

TENNESSEE VALLEY AUTHORITY
NUCLEAR SAFETY REVIEW STAFF
REVIEW
NSRS REPORT NO. R-84-26-WBN

SUBJECT: NSRS ROUTINE REVIEW OF THE RESPONSE TO NSRS
RECOMMENDATIONS IDENTIFIED IN NSRS REPORT
NO. R-84-19-WBN

DATES OF
REVIEW: AUGUST 15-27, 1984

REVIEWERS: John W. Washburn 9-5-84
W. MASHBURN DATE

J. D. Smith 9-5-84
J. D. SMITH DATE

P R Washer 9-5-84
P. R. WASHER DATE

V. S. O'Block 9-5-84
V. S. O'BLOCK DATE

APPROVED
BY: P R Washer 9-5-84
FOR J. F. MURDOCK DATE

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I. PURPOSE AND SCOPE

The NSRS performed an assessment of the results of the Black and Veatch (B&V) Independent Design Review of the Watts Bar Nuclear Plant Auxiliary Feedwater System and documented the results of the review in NSRS Report R-84-19-WBN dated July 5, 1984. The report provided five recommendations and requested that NUC PR provide NSRS with a plan of action to respond to the recommendations. The memorandum from H. G. Parris to H. N. Culver dated July 31, 1984 (EDC 840801 601) provided the response to the recommendations and stated that all findings could be closed. This report provides the results of the NSRS evaluation of the response and provides the status of the recommendations.

II. SUMMARY AND CONCLUSIONS

As a result of the review, the NSRS has determined that adequate corrective action has been completed to satisfy four of the seven recommendations. NSRS has also determined that the response to three recommendations provided insufficient corrective action to warrant closeout.

III. STATUS OF PREVIOUSLY IDENTIFIED ITEMS

All of the responses to the seven recommendations made in the memorandum mentioned above (EDC 840801 601) were examined. Based upon the review, four of the recommendations are satisfied and three remain open. The details of the NSRS action follow:

A. R-84-19-WBN-01 (Category 3)

This recommendation was not fully complied with since it referred to all TVA plants and the response only addressed WBN. As part of this follow-up review, NSRS has examined a number of drawings which were changed under ECNs 4666 and 4667. The changes appeared to clarify and correct the drawings listed. A large number of logic and control drawings were changed. Therefore, NSRS considers this issue satisfied for WBN due to the corrective actions taken and verified. The extent of the problem identified by B&V and identified by this item in the NSRS report is endemic to EN DES drawings for all plants. Therefore it will remain open until EN DES completes a similar review and makes corrections as needed for SQN, BLN, and BFN logic and control drawings versus electrical drawings and termination lists. It is understood that this review for other plants is being performed as a result of the generic review of the B&V findings. NSRS shall be made cognizant of the results of this generic review and upon evaluation will determine if sufficient action has been taken for satisfying this item. A related item is R-84-19-WBN-05 (see below).

B. R-84-19-WBN-02 (Category 9)

This item is satisfied since NSRS concurs with the action specified in the memorandum mentioned above (EDC 840801 601).

C. R-84-19-WBN-03 (Category 9)

This item is satisfied since NSRS concurs with the action specified in the memorandum mentioned above (EDC 840801 601).

D. R-84-19-WBN-04 (Category 20)

This item is satisfied. The NSRS recommendation that a review of time-delay relay settings procedures should be determined for all plants has been satisfied in large measure by work done under SEP-83-11 and work reflected in the memorandum from F. W. Chandler to H. L. Jones (EEB 831125 436). These documents provide satisfactory evidence for WBN and BLN time-delay settings. NSRS has reviewed the BLN design approach in which critical control functions are handled by solid-state logic (SSCS) with predetermined settings in all instances by the designers, and conclude that the program problems discovered by B&V on WBN do not apply to BLN.

E. R-84-19-WBN-05 (Category 34)

This item is satisfied. This category contained 11 findings where "out of function" features of drawings were in error (i.e. these drawings were not used to construct the feature, and drawings which were used differed because of changes or updating). Given the increased emphasis on training and the guidance by checklists and greater detail given in the EPs (EP 3.10 and EP 4.01 for example) now, there is no reason to believe that "out-of-function" features will be in error in the future to the degree that B&V found. In light of this information, NSRS does not believe there is a problem with "out-of-function" elements with the possible exception of old drawings which have not been through a change cycle recently. As noted by EN DES following their review of B&V findings, there were no significant user problems due to the errors found so far, so a special program to review all drawings for this type of error is probably not justified. No corrective action is necessary.

