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U. S. Nuclear Regulatory Commission
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Washington, DC 20555

Subject: Oconee Nuclear Station
Document Nos. 50-269, -270, -287
Safety and Performance Improvement Program (SPIP)
NRC Audit Report

During March, 1989 the NRC conducted an evaluation concerning Oconee Nuclear Station's implementation of the B&W Owners Group Safety and Performance Improvement Program (SPIP) recommendations. Specifically the audit, was to evaluate the commitment and involvement of corporate and site management in the SPIP and the process for disposition of the SPIP recommendations. On August 28, 1989, the NRC issued an evaluation report that contained a number of recommendations and comments concerning Duke Power Company's program in this area. The attachment to this letter responds to these recommendations and provides some clarifying information concerning a number of comments in the report.

As you are aware, Duke Power Company provided significant leadership in formulating and executing the B&W Owners Group SPIP program. In that regard we are fully committed to enacting recommendations from the program that will improve our overall excellent record of performance at our Oconee Nuclear Station. We would welcome the NRC to visit our offices again in the near future to complete the technical phase of the evaluation, at which time our personnel will be available to discuss implementation in detail.

Very truly yours,

H. B. Tucker

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Attachment

cc: Mr. P. H. Skinner
NRC Senior Resident Inspector

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NRC Recommendation:

Establish a formal, proceduralized TR disposition process. The current TR disposition process has no provisions or requirements to allow for peer review to verify the adequacy of the interpretation of the TR intent and the evaluation or decisions on TR applicability or implementation. This resulted in inadequate scope of evaluation which, in some cases, led to improper interpretation of TR intent, unsupported conclusions on TR disposition, and a limited scope of required actions for TR closure which may not fully meet the intent of the SPIP recommendation.

Duke Response:

- The evaluation phase is essentially complete - only 13 recommendations remain in that category.
- The SPIP review process, while not proceduralized, was systematic and involved multiple levels of engineering and management review. The reviews were coordinated and overseen by an individual who provided a leadership role in the B&W Owners Group during the execution of the SPIP Program.
- A limited number of errors have been made during the review.
- The NRC has mischaracterized or misinterpreted the status of certain recommendations.
- Duke will conduct a review to ensure that the status assigned to the recommendation is supported by the actions taken to dispose of the recommendation.

NRC Recommendation:

Establish a formal SPIP TR file with proper documentation. Documentation to support evaluation conclusions was not always contained in the package, not always easily retrievable, and, in some cases, was not available at all.

Duke Response:

- Duke does have a file with appropriate SPIP documentation; however, it is not maintained under the provisions of 10CFR50, Appendix B.

- This file does not necessarily contain all the modification packages, procedure changes, calculation files, etc. that may be referenced in the SPIP closeout documentation; however, this material is available at other locations.
- Duke does not agree that sufficient documentation was not available.

- Duke will review files to ensure that proper documentation is complete for each recommendation.

NRC Comment:

TR-071-MFW recommends installation of valve-position indication for the startup and main feedwater regulating valves. The basis for this TR was that feedwater (FW) conditions are indicated by feed pump speed, main FW flow, FW control valve position, and steam generator level at most plants. It can be difficult to diagnose a problem in FW control during startup and upsets, when these parameters fluctuate. This is particularly true if one of the instruments listed above is lost or if the integrated control system (ICS) was sending an erroneous signal to the pumps or valves. True valve-position indication would eliminate confusion and allow faster operator response during upsets. To address this TR, DPC proposed to install indication of open and shut valve position, only. That proposal does not fully meet the intent of the TR.

Duke Response:

Duke is reviewing the proposed actions to complete this recommendation to ensure that the intent is met.

