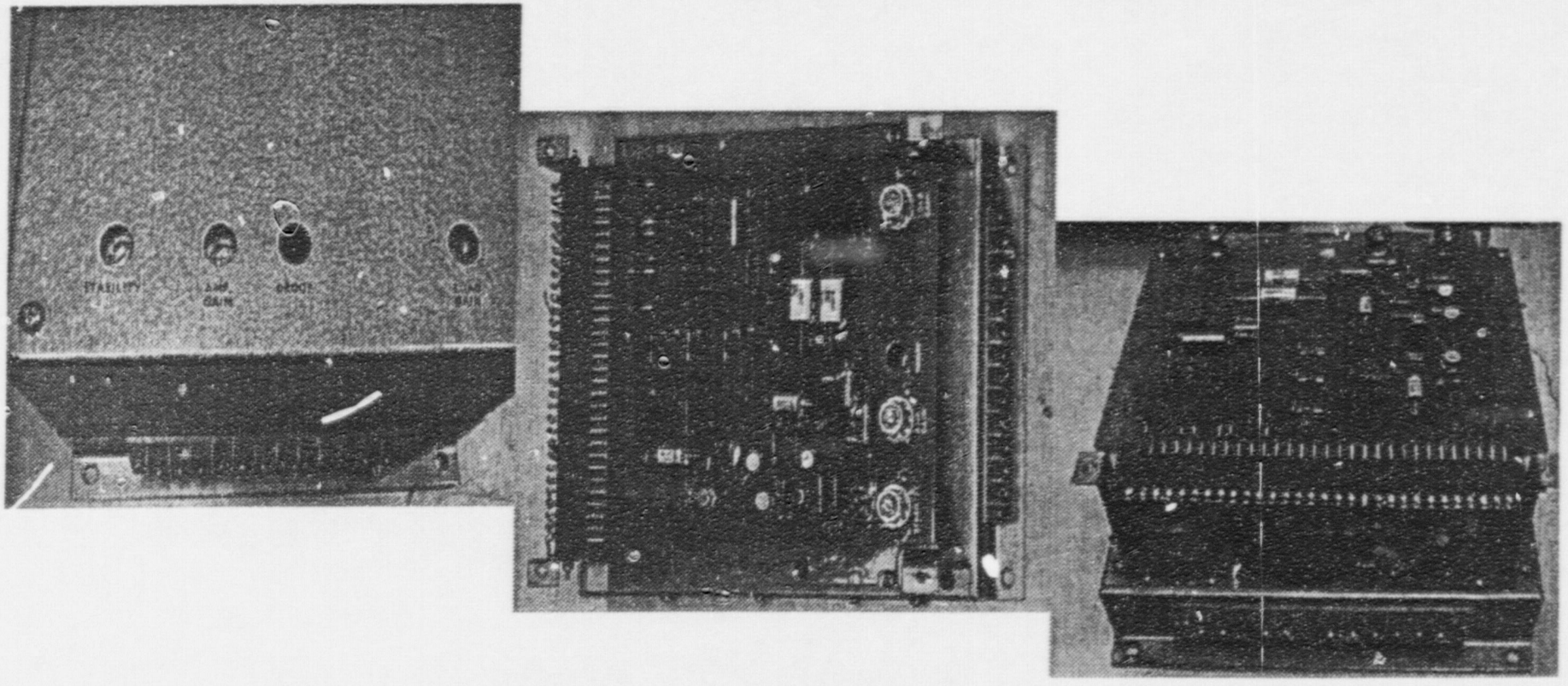
Bob Waselus



Overview of Operation of the Governor Control System

- **Electrical Governor (EGA) Operation**
- **"Mechanical" Governor (EGB) Operation**

Overview of Operation of the Governor Control System



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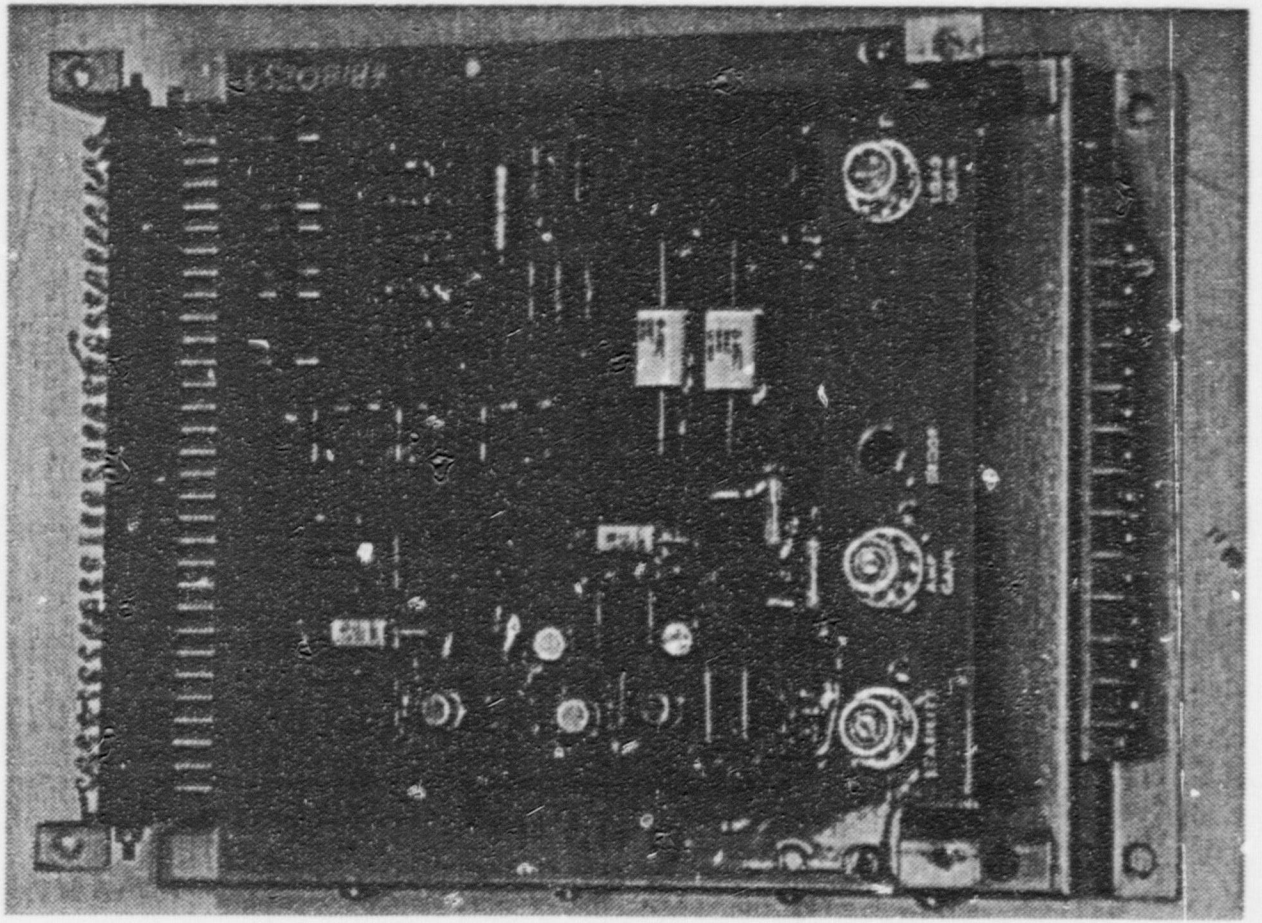
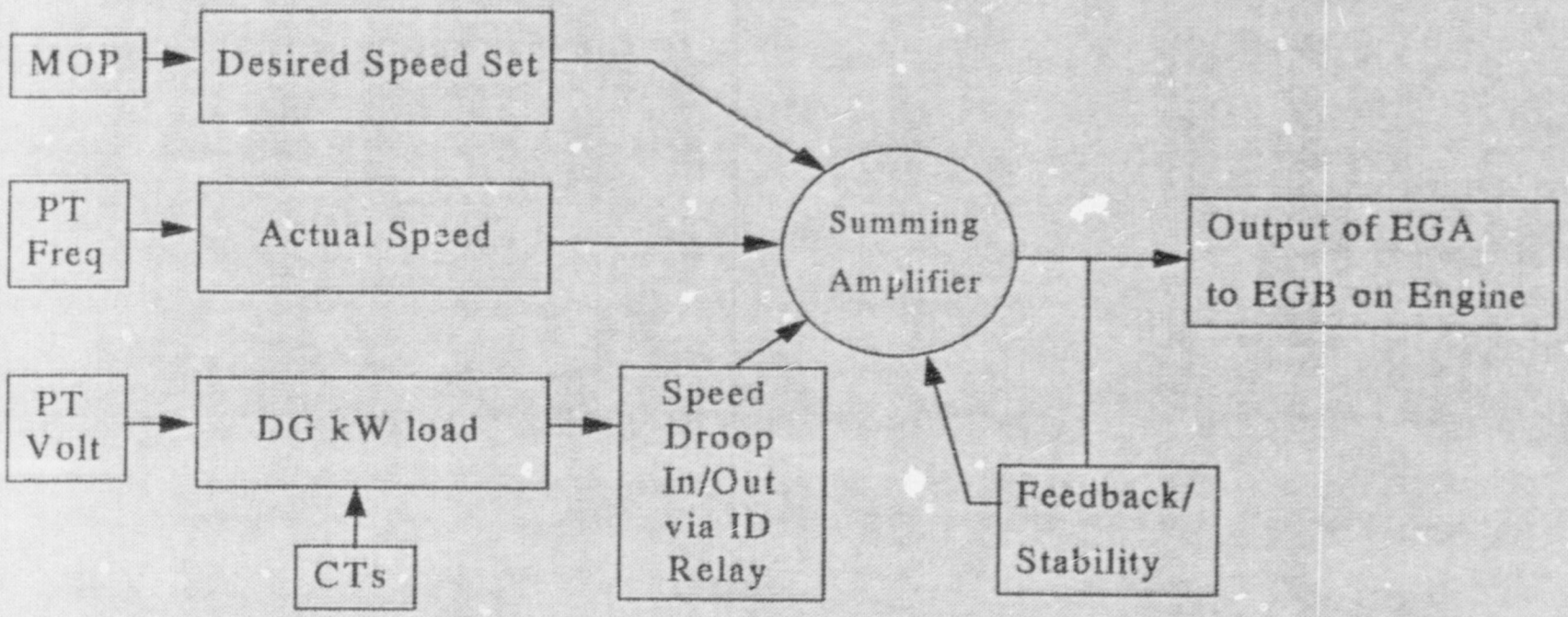


