

APR 12 1983

Docket No. 50-364

LICENSEE: Alabama Power Company (APCo)

FACILITY: Farley Unit 2

SUMMARY OF MEETING HELD ON MARCH 23, 1983, WITH APCO REPRESENTATIVES TO DISCUSS APCO'S REQUEST TO DELETE TURBINE VALVE TESTINGS.

INTRODUCTION

APCo management requested an Assistant Director Level Appeal Meeting for 10:30 a.m. March 23, 1983. The purpose was to discuss APCo's request to delete turbine valve testings at Farley Unit 2. Testing is required by Technical Specification 3/4.3.4. A list of attendees is shown as Enclosure 1.

NRC Project Manager, E. Reeves, introduced staff members present and gave a brief overview of events leading to the meeting. By letter dated October 8, 1982, APCo requested a license amendment to delete Technical Specification 3/4.3.4 entirely by December 1, 1982, to be effective with the startup after the refueling outage for starting Cycle 2. After a preliminary review, the NRC advised APCo by letter dated December 30, 1982, that the Farley Unit 2 review would require about one year to complete. Reasons were provided by the staff letter.

APCo responded to the NRC staff letter by letter dated January 18, 1983. APCo objected to the delay as appearing contrary to the stated policy of assigning highest priority to safety issues involving unnecessary loss of electric generating capability. Further, APCo stated that turbine valve testing is not a generic NRC requirement and that the delay is unwarranted and interim relief should be granted while the NRC generic review is still underway.

DISCUSSION

APCo (O. Kingsley) introduced personnel from APCo and two divisions of Westinghouse Electric Corporation. A review was made of APCo's contentions relating to the issue.

Westinghouse (R. Jansen) presented the NSSS program (WCAP-10161 Proprietary) and used Non-Proprietary vugraphs to describe the program. A copy of the handouts (non-proprietary) is Enclosure 2. The NSSS conclusion is that a Technical Specification requirement for turbine valve testing was not warranted based on consideration of safety issues. However, when questioned by the NRC staff the NSSS response was that yearly testing would appear appropriate based on their probabilistic study.

8304260016 830412
PDR ADOCK 05000364
PDR

OFFICE ▶	.....	.....	.....	.....	.....	.....	.....
SURNAME ▶	.....	.....	.....	.....	.....	.....	.....
DATE ▶	.....	.....	.....	.....	.....	.....	.....

APR 12 1983

Following the NSSS discussion, the Westinghouse Turbine Division representative (G. Hyde) discussed valve testing and bases for a new recommendation of monthly valve testing. Vuographs were used and are shown in Enclosure 3. The Turbine Division conclusion was that they agree with the NSSS contention that the missile probability does not support inclusion of valve testing in Technical Specifications. However, the Turbine Division continues to recommend valve testing to minimize likelihood of component damage. When questioned by the NRC staff, the Turbine Division representative stated that monthly testing would be their new recommendation instead of the existing recommendation for testing weekly.

Following this presentation, APCo (R. McDonald) discussed operating problems associated with using the Farley Unit 2 Technical Specifications. The testing continues to require a weekly reduction in reactor power to about 90% (formerly 85%). The associated plant transient requires close operator attention as well as APCo management attention. The tests are considered by APCo to be unnecessary and counter to safety. For these reasons, APCo strongly stated a case for deletion of the entire surveillance testing as part of the Technical Specifications. APCo requested an NRC management decision as soon as possible.

SUMMARY

After a brief NRC staff caucus, NRC (S. Varga) advised APCo that their concerns would be reviewed and that APCo would be advised of the Assistant Director's decision within about a week.

Original signed by:

E. A. Reeves

Edward A. Reeves, Project Manager
 Operating Reactors Branch No. 1
 Division of Licensing

Enclosures:
 As stated

cc w/enclosures:
 See next page

OFFICE ▶	ORB-1	ORB 1					
SURNAME ▶	E. Reeves/rs	S. Varga					
DATE ▶	4/8/83	4/12/83					

Mr. F. L. Clayton, Jr.
Alabama Power Company

cc: Mr. W. O. Whitt
Executive Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

Mr. F. L. Clayton
Senior Vice President
Alabama Power Company
Post Office Box 2641
Birmingham, Alabama 35291

