UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30323

Report Nos.: 50-259/90-20, 50-260/90-20, and 50-296/90-20

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Facility Name: Browns Ferry 1, 2, and 3

Inspection Conducted: June 25-29 and July 9-13, 1990

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SUMMARY

Scope:

This announced inspection was conducted in the areas of corrective action program implementation and quality verification activities. Performance of the previous one year period in Operations, Surveillance, Maintenance, Design Engineering, and Quality Assurance was examined to assess the effectiveness of licensees activities in these areas. Additional inspection scope included review of licensee implementation of the revised Nuclear Quality Assurance Plan and licensee response to previous NRC inspection findings related to the corrective action program and quality verification activities.

Results:

The licensee has demonstrated an adequate capability for the identification and correction of problems during the previous one year period via quality verification and corrective action program activities. The CAQR program was effective in the identification and resolution of problems and management was actively involved in the corrective action program. The quality organization's

overview of corrective action performance by the plant organization did not effectively focus on verification of all aspects of performance. Several deficiencies were identified regarding trending and site quality overview aspects of the corrective action program.

The licensee was responsive to correct noted deficiencies, and initiated, or verified actions which addressed these areas. Management involvement in the corrective action program contributed to its effectiveness. Deficiencies specific to the Engineering area included the delay in reducing the drawing deficiency backlog and inadequate program controls for the conditional release of non-conforming items.

The licensee effectively planned and monitored the transition to the new Nuclear Quality Assurance Plan. The new plan places increased responsibility for quality performance and verification of nuclear safety activities with the line organization.

Corrective action program deficiencies identified in the previous NRC inspection have been evaluated by the licensee, and most of the deficiencies have been resolved.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

J. Beasley, Monitoring Supervisor
*P. Carrier, Manager, Site Licensing
F. Froscello, Q.C. Manager
*M. Herrell, Plant Operation Manager
*L. Jones, Assistant Site Quality Manager
*N. Kazanas, Vice President, Nuclear Assurance and Services
*C. Lawrence, MODS Engineering Manager
*B. McKinney, Manager Technical Support
*D. Miller, QA Eval/QA
*B. Morris, Corrective Actions
*L. Myers, Plant Manager
*R. Parker, Manager Quality Program, Nuclear Quality Assurance
*P. Salas, Supervisor, Compliance and Licensing
*B. Shadrick, Maintenance
J. Sparks, FCN/DCN Closure Manager
*W. Thompson, Technical Support/BFNP
T. Temple, Section Supervisor/NE Mechanical
*G. Turner, Site Quality Manager

Other licensee employees contacted during this inspection included craftsmen, engineers, operators, mechanics, security force members, technicians, and administrative personnel.

NRC Resident Inspectors

*C. Patterson, Senior Resident Inspector
*W. Little, Section Chief

*Attended exit interview

Acronyms and initialisms used throughout this report are listed in the last paragraph.

2. Site Quality Organization Corrective Action Program Involvement

Problems, or conditions adverse to quality, at BFN were addressed by two methodologies. In general, problems of safety or operability significance were processed in the CAQR program which was administratively controlled by the site quality organization. Problems of lesser significance or meeting specific reportability criteria, such as LERs, were processed by programs administered by the specific plant organization. For example MRs were controlled by maintenance, RIRs by Health Physics, and LERs by Licensing. The corrective action program was controlled by SDSP 3.13, Corrective Action, Revision 7. This procedure provided specific guidance for processing of CAQRs and designated which administrative control

procedures i.e., procedures for MRs, RIRs, LERs, were procedures for processing the lower level identified problems or CAQs. Therefore, identified CAQs at BFN were essentially divided into two subsets; (1) CAQs considered significant and processed via the CAQR program controls in SDSP 3.13 and (2) CAQs of a lower significance level which were processed via CAQ/ACPs.

Prior to May 1990, the corrective action program at BFN conservatively used the CAQR process as the primary mechanism for the identification and resolution of problems. Review of CAQs processed during the previous year verified that the CAQR process, although somewhat cumbersome and lengthy for minor CAQs, was effective in resolving identified problems. The CAQR process involved a comprehensive review and evaluation process which may not have been appropriate for problems of lower significance or those problems such as LERs which already received a comprehensive review. Revision 7 to SDSP 3.13 emphasized plant involvement in the corrective action process by more effective use of the CAQ/ACPs. This was accomplished by raising the threshold for initiation of CAQRs.

Also, plant responsibility for corrective action verification of hardware CAQRs was increased. The changes incorporated by this revision do not represent a corrective action program overhaul. Therefore, performance in the previous one year period provided the basis for this assessment of the present corrective action program at BFN.

The site quality organization administratively controlled the CAQR program and reviewed plant performance with respect to the CAQR and CAQ/ACP corrective action programs. Management's involvement in the corrective action program was primarily evident in the CAQR program. The effectiveness of the BFN corrective action program was based on review of performance as reflected in open and closed CAQRs, documentation of SQ overview activities and findings, and documented plant communications and trending information. Based on the information of this review, the CAQR program was effective in the identification and resolution of problems and management was actively involved in the corrective action program. The quality organization's overview of corrective action performance by the plant organizations did not effectively focus on verification of all aspects of performance.

The Corrective Action procedure, SDSP 3.13, provided adequate guidance for program implementation. The level of reviews and evaluations required were appropriate for the level of problems processed as CAQRs. An apparent weakness in the procedure was the criteria for CAQR initiation. The knowledge level of plant commitments and design basis required to evaluate an identified problem for initiation into either the CAQR or a CAQ/ACP program appeared to exceed the knowledge level reasonably expected from the line level personnel initiating a CAQ. Review of CAQRs initiated in the previous year demonstrated a tendency of plant personnel to use the CAQR process, therefore, there was no evidence of a CAQ receiving an inadequate level of review. Inherent in the emphasis towards the increased use of the CAQ/ACPs is the loss of this conservatism.

The CAQR validation provided an example of management involvement in the corrective action process. A management review committee reviewed each CAQR to verify the problem was adequately defined and merited the CAQR process. An additional function of the MRC was to designate responsibility for corrective action to the appropriate plant organization. Review of MRC meeting minutes for the previous year demonstrated the Site Director and plant organization managers routinely participated in MRC functions. The MRC provided a cross organizational review of each CAQR. Management involvement contributed to the CAQR program effectiveness by timely establishment of responsibility for resolution of identified problems. Additionally, the MRC function provided management a real time awareness of the problems identified at the plant.

Corrective action scheduling and tracking phases of the CAQR program were adequate. Following responsibility designation by the MRC, corrective action determination and implementation dates were entered into the TROI computer tracking system. SQ monitored and trended plant performance timeliness throughout the CAQR process. An example of SQ trending effectiveness was the adverse trend of untimely corrective action performance identified prior to February 1990. This trend was evident from the large number of escalation actions being initiated by SQ for corrective action response and closure as reflected in monthly trend reports throughout 1989. Management corrective action was the initiation of mandatory Saturday Morning Meetings for organization managers responsible for escalated CAQRs. Late CAQRs decreased substantially from 101 in February to 21 in April 1990. The Saturday Meeting provided another example of management's effective involvement in the corrective action program.

An additional mechanism to insure resolution of identified problems was the System Preoperational Check Program which was specific to Unit 2. This program coordinates the completion of DCNs, ECNs, CAQRs, etc., which have been designated by a cross-organizational review board to be necessary for system operability to support Unit 2 restart. The system engineers are involved in implementation of the SPOC for their assigned systems. 134 of 236 open CAQRs were designated as restart items. A review of open CAQRs verified the corrective action implementation dates were reasonable and were entered in the TROI system. A review of restart CAQRs verified the completion schedules were entered appropriately into the SPOC data base. Review of open CAQRs in conjunction with the tracking and scheduling activities demonstrated adequate follow-up of identified problems using the CAQR process. Review of closed CAQRs demonstrated effective use of the escalation process to accomplish problem resolution.

A sample review of closed CAQRs indicated the identified CAQs were adequately identified and resolved. The sample included the following CAQRs:

BFP 900115	BFP 900163	BFP 900186
BFP 900192	BFP 900153	BFP 890306905
BFP 900003	BFP 900023	BFP 900154 P
BFP 900097	BFP 900140	BFP 900107 P
BFP 900080	BFP 880406	BFP 900014 P
BFP 890821		BFP 900174 P

The level of review and evaluation accomplished for each CAQR was adequate and in compliance with program guidance. The generic reviews and corrective actions accomplished were adequate. In cases where timeliness was inadequate, appropriate escalation actions were initiated. The CAQR process was well documented and demonstrated SQ maintained an awareness of resolution status and communicated to plant management plant performance regarding timeliness. The total open CAQRs decreased from 451 in June 1989 to 236 in July 1990. In conjunction with the sample review which indicated CAQRs were adequately resolved, this demonstrated the CAQR program has been effective in correcting identified problems.

The quality organization has implemented a well developed CAQR trending program. Although some CAQ/ACPs, e.g. IIRs and RIRs, are included as trended parameters, this trend activity did not include all CAQ/ACPs.

Trending of the CAQ/ACP programs was the responsibility of the applicable administrative organizations. There were three levels of CAQR trending. Level III trended parameters monthly by individual plant organizations such as maintenance, engineering, or operations and provided this report to the plant organization managers. The Level II monthly report incorporated the Level III trends into a monthly overall plant report to the plant manager. The quarterly Level I trend report incorporated all TVA Level II reports to identify corporate trends. The Level III and II trend reports primarily trended internally and externally identified deficiencies against each organizations providing a perspective of each organizations performance as reflected by reported deficiencies. Level II trend report parameters provided a focussed picture of CAQR program performance. The Level I trend reports provided a comparison between TVA sites which focussed more on common causes of deficiencies such as personnel error, procedural error, and equipment or design failure. Review of the Level III and II trend reports for 1989 and 1990 demonstrated SQ has effectively monitored plant performance. Although the corrective action procedure did not provide specific guidance for the identification of adverse trends or establishment of performance control limits, control limits were established and adverse trends were identified and communicated to management.

