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JUN - 3 1994

Docket Nos. 50-390, 50-391 License Nos. CPPR-91, CPPR-92

Tennessee Valley Authority ATTN: Mr. Oliver D. Kingsley, Jr. President, TVA Nuclear and Chief Nuclear Officer 6A Lookout Place 1101 Market Street Chattanooga, TN 37402-2801

Gentlemen:

SUBJECT: MEETING SUMMARY - WATTS BAR UNITS 1 AND 2

This letter refers to the meeting conducted at the Watts Bar site on June 1, 1994. The meeting was at our request to discuss the method and results of the pre-operational tests of the Unit 1 turbine driven auxiliary feedwater pump. Enclosure 1 is a list of the individuals who attended the meeting, and Enclosure 2 is the meeting information supplied by TVA.

Should you have any questions concerning this letter, please contact me.

Sincerely, Original Signed By: J. P. Jaudon

Johns P. Jaudon, Acting Deputy Director Division of Reactor Projects

Enclosures: 1. List of Attendees 2. Presentation Summary

cc w/encls: (See page 2)



Tennessee Valley Authority

JUN - 3 1994

cc w/encls: Mr. Craven Crowell, Chairman Tennessee Valley Authority ET 12A 400 West Summit Hill Drive Knoxville, TN 37902

Mr. W. H. Kennoy, Director Tennessee Valley Authority ET 12A 400 West Summit Hill Drive Knoxville, TN 37902

Mr. Johnny H. Hayes, Director Tennessee Valley Authority ET 12A 400 West Summit Hill Drive Knoxville, TN 37902

Dr. Mark O. Medford, Vice President Technical Support Tennessee Valley Authority 3B Lookout Place 1101 Market Street Chattanooga, TN 37402-2801

Mr. D. E. Nunn, Vice President Nuclear Projects Tennessee Valley Authority 3B Lookout Place 1101 Market Street Chattanooga, TN 37402-2801

Mr. W. J. Museler, Site Vice President Watts Bar Nuclear Plant Tennessee Valley Authority Route 2, P. O. Box 2000 Spring City, TN 37381

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

Mr. B. S. Schofield, Manager Nuclear Licensing and Regulatory Affairs 4G Blue Ridge 1101 Market Street Chattanooga, TN 37402-2801

(cc w/encls cont'd See page 3)

Tennessee Valley Authority

cc w/encls cont'd: Mr. G. L. Pannell Site Licensing Manager Watts Bar Nuclear Plant Tennessee Valley Authority P. O. Box 2000 Spring City, TN 37381

Mr. Roger W. Huston Tennessee Valley Authority 11921 Rockville Pike Suite 402 Rockville, MD 20852

Honorable Robert Aikman County Executive Rhea County Courthouse Dayton, TN 37321

Honorable Garland Lanksford County Executive Meigs County Courthouse Decatur, TN 37322

Mr. Michael H. Mobley, Director Division of Radiological Health 3rd Floor, L and C Annex 401 Church Street Nashville, TN 37243-1532

Ms. Danielle Droitsch Energy Project The Foundation for Global Sustainability P. O. Box 1101 Knoxville, TN 37901

Mr. Bill Harris Route 1, Box 26 Ten Mile, Tennessee 37880

bcc w/encls: (See page 4)

Tennessee Valley Authority

JUN - 3 1994

bcc w/encls: S. D. Ebneter, ORA/RII E. W. Merschoff, DRP/RII A. F. Gibson, DRS/RII B. S. Mallett, DRSS/RII F. J. Hebdon, NRR J. R. Johnson, DRP/RII G. C. Lainas, NRR B. M. Bordenick, OGC M. S. Callahan, GPA/CA L. C. Plisco, OEDO P. E. Fredrickson, DRP/RII P. S. Tam, NRR P. A. Taylor, DRS/RII NRC Document Control Desk NRC Resident Inspector

