

Docket Nos. 50-327
and 50-328

April 10, 1991

DESIGNATED ORIGINAL
Certified By *[Signature]*

LICENSEE: Tennessee Valley Authority (TVA)
FACILITY: Sequoyah Nuclear Plant, Units 1 and 2
SUBJECT: SUMMARY OF THE APRIL 4, 1991 MEETING ON PRESSURIZER SURGE LINE
THERMAL STRATIFICATION

On Thursday, April 4, 1991, the NRC staff met with the licensee at the NRC Headquarters in Rockville, Maryland. The purpose of the meeting was to discuss the licensee's response to NRC Bulletin 88-11, "Pressurizer Surge Line Thermal Stratification" and its request to apply leak-before-break methodology to the pressurizer surge line. Enclosure 1 is a list of the individuals who attended the meeting. Enclosure 2 is the handout that was provided by TVA.

The Westinghouse analysis performed to address Bulletin 88-11 indicated that it will be necessary to modify the pressurizer surge line supports. The meeting was held to discuss this analysis. Discussions involved operational constraints, the analysis used, the modifications planned, and application of leak-before-break criteria, on the modifications which are under consideration to address the bulletin. As a result of the discussions, the licensee will consider the effects of changes to the following on the Bulletin 88-11 analysis results: (1) possible exclusion of the arbitrary intermediate breaks from the analysis; (2) the use of higher allowables for the whip restraint; and (3) modifications to the supports.

Original signed by
David E. LaBarge, Project Manager
Project Directorate II-4
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1 Attendance List
TVA Handout

cc w/enclosures:
See next page

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PDR ADOCK 05000327
P PDR

*SEE PREVIOUS CONCURRENCE

OFC	: PDII-4/LA*	: PDII-4/PM	: PDII-4/DD*	: PDII-4/D	:
NAME	: MKrebs	: DLaBarge:as	: SBlack	: FHebbon	:
DATE	: 4/09/91	: 4/9/91	: 4/09/91	: 4/10/91	:

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Fol
1/11

cc:

Mr. Marvin Runyon, Chairman
Tennessee Valley Authority
ET 12A
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. Edward G. Wallace
Manager, Nuclear Licensing
and Regulatory Affairs
Tennessee Valley Authority
5B Lookout Place
Chattanooga, Tennessee 37402-2801

Mr. John B. Waters, Director
Tennessee Valley Authority
ET 12A
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. W. F. Willis
Senior Executive Officer
ET 12B
400 West Summit Hill Drive
Knoxville, Tennessee 37902

General Counsel
Tennessee Valley Authority
ET 11H
400 West Summit Hill Drive
Knoxville, Tennessee 37902

Mr. Dwight Nunn
Vice President, Nuclear Projects
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Dr. Mark O. Medford
Vice President, Nuclear Assurance,
Licensing and Fuels
Tennessee Valley Authority
6A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

Mr. Jack Wilson, Vice President
Sequoyah Nuclear Plant
Tennessee Valley Authority
P. O. Box 2000
Soddy Daisy, Tennessee 37379

Ms. Marci Cooper
Site Licensing Manager
Sequoyah Nuclear Plant
P. O. Box 2000
Soddy Daisy, Tennessee 37379

County Judge
Hamilton County Courthouse
Chattanooga, Tennessee 37402

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W.
Atlanta, Georgia 30323

Mr. Paul E. Harmon
Sequoyah Nuclear Plant
U.S. Nuclear Regulatory Commission
2600 Igou Ferry Road
Soddy Daisy, Tennessee 37379

Mr. Michael H. Mobley, Director
Division of Radiological Health
T.E.R.R.A Building 6th Floor
150 9th Avenue North
Nashville, Tennessee 37219-5404

Tennessee Valley Authority
Rockville Office
11921 Rockville Pike
Suite 402
Rockville, Maryland 20852

Mr. Dan A. Nauman
Senior Vice President, Nuclear Power
Tennessee Valley Authority
6N 38A Lookout Place
1101 Market Street
Chattanooga, Tennessee 37402-2801

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ENCLOSURE 1

ATTENDANCE LIST

MEETING WITH TENNESSEE VALLEY AUTHORITY

APRIL 4, 1991

TENNESSEE VALLEY AUTHORITY

M. Cooper
P. Trudel
D. Lundy
J. Smith
E. Cramford
S. Palusamy
T. Liu
R. Patel
M. Medford

NRC STAFF

D. LaBarge
A. Gody
A. Hansen
F. Hebdon
B. D. Liaw
J. Norberg
J. Tsao
S. Hou
C. Cheng
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K. Wichman