In addition to trending discussed above, overview of corrective action performance by SQ was provided by audits and monitoring report reviews. Corrective action program audits BFA 90017 dated May 16, 1990, and BFA 890001 dated November 1989, provided cross-sectional reviews of corrective action activities. An example of the depth of the corrective action audit and the follow-up was demonstrated by a finding from the 1989 audit which identified examples of improperly invalidated CAQRs. Corrective action included an expanded review sample of 163 CAQR invalidations over the previous 3 quarters. The relatively low percentage of improperly invalidated CAQRs was corrected and the MRC was then required to approve all invalidations. The 1990 audit identified examples of inadequate processing of Test Deficiencies. Corrective actions were not yet proposed for this finding. The corrective action audits contributed to SQ's overview of the corrective action program.

SQ accomplished additional corrective action overview functions via monitoring report reviews. Monitoring reviews were real time focussed reviews of specific program aspects. Monitoring report QBF-M-90-1080 dated February 20, 1990, reviewed IIRs to verify deficiencies identified during incident investigations were addressed as CAQRs where appropriate. Monitoring reports QBF-S-90-1007 dated January 12, 1990, reviewed CAQ/ACPs to verify they met SDSP 3.13 requirements for corrective action programs. This report identified 4 CAQ/ACPs which did not meet the trending requirements. Corrective action initiated was to perform monitoring reviews of these four CAQ/ACPs to identify adverse trends as an interim measure until the corporate standard procedure for trending was approved. Monitoring reports QBF-M-90-1326, 1318, 1324, and 1317 reviewed the deficient CAQ/ACPs for adverse trends. Monitoring reports QBF-M-90-1428 and 1173 reviewed CAQ/ACPS for contractor MRs and COTS to verify CAQRs were initiated where appropriate.

SQ overview of the corrective action programs accomplished by trending, audits and monitoring reports was adequate to verify performance for the previous one year period. The focus of this overview will not be adequate to verify performance as the plant organizations assume greater responsibility for corrective action functions. For example, the initial CAQR versus CAQ/ACP determinations by the line organizations has become more significant in determination of the level of review and evaluation an item receives. Overview of this function should include all CAQ/ACPs rather than the three previously monitored. The licensee responsiveness to this issue was demonstrated by their timely initiation of a comprehensive review of CAQ/ACP determinations following discussion with the inspector. Secondly, although responsibility for corrective action verification of hardware CAQRs was given to the plant organizations in May 1990, SQ did not initiate or schedule overview activity to assess plant performance regarding this verification function. SQ overview activity should provide additional focus on the following corrective action program performance aspects:

(a.) Initial CAQ/ACP versus CAQR determinations by the line organizations, and

(b.) Corrective action verification function performance by plant organizations.

This issue will be identified as IFI 50-259,260,296/90-20-02, Site Quality Corrective Action Program overview.

Additionally, although SQ trending of the CAQR program is thorough, it does not encompass all the corrective action programs i.e CAQ/ACPS and CAQRs. As the use of the CAQ/ACPs is increased an effective review of corrective action performance at BFN will include the integration of trends of all CAQ programs. This issue was addressed in paragraph 4 as inspection followup item, 50-259,260,296/90-20-01.

In conclusion, the CAQR program was effective in the identification and resolution of problems in the previous one year period. The CAQR process encompassed those identified problems of safety or operability significance. The corrective action program is currently evolving to establish greater corrective action responsibility on the plant organizations. The quality organization overview of the corrective action program was adequate in the previous year but requires additional focus on verifying satisfactory performance as the program evolves. Management involvement in the corrective action program was primarily evident with respect to the CAQR program and was a major contributor to the effectiveness of this program.

3. Nuclear Quality Assurance Plan

TVA has revised its QA topical report to encompass several changes and improvements. The new plan was submitted to the NRC in March 1989 and was subsequently approved by the NRC in January 1990. A six month period was permitted to prepare for implementation of the new plan, called NQAP. Therefore the plan was implemented by June 30, 1990.

The new plan prescribed the program for assuring quality in the design modification, operation and maintenance of the plant. The previous QA program requirements were essentially retained and newly added items are:

a. The QA requirements have been consolidated and the "how to do" details were deleted.

b. The philosophy within the new plan is that quality assurance for nuclear safety is the responsibility of all employees, especially the line organizations. This means that QA will no longer perform in a line function, but would have a strong role as an overseer of activities.

c. The quality assurance organization now has the option to use a graded approach to accomplish their activities. This means that techniques other than 100 percent in-line verification may be utilized so that resources can be concentrated on problem areas, or activities significant to nuclear safety.

To accomplish an orderly transition from the old NQAM to the new NQAP, TVA prepared an implementation plan. This plan was reviewed by the inspector and found to be thorough and complete. Assignments were made and all procedures requiring a revision were identified. This was done in March 1990. In early June 1990, Site Quality conducted an audit using a team of site and corporate personnel to verify the readiness for the June 30, 1990, effective date. The audit results were reported to the manager NQA on June 15, 1990. The audit team determined that full compliance with the NQAP was achievable by June 30, 1990. Five discrepancies were identified by the audit team and actions to resolve each item was provided. These are described below:

a. Responsible line management is unaware of the transition of the Topical Report to the NQA Plan.

b. Controlled copies of the NQA Plan were relatively unavailable.

c. The elements of the NQA Plan for trending are not specifically addressed in site Administrative Control Programs.

d. The elements of the NQA Plan concerning "Graded Verification" are not implemented in BFN site procedures.

e. Of the site procedures previously identified and requiring revision to implement the NQA Plan, six have not been revised.

The actions to facilitate implementation are described below:

a. Personnel from SQ have met with plant personnel to provide input for a site-wide dispatch. This dispatch will inform site personnel of the NQA Plan implementation and changes resulting from the implementation. This was done on June 22, 1990.

b. An attempt will be made by SQ to increase the number of controlled copies of the NQA Plan. However, BFN does not believe this must be done before implementation of the NQA Plan.

c. While the elements of the NQA Plan pertaining to trending are not specifically addressed in site procedures, Quality Monitoring has monitored all ACP programs, and BFN believes that the quality indicators being trended are adequate.

d. Even though the elements of the NQA Plan concerning Graded Verification are not implemented, BFN is currently not grading items which would require a graded verification. Since BFN is not currently exercising the option to grade, this area is not considered necessary for the NQA Plan.

e. During the identification of the required changes, the line manager responsible for initiating the change was identified. SQ will contact the line organization and communicate the urgency of these revisions.

In conclusion, the NQAP is now in effect and the transition has been successful. TVA's performance under the new NQAP will be examined to determine if the change results in a satisfactory level of nuclear safety.

The change in processing of CAQs is illustrated in Attachments 1 and 2

4. Trend Analysis Program

Criterion XVI, Corrective Action of Appendix B to 10 CFR 50 requires a corrective action program that includes measures to preclude repetition. ANSI N18.7, Section 4 mentions trending of day-to-day events to indicate a need for corrective action.

This philosophy is stated in section 10.2.5 of TVA's nuclear quality assurance plan. The plan requires trend analysis to be performed on conditions adverse to quality and the results are to be used by management to determine quality status, identify adverse trends and compare quality of performance among organizations and industry standards. The trend analysis program is described in STD-3.1.10, Trend Analysis. The plan assigns responsibility for trend analysis to Nuclear Quality Assurance and other site organizations. The applicable sections of the NQAP and the trend analysis procedure were reviewed by the inspector and both were found satisfactory. The NQAP and the corrective action procedure assigns responsibility for recognizing and reporting any condition adverse to quality to all plant personnel. Any person aware that something is not as it should be, must promptly complete an occurrence report and forward it to their supervisor. These data are collected from all departments, collated for trending and analysis. Trend reports are prepared for all levels of management on a periodic basis. Each organizational component establishes limits on goals to detect unsatisfactory trends. A CAQR must then be prepared for any adverse trend of activities. This triggers a review for corrective action by the MRC within three working days. If it is determined that operability, could be affected, the CAQ-PRD form must be submitted to the duty plant manager immediately. Through interviews of plant personnel and attendance at two MRC meetings, the inspector concluded that the process is working. Each CAQR on the MRC agenda was thoroughly discussed, action determined and responsibility assigned. The meetings were attended by plant Operations, Nuclear Engineering, QA, Site Directors' staff and other personnel directly associated with the issues.

To assess the effectiveness of the trending activities, a series of trend reports and performance report were reviewed. In order to get a sufficient sample of this activity, some of the reports were prepared under the previous QA topical report, NQAM, and some were issued after the new NQAP was effective. In addition, interviews and discussions were held with those who prepared the reports and those who receive these data. The inspector concluded that the program is fully supported by management. Results are forwarded to top management with unfavorable trends high lighted. The program is well documented and accepted by all departments.

Site Quality and Corporate Quality Assurance performed a review of BFN's corrective action process for agreement with the trending program. The review dated July 7, 1990, by G. G. Turner, identified four ACPs that required revision to fully implement the conditions stated in STD-3.1.10. these are:

a) Maintenance Management System
b) Processing Drawing Discrepancies
c) Conduct of Testing
d) Engineering Evaluation Request

This finding was discussed with appropriate personnel and agreement was reached on the change and a completion date. Completion of this action will be tracked as an inspector followup item 50-259,260,296/90-20-01, completion of action identified to satisfy STD 3.1.10, trend analysis.

