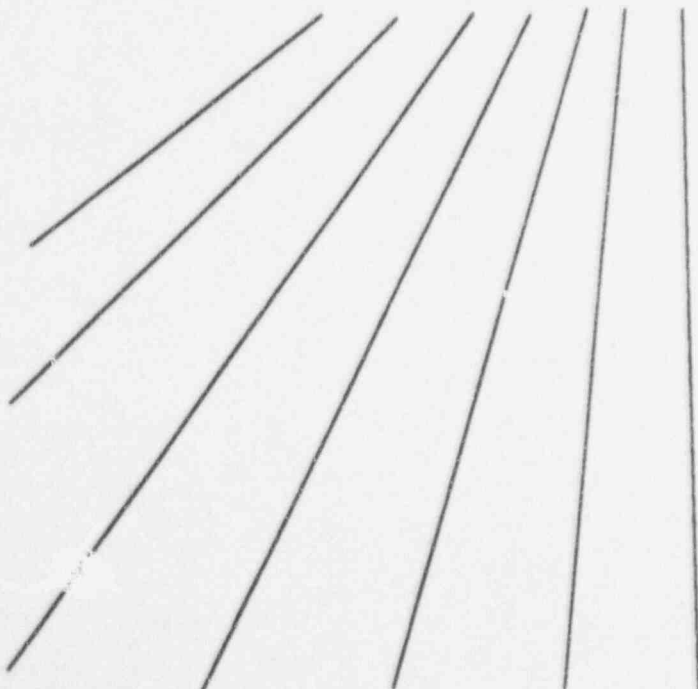


# Quality Assurance

SALEM & HOPE CREEK GENERATING STATIONS  
MECHANICAL MAINTENANCE AUDIT 95-142

Sheila Faulkner, Audit Team Leader



*M/105*

## Executive Summary

This report describes the audit of the Nuclear Business Unit Mechanical Maintenance Programs conducted at Salem and Hope Creek Generating Stations from January 23 through February 23, 1995. A Salem and Hope Creek Mechanical Maintenance audit was last performed from January 11, through February 3, 1993.

The audit team evaluated the effectiveness of the programs in meeting regulatory and licensing commitments. The team evaluated the effectiveness of Salem Mechanical Maintenance Management through structured vertical slice interviews from the first line supervisor up through the Manager. The audit focused on evaluating program adequacy through a review of procedural and programmatic requirements, review of program documentation and observation of in-process Corrective Maintenance at Salem and Hope Creek. Stations' daily meetings were observed, Self-Assessments and Corrective Actions were examined and evaluated and a range of activities associated with Welding were examined.

The audit results indicate that the Mechanical Maintenance programs for Hope Creek and Salem are effectively implemented, to meet program and regulatory requirements and commitments except as noted.

Feedback and observations, (both subjective and objective) from the Audit team are recorded in Appendix C as a matrix showing "good" and "bad" results for Maintenance program elements. Supervisory weakness was noted at both Hope Creek and Salem. Generally activities which showed poor supervisory oversight also displayed poor results in a majority of the other elements evaluated. This result emphasizes the importance of the Supervisors' role. The matrix also highlights areas of strength and weakness relative to specific activities. Weakness was noted in the clarity of instructions and definition of work scope at Salem; and correct material supplied for the job and procedural compliance at Hope Creek. Work practices, correct tool availability and communication were overall areas of strength at Hope Creek. At Salem good work practices were noted by the Audit team

### Areas Requiring Additional Management Attention

Instances of inadequate or missing work instructions at Hope Creek and Salem were perceived as challenges to the Technicians' ability to effectively complete the scoped work within schedule.

Overall weakness in the control of welding was noted by the range of findings in this area. Inadequate weld filler metal control was identified at both Stations and during a tour of the Contractors' fabrication shop. Findings were also issued in the areas of performance continuity for welder qualification, discrepancies in the Welding and Brazing Manual and socket weld fit-up.

The high number of findings at Hope Creek is not consistent with past performance by Hope Creek Maintenance. This may be attributable to a number of causes:

- The findings may be precursors to potential problem areas which warrant additional management attention.
- Personnel changes at Hope Creek may have resulted in a weakened organizational structure that creates greater challenges during day to day operation. This may be offset in part by strong team-work and interdepartmental support which was noted during the audit.
- Instances of procedural non-compliance at Hope Creek (socket weld fit-up, chemical class code knowledge, control of transient loads and the acceptance of Non Q brazing rod for ASME III class 3 work) may indicate a need for Supervisor refresher training.

Additional management attention is required to address the effect of poor practices in the areas of work scheduling and schedule adherence at Salem. This is discussed in Section Four of this report and in detail in Attachment 1. No Action Requests were issued as a result of this activity; however the results are sufficiently significant for it to be included in the Executive Summary of the Audit Report.

- The most significant contributor to deficient performance in Mechanical Maintenance is poor performance in the area of work scheduling and schedule adherence. This results in wasted resources and a diversion of

management and supervisory attention away from expected leadership practices.

- The leadership role of first line Supervisors is diminished by the time spent in rearranging work and obtaining support services.
- Communications has improved in recent months; however its effectiveness is diminished by the number of layers through which it has to travel from the Manager to the first-line Supervisor.
- Although there was general agreement that causal factor analysis is the key to improved performance, there appeared to be a focus on serving the system rather than truly learning from a few significant events.
- Management's expectations for procedure usage was clearly understood throughout the organization; however, there are still problems with procedure quality and consistency which generate frustration in the workforce.

No one in the interview process felt that the field observation process was working well. The following reasons were given:

- Management expectations were not clear
- Observers tended to go with the easy work
- First line supervision did not follow-up on the observation results
- The expectation for frequency of observations seems low.

#### **Strengths Identified by the Audit Team**

Salem Maintenance Department demonstrated responsiveness to audit team comments when the following activities showed improvement following input from the audit team:

- Conduct of the Salem Unit 2 daily outage meeting.
- The quality of the work package for the Salem #21 stator water pump.

Salem Maintenance Mechanics reported improved communications with management. At Hope Creek, communications between Operations, Maintenance and Planning departments were rated as excellent by Maintenance department interviewees.

At Hope Creek the Audit team noted good reinforcement of lessons learned and a demonstration of support for process improvement by using the mechanic, who performed the work, to develop a procedure for EDG bellows installation.

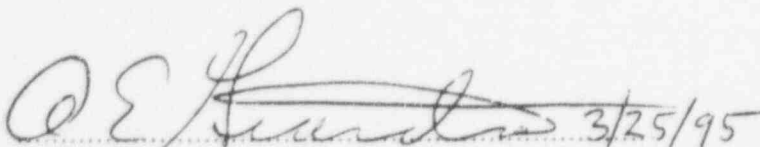
In addition, the following self-initiated action was noted during the audit, and should result in improved performance: The self-identified need for pre-determined dates for the inspection of Lifting and Rigging Equipment (L&RE) is viewed as a positive action on the part of Site Services. Site Services has recently designated specific months for the annual inspection of L&RE maintained in the various storage areas.

#### **Action Requests and Observations**

Areas for improvement identified by the audit resulted in the initiation of the seventeen Action Requests which are summarized in Appendix D, and fourteen Observations of areas which may benefit from additional Management attention.

Although Findings and Observations have in many instances cited a specific station, the Audit team recommends that a review for applicability is performed to ensure that similar conditions do not exist at the sister stations.

Please provide a response to the Observations. The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

  
A. E. Giardino, Manager QA Programs and Audits 3/25/95

Quality Assurance Audit Report

# Salem and Hope Creek Mechanical Maintenance Programs

## Audit 95-142

Audit Dates January 23, through February 23 1995

Sheila Faulkner 3/25/95  
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## I. Purpose and Scope

This audit was conducted to evaluate the performance of Mechanical Maintenance at Salem Units 1 and 2 and Hope Creek.

Audit assessment techniques included verification of program implementation effectiveness through performance based observation as well as document reviews and personnel interviews. The overall audit scope included assessments of the following elements:

- Assessment of Ongoing Maintenance Activities
  - In-process activities
  - Control of Lifting and Rigging Equipment
  - Training and Qualification to ANS 3.1/ANSI 18.1
  - Technical Specification Surveillances
  - Measuring and Test Equipment
- Maintenance Inputs
  - System Walkdown - Material Condition
  - Preventive Maintenance
- Self-Assessments
- Management Assessments
- Corrective Action
- Repair Program Activities

## II. Detailed Report

### Section 1.0

## Assessment of Ongoing Maintenance Activities

### Section 1.1 In-Process Observation

This section focused on evaluating in-process Mechanical Maintenance activities at Hope Creek and Salem. Audit team assessment activities included direct observation of Corrective Maintenance with a review of the associated vendor manuals, and observation of the Stations' daily meetings.

