INTRA-COMPANY MEMORANDUM
ED 8268-e

FirstEnergy

TO Distribution

DATE July 7, 2000

FROM H. W. Stevens, Jr., Manager - Quality Assessment

MAIL STOP 1044

SUBJECT Toledo Edison Quality Assessment Audit AR-00-OUTAG-01

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Attached is the report for the Davis-Besse Quality Assessment audit of the Twelfth Refueling Outage (12RFO) conducted March 31 through June 7, 2000. The audit assessed the effectiveness of various program activities during 12RFO.

The Executive Summary on the attached audit report describes the results of the audit. No audit findings were issued as a result of the audit.

The audit team appreciates the cooperation and assistance extended by the auditees during the audit. If you have any questions, please contact Mark Koziel at extension 7783.

MAK/s
Attachment

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FirstEnergy

Davis-Besse Nuclear Power Station
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QUALITY ASSESSMENT
AUDIT REPORT
AR-00-OUTAG-01

DATE:	July 7, 2000
AUDIT NUMBER:	AR-00-OUTAG-01
ORGANIZATIONS AUDITED:	Nuclear Support Services Plant Technical Services Work Management Outage Contractor Support
AUDIT DATES:	March 31 through June 7, 2000
AUDIT TEAM MEMBERS:	C. E. Ackerman, Auditor T. J. Chambers, Auditor P. L. Faris, Auditor E. J. Grindahl, Auditor R. J. Jarosi, Auditor W. G. Klippstein, Auditor M. A. Koziel, Audit Team Leader M. H. Levering, Auditor M. J. Lewczynski, Auditor E. E. Murphy, Auditor M. Pavlick, Auditor J. T. Ratchen, Auditor H. K. Rhubright, Auditor C. K. Rider, Auditor R. H. Robinson, Auditor C. S. Steagall, Auditor J. M. Vetter, Audit Team Leader D. R. Wahlers, Auditor M. M. Willoughby, Auditor
PERSONNEL CONTACTED:	See Attachment 2

I. EXECUTIVE SUMMARY

This audit was performed to assess the effectiveness of various program activities during the Twelfth Refueling Outage (12 RFO). The programs were evaluated through field

6. Circulating Water Pump impeller to be loaded on underrated trailer

Maintenance Recommendations:

1. Eliminate redundant Molded Case Circuit Breaker tests
2. Consumable items should be more clearly marked with shelf life limits
3. Improvements in scaffold erection techniques and good practices
4. Training should be implemented prior to use of new test equipment
5. More guidance needed on pre-job briefs for single individual (self-briefs)
6. Improve discussions of industry events during pre-job briefs
7. Establish time limits for TIMS data entry
8. The practice of Mechanical and E&C Training Coordinators/Supervisors also functioning as line supervisors during the outage should be reviewed

ENGINEERING **PERFORMANCE:** *SATISFACTORY*

Positive Attributes:

1. Engineering persistence to ensure adequate DH pump bearing test
2. Aggressive cleaning of boric acid accumulation from Rx head
3. Efforts and focus on AOV testing during the outage
4. Technical knowledge of test engineers/supporting contractors
5. Effective coordination of major test evolutions (ILRT and RCS hydro)

Weaknesses:

1. Valve Packing
   - Valve live load packing configuration control/Velan valve parts problems
   - Ownership of valve packing program and departmental interfaces
2. Test Control
   - Test development and conduct human performance deficiencies
   - Test writers and leaders knowledge of acceptance test requirements
3. Modifications
   - Credited Safety Evaluation item implementation
   - Boron Precipitation Modification problems

DOCUMENT CONTROL **PERFORMANCE:** *GOOD*

Positive Attributes:

1. QS Manager ownership and presence in Document Control throughout 12RFO
2. Successful implementation of major change

Weakness: Some human performance errors in verifying or stamping documents

observations, interviews with Site personnel, and reviews of key documents and procedures. The audit was specifically conducted to meet the Davis-Besse Technical Specification requirements to audit refueling activities. The audit also encompassed trending analysis of Condition Reports (CRs) initiated during the outage and CRs initiated during the two-month period prior to the outage. Performance for four audited areas was rated as satisfactory, and six areas received a good performance rating. Condition Reports generated during the audit are listed in Attachment 1. Performance grades for individual programs and projects are provided in the summary of area performance below:

FUEL HANDLING	**PERFORMANCE:** *GOOD*

Positive Attributes:

1. Comprehensive Operations and Engineering training
2. Refueling equipment reliable and ready for outage
3. Ownership of refueling equipment displayed by Reactor Engineers
4. Consistent application of conservative operation philosophy throughout refueling
5. Respect for nuclear safety displayed by Refueling Directors and Reactor Engineers
6. Experience and knowledge of Operations staff and reactor engineers
7. Prescriptive procedural controls were effective
8. Professional and knowledgeable fuel vendor personnel supported refueling activities
9. Effective chemistry controls maintained
10. Reactor Engineer from Beaver Valley provided technical expertise and perspective

Weaknesses:

1. Ineffective FME controls in the Refueling Canal area
2. Work schedules not conducive to optimum human performance during critical refueling evolutions

Recommendations:

1. Perform video inspection immediately prior to core reload
2. Investigate improvements in fuel handling methods

OPERATIONS	**PERFORMANCE:** *SATISFACTORY*

Positive Attributes:

1. As the last line of defense, Operating crews blocked several shots on goal (e.g., prevented the implementation of poorly timed or planned work and testing)
2. Timely and effective response to Loss of Off-Site Power event.
3. Crews are more consistently implementing event free tools including peer checks, STAR techniques, and three part communications
4. Shutdown Risk activities effectively performed to support Outage Nuclear Safety

5. Pre-planned briefs were effectively performed (e.g., infrequently performed evolution briefs for major plant activities including plant shutdown and startup)

Weaknesses:

1. Maintenance involvement in the safety tagging process is not standardized and consistent (e.g., implementation of safety verifications and clearance requests)
2. Inadequacies in the command, control, and coordination of Work Support Center (WSC) activities; inadequate role clarity and inadequate central authority in WSC
3. Inadequate configuration control of important plant systems (e.g., valves which could affect RCS inventory) with annotated Control Room drawings
4. Timeliness concerns for investigations of components found out of position; more aggressive cause investigations needed to reduce the number of these deficiencies
5. Improved procedure utilization needed when responding to unusual shutdown casualties and events (reluctance to utilize off-normal and annunciator procedures)
6. Impromptu briefs were sometimes not performed when appropriate or lacked depth
7. Weaknesses in procedures and understanding of RCS draining and venting evolutions
8. Administrative deficiencies in Control of Outage Overtime for some Site Sections

EDDY CURRENT TESTING **PERFORMANCE:** *GOOD*

Positive Attributes:

1. FTI personnel training
2. NCR processing
3. Document control
4. Materials storage and handling
5. Inspection and hold point process
6. Compliance with FTI/TE QA Program & EPRI Guidelines

Weakness: NCR 60023/CR 2000-0899 Probe speed procedure violation

CHEMICAL CLEANING **PERFORMANCE:** *GOOD*

Strength: Project completion on schedule with significant corrosion product removal

Positive Attributes:

1. Effective leakage checks on systems and controls of the entire process
2. Personnel exhibited good human performance techniques

Weakness: Iron solvent mix NCR 6002529

CHEMISTRY **PERFORMANCE:** *GOOD*

Strengths:

1. OTSG chemical controls have maximized OTSG life span and heat transfer capability
2. Crud Burst controls effectively minimized RCS crud levels (Generic INPO Strength)

Positive Attributes:

1. Overall Chemistry & System chemical addition controls
2. 12RFO support and communications with Operations
3. Professional lab practices and techniques
4. Lab equipment ownership (Generic INPO Strength)

Weaknesses:

1. Procedure usage and documentation deficiencies
2. NPDES limits exceeded when release necessitated by high water level

ANNULUS ACTIVITIES **PERFORMANCE:** *GOOD*

Strength: Conservative lead training & hazard controls/analysis

Positive Attributes:

1. Successful project completion and inspection
2. No safety or radiological issues
3. Dedicated project manager monitored the activities
4. Pre-outage planning tool selection minimized lead release risk
5. Good human performance practices throughout activities

RADIATION PROTECTION **PERFORMANCE:** *SATISFACTORY*

Strengths:

1. Current dose rates provided on CTMT maps for pre-briefs
2. Greeter at RRA entrance ensure personnel wearing dosimetry properly and aware of electronic dose and dose rate alarm setpoints

Positive Attributes

1. Use of Tele-View and Tele-Dosimetry reduce total outage dose
2. Use of shielding minimized work area radiation levels
3. RP Manager and Supervisor provided regular field oversight

RP Weaknesses:

1. Work Practices
   - Survey instrument record deficiencies
   - PCM log contamination documentation errors
   - Air sample volume calculation errors
   - Respirator issued to unqualified personnel
   - Work in progress evaluation records for permanent dosimetry setpoints
2. Program Administration
   - Inadequate RWP instructions (also Generic INPO AFI)
   - Untimely Shallow Dose Equivalent calculation
   - Untimely ALARA post-job reviews (also Generic INPO AFI)
3. Miscellaneous
   - RWP procedure clarifications and enhancements
   - Inadequate guidance for releasing contaminated personnel
   - Lack of adequate ALARA briefing facilities
   - HIS20 untimely RRA exclusion of non-qualified personnel
   - Working on energized equipment (upender, valve, RE cal)

MAINTENANCE	**PERFORMANCE:** *SATISFACTORY* **

Positive Attributes:

1. Preventive measures taken to protect lower portions of instrument cabinets
2. Jumper and lifted wire log sheets effectively maintained
3. Effective coordination and performance of test activities
4. Peer checks routinely performed during error likely situations
5. Commitment to safety (e.g., effective use of safety equipment during electrical work, frequent reminders to work safely, use of meters to detect voltage)
6. Wedging of circuit breakers to prevent movement
7. Procedures consistently available and steps rigidly followed
8. Work activities stopped/procedures changed when necessary
9. Measuring and test equipment use consistently recorded on travelers and database
10. Containment-staged M&TE effectively tracked on E&C shop board

Weaknesses:

1. **Overall satisfactory performance tainted by some significant human performance errors (e.g., Grout gas release, loss of off-site power)
2. Work site housekeeping inadequacies
3. Lack of interface between procedure writers and instructors resulted in training to superseded procedures
4. Some contractors missed confined space training due to JANUS failure
5. Material Deficiency Tags left hanging without associated work document

CR TRENDING	PERFORMANCE: *N/A*

Collective Issue CRs
2000-0819 Operations configuration control issues and challenges to the last human performance barrier
2000-1409 Contractor compliance with administrative procedures
2000-1410 Numerous problems with Boron Precipitation Modification
2000-1411 Human performance concerns in Engineering

II. AUDIT DETAILS

The pre-audit conference was held on March 31, 2000, to introduce the audit team, discuss the audit scope, and present the audit schedule. The audit began March 31, 2000 and concluded with the post-audit conference on June 7, 2000. The scope of the audit included the following Outage programs and activities:

- Fuel Handling
- Operations
- Steam Generator Activities
- Chemistry
- Containment Annulus Activities
- Radiation Protection
- Maintenance
- Engineering
- Document Control
- Outage and Pre-Outage CR Trending

A. Fuel Handling

Activities audited include: training, refueling equipment maintenance, equipment operability and functionality, procedure adherence, fuel inspection/repair, fuel Management, and effectiveness of previous corrective actions.

