

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : O. D. Kingsley, Jr., President, Generating Group, LP 6A-C

FROM : Operational Readiness Review Team, BFN

DATE : January 16, 1991

SUBJECT: BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT TWO (BFN-2), OPERATIONAL READINESS REVIEW (ORR) REPORT, FINAL PHASE

The ORR team was formed at your direction on May 1, 1989. The team has conducted a three phase assessment of the qualification and motivation of personnel at BFN and the necessary support for the safe and reliable testing, operation, and maintenance of Unit Two. The first phase was conducted during May and early June 1989 and the report issued June 9, 1989. The second phase was conducted over a four week period, beginning February 5, 1990, and the report issued March 9, 1990.

The third phase was conducted between January 3 and January 16, 1991, and was limited in scope to operations and maintenance, primarily to address these important areas closer to Unit Two startup. Six of the eight ORR team members who conducted the first two phases were involved in this final phase review.

The team noted that the Nuclear Manager's Review Group (NMRG) has conducted reviews of BFN corrective actions for both the phase one and phase two ORR team reports. The NMRG's most recent report dated November 30, 1990, states that four areas of concern were not evaluated because of the relatively low level of operational activities which existed during the review. These areas, operational communications, formal conduct of operations, assistant unit operator performance, and attention to operational details, were to be reviewed during the third phase review by the ORR team.

While current plant conditions still do not support a detailed review of all aspects of operations, the ORR team concludes that BFN has the ability to safely resume Unit Two nuclear operations upon completion of restart work and planned operator training. This conclusion is primarily based on adequate programmatic controls, continued resolution of previously identified problems, and an active management program to thoroughly investigate and address the causes of emergent problems. The ORR team notes that senior site and plant management generally exhibit the high standards and questioning attitude necessary to improve BFN performance.



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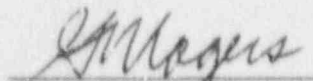
January 16, 1991

BROWNS FERRY NUCLEAR PLANT (BFN) - UNIT TWO (BFN-2), OPERATIONAL
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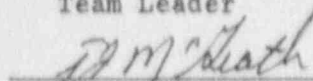
Attachment 1 contains the observations of this third phase ORR review. The review identified areas where senior management's expectations of consistent performance to standards are not yet fully recognized and implemented within all levels in the organization. These observations indicate that:

1. A perception may exist in a few areas that getting the job done is more important than doing it right. With the pressure to complete a large amount of work, maintenance personnel may be particularly susceptible to this.
2. Operators are not always performing at the level of formality and attention to detail that plant management states is expected for refueling and restart. It will not be possible to "turn a switch" just as those operations commence and expect the desired standard to be achieved. The standards must be driven home now before they are needed.
3. Inadequate management attention has been given to preparations for refueling. Numerous violations of foreign material exclusion controls and inventory procedures were observed.
4. Senior management's questioning attitude is not always exhibited throughout the organization.

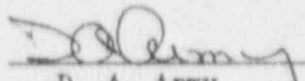
The team concludes that these weaknesses can be satisfactorily rectified by continuing management attention.



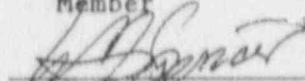
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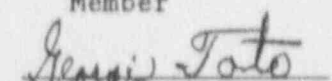
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ORR:PWS
Attachment