F. R-84-19-WBN-06 (Category 35)

This item is considered to remain open since the response presented in the memorandum from H. G. Parris to H. N. Culver dated July 31, 1984 (EDC 840801 601) and memorandum from J. C. Standifer to R. A. Coster dated July 18, 1984 (WBP 840718 076) is considered to be insufficient. The basic NSRS concern is that the 480-volt motor branch protection is not being performed in accordance with the National Electric Code (NEC). The response verifies this and is unacceptable for the following reasons.

1. The memorandum from J. C. Standifer (WBP 840718 076) states in part:

Subsequent to the evaluation of the Task Force Category 35 finding, Design Standard DSE9.2.1 was replaced by DGE-2.3.5. This occurred on November 10, 1983, and negates the requirement to comply with the National Electrical Code. Design Guide DGE-2.3.5 references the National Electrical Code but the final decision in complying with the National Electrical Code is left up to the discretion of the designer per the definition of design guides.

NSRS considers it to be inappropriate to change a design standard to a design guide to resolve the conflict and leave the compliance to the discretion of the designer. The NEC, as with all nationally recognized codes and standards, represents the collective body of knowledge, experience and accepted design practice of the industry. Considering the safety significance of the application it is not considered to be appropriate to let designer discretion be the final authority.

2. The design guide does not appropriately implement the NEC requirements for instantaneous trip circuit breaker settings. Table 430-152 of the NEC states that the maximum rating or setting for instantaneous trip breakers for motors (other than dc constant voltage) shall be 700 percent of full-load current. An exception being that:

Where the setting specified in Table 430-152 is not sufficient for the starting current of the motor, the setting of an instantaneous trip circuit breaker shall be permitted to be increased but shall in no case exceed 1300 percent of the motor full-load current.

As stated, the 1300 percent setting can be used only if the setting is not sufficient for the starting current of the motor. The TVA Design Guide DG-E2.3.5, Table 1 recommends 7 to 13 times motor full-load current and to follow manufacturer's recommendations. The guide is not in compliance with the NEC since no mention is made on designing to the 700 percent and by exception permit settings up to 1300 percent of full-load current.

3. The TVA design guide DG-E2.3.5 states in part:

Table 1 (end of text) does not include overload protection, which must be selected in accordance with NEC Article 430, Part C (see section 1.2). Table 1 is based on the requirements of NEC table 430-152 (see section 1.3) and motor data included

in NEC table 430-150 for three-phase induction motors, full voltage starting, and motors with NEMA code letters F through V, or without code letter. The table shows maximum values, but does not include allowances for exception of NEC section 430-52 which, when required, should be used with discretion. The fuse ratings in the table are based on fuse manufacturers' recommendations corresponding to the foregoing code requirements.

Contrary to the statement of not including allowances for exceptions, the table permits the use of the NEC 1300 percent of full load currents as standard design guidance.

Based upon the above discussion, NSRS does not agree that this recommendation is satisfied until the following is completed:

- ° Design Guide DG-E2.3.5 is made a mandatory Design Standard.
- ° The Design Standard invokes the instantaneous trip circuit breaker setting requirements of the NEC from Table 430-152 and properly implements the exception clause.

G. R-84-19-WBN-07 (Category 36)

The item is considered to remain open since the response presented in the memorandum from H. G. Parris to H. N. Culver dated July 31, 1984 (EDC 840801 601) is considered to be insufficient.

Our root concern as raised in R-84-19-WBN, section IV.B.23, and as summarized in the recommendation section, III.G, was that there did not appear to exist criteria that could be used by the field personnel to evaluate the adequacy of the work that was being performed or that could be used by the QC inspection units to determine that the final installation was acceptable. This concern, which is stated in R-84-19-WBN, relates to the fact that TVA in its FSAR committed that:

. . . low voltage power cable tray fill shall be limited to a maximum of 30 percent of the cross-sectional area of the tray, except when a single layer of cable is used. Cable tray fill for control and instrumentation cables shall be limited to a maximum fill of 60 percent of the cross-sectional area of the tray.

It was recognized by NSRS that TVA uses a computerized system to route cables and to limit the fill in the cable trays. Although this system is used to assist and to document what was actually accomplished in the field, the computer system cannot be used as a final acceptance vehicle without some verification of what exists in the field.

The response to R-84-19-WBN-07 presented by the line organization relates to a concern that is not even identified by NSRS in its report. The recommendation made by NSRS relates to establishing design criteria and providing the field with the acceptance criteria both for installation and QC inspection.

As has been stated previously, the concern raised regarding the cable routing system was raised when NSRS observed that cabling in many areas exceeds the height of the side rails of the cable trays, even though the tray proper seems (in most cases) to have sufficient area to lay cable below the side rails. This physical condition at the plant also negates the natural protection the cable receives from the side rails, thereby unnecessarily exposing them to damage. NSRS recognized that the NEC did not specify tray fill criteria until 1975. However, our discussions with peers in the industry (Bechtel, Stone and Webster, Sargent and Lundy) revealed that tray fill was generally limited to 80 percent and in no case were cables allowed to protrude above the side rail, the exception being where a "side board" could be added to accommodate a tray cover. Since we are not using "side boards" and covers for the Watts Bar trays, it would appear that our cabling in many areas is unnecessarily exposed to damage and is not consistent with standard industry practice.