The team considered the following process control elements: Safety tagging, fire protection controls, fire watch training, M&TE calibration, vendor document control, chemical usage classification, ALARA, industrial safety practices, foreign material intrusion control, procedural adequacy, training and qualification, supervisory oversight, interdepartmental communication and support.

There were six deficiencies and four Observations resulting from this Assessment activity. The Action Requests are listed in the Executive Summary of this report, and are described in the following section. Feedback and observations, (both subjective and objective) from the Audit team are recorded in Appendix C as a matrix showing "good" and "bad" results for Maintenance program elements observed during field walk-downs.

The results of Audit team activities were brought to the attention of Maintenance Department Management during the course of the Audit.

### Salem

The results of observing day-to day activities of the Salem Maintenance Department are presented below.

Work Order 941002139, Salem Unit 1, #13 Demin Water Transfer Pump, Non Safety Related, - oil leak inboard end. This activity is shown on Appendix C, Salem matrix item B.

The audit team walked down the valve tag-outs with the Supervisor. The correct valves were tagged-out upstream and downstream of the pump for

isolation; however, no vent and drain path for the pump had been provided. Operations were called to hang an additional tag for venting. The inadequate tagging delayed the start of work.

The work was classified as within the skill level of the mechanic, therefore no procedure was provided. The drawing in the work package was unclear and a generic vendor manual which covered sixteen variations of pumps was given to the Technician. No bolting torque values for re-assembly or tolerances for the component parts of the pump were provided to the Technician.

Upon disassembling the pump the Technician found that the oil flinger rings had been installed backwards, and after detailed examination found that the previously installed snap rings had been for an internal application, not an external application, as required for the pump.

Three different Supervisors were assigned to this job over a four day period.

The review of this activity resulted in **Observation 95-142-1D**. The Mechanical Maintenance Manager requested the auditor's complete notes for this activity. They will be used as a basis for a process improvement discussion.

Work Order 950111114, Salem Unit 1, #13 Charging pump, Safety Related Safety Related, - packing leaks rework This activity is shown on Appendix C, Salem matrix item R.

This component has had increasing frequency with problems including decreasing run time. An in-depth root cause analysis is being conducted using data from other utilities and the vendor.

The Audit team performed a field walk-down and noted that one member of the work crew was experiencing difficulty staying awake. This was brought to the attention of the job Supervisor for his action.

NC.NA-AP.ZZ-009(Q), Work Control Process, requires that if the procedure is incorrect, the procedure shall be corrected prior to resuming work. Contrary to these requirements, the job procedure, SC.MD-CM.CVC-0005(Q), Revision 3, did not contain instructions for draining or refilling the pump oil. The Supervisor had marked the field copy of the procedure with an asterisk at the oil drain point, but oil refill was not addressed. The Supervisor stated that oil refill was essential to the job, and a proposed revision to the procedure contained oil refill instructions; however, this job was performed without the

revised procedure being issued. **Action Request M29-95-004-2H** was issued to document this deficiency.

Further discussion with the Maintenance Manager indicated that refilling the pump with oil is considered to be an Operations responsibility, not Maintenance. There was no task assigned to Operations in the Work Order for oil refill. If there is no clear understanding of who is responsible for refilling the pump, the potential exists that the pump could be returned to service without the oil being replaced.

Work Order 950125132 Salem Unit 2, 2CVE8, Non Safety Related, RCS filter Change-out. The results of this activity are shown on Appendix C, Salem matrix item G.

Excellent work practices and results were observed, the Technicians were knowledgeable and worked competently and safely, following procedures and good ALARA practices. All information necessary to the job was documented on the work order, procedure and feedback forms.

Work Order 950124138 Salem Unit 2, #21 Stator Water Cooling Main Stator Coolant Pump, Non Safety Related - high vibration. This activity is shown on Appendix C, Salem matrix item I.

On 1/26/95 the Audit team reviewed the work package and verified the qualifications of the Technician. There was no procedure for pump alignment referenced or included in the work package, a trouble-shooting procedure included in the package was not used. This activity resulted in **Observation 95-142-1B**.

The following day the Audit team observed work in-progress, the results of this activity is shown in Appendix C, Salem matrix item O.

The work package was complete and the supervisor was present at the job. The Senior Supervisor had contacted Procurement to inform them of the seal problem with the new pump so they could follow-up with the manufacturer. All appropriate safety equipment was in use. The Technicians were very knowledgeable and displayed a questioning attitude, when they were not sure of the torque value for the pump mounting bolts; they stopped work to question the Supervisor.

Work Order 950125229 Salem Unit 2, 100' Elevation Door Lock Seals Safety Related, - replace seals. This activity is shown in Appendix C, Salem matrix item J.

A post-job review of the Work Order by the Audit team found the work package complete and in order, the work had been performed and documented in adequate detail.

Work Order 950124095 Salem Unit 2, #22 Containment Fan Coil Unit Safety Related, - inspect and repair leak. The activity is shown in Appendix C, Salem matrix item P.

The Audit team observed the pre-job work planning walkdown in the containment and shift turn-over. The Senior Supervisor, Supervisor, System Engineer, Planners and Technicians investigated the work required. The Z shift (mids) investigated and provided information at shift turn-over to planning. Effective transfer of information was noted and the day shift continued the thorough investigation. A prompt response by Reactor Engineering was observed when they were contacted by X shift (days) to assist with investigating the leak.

Work Order 950112145 Salem Unit 1, #12RD21, Bleed Steam Coil Drain Tank Pump Recirculation Valve - leaking between valve actuator and bonnet. This activity is shown on Appendix C, Salem matrix item E.

Audit team field walk-down noted excessive steam leaking at this valve which was causing a safety hazard with the wet floor. An EMIS tag dated 1/11/95 was hanging on the piping under the valve and scaffolding had been erected. The Audit team contacted the Planner, who stated that Maintenance was aware of the leak and a Work Order had been initiated. A safety concern was written as the wet floor, scaffolding ladder rungs and scaffold platform presented a slipping hazard. The Maintenance Supervisor took prompt action by roping-off the area. The status of the scaffolding was verified.

Salem Unit 2 Outage Meetings 1/24 through 1/26/95; This activity is shown on Appendix C Salem matrix item D.

The Audit team attended these meetings and observed ineffective command and control and lack of accountability. Meetings which had been directed to happen did not occur, the Walkdown List was not followed through and the

status of items was not known. The meetings were observed by Audit Team members from three different plants, Trojan, Hope Creek and Peach Bottom, and resulted in **Observation 95-142-1A**. These comments were brought to the attention of the Salem Maintenance Manager at a debrief meeting.

The Salem Unit 2 Outage Meeting was observed on 1/27/95. This activity is shown on Appendix C Salem matrix item M. The Audit team attended this meeting and observed improved with focus and control by Operations with enforced accountability.

Salem Unit 1 Plan of the Day meetings were observed 1/23 through 1/25/95. This activity is shown in Appendix C, Salem matrix item N. The status of priority work was thoroughly reviewed. Required actions were clearly addressed during the meeting, and follow-up meetings at the end made expectations clear. Participation by the groups involved was very positive.

Salem Supervisor Job Assignment Meeting, conducted 1/27/95, 7:30 a.m. The Audit team observed this daily meeting, noting that the Supervisor used a "pre-job brief sheet" which highlighted NAP and job requirements. This was a good tool for going over the job with the Technicians. The Audit team noted that the meeting place needed a better atmosphere due to the noise in the area.

Maintenance Manager's Stand-up meeting in the Maintenance shop on 1/25/95. This activity is shown in Appendix C, Salem matrix item K.

The Audit team attended this meeting and observed a good presentation on plant status and important work activities. Two Technicians' performance was recognized by the Maintenance Engineer and time was provided for questions. This meeting was well received by the Technicians.

Housekeeping, Salem Turbine Building, Elevation 88'. This activity is shown in Appendix C, Salem matrix item H.

The Audit team performed a walkdown and noted the Heater Drain Pedestal foundations eroded below the Condensers at the conductivity cell panels, oil on the floor and the pipe dope used to seal the fittings decomposing.

Mechanical Maintenance Self-Assessments and subsequent follow-up to evaluate the effectiveness of corrective actions was discussed with Maintenance Supervisors. The results are shown in Appendix C, Salem matrix item F.

There does not appear to be a structured follow-up process in place. Corrective actions take the form of "on the spot" corrections and rolldown toolbox meetings. The Mechanical Maintenance Self-Assessment program is covered in Section 3 of this Report.