Training for Operators and Reactor Engineers involved with refueling activities was determined to be comprehensive. Reviews of training records confirmed that Operators had received appropriate training for their assigned refueling positions. Refueling lesson plans included pertinent topics such as refueling limits and precautions, foreign material exclusion (FME) requirements, and the application of abnormal procedure in the event of a fuel handling accident. Operations personnel

demonstrated equipment proficiency of the fuel handling bridges and transfer equipment during fuel movements. Training records verified that Reactor Engineers had received training on appropriate refueling topics and fuel inspection activities (e.g., spacer grid slippage and damage, distinctive crud pattern, and rejection criteria). Four qualified Reactor Engineers displayed a strong knowledge base of the operating requirements of the fuel handling bridges and transfer equipment, but long hours physically and mentally challenged their effectiveness. It is recommended that Nuclear Engineering investigate the possibilities of qualifying additional members of their department as Reactor Engineers to provide more defense in depth for manning the various required refueling activities.

Distinct improvement was noted in the reliability of fuel handling equipment during 12 RFO. During previous outages, the equipment was continually breaking down and required constant attention from Reactor Engineers and supporting Maintenance personnel. The improvement was mainly due to preventive maintenance activities performed during the Mid-Cycle Outage. This preventive maintenance was also a major reason that fuel offload was able to begin earlier than during any previous refueling outage at Davis-Besse. The audit team also verified that fuel handling equipment received applicable additional preventive maintenance prior to the commencement of fuel movements in the reactor vessel. The preventive maintenance work packages were generally found to include adequate drawing references, work instructions and applicable prerequisites/precautions/limitations. Because a fuel hoist oil inspection plug was over-threaded and fell into the gear reducer housing, Condition Report (CR) 2000-0725 was written by Nuclear Engineering. As part of this CR response, the Audit Team recommended that an appropriate caution statement be added to the preventive maintenance instruction to prevent a repeat of this event.

The designation of Reactor Engineers as System/Test Engineers for the refueling equipment system continues to provide benefits. This arrangement enhances equipment performance and provides timesaving for refueling equipment readiness. However, the work schedule demands on Reactor Engineers needs to be taken into account. Reactor Engineers were required to work 72 hours per week from the time fuel was receipted until final fuel reloads and Core inspections were completed. The reactor engineers met the challenge of the demanding work schedule, but the human performance risks presented by these extensive work hours should be factored into planning for future outages. Condition Report 2000-1459 was issued to documented the concern that critical path employees were required to work excessive hours to support the various outage activities.

The audit team noted weaknesses in Foreign Material Exclusion (FME) controls for the Refueling Canal. Prior to reactor vessel head removal, FME walkdowns of the tops of the "D" rings identified several concerns including tie wraps, oil leakage from overhead crane, miscellaneous nut/bolts, and pieces of clear plastic. With the exception of the Service Crane oil leak, all deficiencies were corrected prior to the

commencement of refueling activities. When refueling activities began, oil was still observed leaking from the West Side of the refueling canal walkway causing a safety hazard and an FME concern. As a result, industrial safety initiated measures to keep the oil from dripping onto the walkway and refueling personnel. Close-out of the FME log, when the Reactor Vessel Head was re-installed, was also inadequate; numerous items were incorrectly documented to be in the FME area after log close-out. At least six condition reports documented FME issues during 12 RFO. The inadequate implementation of FME controls was considered an outage weakness.

Observed fuel assembly and control component movements were properly performed and controlled. Fuel Movement Sheets were rigidly followed. The physical locations of fuel assemblies were confirmed to agree with core maps, and the maps and fuel movement sheets were meticulously updated and maintained by Fuel Handling Directors. Effective self-checking and independent checks were utilized to compare fuel assembly tags to core maps and to verify the physical locations of components. Multiple movement sheet pen and ink changes were necessitated because the Auxiliary Fuel Handling Bridge was unavailable and the ultrasonic equipment malfunctioned. Condition Report CR 2000-0889, which was generated by the Shift Supervisor, identified the human performance risk associated with these numerous marked-up changes. The next day, all the movement sheets were re-typed and appropriately verified.

The audit team verified that core alteration prerequisites and periodic checks were performed and documented prior to and during core alterations. Technical Specification requirements for fuel movements (e.g., boric acid concentration limits, communications with the control room, ventilation requirements, etc.) were periodically verified. The water clarity of the reactor canal was considered good for the fuel core offload activity, but the unavailability of the refueling canal skimmer prevented the removal of surface debris. Condition report CR 2000-1019 was issued to document this concern. The skimmer was repaired and was operational for the commencement of core reload.

The audit team evaluated the fuel inspection processes used to detect leaking fuel rods and slipped grids and subsequent repair efforts. Effective administrative controls for the preparation of fuel inspection and repair were noted. The Framatome Cogema Fuels (FCF) Quality Assurance Program controlled the fuel inspection and repair activities. Applicable procedures were approved for use at Davis-Besse, and comprehensive training was provided to FCF personnel. The safety evaluation supporting the fuel repair work adequately evaluated nuclear safety considerations including the potential release of radioactivity during the fuel repair process. The safety evaluation was sufficiently detailed and current with respect to the higher enrichment and burnup values of Batch 15 fuel assemblies designated for Cycle 13. Observed fuel inspections were considered comprehensive and included inspection for fuel pin displacement. Repair activities associated with resetting upper end fitting

springs were successfully performed. Initial concerns were resolved by verifying and calibrating suspect equipment with a spare upper end fitting spring flown in by FCF. Potentially defective springs for two fuel assemblies were replaced.

The twisted condition of fuel assemblies presented significant challenges to the fuel movement and inspection processes. Some older fuel assemblies would not initially slide into assigned core locations. In some cases, movement sequence alterations were required to allow insertion. The bent fuel assemblies required changes in the ultrasonic testing process. A recommendation for investigating alternative methods and techniques of fuel movement and inspection was made to Nuclear Engineering to ensure that fuel damage during movement is minimized. Nuclear Engineering concurs with this recommendation and has scheduled self-assessment activity 2000-0130 to investigate improvements in fuel handling techniques prior to November of 2000. Additionally, a separate self-assessment to address failed fuel detection has also been initiated by Nuclear Engineering.

The implementation of human performance enhancement techniques was considered effective throughout fuel handling activities. Consistent utilization of STAR technique and self-checking was observed. Fuel Handling directors were observed verifying and reviewing the proper placement and tracking of fuel tags during off-load and re-load. Watchstation turnovers were considered comprehensive and were performed when activities were in a stable condition.

The audit team verified the effectiveness of previous corrective actions from the 1998 audit of refueling activities. Due to audit results, one previous finding report was closed. Audit Finding AR-98-NFUEL-01-01 identified the breakage hazard associated with clear glass light bulbs along the west "D" ring walkway. Clear glass is very difficult to see in the reactor pool water, and precautionary measures to eliminate all potential sources of clear glass near the refueling canal are prudent. The long term solution to this finding concern was to replace the three obsolete 300 watt incandescent gooseneck pendant light fixtures with three less intrusive wall mounted globular light fixtures with protective cages that have equivalent illumination properties. Equivalent Replacement Resolution (ERR) 60-0002-166 satisfactorily documents the engineering resolution for the finding concern and included required safety evaluation for seismic considerations.

B. Operations

Activities audited include: startup and shutdown, RCS draining and filling, conduct of shift personnel, work control, shutdown risk, safety tagging, procedure adequacy and adherence, and control of overtime.

Most observed Operations activities were well orchestrated and performed. Improvement in procedure compliance and procedure content over previous outages

was noted. Operations personnel consistently documented equipment deficiencies and below expectation performance events on CRs. Major evolutions, such as plant shutdown and startup, were well implemented and efficiently performed. Operators effectively coordinated changes in plant schedule with Outage Management and oversight personnel. The breakdown of major evolutions into individual tasks helped to facilitate the successful completion of these evolutions, and it is recommended that this practice be expanded for future outages. Operations management oversight enhanced crew performance, and support from other organizations was much better than during non-Outage periods.

Reactor Coolant System draining evolutions were generally well coordinated and implemented, but some weaknesses in drain procedures and the understanding of RCS draining and venting evolutions were evident. Apparently because a non-customary, but procedurally allowed, drain line-up was utilized, liquid levels were not reduced in all portions of the RCS during one evolution. In another instance, the level indications unexpectedly dropped when RCS inventory was redistributed because a planned activity resulted in an unanticipated venting of a Reactor Coolant Pump. Responses for Condition Reports documenting the above two events and other issues associated with RCS draining evolutions must adequately evaluate the lessons learned and ensure improvements are made prior to the next outage.

Operating crews blocked several "shots on goal." As the last line of defense, Operations Crews prevented the initiation of work or testing that could have caused a plant upset or negatively affected plant stability or key safety functions on several occassions. Operators consistently displayed a good questioning attitude for planned events, and responded well to several on the job injuries and illnesses that occurred during the Outage. The response to several unexpected equipment deficiencies and events was also considered effective. In particular, the control room staff effectively handled an unexpected loss of off-site power. The crew restored plant electrical equipment and important cooling systems in a timely manner and maintained air to the Steam Generator nozzle dams.

