

TENNESSEE VALLEY AUTHORITY

**CHATTANOOGA, TENNESSEE 37401
5N 157B Lookout Place**

February 10, 1986

WBRD-50-390/85-50
WBRD-50-391/85-49

U.S. Nuclear Regulatory Commission
Region II
Attention: 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 - INADEQUATE SLOPE ON INSTRUMENT SENSE
LINES - WBRD-50-390/85-50, WBRD-50-391/85-49 - FINAL REPORT

The subject deficiency was initially reported to NRC-OIE Inspector
Al Ignatonis on October 8, 1985 in accordance with 10 CFR 50.55(e) as NCR WPM
6172 R1. NCR WBN 6359 was identified later on the same subject for unit 2 and
is reported along with 6172 R1. Our interim report was submitted on
November 15, 1985. Enclosed is our final report.

A delay in submittal of this report was discussed with Bob Carroll on
January 21, 1986.

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

Very truly yours,

TENNESSEE VALLEY AUTHORITY

R. L. Gridley
R. L. Gridley
Manager of Licensing

Enclosure

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

Records Center (Enclosure)
Institute of Nuclear Power Operations
1100 Circle 75 Parkway, Suite 1500
Atlanta, Georgia 30339

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ENCLOSURE

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2
INADEQUATE SLOPE ON INSTRUMENT SENSE LINES
WBRD-50-390/85-50, WBRD-50-391/85-49
NCRs 6172 R1 AND 6359
10 CFR 50.55(e)
FINAL REPORT

Description of Deficiency

A number of instrument sense lines have been found that do not conform to the minimum slope requirements as specified in TVA drawing 47W600-0-4 notes. TVA considers this a generic deficiency in that this condition may exist in the majority of the sense lines at the plant and has determined that the major contributing factors causing this problem were unclear design requirements and poor installation requirements and techniques.

Safety Implications

Inadequate sense line slope could result in the degradation over the plants' lifetime of the related safety-related instruments due to the effects of air entrapment which could accumulate and adversely affect the accuracy or time response of the instrument or could induce noise. As determination and justification of safety-related instrument set points do not include errors due to air entrapment in sense lines, there is a potential that over time air accumulation could cause a failure of various safety-related instruments to perform their required safety or control functions within analyzed limits.

Corrective Action

TVA has established an Instrumentation Project to evaluate this (and other) problems to ensure the implementation of appropriate corrective actions and actions to prevent recurrence. As a result, TVA has created new drawings with drawing 47W600-0-7 identifying instruments which perform reactor trip actuation, engineered safeguards feature actuation, postaccident monitoring, and automatic actuation of features required to perform a primary safety function (listed under the drawing's Table A); and with drawing 47W600-0-8 identifying under its Table B another set of instruments which are particularly sensitive to entrapped air in their sense lines and are not previously identified on Table A of 47W600-0-7.

For the Table A instruments, TVA is sketching the installed slope configuration of the instrument lines, and the sketches are being evaluated in detail to ensure that adequate slope and/or other measures are in place to remove air from liquid-filled sense lines or to remove condensate from gas-filled sense lines. Where necessary, portions of sense lines will be

reworked to ensure removal of air or condensate by gravity (slope). It should be noted, however, that for many sense lines, the application of sound filling and venting maintenance techniques will provide reliable instrumentation. The sense lines associated with Table B instruments will be reworked as necessary to comply with an enhanced slope criteria defined by drawings. (Note: There are a few exceptions where filling and venting maintenance requirements are being imposed in lieu of slope line requirements.) Any required rework or maintenance procedures will be completed by fuel loading of the respective unit.

To prevent recurrence of this deficiency, TVA has established a new minimum slope requirement for WBN as an enhancement for future installations. Any exceptions must be officially evaluated and approved by OE. The enhanced slope requirement (1-inch per foot) is consistent with industry standards and INPO management action team recommendations, and it is defined on TVA drawing 47W600-0-4. In addition, TVA is in the process of revising site construction procedures to improve installation practices and techniques, and to ensure compliance to the enhanced requirements, TVA will not perform any sense line work on unit 2 until these procedures, which are currently scheduled to be issued by April 15, 1986, are complete.

For TVA's Site Modifications Section, which is performing the unit 1 rework, new modification and addition instructions (M&AIs) will be written to control future work occurring after the completion of the Instrumentation Project's activities. These M&AIs are scheduled to be issued by unit 1 fuel load. Until these procedures are issued, unit 1 rework is being performed through specific workplan instructions which ensure compliance to the enhanced slope requirements. These instructions have been reviewed and concurred with by TVA's Instrumentation Project.