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Senior Vice President

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March 23, 1998
Re: Indian Point Unit No. 2
Docket No. 50-247

Mr. Hubert J. Miller
Regional Administrator- Region 1
US Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Subject: Indian Point Performance

Dear Mr. Miller:

Thank you for the opportunity to meet with you and your staff as outlined in your January 23, 1998 letter in order that we might discuss in more detail Indian Point Unit 2 performance and our plans for returning the unit to service. Your letter specifically referred to aspects of Indian Point Unit 2 equipment performance, engineering support and corrective action processes. In addition, you requested a better understanding of our current improvement efforts in the areas of human performance and station processes, including procedure adherence, informality in station work control processes and exhibiting a questioning attitude about anomalous conditions.

Con Edison has the same concerns that were expressed in your January 23 letter and believes that the underlying root causes are principally associated with management effectiveness and informality of work processes and programs. We believe that external reviews as well as our own self-assessments over the past two years have provided valuable insights into the root causes of these problems and have assisted us in formulating corrective action plans. Management should have been more effective in establishing and communicating clearly defined standards and expectations, in defining clear roles and responsibilities, and in monitoring implementation and accountability to insure expected results. Informal work processes existed during periods of good plant performance, but may have been masked by the extensive experience of key station personnel who were capable of achieving excellent results through informal processes. Personnel changes during this period of good plant performance exposed vulnerabilities to dependence on individual performers. The reasons for these changes in plant performance were initially difficult to recognize and accept because we had made no significant changes to processes and programs which had been successful.

We have discussed with you in some detail our efforts to address these problems to date, their status, and our current plans for returning the plant to service. As you know, we took the unit out of service on October 14, 1997 when a Safety Injection Pump

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failed to start during surveillance testing because its associated 480 volt circuit breaker did not close on demand. Recurring problems with this model DB-50 circuit breaker in several different plant applications led us to conclude that our original plan to refurbish these breakers to an as-new condition might not prevent the recurrence of problems. Accordingly, we began a comprehensive program of tests, evaluations and modifications of these circuit breakers to ensure that we fully understood and eliminated the causes of their performance problems.

During the unit outage designed to address the DB-50 breakers, we concurrently applied the same thorough analytical approach to other recurring equipment problems. To date, more than 3,200 work orders have been completed and approximately 900 more are scheduled to be completed prior to start-up. In addition, the outage scope includes approximately 200 plant modifications. At the completion of this outage seventy-eight DB-50 breakers and eleven DB-75 breakers will have been tested, modified and refurbished, resulting in enhanced breaker design and improved reliability. Among other problems addressed are the performance of the ASCO transfer switches used for our alternate safe-shutdown power supplies, occasional unplanned "restarting" of our Emergency Diesel Generators during coastdown, and circuit failures for some of our control room alarm annunciators. In the process of addressing these longstanding problems we believe we have re-validated our technical ability to fully resolve longstanding equipment problems when we focus on them. In doing this work, we have also demonstrated a model of behavior for adherence to procedures and a questioning attitude that will be used in the future to assure that deficiencies in both equipment and human performance are identified and properly addressed.

In determining the work to be performed during this outage, several reviews of the available backlog were performed by key personnel several of whom are current or previously licensed Senior Reactor Operators. The purpose of these reviews was to ensure that all jobs that posed challenges to operators and to safety systems or that could not be reasonably performed within three 12-week maintenance cycles would be completed during the outage. This assures us that the remaining jobs have minimal impact on operations, even in the aggregate, and that the magnitude of the backlog is manageable during power operations with existing processes and identified additional resources.

As part of our restart efforts, we also initiated a program of "System Readiness Reviews" which involves a cross-disciplinary panel of knowledgeable managers meeting with each of the system engineers to review the performance problems, work orders, open corrective actions, and Maintenance Rule status of each of their safety significant systems. We completed one round of these reviews and believe that this effort has already begun to improve the communication of expectations for both personnel and equipment performance to the system engineers, and our awareness of plant conditions requiring prompt action. This approach will be formalized into station procedures and repeated periodically. The output of these System Readiness Reviews was critically reviewed by a team of senior managers (Outage Manager, Work Control Manager, Assistant to the Plant Manager, Operations Training Manager, Generation Support

Manager, Independent Safety Review Manager) and provided an additional input for the determination of work that needed to be performed prior to returning the unit to service. Several other issues which required us to expand our approach to their solution were identified during these reviews and through other station corrective action processes. These issues included supports and hangers on small bore piping in the Vapor Containment Building, electrical separation and drawing accuracy for instrument buses and DC power panels, and the condition of coatings and insulation on equipment in the Vapor Containment Building. We believe that all of the actions we have taken to improve equipment performance and reliability will support safe and reliable operations.