SEQUOYAH NUCLEAR PLANT

Pressurizer Surge Line
Thermal Stratification

NRC Bulletin 88-11

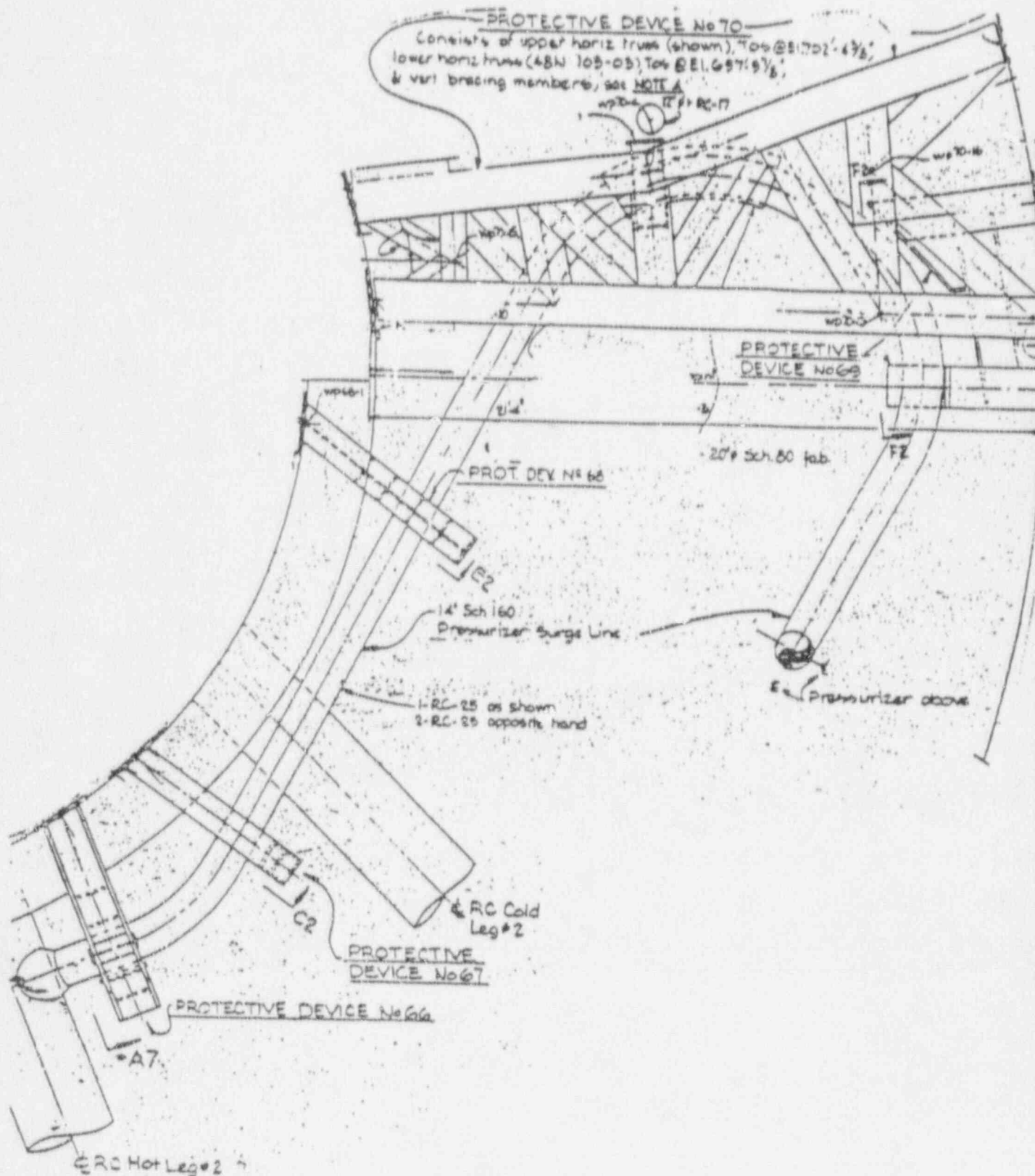
April 1991

Agenda

- Chronology
- Operational Constraints
- Bulletin Compliance
- Options to Address Pipe Rupture Requirements
 - Option A - Modify Pipe Rupture Devices (PDs)
 - Option B - LBB Approval
- Conclusion