5. Plant Operations

This area concerned the implementation of corrective actions as they relate to plant operations. The inspectors observed control room operations and reviewed applicable logs including the shift logs, clearance hold order book, TACF log, and Licensee Reportable Event Determination Binder. The inspectors also observed plant activities outside the control room. No noteworthy or significant events occurred during this inspection period.

Within the area of plant operations conditions adverse to quality may be dispositioned under a number of ACPs as allowed by SDSP-3.13. However, the majority of CAQs identified by operators are dispositioned under CAQ/ACPs such as LERs, IIRs, or WRs.

In order to determine the extent and effectiveness of Site Quality Organization activities in this area the inspector held discussions with various members of the Site Quality Organization. During those discussions the inspector was provided a computer printout which the licensee representatives stated listed all Quality Monitoring Reports and Special Quality Surveillances performed in the plant operations area during the period January 1, 1989, until the start of this inspection. The inspector selected from this list 36 monitoring reports and two special reports for review. Specific reports reviewed are as follows:

Report Number	Subject
QBF-M-90-0010	Conduct of Operations
QBF-M-90-0192	Conduct of Operations
QBF-M-90-0251	Observation of STA Activities
QBF-M-90-0252	Observation of STA Activities
QBF-M-90-0005	Limiting Conditions for Operation
QBF-M-90-0208	Limiting Conditions for Operation
QBF-M-90-0216	Limiting Conditions for Operation
QBF-M-90-0217	Limiting Conditions for Operation
QBF-M-90-0250	Limiting Conditions for Operation
QBF-M-90-0132	Clearance/Hold Orders
QBF-M-90-0137	Clearance/Hold Orders
QBF-M-90-0157	Clearance/Hold Orders
QBF-M-90-0043	Observation of Fuel Handling Activities
QBF-M-90-0044	Observation of Fuel Handling Activities
QBF-M-90-0045	Observation of Fuel Handling Activities
QBF-M-90-0046	Observation of Fuel Handling Activities
QBF-M-90-0056	Observation of Fuel Handling Activities
QBF-M-90-0079	Observation of Fuel Handling Activities
QBF-M-90-0108	Observation of Fuel Handling Activities
QBF-M-90-0109	Observation of Fuel Handling Activities

QBF-M-90-0110	Observation of Fuel Handling Activities
QBF-M-90-0111	Observation of Fuel Handling Activities
QBF-M-90-0114	Observation of Fuel Handling Activities
QBF-M-90-0115	Observation of Fuel Handling Activities
QBF-M-90-0117	Observation of Fuel Handling Activities
QBF-M-90-0130	Control of Temporary Alterations
QBF-M-90-0163	Control of Temporary Alterations
QBF-M-90-0194	Control of Temporary Alterations
QBF-M-90-0206	Control of Temporary Alterations
QBF-M-90-0213	Control of Temporary Alterations
QBF-M-90-0629	Fire Watches
QBF-M-90-0947	Fire Watches
QBF-M-90-0181	Portable Fire Extinguishers, Hose Stations
QBF-M-90-0182	Portable Fire Extinguishers, Hose Stations
QBF-M-90-0286	Portable Fire Extinguishers, Hose Stations
QBF-M-90-1080	Various Incident Investigation Reports Reviewed to verify any CAQs identified were properly documented
QBF-M-90-0278	Special Quality Surveillance performed to follow-up on corrective actions associated with Incident Investigation Report, II-B-90-046, where the High Pressure Fire Protection System was inadvertently isolated on April 26, 1990, (also covered under LER 259/90-007)
QBF-M-90-0285	Special Quality Surveillance performed to verify required signs posted and hose stations marked as inoperative, verification of required compensatory firehoses available as required

For those reports reviewed there were no significant CAQs identified by licensee personnel. In most cases, only minor administrative and other discrepancies were identified which were corrected as COTS. However, it is noteworthy to point out that quality monitoring activities were noticeably redirected as the result of identified problem areas such as fire protection.

Control of Fluid Systems

The inspector selected for review various IIRs which the licensee performed since January 1, 1989, in the plant operations area. IIRs reviewed included the following:

Report Number	Subject
89-012	Unmonitored release of 192,000 gallons condensate storage water (also LER 259/89-004 and NRC Violation 259, 260, 296/89-35-04)
89-019	Unit 1 condenser pump pit floor flooded

89-027	Clean spill in radwaste building
89-048	CCW spill in Unit 1 turbine building
89-050	Unit 2 condenser room flooding
89-059	Overflow/Contamination radwaste precoat tank
89-061	Radioactive spill/personnel contamination
89-069	Radwaste fire pump bladder rupture
89-091	Overflow of Fuel Pool (also NRC Violation 260/89-53-01)
89-094	Spraying down Unit 1 HPCI
90-024	Unplanned ESF due to transfer of 480 Volt Shutdown Board (LER 259/90-002)
90-025	Unplanned loss of fire protection hose stations for all three units (LER 259/90-004
90-046	Fire protection system isolation (LER 259/90-007)
90-050	Reactor and refuel zone isolation (LER 260/90-003)
90-55	PCIS Group 6 isolation during SI performance (LER 260/90-004)

During the inspector's review of the above IIRs a large number of personnel errors were noted. In particular it is noteworthy to recognize that the licensee experienced 10 separate events during 1989 that involved failure to control fluid systems resulting in spills, flooding, or uncontrolled loss of large amounts of potentially contaminated water. Two of these failures resulted in NRC violations for failure to respond promptly to off-normal conditions.

The inspector held discussions with management representatives from plant operations and the Site Quality Organization to determine the extent of corrective actions associated with this problem. Based on this discussion and examination of various additional documentation provided by the licensee, the inspector determined that the problem has been adequately resolved due to the following corrective actions which took place in December 1989:

Reassignment of an experienced SRO to the newly created position of Water and Waste Coordinator.

Assignment of operations personnel to newly created Radwaste Unit Operator position which is now fully manned around the clock.

Each SOS was counseled with increased emphasis placed on attention to detail and prompt response to off normal conditions.

Training conducted with all operations personnel on the above events.

The inspector noted that these actions appear to have been effective by the absence of any similar events during 1990. This is made further evident in the decrease in the overall average radwaste input rate (which represents plant leakage) from 25 gpm to 10 gpm during the same time period.

Fire Protection Problems

The inspector selected for review various LERs which the licensee has submitted since January 1, 1989, in the plant operations area. LERs reviewed included the following:

Report Number	Subject
259/90-002	Unplanned ESF actuation (also IIR 90-024)
259/90-004	Loss of all three units' hose stations (also IIR 90-025)
259/90-006	Unplanned ESF actuation (auto D/G start)
259/90-007	Isolation of high pressure fire protection (also IIR 90-046)
259/89-021	Failure to establish firewatch
260/89-020	Unplanned ESF actuation
259/89-022	Unplanned ESF actuation (CREV isolation due to maintenance error)
259/89-023	Inoperable EECW and D/G (due to error during SI)
260/89-025	Removal of firehose compensatory measure due to personnel error
260/89-026	Inoperable D/G (due to maintenance error)
296/90-022	Unplanned ESF actuation due to electrical board transfer
296/89-004	Unplanned ESF actuation (auto D/G start, inadequate work request)

During the review of the above LERs the inspector noted a definite trend in personnel errors resulting in either unplanned ESF isolations or inadvertently not satisfying TS requirements for fire protection equipment.

The personnel errors related to fire protection appear to be related to plant operations activities. The inspector met with licensee management to discuss this problem. The inspector was informed during the meeting that the problem was due in part to the recent organization change and change in responsibility for fire protection and at the same time a significant amount of modification work was ongoing on fire protection equipment. Licensee management informed the inspector of the following corrective action in this area:

Increased emphasis by plant management toward the goal of zero personnel errors.

Recent assignment of an experienced SRO responsible for managing the fire protection program.

The inspector noted that no similar failures have occurred since the event of April 26, 1990. Although this represents a positive change indicating that management may be correcting the problem with personnel errors, insufficient time has lapsed to determine if the effects are long lasting. The resident staff will continue to monitor licensee activities in this area.

Temporary Alterations

The plant has had an extensive history of abuse of the temporary alteration program which resulted in a large backlog of outstanding open TACFs. This constituted a condition which makes management and status of the configuration control program difficult. This issue had been identified by the NRC as IFI 260/88-02-02. As of January 1988 there had been approximately 200 existing TACFs for Unit 2 with greater than 700 for all three units. At that time the licensee agreed that this issue was a problem and committed to a significant reduction in open TACFs.

The inspector noted that licensee management has continued to devote attention to this area with the current number of open TACFs at 29 for Unit 2. Only three new temporary alterations have been issued for all three units during 1990. Although 29 is still too high and further reduction in the backlog is needed, the licensee has made significant progress in this area largely due to management attention by both plant Operations and Technical Support personnel. Licensee Technical Support personnel responsible for oversight of this program stated that although the goal is still zero open TACFs for Unit 2 the actual commitment is to be below 10 open TACFs before restart. There are apparently seven TACFs that the licensee feels will still be necessary at restart. The resident staff will continue to follow the licensee progress in this area with a review of all open TACFs prior to restart.

6. Surveillance Testing

This area concerned the corrective action program as it applies to surveillance testing. The inspection was performance based and included reviews of deficiencies identified during the performance and review of

SIs to verify that adequate corrective actions had been initiated in accordance with the licensee's approved programs and procedures.