We have also informed you of management personnel changes in the key roles of Operations Manager, Chief Engineer - Nuclear Power Engineering, and Work Control Manager. These are in addition to changes made several months ago for Vice President - Nuclear Power, creation of the Vice President - Generation Engineering to strengthen engineering support for the plant, and personnel changes in the key roles of Plant Manager, Director of Quality Assurance, Maintenance Manager, Instrument and Control Manager, and Station Nuclear Safety Committee Chairman.

Our plans for work to be completed prior to restart and their associated status are listed in Attachment A, Plant Restart Criteria, Attachment B, Plant Restart Criteria Status, and Attachment C, Work Completed to Date. These criteria focus on equipment performance as well as plant process and human performance improvements. In addition, elements of our Indian Point Program for Excellence are scheduled for completion prior to startup. Several of these elements directly address the root cause areas of management effectiveness and informal processes. In the area of Work Management, we plan to refine the standards and expectations of the program, communicate the work management process to employees, revise and implement an improved work priority system, and improve the metrics used to measure performance in this area. In the area of Corrective Action, we plan to refine the standards and expectations of the program, standardize the process for making initial operability determinations, ensure that root cause analysis reports and corrective actions are on schedule, perform a verification of the correctness of initial operability determinations for open Open Item Reports (OIRs), and improve the metrics used to measure performance in this area. In the area of Conduct of Operations, we will complete simulator startup and shutdown training for all watch crews, complete human performance error reduction training, significantly reduce Central Control Room deficiencies, revise startup, shutdown, and abnormal operating procedures to incorporate temporary procedure changes and enhancements, complete simulator verification and validation of startup and shutdown procedures, reinforce standards for strict procedure adherence and use, and implement an Operations Mentor Program which will provide real time on-shift coaching by personnel with extensive operations and mentoring experience from other nuclear facilities. In the area of Conduct of Engineering, we will perform maintenance rule/system health reviews for key systems (42 risk significant systems), conduct field observation for systems in containment, reduce open operability determinations for degraded equipment to no more than ten, and complete review of Technical Specification surveillance requirements and resolve identified discrepancies.

We will perform a final review of our restart plan with a committee consisting of the Plant Manager, Operations Manager, Maintenance Manager, Independent Safety Review Manger, and one or more managers from stations that have recently restarted following an extended outage to ensure that all key recovery elements and potential challenges are properly considered prior to restart. Included in this review will be the adequacy of our planned surveillance activities (including post maintenance/modification testing, component testing, and system testing) for restart of the plant.

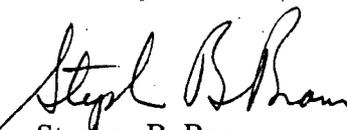
To assure and provide confidence that the activities described to be accomplished prior to restart have indeed been completed as intended, a panel will be convened to review this work prior to restart. This panel will consist of the Vice Presidents of Nuclear Power and Generation Engineering, the Plant Manager, and the Chief Engineer - Nuclear Power Engineering. Additionally, a subcommittee of our Nuclear Facilities Safety Committee will conduct an independent review of our Restart Criteria.

Con Edison will keep the NRC informed of changes that may occur to the restart criteria and startup schedule by promptly notifying the resident inspectors.

Finally, as described in our letter to you of February 23, 1998, Con Edison will conduct an Independent Safety Assessment (ISA) of facility operations and support using an outside team of independent senior industry personnel. The charter issued for this activity is based upon the USNRC inspection module for conduct of Operational Safety Team Inspection (OSTI). This assessment will commence this month and be completed no later than May 1, 1998. Con Edison will meet with NRC after the ISA is completed to discuss the results and proposed corrective actions. We will incorporate the actions resulting from the ISA into our Indian Point Program for Excellence.

We understand and appreciate the need for excellent communications with USNRC at all levels of our organization. We look forward to frequent, timely and complete discussions with you and your staff regarding our progress toward completing our immediate and ongoing action plans.