Ruble A. Thomas, Vice President
Southern Company Services, Inc.
Post Office Box 2625
Birmingham, Alabama 35202

George F. Trowbridge, Esquire
Shaw, Pittman, Potts and Trowbridge
1800 M Street, N.W.
Washington, D. C. 20036

Robert A. Buettner, Esquire
Balch, Bingham, Baker, Hawthorne,
Williams and Ward
Post Office Box 306
Birmingham, Alabama 35201

Resident Inspector
U. S. Nuclear Regulatory Commission
Post Office Box 24-Route 2
Columbia, Alabama 36319

Mr. R. P. McDonald
Vice President - Nuclear Generation
Alabama Power Company
P.O. Box 2641
Birmingham, Alabama 35291

James P. O'Reilly
Regional Administrator - Region II
U. S. Nuclear Regulatory Commission
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

ENCLOSURE 1

MARCH 23, 1983 AD LEVEL APPEAL MEETING

ATTENDANCE LIST

Alabama Power

Oliver Kingsley
Ron George
R. P. McDonald

Westinghouse

G. F. Hyde
J. Dickinson
R. Jansen
D. L. Walter
J. W. Conrad
S. C. Chay
D. W. Call

Other Organizations

John P. Smith, VEPCO
Daniel E. Clark, VEPCO
Curtis G. Meyer, VEPCO
Joseph E. Msaba, FPL

NRC - Organization

Ed A. Reeves	Project Manager ORB-1/DL
M. Srinivasan	PSB/NRR
Frank Jape	RII Test Programs Section
Wm V. Johnston	NRR/DE
L. S. Rubenstein	NRR/DSI
R. A. Clark	NRR/DL
A. R. Ungaro	PSB/DSI/NRR
D. S. Brinkman	SSPB/DL/NRR
J. O. Schiffgens	NRR/DE/MTEB
R. W. Klecker	NRR/DE/MTEB
S. Varga	NRR/DL/ORB-1

ENCLOSURE 2

WESTINGHOUSE PROGRAM

1. DETERMINATION OF BASIS OF CURRENT TECHNICAL SPECIFICATION REQUIREMENT
2. EVALUATION OF PROBABILITY OF MISSILE GENERATION FROM TURBINE OVERSPEED
3. COMPARISON OF TESTING PERIODS AND CORRESPONDING VALVE FAILURE RATES
4. EVALUATION OF IMPACT OF NO TURBINE TRIP

DEVELOPMENT OF TECHNICAL SPECIFICATION
REQUIREMENTS FOR THE TURBINE
OVERSPEED PROTECTION SYSTEM

1. MID 1950'S - WESTINGHOUSE PUBLISHED WEEKLY VALVE TEST RECOMMENDATION
BASED ON EXPERIENCE AT FOSSIL PLANTS

2. WEEKLY RECOMMENDATION CARRIED OVER TO NUCLEAR UNITS
BASED ON ENGINEERING JUDGMENT, SIMILARITY BETWEEN FOSSIL
AND EARLY NUCLEAR APPLICATION AND LACK OF DATA FOR
NUCLEAR UNITS UPON WHICH TO BASE A DIFFERENT RECOMMENDATION

3. MID 1977 - NRC INCREASED THEIR CONCERN ABOUT TURBINE OVERSPEED
AND MISSILE GENERATION AND THE NEED TO SPECIFY TURBINE TESTING
 - PREDECESSOR OF ACCIDENT EVALUATION BRANCH REQUESTED A
TECHNICAL SPECIFICATION FOR OVERSPEED PROTECTION SYSTEMS

 - PREDECESSOR OF STANDARDIZATION AND SPECIAL PROJECTS BRANCH
WROTE A TECHNICAL SPECIFICATION INCORPORATING THE WESTINGHOUSE
WEEKLY RECOMMENDATION