An Audit team review of completed work packages, on which supervisory review had been completed, showed that all packages were in order and all sign-offs were complete. The work descriptions were adequate, and turn-over sheets and feedback forms had been used. A review of Library copy Work Orders showed that some Work Orders were assigned an active status without being updated; for example, the planners names and extension number were incorrect and procedure numbers were not current. This resulted in **Observation 95-142-1C**.

Maintenance Department Communications; This activity is shown in Appendix C, Salem matrix item Q.

Communications within the Maintenance Department was discussed with Technicians. There were positive responses on the Stand-up Meetings and pre-job briefings and that feedback was received on work package and procedure concerns. Pre-job briefings need a quieter area.

### Hope Creek

The results of observing day-to day activities of the Hope Creek Maintenance Department are listed below. Some of these activities resulted in the issue of Action Requests or Observations by the QA Assessment team.

Work Order 940504184, Hope Creek, Primary Condensate Pump, Non Safety Related - rebuild spare pump. This activity is shown in Appendix C, Hope Creek item A.

The Audit team observed on-going work and reviewed the work package at the job site. The work package and procedures were complete and up-to-date. Appropriate Personal Protective Equipment (PPE) and tools were in

use. The Technician made a note to enter a procedure revision for the next use, adding a caution about a left-hand thread.

Work Order 941004105 Hope Creek, Turbine Generator EHC Power Unit, Non Safety Related - Fullers Earth filter in EHC system cover leaking. This activity is shown in Appendix C, Hope Creek item B.

This was a rework of a job performed on the midnight to eight o' clock shift who had previously attempted the repair.

The Audit team reviewed the work package and observed work in progress.

NC.NA-AP.ZZ-0038(Q) Rev 2, Chemical Control Program, requires that the Work Supervisor or Planner verifies all aspects of the Chemical Item Classification Permit (CICP) are addressed and that the mechanisms for the planned use are within the limitations of the CICP. Contrary to these requirements, the Supervisor directed the Technicians to use Loctite Quick-set 404, which carried a Use Class 5 sticker. Use Class 5 chemicals are to be removed from surfaces prior to returning a component to service; however, this material was not removed. When questioned by the Audit team, the supervisor stated that NAP 38 Use Classes apply only to Reactor Systems. The Station Approved Chemical List (SACL) classifies Loctite 404 as Use Class 3, and as such is not approved for use in any system.

NC.NA-AP.ZZ-009(Q), Work Control Process, requires that if the procedure is incorrect, the procedure shall be corrected prior to resuming work. Contrary to these requirements, the Supervisor instructed the Technicians to torque the cover to 100 ft. lb.; however, this value was not in the procedure. When asked by the Audit team where this value came from the Supervisor stated that it was in the vendor manual and a procedure revision to include it had been submitted in October 1994. The date of the current procedure revision used in the field was November 1994. The Technicians asked their Supervisor if a procedure change was required, and they were told it was not. **Action Request M29-95-010-2H** was issued to document these deficiencies in chemical classification use and procedure control.

Work Order 941202163, Hope Creek, Diesel Room Cooler, Safety Related, ASME Nuclear Class 3) - leaking cap on cooler. This activity is shown in Appendix C, Hope Creek matrix item C.



The Audit team attended the pre-job briefing, reviewed the work package and observed in-process work. The pre-job briefing, during which the Technicians appeared attentive, was informative and included a hand-out of the status of the three plants.

NC.NA-AP.ZZ-0003(Q), Document Control Program, states that working copies are valid for fourteen working days from the date of the copy stamp. Contrary to these requirements, the work package contained a drawing which did not have a current date stamp for field use.

NC.NA-AP.ZZ-0023(Q), Scaffolding and Transient Load Control, requires that transient loads introduced to Seismic Control areas, should be controlled. These measures include securing, removing, or evaluating the transient load. Contrary to these requirements two ladders and a compressed gas cylinder that had been set-up the previous day by the work crew and were not restrained. This was not addressed to the Technicians by the Supervisor.

The Nuclear Department Repair Program Manual requires that documents for procurement of materials shall include requirements to the extent necessary to assure their compliance with Section XI of the ASME Code. Contrary to these requirements, prior to brazing the caps in place, the Audit team noted that the documentation for the brazing rod was not in the work package. The Technicians stated that the brazing rod had been issued to them by their Supervisor, and the label on it classified it as Non-Safety Related. They had questioned their Supervisor on the use of this material as the equipment to be brazed was Nuclear Class 3. The Supervisor has stated that this was the only brazing material available. The Audit team contacted the Welding Engineer to confirm that certified material was required and assisted the Supervisor in obtaining the correct certified material. The deficiencies regarding document control, control of transient loads and Non Safety Related brazing rod are documented on **Action Request M29-95-018-2H**.

The Audit team observed that the Technicians tied-off the ladder when in use, but did not use fall protection, and turned-on the acetylene bottle without checking that the regulator was in the off position. This is not an accepted practice, the regulator can become over-pressurized and result in damage and injury.

The Technicians, who worked well as a team displayed ingenuity by devising a modified tubing cutter for this job. When the Technicians cut the tubing they found it had not been drained or tagged, Operations department was called and responded by tagging the valve and documenting it in the open position. The Technicians took care to identify the correct tubing prior to cutting by self-

checking. The caps for the failed tubing had to be modified to fit, and the audit team noted good teamwork by the System Engineer, the Technicians and Machinists.

Work Order 950103201, Hope Creek Aux. Heating Steam Boiler, Non Safety Related - repair atomizing steam fitting leak. This activity is shown in Appendix C, Hope Creek matrix item D.

The Audit team observed in-process activities and reviewed the work package at the job site. The Supervisor walked-down tags and notified the Technicians that they could proceed with the repair, he also instructed the Technicians to replace all fittings to preclude future rework. Good foreign material exclusion (FME) practices were observed, the Technicians consistently covered all openings, and when he re-tapped the holes to clean the threads he ensured that there was no debris left in the piping. Good work practices were observed with the appropriate level of supervisory oversight.

Work Order 950105088, "A" Emergency Diesel Generator (EDG), Safety Related,- Jacket Water leak on #2 and #3 cylinders. This activity is shown in Appendix C, Hope Creek matrix item E.

The Audit team observed in-process field activities and reviewed the work documents at the job site. A procedure in the work package did not have current date stamp for field use, the Technician brought it to the attention of the Supervisor who verified the revision and date stamped the procedure. The Technician obtained a copy of the Vendor Manual from the Technical Document Room to ensure that there were no additional values or instruction for the job. The Technicians worked well and safely and adequate Supervisory oversight was observed by the presence of the Maintenance Engineer and the Senior Supervisor who were observed monitoring the work areas.

Work Order 940830179 Hope Creek, Service Water Chlorination Diffusers, Non Safety Related - replace Service Water Chlorination piping in Service Water Intake Structure. This activity is shown in Appendix C, Hope Creek matrix item J.

The Audit team observed in-process activities and reviewed the work package documents. NC NA-AP.ZZ-0023(Q), Scaffold and Transient Load Program, requires that the job Supervisor complete entries in the Scaffold Control Log prior to erecting the scaffold, and perform a visual inspection of the installed

scaffold prior to use. Contrary to this the scaffold was not entered in the Scaffold Control Log prior to its erection, neither was it inspected prior to its use. The Technicians disregarded the Supervisor's instructions not to work on the scaffolding before it was complete.

NC.NA-AP.ZZ-0003(Q), Document Control Program, states that Working Copies are valid for 14 days from the date of the copy stamp. Contrary to this an outdated copy of a controlled vendor manual, Public Service Blue Print 314514, dated 3/11/94 was found in the Tool Tapering kit. The deficiencies regarding scaffolding and vendor manual control are documented on **Action Request M29-95-017-3H**.

The Supervisor did not walk-down the job before assigning the Technicians to the work. The Technicians were asked how they would join the fiberglass pipe to the metal fittings, they stated that there was no procedure, but they would use the vendor manual; however, the vendor manual was not in the work package. The work package had no instructions for fiberglass to metal bolting, the general station torquing procedure for metal to metal bolting had been included, which the Technician was going to use. The Audit team suggested that the Technician obtain a current copy of the vendor manual which contained the special requirements for this application. The Technicians showed good work practices in erecting the scaffolding, and their qualifications to erect scaffolding were verified.

Work Order 940520158, Hope Creek, "A" EDG Starting Air Receiver (SR) - check valve replacement. This activity is shown in Appendix C, Hope Creek matrix items K and Q.

The Audit team observed work activities including a good pre-job briefing and reviewed the work package.