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OPERATIONAL READINESS REVIEW
BROWNS FERRY NUCLEAR PLANT

Operational Readiness Review Final Phase Observations

- A. Refueling Preparations - Numerous deficiencies which were observed on the refueling floor, in procedures and in other plans for refueling Unit Two are summarized below. Detailed examples were provided to the Plant Manager.
1. A lack of sensitivity exists with regard to Foreign Material Exclusion in the Reactor Vessel and Spent Fuel Storage Pool (SFSP). The Operational Readiness Review (ORR) team noted numerous pieces of small debris, wire clippings, tie wraps, small pieces of tape, and items adrift in and around the immediate proximity of the reactor vessel and SFSP. A mesh cover over the reactor vessel, which was removed in November 1990 to facilitate refueling crane exercise, has not been reinstalled. The cover could have been adjusted to accommodate the crane and then restored.
 2. Procedures for Prevention of Foreign Material in the Reactor Vessel Cavity (Plant Manager Instruction [PMI] 7.2) and Control of the SFSP (PMI 23.5) are not being followed. The accountability log is inaccurate and log entries are ambiguous and not in compliance with procedure requirements. Responsible management does not review and sign completed entries in a timely manner.
 3. No control zone accountability inventories have been conducted since April 4, 1990. PMI 7.2 requires these weekly. There have been no SFSP inventories since March 1989. PMI 23.5 requires these annually. Browns Ferry Technical Specifications require that handling of spent fuel and all operations over spent fuel pools and open reactor wells containing fuel shall be prohibited if refueling zone secondary containment cannot be maintained. BFN personnel cite this requirement as the reason for noncompliance with the procedures because performance of an inventory would require "operations" over spent fuel pools. The possible conflict between site procedures and the Technical Specifications has not been resolved nor has an alternate means of obtaining a reasonable inventory of materials in these controlled areas been provided.
 4. An assessment of potential radiation damage to organic materials in the Spent Fuel Storage Pool has not been completed subsequent to receipt of Institute of Nuclear Power Operations SER 90-004 and revision of PMI 23.5, "Control of the Spent Fuel Storage Pools." The refueling organization was not sensitive to technical concerns associated with irradiation of organic materials.
 5. Use of the "Operations Unit Two Refueling Briefing" book, which the ORR team was told would be kept in the Control Room and on the Refueling floor, could result in actions not in accordance with approved procedures. Specifically, the book contains out-of-date revisions to operating instructions and includes a "contingency plan" which directs actions to be taken for various abnormal events. This "contingency plan" is not a formally approved and controlled procedure.

B. Reactor Vessel Nozzle, Steam Line Plugs - Maintenance procedure, MMJ-1, Vessel and Cavity Reactor Disassembly and Reassembly, Steam Line Plug Installation, connects a rubber hose to the vent pipe of the plug using a "Chicago fitting" type coupling. The hose is then run up the side of the Reactor Cavity Pool and wrapped around the hand rails with the open free end lying on the refueling floor. The GE technical manual indicates a cap should be placed over the vent pipe after the main steam line is drained thus providing a metal water boundary which does not vent the radioactive internals of the main steam system to atmosphere. The rubber hose is susceptible to physical or radiation damage, which could provide a reactor vessel drain path. Also, the hose vents a radioactive volume into the refueling floor atmosphere without passing through HEPA filters. (The team noted that an air hose to one plug had been damaged.)

C. Control of Minor Maintenance - The site procedure for the authorization of maintenance (SDSP 7.6) permits the performance of minor maintenance without adequate controls to ensure compliance with technical specifications and evaluation of operational impacts. Specifically, Operations review is not required until after completion of the maintenance.

The list of allowed minor maintenance also contains several work items which appear inappropriate (e.g., affecting valve or system operability, requiring work instructions or post maintenance testing beyond visual inspection). In addition, the list may be modified without normal procedure revision reviews and approvals.

The ORR team notes that Nuclear Power Standard 10.3.2 contains a similar procedure for minor maintenance.

D. Plant Tours: Housekeeping, Radiological Controls, Industrial Safety - During plant tours, the ORR team noted deficiencies in industrial safety, radiological control practices, fire protection, and housekeeping. These deficiencies are indicative of the need for improvement in the communication and enforcement of requisite standards by line management and first line supervision. Industrial safety deficiencies (tripping hazards, failure to wear hardhats/safety glasses, incomplete scaffolding) were particularly numerous.

One particular concern of the ORR team is the lack of egress markings in the BFN plant. This same concern was noted in the phase two ORR report.

E. Maintenance Practices - Deficiencies in maintenance practices were noted while observing maintenance work in progress and during plant tours. Specific detailed observations were provided to the Plant Manager and are summarized below. The team noted that most deficiencies were on non-CSSC work.

1. Numerous poor maintenance work practices, lack of proper work documentation, and evidence of previous poor maintenance were observed while maintenance repaired a condenser inlet water box isolation valve.
2. Poor work practices were observed during reassembly of an air compressor.
3. An NRC inspector found a chain fall attached to a safety-related pipe hanger.