Overview of Operation of the Governor Control System

EGA Block Diagram



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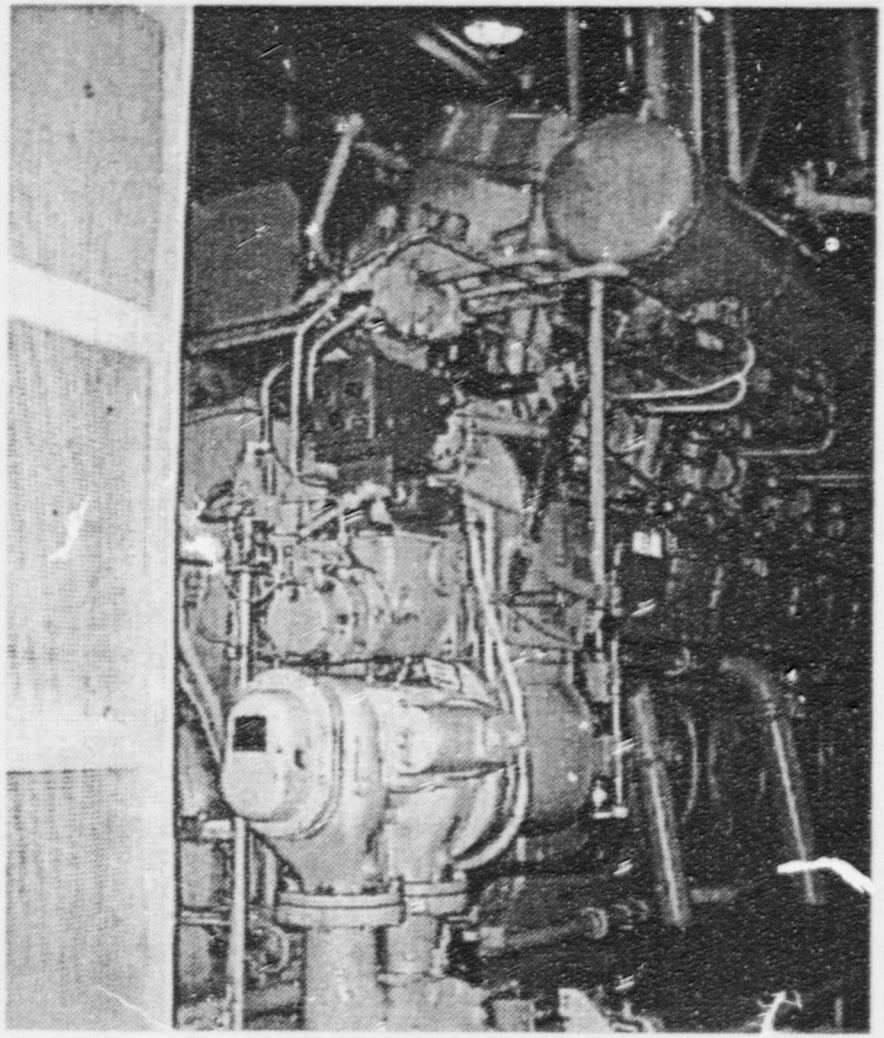

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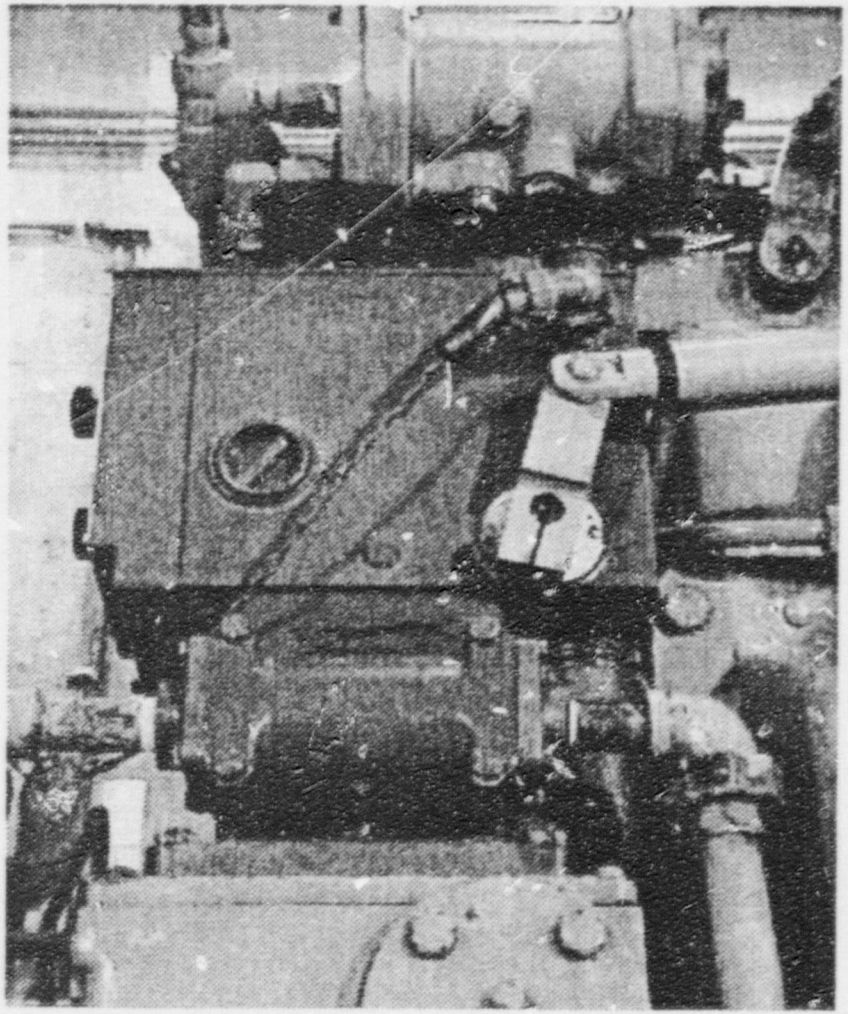