The Nuclear Department Welding and Brazing Manual requires for socket joint fit-up, the pipe shall be tack welded in at least two places prior to fit-up verification. Contrary to this the job Supervisor signed-off the socket weld fit-up Hold Point prior to tack welds being completed. This deficiency has been addressed on **Action Request M29-95-015-2H**.

Fire door and burning and cutting permits were posted in the work area. The Technicians checked the tags to ensure that the correct valves were tagged-out and were in the correct position. When questioned by the Audit team the Technicians were knowledgeable of the work scope and methods. The Maintenance Engineer and the Senior Supervisor were observed monitoring

the area. General observation of the work area showed an Instrument and Controls Technician climbing approximately fifteen feet above the ground, without using a safety belt. He left to get a safety belt after observing the Audit team. The three Technicians had to leave work area for over an hour to get weld wire as this had not been brought to the work area at the start of the job.

Work Order 940412172 Hope Creek 'B" EDG (SR) - repair exhaust leak from EDG exhaust manifold to turbo inlet. This activity is shown in Appendix C, Hope Creek matrix item M.

The Audit team observed the in-process work and conducted a follow-up interview, to determine Supervisory effectiveness, with the Lead Technician for this job. The Audit team observed good supervisory and management oversight and good work practices. As a result of the post-job debrief and root cause analysis, a procedure is being prepared to address bellows installation. This will be done by the technician who performed the work and had the most direct involvement in the job from its initial repair to its rework. This is viewed as a positive step as it reinforces lessons learned, provides an opportunity to allow contributions to improving work practices by those performing the work and demonstrates management's support of process improvement.

Work Order 941013093 Hope Creek, 'D" Circ Water Pump, Non Safety Related - high vibration, troubleshoot and repair as needed. This activity is shown in Appendix C, Hope Creek matrix item N.

The Audit team observed the work area and reviewed the work package. The job was on hold awaiting a procedure for running the motor uncoupled from the pump. The Audit team did not observe Supervisory presence or Engineering involvement in the field. The procedure in the work package did not specifically address an alignment check. When the readings obtained did not fall within the range specified, the Supervisor was notified. The calibration of the M&TE in use was verified.

Work Order 940306105 Hope Creek, 'A" EDG Lube Oil Keep Warm Pump.(SR) - disassemble and inspect pump internals, vibration levels are increasing. This activity is shown in Appendix C, Hope Creek matrix item O.

NC.NA-AP.ZZ-009(Q), Work Control Process, requires that if the procedure is incorrect, the procedure shall be corrected prior to resuming work. Contrary to these requirements the following conditions were noted:

- The procedure issued to the field did not provide adequate instructions to assemble the pump following repair.
- The idler pin pre-staged and supplied was incorrect, this pin was not for the pump installed on Hope Creek's Emergency Diesel Generators (EDG), the attentiveness of the Technician prevented this incorrect part from being installed
- A parts list and Vendor manual initially provided by the System Engineer for use by the Technician were stamped for Information Only" and were not for the model pump installed on the Hope Creek EDG. The correct manual was obtained from the vendor and entered into the document control system.

**Action Request M29-95-0016-2M** was issued to document these deficiencies.

In Summary, the Audit team observed job turn-over meetings, in-process activities and reviewed the work package and associated documents. The job turn-over and pre-job briefing were thorough. The Technician stopped work and questioned his supervisor when problems arose and used the vendor manual when needed during re-assembly. The Technicians appeared very knowledgeable and worked competently. There was good supervisory involvement with the work; however the Audit team thought that a "time-out" to review the new vendor manual with the Technicians and point-out caution items and assembly instructions would have been a good practice.

Maintenance Shop Meeting, January 31, 1995. This activity is shown in Appendix C, Hope Creek matrix item I.

The Audit team observed a group meeting in which the Supervisor attempted to go over items from the Control Room Turnover Sheet that might affect the Technicians. The Supervisor did not speak with authority or clarity, the Technicians were scattered in the area and were not paying attention to the supervisor. The intent of the meeting was good, but the failure of the Supervisor to take control of the group, and the lack of clarity in his presentation made this meeting ineffective.

Hope Creek Plan of the Day meetings on January 30 and 31, 1995. This activity is shown in Appendix C, Hope Creek matrix item L.

The Audit team attended the meetings which started on time and from the onset it was evident who had command and control of the meeting. People attending the meeting came prepared to discuss the status of the items in question. Work activity discussions were positive and interactive with a questioning attitude and with relevant input to support all departments. A team work concept was evident. All immediate concerns were addressed and resolved at this meeting; and not deferred to a later time and date.

### **Section 1.2 Control of Lifting and Rigging.**

This portion of the audit evaluated the implementation of program controls for the inspection and control of Lifting and Rigging Equipment (L&RE).

Site Services has recently designated specific months for annual inspection of L&RE maintained in the various storage areas. This represents a worthwhile and successful effort

A sample of L&RE was selected from the Central Store Room, the Salem Store Room, the Salem Hot Tool Store Room and the Hope Creek Store Room and traced to inspection records in Site Service's Central Files. Investigation at each of the storage areas showed that all L&RE was identified with a unique identification number and inspection due date tag. Numerous pieces of L&RE that were segregated and identified "not for issue" pending inspection and proof testing, were found in the Central, Salem and Hope Creek Store Rooms. The individual L&RE devices were traceable to inspection records on file in Central Store-Room

Review of the individual records revealed that all prior inspections were performed within the annual commitment except for those identified with an (\*). A significant number of new devices were purchased in February of 1994. Site Services Management made a conscious decision to tag the individual L&RE for re-inspection in May of 1995 which extended the annual re-inspection by three months. This one time adjustment to align dates has been addressed in a Site Services letter dated 2/21/95. All future L&RE devices will be tagged for re-inspection at the next scheduled inspection date for the facility to which they are assigned.

### **Section 1.3 Training and Qualification to ANS 3.1/ANSI 18.1**

The auditors confirmed that the Salem and Hope Creek Mechanical Maintenance Managers met the qualification requirements of ANSI 18.1 and ANS 3.1 respectively. This was accomplished by review of educational and employment records maintained in the Human Resources files

### **Section 1.4 Technical Specification Surveillances**

A sample of Technical Specification Surveillances assigned to the Salem and Hope Creek Mechanical Maintenance Departments was examined to determine if the selected surveillances had been performed within the required frequency and that a procedure was in place that adequately

addressed the Surveillance requirement. This was performed through a review of MMIS and an examination of records in microfilm. The Audit team determined that the Technical Specifications had been appropriately accomplished and no deficiencies were identified as a result of this assessment.

#### **Section 1.5 Calibration of M&TE**

M&TE noted during in-process observation of Maintenance activities and review of completed work packages was verified as being within its required calibration frequency. This was accomplished through a review of the M&TE database.



## Section 2.0

### **Maintenance Inputs**

This portion of the audit evaluated Salem Maintenance Department's effectiveness in processing and addressing some of the factors that drive the Maintenance process in support of Station Operation. The audit team performed a system walkdown and evaluated component status, examined Preventive Maintenance Program activities, and recurring Corrective Maintenance.

One Action Request and two Observations resulted from this portion of the audit. A summary of Action Requests is provided in Appendix D. Details of the findings are in the activity descriptions listed below.

#### **2.1 Field Walkdown and Material Condition**

A walkdown of Unit 1 Aux. Feed system examined equipment condition and EMIS tags, and noted the name of the individual who reported the equipment deficiency.

No component deficiencies were noted that weren't identified with an EMIS tag. A sample of tags were reviewed in MMIS to confirm that work orders had been generated to address the noted conditions. No deficiencies were identified. A majority of the equipment deficiencies had been identified by the Operations Department, one by an NTC instructor.

The Audit team visited Salem Unit 1 control room and discussed which mechanical items were giving trouble but were not receiving attention. The Operators stated that there had been problems, but felt that now all their concerns were being satisfactorily addressed. Reviewed the latest ASME Section XI In-Service test results for the 11, 12 and 13 Aux. Feed Pumps. No problems were noted.

#### **2.2 Planning and Work Package Preparation**

The Salem Unit 1 Planning Engineer was interviewed to discuss what governed the quality of work packages. An agreement of what the Maintenance Department wants is covered in a guideline (issued in 1991). The Planning Engineer stated that there is general agreement within the station and among affected departments that this guideline needs to be updated and revised to reflect current expectations. Inputs have been

solicited to start this change, but to date input has been primarily from the Controls group.