The audit team noted that crews are more consistently implementing event free tools including peer checks, STAR techniques, and three part communications. Peer checks are becoming more routine, and phonetic alphabet use is becoming more natural. In general, effective procedure adherence was observed, and the audit team noted specific improvement in the area of procedure interpretation. However, weaknesses in procedure utilization were noted when crews responded to annunciator alarms and some shutdown casualties. Specifically, crews were too quick to classify alarms as expected without adequate investigation, and crews did not consistently reference annunciator procedures when appropriate. Similarly, during the grout gas release event, Operators referred to, but were reluctant to enter applicable procedures. Concerns about the response to this gas release were documented on CR 2000-1070.

Two noteworthy weaknesses in the performance of Operations crews were identified. Overall command, control, and coordination of Work Support Center (WSC) activities were inadequate. Insufficient role clarity and no central authority in the WSC were probably the primary causes of the inadvertent drainage of Core Flood Tank (CFT) water to the RCS, early in the outage. Specifically, plant line-up changes, implemented by WSC personnel, were not adequately tracked by the WSC and not adequately communicated to the Control Room and oncoming WSC watchstanders. The second weakness was also a contributing cause for the CFT event. During the outage, the configuration of important plant systems was not being adequately tracked on CTRM drawings. Prior to the CFT event, a Reactor Operator had received word that important changes to RCS drain line-up had been implemented, but the changes were not annotated on Control Room drawings. As part of the response to the CFT event, interim actions were implemented to address both of the above weaknesses. Some improvement was noted by the audit team, but more improvement for future outages is needed. Late in the outage, the audit team generated CR 2000-1234 to document the fact that plant drawings were still not being adequately maintained and utilized to verify important line-ups.

Pre-planned briefs were effectively performed. Infrequently performed evolution briefs for Shutdown, Startup and integrated Safety Features Actuation System testing were observed to be notably comprehensive, incorporating important lessons learned from industry and Davis-Besse operating experience. In contrast to Planned briefs, impromptu briefs were sometimes not performed when appropriate or lacked depth. Two specific examples were the absence of any briefs during unexpected Feedwater Heater drain isolations and the Auxiliary Boiler trip on high steam pressure.

Shutdown Risk activities were mainly evaluated by a Peer Evaluator from the Beaver Valley Nuclear Power Station. He noted many positive aspects in the program. Procedures provided the structure for a strong program and incorporated guidance from applicable industry documents. Detailed requirements for maintaining the key safety functions of inventory control, reactivity control, decay heat removal capability, containment control, and power availability were adequately proceduralized. Shutdown Risk Advisors displayed a strong plant technical knowledge and a good understanding of Shutdown Risk requirements and guidelines. Shutdown Risk Advisors adequately ensured compliance with applicable requirements, monitored performance of higher risk evolutions, and advised Plant Management of emergent shutdown risk concerns. Shiftly reports provided a comprehensive, yet easy to understand, summary of overall plant shutdown risk status. The audit team recommended some minor procedure updates to cognizant personnel.

Operations crews adequately embraced the protected train and defense in depth philosophies. The functionality of key safety systems and components was assured by post-maintenance testing, monitoring of key parameters with the system in service,

or through the verification of system alignment by Operations personnel. The systems, structures, and components identified in the schedule to provide defense in depth during outage periods were generally controlled such that they remained available, functional, or operable with no work being performed on the system. Selected protected train equipment and backup equipment were uniquely identified in the plant with special tags and/or barriers to prevent inadvertent loss of the required safety function.

The audit team evaluated many safety tagging activities during the outage. A new tagging system and clearance database had been implemented at the end of 1999, and it was clear that Operators were still learning the intricacies of the new system. Several Senior Reactor Operators indicated they had problems utilizing the new safety tagging system. When concerns or questions arose, technical experts on the database or database instructions were consulted to resolve the issues. In the final analysis, very few database related errors occurred during the outage. The implementation of the new process appears to be successful, and the many configuration control mechanisms associated with the new system will certainly improve plant performance in the long run.

In general, reviewed clearances were properly completed and approved. Tagging boundaries were appropriate with vent and drain paths when applicable. Changes to clearances were properly completed and approved. The Temporary Lifts reviewed were also implemented appropriately. One deficiency was identified during the preparation for a Seal Injection clearance. This clearance had been issued to the field which would have created an undesired RCS drain flowpath. The tagout was corrected and these valves were removed from the clearance. Condition Report 2000-0784 was written to document this concern.

Operators were observed postings and removing Red Tags on several occasions. Equipment and components were properly positioned and checked. Correct sequencing was followed for positioning components when required. Independent verifications were performed with an appropriate degree of independence. Special instructions from DB-OP-00000, Conduct of Operation, for verifying valve position and for operating air operated valves, remotely operated valves, and motor operated valves were followed when appropriate. Reviews of approximately 100 red tags in the field revealed no tagging discrepancies.

The participation of maintenance personnel and clearance holders in the safety tagging process was evaluated. Interviewed personnel considered the walkdowns of clearances for this outage to be less thorough than during past outages. As documented on Condition Report 2000-0362, the Site was not as well prepared for 12 RFO as it had been for previous outages. Most workers stated that supervisors and management are encouraging personnel to personally check the status of important tagged components prior to work commencing. The addition of Maintenance Work

Orders to existing clearances was evaluated. Clearance Holders adequately obtained Senior Reactor Operator concurrence and met procedural requirements when adding work to clearances.

Several concerns relating to Maintenance personnel involvement and ownership in the Safety Tagging process were generated during a review of approximately 20 outage Work Orders (MWOs) and related clearances and documented on CR 2000-1446. In several instances, the mechanisms utilized by Maintenance personnel to ensure their work areas are isolated from high-energy sources were not adequately and consistently performed and implemented. For instance, some clearance requests did not list isolation boundaries, and some Safety Verifications were inadequately performed or inadequately documented. Additionally, the process for workers to sign on to the clearance database needs to be standardized. During outages, when generic clearances are used to isolate entire fluid systems, more effective and efficient methods for implementing these safety tagging mechanisms should be developed. No instances were identified where personnel were working within inadequately tagged work boundaries.

The audit team evaluated the control of overtime for all Site personnel. Some administrative discrepancies in the approval for overtime were documented on CRs.

C. Steam Generator Eddy Current Testing and FTI Quality Program

Activities audited include: training and qualification, Framatome NCR processing, materials storage and handling, compliance with Quality Assurance Program & EPRI Steam Generator Examination Guidelines, inspection and hold points, and human performance.

Activities conducted by Framatome Technologies Inc. (FTI) were performed under the FTI Quality Plan. Prior to the outage, an auditor met with the FTI Quality Manager, Project Manager, and Coordinator to ensure proper interface and integration with the FENOC Corrective Action Program. As part of the FTI Quality Plan, FTI auditors performed surveillances of FTI activities. These auditing activities were determined to be critical and constructive. The audit team verified the proper processing of FTI nonconformance reports (NCRs), including required interface with FENOC personnel. Corresponding CRs were generated when NCRs met the applicable Davis-Besse criteria. Responses to NCRs were considered timely and effective. Procedures and drawings associated with FTI work were controlled to ensure that only the most current versions were used and that changes were reviewed, approved, and distributed. The Task Deployment Letters (document packages for specific work) contained required documents and were adequately updated and maintained.

Material storage by FTI was considered effective. Required materials were processed through an established receipt area before the material was released for use. The

designated area was suitable for the storage of all quality levels of material and included appropriate boundaries to segregate materials with different quality classifications. Proper security controls and receipt inspection practices were observed at various times during the outage. The area was also adequately maintained and controlled; material transfers were adequately documented. Consumables brought on site were accompanied by appropriate Material Certifications, Material Safety Data Sheets, and laboratory test results. Control of lot and batch numbers was evident to ensure traceability to material certifications.

The audit team evaluated the effectiveness of Steam Generator eddy current testing. Training and certifications for FTI personnel were determined to be effective and adequately documented. In general, eddy current activities were conducted in accordance with applicable procedure requirements using state of the art techniques. Industry experience and up to date information on steam generator degradation mechanisms were incorporated into the analysis. When a probe speed violation was identified, an NCR and corresponding CR were generated. The issue was evaluated in a timely manner and it was ultimately determined that re-testing of the affected tubes was not necessary. Active involvement by FTI quality inspectors was witnessed by the audit team. Witness and hold points were adequately dispositioned, and effective oversight was provided. Procedures were clear, concise, and addressed applicable Quality Program requirements and EPRI Steam Generator Examination Guidelines.

A good working relationship existed between FTI personnel and Davis-Besse personnel. Communications were frequent, open, and professional. Everyone interviewed indicated communications within FTI and between FTI and Davis-Besse were effective. Plant engineering provided direct oversight of the entire eddy current process. Additionally, two independent qualified Data Analysts and a peer evaluator from Three Mile Island were used to provide additional oversight. All of the guest analysis personnel were required to pass both a written and practical site specific performance demonstration test prior to analyzing any data at Davis-Besse. Turnover meetings were also considered comprehensive with appropriate levels of participation from attendees.

D. Steam Generator Chemical Cleaning

Activities audited include: safety, radiological performance, human performance, and chemical cleaning process including leak checks, containment, cleaning steps, and corrosion monitoring.

The chemical cleaning process was effectively implemented. System connections were checked at least twice prior to nitrogen or water pressure checks. The only leakage detected was at the Steam Generator manway, and this connection was not verified by FTI personnel. Integrity of the dike containing most tanks, hoses, and

tank farm equipment was maintained during all chemical cleaning activities. In general, the preparation of cleaning solutions produced the desired chemical concentrations in the final product. One improper mix was promptly identified on an NCR and corrected. The various steps of the cleaning process (e.g., leak checks, solution heat-up, iron removal, rinse, and passivation) were effectively implemented in accordance with established parameters for temperature, chemical concentrations, and application times. The success of the chemical cleaning process was demonstrated by the large amounts of iron oxide removed (2495 pounds from 2A Steam Generator and 2614 pounds from 1B Steam Generator). Additionally, almost 900 pounds of sludge were removed from the Steam Generators.

The audit team also verified that corrosion monitoring equipment was adequately installed and utilized. Pre-job briefs for the installation were comprehensive, but the audit team questioned the planned use of four controlled materials. Approvals had been obtained for the use of teflon tape, pipe sealant, adhesive, and locktite, but these approvals did not allow contact with plant components. Responsible personnel were notified and ensured new controlled material requests were generated to allow use of these substances in the desired applications. Corrosion monitoring equipment installation procedures were strictly followed, and the installation was completed successfully.