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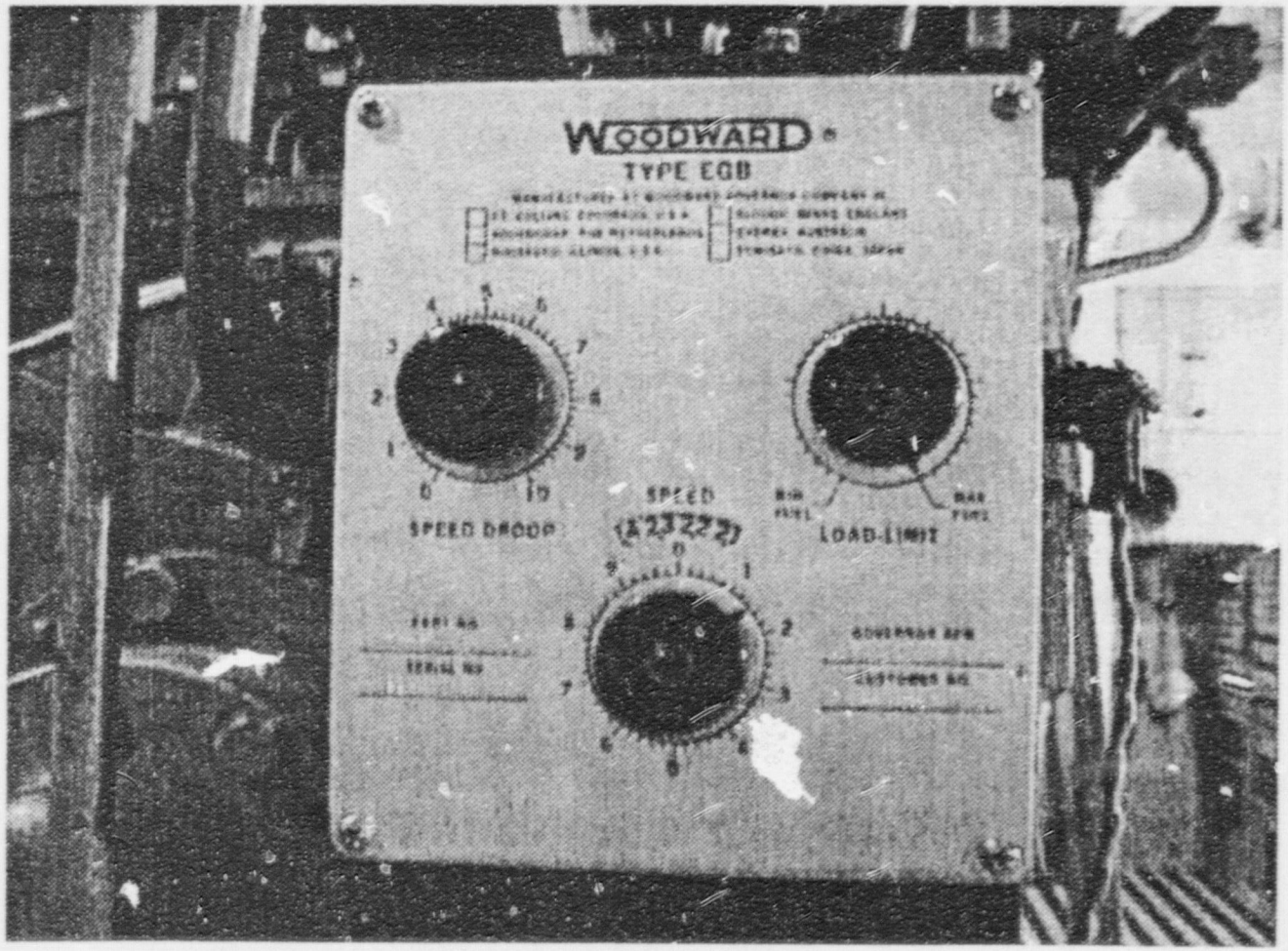
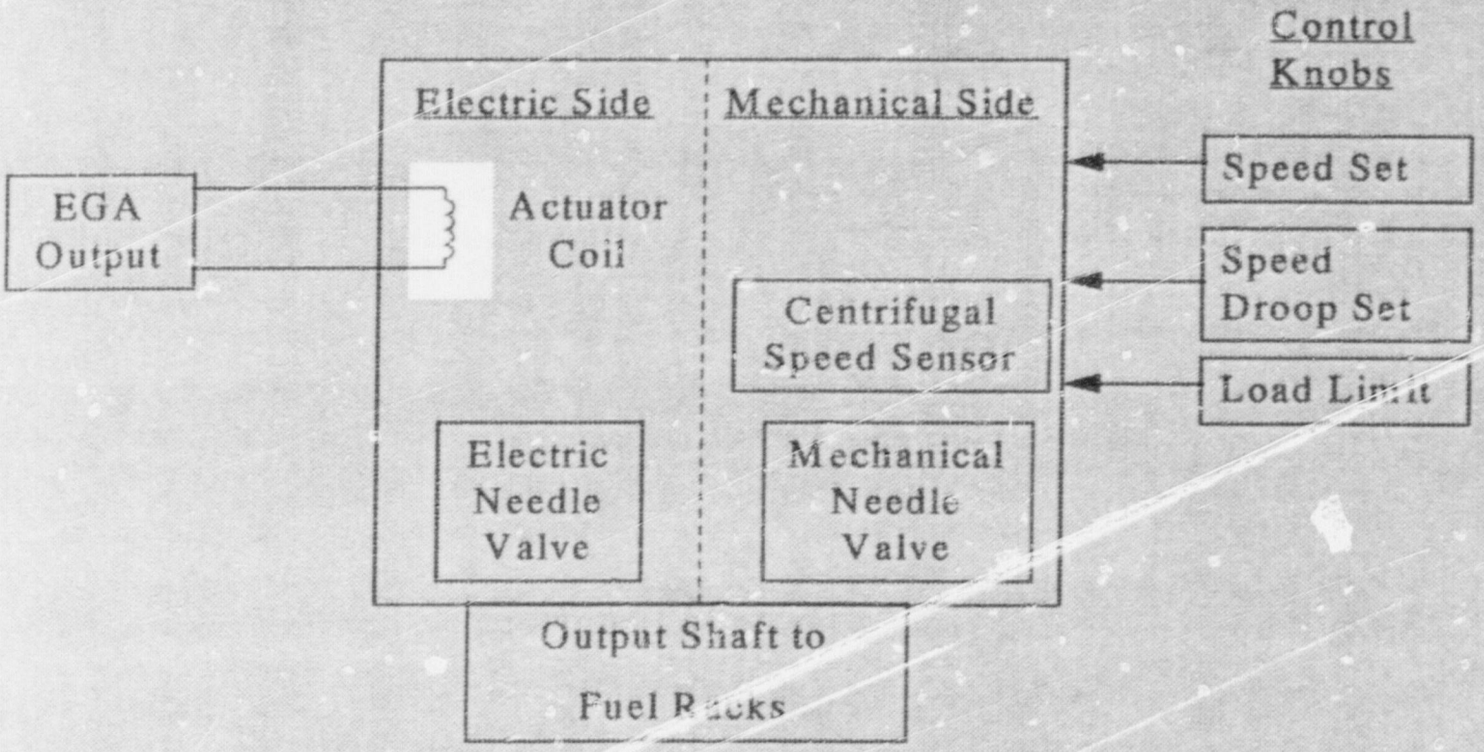


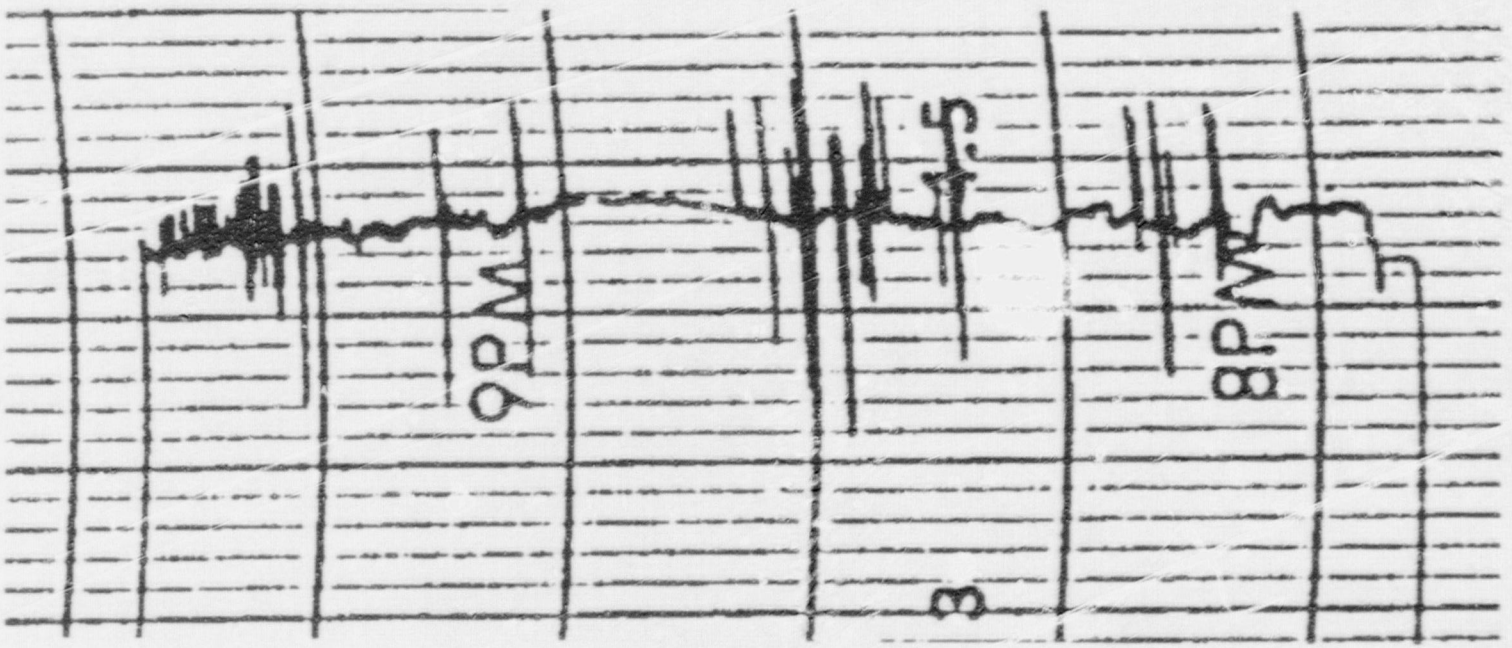
Overview of Operation of the Governor Control System