U.S. Nuclear Regulatory Commission Route 2, Box 700 Spring City, TN 37381

RII:DRP T/2 ARuff 06/3/94 RII:DRR PFredrickson 06/3/94

ENCLOSURE 1

LIST OF ATTENDEES

<u>Name</u>

<u>Title</u>

NRC Staff

S. J.	D. P.	Ebneter Jaudon	Regional Administrator, Region II (RII) Acting Deputy Director, DRP, RII
۲.	J.	Hebdon	Director, Project Directorate 11-4, NKK
C.	Α.	Julian	Branch Chief. Watts Bar (WB) Startup, DRP, RII
G.	Α.	Walton	Senior Resident Inspector, WB Construction Branch, DRP, RII
Ρ.	Κ.	Van Doorn	Senior Resident Inspector, WB Startup Branch, DRP, RII

TVA Staff

D.	E. Nunn
J.	A. Scalice
₩.	L. Elliott
R.	W. Huston
R.	T. Purcell
Β.	S. Schofield
L.	B. Spiers
M.	Bajestani

Vice President, New Plant Completion Vice President, WB Engineering and Modifications Manager Manager, Rockville Office Acting Plant Manager WB Licensing Manager WB Site Quality Manager Manager, Startup and Test ENCLUSURE 2

TVA/NRC WATTS BAR AUXILIARY FEEDWATER PUMP TESTING MEETING

WEDNESDAY, JUNE 1, 1994

1:00 P. M.

AGENDA

I .	INTRODUCTIONS AND OPENING REMARKS	NRC/TVA/EBNETER/NUNN
II.	PRESENT STATUS OF TURBINE DRIVEN AUXILIARY FEEDWATER PUMP (TDAFW)	TVA/SCALICE
III.	TESTING AND PROBLEMS ASSOCIATED WITH TDAFWP	TVA/BAJESTANI
IV.	SYSTEM DESIGN CHANGES	TVA/ELLIOTT
v.	HFT LESSONS LEARNED	TVA/BAJESTANI/ ELLIOTT/PURCELL

VI. CLOSING REMARKS

NRC/TVA/EBNETER/NUNN

SEQUENCE OF EVENTS

APRIL 10 - APRIL 23

INITIAL TURBINE TESTING

APRIL 25

TURBINE AND PUMP COUPLED

APRIL 25 - MAY 1

INITIAL TESTING OF TURBINE AND PUMP

MAY 2 - MAY 4

INITIAL 48 HOUR RUN

MAY 4

TURBINE TRIPPED ON OVERSPEED ÷.,

SEQUENCE OF EVENTS

MAY 4 - MAY 9

TROUBLESHOOTING PUMP PROBLEMS

MAY 9 - MAY 13

PUMP TESTING AND ADDITIONAL TROUBLESHOOTING

MAY 14 - MAY 22

COLD START TESTING ADDITIONAL PROBLEMS IDENTIFIED

MAY 23 - MAY 26

ADDITIONAL ENGINEERING EVALUATIONS AND COLD START TESTING

SEQUENCE OF EVENTS

MAY 27 - MAY 30

SECOND 48 HOUR RUN; COLD RESTART FAILURE

MAY 31 - JUNE 1

TROUBLESHOOTING OF PROBLEMS

JUNE 1 - JUNE 4

COMPLETION OF TESTING AT 557°F AND 350°F PLATEAUS

JUNE 4

DECISION FOR RETESTING OF TDAFWP OR COOLDOWN

TURBINE DRIVEN AUXILIARY FEEDWATER SYSTEM DESIGN/CHANGES

SYSTEM DESIGN

STEAM TRAPS/DRAIN ROUTING ISSUES

ENVIRONMENTAL ISSUES

LEVEL CONTROL VALVE ISSUES

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TURBINE DRIVEN AUXILIARY FEEDWATER SYSTEM DESIGN

- DESIGN BASIS IS 720 GPM DELIVERED WITHIN 60 SECONDS TO 2 STEAM GENERATORS
- PUMP IS SUPPLIED BY INGERSOLL-DRESSER; TURBINE IS SUPPLIED BY DRESSER-RAND
- DESIGN OF PUMP IS 790 GPM AT 3350 FEET OF HEAD
- SUPPLIES ALL 4 STEAM GENERATORS
- STEAM SUPPLY IS FROM STEAM GENERATORS 1 AND 4 (4 NORMALLY ISOLATED) WITH AUTOMATIC SWITCHOVER CAPABILITY
- CONDENSATE STORAGE TANK IS NORMAL SUPPLY WITH AUTOMATIC SWITCHOVER CAPABILITY TO ESSENTIAL RAW COOLING WATER