TVA has recognized this inconsistency and has revised the TVA General Construction Specification G-38, section 3.2.1.3, paragraph b, which states in part:

Beginning with Bellefonte Nuclear Power Plant, cable trays must not be filled above the side rails except at intersections and where cables enter or exit the tray.

To satisfy the recommendation NSRS considers the following should be performed:

- a. Develop criteria for field use to control actual tray fill levels and to provide a basis for QC inspection.
- b. Either QC or the appropriate QA organization should through an inspection and/or audit process determine if the existing installation meets the established criteria.
- c. Where deviation from the FSAR commitment are made, TVA should perform a safety analysis to justify the deviations. Such deviations should be examined for reportability to NRC.

IV. PERSONNEL CONTACTED

Jim Thompson - Watts Bar Project Manager's Office
Ara Djirikian - Electrical Engineering Branch

V. DOCUMENTS REVIEWED

EN DES EP 3.10

EN DES SEP 83-11

EN DES EP 4.01

ECN 4666

ECN 4667

EN DES EP 1.44

Drawings changed by ECN 4666 and ECN 4667

Memorandum from F. W. Chandler to H. L. Jones dated November 25, 1983
(EEB 831125 936)

Memorandum from H. G. Parris to H. N. Culver dated July 31, 1984
(EDC 840801 601)

Memorandum from J. C. Standifer to R. A. Costner dated July 18, 1984
(WBF 840718 076)

INPO Good Practices (Searched--none apply to "out-of-function"
drawing)

EN DES DG-E2.3.5

National Electric Code, 1984

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

GNS '840730 050

TO : J. P. Darling, Manager of Nuclear Power, 1750 CST2-C

FROM : H. N. Culver, Director of Nuclear Safety Review Staff, 249A HBB-K

DATE : July 30, 1984

SUBJECT: BROWNS FERRY NUCLEAR PLANT (BFN) - NUCLEAR SAFETY REVIEW STAFF (NSRS)
REPORT ON THE INDEPENDENT ASSESSMENT OF THE BFN REGULATORY PERFORMANCE
IMPROVEMENT PLAN (RPIP) - NSRS REPORT NO. R-84-20-BFN

The subject report is attached for your information and possible action. Many of the tasks of the short-term objectives of the RPIP have now been completed and have resulted in significant improvements in the targeted areas. Some of the more visible accomplishments include management and employee training in regulatory compliance, supervisor presence in work areas, periodic inspections of work areas by plant personnel, and the dissemination of management policy regarding strict adherence to procedures and compliance with regulatory requirements. NSRS is also impressed with the progress of the long-term objectives and remain optimistic that the RPIP will be effectively managed to full completion and will represent a major contribution to the reversal to the regulatory fortunes of BFN.

From an oversight point of view, the areas that appear to represent the greatest potential benefits to the RPIP effort are upgrading of plant programs and managing the site and plant personnel toward a unified team effort. Both site and plant management personnel are working toward this goal, but additional support in the form of guidance, resources, or encouragement may be necessary from top management.

No recommendations have been made in the report since all of NSRS's recommendations and suggestions have received prompt consideration by plant and site management. However, it is suggested that you pay particular attention to section III.B.1.c of the report. The problems discussed in that section represents one of the areas in which special support from upper management could be appropriate.

This report essentially concludes the informal assessment of the RPIP by NSRS. The NSRS reviewer will attend one more oversight group meeting in August or September. The remainder of the week following the meeting will be spent discussing the attached report with site and plant management and addressing any other areas, situations, or conditions relating to the RPIP that plant or site management wishes to talk about. At the completion of this phase of the assessment, NSRS will periodically evaluate the RPIP both at BFN and at other sites as a part of the routine review process.


NSRS FILE

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J. P. Darling
July 30, 1984

BROWNS FERRY NUCLEAR PLANT (BFN) - NUCLEAR SAFETY REVIEW STAFF (NSRS)
REPORT ON THE INDEPENDENT ASSESSMENT OF THE BFN REGULATORY PERFORMANCE
IMPROVEMENT PLAN (RPIP) - NSRS REPORT NO. R-84-20-BFN

If you have any questions regarding the content of the report, please
contact K. W. Whitt at extension 6620 in Knoxville.



H. N. Culver

KWW:LML

Attachment

cc (Attachment):

H. G. Parris, 500A CST2-C

W. F. Willis, E12B16 C-K

MEDS, W5B63 C-K