EGB Block Diagram



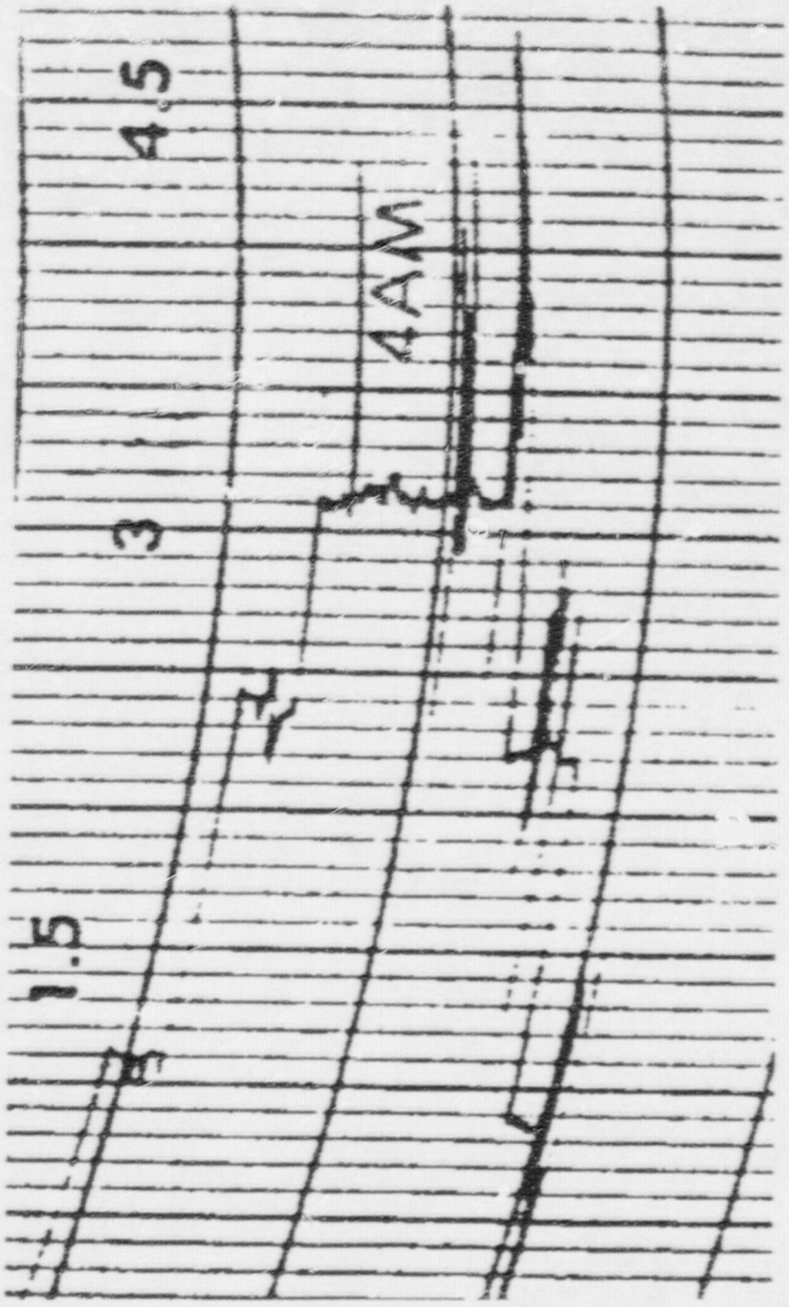
Event #1

EGA Failure 11-11-97



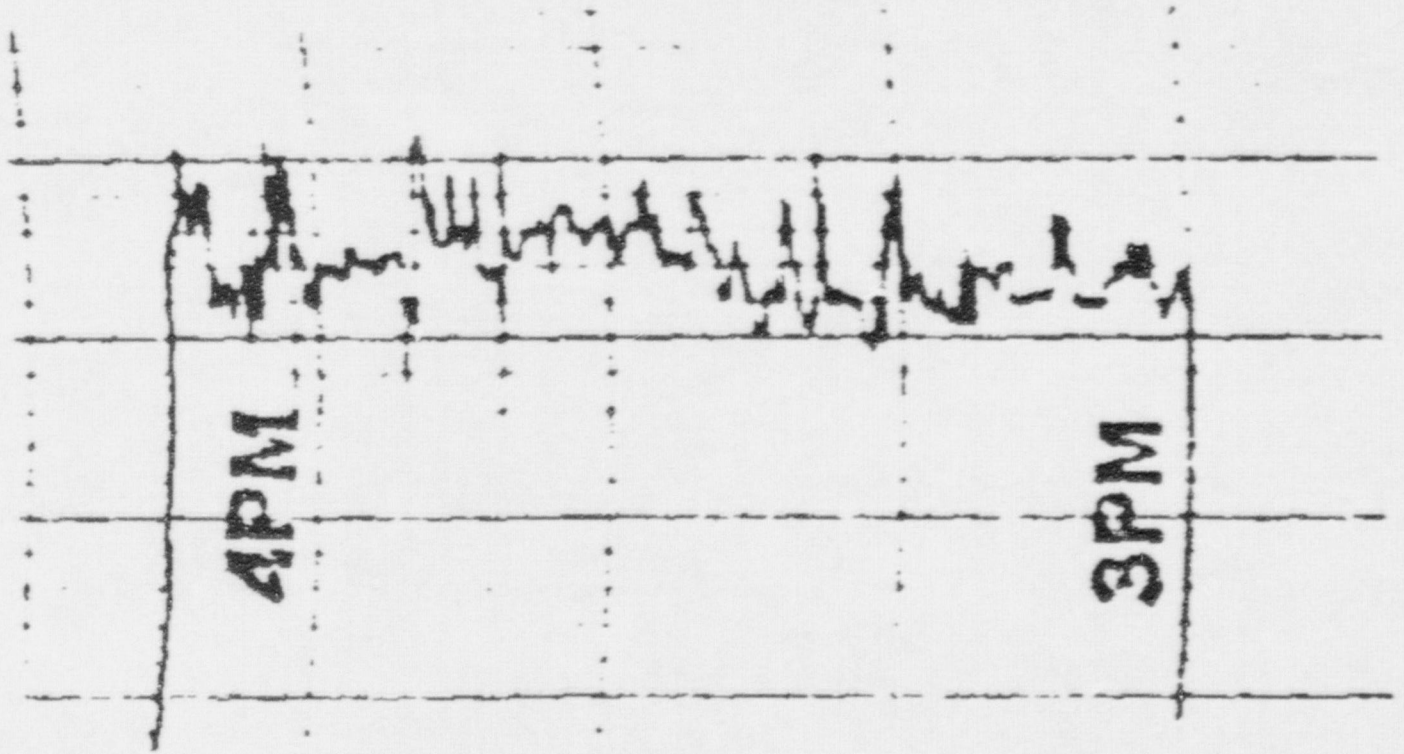
Event #2

Droop Relay Failure
11-21-97



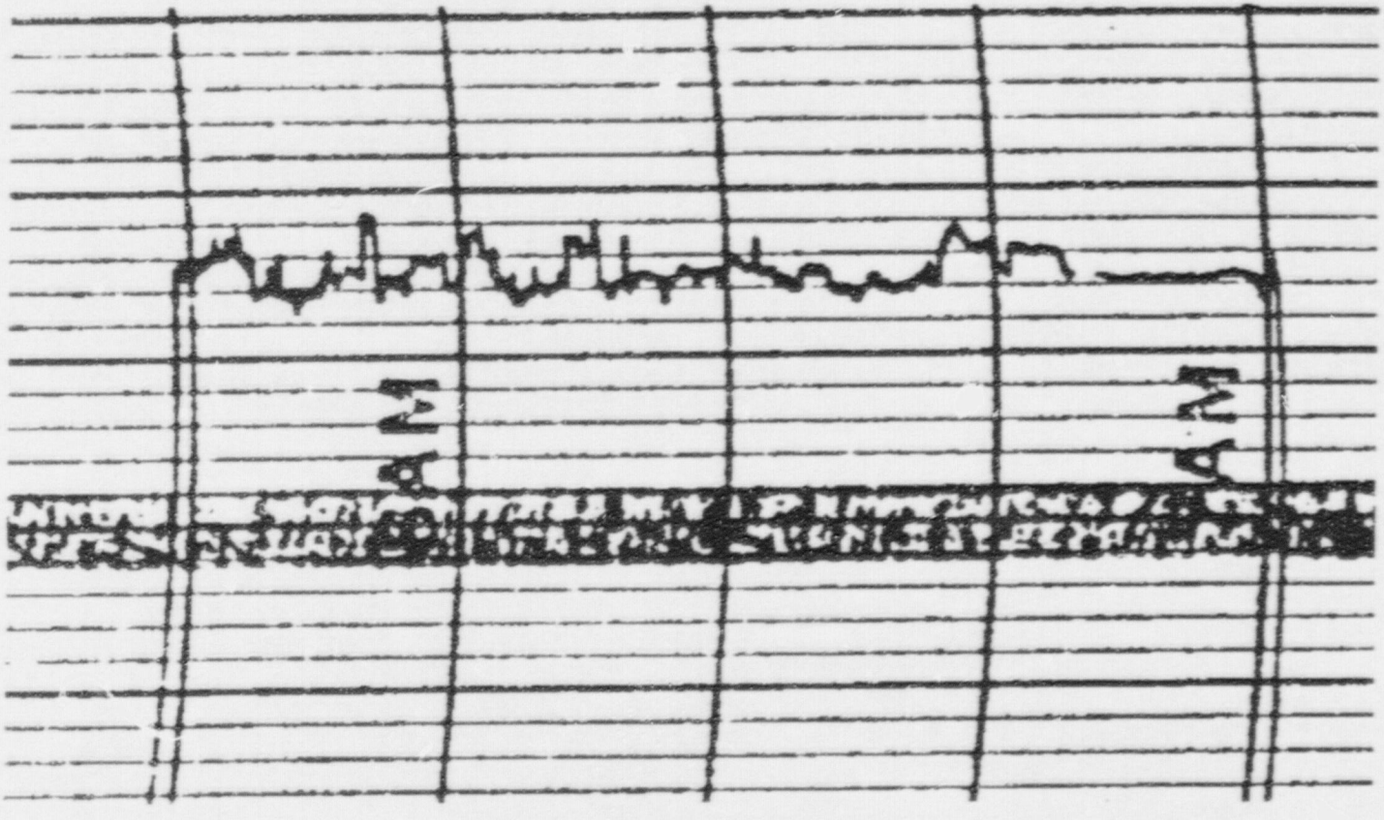
Event #3

EGA Failure 12-2-97

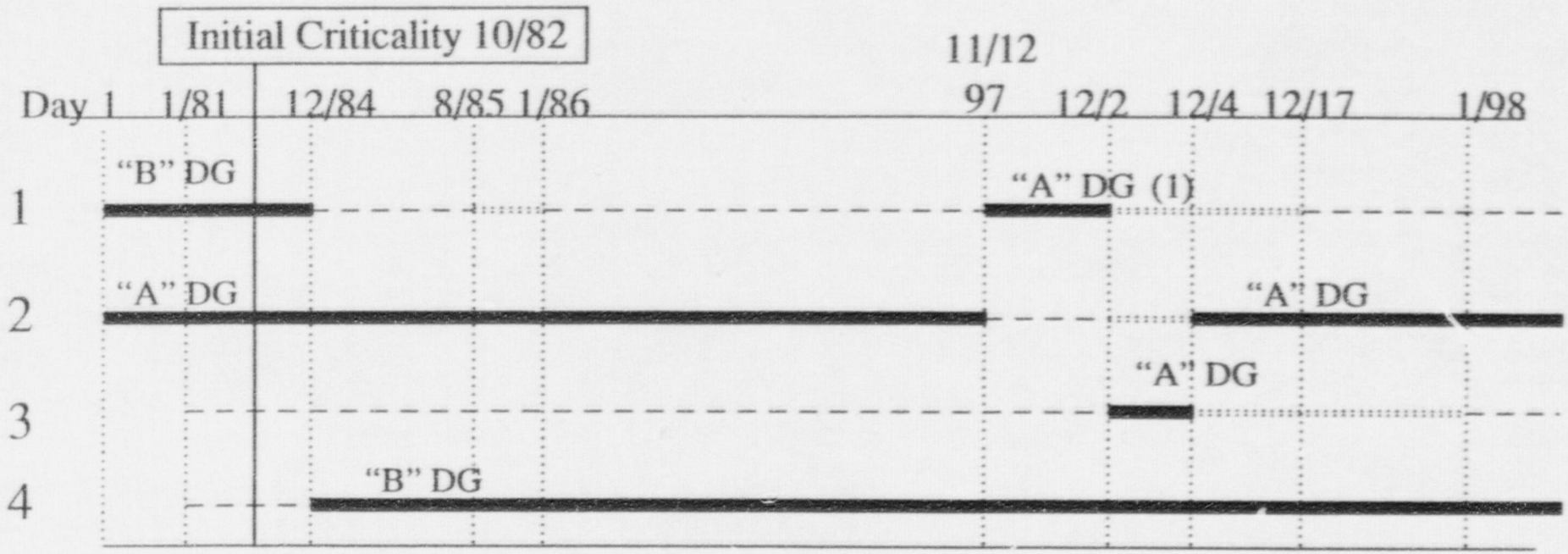


Event #4

EGB Failure 12-28-97



Diesel Generator History
Electrical Governor (EGA)