NRC Comment:

TR-201-MTS recommends that each utility review electrohydraulic control (EHC) circuits and the circuits for the control and intercept valves to determine why they are inadvertently actuated and how recurrence of inadvertent actuation can be prevented. The basis for this TR was that seven reactor trips had occurred due to inadvertent actuation of the EHC control circuits for turbine overspeed and for fast closure of control and intercept valves. The ONS data base revealed no previous problems in this area, therefore, this TR was rejected. However, neither an engineering analysis nor a failure modes and effects analysis was performed to assure a potential for EHC problems and possible trips at ONS did not exist.

Duke Response:

TR-201 recommends that each utility review the EHC overspeed and fast control and intercept valve circuits to determine why they are actuated and how they can be corrected to prevent recurrence. The review conducted by Duke noted that the only related events had been caused by a broken connection on an edge card and that no inadvertent trips had occurred due to design deficiencies.

Since the inadvertent actuations had been attributed to an equipment failure, the Duke review properly concluded that no failures could be attributed to the inherent design of the control circuitry; therefore, the recommendation was classified as Closed/Operable. This classification is considered to be appropriate and supported by the review conducted for this item.

NRC Comments:

TR-158-OPS recommends that annunciator design be reevaluated and restructured as necessary to ensure that key alarms do not go unnoticed. Implementation of this recommendation would involve grouping alarms into as few categories as possible, while allowing for quick followup to determine the root alarm. The basis for this TR was that some transients result in so many alarms that operators tend to ignore them all, thus defeating the purpose of the alarm system. Alarms that are related to degraded capability of providing adequate core cooling should be easily discernible from alarms on systems and equipment unrelated to core cooling.

DPC proposed categorizing this TR as Closed/Operable without making any changes. This proposal was based on the premise that operating experience had shown that: 1) the existing arrangement of the annunciator system was adequate; and 2) a concern for potential operator error existed if the rearrangement is implemented. In addition, DPC referenced an Electric Power Research Institute study (Research Project - RP 2011). This study found that, in general, the difference in operator performance between an annunciator system in which alarms were generally grouped with their respective system controls and one in which alarms were grouped strictly by system/function with additional demarcation was "not statistically significant." Thus, DPC stated that plant annunciators would not be restructured. DPC had reduced the scope of changes in annunciators, following the Detailed Control Room Design Review, and accepted only three of the review's four recommendations:

(1) Add a turbine/generator "first out" panel.

(2) Revise audible alarms to group individual panels to a specific horn for the purpose of differentiation between alarms.

(3) Revise the annunciator logic so all tiles are dark, etc.

DPC rejected the fourth recommendation from the Detailed Control Room Design Review which addressed the intent of TR-158-OPS and required a rearrangement of annunciator system windows to functionally group all alarms.

Duke Comment:

First, it should be noted that this recommendation is in the evaluating for implementation category and Duke has not proposed categorizing this TR as Closed/Operable. The NRC was given an internal document that had not been accepted by management to dispose of this recommendation. This document does, however, potentially support a position of Closed/Rejected for this recommendation. Originally, the Detailed Control Room Design Review recommended that the annunciator panels at Oconee be rearranged. Subsequently, Duke's Design Engineering Department formed a multi-department review team to evaluate this HED solution again and determined that a restructuring was unnecessary, for the reasons summarized in the document that was reviewed by the NRC audit team. This position was endorsed by Oconee Station Management and was formally transmitted to the NRC on April 20, 1988 for their review.

NRC Comment:

TR-105-ICS recommends that each utility: 1) perform a field verification of ICS/NNI (Integrated Control System/Non-nuclear Instrumentation) drawings and that all drawings be updated based on the verification; 2) update drawings for legibility and to indicate NNI output functions, signal input ranges, interlock functions, power supply dependence (NNI X or Y); and 3) coordinate references regarding relay-contact location. DPC stated that all drawings were being officially upgraded. However, no field verification would be performed to verify drawing accuracy to as-built ICI/NNI configurations.

Duke Response:

Duke has taken a number of actions in recent years to turn the Bailey ICS/NNI Manual into separate prints, so that the drawings could be properly controlled by our Design Engineering Department. During this upgrade, substantial field verification of the drawings was made. There were, however, some changes that did not get included in the drawing upgrade, found on stick drawings that were the controlled ICS configuration documents before the drawing upgrade program was established.