 - FIRST ISSUED FOR NORTH ANNA 1 AND D.C. COOK 2 IN 11-77
AND 12-77 RESPECTIVELY

 - INCORPORATED INTO 1978 VERSION OF GENERIC STANDARD
TECHNICAL SPECIFICATIONS

 - BASIS WAS TO MINIMIZE MISSILES RESULTING FROM OVERSPEED
CONCURRENT WITH FATIGUE DISC CRACKS

EVALUATION OF PROBABILITY OF MISSILE
GENERATION FROM TURBINE OVERSPEED

1. WESTINGHOUSE EVALUATED

THE DESIGN OF THE FARLEY NUCLEAR PLANT TURBINE AND TURBINE
PROTECTION SYSTEM

THE OPERATING HISTORY OF TURBINE AND TURBINE PROTECTION
SYSTEM COMPONENTS

2. FAULT TREES WERE CONSTRUCTED TO MODEL THE VARIOUS OVERSPEED EVENT
SEQUENCES AND USED TO CALCULATE THE PROBABILITY OF TURBINE OVERSPEED

ASSUMPTIONS

OVERSPEED CONTINGENT ON SYSTEM SEPARATION

3 SYSTEM SEPARATIONS PER YEAR

3. FAILURE PROBABILITIES WERE CALCULATED USING INDUSTRY EXPERIENCE

ASSUMPTIONS

EXPONENTIAL FAILURE RATE

CHI SQUARED DISTRIBUTION USED TO CALCULATE 50% AND 95%
FAILURE PROBABILITY ESTIMATES

4. PROBABILITY OF MISSILE GENERATION CALCULATED FROM EQUATION
 $P = P_1 \times P_2$

P_1 = OVERSPEED PROBABILITY FROM FAULT TREE ANALYSIS

P_2 = PROBABILITY OF GENERATING A MISSILE GIVEN AN
OVERSPEED CONDITION

5. DESIGN OVERSPEED MISSILE GENERATION PROBABILITIES ALSO CALCULATED
USING CORROSION CRACKING TECHNIQUES AND OPERATIONAL DATA

6. RESULTS

<u>EVENT</u>	<u>MISSILE GENERATION PROBABILITY*</u>
DESIGN OVERSPEED	[] A,C
INTERMEDIATE OVERSPEED	6.9×10^{-6}
DESTRUCTIVE OVERSPEED	6.7×10^{-6}

* BASED ON 3 SEPARATIONS A YEAR, 95% UCB, CREDIT TAKEN FOR GENERATOR BREAKER TRIP - TURBINE TRIP FEATURE

<u>EVENT</u>	<u>MISSILE GENERATION PROBABILITY**</u>
DESIGN OVERSPEED	[] A,C

**BASED ON 5 YEAR DISC INSPECTION INTERVAL, 3.2×10^{-3} PROBABILITY OF DESIGN OVERSPEED OBTAINED FROM OPERATIONAL DATA

COMPARISON OF TESTING PERIODS
AND CORRESPONDING VALVE FAILURE RATES

1. AN EVALUATION OF VALVE TESTING AND VALVE FAILURE MECHANISMS WAS PERFORMED.

PERIODIC TESTING VERIFIES CAPABILITY OF VALVE TO MOVE AND CLOSE.

FAILURE PRECURSORS THAT EVENTUALLY RESULT IN FAILURE OF VALVE TO CLOSE GENERALLY NOT DETECTABLE BY PERIODIC TESTING.

VALVE TESTING HAS LITTLE INFLUENCE ON VALVE FAILURE RATE.

2. A STATISTICAL HYPOTHESIS TEST OF INDEPENDENCE OF VALVE TESTING AND VALVE FAILURE RATE WAS PERFORMED.

TURBINE VALVE TEST DATA WAS OBTAINED FROM A SURVEY OF OPERATING NUCLEAR UNITS.

DATA OBTAINED WAS SUFFICIENT TO ALLOW A STATISTICAL COMPARISON OF FAILURE RATES FOR WEEKLY, MONTHLY AND IRREGULAR VALVE TESTING INTERVALS.

FAILURE RATES FOR THE VARIOUS TEST INTERVALS ARE UNDISTINGUISHABLE STATISTICALLY.