1 = 1425251

2 = 1425252

3 = 1790987

4 = 1790988

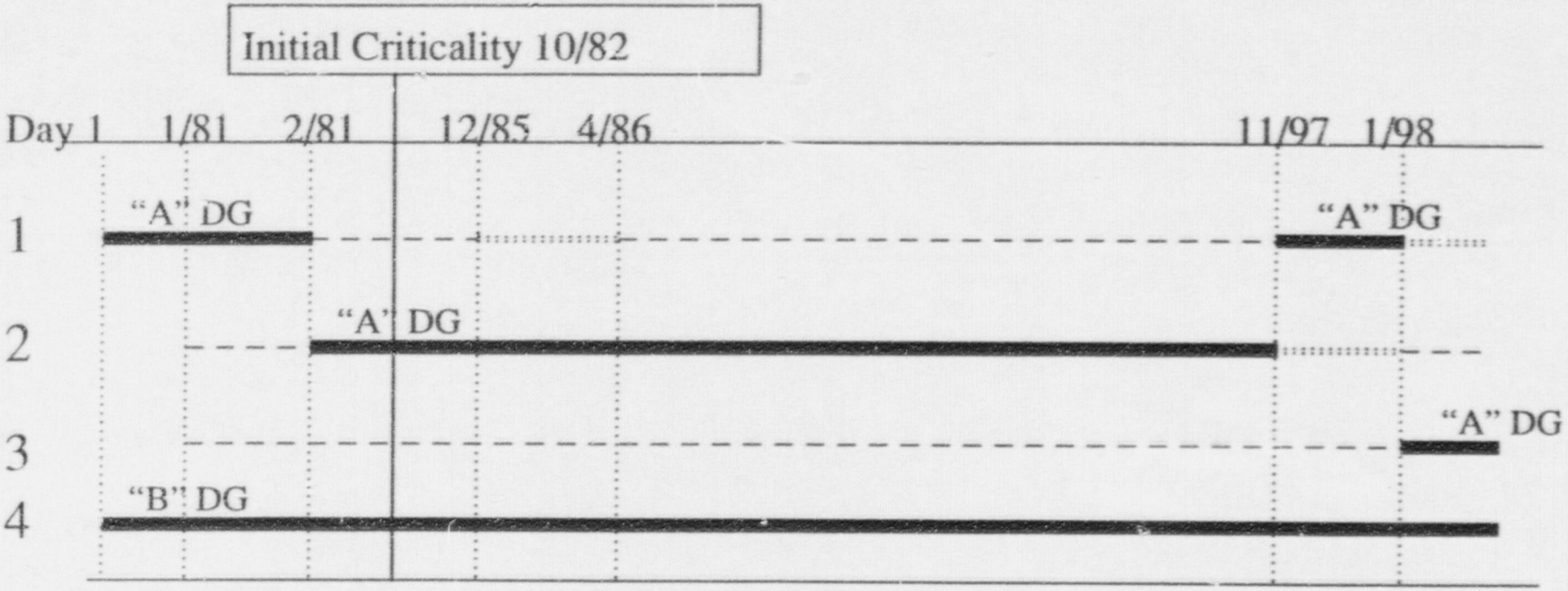
Installed

Warehouse

At Refurb

(1) - Refurb Failed Benchtest

Diesel Generator History
Mechanical Governor (EG 'B')



1 = 1380933

2 = 1790986

3 = 1790985

4 = 1391786

Installed

Warehouse

At Refurb

Actions Completed

- CT / PT Evaluation
- Evaluation of Ambient Temperature
- Lube Oil Consumption
- Outage Scope Review
- Viscosity and Synthetic Oil Evaluation

Actions Completed

- Fuel Oil Delivery System
- Voltage Regulator Evaluation
- Independent Design Engineering Determination of Troubleshooting
- Design Engineering Review of Set-up Procedures

Actions Completed

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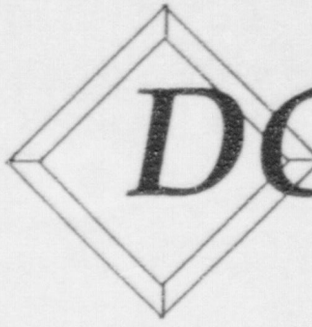

DG Operability Retesting

Mike Fowlkes

Operability Retesting RF10

- Three Maintenance Runs
- Monthly Operability Test
- Twenty-Four Hour Refueling Surveillance Test
- Load Rejection Test
- Loss of Offsite Power Test
- Integrated Safeguards Test

Operability Retesting For First Three Events

- **Maintenance Runs**
- **Monthly Operability Test**
- **Load Rejection Test (Modified to Check Loading Stability)**

Operability Retesting For Fourth Event

- Maintenance Runs
- Pre-Operability Tests Per Monthly Surveillance Procedure
- Monthly Operability Test
- Load Rejection Test
- Loss of Offsite Power Test
- Semi-Annual Cold Start-Fast Load Test

Summary of Retesting Activities

- **Maintenance Runs**
- **Monthly Surveillance Tests**
- **Other Surveillance Testing Per Technical Specifications**

Future Plans

Bruce Williams

Planned Activities

- Expert Panel Independent Assessment - 1/19
- Part 21 Evaluation - 2/8
- Analog Governor Upgrade Evaluation
- Speed Control System Overhaul Evaluation
- Periodic Diagnostics
- Shelf Life Assessment

Steve Byrne

Summary

- Questioned Similarity and Number of Events
- Continue to Evaluate
  - Parts Issues
  - Vendors
  - Tech Spec Methodologies
  - Governor Upgrades
- Established Operability

Summary

- MR to Establish Confidence Over Time
- History Shows DGs Very Reliable

Participants

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Bruce Williams	Gen. Mgr. Engineering
Bob Waselus	Mgr. Syst. Engineering
Mike Fowlkes	Operations Mgr.
Richard Slone	System Engineer
Dan Gatlin	Engineering Analyst
April Rice	Mgr. Licensing

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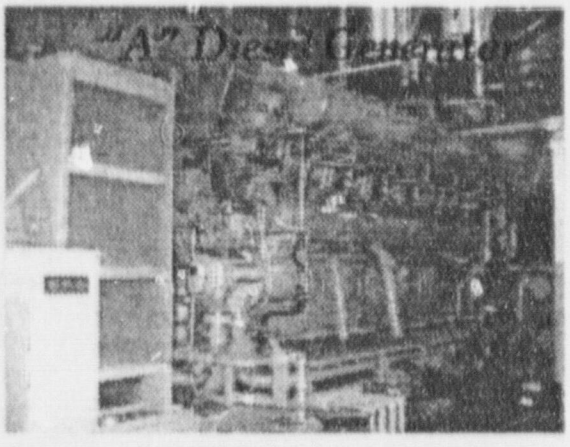
"A" Diesel Generator Issues



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Diesel Generator Equipment Overview

Bob Waselus

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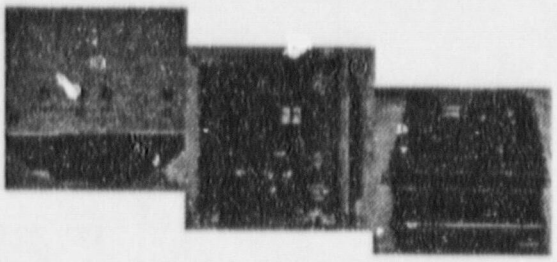

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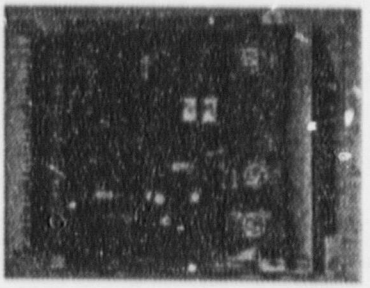

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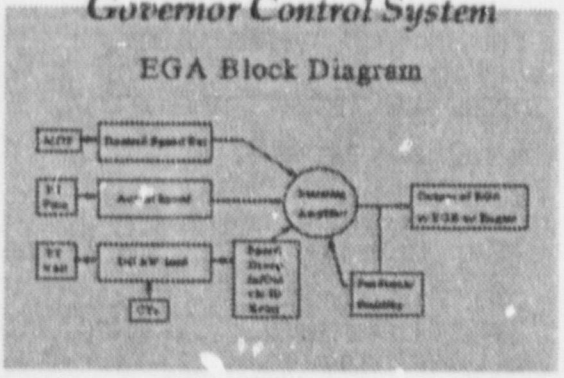

Overview of Operation of the Governor Control System

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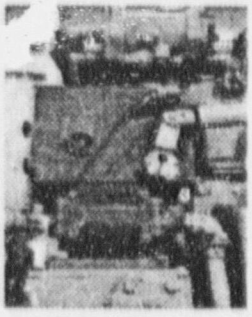