Appropriate safety and radiological controls were maintained during steam generator cleaning activities. Personal protective equipment was adequately utilized during observed evolutions. Chemicals were adequately controlled and labeled in accordance with procedure requirements. Processing tanks were maintained within an erected dike. Hydrazine and Ammonium Hydroxide were adequately stored with secondary containment boundaries, and the chemical EDTA was stored in qualified tanker trucks. Although no spills occurred, spill kits were properly staged, and workers were aware of their location and use requirements. ALARA Briefs were comprehensive and included discussions of electronic dosimetry usage, Radiation Work Permit requirements, radiological hazards associated with the chemical cleaning processes, radiological work practice expectations, and radiological requirements for breaching systems. Potential radioactive sources, including rainwater accumulation in the dike area and in sample containers, were properly controlled and surveyed by radiation protection technicians. All potentially radiological effluents were sampled for radioactivity prior to release.

Human performance techniques were adequately implemented during cleaning activities. Self-checking, pre-job walk downs, and three-way communications were utilized to reduce the risk of errors. Personnel displayed a questioning attitude, and a high degree of procedure adherence was observed. Consistent supervisory monitoring by FTI management, Davis-Besse Project Managers, and Operations staff personnel was observed.

E. Chemistry

Activities audited include: plant chemistry and radiochemistry control, system chemical additions, communications with operations, water management plans, lab practices, safety and ALARA controls/practices, Crud Burst Control, ownership of lab equipment, and outage support.

Chemistry related activities were adequately planned and executed to support 12 RFO. High standards of water quality were consistently maintained in plant systems, and high quality instrumentation closely monitored system performance. Two specific strengths were identified. First, Chemistry has historically maintained excellent water chemistry in the Steam Generators (OTSGs). The condition of the Davis-Besse OTSGs is excellent for their vintage and has precluded the need for costly replacement. Observations and review during this audit continue to provide evidence of chemistry's vigilance at maintaining the OTSGs. The primary system oxidation and subsequent crud burst was well controlled and in compliance with applicable procedures. This area has also recently been identified by INPO as a strength.

Chemistry developed a comprehensive Water Management Plan for 12 RFO that included actions for handling water from the spent resin storage tank, condenser cleaning, steam generator lay-ups, cooling tower/circulating water, steam generator chemical cleaning, hydro-lazing of service water, air compressor cooling water, and other draining operations. Overall the handling of water inventories was good throughout the outage. The only issue arose when it became necessary to discharge the settling basins due to high water levels. This release was slightly in excess of the applicable NPDES permit limit of 8.7 ppb. This condition, which was caused by chemical cleaning distillate and rainwater accumulation, was captured on Condition Report 2000-1424, and the Environmental Protection Agency was contacted prior to the commencement of the discharge.

The audit team verified that chemistry and radiochemistry parameters for the Reactor Coolant System (RCS), the Secondary Systems, and various other closed loop systems were maintained within applicable requirements and specifications throughout the outage. Sampling frequencies met procedural requirements, and chemical additions were performed in accordance with procedural guidance when prudent. The audit team observed primary system sampling on several occasions. The sampling area was clean, and background dose rates were commendably low, approximately 5 mr/hr. Analysts followed the posted chemistry procedure step by step through shutdown of the sample sink. Contamination control was maintained during sampling, and the sample sink was left in a satisfactory condition.

Various sample analyses were observed including conductivity, pH, and concentration determinations for the following specific elements and chemical

compounds: Boron, Lithium, dissolved Oxygen, Chloride, Fluoride, Sulfate, dissolved Hydrogen, and Silica. In all cases, the appropriate samples were obtained, analyses performed, and limits maintained. Radiochemistry analyses for Spent Fuel Pool weekly isotopic samples and various RCS samples (Gross Activity [Daily], Dose Equivalent I-131 [Daily], Crud gamma isotopic [72 hours], Filtrate gamma isotopic [72 hours], Stripped gas gamma isotopic [weekly], and tritium [monthly]) were adequately performed, and no out-of-limit values were recorded. Adequate lab practices were observed including contamination control, chemical control, and proper analysis techniques. Strong ownership of chemistry lab equipment, including recently acquired, state of the art, analysis equipment (e.g., boron auto-titrator and ion chromatograph), was demonstrated. Observations of chemistry staff indicated adequate safety and radiological control practices. In all cases appropriate Personal Protective Equipment and ALARA practices were utilized.

In general, Chemistry personnel exhibited adequate human performance characteristics (e.g., self-checking, questioning attitude, strict procedure adherence, and supervisory monitoring) during 12RFO. Three minor procedure documentation errors (e.g., missing initials, insufficient recorded information) were identified on CR 2000-1407. The audit team observed consistently effective communications between Operations and Chemistry throughout the outage. Chemistry representatives kept Control Room personnel apprised of ongoing and upcoming Chemistry activities through turnover briefings and periodic phone communications. Effective coordination of major evolutions (e.g., fill and lay-up of Steam Generators after completion of chemical cleaning, Steam Generator fill, soak, and drain activities, and oxygen and iron removal during startup) was observed. During the audit, Chemistry was completing a self-assessment of the Operations communications interface and expected to generate some additional recommendations for improvement. Use of three-way communications and phonetic alphabet by Chemistry Testers showed improvement from previous Quality Assurance observations. Chemistry supervision stated that increases in staff efficiency could be realized if Technicians were trained and qualified to perform individual tasks prior to completing all tester qualifications. It is recommended that this issue be reviewed for potential future benefits.

F. Containment Annulus Work Activities

Activities audited include: lead hazard controls, modification project, completion for vessel inspection, analysis/resolution of water in-leakage, human performance, safety and radiological controls.

The main purpose of Annulus work was to remove the corrosion product layer from the lower portion of containment, allow inspection, and to repaint the surface. This sand removal and repainting project had been started in 11RFO, and additional work was performed during the 1999 Mid-Cycle Outage. During 11 RFO, the unsuspected lead content of removed paint created a potential lead ingestion hazard. During the mid-cycle outage, a release of sandblasting material also created a lead hazard. Due to these past problems with sandblasting, alternative paint removal techniques were evaluated. Ultimately, testing and engineering evaluations determined that use of various power tools, such as air grinders, air chisels, and air impact hammers were an acceptable alternative to sand blasting.

Considerable efforts were dedicated to planning this project to ensure it would be completed in a safe and efficient manner. The vendor choice was based on a more detailed bid specification and work plan, including additional lead abatement and nuclear site experience. Lead awareness training was provided to all applicable Davis-Besse and vendor personnel as required by federal statute. The personnel performing the work were required to have blood tests and respirator qualifications. Safety personnel provided informational summaries for adequate and expected safety practices.

Work activities were conducted in a safe and effective manner. The annulus areas, where work was performed, were properly controlled and posted. No Occupational Safety and Health Administration (OSHA) recordable incidents, no uncontrolled exposures to lead contamination, and no radiological events occurred during this work. Personnel wore required personal protection equipment and lapel air samplers when appropriate. Daily air samples verified that lead levels remained within requirements. Power tools were provided with HEPA filtration systems to ensure airborne lead levels were minimized. Dedicated management oversight provided continuous project oversight and support. Safety provided periodic oversight and personnel monitoring. Radiation Protection provided job support for radiological controls and waste generation.

Corrosion layer removal per Design Modification 94-0032 was adequately completed to allow containment vessel inspection. The original objective of this modification, sand removal, was expanded because moisture contained in the sand had corroded and pitted the Containment surface. The alternate tools utilized for removal of this corrosion layer proved to be effective and efficient. Removal activities were completed ahead of schedule, and painting activities were completed

as planned. Subsequent inspections were satisfactorily completed. The biggest concern was the observed ground water in-leakage. Previous dispositions of this issue were ultimately determined to be unacceptable either because contingency actions were ineffective or the source of the water was incorrectly determined. Ultimately, an engineering evaluation associated with CR 2000-1362 justified continued operation with the known leakage.

G. Radiation Protection

Activities audited include: dose control and tracking, contamination control, surveys and personnel monitoring, radiological posting and labeling, respiratory protection, radioactive material storage and control, ALARA briefings, Radiation Protection Program administration, use of event free tools, and work practices.

The audit team verified that the occupational dose was controlled in compliance with applicable requirements. Occupational dose was verified to be properly tracked through the HIS-20 computer system with twice daily total dose reports for all individuals provided to RP Supervisors. The HIS-20 system was programmed to lock-out individual's entry on a RWP when their total accumulated dose reaches 900 millirem, (90% of the 1000 millirem administrative limit). Administrative dose controls were effectively monitored and the Dose Control Alert List was properly maintained. Accumulated dose from external and internal radiation sources was verified to be properly captured and input into the HIS-20 dose tracking system from applicable sources including whole body count data, lapel air sample results, extremity monitoring, and Personnel Contamination Worksheet (PCW) results. However, the audit team documented a failure to calculate a skin dose from an 80 mrad contamination incident on CR2000-1212.

Over 300 routine and specific survey results were reviewed during the audit. Radiation and contamination surveys overall were found to be legible, pertinent, and performed in accordance with the applicable sections of DB-HP-01104, Radiological Surveillance. Survey information was sufficient for proper radiological posting of areas, control of non-radiological areas, and adequately identifying worker dose rate exposures and work area contamination levels. Surveys were properly recorded in the survey logs and reviewed by RP Management.

Control of radiation areas, contamination areas, and airborne radioactivity areas was adequate. Periodic tours verified proper posting, based on survey results. However, several challenges to contamination area boundary controls were observed early in the outage. Initially, general areas of Containment were posted as Contamination Areas (CAs), with specific areas, such as the entrance to the D-Rings, posted as High Contamination Areas (HCAs) requiring extra protective clothing. As equipment was brought into these areas it became apparent that effectively controlling the boundaries was not practical. Radiation Protection Management appropriately made the decision

to control Containment as an HCA. Increased decontamination activities of general walkways greatly reduced the frequency of contamination problems.

Portable survey instruments, article and personnel contamination monitors, and Continuous Air Monitors were verified to have current calibrations. Daily source checks were consistently performed and documented. Instruments were also properly tagged out of service when required. However, CR 2000-0695 documented failures to record some portable survey instrument return information in the Instrument Response/Use Log (e.g., return time and date and after use source check information).