Trending was identified as an area where PMI-17.1 did not satisfy the requirements of SDSP 3.13. Test deficiencies which are determined to be CAQs will normally result in the initiation of a WR, CAQR, or PRD to effect corrective actions. Procedure PMI-17.1 leaves the trending of test deficiencies to these programs instead of including a test deficiency trend analysis. A licensee quality audit identified that the PMI-17.1 method did not meet the requirements for a trending program contained in STD-3.1.10 Trend Analysis. The licensee is in the process of correcting this concern. This issue is further discussed in paragraph 4.

The inspector held discussions with licensee personnel on the control of test deficiencies, CAQ/ACP trending, and implementation of the QA and CAQ programs. The inspector reviewed documentation identifying surveillance testing deficiencies that were issued or performed since October 1989. The inspector also reviewed the proposed corrective actions to resolve the identified deficiencies. The following documents were reviewed:

- List of all open test deficiencies

- NQA&E Audit Reports

  BFA89003: Technical Evaluation of the RHR System
  BFA90013: Conformance to Technical Specifications
  BFA90017: Correction of Deficiencies/Corrective Action Program

- Site Quality Monitoring Reports

  QBF-S-89-1832: SI Performance Observation
  QBF-S-89-1866: SI Performance Observation
  QBF-S-89-1927: SI Review
  QBF-S-89-1972: SI Review
  QBF-S-89-1974: SI Review

- CAQRs/PRDs
  BFP890760: Deficiencies Identified During 2-SI-4.2.C.1.2FT
  BFP890821: Deficiencies Identified During 2-SI-4.5.A.1.d(I)
  BFP900169P: Deficiencies Identified During 3-SI-4.2.K-3A

- Incident Investigations

  II-B-90-035: Unidentified Reactor Scram
  II-B-90-038: Inadequate Compensatory Sample for RCW Effluent Radiation Monitor
  II-B-90-056: Unplanned ESF Actuation During 0-SI-4.2.G.2
  II-B-90-057: Missed Steps on 3-SI-4.2.K-3A

For each of the documents reviewed, the inspector verified that approved procedures were implemented and adequate corrective actions were identified for resolution of the deficiencies. No discrepancies were identified during the performance of the reviews.

The inspector concluded that the licensee had programs to evaluate, resolve, and follow-up on deficiencies identified during the performance and review of surveillance testing and that the programs were being implemented at BFN.

7. Maintenance

The NRC inspector reviewed the licensee activities in the quality verification area that occurred over the past six to twelve months. The review was of the licensee's activities in the Quality Monitoring, Quality Surveillance and Maintenance Site Organizations. The items specifically reviewed were:

- Quality Monitoring Reports involved with corrective maintenance, preventive maintenance and post maintenance testing
- Temporary Alterations involved with Maintenance Requests
- Quality Surveillance Reports involved with performance of maintenance and Temporary Alterations
- Failure Investigations involved with maintenance and LERs
- Maintenance work activities which required rework due to personnel errors
- Trending of Preventive Maintenance
- Actions by Maintenance Managers involved with quality verification

These items are indicators that demonstrate the licensees commitment to quality in the area of maintenance activities.

a. Quality Monitoring

The site quality monitoring activities are controlled by procedure QMP 102.1, Quality Monitoring Program - Site. This procedure resulted in the establishment of a monitoring matrix which contained the areas to be monitored such as: MA-1, Corrective Maintenance; MA-2, Preventive Maintenance; MA-7, Maintenance Organization and Administration; MA-9, Post Maintenance Testing; and MA-14, Work Control. The inspector reviewed the Quality Monitoring group activities in the areas of Corrective Maintenance, Preventative Maintenance and Post Maintenance Testing.

In the area of corrective maintenance the inspector reviewed 13 quality reports involving the monitoring of maintenance activities in the following area: Fire Protection which included work on a pressure control valve; Diesel Generators which included work on a ground detector meter and DG starting air meter; Control Rod Drive system air lines; Residual Heat Removal system which included part of the Unit 3 layup program; compliance with procedure SDSP 7.6,

Maintenance Management system; Control Bay Chill Water System which included the repairs to a pipe depression; and compliance with G-SPEC 38 which included minimum turning radius of electrical cables/conductors. The most significant item reviewed involved CAQR BFP 900013. This issue concerned minimum turning radius. The results of the review indicated that the subject CAQR did not constitute a programmatic deficiency. Additional areas observed during the review concerned the use of COTS method of correcting minor deficiencies. COTS review identified the following: No. 1460-01, incorrect information for foreman; 1460-02, name of craftsman performing the work not listed; 1460-03, typographical error in work instruction; and 1772-06, Blanks not marked N/A.

b. Temporary Alterations

The inspector reviewed three temporary alterations which involved the following:

- TACF 0-89-001-018 was installed using MR 898849. This activity involved the removal of the check valves on the discharge side of the Unit 1/2A diesel generator fuel oil pump 2. This TA was initiated to verify that the removal of the check valve was necessary.

- TACF 2-90-001-79 was installed using MR 876133. This activity involved the installation of mounting brackets and platform to the fuel handling boom. This TA was initiated to facilitate core off loading.

- TACF 2-90-002-303 was installed using WR C020188. This activity involved the installation of hinged locking clasps on the wire cage surrounding the northwest drywell equipment access. This TA was initiated to facilitate site security opening and closing the access.

All items involved in the TACFs were well documented and all work activities were adequately controlled. TACF 0-89-001-018 resulted in the issuance of DCN W9097 which authorized the removal of all Unit 1 and 2 DG fuel oil pump check valves.

c. Quality Surveillance

The inspector reviewed quality surveillances which were done in process as well as post performance and involved with the following: testing of a one inch fuel pool heat exchanger relief valve; review of completed maintenance requests and preventive maintenance packages; repair of cable jacket damage by the use of a Raychem cable repair sleeve; management involvement in reducing the large amount of backlogged PMs; annual PM of Unit 1/2 diesel generator C; weekly inspection of control bay chiller 1B; and calibration of temperature

indicator 2-TI-076-15. During the review, the inspector noted that adverse conditions were identified and each item was resolved by the use of COTS. The surveillance indicated adequate monitoring of field activities.

d. Failure Investigations and LERs

The inspector reviewed the following LERs:

- LER 50-259/89022, which documented that on August 10, 1989, at approximately 1000 hours, train A of the Control Room Emergency Ventilation system unexpectedly actuated due to a signal system that was out of service at the time of this event: Investigation of the actuation revealed that the radiation detector internal calibration source (check source) had been inadvertently inserted during insulation work in the area. The cause of this event was the insertion of the radiation detector check source due to bumping of the check source assembly. The root cause was human factors in that the detector was not labeled as sensitive equipment; therefore, it was not protected from ongoing work.

- LER 50-260/89020, which documented that on July 2, 1989, at 1335 hours, the logic circuit associated with the unit 2 reactor zone ventilation radiation monitor was deenergized during replacement of a fuse. This resulted in the isolation of unit 2 reactor zone ventilation, and the refueling zone ventilation; and the initiation of standby gas treatment and control room emergency ventilation. This event was caused by electricians incorrectly jumpering the fuse and associated circuit. After completion of the investigation, the jumper was properly installed and the fuse replaced. The ventilation systems were returned to normal at 1525 hours. The electricians involved were counseled on the need to research unfamiliar equipment or conditions. Training was provided to electrical maintenance craft and planners on alarming fuses and circuits. In addition, the maintenance instruction for fuse replacement was revised to add a caution about this type of fuse circuit.

- LER 50-260/89026, which documented that on August 10, 1989, at 1750 hours, the "B" EDG was declared inoperable along with its associated Unit 2 residual heat removal system pump and core spray system pump which resulted in not meeting the minimum core cooling system requirements of Technical Specification 3.5. The "B" EDG was declared inoperable when minimum air start system pressure requirements could not be met due to an air leak on the high pressure head of the right bank air compressor for the EDG starting air system.

  The cause of this event was personnel error during the reassembly of the high pressure head of the air compressor following maintenance earlier in the day. Failure to reassemble the head correctly and allowing debris to remain in the head

bolt holes prevented proper torquing of the head bolts. Also contributing to this event was a malfunctioning unloader valve. This malfunction increased the stresses on the head gasket. These problems resulted in the failure of the head gasket and subsequent inoperability of the EDG. As a result of this event, appropriate personnel corrective action was initiated for the maintenance personnel involved in this event. Other appropriate maintenance personnel were also made aware of this event. Additionally, the procedure used to repair the air compressor in this event was enhanced to prevent recurrence of these problems during future repairs.

The inspector also reviewed five failure investigations which involved the following; radiation monitoring power supply, emergency equipment cooling water system check valve O-CKV-67-652, spent fuel pool cooling system alarm, O-PDM-78-22, core spray system valve, 2-MOV-75-23, and standby gas train trains A and B, humidity control heater circuit breakers.

During this review the inspector noted that in the case of each LER the problem was identified and corrected. It was also noted that for the failure investigations, each item was thoroughly reviewed and the root cause was noted. The failure investigation for the failed spent fuel pool cooling alarm was initiated because of a trend in the number of failures in a given amount of time.

e. Maintenance Requests

The inspector reviewed three MRs, which involved the following:

- MR 781568, which required the replacement of O-rings for relay AD3 (AY) in panel 25-45D.

- MR 781569, which required the replacement of O-rings for relay AD2 (A2) in panel 25-45D.

- MR 89330, which required HFA relay ASLR (RW) in Shutdown Board 3EC to be calibrated and the latch engagement to be checked per NRC Bulletin 88-03.