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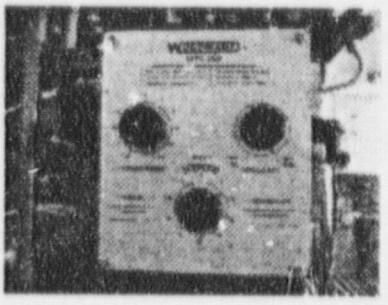
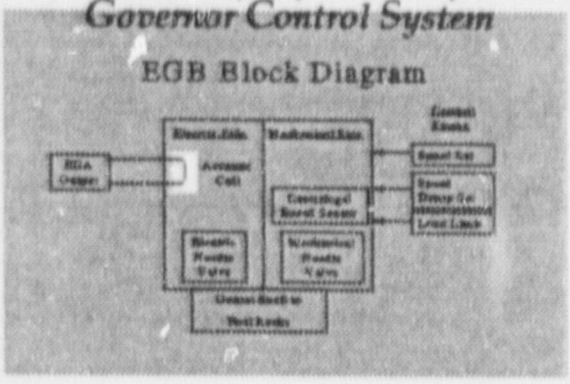


Overview of Operation of the Governor Control System

EGB Block Diagram



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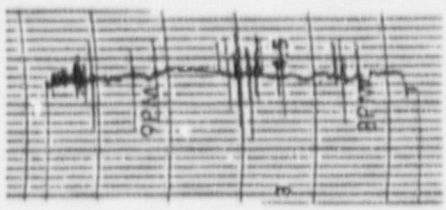

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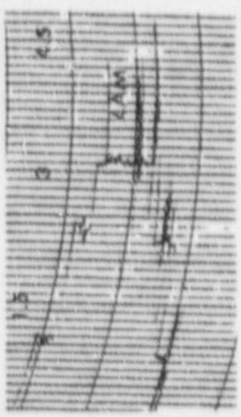
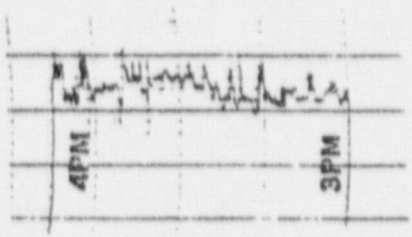


Event #3

EGA Failure 12-2-97



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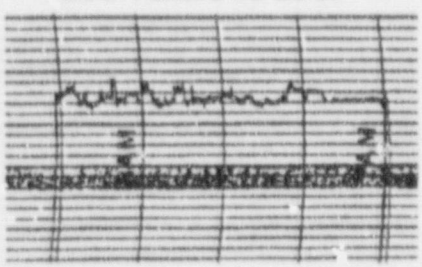
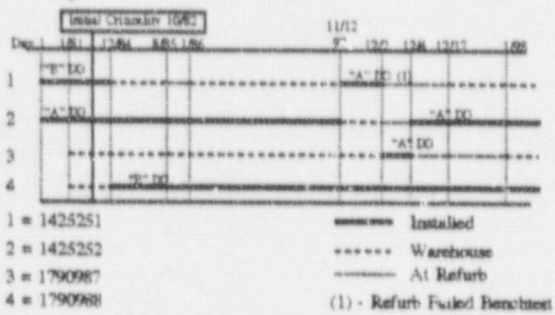
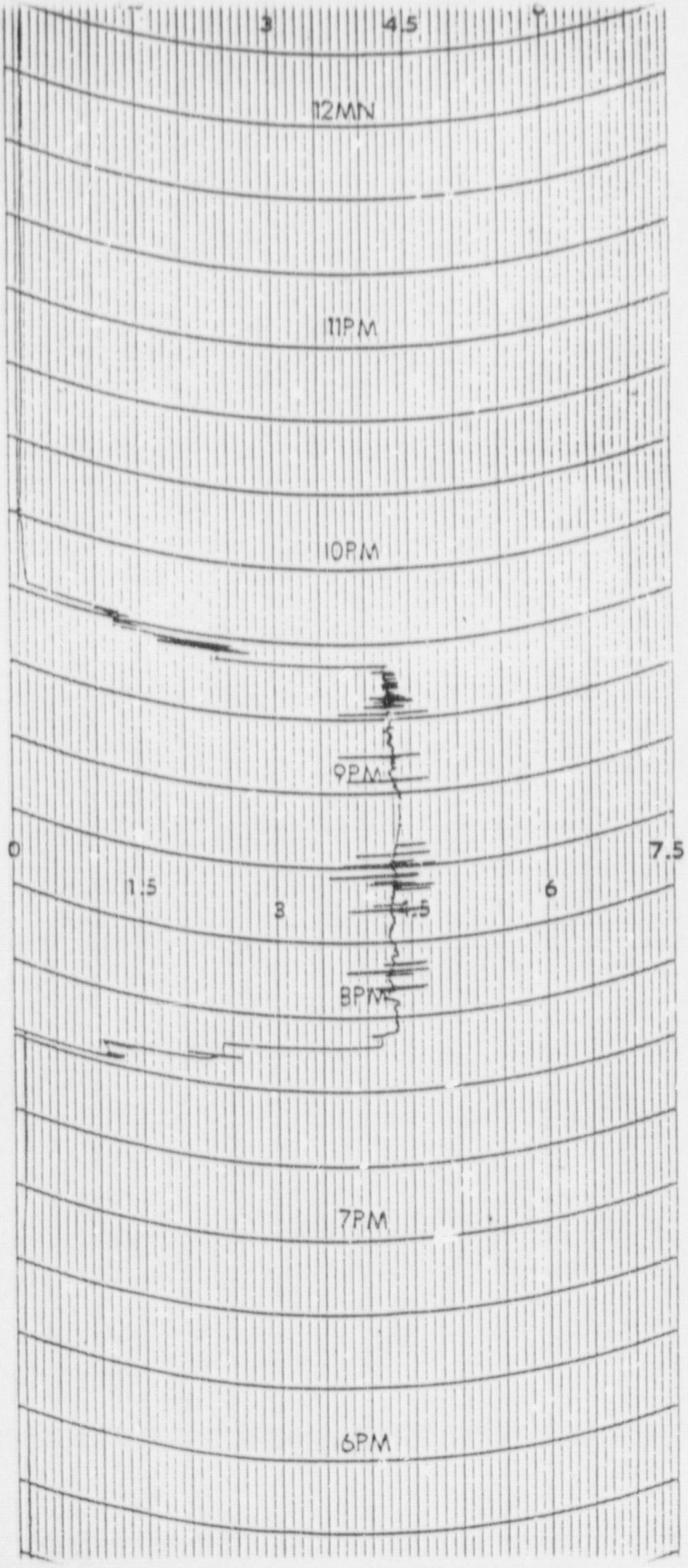


Diesel Generator History Electrical Governor (EGA)





11/11/97
First Failure

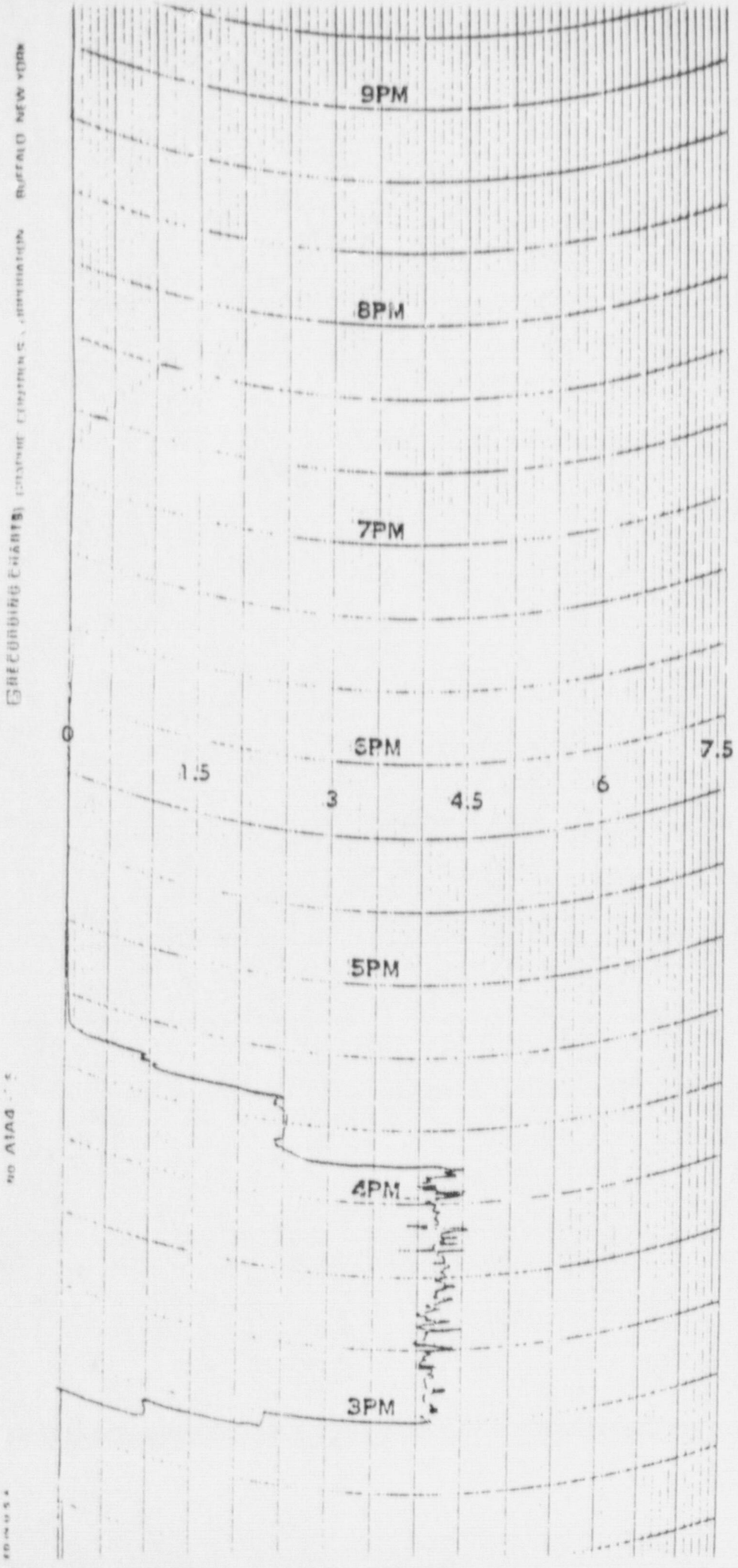
EVENT #1

CHART GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

11/21/47

ID Relay Failure

EVENT #2



12/2/97
STP-125.002
(Failure)