Over the last year efforts have been made to improve work packages by adding the "D" page to the work order. This page provide the Technician and Supervisor with ancillary information on the job status and scope. The planners are evaluating the appropriate level of detail to support the needs of a large customer base. The planners find that troubleshooting activities are a challenge to putting together a good package as the work scope shifts and changes. Known problems make it easier to prepare a good package. Two Operations Department representatives meet with Scheduling Dept. representatives each morning to review and prioritize incoming work.

The equipment status reported on the Unit 1 Control Room Status sheet dated January 6, 1995 was reviewed and compared it with equipment reported out of service on February 14, 1995. A sample of the equipment still showing out of service was reviewed and discussed with station Scheduling. The Scheduler was able to provide current work status and information on restraints to work completion.

### **2.3 Repetitive Corrective Maintenance**

A review in MMIS was performed to identify instances of recurring Corrective Maintenance. A review of work orders for Salem Heating Water System revealed a large number of repetitive work orders written to replace heater unit motors. A total of seventy-eight work orders, active and history were found for Units 1 & 2. This activity resulted in **Observation 95-142-2B**

### **2.4 Preventive Maintenance Activities**

This examination evaluated the implementation of Salem Unit 1 Preventive Maintenance (PM) Program with respect to vendor recommendations, engineering analysis, and periodicity, Preventive Maintenance backlog elimination and Preventive Maintenance deferral. In addition Preventive Maintenance Performance Indicators were reviewed to assure the veracity of the information.

#### **2.4.1 Vendor Recommendations**

The Emergency Diesel Generator (1DAE4) Preventive Maintenance and its periodicity was examined and compared to vendor recommendations. Due to the extensive individual parts comprising this component, a sample of parts

were selected for investigation. A review of Preventive Maintenance procedure contents and MMIS correlated with the vendor documents for periodicity and Preventive Maintenance activities.

#### **2.4.2 Preventive Maintenance Performance Indicators**

The data provided in the Preventive Maintenance Performance Indicator chart was validated through a review of the MMIS database and interviews with Planning and Scheduling personnel. However, the Audit team noted that over the past two months (December 1994 and January 1995) approximately 75% of Salem Unit 1 and 80% of Salem Units 2 and 3 Preventive Maintenance has been performed past the originally scheduled due date, but just prior to going overdue.

#### **2.4.3 Preventive Maintenance Backlog Elimination**

Investigation of the Preventive Maintenance backlog indicates that over the past several months, Salem Station has exerted considerable effort in eliminating the PM backlog. This resulted in a steady and rapid downward trend in the backlog. In the process of reducing the backlog, the Central Preventive Maintenance Group in coordination with System Engineering, has analyzed various PM's with respect to necessity, frequency, etc. This effort resulted in a considerable number of PM's being eliminated and periodicity revisions, which contributed to the backlog reduction. In addition, the backlog has been reduced by completing the Preventive Maintenance work orders

Reliability and Assessment Central Preventive Maintenance Group personnel expressed concern for the continued aging of electrical system components located in the Nuclear Instrumentation System (NIS) and Electrohydraulic Control Instrumentation (EHC) systems that cannot be addressed via normal Reliability Centered Maintenance processes and which may require refurbishment or replacement in the future. This information resulted in **Observation 95-142-2A**, and will be examined further in the Salem Controls Audit scheduled for April 1995.

#### **2.4.4 Preventive Maintenance Deferral**

NC.NA-AP.ZZ-0010(Q), Preventive Maintenance Program, states that all Nuclear Operations Departments are responsible for ensuring that assigned Preventive Maintenance tasks are performed and documented. Contrary to this, while awaiting approval of Preventive Maintenance Deferral Requests

the Preventive Maintenance for a component is on hold, consequently it does not receive its scheduled PM while the change request is being processed. The PM deferral process originates with the scheduler submitting the Preventive Maintenance Deferral Request (PMDR) form to the System Engineer for evaluation. After approval/disapproval, the appropriate systems engineering supervisor approves the request and it is returned to the scheduler. This is an informal process which is not procedurally defined. This has resulted in open PMDR's with no follow-up performed to assure that they are answered. **Action Request M29-95-025-2S** was issued to document this deficiency.

## Section 3.0

### Self-Assessments

This portion of the Audit examined Hope Creek and Salem Mechanical Maintenance Self-Assessments including subsequent corrective actions resulting from the Assessments. One Action Request and four Observations resulted from this portion of the audit. A summary of Action Requests is provided in Appendix D. Details of the findings are in the activity descriptions listed below.

The Nuclear Business Unit does not have an overall guidance document for performing Self-Assessments. Such a document could provide consistency of Management expectations, definitions, structure, frequency and documentation requirements. This is addressed in **Observation 95-142-3B**. Guidance would also be beneficial in the areas described in Self-Assessment Programmatic Components listed in Attachment 2. These Self-Assessment Programmatic Components are derived from PECO Energy Company Self-Assessment Guidelines dated 11/1/94 which the Audit team has found to be the best measurement tool to assess this area.

Following the Audit exit meeting the detailed Audit results for this area were sent to Salem and Hope Creek personnel involved in the Self-Assessment process.

Completed Self-Assessments were reviewed to determine which of the components listed in Attachment 2 to this Audit Report were included in the Self-Assessment process. The Audit team noted that the effectiveness of Salem and Hope Creek Stations' Self-Assessments is diminished due to lack of follow-up to confirm or evaluate the effectiveness of Corrective Actions. This is addressed in **Observation 95-142-3A**.

During their examination of this portion of the audit, the Audit team noted that a formal mechanism is not used to address Self-Assessment observations involving another department. The use of a formal mechanism to facilitate this transfer of responsibility would ensure that corrective actions do not get overlooked. This is addressed in **Observation 95-142-3C** to address this.

Interviews with Planning Department personnel revealed that Guidance does not exist for the Planners and Schedulers when incorporating Self-Assessment information obtained through the Work Order feedback process. Guidance would help eliminate the current ambiguity associated with the

process and ensure consistency with regard to where the feedback is entered into MMIS. This is addressed in **Observation M29-5-3D**.

### Salem Units 1 & 2

The Salem Maintenance Manager, the Units 1 and 2 Maintenance Engineers, and a Maintenance Senior Staff Engineer were interviewed and the following Mechanical Maintenance Self Assessments were reviewed; Job Observations, Self-Assessment Program - Monthly Summary Report, Job Observation Summaries, Field Observations, and Work Standards Monitoring Quarterly Observation Reports.

The Mechanical Maintenance Department has one established *Routine Self-Assessment* program, Supervisors Job Observations. They do not have established internal Self-Assessment programs in the categories of *Periodic, Preemptive, or Reactive*. The Supervisors Job Observations, program contains Self-Assessment Components; 1, 6, 12, and 15:

- 1. Is the purpose defined.
- 6. Are the Self-Assessment plans implemented using the desired techniques.
- 12. Are issues entered into the appropriate tracking or corrective action system.
- 15. Are the results documented within the group and conveyed to the appropriate levels of management.

These programmatic Components are present in an elementary form, but appear weak with regard to the areas of standardization, details and alignment. The other programmatic components were not included in the Mechanical Maintenance Self Assessment program.

Accountability and responsibility for the Self-Assessment program was not evident through interviews. The Senior Staff Engineer interviewed was frequently tasked with different self-assessment initiatives; however, this individual was not able to complete these projects before another self-assessment idea was conceived.

Review of their current *Routine Self-Assessments*, and incorporation of the Self-Assessment Programmatic Components would provide personnel with the guidance to perform successful self-assessments.

### Hope Creek

The Hope Creek Maintenance Engineer and Hope Creek Maintenance Senior Staff Engineer were interviewed to obtain inputs on the Hope Creek Self-Assessment process. Self-Assessments were reviewed to confirm which of the Self-Assessment Components listed in Attachment 2 were included in the Hope Creek program. They were also reviewed to identify corrective action items that could be followed-up to confirm completion. The main focus of the Self-Assessments reviewed was field observation checklists.

The "Self Assessment Management Practices" program at Hope Creek contains the Self-Assessment Components 1, 3, 6, 7, 9, and 15:

- 1. Is the purpose defined.
- 3. Are the products/activities that are key to the success of the organization identified.
- 6. Are the Self-Assessment plans implemented using the desired techniques.
- 7. Is the data consolidated, checked for inconsistencies and followed-up as needed.
- 9. Are the results categorized in relation to selected activities and Self-Assessment techniques.
- 15. Are the results documented within the group and conveyed to the appropriate levels of management.

Hope Creek Mechanical Maintenance Department has informal Self-Assessment Programs in the categories of *Periodic and Preemptive*. They do not currently have internal Self-Assessments in the category of *Reactive*. The department's *Routine Self-Assessment* program: "Supervisors Job Observations" program contains Components number; 1, 3, 6, 7, 12, and 15. These programmatic Components are present in an elementary form and appear weak with regard to the areas of standardizing, details, and alignment.