Sincerely,



Stephen B. Bram

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ATTACHMENT A

PLANT RESTART CRITERIA

1. EQUIPMENT PERFORMANCE AND MATERIAL CONDITION REVIEWS ARE TO BE COMPLETED AND IDENTIFIED DEFICIENCIES CORRECTED. ALL ACTIONS COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE.

- System readiness reviews and resolution of any operability issues completed by cognizant system engineers including expanded scope review of key Maintenance Rule Systems.
- Preventive maintenance items current without use of grace period.
- Surveillance tests current without use of grace period.
- No Category 1 operator workarounds.
- Category 2 operator workarounds minimized. Repairs required to eliminate Category 2 operator workarounds deferred only if engineering or material constraints prevent timely resolution. Consequences of the deferral must be evaluated and Operations Manager approval required for deferral.
- No jumpers associated with deficiencies that have an adverse impact on plant reliability/availability.
- No caution tags associated with deficiencies that have an adverse impact on plant reliability/availability.
- No overdue operational gauge calibrations associated with operating logs.
- Unit 2 supplemental logs reviewed. Repairs required to eliminate supplemental logs deferred only if engineering or material constraints prevent timely resolution. Consequences of the deferral must be evaluated and Operations Manager approval required for deferral.
- No open temporary repairs against Unit 2 safety related equipment.
- Open Operability Determinations for degraded equipment reviewed. Repairs required to eliminate the need for Operability Determinations deferred only if engineering or material constraints prevent timely resolution. No more than ten will remain open at restart. Consequences of the deferral must be evaluated and Operations Manager and Manager of Site Engineering approval required for deferral.
- Non-outage and outage corrective maintenance back-log reviewed, identified deficiencies corrected, and non-outage backlog reduced below 900 work orders. Repairs identified as outage scope completed by 200 degrees unless higher plant thresholds required to support completion of repairs. Consequences of any deferrals must be evaluated and Operations Manager approval required for deferral.
- Central Control Room Deficiencies (CCRDI's) reduced to five or less.
- Material condition assessment and required repairs for coatings and insulation inside the containment building completed.

- Field observations by system engineers for systems in containment completed and any operability issues addressed.
- Containment, Primary Auxiliary Building Piping Penetration area, and Auxiliary Feed Water Building small bore piping walk-downs and required repairs completed.
- Verification and validation of all loads on 118V AC and 125 DC instrument buses completed and discrepancies corrected.
- CCR alarm annunciator panel walk-downs completed and physical changes completed.
- Actions to address Section XI Alert status for safety related pumps completed.
- All DB-50/75 Circuit Breaker project corrective actions completed.
- Reactor Vessel Part-Length Control Rod Drive Mechanism removal and capping completed.
- Fan cooler unit service water containment isolation valves repairs will be completed.
- All three gas turbines will be capable of remote start from the control room.
- A modification to install new stilling wells for circulating water travelling screen delta-level instrumentation to improve the reliability of the associated instrumentation will be completed
- Modifications to the VC sump grating and recirculation sump level instrumentation screen will be implemented
- A modification to provide a more effective vent path between the reactor head and the pressurizer, will be completed prior to pressurizing the reactor coolant system
- A complete review of Appendix R lights has been completed and modifications to address deficiencies in localized areas will be completed prior to start-up. In addition, a preventative maintenance program for 100% of the emergency lights will be established prior to startup.
- The Quality Assurance review of snubber status and any necessary repairs will be completed.

2. PROCEDURE/PROCESS REVIEWS COMPLETED. ALL ACTIONS COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE.

- No open Temporary Procedure Changes pertaining to Emergency Operating Procedures, Abnormal Operating Instructions, Alarm Response Procedures, or normal operating procedures required for plant startup or shutdown.
- No open Communications-To-Staff pertaining to operating procedures identified during simulator procedure validation and verification process or that have an adverse affect on procedure use for startup or shutdown.