Chronology

- Fall 1988 First WOG Program Approved by Member Utilities
- Winter 1989 Sequoyah Receives Bulletin
- Summer 1989 Second W Owners Group Program Approved
- Summer 1989 Sequoyah Submits W Prepared JCO
- February 1990 W Notification that SQN was Not Bounded by Grouped Analysis
- April 1990 W/TVA Decision Made to Pursue Minor Mod for iEB 88-11 Compliance
- January 1991 Licensing Bulletin Response with LBB Application Submitted



Operational Constraints

Design Basis Limitations for Cold Startup

- RCS < 160 F (Typical)
- Pressurizer > 430 F (325 psig) [Min RCP Seal Delta P]
- Yields Typical Minimum Cold Startup - Delta T > 270 F

Margin Above Minimum Delta T Needed

- Loop 2 HL Cooler than Loop 4 (RHR Suction)
- Minimum Seal Leak-Off Requirements

Configuration Severely Constrained

- Restraint Occurs at Very Low Delta T
- Significant Modifications are Anticipated Unless Delta T Maintained unreasonably low
- Any shim removal opens pipe rupture analysis

Conclusion

- Operational Controls can be Implemented to Minimize Delta T
- Further Operational Controls Unduly Restrictive and Potentially Not Possible to Operate on Consistent Basis
- Operational Controls Insufficient even with Shim Removal to Meet Bulletin