Virtually no failures to wear the correctly positioned and activated whole body dosimetry were identified during the outage. A "greeter" was stationed at the entrance to the Radiological Restricted Area (RRA) to ensure that required dosimetry was properly positioned, electronic dosimetry was activated, and that personnel knew their alarming set points for dose and rate. Multiple dosimetry was properly utilized when required and positioned to measure the maximum whole body dose. Dose alarm set points were conservatively established according to the individuals current calculated dose margin. Tele-dosimetry was effectively used to reduce RP technician dose by remotely monitoring and controlling worker dose rate exposures and accumulated dose. RP technicians were observed appropriately monitoring and instructing workers through radio communications and the tele-view system to maintain dose ALARA.

In general, airborne radioactivity monitoring and controls were properly implemented. Lapel air samplers were worn when work involved potential airborne radioactivity hazards, such as mirror insulation removal, and opening primary systems. General area air samples were also taken during performance of high contamination work. Personnel working near the Spent Fuel Pool and Refueling Canal were properly monitored for tritium uptake by urinalysis bioassay per DB-HP-00002. Respirator issue was generally performed in accordance with procedure DB-HP-00002. Qualification lists were maintained current; however, CR 2000-0945 documented respirators being issued to two individuals who were not qualified. Respirators and associated spare parts were verified as NIOSH/MSHA certified, and respirators were verified to be inspected and inventoried at required frequencies. Most air sample activity calculations were performed in accordance with procedure requirements, but the audit team generated CR 2000-0917 to document several air sample volume calculation errors on Air Sample Field Analysis Sheets.

High radiation area controls were verified to meet revised Technical Specification requirements. Specific radiation work permits (RWPs) required personnel to wear electronic dosimetry with alarming set points when entering high radiation areas. High radiation areas were properly identified by radiation surveys and appropriately barricaded and posted in accordance with DB-HP-01100. Low dose waiting area

signs were clearly marked in the Auxiliary Building and Containment, and temporary lead shielding was used where possible to reduce dose rates.

Solid and liquid radioactive waste generated during the outage was adequately dispositioned. Most solid dry activated waste generated during the outage was collected and placed in sea-land containers for off-site disposal. Radioactive filters were placed in high integrity containers (HICs) and temporarily stored in appropriate areas. Radioactive resins were sluiced to the Spent Resin Storage Tank for later transfer to HICs. Radioactive waste liquids were collected in designated storage tanks and processed for release through a series of filters and demineralizers (Duratek system.)

The effectiveness of outage RWPs was evaluated by the audit team. Although the overall outage dose as measured by electronic dosimeters exceeded established goals, most individual RWP estimates were within accuracy expectations. In most cases, RWP dose estimates were exceeded due to job scope taking more time than originally budgeted. Twenty reviewed packages were properly developed in accordance with DB-HP-01901. Packages generally contained the required documents such as ALARA TEDE evaluation sheets, surveys, alarming dosimeter set-point sheets, and anticipated contamination evaluation forms. Two identified RWP errors were documented on Condition Reports. Condition Report 2000-1159 identified the implementation of permanent alarming dosimeter set point changes without a Work in Progress Evaluation form in the RWP package. Condition Report 2000-1074 identified estimate inconsistencies for total person-rem documentation. In some other cases, RWPs did not provide sufficient requirements or direction. This weakness is similar to the recent Area For Improvement identified by INPO.

At least fifteen ALARA briefs were observed during the audit. Most observed ALARA briefs were thorough and properly conducted in accordance with DB-HP-01803. However, the dayshift brief for removing the Reactor Vessel Core Support Assembly (RWP-5129) was held in the PSF third floor lunchroom. This location was not adequate because of high background noise from refrigeration units and made it difficult for some personnel to hear the information being presented. Condition Report 2000-0976 was written by ALARA Services to address the inadequacy of briefing facilities. Later briefs were held in more appropriate locations. An amplification system was used for subsequent briefs held in the lunchroom. Condition Report 2000-1483, written by the audit team, documented a weakness in performing ALARA post job reviews in a timely manner.

Contamination control and monitoring of areas and personnel were observed to be adequate. Routine contamination surveys were performed at least once per shift, and general area walkways were periodically mopped. Personnel exiting contaminated areas were observed to be properly removing protective clothing. Technicians were observed coaching and assisting these personnel when necessary. Personnel

Contamination Monitors (PCMs) were set up at the Decontamination Shower Area as a means to prevent the spread of contamination to the RRA entrance. Technicians manning these PCMs maintained alarm logs and initiated contamination worksheets when necessary. Condition Report 2000-0824 was written by the audit team to document a failure to enter PCM Alarm Log information as required by DB-HP-01701.

Adequate radioactive material (RAM) control was observed. Materials were surveyed when required using proper radiological techniques and appropriately dispositioned. Tours of the plant verified that RAM was properly labeled or tagged and Radioactive Material Areas were properly posted. A few instances of yellow RAM bags containing items were observed outside of radiologically posted areas without an identifying tag, but were promptly corrected by RP personnel when reported.

H. Maintenance

Activities audited include: work documents, pre-job briefs, work practices, material readiness, housekeeping, foreign material exclusion, material deficiency tags, materials program, maintenance training and qualification, records, measuring and test equipment, and lifting and handling equipment.

In general, the sixty observed pre-job briefs audited were adequately performed and included all items required by procedure. In most cases, the individual leading the work activity and not the supervisor performed the briefs. The pre-job brief checklist was used, and the appropriate individuals signed the checklist. Safety and working with operating equipment were especially stressed along with previous events at Davis Besse. Two areas for improvement were identified. More information on applicable industry events should be included in pre-job briefs. Secondly, Maintenance should review self-brief practices and ensure these briefs meet applicable requirements and expectations. A self-brief is conducted by the individual performing the activity with no involvement from a supervisor or peer.

Through observation of work activities and review of work documents, the audit team evaluated maintenance work practices including documentation of work, procedure adherence, safety, and communication practices. Work Order (WO) documentation was generally adequate. Some minor deficiencies (e.g., work history inadequacies and missing signatures) were identified and corrected by the work groups. A review of WO closeouts indicates good documentation of work performed by the craft and responsible engineers. Procedures were consistently available and adequate procedure adherence was observed during work activities. When procedure concerns arose, craft personnel stopped activities to obtain clarification or changes to procedures.

A proper work safety culture was maintained throughout the outage. Safety was emphasized prior to and during work. Proper industrial safety practices were observed, and the appropriate safety equipment was worn for the job being worked. Particularly effective safety practices were observed during electrical work. Meters or tic-tracers were consistently used to detect voltage, and circuit breakers were wedged to prevent movement. Maintenance personnel also supported reactor safety concerns by having designated personnel on standby to close the equipment hatch if necessary. The responsible maintenance supervisor and craft personnel were knowledgeable of their assigned duties, and necessary procedures and equipment were available and ready for this task, if required.

In general, communication practices and utilization of event free tools by Davis-Besse maintenance personnel were proper and effective. Three-way communications and phonetic alphabet were consistently used. Some contractors were notably unfamiliar with these communication techniques and required periodic coaching from Davis-Besse personnel. Workers were also observed using STAR techniques, self-checking practices, and peer checks for critical tasks. Supervisors were observed at assigned work sites. During the outage, some Maintenance human performance errors were identified (e.g., Grout gas release, loss of off-site power). These noteworthy errors certainly tainted perceptions of overall outage performance, but the audit team did not detect any widespread or systemic weaknesses in the Maintenance human performance culture.

During the audit, two issues associated with circuit breaker inspections were identified. The audit team and maintenance personnel identified several deficiencies on breakers returned from vendors. Some breakers were improperly adjusted or missing parts. In other cases, Work Orders did not provide a point to point wire check for breakers. These concerns were discussed with responsible personnel and corrected. Condition Reports were generated when appropriate. In contrast to the above, the audit team also noted that molded case circuit breakers are unnecessarily tested and inspected twice prior to installation. The audit team recommended that the circuit breakers be tested only once, when they are removed from service.

In general, Maintenance activities were adequately planned prior to implementation. Reviews, evaluations, and document checks on new and revised work documents verified effective planning, proper work documents identification and verification, required reviews were completed, and appropriate approvals. Work order packages were observed at the job sites when required, and the documentation was verified to be up to date.

Daily plant walkdowns were performed to evaluate material readiness, housekeeping, and foreign material exclusion (FME) effectiveness. Housekeeping concerns, such as spilled oil, leaking hoses, and stray trash, were pointed out to responsible personnel and corrected. Scaffolding concerns were identified and corrected by Maintenance

services scaffold builders. Two Procedure Change Requests (00-0683 and 00-0684) were submitted for clarification of minimum size gap requirements and height requirements for pearl weave screening. Foreign Material Exclusion covers were found in place and barriers were set up to protect items from accidentally getting into open areas. Some FME administrative concerns and specific work area concerns were documented on CRs. In general, Maintenance Information Tags were used to identify items, such as material, tools, or hoses, used in the maintenance process. However, a CR was generated to document several hoses not being tagged per DB-DP-00007. Additionally, numerous cords were found plugged into receptacles without Ground Fault Circuit Interrupters installed.

During plant inspections, several material storage concerns were identified. In the tool cribs and Maintenance Services work areas, several consumable items with expired shelf life were found. Responsible personnel ensured that the items had not been used, and all items with expired shelf life were segregated to preclude any future usage. The shelf-life expiration dates of some items are not being identified or transferred to the containers they are stored in. Flammable liquids were found improperly stored outside of a flammable liquid cabinet, and some ISI Specimens were incorrectly stored outside the ISI trailer. A bigger picture concern is that the shelf-life expiration dates of some items are not identified on storage containers. The errors were identified on CRs.

Approximately 130 Material Deficiency tags (MDTs) were cross-referenced against corresponding work documents. Twelve of the MDTs, which were hanging on equipment, had no corresponding work order identified. Per procedure, NG-DB-00215 Material Readiness and Housekeeping Inspection Program, it is the responsibility of each group to ensure material deficiencies are identified and tracked. The failure to track or remove MDTs is a reoccurring problem. Similar deficiencies had previously been identified on three corrective action documents.