PAGE 7

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STEAM TRAPS DRAIN ROUTING ISSUES

PROBLEM

• TURBINE TRIP POTENTIALLY DUE IN PART TO BACKUP OF STEAM TRAPS/DRAINS

SOLUTION

- PERFORMED MAINTENANCE ON TRAPS
- REROUTED HIGH PRESSURE TRAP DIRECTLY TO SUMP
- REROUTED STEM LEAKOFF GOVERNOR VALVE DIRECTLY TO SUMP

COMPARISON TO SON DESIGN

- SAME AS PRESENT WBN EXCEPT:
 - MODIFICATIONS GIVEN ABOVE
 - LOW PRESSURE TRAP ISOLATION VALVES AT WBN
 - LOW PRESSURE TRAPS INSULATED AT WBN

FURTHER ACTION

• ENGINEERING WILL EVALUATE THE NEED FOR TRAP BYPASS FOR THIS AND OTHER CRITICAL APPLICATIONS

TURBINE DRIVEN AFW DRAINS



FINAL CONFIGURATION



PAGE 9

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ENVIRONMENTAL ISSUES

PROBLEM

- HIGH HUMIDITY DURING TURBINE RUNS
- QUESTIONS ABOUT TEMPERATURE

SOLUTION

- PUT SUMP INTO DESIGN CONFIGURATION (CLOSE COVER)
- SEAL WELD/REPLACE LEAKING UNION (T/T VALVE SEAT DRAIN)
- COMPLETED ROUTING GOV VALVE STEM LEAKOFF TO SUMP

STATUS

- A105
- RECENT 48 HOUR RUN SHOWED TEMPERATURE ACCEPTABLE, ALTHOUGH HUMIDITY HIGH

FURTHER ACTIONS

- REPACK TRIP AND THROTTLE VALVE
- REPACK GOVERNOR VALVE
- ENHANCE SUMP SEALING
- REPLACE TURBINE STEAM SEALS
- MONITOR ROOM HUMIDITY DURING FUTURE 48 HOUR RUN

STEAM GENERATOR LEVEL CONTROL VALVE CONCERNS

PROBLEM

• STROKE TIME OF THE LEVEL CONTROL VALVES (LCVs) WAS IN EXCESS OF REQUIRED TIME (46 SECONDS)

CAUSE

- BACKUP NITROGEN CONTROL ISOLATION VALVE WAS RESTRICTING CONTROL AIR FLOW
- REGULATOR SET PRESSURE WAS NEAR MINIMUM REQUIREMENT FOR VALVE ACTUATION

BACKGROUND

- BACKUP NITROGEN WAS ADDED TO VALVES FOR CONTROL FOR APPENDIX R
- VALVE USED TO ISOLATE NORMAL CONTROLLER WHEN BACKUP NITROGEN USED. ISOLATION VALVE INSTALLED IN REVERSED DIRECTION BASED ON BENCH TESTING.

SOLUTIONS

- TEMPORARY
 - FOR HFT, APPENDIX R ISOLATION VALVE HAS BEEN BYPASSED
 - SET PRESSURE FOR THE NORMAL REGULATOR RAISED AFTER CONSULTATION WITH VENDOR
 - LCVs TESTED SATISFACTORILY WITH MODIFICATION

• PERMANENT

- SET PRESSURE FOR NORMAL AIR SUPPLY FOR LCVs WILL REMAIN AT NEW VALUE (53 PSIG)
- NITROGEN ISOLATION VALVES WILL BE INSTALLED IN THE FORWARD FLOW DIRECTION AND ACTUATION PRESSURE INCREASED

