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ENCLOSURE

SAFETY EVALUATION BY THE OFFICE OF SPECIAL PROJECTS

CONCERNING THE TRAINING PROGRAM

TENNESSEE VALLEY AUTHORITY

BROWNS FERRY NUCLEAR PLANT, UNIT 2

DOCKET NO. 50-260

1.0 INTRODUCTION

In developing the Browns Ferry Nuclear Performance Plan (BFNPP), TVA management conducted an in-depth evaluation of the personnel training programs at Browns Ferry Nuclear Plant (BFN) to identify areas requiring training program improvements to enhance BFN staff operational performance. As a result of this evaluation, training initiatives were undertaken in the areas of operator training, engineer training, technical training for non-licensed plant personnel, accreditation of training courses by the Institute of Nuclear Power Operations (INPO), and upgrades to the site training facilities. The NRC staff's review of the BFN training upgrades concentrated on operator training programs because of NRC's responsibilities with respect to operator licensing.

The following discussion provides the staff's evaluation of the training program upgrades at BFN.

2.0 EVALUATION

The staff's evaluation of the BFN training programs consisted of a combination of programmatic reviews, detailed inspections, and administration of operator licensing and requalification examinations.

2.1 Operator Training Upgrades

TVA undertook a significant upgrade of operator requalification training in response to weaknesses identified by NRC operator examinations. The identified weaknesses were evidenced by reactor operator replacement and senior reactor operator upgrade examination pass rates which had been significantly below the industry average, and by the unsatisfactory performance of licensed reactor operators and senior reactor operators on NRC developed and administered requalification examinations. TVA conducted a detailed evaluation of the weaknesses, and determined the root causes for the training deficiencies. These root causes were concentrated in the areas of operator requalification and simulator training. The programs developed to correct the underlying deficiencies are described in the following paragraphs.

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a. Accelerated Requalification Program

The Accelerated Requalification Program (ARP) was implemented to provide a detailed one-time training curriculum to upgrade the level of knowledge of all BFN licensed operators. The ARP consisted of 16 or more weeks of instruction covering the topics discussed in the Hot License Program, with additional emphasis on thermodynamics, heat transfer, fluid flow, reactor physics, mitigating core damage, and plant and reactor transient analysis. The operators were divided into four groups, and their training progress was monitored by weekly examinations plus a comprehensive final examination.

Prior to resuming operating plant duties, all operators completing the ARP must have completed an NRC-administered requalification examination. As of the writing of this SE, all four groups had completed the ARP, and the first three groups had completed the NRC requalification examination; the requalification examination for ARP group 4 had been scheduled for early 1989.

Based on the results of an NRC inspection of requalification training at BFN on March 22-24, 1988 (documented in Inspection Report 50-259/260/296/88-08 of April 13, 1988), during which an evaluation of BFNPP operator training commitments was conducted, the staff has concluded that TVA has met all BFNPP commitments regarding the ARP.

The staff finds the Accelerated Requalification Program acceptable.

b. Annual Requalification

In the BFNPP, TVA committed to lengthening Annual Requalification Training from four to eight weeks to enhance operator level of knowledge and retention of that knowledge. TVA has planned to evaluate improvements resulting from the increased length of annual training, and adjust the length of annual training, as necessary; however, TVA has committed to maintain at least six weeks of annual requalification training.

The plan described above appears to be sufficient to maintain adequate operator level of knowledge. NRC inspectors and license examiners have determined that the increased length of training, combined with the increased scope and quality of the training, appears effective in enhancing operator level of knowledge, and, as a result, performance.

TVA's commitment to review "improvements due to increased training" needs to be performed carefully, without diminishing the primary importance of maintaining training quality. Before the length of requalification training is scaled back, TVA must ensure that a shortened training program will not adversely impact operator ability to perform required tasks safely. NRC will continue to closely

monitor and evaluate TVA's operator performance, especially in light of the contribution poor operator performance made to the current extended plant outage at BFN.

The staff finds that the upgraded Annual Requalification Program is acceptable.

c. Simulator Training

The generic deficiencies identified with simulator training at BFN related to poor use of Emergency Operating Instructions (EOI), use of uncontrolled reference material in the simulator, and ineffective communication among control room operators. Corrective actions implemented to correct these problems included two weeks of training on EOIs for all licensed operators as part of the Accelerated Requalification Program (one week each in the classroom and the simulator), banning uncontrolled documentation from the simulator, providing increased training emphasis on control room crew communications and teamwork, and providing additional communication skills training to individual operators whose performance would be enhanced by improved communications skills.