- No open Temporary Procedure Changes pertaining to surveillance test procedures used on a monthly frequency or less. (monthly, bi-weekly, weekly, daily).
- Comprehensive review of work order back-log for potential impacts on operating procedures completed and new review process formalized.
- Simulator validation and verification procedures required for startup and shutdown completed.
- Simulator startup and shutdown training completed for all watch crews prior to criticality.
- Operations Watch mentoring program established.
- Operations Department error reduction training and reinforcement of the standards for use of error reduction tools completed.
- Operations Department standards document issued.
- Operations Department standard for strict procedure adherence reviewed, enhanced, and reinforced.
- Comprehensive review of Technical Specification surveillance testing requirements to clearly link specification requirements to existing surveillance tests completed and discrepancies resolved.
- Comprehensive review and verification of critical set points associated with emergency operating and abnormal operating procedures completed and any discrepancies resolved.
- Identified CCR Drawing discrepancies resolved.
- Training of all station personnel to use the Condition Identification Tracking System (CITRS) completed.
- Corrective Action communication plan implemented to ensure station personnel understand expectations for use of the corrective action system.
- Station procedures for operability determinations on OIRs formalized.
- Root cause analysis reports (SAO-132 A) scheduled to be completed will be completed. Associated corrective actions will be reviewed to ensure any necessary actions required to support startup are completed.
- Work Control communication plan implemented to ensure station personnel clearly understand their roles and responsibilities.
- Existing work order priority scheme reviewed and procedure changes implemented as required.
- Improved work management performance metrics established.
- Written statement of expectations for procedure compliance issued by Vice President, Nuclear Power and Departmental meetings held.
- Key management personnel assigned around-the-clock positions prior to plant exiting cold shut down.

3. ADMINISTRATIVE HOLDS REVIEWED AND DISPOSITIONED. ALL ACTIONS COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE.

- CITRS items identified as outage holds closed out.
- Comprehensive review of CITRS open item reports (OIRs) to verify that OIRs have been properly evaluated for operability concerns completed.
- All open Station Nuclear Safety Committee items reviewed for impact on plant operations and all SNSC items associated with plant start-up holds closed.

Any proposed exceptions to these criteria must be approved by the Plant Manager, Nuclear Power Generation. Plant Manager shall promptly notify the Vice President, Nuclear Power.

ATTACHMENT B

PLANT RESTART CRITERIA STATUS

March 21, 1998

1. EQUIPMENT PERFORMANCE AND MATERIAL CONDITION REVIEWS COMPLETED AND IDENTIFIED DEFICIENCIES CORRECTED. ALL ACTIONS COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE.

- Fifty-four system readiness reviews completed by cognizant system engineers and reviewed by a committee of experienced plant personnel. Corrective actions were implemented as a result of these reviews. These corrective actions included completion of outstanding work orders to improve system and plant material condition, identifying outstanding CITRS item reviews as start-up holds, and initiation of additional training for system engineers on management of maintenance rule functions for their systems. Expanded scope reviews of maintenance rule systems are in progress.
- Non-outage preventative maintenance items have been included in the outage scope to support the restart criteria of having no preventive maintenance items overdue or within their grace period. A total of 296 PM activities were completed during the months of October through February. Overdue PM's were reduced from 14 to 4. PM's late but within their grace period were reduced from 83 to 12.
- I&C, Test & Performance, and Operations surveillance tests have been included in the outage scope to support the restart criteria requirements that all surveillance tests are completed and not late or overdue. A total of 203 of 295 required surveillance tests to satisfy this criteria have been completed.
- In support of the restart criteria to eliminate category 2 operator workarounds where possible, 40 of 41 outstanding work orders have been included in the outage scope. Of this total, 30 have been completed. One category 2 workaround is projected to remain after start-up. Ten of these items emerged as workarounds since the start of the outage.
- In support of the restart criteria to eliminate jumpers associated with deficiencies that have the potential to have an adverse impact on plant reliability/availability, approximately 20 jumpers have been eliminated thus far. When the current outage scope is completed, installed jumpers will be reduced from 52 to 15. Of these, 8 will be associated with Unit 2, and 7 with Unit 1.
- In support of the restart criteria to eliminate caution tags associated with deficiencies that could potentially have an adverse impact on plant reliability/availability, a total of 8 caution tags have been removed. An additional 10 caution tags will be removed as a result of outage work.