All three MRs were not worked correctly per procedures. This involved not performing post maintenance testing and inappropriate signatures. The inspector noted that the licensee corrected these deficiencies and took additional personnel actions.

f. Additional Reviews and Observations

The inspector reviewed memos from line management to maintenance personnel emphasizing quality on the job. These memos discussed the following:

- Priorities. This memo listed the priorities as 1) Safety, 2) Quality, 3) Team Effort, 4) Attitude/Determination, 5) Efficiency, and 6) Production. This memo went on to state that if the first four were firmly established, the last two would occur naturally.

- QA Records. This memo emphasized that test data must be included when work authorizing documents were sent to history files. The personnel were to ensure that data was included when MRs, PMs, and SIs were signed off as completed.

- Procedure Compliance. This memo emphasized that attention to detail was a key element in the accuracy, completeness, and procedural compliance associated with completed work packages.

- Task Closure Verification. This memo emphasized the need for all responsible general foreman to verify that tasks are completed in a safe and quality manner consistent with applicable instructions and procedures.

- Job Briefing. This memo emphasized the following and stated:

  Prior to starting a job, conduct a pre-job briefing or discussions with appropriate personnel to ensure a clear understanding of the following:

  1) Work to be performed (including the correct components, train, system and unit to be worked)

  2) Impact on other work and operating activities

  3) Communication requirements

  4) Radiological control requirements

  5) Material and tools required for the job

  6) Tagout boundaries

During these discussions, plant personnel should be encouraged to use specific equipment identification nomenclature in verbal communications.

The above memos indicated line management involvement in quality verification.

Additionally, during this QVI, the licensee completed a QA Audit of the maintenance activities. At the QA exit the lead auditor discussed with senior plant managers the findings observed during the audit. These findings include a lack of understanding by maintenance personnel of independent verification and the M&TE usage log did not accurately reflect usage of M&TE. This audit is another indication of senior TVA management involvement in QV activities.

Conclusions:

As result of the above reviews and observations the inspector determined that:

- Quality Monitoring and Surveillance, the onsite quality organization, is adequately pursuing activities involving quality in the field (item a. and c. above).

- The maintenance line management is involved in reviewing work activities and methodologies to ensure quality is emphasized over production (item b., e., and f.).

- Failure investigations are used and root causes are identified (item d. above).

- A corrective action program for maintenance activities is inplace and is effective (all items above).

The inspector also reviewed trending in the maintenance group and, although trending of PMs was very adequate, additional trending of CAQ/ACPs needs to be formalized. This item is documented in the IFI on trending for this report.

8. Design Engineering Support to Correct Deficiencies

a. Plant Stack Dilution Fan Damper Leakage

(1) Description of Activity

CAQR BFP880304, Plant Stack Dilution Fan Damper Leakage, was written on April 21, 1988, to document the absence of a convective flow in the plant stack. This design deficiency was identified by base-line test 2-BFN-RTP-065 which was performed to determine if a natural draft exists within the stack due to convective forces. A natural draft is required to prevent a ground level release with only the Standby Gas Treatment System operating because credit cannot be taken for the stack dilution fans or the cubicle exhaust fans and their associated ductwork. These items had never been designed nor procured as safety-related components.

(2) References

(i) LER 88-039-01, Control Room Operator Dose after Design Basis Event May Exceed 10 CFR Limits Because of Design Error.

(ii) Special Test 89-07, Off Gas Stack Back Flow Measurement, Revision 0.

(iii) Off Gas Stack Backdraft/Resolution Feasibility Study, Revision 1, BFNP TSD-M078, dated February 23, 1990.

(iv) Memorandum from W. C. Thomison, Acting Technical Support Superintendent, BFNP, to Plant Operations Review Committee, BFNP, Subject: BFNP - Closure of Special Test (ST) 89-07, "Off Gas Stack Backflow Measurements - System 66, dated January 4, 1990.

(v) DCN No. W11053A, Prevent Ground Level Releases, dated April 6, 1990.

(vi) DNE Calculation, No. ND-Q2066-900030, Post Accident Off Gas Release Potential, dated June 19, 1990.

(3) Conclusions

The licensee determined that the root cause of the above design-deficiency was failure to verify or justify assumptions used in engineering calculations. The original off-site dose calculations prepared for BFNP assumed that all of the SGT system effluent would be released at the top of the stack because of zero back-leakage through the off-gas dilution fan damper and ductwork. This assumption of zero ground releases from the stack was documented as an NRC commitment in FSAR Chapter 14, Analyses. This assumption was not valid, however, in that leak-tight dampers and ductwork were never originally specified for the off-gas dilution fan exhaust. Consequently, use of this unverified assumption in the off-site dose calculation resulted in an NRC commitment that was beyond the functional capabilities of the off-gas system dilution fan damper/ductwork design. The procedural deficiency that allowed the use of unverified/unjustified assumptions in engineering calculation was corrected on September 27, 1987, when Nuclear Engineering Procedure (NEP-3.1), Calculations, was issued for use.

The inspectors reviewed the referenced documents and conducted interviews with licensee engineering staff to determine the technical adequacy of the corrective action taken for disposition of the identified deficiencies. The inspectors determined that reference "V" was being developed to correct the hardware non-conformances. the stated design objectives were:

- To minimize ground level releases
- Provide air flow greater than or equal to 1100 CFM required by the WRGERMS
- Minimize release in the SGT system building during normal operation

Hardware changes required to accomplish the above objectives include installing redundant safety-related isolation dampers, (2 in series for single failure protection), in (1) Units 2 and 3 dilution air ducts; (2) Cubicle Exhaust Duct, (3) Steam Packing Exhauster Duct; and (4) six inch cross-tie lines from the SGT system headers to the Units 2 and 3 dilution air ducts. Additionally, Unit 1 dilution air duct and its associated six inch off-gas line will be blanked off. Also, to ensure minimum air flow to the WRGERMS the speed of both Units 2 and 3 dilution fans will be increased within the limits of the existing motor. Finally, electrical design changes will provide Class 1E power, controls and indication for the installed isolation dampers.

The plant modification package was reviewed to verify that selected design-output documents were consistent with the hardware changes. Additionally, the inspectors verified that appropriate technical and quality requirements had been specified on procurement documents for procuring necessary materials. Post-modification test requirements and test acceptance criteria were not included in the DCN package. In response to the inspector's request for information concerning this issue, TVA management stated that a test scoping document had not yet been prepared for this plant modification. At the time of the inspection the DCN package was still being reviewed and commented on by TVA engineers.

Nuclear Safety Evaluation No. SEBFDCN900092, prepared in accordance with the requirements of 10 CFR 50.59, lists special requirements that have to be performed prior to declaring the system operable or closing the DCN. Additionally, two compensatory measures determination forms were included in the safety evaluation. Discussions were held with licensee's engineering personnel concerning licensee's actions required to (1) satisfy these special requirements and (2) implement the compensatory measures.

The inspectors concluded that CAQR BFP880304, Revision 2 was being properly dispositioned by the licensee. The developed corrective action plan as implemented by DCN No. W11053A is incomplete in that the DCN is in the review and comment stage prior to approval of the design output documents. The scope of that plant modification, however, adequately addresses the identified material nonconformances. Development and preparation of the DCN was done in a controlled manner; and resolution of this issue was done from a nuclear safety standpoint.

b. Potential Uncontrolled Leakage Paths

(1) Description of Activity

CAQR BFP900164 was written on June 11, 1990, to document previously unidentified leakage paths associated with the deficiency described on CAQR BFP880304 Revision 2. The potential leakage paths are (1) from the stack liner drain line to the stack drain sump; (2) from the off-gas treatment building sump to a connection to the stack liner drain line; (3) from the radwaste building sump to a connection to the stack liner drain line, and (4) from the drain of the SGT system piping into the off-gas condensate sump in the radwaste building.

(2) References

CAQR BFP880304, Plant Stack Dilution Fan Leakage, Revision 2

Drawing No. 0-47E830-1, Flow Diagram Radwaste

Drawing No. 17W920-2, Mechanical Heating and Ventilating Stack Gas Dispersal System

Drawing No. 17W401-1, Mechanical Off-gas System

Drawing No. 17W401-2, Mechanical Off-gas System

(3) Conclusions

Baseline test 2-BFN-RTP-065 demonstrated that the SGT system exhaust would backflow from openings at the base of the stack. This condition caused the drains from the SGT system piping and from the stack-liner to be pressurized by radioactive gases. These gases could escape either from a break in the drain piping itself or by failure of the water sealing system in the three sumps to which it is connected. The drain lines are not designed to be seismic Class 1 and the sumps and their supporting electrical equipment are not safety-related equipment. No credit can be taken for them with regard to limiting post-accident releases.

The above determination was made during detail design of DCN W11053A. That portion of the three inch stack liner drain line and related pipe supports within the stack was seismically analyzed during preparation of the DCN. CAQR BFP900164 was written to initiate corrective actions for the remaining portion of the drain lines, that are routed underground, to ensure their structural integrity during a seismic event. The developed corrective action plan included performance of a seismic analysis of the underground drain line connected to the SGT system header to verify its structural integrity. A normally locked-close valve would be installed in this line at the radwaste building to establish a boundary between

seismically and non-seismically qualified drain lines. In a similar fashion a normally locked-close valve would be installed in the exposed part of the stack liner drain line. This line has previously been seismically analyzed and its structural integrity verified under DCN W11053A.