PAGE 11



Level Control Valve

STARTUP

- IMPROVED COMMUNICATION BETWEEN STARTUP AND OTHER SITE ORGANIZATIONS
- NEED TO REDUCE BACKLOG ON PTIS AND ATIS PROCEDURE PREPARATION
- SYSTEM READINESS FOR PREOP TEST NEEDS TO BE EVALUATED MORE

OBSERVED IMPROVEMENTS

- TWO SENIOR OPERATORS ASSIGNED TO STARTUP TEST ORGANIZATION
 - IMPROVED COMMUNICATIONS
 - REMOVE OBSTACLES
- BETTER ROOT CAUSE ANALYSES ON SYSTEM PROBLEMS

ENGINEERING AND MODS

- OPERATIONAL RESPONSIVENESS
- TECHNICAL ISSUES OWNERSHIP
- FEEDBACK FROM TESTING OF DESIGN FEATURES
- NEED FOR LOOKAHEAD/TRENDING FOR OBSOLETE EQUIPMENT

OBSERVED IMPROVEMENTS

- BETTER COMMUNICATIONS
- WORK CONTROL/ACCESS CONTROL PERFORMANCE

PLANT

OPERATIONS

- CONFIGURATION CONTROL IDENTIFIED WEAKNESS PRIOR TO COMMENCING HEATUP
- PROCEDURES REFERENCED CONDITIONS TO COLD STARTUP AND DESIGN BASIS DATA INCORPORATION
- LOG KEEPING EVENTS NOT LOGGED WITH SUFFICIENT DETAIL
- PRETEST BRIEFING LEVEL OF DETAIL LACKING IN SOME INSTANCES
- NEED BETTER PROCESSING OF WORK AT START OF SHIFT

IMPROVEMENTS OBSERVED

- OPERATOR ATTENTION TO BOARDS AND RESPONSE TO INDICATIONS
- OPERATION SUPERVISION IN THE FIELD

MAINTENANCE

- EQUIPMENT PROBLEMS; PUMP PERFORMANCE, SAFETY VALVE SETTINGS
- EHC LEAKS ON TURBINE VALVES
- SPARE PARTS AVAILABILITY
- SCHEDULING AND COORDINATION OF WORK
- UP FRONT PREPARATION TO BRING IN SUPPORT VENDORS
- ADEQUACY OF PMT REVIEWS

IMPROVEMENT OBSERVED

- PREDICTIVE MAINTENANCE
- QUESTIONING ATTITUDE

PLANT

TECHNICAL SUPPORT

- ERRORS IN ATI/PTIS NOT CAUGHT IN PROCEDURE REVIEW
- LACK OF SYSTEMATIC TROUBLESHOOTING
- ENGINEERS ON IN PLANT EQUIPMENT RESPONSE DURING PROCEDURE VALIDATION

IMPROVEMENT OBSERVED

• SYSTEM ENGINEER EXPERIENCE ON SYSTEM OPERATION

GENERAL COMMENTS

• USE OF INCIDENT INVESTIGATIONS, HUMAN PERFORMANCE EVALUATIONS TO LEARN FROM PROBLEMS

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- AWARENESS OF INDUSTRIAL SAFETY
- OPPORTUNITY TO SHAKEDOWN EQUIPMENT PROBLEMS
- OPPORTUNITY FOR OPERATOR HANDS-ON EXPERIENCE WITH WBN EQUIPMENT

CONCLUSION OF OPERATIONAL READINESS

- PLANT PROGRAMS AND PEOPLE ARE WHERE WE EXPECTED THEY NEEDED TO BE FOR HOT FUNCTIONAL TEST
- PLANT PROGRAMS AND PEOPLE GENERALLY PERFORMED WELL IN SUPPORT OF HFT AND HAVE LEARNED FROM THE EXPERIENCE
- WE ARE NOT YET READY TO SUPPORT PLANT POWER OPERATION, BUT BASED ON PROGRESS WE ARE SEEING WE WILL ACHIEVE OPERATIONAL READINESS AS PART OF OUR OVERALL OPERATIONAL READINESS PROGRAM

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CLOSING REMARKS

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