- In support of the restart criteria to ensure all gauges associated with operating logs are within the required calibration frequency, 372 of 433 required calibrations have been completed.
- In support of the restart criteria to eliminate supplemental logs where practical, a total of 10 supplemental log items will be eliminated as a result of planned outage work.
- Consistent with the plant restart criteria, no temporary repairs will be open against Unit 2 safety related equipment.
- In support of the restart criteria operability determinations have been reviewed and eliminated where practical. A total of 36 operability determinations have been closed out this outage. Operability determinations projected to remain open at the end of the current outage are ten or less.
- The non-outage and outage work order back-log was independently reviewed by a team of operations, maintenance and work control personnel with input from operating shift personnel. As a result of this review, approximately 334 additional work orders were identified as items for correction this outage. Overall, over 3200 work orders have been completed this outage. Approximately 900 remain to be completed prior to plant start-up. Over 200 modifications are included in the current outage scope. Currently less than 900 corrective maintenance work orders are projected to remain after the current outage. A second independent review of the impact of the remaining outage and non-outage work orders is in progress and will be completed prior to start-up.
- Reduction of central control room deficiencies (CCRDIs) has been included as a specific restart criteria. A total of 77 were originally identified on 12/18/97. Since that time an additional 67 items have been added as emergent scope. A total of 134 of 144 have been completed. The pre-restart goal is five or less.
- A review and repair of the material condition of coatings and insulation inside the containment building has been added as a start-up hold. The work scope of planned repairs is extensive. Currently these repairs are projected to be completed by the end of March.
- System Engineers were given additional guidance for the conduct of field observations. Field observations by system engineers for systems in containment are continuing.
- Containment, Primary Auxiliary Building Piping Pen, and Auxiliary Feed Water Building small bore piping walk-downs and repairs are in progress.
- A comprehensive verification of all loads on the 118V AC and 125V DC instrument buses has been initiated. All drawing discrepancies will be corrected prior to start-up as part of the scope of this initiative. This effort is projected to be completed by the end of March
- Actions to resolve the Section XI Alert status of safety injection, component cooling, and containment spray pumps are in progress.
- Reactor Vessel Part-Length Control Rod Drive Mechanism removal and capping are projected to be completed by March 27

- The fan cooler service water valve repairs will be completed prior to restart.
- Work orders to improve reliability of all three gas turbines are in progress.
- The design for new stilling wells for the circulating water traveling screen delta level instrumentation has been approved and will be installed prior to startup.
- Modifications to the containment sump grating and recirculation sump level screen have been identified and will be implemented.
- A modification to improve the vent path between the reactor head and the pressurizer has been identified and will be installed prior to pressurizing the reactor coolant system.
- Modifications to address deficiencies in localized areas have been initiated and will be completed prior to startup. Completion of the preventive maintenance program for 100% of the emergency lights is on schedule.
- Quality Control conducted an in-depth inspection of snubber attachments for discrepant conditions and conformance with drawings. This inspection was initiated as a result of incidental observations on anomalous conditions associated with snubbers being entered into the corrective action system. No operability issues were identified as a result of the inspections to date. A review is in progress to determine if the sample (205 of 240) needs to be expanded further to inspect additional snubbers that are not easily accessible.

2. PROCEDURE/PROCESS REVIEWS COMPLETED. ALL ACTIONS COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE

- Open TPCs pertaining to critical operating procedures are being incorporated into procedure revisions. To date, 175 procedures have been revised. A total of 22 procedures remain to be revised prior to start-up.
- Open Communications-To-Staff pertaining to operating procedures identified during simulator procedure validation and verification process are being incorporated.
- In support of the restart criteria, open TPCs pertaining to surveillance test procedures used on a monthly frequency or less (monthly, bi-weekly, weekly, daily) a total of 10 procedures were initially identified and revised. Any new TPCs needed in these procedures will be incorporated prior to startup.
- A comprehensive review of the outstanding work order backlog for operating procedure impact has been completed. In the future, once-per-shift review of new work orders will be performed by watch engineers focusing on assessing the impact of newly identified deficiencies on plant and system operability, including impact on operating procedures.
- Simulator validation and verification of 35 start-up procedures has been completed and necessary procedure changes are being incorporated. Simulator validation of 30 shut-down procedures and resulting procedure changes will be completed prior to start-up.