SECOND
EGA FAILURE

EVENT #3

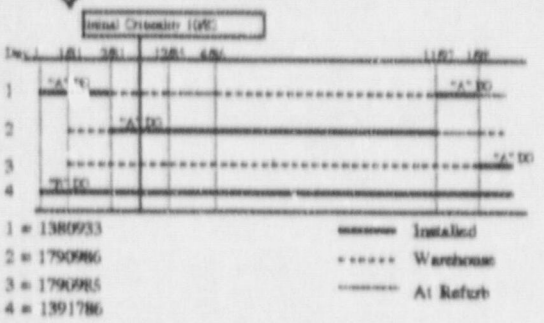
12/30/97

7.5
6
4.5
3
1.5
0

EVENT #4

RECORDING CHARTS GRAPHIC CONTROLS CORPORATION BUFFALO, NEW YORK

Diesel Generator History Mechanical Governor (EG 'B')



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Mike Fowlkes

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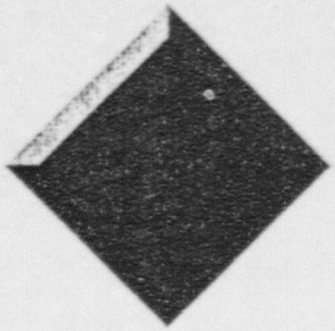
- MR to Establish Confidence Over Time
- History Shows DGs Very Reliable



REFUEL 10

Enclosure 3

RF - 10

SCHEDULE VS VCSNS BEST

TOTAL DURATION

(BREAKER OPEN TO BREAKER CLOSURE)

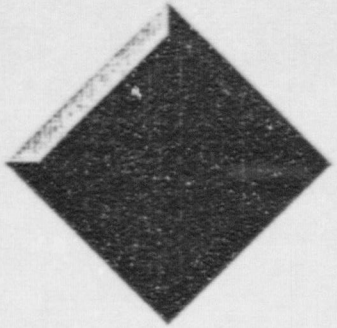
SCHEDULE-35 DAYS

VCSNS BEST-39 DAYS, 17 HOURS

34 DAYS, 5HOURS

Review of RF 10 Objectives

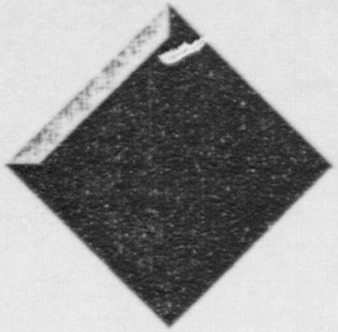
- **Outage Start**
  - **October 4, 1997**
- **Continue Excellence in Nuclear Safety**
- **Achieve Business Plan Objectives**
  - **Dose ≤ 60 Man Rem**
  - **Duration ≤ 35 Days**
  - **Cost ≤ 15 Million**



SAFETY

Nuclear Safety

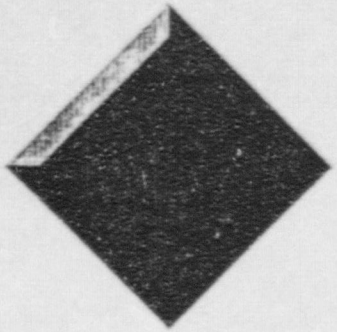
- **No Safety Significant Events**
- **Safety Over Schedule Philosophy Maintained**



SAFETY

Industrial Safety

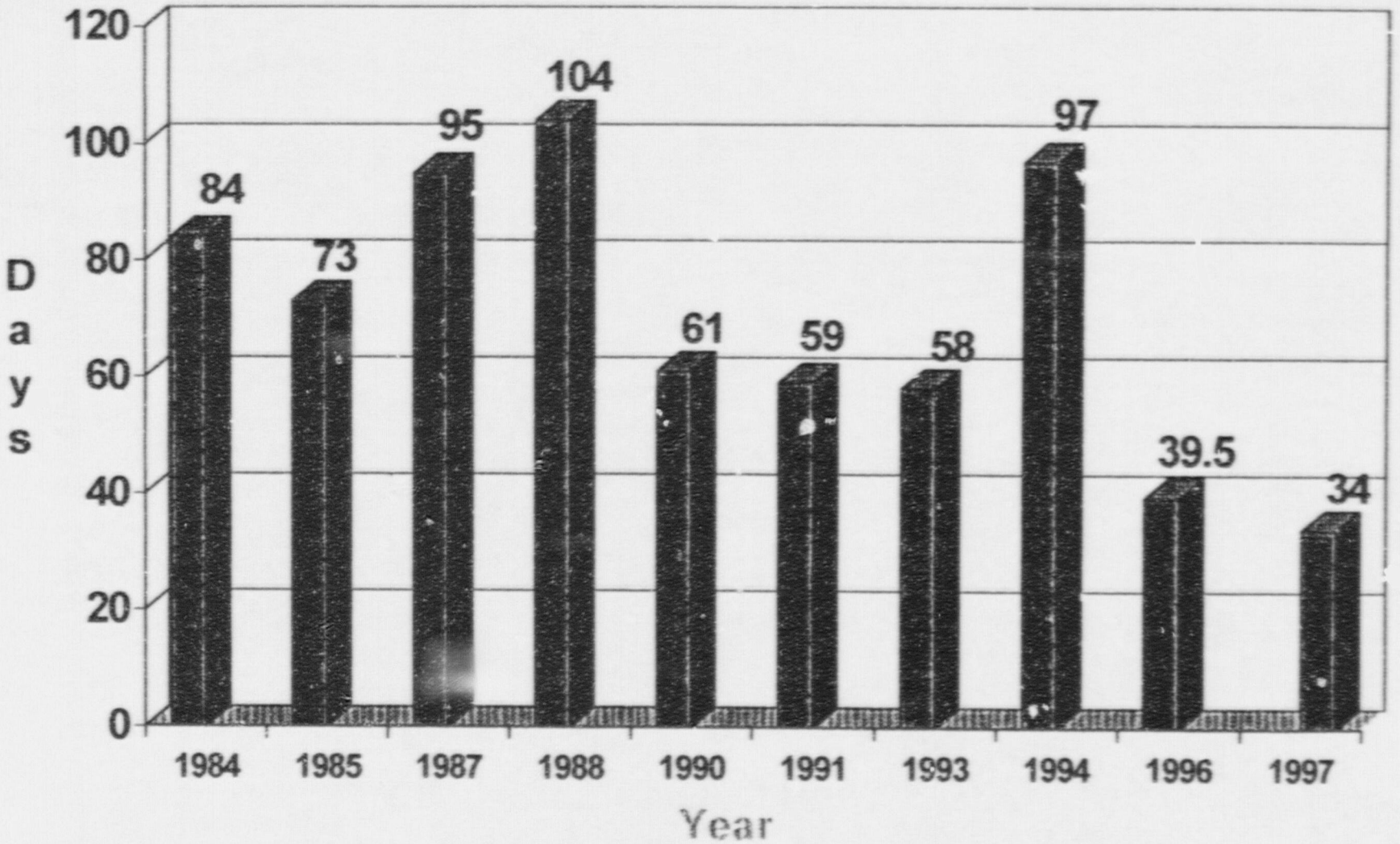
- **Increased Safety Awareness Training**
- **Two Lost time Accidents**
- **No Contractor Lost Time Accidents**



Outage Exposure

- **Projected To Be 95 ManRem**
- **Actual 170 ManRem**
- **Contributors**
  - **Unanticipated RCS Exposure Levels Resulting From Crud Burst**
  - **Elevated Dose Rates The Entire Outage**
  - **Emergent Snubber Testing Scope**