Follow up was performed to verify that Supervisor Observation corrective actions had been completed. NC NA-AP.ZZ-009(Q), Work Control Process, requires that if the procedure is incorrect, the procedure shall be corrected prior to resuming work. Contrary to these requirements a procedure revision request for HC.OP-IS.KJ-0104 was initiated in June 1994 requesting that Step 5.1.10 on page 6 of 11 be changed to state that the electrician should remove the switched jumper. Currently the procedure states install the switched jumper. The word 'install' should be changed to 'remove'. The procedure was not revised and has been used on a quarterly surveillance since June 1994, the last date was February 1995. The procedure was last reviewed on 8/24/94. The original Procedure Revision Request could not be located. **Action Request M29-95-026-2H** was issued to address this deficiency.



## Section 4.0

### Management Assessment

#### Salem

##### 4.1 Methodology

Maintenance management was assessed using targeted interviews and attending planning meetings. A vertical slice of Salem Mechanical Maintenance from first line supervisor up through Manager were selected for interviews. In addition "confirming" interviews of persons in parallel positions were performed. For critical support functions which have been reported as adversely impacting Maintenance performance, such as planning/scheduling and experience assessment, targeted management interviews were also conducted. An interview format was developed to provide guidance for questioning for the vertical slice interviews. Positions interviewed in the vertical slice included:

- Manager Mechanical Maintenance (Level 4)
- Maintenance Engineer (Level 3)
- Senior Nuclear Maintenance Supervisor (Level 2)
- Nuclear Maintenance Supervisor (Level 1)

"Confirming" interviews were conducted for Supervisor and Senior Supervisor positions.

Critical support function interviews included three interviews of experience assessment and one interview pertaining to planning.

The results of each interview or meeting attendance is recorded in Attachment 1 with direct quotes and examples. Each write-up was reviewed for concerns based on the experience of the evaluator and to identify patterns of organizational behaviors. The importance or credibility of concerns was determined by the frequency with which they occurred during the interview/meetings.

##### 4.2 Conclusions

###### 4.2.1 Scheduling

Poor performance in the area of scheduling and schedule adherence are significantly impacting Maintenance effectiveness. This problem is resulting in wasted resources and diversion of management and supervisory attention

away from expected leadership practices. The poor performance in this area is being sustained and reinforced by a method of measuring performance which does not assess the real problem. Presently, schedule adherence success is noted if work gets done in the same week in which it was scheduled, but the real impact of poor scheduling and schedule adherence is the failure to achieve start and finish times when the schedule said they would occur.

Operations is frequently cited as being the major contributor to the scheduling of emergent work. The station regards itself as "Operations centered" and persons having responsibility for schedule adherence seem to regard perturbations in the schedule as inevitable. There was no evidence from any of the interviews that a concerted effort was being made to determine what the emergent work was really composed of.

Services such as HP support, tagging, crane support, security, scaffolding, etc. which should be successfully scheduled are not, requiring first line supervision to perform last minute preparations to get work started. In general, interview data indicated a lack of commitment to schedule adherence by support groups. The role of Operations in supporting the schedule by clearance application was particularly noted as experiencing difficulty.

#### **4.2.2 Leadership**

Leadership in the workforce is vested in the older workers instead of in the first line supervisors. The first line supervisors devoted much of their time to rearranging work and obtaining support services instead of exercising their leadership responsibilities. The manager is bringing management leadership back into the organization by using "skip" meetings on a very frequent basis. Ultimately, however, the first line supervisors must understand this as their primary responsibility and recapture the leadership that belongs to them. Two things that are presently preventing that are poor scheduling and their own paradigm regarding their role.

#### **4.2.3 Communication**

As was identified in a number of interviews, communications has improved significantly in recent months. Most frequently cited was the "skip" level meetings held by the Maintenance Manager. This is an important improvement in the short term to support organizational change. In the short term "skip" level communications should be more in support of regular line communications and not substituting for it. Communications through the present line organization will be diminished by the number of layers of organization between the manager and the first line supervisor. The present

Mechanical Maintenance organization has a number of 1 over 2 or 1 over 3 relationships (in levels 2 and 3) which may be necessary to support the activity generated by dysfunctional scheduling. In the past, important Quality Assurance observations were not communicated through the line organization. In conjunction with the fact that QA did not typically issue findings, important learning opportunities were eliminated. Observations of first and second line supervision communicating to the organization, and the results of interviews, indicate that lower levels of the Maintenance management/supervisory team have more to learn about the use of communication in shaping human behaviors.

#### **4.2.4 Organizational Learning**

There is strong alignment throughout the management team that good causal factor analysis is the key to improving performance in the area of repeat maintenance. There were a number of successes identified in the interviews and some level of frustration. It appeared to the evaluator that there may be a focus in serving the system rather than learning. There appears to be an expectation that all events are pushed through "the process" instead of gathering the important learnings from a few significant events and using the rest of the data for performance monitoring.

The failure to aggressively follow-up on minor tagging errors is particularly disturbing because of the safety impact that these errors can potentially have. A similar situation was identified from one interview relative to incorrect procedures being found in repetitive, albeit infrequent, basis in work packages.

#### **4.2.5 Procedure Usage**

The management expectation for procedure usage was very clear and strongly held throughout the management organization. A review of interview data from Corrective Action Assessment QA-PA-94-002 indicates that this expectation is also strongly held by the workforce. This strong understanding of the expectation notwithstanding, the SALP report identified procedure adherence and procedure adequacy as problem areas. Similarly QA observation MAINT-002 issued on September 27, 1994 identified procedure adherence problems. Interview data, particularly at the first and second levels of Maintenance supervision identified problems with procedure quality and consistency which generated frustrations in the workforce. This was not linked explicitly to the identified problems of procedure adherence, but is undoubtedly linked to that issue.

#### 4.2.6 Field Observations (Self-Assessment)

No one in the interview process felt that the field observation process was working well. A number of reasons given included:

- Management expectations on how the observations were to be conducted were not clear.
- Observers tended to go with the "easy" work and not observe the more challenging assignments.
- First line supervision did not follow-up on the results of the observations.
- The expectation held for the frequency of observations seems low. Further, while identifying Observation as a program may be important during this organizational change process, there should be an understanding that it is embedded in the first line supervisors' job and that the rest of the management team occasionally utilizes it to verify that management expectations are being carried out.

The problems with the observation program may indicate a weakness in management sponsorship and top down coaching by mechanical maintenance managers.

#### 4.2.7 General

As a general observation, the managers which are being put into place in Mechanical Maintenance understand the issues and have the energy and understanding of the methods which must be used to bring about change. It will be very important that they focus on the most important issues to improve initially. There remains within the supervisory management team some of the old attitudes, but the current practices used for selecting new supervision, BLD training, and the improved use of performance reviews should easily correct this. An issue which surfaced in two interviews centered on the rapid change in personnel that has occurred with the organization in recent years. While that is necessary to get the right people and organization in place, it can also be having a negative impact on the effort to institute a new culture

The final result was a strong indication that the most significant contributor to deficient performance in Mechanical Maintenance is poor performance in the area of work scheduling and schedule adherence. The impact that this is

having is wasted resources and a diversion of management and supervisory attention away from expected leadership practices.

Learning from experience within Mechanical Maintenance is improving but the Corrective Action side of the learning formula, including accountability for closure and follow-up for effectiveness still needs improvement. In the past major opportunities to learn and improve from Quality Assurance reports were missed. A positive shift in the attitude towards the benefit of learning from Quality Assurance observations appears to be occurring but there are still areas within the organization that do not understand the benefit.

The results of this Management Assessment are issued as **Observation 95-142-4A**

### Hope Creek

A similar assessment, on a smaller scale was performed at Hope Creek.

### 4.3 Methodology

Interviews were conducted with one First Line Supervisor, one Senior Supervisor, and the Maintenance Engineer with confirming questions about scheduling asked of another First Line Supervisor.

The results of each interview is recorded in the report with direct quotes and examples where applicable. The importance or credibility of concerns was determined by the frequency with which they occurred during interviews.

An assessment was made of concerns to identify patterns which impact Mechanical Maintenance effectiveness. The result was that there were no significant contributors that may result in poor performance. There were several instances where learning from experience could be improved. The corrective action side of the learning formula, including accountability for closure and follow-up for effectiveness still needs improvement.

### 4.4 Conclusions

The following general conclusions were formulated from a review of the concerns from each interview. It is important to recognize that these conclusions are based on interview results not documented historical data. However, these conclusions are drawn from well corroborated interview information.