- Simulator start-up and shut-down training is planned to be completed for all watch crews prior to plant start-up.
- An Operations Watch mentoring program has been established.
- Error reduction training for operations personnel and reinforcement of the standards for use of error reduction tools is in progress.
- Standards for strict procedure adherence for operations personnel are being reinforced.
- The Operations Department standards documents are being enhanced and will be issued and reviewed with department personnel prior to plant start-up.
- A comprehensive review of Technical Specification surveillance requirements to resolve discrepancies has been initiated and identified as a start-up hold. This review is projected to be completed by the end of March.
- Resolution of identified CCR Drawing discrepancies are in progress.
- CITRS training for all station personnel on how to enter items is in progress and will be completed prior to start-up.
- Corrective Action System expectations are being refined and communicated.
- Station procedures for operability determinations for OIRs are being formalized.
- Root cause analysis reports are being completed. Associated corrective actions are being reviewed to ensure any necessary actions required to support start-up are completed.
- A Work Control Communication Plan which will ensure all station personnel clearly understand their roles and responsibilities is being developed and will be implemented prior to plant start-up.
- The existing work order priority scheme is being reviewed and required procedure changes implemented.
- Improved work management performance metrics are being developed.
- Key management personnel will be assigned positions around-the-clock to support plant start-up prior to plant exiting cold shut down.

3. ADMINISTRATIVE HOLDS ARE TO BE REVIEWED AND DISPOSITIONED. ALL ACTIONS WILL BE COMPLETED PRIOR TO 200 DEGREES UNLESS NOTED OTHERWISE

- CITRS items identified as outage holds are currently being tracked as plant restart hold items and will be resolved prior to 200 degrees.
- A comprehensive review of open item reports (OIR) in CITRS to verify that OIRs have been properly evaluated for operability concerns is in progress and will be completed prior to restart. In a parallel effort, a net reduction of 1000 open OIRs has been realized since March 2, 1997.
- A review of all Station Nuclear Safety Committee open items has been completed and those items which have an impact on plant operations have been entered into CITRS and are being tracked as outage holds.

ATTACHMENT C

WORK COMPLETED TO DATE

Equipment Improvements

1. Outstanding work order backlogs have been reviewed systematically, including the use of system readiness reviews to identify appropriate outage scope items. These items were added to the original outage scope which initially focused on the DB-50 circuit breakers. Currently more than 3200 work orders have been completed.
2. Seventy - five DB-50 breakers have been tested, modified, and refurbished resulting in enhanced breaker design and improved reliability. The original outage scope included the 42 DB-50 breakers which were identified as having to close during a safety injection signal. Thirty-six DB-50 breakers were added to the scope due to the extension of the outage. In addition, 11 DB-75 breakers have been tested, modified and refurbished.
3. Extensive testing was performed to address the reliability of DB-50 breaker amptector targets. As a result, amptectors were replaced or modified to provide the highest level of reliability that could be achieved.
4. CCR alarm panels were modified to address annunciator failures experienced prior to and after the start of the current outage. Modifications that have been implemented include a provision for supervisory fuse monitoring of discrete alarm panels which necessitated the elimination of all back-feeds. The scope of this project included the functional verification of every initiating device inputting to the control room.
5. All eleven main steam safety valves which had previously been identified as experiencing leakage on-line were disassembled and rebuilt using an improved and more detailed procedure. In addition, to eliminate the potential for main steam safety valve common drain lines to mask identification of leaking safety valves in the future, separate drain lines have been installed.
6. A modification to reroute the main steam trap line associated with the main steam line supply to the turbine driven auxiliary feed pump has been installed to eliminate previous problems with accumulation of water in the line.
7. Service water pump problems related to overheating of the stuffing boxes were investigated and resolved.
8. Recurring problems with Appendix R Safe Shutdown 480V ASCO transfer switches were investigated and resolved. The switches were modified to simplify the design and improve reliability.
9. Two reactor coolant pump motors were disassembled and inspected as a result of identified anomalies since start-up from the refueling outage. This effort resulted in the repair of thrust bearing oil injection lines, relocation of vibration probes to improve the reliability of the data acquisition, and replacement of oil level indicating