These stick drawings were kept at the station for many years. They were updated by station personnel as modifications to the system were made, but before the official modification "as built" drawings were issued. In the early years of station operation many problems were encountered trying to keep the official drawings up to date, and many times modifications were issued on drawings that were not accurate. During this period, these "as built" drawings were maintained by station personnel to ensure that the best possible documentation was available to persons in the field. As the drawing control program progressed, the practice of updating these drawings was stopped, and the use of these drawings was also stopped when the Duke controlled drawings were issued as part of the document upgrade program. Nevertheless, it was recognized that these now uncontrolled drawings contained many small corrections that were not caught in the drawing upgrade program.

The plan for addressing the BWOG recommendation is to have station personnel familiar with the ICS/NNI red mark a set of official drawings to include all of the known errors found by field verifying the old stick drawings. In addition, Duke will red mark the drawings to include as necessary information suggested by the recommendation, including Engineering Unit spans, reference document information, power supply sources, computer point references, interlock functions of some control relays, and Duke Power drawing number information. These marked drawings will then be sent to our Design Engineering Department for incorporation into the controlled Duke drawings.

It is not considered necessary to do another field verification of the internal ICS wiring at Oconee. Substantial verification was performed as part of the drawing upgrade program. In addition, this wiring is constantly monitored not only by the continual operation of the plant, but by the verification of ICS configuration that occurs during troubleshooting. The station modification program also contains limits and precautions that assure that the documentation in use is current.

While this approach does not include a complete field verification, Duke considers that this program meets the intent of the recommendation.

NRC Comment:

TR-107-ICS recommends that ICS/NNI system and/or subsystem tuning be performed in accordance with vendor recommendations at least every other refueling outage. This TR also recommends that the utility investigate improved ICS maintenance and tuning methods

to correct post-trip MFW control system problems and develop a periodic surveillance/tuning program. TR-038-ICS recommends that the utility develop and implement a recommended preventative maintenance program for ICS/NNI. The actions required by TR-107-ICS and TR-038-ICS were combined during the disposition process at ONS. The procedure provided to the staff during the audit addressed only the intent and concerns of TR-107-ICS (fine tuning). The intent and concerns of TR-038-ICS (improved ICS maintenance, including maintenance of electrical connections, lug tightness, overall cleanliness, resistance, and ground checks, etc.) were not addressed.

Duke Response:

The status of these recommendations is evaluating for implementation, and no procedures have been reviewed and approved by management as meeting the requirements of TR-038 or TR-107. During the course of the NRC evaluation, the team was given a copy of a draft procedure that was being generated to partially address these recommendations. There was no intent to indicate that this procedure would be used to meet all the requirements of these two items. A separate preventative maintenance procedure is being used to provide improved ICS component maintenance, inspection and cleanliness checks as recommended in TR-038.

NRC Comment:

TR-99-OPS recommends that each utility ensure that guidance from Chapter IV of the Abnormal Transient Operator Guideline Technical Basis document (e.g., "Excessive MFW," "Throttling AFW," and "Throttling HPI Flow") is reflected in plant-specific procedures. TR-159-OPS recommends that the utility evaluate secondary system controls and consider the necessary modifications to achieve the following capabilities:

(1) Remote manual control in the Main Control Room (MCR) of all post-trip steam flow paths, including turbine bypass valves (TBVs), atmospheric dump valves, auxiliary steam, steam supplies to all feed pump turbines (including EFWPTs) and any other lines that could result in steam leaks.

(2) Remote manual control in the MCR of all pumps and valves for both MFW and EFW (all possible injection flowpaths) sufficient to both control flow and isolate all paths.

(3) Sufficiently redundant capability to provide a high reliability of isolating a failed path to terminate excessive steam or feed flow from the MCR (e.g., capability to operate both control and isolation valves,

TBVs and block valves, etc.)