The inspectors verified that CAQR BFP900164 was being dispositioned in accordance with the administrative controls of the licensee's corrective actions program. A determination of QA programmatic deficiency was performed and the deficiency was reviewed for its effect on Unit 2 startup. The completed restart review check list recommendations identified CAQR BFP900164 as a restart item with corrective action required to be completed prior to Unit 2 startup. The inspectors concluded that the deficiency documented on CAQR BFP900164 was being adequately dispositioned by the licensee. The capability of the design engineering process to identify additional release pathways demonstrates a controlled and thorough technical approach to the resolution of this problem from a nuclear safety standpoint.

c. Control Bay Chilled Water Pump Failure to Supply Design Flow Rate

(1) Description of Activity

CAQR BFP900186 was written on June 7, 1990, to document failure to Units 1 and 2 Control Bay Chilled Water pumps to supply design flow rate. Restart test 2-BFN-RTP-031A, Control Bay HVAC, documents on TE07 and TE10 the above deficiency. Test Exception (TE)07 was written on November 30, 1988, with a disposition of performing maintenance on the pumps followed by re-testing. TE-10 was written on December 15, 1988, upon failure of the retest to demonstrate adequate pump performance.

(2) References

(i) Drawing No. 0-47E866-3, Flow Diagram, Heating and Air Conditioning Hot and Chilled Water, Revision 4

(ii) RTP Test Instruction No. 2-BFN-RTP-031A, Control Bay HVAC, Revision 0.

(iii) Temporary Alteration Control Form No. 0-88-002-031, Change Instrument Setpoints 0-TS-31-7 44 Degrees F to 37.5 Degrees F ± 5 Degrees F; 0-TS-31-12 44 Degrees F to 37.5 Degrees F

(iv) DNE Calculation No. MD-Q2031-880378, Chilled Water Temperature Determination for Units 1 and 2 Water Chillers A and B, dated December 19, 1988

(v) Special Test 89-01, Control Bay Chilled Water Pump Test, System 31, Revision 1

(vi) Special Test 89-01, Unit 1 and 2 Main Control Room AHU Electrical Cooling Load Determination, Revision 0

(vii) QIR No. LMEBFN9005, RO, Mechanical Control Room (MCR) Heat Loads, February 20, 1990

(viii) DNE Calculation No. MD-Q0031-900002, Browns Ferry Control Building Analysis, Revision 0

(3) Conclusion

Failure of Units 1 and 2 Control Bay Chiller Water pumps to deliver design flow rate was reviewed by Nuclear Engineering to evaluate its effect on plant operation. Compensatory measures were implemented via Temporary Alteration Control Form No. 0-88-002-031 which lowered the setpoints of Water Chillers A and B temperature switches. Design basis information for this setpoint change was provided by reference (iv), DNE Calculation No. MD-Q2031-880378.

Pursuant to development of a long-term resolution for CAQR BFP900186, the licensee has performed a number of special tests. Special Test 89-01 was performed to determine the cause of the low chilled water flow rate. Several problems were identified and corrected during this test which resulted in flow rates greater than that measured in the restart test. These values were, however, still less than the required design flow by approximately ten percent. Special test 89-09 was subsequently performed to monitor the operation of Units 1 and 2 control bay elevation 617 air conditioning system for 48 hours. Data collected during this test was used in preparation of reference (viii) DNE Calculation No. MD-Q0031-900002. The purpose of the calculation was to determine the electrical heat load that existed in the main control room during performance of ST 89-09. This electrical heat load along with pertinent information concerning tagged out equipment can be used by the electrical engineering staff to determine the electrical heat load that would exist during a Unit 2 Loss of Coolant Accident.

The inspectors determined that the root cause of the deficiency was unverified and unjustified engineering assumptions concerning electrical heat loads in the control bay made during original plant design. The licensee's corrective action plan is intended to provide an accurate evaluation of the electrical heat load for the control bay and subsequently determine the minimum chilled water flow requirements. At the time of the inspection, Nuclear Engineering, (Electrical Engineering) provided an informal response to reference vii addressed to the Lead

Mechanical Engineer. The electrical engineering staff stated that they were unable to analytically demonstrate a reduction in electrical heat loads in the main control room panel, because of insufficient information concerning load diversity. They stated, however, that a test was performed to determine the actual heat loads generated. Preliminary review of the test data has been performed, with the final test results scheduled for issue on July 20, 1990.

The inspectors concluded that the disposition of CAQR BFP900186 was being handled in a controlled and technically adequate manner. Reference vii was prepared on February 20, 1990, and transmitted to the Lead Electrical Engineer with request for a response by March 26, 1990. This response was provided in an informal memo dated July 12, 1990, at the time of the inspection. This action is an isolated example of untimely response which is further discussed in paragraph 8.f of this report.

d. Use of Nonconforming Items

The licensee corrective action program, paragraph 3.8.3, Conditional Releases, specifies the procedure whereby the licensee can "use-at-risk" various nonconforming items. The conditional release classifications are described as follows:

Type 1 CR permits the nonconforming item to be installed, but NOT OPERATED, ENERGIZED, PRESSURIZED, OR CONSIDERED OPERATIONAL.

Type 2 CR permits the nonconforming item to be energized, pressurized, and operated ONLY FOR TESTING. The item SHALL NOT BE CONSIDERED OPERATIONAL.

Type 3 CR consists of two types (i.e. Type 3A and 3B).

For nonconforming items in an operational status, a Type 3A CR ALLOWS CONTINUED OPERATION of the nonconforming item.

For nonconforming items that are in the process of being turned over for operations after performance of maintenance, modification, repair, or test activity a Type 3B CR ALLOWS CONTINUED OPERATION of the nonconforming item.

The program requires System Engineering, Nuclear Engineering, or Nuclear Fuels to provide a technical evaluation and justification for types 2 and 3 CRs. The inspectors determined that a lower-tier quality implementing procedure has not been developed to provide guidance for performing this function. Additionally, in response to the inspectors question, concerning the extent to which System Engineers perform reviews and evaluations of design basis documents,

licensee management stated that SDSP 27.6 will define the limited design scope of this group. This procedure was in draft form at the time of the inspection and was not reviewed by the inspectors.

The inspectors reviewed 11 Conditional Release Requests that were outstanding at the time of the inspection. Based on the small number the program appears to be well controlled. Requirements for the Shift Operations Supervisor and PORC to review types 2, 3A, and 3B CRs established appropriate checks and balances which provides assurance that action will be completed from a nuclear safety standpoint. Review of the Conditional Release Requests revealed, however, that the process is more directed towards providing a basis for using the nonconforming hardware. The process does not (1) first assure the public health and safety and (2) then make provision for successfully restoring the plant to on acceptable level of quality.

The inspectors concluded that requirements for performing a nuclear safety evaluation relative to the CR and use of nonconforming items have not been established. Also, CRs may be used during any mode of unit operation with no specified time limit for completing the corrective actions. The above programmatic weaknesses were discussed with licensee management.

Licensee management concurred with the inspectors observations and stated that appropriate administrative controls will be established to address the identified weaknesses.

e. ACP for Drawing Discrepancies

The inspectors reviewed objective evidence and conducted interviews with licensee's engineering personnel to assess the effectiveness of the DD program. Additionally, licensee's commitment to the NRC concerning closure of DDs open against Unit 2 was reviewed and discussed. The following references were used during this effort.

(i) PI 87-70, Processing Drawing Discrepancies, Revision 3

(ii) SDSP 9.1, Processing Potential Drawing Discrepancies, Revision 10

(iii) STD 3.1.10, Trend Analysis, Revision 0

(iv) Drawing Discrepancy Daily Progress Report (Selected samples for July 1990)

Based on review of the above documents the inspectors concluded that the DD program has not been effective in resolving drawing discrepancies. The total number of DDs remaining to be processed is still unacceptably high. This number was 1960 as of July 12, 1990. Additionally, the licensee has not been closing DDs open against

Unit 2 in accordance with its NRC commitment. A Notice of Deviation was recently written against the licensee for failing to meet this commitment and is documented in NRC Report 50-259,50-260,50-296/90-18.

Review of SDSP.9.1 revealed a recent change to the DD program. The new program uses the PDD form to document and initiate corrective action for apparent discrepancies in the as-built plant configuration and the drawings which document the as-built plant. Primary responsibility has been assigned to the System Engineer for resolution of DDs. Procedure STD 3.1.10 establishes requirements for trending DDs. At the time of the inspection this program requirement was not being implemented. However, actions are in progress to develop this program capability.

An assessment of the effectiveness of the revised DD program cannot be made at this time. The program requires time to be implemented and to demonstrate is effectiveness via Trend Charts and a reduction in number of the outstanding drawings still to be processed.

f. Timeliness of Corrective Actions

Statistics revealed that Nuclear Engineering has been one of the major contributor for delinquent corrective actions. Since the establishment of mandatory Saturday morning meetings, for organization managers responsible for escalated CAQRs, there has been a measurable improvement in the performance of this group. Saturday morning meetings were initiated on March 17, 1990, with the expressed purpose of assigning ownership and accountability for resolving CAQRs that had late action items. The monthly QA Level 2 Trend Report shows Nuclear Engineering having 62 percent and 66 percent CAQR delinquent actions in January and February, 1990.

The delinquent rate fell to 49 percent in March and has continued to trend lower with delinquent rates of 36 percent and 24 percent in April and May respectively. Data for the trend report compiled on July 11, 1990, shows a delinquent rate of 25 percent. Additional information on SQ trending effectiveness is addressed in paragraph 9 of the report.