- transmitters. In addition, a modification to harden the installed vibration monitoring cables was completed.
10. Recurring problems with emergency diesel generators attempting to restart after being placed in a shutdown mode were investigated and corrective measures taken.
 11. Problems with the functioning of electrical heat trace for post accident containment radiation monitor R-27 were thoroughly investigated. A modification to install an entirely new and more reliable heat trace system was effected as a result of this investigation.
 12. A total of 134 of 144 central control room deficiencies have been addressed and corrective action completed.
 13. 372 of 433 calibrations of gauges associated with operating logs have been completed.
 14. To improve access and personnel safety, several modifications have been installed this outage, including hand rail extensions for the RCP ladders and modifications to the steam generator access platforms.
 15. A modification to simplify the control circuit for the fire water storage tank heater was installed to improve reliability and eliminate a long standing jumper.
 16. Auxiliary feed pump discharge valves which had previously been identified as leaking through were thoroughly investigated which resulted in a modification and elimination of significant leakage on these valves. In addition, a modification has been installed which will allow the use of AOV diagnostic equipment during quarterly valve stroke testing.
 17. Non-outage preventative maintenance items have been included in the outage scope to support the restart criteria of having no preventive maintenance items overdue or within their grace period. A total of 296 preventative maintenance activities were completed during the months of October through February. Overdue items were reduced from 14 to 4. Items late but within their grace period were reduced from 83 to 12.
 18. A modification has been installed to resolve problems with the system that supplies nitrogen to containment including the over pressure protection system (OPS) accumulators. This modification addresses the root cause of the failure of the nitrogen check valves associated with OPS. Failure of these valves during the 1997 refueling outage was a prime contributor to the OPS technical specification violation event.
 19. Quality Control conducted an in-depth inspection of snubber attachments for discrepant conditions and conformance with drawings. This inspection was initiated as a result of incidental observations on anomalous conditions associated with snubbers being entered into the corrective action system. No operability issues were identified as a result of the inspections to date
 20. Work required to eliminate category 1 operator workarounds have been completed.
 21. A complete review of Appendix R lights was performed, and modifications to address deficiencies in localized areas were added to the outage scope.

Procedure/Process Improvements

1. System readiness/system health reviews have been integrated into the station maintenance rule review process. Fifty-four system readiness reviews were completed by cognizant system engineers and reviewed by a committee of experienced plant personnel. Corrective actions have been identified and implemented as a result of these reviews. These corrective actions included completion of outstanding work orders to improve system and plant material condition, identifying outstanding corrective action items as start-up holds, and initiation of additional training for system engineers on management of maintenance rule functions on their systems.
2. In order to integrate additional industry experience into the organization, an INPO loaned employee has assumed the role of Chief Engineer - Nuclear Power Engineering, responsible for all engineering activities associated with the station.
3. A streamlined generic modification process for changes to plant facilities outside of the power block has been implemented.
4. A maintenance rule self assessment has been completed, a maintenance rule coordinator has been assigned, and an improvement plan has been initiated. Additional training on maintenance rule responsibilities was provided to system engineers in December, 1997.
5. A self assessment of fire protection program requirements has been completed.
6. Verification of the fire penetration seal design basis has been completed.
7. Review of Motor Operated Valve design margins has been completed.
8. A self assessment of implementation of the snubber in-service inspection program has been completed. The service life files have been upgraded, a service life database has been developed, and the snubber service life evaluation has been updated.
9. As part of the station's 10 CFR 50.54(f) response on design basis, an electronic document management system has been implemented.
10. Critical operating procedure set points, including Regulatory Guide 1.97 set points associated with emergency operating procedures, have been reviewed and validated.
11. A simulator validation and verification of startup procedures has been completed.
12. A comprehensive assessment of the impact of the outstanding work order backlog on use of operating procedures has been completed.
13. An Operations mentoring program has been established to provide reinforcement of appropriate standards to on-shift personnel.
14. Benchmarking at recognized industry leaders has been completed for the purposes of re-defining roles of operations personnel and other good practices.
15. INPO assist visits have recently been completed for the purposes of identifying areas of improvement. These visits covered the following areas:
 - Work Control - 11/96, 1/98
 - Engineering - 12/97
 - Operations - 2/98
16. Benchmarking in other areas across the station has also recently been completed: South Texas for work control, VC Summer and Wolf Creek for refueling outage planning and execution, Catawba to see the "Tools for Success Program", which focuses on improving human performance.

17. A station work control self-assessment was completed in October 1997. Corrective actions have been incorporated into action plans for improving work management at the station.
18. Additional training of more than 900 station personnel, including contractors on the licensing basis of the station was completed by the end of 1997.