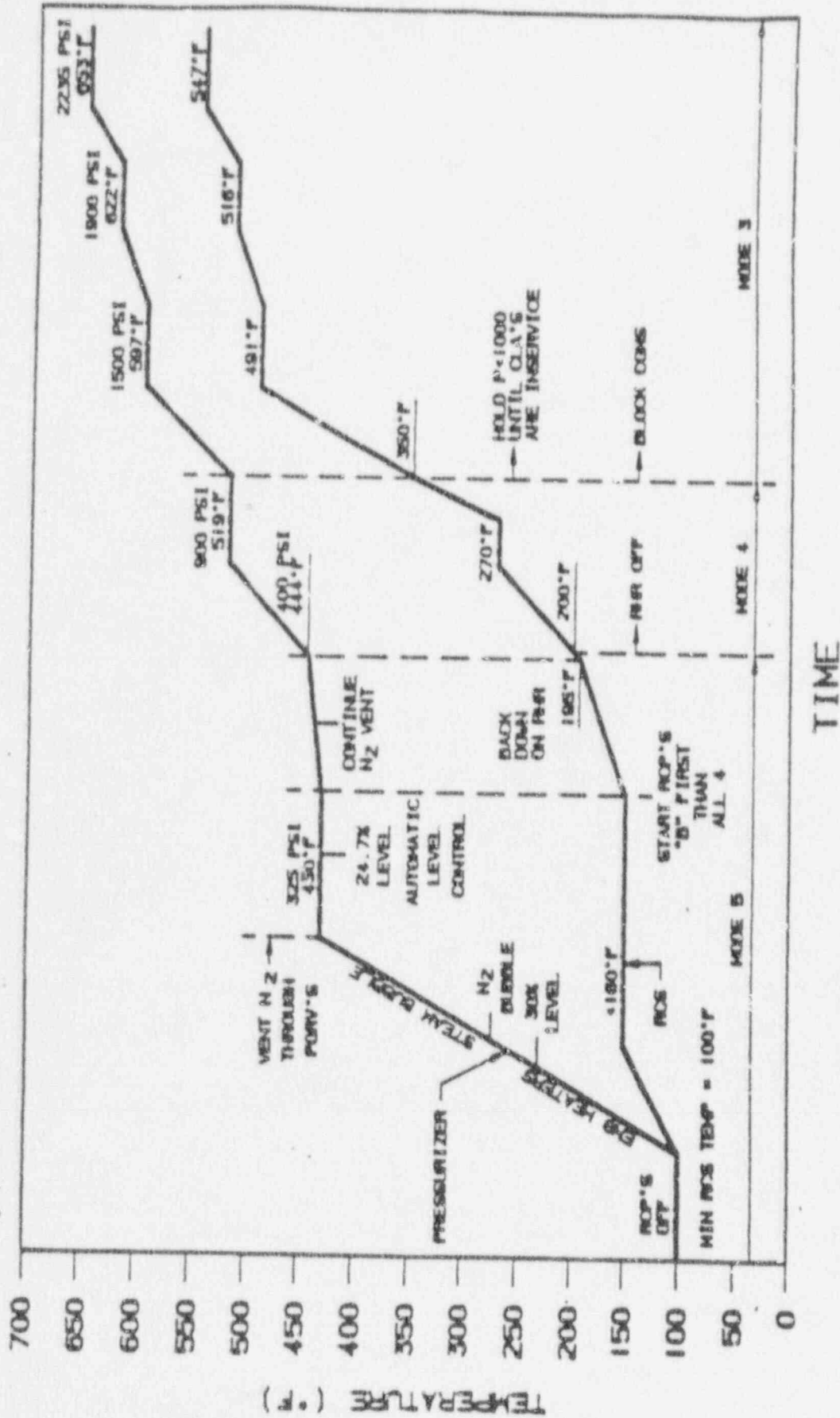


Figure 2-3. Heatup Curve for Sequoyah Units 1 and 2 also Typical for Watts Bar Units 1 and 2

Sequoyah Unit 1

System ΔT Range ($^{\circ}F$)	Number of Heatup & Cooldown Experienced to Date		Number of Heatup & Cooldown Considered in 40 Year Design		
	Heatups	Cooldowns	Heatups	Cooldowns	
336-333	1	0	1	0] a,c,e
332-331	1	0	1	0	
330-329	0	0	2	0	
329-328	0	0	1	0	
327-321	2	0	2	0	
320-301	16*	13	40	40	
300-271 } 270-251 }	14	9	70	70	
250-0	1	5	72	72	
	1	6	18	18	

*includes 6 heatups of unknown ΔT

Sequoyah Unit 2

System ΔT Range ($^{\circ}F$)	Number of Heatup & Cooldown Experienced to Date		Number of Heatup & Cooldown Considered in 40 Year Design		
	Heatups	Cooldowns	Heatups	Cooldowns	
336-333	0	0	1	0] a,c,e
332-331	0	0	1	0	
330-329	2	0	2	0	
329-328	0	0	1	0	
327-321	4	0	2	0	
320-301	15	6	40	40	
300-271	11	11	70	70	
270-251	0	3	72	72	
250-0	1	0	18	18	

Bulletin Compliance

- Sequoyah Will Comply with Bulletin 88-11 for Design Life of Plant
 - System Delta T will Conform to Distribution in WCAP 12777
 - Shims will be Removed at PDs 68 and 69
 - Lower Half of Jet Shield will be Removed at PD 70
 - Modifications are Required to Accomodate Predicted Displacements in WCAP 12777
 - ALARA Consideration - 24 Man-Rem
 - Cost - 300K Design (Expended)
170K Implementation (Cycle 5)

Options to Address Pipe Rupture Requirements

- A. Extensive Modifications of PDs
- B. Receive Early Approval of LBB

Option A: Modify PDs

- Advantages
 - Does Not Require NRC Approval
- Disadvantages
 - Low PD Design Margin
 - Increased PD Dynamic Loads due to Enlarged Gaps
 - Increased Jet Impingement Zone of Influence Revises Original Design Basis
 - Potential PD Modification and Additional Jet Shields
 - Walkdowns Cycle 5
 - Modify Cycle 5
 - ALARA Considerations - Approximately 46 Man-Rem
 - Additional Cost
 - 190 - 250K Design
 - 200 - 360K Implementation

Option B: LBB Approval

- **LBB Request Technically Adequate**
 - Meets NRC Requirements
 - Results Compare Favorably with Other Approved Plants
 - Crack Growth Due to Stratification has been Considered
 - Benefits Consistent with GDC-4 Intent
- **Advantages**
 - No Further Modifications
 - Implements Modifications at Earliest Time
 - Minimizes Fatigue Buildup
 - Improves ISI Reliability and Plant Access
 - Minimizes Radiological Dose
- **Disadvantages**
 - Requires Early NRC Approval of LBB

Conclusion

- Minor Modifications can be Made to Meet Bulletin
- Application of LBB to Address Pipe Rupture Requirements Consistent with GDC-4
- Achieves
 - Reduced Radiation Exposure - 22 Man-Rem
 - Reduced Cost - \$220K - \$440K
 - Minimized Fatigue Usage of Surge Line
 - Improved ISI Reliability and Plant Access