#### **4.4.1 Scheduling**

Concerns were expressed with regard to scheduling backlog maintenance work orders for those times that crews are available to work them, and scheduling system outages. Performance in this area does not appear to be significantly impacting Maintenance effectiveness. However enough concerns were expressed that this area may result in wasted resources and diverted supervisory attention.

#### **4.4.2 Communication**

Interviewees appeared to have no barriers to the free flow of communication between the different levels of supervision. Expectations are known and are communicated in rolldown meetings. Consistency was evident. Learning opportunities are apparent with the development of written expectations, - "Effective Tools for First Line Supervisors." This is viewed by the evaluator as a positive initiative in communicating expectations. Communications from other departments are felt to be excellent.

#### **4.4.3 Work/Process Improvement**

The supervisors support strong efforts in the area of failure analysis. Supervisors interviewed were positive about performance; however, they were not aware of where they stood with actual performance criteria with regard to rework percentages, schedule adherence, repeat maintenance, effectiveness of root cause or failure causes, and other performance criteria. They were aware that graphs were developed by the Maintenance Staff and posted, but did not know their own position with regard to what the standards are. This may present a learning opportunity that providing performance feedback through the ranks may contribute to goal setting and recognizing the results of effort.

Post system-outage critiques identify problem areas, task individuals for corrective action and discuss general areas for improvement.

Major learning opportunities may be missed because of a culture that views rework as "no big deal because it doesn't require a lot of manpower to do the job and the system is not Q." Efficiency does not seem to be a high priority.

#### **4.4.4 Procedures**

Emphasis on procedure adherence and enhancement has been strong in the past year. All supervisors felt very confident in the crew's understanding of procedure expectations, although the audit results with respect to Hope Creek

may not support this. A concern was expressed that feedback to supervisors on procedure revision status is weak, consequently feedback to the Technicians is uncertain.

#### **4.4.5 Tagging**

Tagging problems that occur are generally minor in nature; however, supervisors' resolution on the spot without follow-up may inhibit organizational learning.

#### **4.4.6 Qualification**

Uncertainty was expressed on the accuracy of the computerized training matrix although no specific examples could be cited where inaccuracy could be demonstrated.

## Section 5.0

### **Corrective Action**

The Corrective Actions resulting from NRC Inspections, LERs, and Industry events were evaluated by a review of documents, the Action Tracking System and through interviews with PSE&G and Regulatory personnel.

This portion of the audit resulted in two Action Requests. A summary of Action Requests is provided in Appendix D. Details of the findings are in the activity descriptions listed below.

Interviews were conducted with the LER Coordinators at both Hope Creek and Salem Stations, Incident Report (IR) Coordinators, SERT Coordinators, Reliability & Assessment personnel, individuals responsible for coordinating INPO items and Nuclear Licensing personnel.

If repetitive problems were identified the auditor confirmed that the responsible department was aware of the repeat problem and was instituting corrective action.

Review of the following NRC reports identified one repetitive problem and one item that did not appear to have all actions completed. These items were identified during the review of NRC Inspection Report 311/94-014, 354/94-13.

#### NRC Inspection Reports Reviewed

1. 311/94-01, 354/94-01
2. 311/94-03
3. 311/94-06, 354/94-04
4. 311/94-014, 354/94-13

#### Repeat Problems - Loss of Station Control Air (compressors)

The loss of Station Air Compressors is a repeat problem at the stations. Action Tracking System (ATS) SERT item 94-03, task 10 has been assigned to evaluate the cost benefit of the proposed solution to prevent recurrence and has a current due date of 5/30/95. The initial evaluation determined that



a less expensive solution is more practical and is currently being pursued under task 10.

Corrective Action Awaiting Completion - NRC Unresolved Item (URI) # 50-311/94-14-01 Unit 2 Flange Repair

The Unresolved Item # 50-311/94-14-01 Flange Leak Repair noted that a root cause analysis was to be performed on the flange leak. Review of the Station Licensing files determined that as of 2/17/95, no root cause analysis had been received. Further discussion and investigation revealed that a root cause analysis had been completed and written in draft form by Salem Technical and was in final review by the Mechanical Engineering Group. There is currently an ATS Item assigned for this URI. However, there are no tasks assigned to it and the item is in "AGAP" status. AGAP is awaiting agency approval, which indicates that the PSE&G actions are complete. The Audit team stated to Licensing that until the root cause is issued for NRC review it should not be status "AGAP." The root cause analysis report was reviewed and evaluated as adequately identifying the root cause. It also identified weaknesses within our leak repair process and made several recommendations for improvement. These recommendations are being reviewed by Mechanical Engineering for incorporation into the leak repair program. The auditor noted in discussions with Nuclear Licensing that the Action Tracking System (ATS) may need to be updated with an additional task to track the implementation of any accepted recommendations.

A sample of items that impact Mechanical Maintenance or were the result of Mechanical Maintenance activities were selected to determine whether any negative trends or repetitive problems have been identified and to assess the corrective actions taken to address them. These included INPO findings, SERT open items, LERs and Incident Reports.

The items reviewed focused on mechanical maintenance related problems from 1990 through 1994. Based on the items reviewed, no concerns were identified where corrective actions were identified as being completed by the Coordinator or ATS and were not actually completed.

NC.NA-AP.ZZ-0011(Q), Records Management Program requires that records should normally be transferred to the Central Records Facility (CRF) within 90 days of completion. If longer intervals are established (more than 90 days), the Records and Document Control Manager shall concur in writing. Contrary to this requirement, the Audit team noted records dating back as far as 1991

stored in the Salem and Hope Creek LER coordinators' office areas. These records had not been sent to the CRF. **Action Request M29-95-023-3H & M29-95-024-3S** were issued to correct this deficiency.

All the selected items were correctly entered into ATS in accordance with NAP-57 requirements. However, several instances were noted where administration of those items including extensions of due dates and level of detail in ATS tasks could be improved. These items were discussed with the responsible Departmental ATS Coordinators at both Stations. Currently, they are working to improve the quality of the information contained within ATS by identifying repeat abusers of the process to management for action. The overall level of detail for ATS has improved for items issued from mid-1994 to the present.

Additional attention is needed regarding extensions to ATS items. Extensions to LERs, INPO items and Incident Report ATS tasks are being granted without consistently obtaining written justification. In some cases telecons have been accepted instead of written justification. This creates a problem as the ATS task states "per telecon with ...." the actual justification isn't provided nor has the impact of the delay of corrective action been documented.

Extensions on the due date in order to avoid being placed on the station overdue list needs continued monitoring. An improvement in this area within the past months was noted by the Audit team; however, there is still room for improvement. This was discussed with the LER Coordinators and their supervisors who felt that the current process of requiring more detailed justification for extensions together with the denial of unacceptable requests would resolve the situation.

Another poor practice noted was the close-out of one task and the re-issue of a new task when corrective actions are transferred by the responder to another group or department. This practice provides an automatic extension since new due dates are reassigned with the new task. One example noted had a task extended 5 times from its original due date of 9/1/92 to the current due date of 6/1/95. The justifications varied from the improper assignment of initial task to work load issues.

There was no evidence in the LER, INPO or IR files of an evaluation of the impact that the ATS extension has on the plant or system affected. There was also no evidence of a system in place to assure that follow up of implemented corrective actions is performed to determine the effectiveness of actions to prevent recurrence. However, an evaluation was performed for impact on like components within the plants.

RSPD's (response) in ATS that do not signify completed corrective actions should have the task closure section cleared. If the RSPD is left as is, it appears that the corrective actions have been completed and thus may not be identified as an item that still requires action on one of the ATS status reporting documents. Consequently this item may be overlooked.

Several tasks that had received excessive extensions (greater than 2 or greater than 6 months for additional completion time) were identified as low value or "nice things to do" by the responsible individual and LER Coordinators. Items that are entered as LER tasks which do not directly reflect or impact the committed corrective action should be identified as such. This would allow for clear allocation of resources on true corrective action.

It was identified during this audit that a change was underway to the NBU Corrective Action Program that should improve the overall corrective action program. This includes taking all of the corrective action processes within the NBU and combining them into one, including a new database tracking system.

The administrative controls associated with due date extensions in the Action Tracking System will be placed in the QA Assessment file for further follow-up.

## Section 6.0

### **Nuclear Business Unit Repair Program Activities**

The Nuclear Department Repair Program Manual (NDRPM) requirements for the control of welding and nondestructive examination were audited through reviews of completed Code Job Packages, Welding Procedure Specifications, Performance Qualification Reports, Welder Qualifications, field walk-downs and interviews.