The NRC inspectors who conducted the March 22-24, 1988, inspection of the operator training and requalification program determined that the BFNPP commitments regarding simulator training had been met, with the exception of the issues relating to operator communications. The operator communications commitments were not considered entirely fulfilled because TVA instructors developed concerns in this area during simulator examinations conducted in February 1988. The staff notes, however, that operator communications have improved, as demonstrated by the fact that the first three groups of operators in the ARP have completed NRC administered requalification examinations. It therefore appears that effective action has been initiated at BFN to remedy the concerns associated with the outstanding operator communications commitments.

Another significant improvement in the simulator training program has been the relocation of the simulator from the Power Operations Training Center in Chattanooga to the BFN site. The staff concurs with TVA's assessment that this relocation enhances operator training because of the improved accessibility of the simulator. The staff notes, however, that the BFN simulator will be modified to a plant referenced simulator, and that TVA must certify to NRC by March 1991 (per the March 1987 revision to 10 CFR 55), that the simulator has been so modified.

In summary, the staff finds the upgrades to simulator training described in the BFNPP acceptable.

2.2 Engineer Training

TVA stated in the BFNPP that, "Training has been inadequate to equip engineers for tasks at BFN." To address this concern, an extensive training program for BFN site engineers was implemented by Site Director Standard Practice (SDSP) 4.9. This two-part program consists of an orientation phase and an advanced phase. Orientation training provides instruction in print reading, regulatory requirements, work control, plant modifications, and plant systems. The orientation phase must be completed within 18 months of appointment by newly assigned BFN engineers and plant technical managers, unless a specific waiver of training is granted. In addition, all incumbent plant technical staff managers and engineers were required to complete the orientation phase by August 1, 1987, have an approved waiver or have limited duties.

The advanced phase training is designed for engineers and technical managers whose duties require in depth knowledge of plant systems and operations. There are two segments to the advanced phase, classroom and simulator. Completion of these segments satisfies the training requirements of ANSI-18.1, "Selection and Training of Nuclear Power Plant Personnel." The advanced phase training is equivalent to the classroom and simulator training given to Senior Reactor Operators, and those personnel successfully completing advanced phase training receive simulator certification. The topics covered in-depth in this phase are plant systems, reactor physics, thermodynamics, fluid flow, chemistry, health physics, electricity, material science, and plant simulator training. Following successful completion of the advanced phase, personnel are required to complete annual requalification training and testing to maintain certification.

The staff finds that the Engineer Training program described in the BFNPP is acceptable.

2.3 Non-Licensed Personnel Training

TVA has undertaken several initiatives regarding the training of non-licensed personnel at BFN, as discussed in the BFNPP. Since 1984, a formal training program for craftsmen has been instituted. The primary goal of this program is to upgrade craft level of knowledge regarding plant components and maintenance practices. The individual courses are being taught by permanent BFN staff, TVA corporate training staff, and, for highly specialized courses, by contracted outside sources. Additionally, two plant systems familiarization courses for craftsmen, of 80 and 24 hours in length, respectively, have been instituted to expand craft level of knowledge beyond a traditional equipment specific and maintenance related orientation.

Also, TVA has begun implementation of a training program applicable to all BFN personnel regarding Environmental Qualification (EQ). TVA envisions that the courses constituting this program will teach personnel about general EQ requirements, plus give job-specific training tailored to each work group's assigned tasks.

The staff finds that the Non-Licensed Personnel Training program described in the BFNPP is acceptable.

2.4 INPO Accreditation

TVA has attained INPO accreditation of BFN training programs and instructors in the following training areas: Instrument and Controls Technician, Radiological Technician, Chemistry Technician, Non-Licensed Operator, Reactor Operator, SRO/Shift Supervisor, Shift Technical Advisor, Technical Staff and Manager, Mechanical Maintenance, and Electrical Maintenance. The BFN training program is, therefore, fully accredited in all areas subject to INPO training accreditation.

2.5 Training Facility Upgrades

In the BFNPP, TVA discussed the modern training facility which has been constructed at the BFN site. The BFN simulator has been incorporated in this facility, having been relocated from the Power Operations Training Center in Chattanooga, as previously discussed in this safety evaluation. This improved facility has made a positive contribution to the plant's overall training program by providing an easily accessible environment which is conducive to effective training.

3.0 CONCLUSION

Based on the preceding discussion, the staff finds that TVA's training program at BFN is acceptable.

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