V.C. Summer Outage History

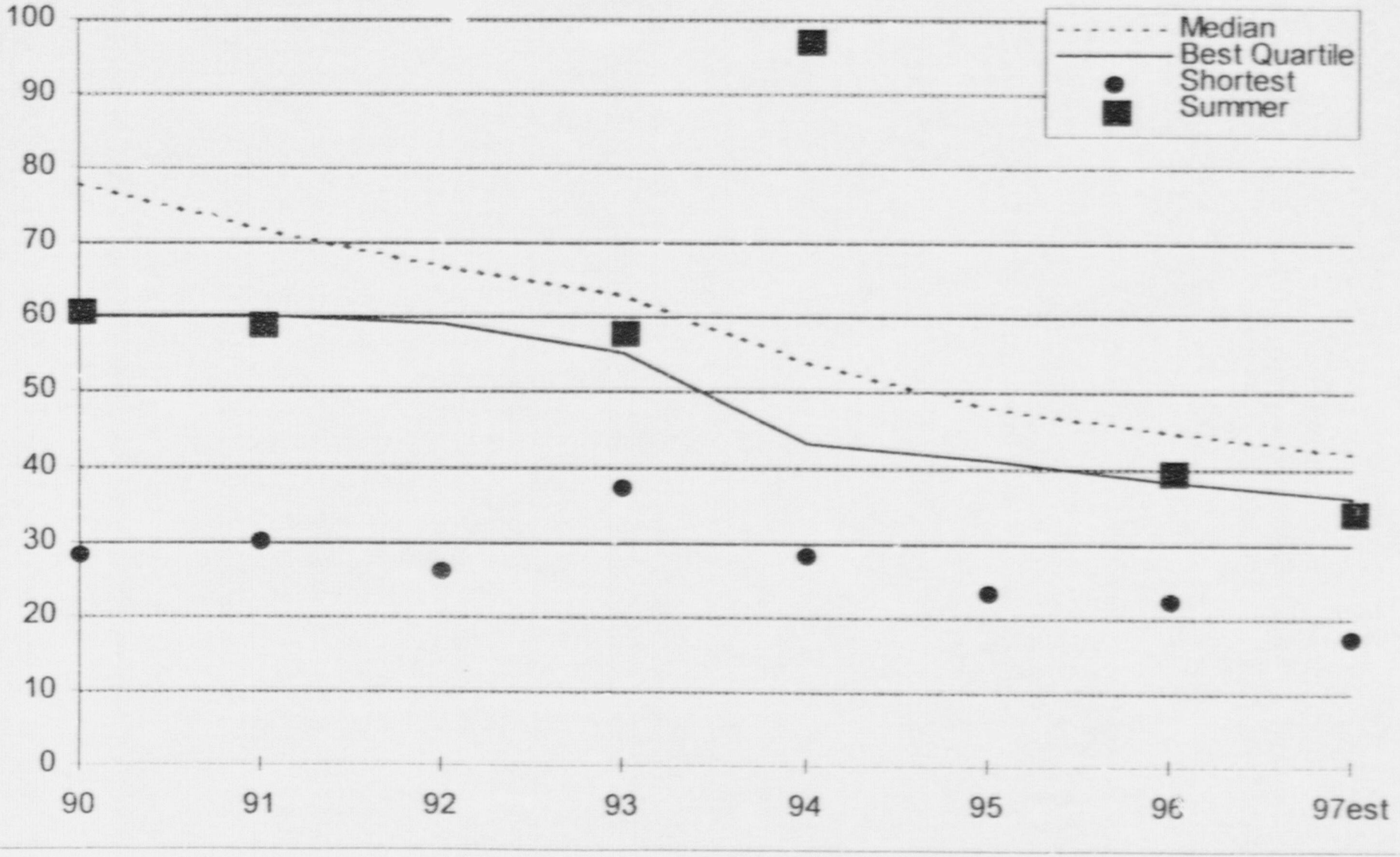


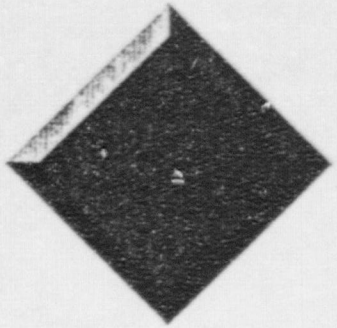
1996 TOP 11
US REFUELING OUTAGE DURATIONS

PLANT	UTILITY	VENDOR	DURATION
Peach Bottom 2	PECO	GE	21
South Texas 1	HL&P	W	22
Limerick 1	PECO	GE	25
Point Beach 1	WEPCO	W	25
Robinson	CP&L	W	27
North Anna 1	Virginia Power	W	29
Callaway	Union Electric	W	30
Browns Ferry 2	TVA	GE	31
Arnold	IES	GE	33
Brunswick 1	CP&L	GE	33
Surry 2	Virginia Power	W	33

Refueling Outage Duration

Source: TDM Analysis

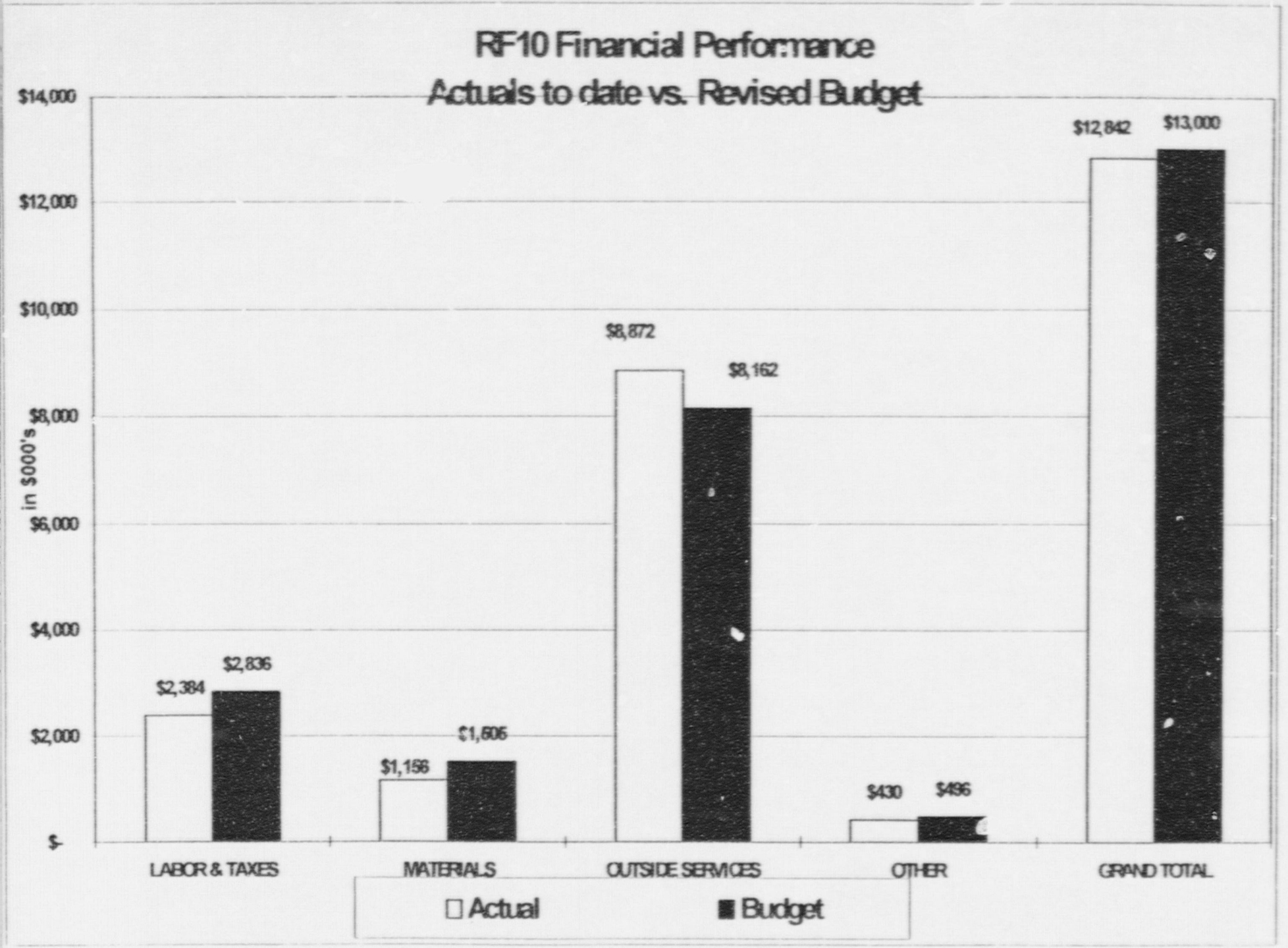




Outage Cost

Business Plan Goal of ≤15 Million

- **RF 10 Actuals Approximately 12.8 Million**


RF10 Financial Performance
Actuals to date vs. Revised Budget
$14,000
$12,000
$10,000
$8,000
$6,000
$4,000
$2,000
$-
in $000's
$2,384
$2,836
$1,156
$1,606
$8,872
$8,162
$430
$496
$12,842
$13,000
LABOR & TAXES
MATERIALS
OUTSIDE SERVICES
OTHER
GRAND TOTAL
Actual
Budget

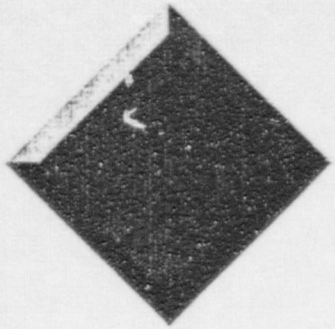
- Snubber Removal and Inspection
- Inspections of 'C' Steam Generator
- Preventative & Corrective Maintenance
- Outage Improvement Modifications
  - CRDM Ring Duct
  - Fuel Handling Machine Upgrade
  - Thermo-Lag Elimination

Snubbers

- **Snubber Reduction**
- **Tech Spec Inspection**

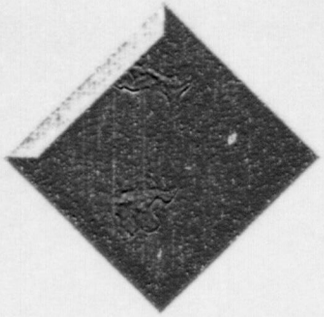
Snubbers (con't)

- **Problems Found**
  - **Increased Drag on Snubber Reduction Components**
  - **Evidence of Fretting Corrosion**
  - **Evidence of Transients**
    - * RHR
    - * Feedwater
    - * Blowdown
    - * Pressurizer Spray



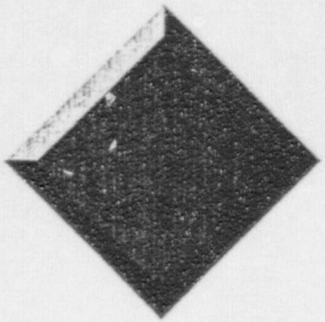
Results

- **Significantly increased # of Snubbers to be tested (411)**
  - **44 Were Degraded**
  - **29 Failures**
- **Ongoing evaluation in process**



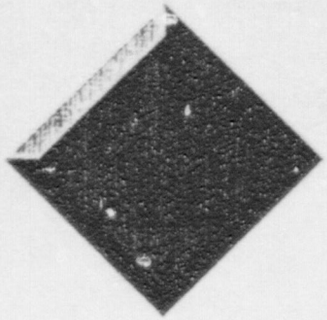
CONDENSER TUBE SHEET REPAIRS

- **Cleaning Methodology**
  - **Shot Gun Blast**
  - **Standard Lancing**
- **Corrective Action**
  - **Re-roll all tubes in Water Box 1**



RF 10 Enhancements

- **Teamwork and Communication**
- **Use of OPS Windows Managers**
- **Manageable Plant Modification Scope**
- **Pre-Outage Task Reviews**
- **Resource Sharing (SBU and SCE&G)**



SUMMARY

- **Station conducted a good, safe outage**
- **Resolved a number of long-standing equipment/reliability issues**