The audit team evaluated the training and qualifications for personnel performing maintenance functions, inspection activities, and special processes. Two deficiencies associated with qualification data entry were identified by the audit team. Shop personnel and outage management generated several CRs due to non-qualified individuals performing work. Qualification reviews by the audit team revealed no additional deficiencies indicating that these errors were being comprehensively identified by line organizations. Some recommendations were identified. More pre-outage training should be provided for tasks performed on an infrequent basis, such as Raychem, cable pulls, and pressure grout work. Also, the Training Department should be integrated into the process for purchasing new models and new types of purchased M&TE equipment. Some of these models require special training on proper operation, controls, and limitations for use. Finally, the practice of using Maintenance Training Coordinators/Supervisors as line supervisors during outages

should be reviewed because these training coordinators/supervisors are spread too thin to properly perform both functions.

The audit team verified that tools, gages, instruments, and other measuring and testing devices used for activities affecting Quality were properly controlled, calibrated and adjusted at specified periods to maintain accuracy within necessary limits through reviews of over 100 Work Orders. The M&TE associated with observed work activities were verified to have unique identification numbers, span the proper range and accuracy, and include appropriate use documentation. The audit team recommended to responsible personnel that traveler sheets remain in the Work Package until closeout to provide easy verification of proper M&TE tracking, control, and usage.

Most observed lifting and rigging activities were safely performed in accordance with applicable requirements. Work packages and lift personnel certifications were adequate. One deficiency involved the placement of a Circulating Water Pump Impeller onto a trailer that was not rated for the load. An auditor identified the deficiency, and the impeller was removed prior to transport of the load off site.

I. Engineering

Activities audited include: boric acid corrosion control, valve packing, test control, modifications, and temporary modifications.

The implementation of Modification and Temporary Modification packages was evaluated during the audit. The audit team concluded that modification packages were generally comprehensive and adequately prepared. Safety evaluations were performed when applicable and addressed modification changes. Several deficiencies with the implementation of the Post-LOCA Boron Precipitation Modification (MOD 97-0074) were identified. The collective significance of these issues will be evaluated by CR 2000-1410. Some of the specific identified deficiencies are described below:

- Drawings were not updated when required
- Modification test procedures incorrectly stated low temperature over-pressurization limitation on the RCS and did not include Safety Evaluation requirement for demonstrating High Pressure Injection (HPI) System operability
- Test procedures not scheduled to be performed as identified by the Safety Evaluation
- Administrative control deficiencies for valves that cross-connect HPI System with the Decay Heat Removal System
- Modification testing did not adequately quantify system leakage
- Surveillance tests that quantify system leakage were not revised as part of the modification

A number of Temporary Modifications (TMs) were implemented to support Outage activities. The implemented TMs were verified to be temporary and small-scale design changes within the scope of applicable procedure requirements. In general, the reviewed TMs were found to be properly processed and approved. Applicable document changes were prepared and posted. Most Safety Reviews and Safety Evaluations were adequately researched, performed, and documented. Walkdowns of the Plant identified no instances where temporary design alterations were implemented without being properly controlled as a TM or design Modification. Walkdowns did identify one case where sump pumps were not available in the event of a temporary hose break as identified in the TM Safety Evaluation.

The audit team evaluated implementation of the Boric Acid Corrosion Control (BACC) Program. Team members participated in and reviewed Mode 5, Mode 3, and RCS Hydrostatic inspection results. Boric Acid Corrosion Control Inspection Checklists and Condition Reports were initiated by inspectors when prudent to document and evaluate boric acid accumulation and leaks. Boric acid leakage was adequately classified and corrected when appropriate. Engineering displayed noteworthy persistence in ensuring boric acid accumulation from the Reactor head was thoroughly cleaned.

The audit team evaluated several valve-packing issues during the outage. The packing of valve RC-2 was adequately installed and did not have to be adjusted during plant startup; this fact is significant due to the historic problems associated with packing this valve. Two valve packing issues were identified. Concerns about the ownership of valve packing program and departmental interfaces between Maintenance, Plant Engineering, and Design Basis Engineering were noted and discussed with plant personnel. QA identified a valve live load packing configuration control issue concerning the stud size versus belleville washer size on RC-2. QA review of the RC-2 repacking effort was added to the WO package at the start of the outage as requested by the audit team.

The audit team observed the performance of Surveillance, Periodic, Modification, Post-Modification, and Acceptance Test activities in the field and evaluated test results. Observed tests included MOD 97-0074 testing, Zero Power Physics testing, Integrated Leak Rate Testing (ILRT), Decay Heat Pump Bearing test, Local Leak Rate Testing (LLRT), Check Valve Reverse and Forward Flow testing, Service Water Integrated Flow Balance, Modification Testing, and Reactor Coolant System Hydrostatic testing.

In general, observed tests were adequately performed, and reviewed test results were determined to be complete, accurate, and acceptable. Personnel performing the testing were knowledgeable of test requirements and equipment use. Appropriate safety and radiological practices were implemented during testing. Test requirements for

maintenance and modification activities were appropriate for the scope of work performed. The following additional positive attributes were observed during testing:

- Observed pre-test briefings were conducted in accordance with governing procedures
- Prior to beginning the tests, the test leader and control room operators ensured that affected equipment and components were properly aligned and that overall plant conditions were suitable for the testing. Administrative approvals were obtained and clearances were implemented prior to test performance.
- Limiting Conditions for Operation (LCO) requirements were adequately tracked when equipment was unable to perform its safety function.
- A working copy of the latest approved revision of the test procedure, including effective changes, was used to implement the test. Temporary Approval procedure changes implemented during the course of some tests were incorporated into working copies of procedures when the changes became effective.
- Equipment was only adjusted when authorized by the test procedure.
- The M&TE used in the test satisfied the requirements of the test procedure and were within their calibration due dates.
- With minor exceptions, procedure performances were adequately documented in accordance with applicable testing procedure requirements.
- Proper control and oversight of test activities, including briefings and test conduct by Test Leaders, Test Personnel, and Management Designee.

There were several issues associated with the MOD 97-0074 post-modification test. Some of the specific identified deficiencies are described below:

- Original test procedure revised to be performed as an Acceptance Test (non-routine test performed to meet specific design requirements) when questioned by the audit team. Some Plant Engineering test writers were not knowledgeable of the NG-DB-00202, Test Control, Acceptance Test requirements.
- Test procedure acceptance criteria specifies flow requirements at the design condition, but the test was run at non-design basis conditions, and did not account for instrument inaccuracies.
- Test procedure incorrectly stated low temperature over-pressurization limitation on the RCS, and did not include Safety Evaluation requirement for demonstrating High Pressure Injection (HPI) System operability.
- Test procedure did not administratively control valves that cross-connect HPI System with the Decay Heat Removal System.

Testing efforts by Engineering in the following specific areas are considered noteworthy:

- Engineering persistence to fully implement Decay Heat Pump bearing testing
- Focus on thorough air operated valve testing
- Coordination of major test evolutions (e.g., Integrated Leak Rate Testing and RCS Hydrostatic testing)

Improvement is needed in the area of Engineering human performance. In several instances, human errors resulted when Engineers inadequately utilized event free tools (e.g., STAR, self-checking, and questioning attitude). For instance, several problems occurred during the Integrated Leak Rate Test: annulus scaffolding damaged due to expansion of containment; containment pressure instrument isolation valve not open; and containment entry made with pressure above preferred limit. Other problems included valve MS107 was inadvertently backseated and damaged, and attempted to pull test forward in schedule when personnel not fully cognitive of test boundary. The adverse human performance trend was documented on CR 2000-1411.

J. Document Control

The activity audited was the working copy process.

The working copy verification process had recently changed. Users now have the responsibility for obtaining working copies and for verifying that documents are current prior to use. Due to this change and the fact that previous problems had been identified in this area, Quality Assessment reviewed the new process extensively during 12RFO to ensure the changes were being effectively implemented and achieved their intended purpose. A total of 454 working copy documents in 129 work order packages was reviewed. The work order packages reviewed were either closed (i.e., awaiting transmittal to Records Management) or ready to be closed (i.e., work performed, signed off by the Shift Supervisor/Shift Manager, and package awaiting delivery to the planner for final closeout).

The auditors verified that the 454 documents required to perform work were verified to be current prior to use. Almost all working copy documents were stamped using a "Working Copy Verified Current" stamp, or the information was hand-written on the working copy followed by the verifier's initials and date verified. In addition, the auditors verified that each of the 454 working copies was the current effective document at the time the work was performed. The auditors only identified a handful of deficiencies. Investigations into the deficiencies revealed that these were human error deficiencies rather than a lack of knowledge deficiencies. These results indicated that the new process had been effectively implemented and that workers

were adequately performing the required document verifications for the vast majority of work documents.

One potentially wide spread deficiency was identified during these work package reviews. It appeared that Equivalent Replacement Resolutions (ERRs) were not being stamped with a "Working Copy Verified Current" stamp. Further investigation indicated there was confusion about whether or not ERRs should be included in the working copy verification process. This concern was documented on CR 2000-1055, and an extent of condition was required. The audit team monitored the extent of condition evaluations. The Quality Services Manager personally coordinated the effort to ensure potentially affected ERRs were identified and verified. A Shutdown Lowdown was issued to reiterate the working copy verification requirements and to inform Site personnel that ERRs were included in the process. Quality Assessment also recommended that procedures be clarified as part of this CR response.

K. Outage and Pre-Outage Trending Analysis

The audit team expended significant effort tracking, grouping, and analyzing issue trends documented on Outage CRs. The utilization of computer database programs was a major improvement over "yellow sticky boards" maintained during previous outages. Condition Reports were reviewed and grouped into trend subgroups on a daily basis. The trend subgroups from 11 RFO were used as a starting point, and categories were expanded as necessary. The ultimate goal of these trending activities was to identify emerging negative trends, repetitive issues, and collective significance issues. When identified, negative trends were documented on Condition Reports and communicated to Outage Management. Interim actions were taken, when necessary, and Quality Assessment monitors the effectiveness of both interim and long term corrective actions. Individual groups were also encouraged to use the trending data as a management tool and as an information source for human performance enhancement training during standdowns and at tailgate training sessions. Weekly de-briefs of trending analysis results were provided to the Vice-President and the Nuclear Regulatory Commission Resident Inspector. The four collective significance CRs generated during the Outage are summarized below:

2000-0819 Operations configuration control issues and challenges to the last human performance barrier
2000-1409 Contractor compliance with administrative procedures
2000-1410 Numerous problems with Boron Precipitation Modification
2000-1411 Human performance concerns in Engineering

The Audit team also performed trending analysis of CRs generated during the February and March pre-Outage period. Results were summarized and provided to individual Managers. One issue was documented on CR 2000-1584. An undesirable number of component out of position events occurred during this two-month period.