9. Followup on Previous Inspection Items

a. (Closed) IFI 50-259,296/84-49-02, Modification to the RPS Power Supply Monitoring System

This item involved an inconsistency between RPS M-G Set surveillance requirements of TS Section 4.1.B.1. The item has been closed for Unit 2 in Inspection Report 50-259,260,296/89-61. Work has progressed for Units 1 and 3. TVA has submitted a TS change request to the NRC dated, June 4, 1990. The amendment proposes to revise the RPS circuit protector trip level setpoints for Unit 2 and add surveillance requirement, containing the same setpoints for Units 1

and 3. Progress on this request is underway and until completed, followup action will be tracked as inspector followup item 50-259,260,296/90-20-03, RRS Circuit Protector Trip Level Setpoints and Surveillance.

b. (Closed) Temporary Instruction 2515/78, Inspection of Quality Verification Functions.

Verification activities of QA requirements at a TVA nuclear plant is performed by a number of organizational entities. These are Site Quality, Quality Technical Support, Quality Control and Off-site Quality. Since the concept of performance-based techniques has been introduced, these organizations have made the change to utilizing these methods in conducting their audits. One recent example of this technique is Audit No. BFA 90017, dated May 16, 1990. This report was reviewed by the inspector and found to fulfill the expectations of a performance-based audit. Also, during discussions with quality personnel it was noted that they have adopted this type of results-oriented program into their activities.

c. Weaknesses Identified in Inspection Report 50-259,260,296/89-12

A number of weaknesses were described in Inspection Report 50-259, 260,296/89-12 which was performed April 10, 1989, through May 12, 1989. BFN responded to each item soon after the report was issued (August 16, 1989). However, since that time a number of organizational and QA programmatic changes have taken place. In some cases the weaknesses are not germane or have been resolved. Each item is closed and is briefly discussed below. The items have been grouped by subject and the identifying number listed is the TVA Control Number:

(1) Procedures

SLT 890930006, Procedure Intent Changed Without a Second Independent Review.

QC verification of bolt torquing was not done. Instead, the craftsman performed the bolting without QC involved.

The bolts were subsequently retorqued in October 1988 with QC verification. The maintenance procedure, MMI-6, was revised in June 1989 to specifically require QC verification for bolting with or without a crows foot adaptor.

SLT 890930009 The Large Number of Non-intent Procedure Change.

The large number of non-intent procedure changes indicates that the validation process is not working. In the past, non-intent changes were not well defined. As of October 29, 1989, procedure changes involving sequence of steps, setpoints, torque

values or valve lineups are not permitted to be made as a non-intent change. The large number of changes were believed to result from the procedure upgrade program and re-labelling program of the control room and other equipment.

SLT 890930010 Overdue Investigations for Out-of-Tolerance Measuring and Test Equipment.

The weakness was described as not meeting the self-imposed 15 day deadline to investigate out-of-tolerance measuring and test equipment. A study, conducted by TVA personnel, recommended a 30 day deadline as more reasonable and this was standardized for all TVA nuclear facilities.

Upon detection of an out-of-tolerance condition, an operability check is required immediately, this requirement has not been changed. The Management Review Committee does not necessarily investigate these as they may be processed by an accepted administration control program.

(2) Operations

SLT 890930015 Shift Supervisor Knowledge of Activities Within the Plant.

The weakness stated deals with the degree of knowledge that the Shift Supervisor has of on-going activities. This is a subjective area. The Shift Supervisor participates in the plan-of-the-day meeting, evening craft turnover meeting, and a maintenance and modification coordination meeting. He is involved in scheduling work to ensure compliance with Technical Specification. Since this finding was identified, changes have been made to the operations organization. A Shift Support Supervision position was created. This change has resulted in increased involvement of the Shift Operations Supervisor in operational activities. His involvement in work activities appears adequate and is not burdened with trivial details.

SLT 890930018 Compensatory Measures Program.

A weakness was noted whereby the operators did not understand the compensatory measures program. Also noted, was that all applicable procedures had not been revised to reflect the compensatory measures. At the time these findings were observed, the licensee was establishing the compensatory measures program and had a procedures improvement program underway. Follow up on this matter revealed that procedure SDSP 12.11 has been revised to provide a list of special requirements and compensatory measures. Operation personnel were trained on this matter on December 6, 1989.

(3) Maintenance

SLT 890930004 Backlog of Preventive Maintenance.

The maintenance organization has addressed the backlog of preventive maintenance items. Since July 1989 the backlog has been reduced from 664 to 71 items as of September 1989. A further reduction to 50 items was noted on October 1989. This downward trend indicates that this weakness is under control.

(4) Site Licensing

SLT 890930001 Packages Submitted for Closure Was not Ready.

A review indicated that closure packages submitted to the NRC were not complete or technically adequate. To resolve this weakness, a meeting was held between NRC and TVA in September 1989. Changes in the closure process were agreed upon and since these changes went into effect, none of the packages submitted have been rejected.

(5) Site Quality

SLT 890930012 Site Quality Involvement in the Resolution of Personnel Errors is Mainly Statistical.

Responsibility for resolving personnel errors lies with the plant Superintendents. Site quality provides reports and statistical data for others to use in correcting personnel errors. QA is not responsible for effecting or administrating actions for this problem area.

(6) Corrective Action

SLT 890930002 Site Quality Assurance Activities in Support of a QVI.

The site Quality Assurance staff performed an audit using the QVI format. The inspectors' review of this audit revealed that root cause determinations were not performed and the impact on future plant operations was not assessed.

The QVI effort was repeated by TVA during the period of April 17 through May 5, 1989. The NRC agreed that the second look was adequate.

SLT 890930003 Corrective Actions Not Promptly Identified.

This weakness dealt with valve 2-FCV-74-67. The valve was inadvertently electrically backseated in March 1989. A maintenance request was written to inspect the valve for damage.

The valve failed to open and repairs were completed by April 8, 1989. A failure investigation report was initiated on April 10, 1989, to determine the root causes. The actions taken and the chronology appear reasonable.

SLT 890930005 Weaknesses Identified Root Cause Determinations and Input to NPRDS.

Formal training has been provided to engineers and managers to improve their ability to analyze failed components and to arrive at the proper root causes. An engineer reviews the data prior to submittal into NPRDS. These changes should improve the information submitted to INPO and correct this weakness.

It was observed that several plant events associated with Temporary Alteration Control were caused by weak implementation of plant work activities which in turn was due to weak management control. Since that time, management controls have been strengthened in that corrective actions using a variety of administration control procedures have been formalized.

SLT 890930008 Surveillance Upgrade Program.

The weaknesses with the BFN surveillance program are discussed in inspection report 50-259,260,296/89-43. A Notice of Violation regarding this matter was issued March 2, 1990. Followup on this matter will be conducted by the resident inspector.

SLT 890930011 Test Deficiency Not Dispositioned as a Condition Adverse to Quality.

The weakness was that a test deficiency was dispositioned without proper management attention. The decision as to whether a test deficiency should be a CAQ or processed as an administrative control procedure is related to safety significance. In this example, the inspector did not agree with TVA's decision, yet the outcome is essentially the same. The discrepancy was reviewed and ultimately corrected.

SLT 890930013 Inadequate Root Cause for LER 296/88-07.

The root cause identified in LER 296/88-07 was determined to be an untimely implementation of drawing corrections. The inspector believed that the problem was generic and a programmatic deficiency. TVA agreed and this was discussed in the analysis of the event.

Since this inspection finding was identified, the processing of drawing discrepancies has been revised several times. The issue has been assigned a new tracking number and is currently being reviewed and tracked by the resident inspectors.

SLT 890930014 Standby Gas Treatment Inlet Damper Stroke Times.

The inspector had questioned the corrective actions when the inlet damper failed to meet a stroke time stated in the FSAR. BFN prepared a safety evaluation to evaluate the effects of the damper stroke time. TVA decided to revise the FSAR with more general statements to satisfy the requirements of Design

Criteria 2-BFN-50-7065 and 2-BFN-50-7064C. This change has been submitted in June 1989, and the matter is resolved.

SLT 890930017 Personnel Errors.

A Review of about 50 LERs revealed that many were the result of personnel errors and management control of personnel errors appeared to be lacking. Since the report was issued, BFN has placed increased attention on human performance. Personnel errors are monitored and each department has established a zero error goal. The efforts appears to be working since the number of personnel errors reported is decreasing.

10. Exit Interview

The inspection scope and results were summarized on July 13, 1990, with those persons indicated in paragraph 1. The inspectors described the areas inspected and discussed in detail the inspection results listed below. Proprietary information is not contained in this report. Dissenting comments were not received from the licensee.

Licensee management was informed that the following items have been closed.

- IFI 50-259,296/84-49-02, Modification to the RPS Power Supply Monitoring System
- Temporary Instruction 2525/78, Inspection of Quality Verification Function
- Weaknesses identified in Inspection Report 50-259,260,296/89-12.

Additionally, licensee management was told the following items have been opened.

IFI 50-259,260,296/90-20-01, Completion of Action Identified to satisfy STD 3.1.10 Trend analysis, paragraph 4.

IFI 50-259,260,296/90-20-02, Site Quality Corrective Action Program Overview, paragraph 2.

IFI 50-259,260,296/90-20-03, RPS Circuit Protector Trip Level Setpoints and Surviellance, paragraph 9.