F. Operator Aids - Deficiencies were identified in the control of operator aids. Specifically:

1. Unauthorized operator aids were noted in the plant including ones on the fuel pool bubbler (provided to Operations by the instrument shop) and on a radiation monitor by the drywell entry, a fire protection layout posted on the south wall of the turbine deck, and a hand drawn electrical diagram in use by an operator in the control room.
2. No means were evident to readily determine whether operator aids complied with the latest version of source material used in their preparation.

G. Control Room Alarms - Review of control room alarms in Unit Two revealed a lack of attention to detail and operating rigor. The following problems were noted:

1. A partial audit was made of the ANNUNCIATOR STATUS REPORT for the Unit Two Control Room. The "daily" computer-generated update had not been run for two days, but the latest copy had been marked up for the preceding day. For panels immediately around the horseshoe, there were six alarms lighted that were not listed and four alarms that were listed as lighted but were not.
2. In the Unit Two horseshoe area, many of the alarm windows that were lighted had one of the light bulbs burned out.
3. Operators are not supplied with the proper (special) tools for removing the small square light covers for equipment status indicators; the operators removed the covers with pocket knives. Spare bulbs were not available for these indicators.
4. A local panel alarm speaker on a radiation monitor was muted by being taped over.
5. Operator response to alarms often was not formal. This response apparently results from the long shutdown condition.

- H. Communications - Communications associated with control room activities lack the formality and crispness intended by PMI 12.12, Conduct of Operations. It is recognized that most of the operational communication within the control room is informational versus directive in nature. Nevertheless, even such routine communications should adhere to requisite standards (e.g. repeat backs and alpha phonetics) or the problem will be compounded under operating conditions.
- I. Auxiliary Boilers - The team observed a number of deficiencies with the auxiliary boilers, indicating a lack of proper operating discipline. For example:
1. A boiler was operating with four alarms lit on the local panel. One had a work order issued for repair. An abnormal water level alarm was lit despite the panel meter showing the level to be near the middle of the normal band.
 2. Boiler daily chart recorders were being used for several days and improperly dated.
 3. A shutdown boiler had a fuel oil leak. Some of the leaking oil was falling to the floor and there was a strong fuel odor in the area.
- J. Use of Simulator for Command and Control Training - One of the causes of a recent Sequoyah Unit Two trip (Final Event Report, SQN II-90-140) was a breakdown in control room command and control. As events developed, there was a challenge to the management of resources in the response to the abnormal conditions. Additionally, NRC Information Notice No. 90-54, Summary of Requalification Program Deficiencies, dated August 28, 1990, cited Senior Reactor Operator (SRO) command and control under the area of safety and technical weaknesses needing attention.
- Current BFN Training philosophy does not include simulator scenarios which emphasize potential command and control problems. Instructors do monitor and critique command and control problems that arise within present scenarios. However, specific scenarios to challenge command and control are not available.
- K. Involvement in Areas of Responsibility - Examples were noted of failures to communicate to and involve key individuals and organizations in matters affecting their areas of responsibility. These included:
1. Operations was not involved in the site Training reply dated December 12, 1990 to corporate Training concerning NRC Information Notice No. 90-54 dated August 28, 1990, even though this notice contains examples of command and control problems similar to the incident which occurred at Sequoyah Nuclear Plant on November 23, 1990. Moreover, BFN Operations did not act on an information copy received from the site Nuclear Experience Review Group. Neither Training nor Operations recognized the issue discussed in item J. above.

K. Involvement in Areas of Responsibility (Continued)

2. System Engineers in Technical Support are not routinely provided with Category II Incident Investigation Reports concerning their systems. Also, the engineer in Maintenance responsible for weight handling was not provided two reports of weight handling personnel incidents in 1990.
3. The weight handling engineer was not aware of "Repairs to Crane Hoists" included in a list of minor maintenance defined in Appendix D to SDSP 7.6. (The team was informed this item was being removed from the list.)
4. A set of reactivity control guidelines developed by the BWR owners group had not been provided to Operations.

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ENCLOSURE 2

All corrective actions will be evaluated as to whether completion is required prior to restart.