Audit team investigation of CR responses revealed that many of the cause determinations were inconclusive. More aggressive and timely evaluations of these events are necessary to implement corrective actions that will reduce the rate of occurrence.

III. CONCLUSION

Performance for four audited areas was rated as satisfactory, and six areas received a good performance rating. Condition Reports generated during the audit are listed in Attachment 1. Performance grades for individual programs and projects are provided in the Executive Summary.

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MAK/s

QUALITY ASSESSMENT
AUDIT REPORT
AR-00-OUTAG-01
ATTACHMENT 2

PERSONNEL CONTACTED:

Name	Title/Organization	Pre Audit	Audit	Post Audit
C. N. Alm	Senior Reactor Engineer		X	
D. Atkinson	NPS Corporate		X	
T. A. Baker	Nuclear Technologist		X	
J. M. Baldwin	Shift Supervisor		X	
M. C. Beier	Manager - Quality Programs	X	X	
W. J. Bentley	Supervisor - Operations Work Control	X	X	
J. C. Bialorucki	DB Maintenance Supervisor		X	
D. L. Bondy	Sr. Nuclear Training Advisor		X	
J. M. Bonfiglio	Shift Supervisor		X	
L. A. Bonker	Supervisor – ALARA Services		X	
R. J. Borland	Senior Reactor Engineer		X	
J. P. Bourdo	Manager – Human Resources	X		
M. J. Bury	Supervisor – DB Maintenance		X	
G. G. Campbell	Vice-President Nuclear DB	X	X	
T. J. Chambers	Supervisor - Audits	X	X	X
G. T. Chung	Senior Engineer Maintenance		X	
R. B. Coad	Manager - Plant Operations	X	X	X*
S. A. Coakley	Manager - Work Management		X	
S. A. Couture	Master Nuclear I&C Mechanic		X	
B. P. DeMaison	Supervisor – Nuclear Training Programs		X	
D. J. Dibert	Senior Reactor Engineer		X	
R. L. Dielman	Safety Specialist	X	X	
L. M. Dohrmann	Manager - Quality Services	X	X	X
J. C. Dominy	DB Work Week Manager		X	
R. D. Edwards	Lead Nuclear Technologist		X	
D. L. Eshelman	Manager - Plant Engineering		X	
R. B. Ewing	Senior Nuclear Projects Coordinator	X	X	X
J. L. Freels	Manager - Regulatory Affairs	X	X	
B. R. Gallatin	Senior Performance Engineer		X	
S. M. Garchow	Manager - Training	X		
J. Garrison	NPS Project Management		X	
D. C. Geisen	Manager - Design Basis Engineering		X	X
E. W. Gensler	DB I&C Supervisor		X	
G. W. Gillespie	Manager - Chemistry	X	X	X
C. A. Gillig	Shift Supervisor		X	
P. R. Gilles	Senior Reactor Engineer		X	
D. B. Glowczewski	Supervisor – DB Maintenance		X	
L. K. Griffith	Supervisor - Record Services	X		
M. R. Gruenberg	Master Nuclear Electrician		X	
L. Hansen	NPS Site Supervisor	X		

QUALITY ASSESSMENT
AUDIT REPORT
AR-00-OUTAG-01
ATTACHMENT 2

Name	Title/Organization	Pre Audit	Audit	Post Audit
L. R. Harder	Supervisor – Access Control		X	
K. L. Harsanje	DB Maintenance Supervisor		X	
W. P. Hayes	Lead Nuclear Analyst			X
S. C. Henn	Supervisor – DB Maintenance		X	
D. R. Hodges	Master Nuclear I&C Mechanic		X	
M. A. Hoffman	Supervisor – Technical Skills Training		X	
L. J. Holmes	Assistant Nuclear Analyst	X	X	
S. M. Hopper	Senior Reactor Engineer		X	
E. A. Horvath	Supervisor - Nuclear Operations Support		X	
J. C. House	Supervisor – Nuclear Ops Training		X	
G. L. Iagulli	Supervisor - DB Client Services	X		
D. M. Imlay	Superintendent - Operations	X	X	
D. Isherwood	Supervisor – Quality Services		X	
J. T. Karner	Lead Operations Scheduler	X		
D. B. Kelley	Senior Reactor Engineer		X	
J. D. King, Jr.	Contractor	X		
L. D. Klett	Nuclear Qualification Instructor		X	
W. G. Klippstein	Supervisor – Quality Analysis	X		
J. A. Kalmbach	Lead Operations Scheduler		X	X
G. C. Laird	Senior Plant Engineering Advisor		X	
D. J. Lange	Senior Nuclear Training Advisor		X	
T. A. Lang	Supervisor - Nuclear Engineering		X	X
D. Langenfield	FTI NDE		X	
J. H. Lash	Plant Manager	X	X	X*
J. A. Laurer	Supervisor - DB Maintenance		X	
A. J. Lewis	Shift Supervisor		X	
S. M. Livingston	Supervisor - Nuclear Operations Support		X	
D. H. Lockwood	Supervisor - Compliance		X	X
J. W. Long	Supervisor - Electrical Maint. Engineering		X	
A. L. McAllister	Supervisor - Performance Engineering		X	
J. L. McGee	Supervisor – Outage Management	X	X	
G. R. McIntyre	Supervisor - Mechanical Systems		X	X
J. Messina	Director - Work Management	X	X	X
L. D. Myers	Shift Supervisor		X	
J. L. Michaelis	Manager – DB Supply	X	X	X
S. P. Moffit	Director-Nuclear Support	X	X	X
V. Montalbono	FTI QC		X	
W. A. Mugge	Superintendent – Operations			X
J. J. O'Neill	Superintendent – Mechanical Maintenance		X	
C. A. Price	Manager - DB Business Services	X		
J. E. Reddington	Superintendent - Mechanical Services	X	X	
D. P. Ricci	Supervisor - Operations		X	

Name	Title/Organization	Pre Audit	Audit	Post Audit
L. L. Ring	Lead Operations Scheduler		X	
S. W. Roberts	Shift Supervisor		X	
M. J. Roder	Superintendent - Electrical and Control	X	X	
J. W. Rogers	Manager - Maintenance	X	X	X
J. H. Sankovich	Supervisor – Chemistry		X	
P. Schultz	Manager – Radiation Protection	X	X	X
A. R. Schumaker	Supervisor – Security Support	X		
R. J. Scott	Manager - Radiological Assessment	X	X	X
G. A. Skeel	Manager – Security	X		
R. E. Snow	Senior Maintenance Serviceman		X	
A. R. Stallard	Senior Operations Advisor		X	
R. H. Stark	Senior Maintenance Serviceman		X	
H. W. Stevens, Jr.	Manager – Quality Assessment	X	X	X
M. Stevens	Manager – Work Management	X	X	X
R. J. Vargas, Jr.	Nuclear Power Plant Master Mechanic		X	
J. M. Vetter	Supervisor - QA Support	X		X
R. W. Voll	Senior Reactor Engineer		X	
J. A. Waddell	Supervisor – Security Shift		X	
J. H. Whitright	Maintenance Advisor		X	
M. R. Widner	Supervisor - DB Maintenance		X	
S. E. Wise	Senior Operations Advisor		X	
L. W. Worley	Director - Nuclear Assurance	X	X	X
B. D. Young	Nuclear Qualification Instructor		X	

(*) Individual provided a de-brief of audit results independent of the formal exit.

AUDIT AR-00-OUTAG-01 CONDITION REPORTS

FUEL HANDLING

CR Number	*Subject*
2000-0871	The Reactor Service Crane oil leakage is dripping onto personnel and the walkway along the reactor pool. This is a safety hazard and FME issue.
2000-1111	Foreign objects and numerous pieces of small debris were noted during the review of the FTI videotape made on 4/20/00 documenting inspection of the bottom of reactor vessel.

OPERATIONS

CR Number	*Subject*
2000-0784	Identifies a concern with clearance CLR 64-03-006 for RCP 1-1 which could have resulted in an inadvertent RCS drain. The clearance was issued to the field with RCP 1-1 seal injection & seal return line drain and vent valves assigned in the open position.
2000-0893	CR 2000-0802 noted the new FFA rule requires notification when a Cooling Tower or Met Tower light is out and requires re-notification every 15 days if not yet fixed. Operations Directive EO-2 provides initial notification but no process to re-notify.
2000-1070	This CR is to document concerns identified during the site response to smoke generation from the exothermic reaction of Master Flow 658N grout.
2000-1120	Concerns with the routing and guidance available in case of a lowering Refueling Canal or SFP level.
2000-1234	Control Room operators are not updating drawings of the RCS and interconnected piping as plant conditions change. This was interim corrective action for CR 2000-0731, the water transfer during Core Flood Tank (CFT) drain.
2000-1273	Procedures DB-OP-06011 & DB-OP-06904 need to be altered to clearly state the administrative requirement for HPI Pumps to be disabled when RCS temperatures are below 140 F and the RCS is not vented.

OPERATIONS (continued)

CR Number	Subject
2000-1439	The Safety Verification Checklist form used to support several MWOs, did not match the form contained in procedure DB-DP-00007, Control of Work.
2000-1446	During a review of 20 outage Work Orders and related clearances, it was noted that several concerns relating to Maintenance personnel involvement and ownership in the Safety Tagging process were generated.
2000-1459	The audit team noted that the administrative requirements of DB-DP-00900, Control of Overtime for Key Personnel, and Technical Requirements Manual 5.2.3, Facility Staff Overtime, were not always met.

CHEMISTRY

CR Number	Subject
2000-1407	During a review of Chemistry documentation several problems were identified with procedures DB-CH-01037, DB-CH-06035 and DB-CH-01009.

RADIATION PROTECTION

CR Number	Subject
2000-0695	Six portable radiation survey instruments were not properly documented as being returned and source checked in the Instrument Response/Use Log. This is non-compliance of DB-HP-00010.
2000-0824	CR 2000-0783 documented Performance Engineering individuals who were contaminated after exiting the Make-up Pump Room. The audit team reviewed the PCM logs and found no record of these contamination incidents.
2000-0917	Numerous sample volume calculations were identified to be incorrect on Air Sample Field Analysis Logs.

