

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

April 19, 1985

WBRD-50-390/83-46

WBRD-50-391/83-45

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U.S. Nuclear Regulatory Commission
Region II
Attn: Dr. J. Nelson Grace, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30323

Dear Dr. Grace:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - ROUTING OF RADIOACTIVE AND
NONRADIOACTIVE SYSTEM INSTRUMENT LINES - WBRD-50-390/83-46, WBRD-50-391/83-45 -
REVISED FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Linda Watson on July 29, 1983 in accordance with 10 CFR 50.55(e) as
NCR W-130-P. Interim reports were submitted on August 29 and October 6, 1983
and a final report was submitted on December 22, 1983. Enclosed is our revised
final report.

If you have any questions, please get in touch with R. H. Shell at
FTS 858-2688.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

J. W. Hufham
by RHD

J. W. Hufham, Manager
Licensing and Regulations

Enclosure

cc: Mr. James Taylor, Director (Enclosure)
Office of Inspection and Enforcement
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Records Center (Enclosure)
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ENCLOSURE

WATTS BAR PLANT UNITS 1 AND 2
ROUTING OF RADIOACTIVE AND NONRADIOACTIVE SYSTEM INSTRUMENT LINES
NCR W-130-P
WBRD-50-390/83-46, WBRD-50-391/83-45,
10 CFR 50.55(e)
REVISED FINAL REPORT

Description of Deficiency

TVA drawing 47W600-0-4 requires that systems which present a radiation hazard must have instrument panel drains routed to the closed drain systems and any high point vents must also have the drain line routed to closed drain systems. Instruments from these systems are often installed on the same local panel with instruments from other plant systems which do not present a radiation hazard. When the 47W600 series drawings show a closed drain panel, all instruments installed on that panel, regardless of system number, are shown routed to the closed drain and hence the high point vents are also routed to the closed drain. This presents the possibility of radiation entering systems not containing radioactive materials through instrument sense line drain valves and high point vent valves. In addition, this practice allowed nitrogen from a cold leg accumulator No. 4 pressure transmitter high point vent to enter the component cooling system via the high point vent for the loop 4 reactor coolant pump's (RCP) motor oil cooler flow transmitter. Enough nitrogen entered the system to cause the component cooling system pumps to cavitate. This is a source of potential common mode failure for this system.

Because the probability that two (or more) of the normally closed instrument drain lines being open simultaneously during operation was considered very unlikely and (assuming the condition occurred) so easily detected before operation, it was not considered in designing the routing of the high point vent and instrument drain lines to the closed drain system. All instruments installed on a panel which contained radiation hazard system instrumentation were routed to the closed drain system for ease and simplification of installation.

Safety Implications

Uncontrolled system crossties could allow the introduction of a radioactive hazard into systems that are not designed to handle such materials. This could result in the release of radioactive materials to the environment in excess of the limits stipulated in 10 CFR 100. In addition, the possibility of safety-related pump degradation due to cavitation induced by the injection of gas into liquid-solid systems is a significant safety concern.

Corrective Action

All instrument drain lines which were originally connected to the closed drain system but are not associated with a radiation hazard were disconnected by TVA from the closed drain system. However, it is possible that radioactive effluent could be detected in two of the systems that were

disconnected (the containment spray (72) and spent fuel pit cooling (78) systems). OE Watts Bar Nuclear Plant (WBN) design personnel had not specified these systems on note 6 of TVA drawing 47W600-0-4 which identified the systems that could present a radiation hazard and therefore required connection to the closed drain system. Consequently, the panel drains and high-point vent lines of the instruments monitoring these two systems were removed from the closed drain system.

TVA still does not consider systems 72 and 78 to represent a radiation hazard either from an offsite dose or an ALARA perspective; however, in order to enhance the conservatism inherent in the present design, TVA will also route the effluent from the instrument panel drains and high-point vents on these two systems to the closed drain system. Engineering change notices (ECNs) 5553 (unit 1 and common components) and 5554 (unit 2 components) were issued to reconnect systems 72 and 78 panel drains and high-point vent lines to the closed drain system. All pertinent connection drawings were revised under these ECNs and issued March 2, 1985. All construction rework required for unit 1 is complete; the unit 2 rework will be completed by December 31, 1985.

All instrumentation connected to the closed drain system will be controlled by plant instructions to verify that no unacceptable crosstie exists before or during system operation. WBN Office of Nuclear Power (NUC PR) has issued instrument maintenance instruction (IMI) 150, "Essential Instrument Operability Verification," (in lieu of the maintenance request and revised surveillance instruction detailed in item 2 and 3 of the final report) to assure that all pertinent valves are verified to be properly oriented prior to operation. IMI-150 will be performed at each refueling outage before startup. This approach was required because several of the valves in question were not covered in a surveillance instruction.

In addition, the valve numbering program (outlined in item 1 of the final report) was implemented by design change request (DCR) 536 instead of a technical instruction. However, systems 72 and 78 were not included in the scope of the DCR and are being addressed separately via field change request (FCR) NP826. These valves will be tagged by May 22, 1985.

The deficiency described above was an isolated case with an extremely remote probability of recurrence. The valves are opened only after repairs or an outage and, even in the unlikely event of a recurrence, detection would be made before plant operation. (Note that detection of this incident was during preoperational tests.)