EVALUATION OF IMPACT OF NO TURBINE TRIP

1. WESTINGHOUSE PERFORMED AN EVALUATION OF THE IMPACT OF NO TURBINE TRIP FOLLOWING REACTOR TRIP

FSAR CHAPTER 15 ACCIDENTS CONSIDERED

CONSIDERATION WAS GIVEN TO THE FARLEY NUCLEAR PLANT MSIV ARRANGEMENT

2. RESULTS

IF CREDIT IS TAKEN FOR THE REDUNDANT MSIV ARRANGEMENT PRESENT AT THE FARLEY NUCLEAR PLANT THERE IS NO SIGNIFICANT IMPACT IF NO TURBINE TRIP OCCURS

IF THE ASSUMPTION IS MADE THAT TWO SERIES MSIV'S FAIL, THE FSAR REMAINS BOUNDING FOR CONDITION I AND II EVENTS. THE CONSEQUENCES OF SOME CONDITION III AND IV EVENTS (PARTICULARLY TUBE RUPTURE AND STEAM BREAK) COULD BE WORSE THAN THOSE POSTULATED IN THE FSAR. THE PROBABILITY OF OCCURRENCE OF SUCH AN EVENT HOWEVER WOULD BE ON THE ORDER OF 10^{-9}

CONCLUSIONS

1. SUMMARY OF RESULTS

OVERALL PROBABILITY OF MISSILE GENERATION RESULTING FROM TURBINE OVERSPEED IS $\sim 1.4 \times 10^{-6}$ *

VALVE FAILURE RATE GENERALLY NOT INFLUENCED BY PERIODIC VALVE TESTING. SUPPORTED BY STATISTICAL HYPOTHESIS TEST.

CONSEQUENCES OF NO TURBINE TRIP FOLLOWING REACTOR TRIP WITHIN ANALYTICAL BOUNDS FOR MOST CASES, FOR OTHER CASES, SEQUENCE OF EVENTS EXTREMELY IMPROBABLE