RADIATION PROTECTION (continued)

CR Number	Subject
2000-1074	A review of Outage Radiation Work Permit (RWP) development packages identified some RWP data entry inconsistencies on forms & omission of information. Also found instances of inappropriate & confusing instructions.
2000-1159	RWPs 2000-5004, 5015, 5100, 5121, 5305, 5502, 5504, and 5604 dose and/or dose rate setpoints were changed without any evaluation documented in the RWP packages as required by DB-HP-01901.
2000-1212	A dose calculation had not been performed for an individual that was documented on Personnel Contamination Worksheet 00-003 as having contamination levels on the knee greater than 50,000 ccpm,to determine the Shallow Dose Equivalent (SDE).
2000-1483	Weaknesses exist with the ALARA program. During 12 RFO there were 8 RWPs estimated greater than 1 person Rem that exceeded 125% & 3 RWPs that exceeded the 10 person REM greater than 125%.

MAINTENANCE

CR Number	Subject
2000-0751	WO 99-003156-00 was originally routed as a two signature PM, but due to some changes in the WO it was routed to QC for changes to the two signature PM. This WO should have been marked as ASME and requires PE and QC reviews.
2000-0765	DB-DP-00007, requires temporary compressed air manifolds, temporary hoses, temporary test connections, etc., which are installed, shall be tagged to identify the activity which require them. A plant walkdown identified many hoses that were not tagged.
2000-0766	Oil was found by the Turbine Plant Cooling Water (TPCW) Heat Exchangers on elevation 585. The oil was coming from a hose, which was used to drain Turbine Lube Oil, laying on the grating on elevation 603. The oil spill was cleaned.
2000-0767	A-frame scaffolding doesn't have the weight limit written on the scaffold tag as required by DB-MS-01637.

MAINTENANCE (continued)

CR Number	Subject
2000-0768	A walkdown of 96 scaffolds was performed to evaluate scaffold construction and compliance with procedure DB-MS-01637. This CR is to document 9 issues that did not meet the requirements.
2000-0776	During a walkdown of the Turbine building for QA audit AR-00-OUTAG-01, nine descrepancies were discovered with Material Deficiency Tags.
2000-0792	While observing the loading of the Circ Water Pump Impeller on Tristate International Inc. trailer, the load rating of the trailer was questioned. The maximum rating on the trailer is 7,835 and they were loading 21,000 lbs onto the trailer.
2000-0796	Found level transmitter LTSP9A6, SG 2 SU LVL XMTR for SFRCS Ch 1, head turned approximately 10-15 degrees from center. The transmitter may have been hit. Transmitter is EQ. MDT W091 submitted to initiate repairs.
2000-0921	Documents concerns previously identified to Outage Central regarding material deficiencies in Containment. (e.g. Temporary 480 VAC power cables in contact with essential conduits, extension cores with no GFIs, many tyraps, clear plastic from face shields)
2000-0967	During installation of motor termination kits under WO 99-006758-000, the terminations were not torqued per the applicable procedure.
2000-1032	The audit team noted that, although NG-NT-00600 requires the entry of complete training activities into TIMS, there is no limit established for entries.
2000-1043	During observation of calibration/string check for WO 99-002348-000 and shop interviews, effective training was not provided on the Documenting Process Calibrator Fluke 743B. The calibrator and manuals were set out in the shop for self training.
2000-1056	During a walkdown of various areas in the turbine building for compliance with NG-DB-00269, Electrical Safety, numerous cords were found plugged into receptacles without Ground Fault Circuit Interrupters (GFCI) installed.
2000-1058	Observed water spraying out of a red hose that was run through blowout panel from #4 Mechanical Penetration Room. The hose end was laying on top of the drain and may not have been securely inserted into the drain.

MAINTENANCE (continued)

CR Number	*Subject*
2000-1060	There is no requirements or guidance in NG-NA-00115, NG-NT-00600, or NT-DP-00006 that programmatically requires an interface between procedure preparers and training instructors.
2000-1073	The Mech & E&C Supervisors are functioning as line supervisors & training coordinators during 12RFO resulting in qualification cards not being completed or sent to records due to shortage of time.
2000-1075	The JANUS program had not electronically transferred the information regarding confined space training to ensure the 12 RFO contractors were scheduled for the confined space training class.
2000-1122	Multiple indications in the valve body casing of ICS38B were identified in the area adjacent to the seal weld during liquid penetrant inspection of the seal weld of the ICS38B valve seat.
2000-1129	While performing a liquid penetrant (PT) examination on the seal on ICS38A, #2 AFPT Governor Valve, multiple indications in the valve body casting were identified in the area adjacent to the seal weld.
2000-1232	ISI Specimens are stored in wooden boxes outside ISI trailer 5. The green accept tags read Level C storage required.
2000-0898	A bucket of oil was spilled in the Turbine Building resulting in a slip hazard on and under some scaffolding. The scaffold was posted "Do Not Use", and cleanup was commenced.
2000-0727	During a review of the Spent Fuel Pool (SFP) FME log, it was identified that Engineering and Maintenance did not perform a monthly review of the FME zone during March as required by DB-DP-00005, Foreign Material Exclusion.
2000-0728	During an inspection of the main tool crib and Maintenance Services areas, several consumable items with expired shelf life were found. The items included Loc Tite, paint, and sealants.
2000-0739	During a walkdown of the auxiliary building, two material deficiency tags, A035 located on C2702 and Q0960 located on R2714, were found that are not traceable to any work documents.

MAINTENANCE (continued)

CR Number	Subject
2000-0770	While walking down work areas prior to the start of work, it was identified that MDT O-411 is hanging on Booster Feedwater Pump 1-1. According to EMPAC, this tag was associated with work performed under WO 98-001011-000, which was closed 6/25/99.
2000-1009	Four refurbished safety-related breakers were received from Nuclear Logistics Incorporated and given to E&C to inspect per DB-ME-09102. However, the WO's for this work did not require anyone to perform wire checks on these breakers.
2000-1087	Molded case circuit breakers are being unnecessarily tested twice prior to installation.
2000-1239	During preparation for work associated with WO 99-003735-000 (MV599), it was identified that some of the prints in the WO package were incorrect as thy referenced the wrong valve. The prints were associated with MV779 and not MV599.
2000-1348	During a material readiness inspection performed during audit AR-OUTAG-01, it was identified that the shelf-life expiration date of some items are not being identified on the containers they are stored in.
2000-1384	Procedure DB-MI-00003, Measuring & Test Equipment, states that issue area personnel shall generate a traveler sheet for issue along with the equipment. However, there is no clear expectation that the traveler be kept in the WO package until WO closeout.
2000-1038	A container of flammable liquid was found improperly stored and left unattended on 603' level of the Turbine Building near the Iso-Phase Bus.

DOCUMENT CONTROL

CR Number	*Subject*
2000-0944	The working copy of DB-MM-09266 in WO 99-003109-002 SA237 Station Air Check Valve temporary modification, was not the current revision.
2000-0965	Working copies of the controlled documents in WO 99-005864-000, Painting of Electrical Panel P1C5SI, had not been verified to be current prior to use.
2000-1055	I&C WO 99-005951-000 contained a copy of Equivalent Replacement Resolution (ERR) 60-0001-085 which was not verified in accordance with NG-NA-00107.
2000-1160	Working copies of controlled documents in recently completed WO's 99-003362-000, 99-003550-000 and 99-005149-010 had not been verified current prior to use, as required by NG-NA-00107.

ENGINEERING

CR Number	*Subject*
2000-0760	Follow-up item #1 to CR 1999-0738 was created for PE to evaluate the packing program for problematic valves. The evaluation proposed repacking specific valves during 12R, 13R & 14R. No follow-up actions were created for these additional actions.
2000-0909	The Safety Evaluation 00-0014 for TM 00-0004 takes credit for both Service Water Pump Valve Room sump pumps being available. One of the pumps is locked out under an OP-16 lineup.
2000-1251	WO#99-004337-015 installs conduit to FT4999 in support of MOD 97-0074, Boric precipitation. QC witness points for conduit installation were established in the work package, but there was no documentation that QC witnessed or were even notified.
2000-1304	Drawings that support the Boron Precipitation Modification have not been updated as required.

ENGINEERING (continued)	
CR Number	***Subject***
2000-1388	During VT-3 inspection of RC 262 the new body to bonnet stud nut was found to be significantly relaxed from its initial torque value. This is thought to be from stud relaxation. The packing gland leakoff is not capped off.
2000-1396	MOD 97-0074, Post-LCOA Boric Acid Precipitation Control, and SE 99-0025 identifies testing requirements necessary to demonstrate HPI operability prior to Mode 3; however, current effective test procedures to meet these requirements do not exist.
2000-1399	During review of CR 2000-1391(repack of RC74 not completed) the MRC identified questions that needed to be answered and/or issues that need to be addressed regarding changes in the scope of work.
2000-1400	The MRC reviewed CR 2000-1396, Boric Acid Precipiation Control Safety Evaluation Issue, and identified that it is programmatically possible to write a Safety Evaluation that relies on a subsequent action to be taken.
2000-1410	Collective significance of Boron Precipitation Modification Condition Reports.
2000-1411	This CR was written to document an adverse trend in Human Performance in the Engineering Department noted by review of the CRs for the period of 5/5/00 to 5/1//00. Also there have been no Engineering Section Clock Resets during 12 RFO.
2000-1435	Documents a concern over the administrative controls in various procedures relating to the respective positions of HP209, HP210, DH200, and DH201.
2000-1460	Tech Spec 6.8.4.a requires a program to reduce leakage as low as possible from portions outside CTMT for systems which could contain highly radioactive fluids. Testing for MOD 97-0074 did not accurately quantify this leakage.

TRENDING ANALYSIS

CR Number	*Subject*
2000-0664	This is a collective significance CR written on four safety incidents involving NPS personnel that have occurred in March while performing per-outage work for 12 RFO. Two of these incidents potentially involve OSHA recordable injuries.
2000-0819	This CR is written to address a negative trend, where the Operations section's last barrier of defence is being challenged. The following CRs should be evaluated for this collective condition: 2000-0731, 2000-0744, 2000-0754, 2000-0784, 2000-0784.
2000-1409	This CR was written to document concerns with the failure of contract personnel to comply with numerous administrative requirements during 12 RFO. Numerous CRs were written that documented failure to follow established Davis-Besse programs.
2000-1410	Collective significance of Boron Precipitation Modification Condition Reports.
2000-1411	This CR was written to document an adverse trend in Human Performance in the Engineering Department noted by review of the CRs for the period of 5/5/00 to 5/1//00. Also there have been no Engineering Section Clock Resets during 12 RFO.