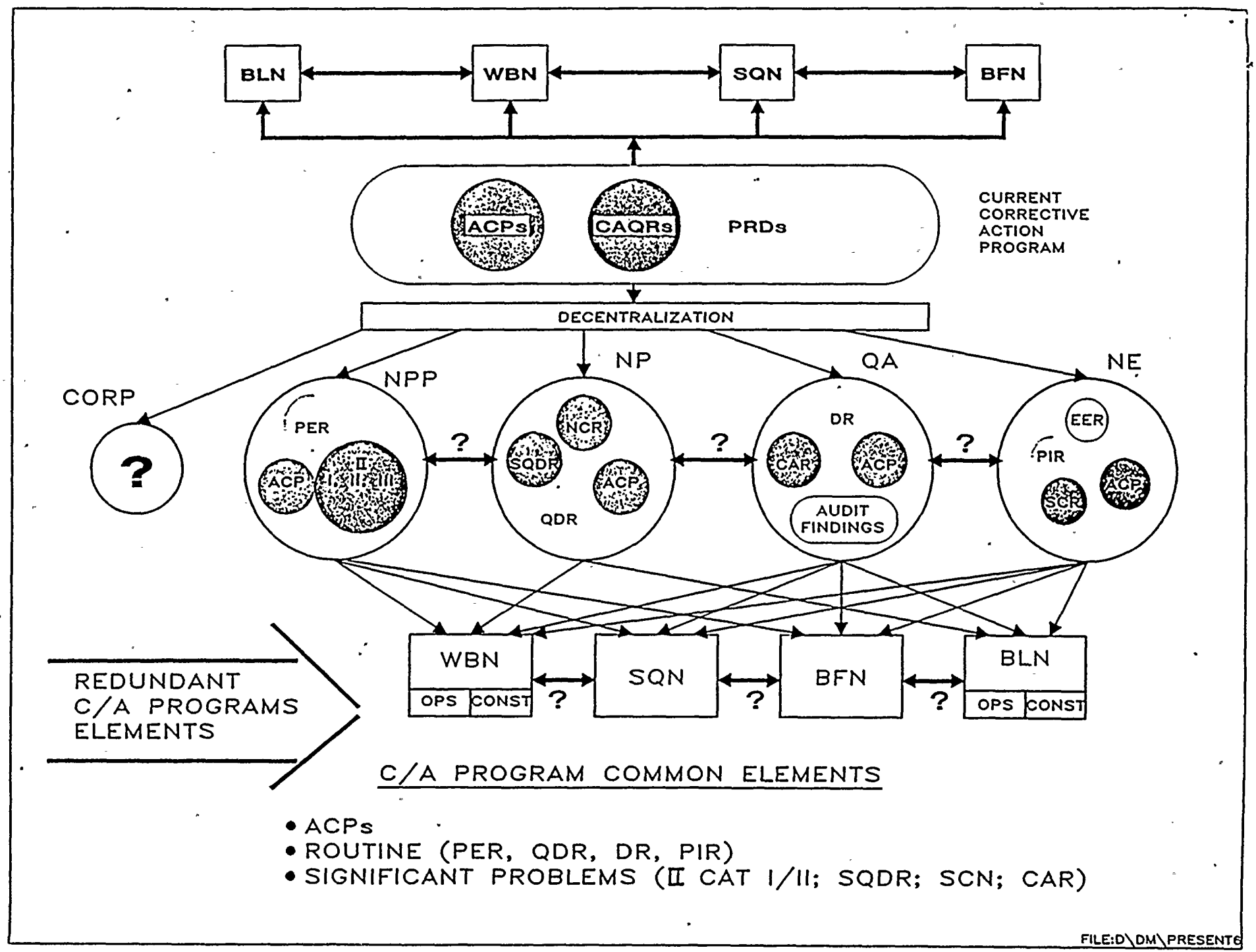
11. Acronyms and Initialisms

ACP	Administrative Control Program
BFN	Browns Ferry Nuclear (station)
CAQ	Conditions Adverse to Quality
CAQR	Conditions Adverse to Quality Report
COTS	Correct on-the-Spot
CR	Conditional Release
DCN	Design Change Notice
DD	Drawing Discrepancies
DG	Diesel Generator
DNE	Division of Nuclear Engineering
ECN	Engineering Change Notice
ESF	Engineered Safety Features
FSAR	Final Safety Analysis Report
IFI	Inspector Followup Item
IIR	Incident Investigation Report
INPO	Institute of Nuclear Power Operations
IR	Incident Report
LER	Licensee Event Report
MRC	Management Review Committee
MR	Maintenance Request
M&TE	Measuring and Test Equipment
NPRDS	Nuclear Performance Reliability Data System
NQAM	Nuclear Quality Assurance Manual
NQAP	Nuclear Quality Assurance Plan
PORC	Plant Operations Review Committee
PRD	Problem Reporting Document
QA	Quality Assurance
QVI	Quality Verification Inspection
RIR	Radiolical Investigation Report
RPS	Reactor Protection System
SGTS	Standby Gas Treatment System
SI	Surveillance Instructor
SOS	Shift Operations Supervisor
SPOC	System Preoperational Check List
SQ	Site Quality (organization)

TACF	Temporary Alteration Control Form
TD	Test Deficiency
TE	Test Exception
TROI	Tracking and Reporting of Open Items (system)
TS	Technical Specification
TVA	Tennessee Valley Authority
WRGERMS	Wide Range Gaseous Effluent Radiation Monitoring System
WR	Work Request

ATTACHMENT 1

CORRECTIVE ACTION PROGRAM UNDER THE NQAM "BEFORE"



C/A PROGRAM COMMON ELEMENTS

- ACPs
- ROUTINE (PER, QDR, DR, PIR)
- SIGNIFICANT PROBLEMS (II CAT I/II; SQDR; SCN; CAR)

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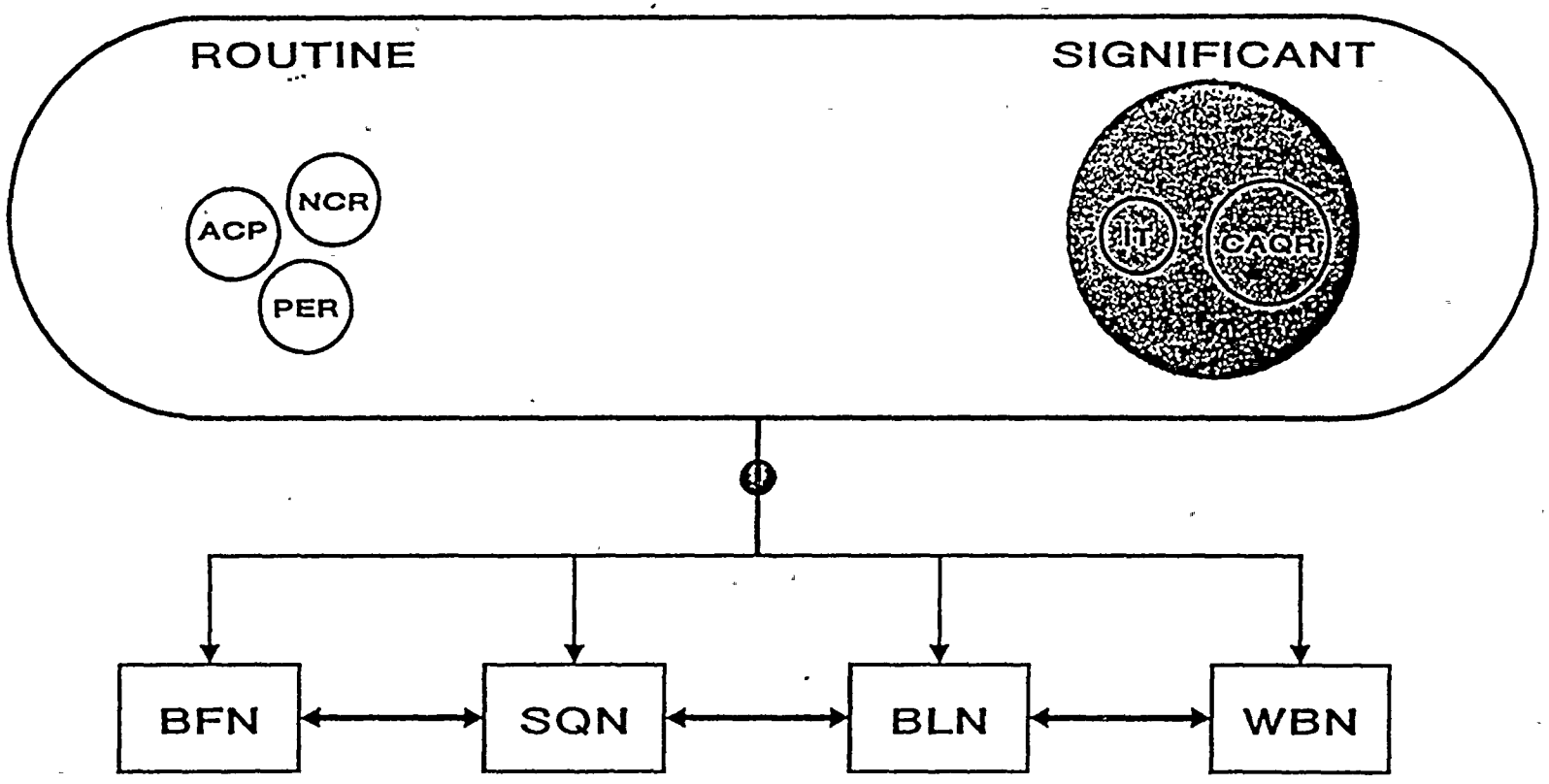
ATTACHMENT 2

CORRECTIVE ACTION PROGRAM UNDER NQAP "AFTER"



- STANDARDIZATION OF PROGRAMS
- ENHANCED COMMUNICATIONS AND PROBLEM RESOLUTION THRU COMMON PROGRAMS
  - ON SITE
  - BETWEEN ORGANIZATIONS
  - BETWEEN SITES
- TRENDING ABILITY ON BROADER SCALE
- NCR (SINGLE FORM - 2 PROCEDURES)

FILE:D\DM\PRESENT7