2. CONCLUSIONS

TECHNICAL SPECIFICATION REQUIREMENT FOR TURBINE VALVE NOT WARRANTED BASED ON CONSIDERATION OF SAFETY ISSUES

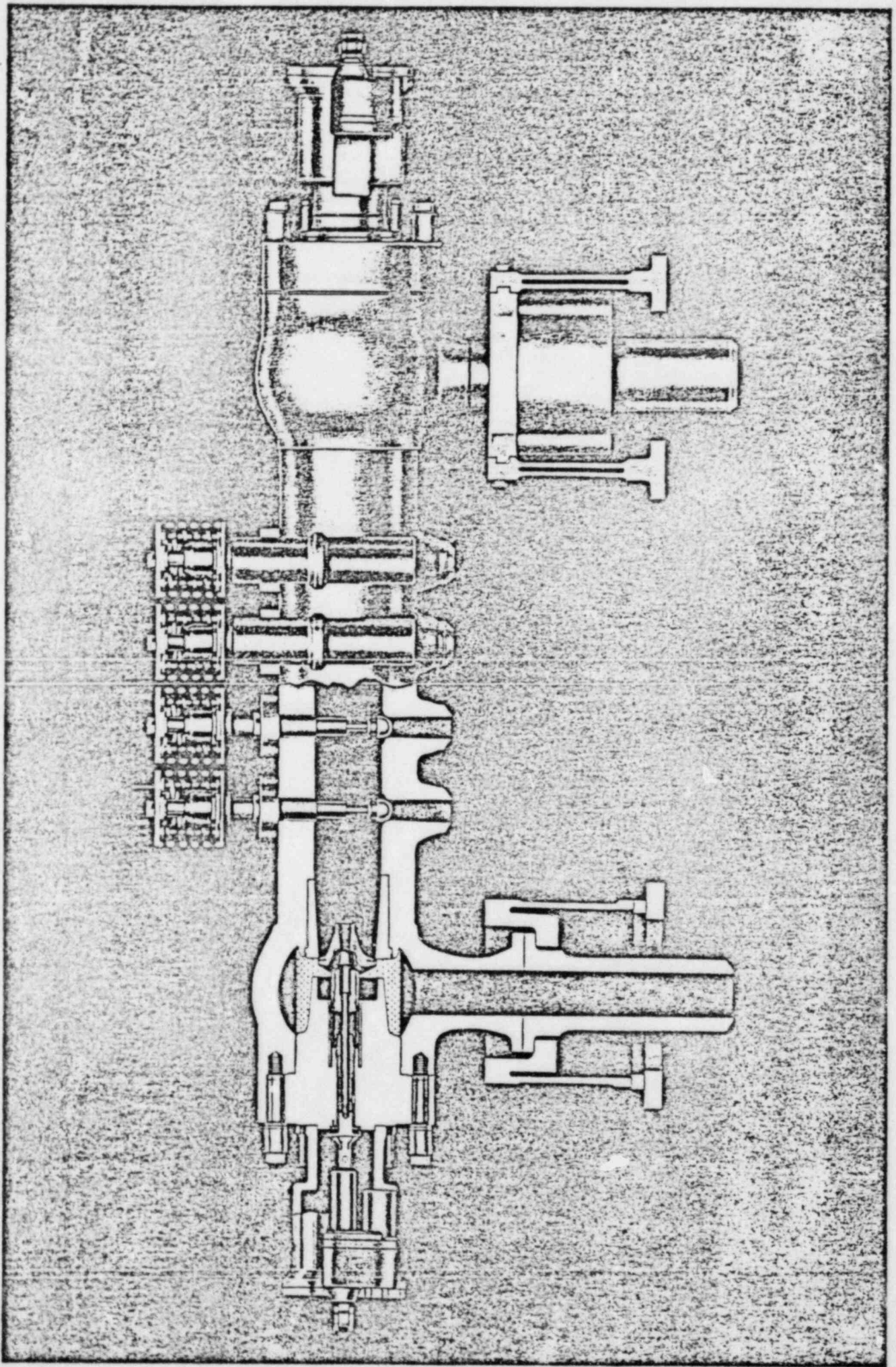
* BASED ON RESULTS OF FAULT TREE ANALYSIS

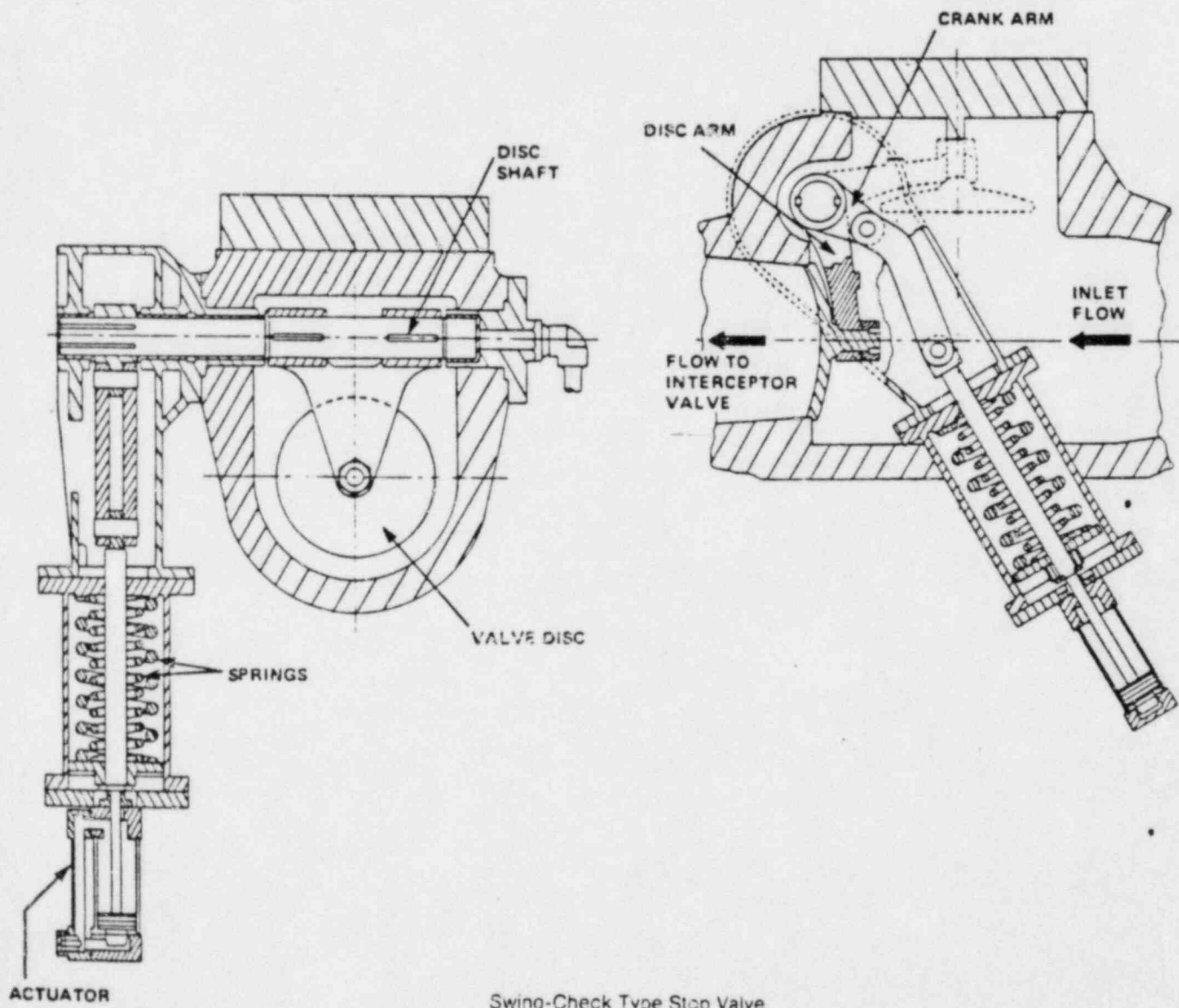
ENCLOSURE 3

WESTINGHOUSE STGD VIEWGRAPHS FOR
ALABAMA POWER COMPANY MEETING WITH THE NRC

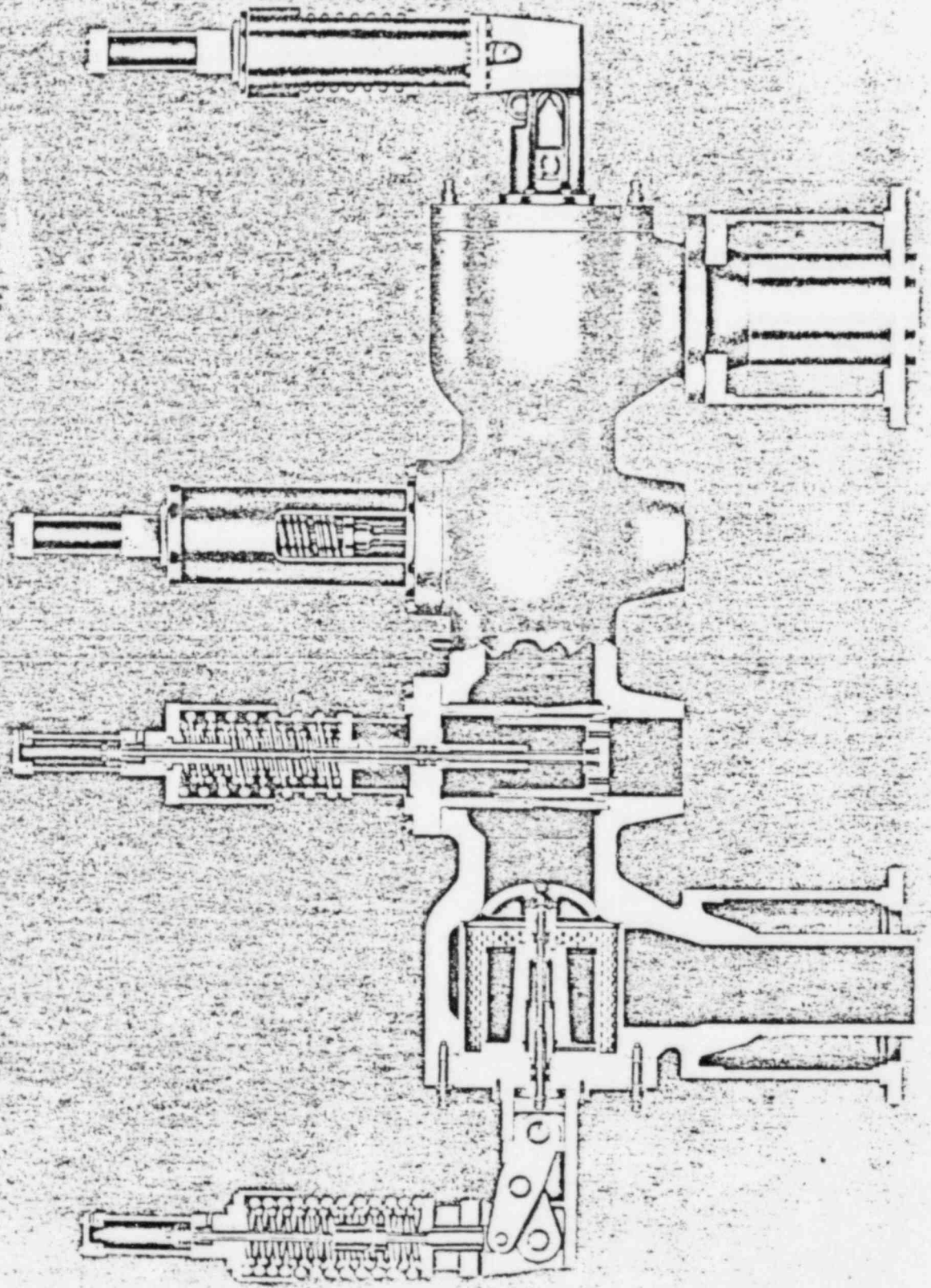
ON 3-25-83

Enclosure 3





Swing-Check Type Stop Valve



VALVE TESTING RECOMMENDATION

BASED ON EXPERIENCE -

THEREFORE REVIEW EXPERIENCE AT

DIFFERENT TESTING FREQUENCIES

RELEVANT INCIDENTS

FAILURE OF THE VALVE TO CLOSE ON DEMAND

DATA SOURCES REVIEWED

- FIELD INCIDENTS REPORT
- OUTAGE DATA SYSTEM
- STGD DATA BANK
- SUMMARY OF (W) GENERIC RELIABILITY DATA BANK
- SURVEY OF STGD ENGINEERS AND MANAGERS INVOLVED WITH VALVES