TRs 099-OPS and 159-OPS were categorized as C/O until the January 1989 overcooling event at ONS. Following this event, the TRs were re-opened and placed in the E/A bin to allow for a more detailed review in order to fully determine the impact of these TRs on plant operation. This followup effort on closed TRs showed good commitment and involvement by DPC and ONS personnel. However, if the initial review had included peer checks or independent quality input to the disposition process decisions, the above concerns might have been adequately addressed, and the potential for overcooling might have been removed.

Duke Response:

The initial approach to address TR-99 was prepared, reviewed and approved by both our Design Engineering and Oconee Operations organizations, consistent with the administrative procedures that Duke employs to address any and all change to the Emergency Operating Procedures. The decision was made at that time not to include specific throttling limits for EFW. Subsequently, this decision has been reexamined, and although the procedure has been enhanced, the organizations involved reaffirmed the decision not to include specific throttling limits.

In the case of TR-159, the response was prepared by a member of the Operations organization at Oconee and endorsed by the Superintendent of Operations. This was also reviewed by the Oconee Compliance Engineer, the Oconee Station Manager and the Technical System Manager, Licensing prior to categorizing the item as Closed/Operable. During the course of these reviews a subtle operating situation during an unusual operating mode was overlooked. As the evaluation report notes, Duke initiated a review of this item based on the analysis of an overcooling event that occurred at Oconee.

NRC Comment:

TR-066-MFW recommends that the utility check all main feedwater and condensate system protective circuits, interlocks, motors, and other necessary electrical equipment or system operation to ensure that a single electrical failure, e.g., loss of a motor control center, would not cause a loss of both feedwater trains. The TR also recommends eliminating the potential for a single electrical failure causing a loss of both feedwater trains, wherever possible. TR-179-MFW recommends that the utility perform an evaluation to identify areas for enhancing the reliability of the MFW and condensate systems and controls, with

attention given to preventing failure of an active component from causing a loss of all feedwater. The recommendation stated that the changes identified in this evaluation should be made "as practical". TR-066-MFW was categorized as C/R, and portions of TR-179-MFW were being rejected based on a DPC conclusion that these recommendations were not economically feasible.

The documentation necessary to support the conclusion that a TR should be rejected based on economic feasibility was not available for review. The staff found no evidence of a formal process used to analyze cost feasibility, relate cost to safety impact, and present a conclusion on cost-effectiveness for these modifications. Apparently, a "not economically feasible" conclusion was arrived at during informal discussions among lower tier groups, then, discussed with management and approved. However, documentation to support the actual cost analysis was never prepared.

Duke Response:

There was never any intent to prepare a formal cost-benefit analysis to address the item identified in the Design study. The conclusions reached were based on the engineering judgment of the personnel involved from our Design Engineering and Oconee organizations, after discussion of the cost-benefit aspects of the proposed changes. As noted, the disposition of these items was reviewed and approved by management.

NRC Comment:

TR-153-IAS recommends that a plant-specific evaluation of air-system failure be made to ensure that cc tain failures would not affect the ability to control the plant during an air outage. Documentation to support the review of the Instrument Air System probabilistic risk assessment (PRA), (i.e., the review criteria and the conclusion that the PRA recommendations met the intent of TR-153-IAS) was not available. In addition, specific PRA review criteria were never established. However, the PRA was reviewed by one member of management, and TR-153-IAS was categorized as C/O.

Duke Response:

The status of TR-153 relies both on a section of the PRA conducted for Oconee and a Design Engineering Design Study that specifically addresses the information contained in Section 6 of the Instrument Air System Review Report. Apparently, the

evaluation team did not review this design study. The section of the PRA dealing with failure of instrument air was included to address the more global question raised in the basis for the recommendation; i.e., does the core remain covered and cooled during loss of instrument air or are there vulnerabilities that need to be addressed.

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