- SURVEY OF OWNERS OF OPERATING (W) NUCLEAR TURBINES

1982 NUCLEAR UNIT SURVEY

36 INQUIRIES

24 RESPONSES

7 TESTED WEEKLY

11 TESTED MONTHLY

6 TESTED "OTHER"

4 RELEVANT VALVE INCIDENTS IDENTIFIED

ANALYSIS OF DATA BY (W)
R&D CONCLUDES THAT THERE
IS NO SIGNIFICANT DIFFERENCE
IN FAILURE RATE BETWEEN
THOSE VALVES TESTED WEEKLY
AND THOSE VALVES TESTED
MONTHLY

(W) STGD RECOMMENDS MONTHLY TESTING
OF THE STEAM ADMISSION VALVES OF
NUCLEAR TURBINE-GENERATORS WITH STEAM CHESTS

BASIS FOR RECOMMENDATION:

- DEMONSTRATED ABILITY TO PREVENT OVERSPEED
WITH VARIED TESTING FREQUENCIES
- NO SIGNIFICANT DIFFERENCE IN VALVE
RELIABILITY BETWEEN THOSE TESTED WEEKLY
AND THOSE TESTED MONTHLY
- JUDGED TO BE A PRUDENT EXTENSION OF PREVIOUS
RECOMMENDATION

STEAM TURBINE-GENERATOR DIVISION

SUPPORT OF THE PROBABILITY STUDY:

- CONTROL SYSTEM DESCRIPTION
- VALVE SYSTEM DESCRIPTION
- FAULT TREES
- SERVICE HOURS
- MALFUNCTIONS

CONCLUSION

- THE STEAM TURBINE GENERATOR DIVISION AGREES THAT THE CALCULATED PROBABILITY OF MISSILE GENERATION DUE TO VALVE FAILURE DOES NOT SUPPORT THE INCLUSION OF VALVE TESTING IN THE FARLEY PLANT TECHNICAL SPECIFICATIONS.
- THE STEAM TURBINE GENERATOR DIVISION CONTINUES TO RECOMMEND PERIODIC VALVE TESTING FOR ALL ITS TURBINE-GENERATOR UNITS TO MINIMIZE THE LIKELIHOOD OF COMPONENT DAMAGE.

MEETING SUMMARY DISTRIBUTION
OPERATING REACTORS BRANCH NO. 1

Docket/Central File

NRC PDR

L PDR

NSIC

ORB#1 Rdg

J. Heltemes, AEOD

B. Grimes (Emergency Preparedness)

S. Varga

Project Manager

OELD

F. L. Jordan, DEQA:IE

J. M. Taylor, DRP:IE

ACRS-10

NRC Participants

cc: Licensee w/short cc list