This portion of the audit resulted in seven Action Requests and four Observations. A summary of Action Requests is provided in Appendix D. Details of the findings are in the activity descriptions listed below. Feedback and observations, (both subjective and objective) from the Audit team are recorded in Appendix C as a matrix showing "good" and "bad" results for Maintenance program elements observed during this portion of the Audit.

#### **6.1 Nuclear Training Center**

Lesson plans for socket welding and personnel safety were reviewed and found acceptable. The lesson plan included good use of pertinent Licensee Event Reports. This activity is shown in Appendix C Salem matrix item S

Individuals' names were selected from work orders and field walkdown observations. Nuclear Training Center records were reviewed to confirm that these individuals who had been involved in Nuclear Repair Program activities had received training required by the Nuclear Repair Program Manual. The Nuclear Repair Program Manual requires that Indoctrination and Training to the applicable requirement of the Code shall be given to employees to assure continued proficiency in their assignments. Contrary to this requirement, a review of the Nuclear Training Center's records indicated that a Salem Maintenance Supervisor had not received Nuclear Repair Program Manual Training. **Action Request-M29-95-020-3S** was issued to document this deficiency.

The Nuclear Repair Program Manual requires training, however, it does not state what constitutes training or when training must be attended. This was discussed with the NDE Level III Administrator who stated that clarification would be provided in the next revision of the Repair Program Manual.

The audit team toured the welding instruction facility, reviewed lesson plans and interviewed instructors. The Audit team observed that while focusing on teaching specific hands-on welding skills, the Nuclear Training Center does not take the opportunity to use technically correct terminology for welding positions, brazing joint types, and weld bead patterns. This can make the welders sound less technically proficient and knowledgeable and has been addressed in **Observation M29-95-6C**.

## 6.2 Review of ASME Code Work Orders

Work Order 940328150, Hope Creek, Safety Related, ASME Class 1 - repair Reactor Vessel head vent line.

The Audit team reviewed Weld Procedure Specification NWDP-13-4 and Performance Qualification Records PQ-4, PQ-10, and PQ-115 and found them to be acceptable. The Weld Procedure Specification selected for use was appropriate for this repair.

Work Order 940123069, Salem, #14 Steam Generator Inlet Chemical Feed Isolation Valve, Safety Related, ASME Class 3, - leak in weld upstream of valve.

An Audit team review of the work package indicated that the Weld Procedure Specification (NDWP-13-4) used, was appropriate for the application. A review of NDE records and the welder's qualifications was acceptable.

Work Order 931207116, Salem, Service Water Containment Fan Coil Unit Outlet Air Operated Butterfly Valve, 15SW65, Safety Related, ASME Class 3 - valve flange leaking from gasket area.

This work order showed inconsistencies in the ASME III Classification of the component, Class 2 vs. 3 on the Weld History Records and the NR-1 Form record. Further investigation identified ASME III, Class 3 as the correct classification. Inconsistent NDE Acceptance Criteria was documented on a nondestructive examination report. A review of the indications' dimensions against the referenced codes (ASME Section III and ANSI B31.7) acceptance criteria confirmed rejected status. Conflicting information, regarding the Code class of a component (2 vs. 3) and NDE acceptance criteria (ASME III vs. ANSI B31.7), in Code Job Packages was noted. This may be due to training weakness or indicative of a lack of attention of detail. This is addressed in **Observation 95-142-6D**.

Further investigation by the Auditors did not reveal any conditions adverse to quality as a result of these conflicts. This activity is shown in Appendix C, Salem matrix item T.

### **6.3 Salem Field Walkdown**

Work Order 950109110, Salem Unit 1, #11 Service Water Chiller Condenser Recirculation Pump, Safety Related, piping mis-aligned. This activity is shown on Appendix C, Salem matrix item A.

The Auditors observed the work area, interviewed the Supervisor and Technician and reviewed the Code Job Package, which included engineering instructions, the Work Order, completed NDE report, weld histories for welds SI-SWP-1235-1,2, and 3 and SI-SWP-1236-1A, 2, and the Stock Material Issue Permit (SMIP) for weld filler material. The Weld History records were satisfactory based upon the job status. NDE reports were acceptable for the examination results within the weld preparation area. Engineering instructions for "Pre-Weld NDE" did not specify the NDE method, acceptance criteria, or areas of interest. The conclusion by the work group to perform liquid penetrant examination appeared to be correct based upon the information given and the conditions existing. Visual examinations of the weld quality yielded acceptable results.

The Maintenance Supervisor stated that the work package was incomplete when initially sent to the Maintenance shop, a spool piece was missing from the work scope. This was identified by the Mechanic during a pre-job review. The work order was returned to planning for correction.

### **6.4 Hope Creek Field Walkdown**

Work order 940520161, Hope Creek, "B" EDG Starting Air Receiver Check Valves, Safety Related, ASME Class 3 - replace valves. This activity is shown on Appendix C, Hope Creek matrix item G and H.

The Audit team reviewed the Weld Procedure Specification used, NDWP-7-5, the welder's qualifications, and weld filler material (ER3082) were acceptable. The component (3/4", ASME class III) Weld Histories for welds HC.KJ-PM018Q0639 FW 5, 6, 7, and 8 were all acceptable based upon the process observed.

### 6.5 Welder Qualification Verification

This activity is shown on Appendix C, Salem matrix item C The qualifications of three welders, who had performed Code welding, were verified. No deficiencies were identified.

The welder qualification process was reviewed. The Nuclear Department Welding and Brazing Manual requires that welders, once qualified, remain qualified by demonstrating active welding or re-qualify by the methods described in the ASME Code. Contrary to this requirement, Welder continuity for qualification is maintained through weld rod issue slip dates, not actual process performance. **Action Requests M29-95-002-2M, - M29-95-021-2H, - M29-95-022-2S** have been issued to address this deficiency.

### 6.6 NDE Procedures, Technician Qualification and Observation

Work Order 940520158, Hope Creek, "A" EDG Starting Air Receiver (SR) - check valve replacement.

The Audit team witnessed the Liquid Penetrant examination of four welds, by the NDE contractor, (MQS) in the Hope Creek Maintenance Shop. The MQS examiner adequately followed the steps of the procedure and appeared to possess sufficient technical information to implement the procedure correctly. This was evidenced by the methodical implementation of sequential examination steps and the application of essential parameters to complete the examination. The NDE technician qualification was confirmed as currently holding a level II PT certification.

The MQS technician did not have a copy of the implementing procedure with him. This is acceptable as the Nondestructive Examination procedure is a Category III procedure. A re-evaluation of Nondestructive Examination procedure's Category III classification to a Category II classification in order to require its presence at the work area was discussed with the NDE Level III Administrator and the NDE Supervisor. They felt that it would not be appropriate to reclassify all NDE procedures, and that the decision on taking the procedure to the field should rest with the Level II Technician.

The following NDE procedures were reviewed for technical adequacy and verification of Level III acceptance. No deficiencies were identified.

VHS.SS-SP.ZZ-0211 (Q) Rev. 1

VSH.SS-SP.ZZ-0204 (Q) Rev. 1

### 6.7 Weld Filler Metal Storage and Issue Areas

Hope Creek Storeroom Walkdown, This activity is shown on Appendix C, Hope Creek matrix item P

The walkdown in the Hope Creek Storeroom weld rod issue area was conducted as part of the assessment of Repair Program welding activities. NC.PM-AP.ZZ-0300(Q) requires that welding electrodes that deteriorate from the effects of moisture should be stored in heated ovens to prevent the absorption of moisture. Contrary to this requirement, American Welding Society (AWS) Classification 3/32" ENiCrMo-3 weld filler metal was incorrectly stored outside an oven environment.

HC.MC-AP.ZZ-0151(Q) requires that welding materials shall be identified at all times as to electrode coding, classification, and manufacturers heat or lot number. Contrary to this requirement there was no heat number for this material on the Inspection Release Tag. This condition was brought to the attention of the stock handler who immediately removed the material from the area and notified the supervisor. The material was discarded.

The Procurement and Material Control Procedure, ND.PM-AP.ZZ-0300 (Q) Rev 3, Exhibit 3, ENiCrMo-3 (ASME Classification SFA-5.11) type electrodes provides conflicting information on storage duration. **Action Request M29-95-008-2M** was issued to address these deficiencies.

The Nuclear Department Welding Engineer does not have an opportunity to review Procurement and Material Management Procedures which deal with the control of weld filler metal. Improved inter-departmental communication in this area could have avoided conflicting information in the Procurement and Material Control procedure governing storage of weld filler metal for ENiCrMo-3 (ASME Classification SFA -5.11). **Observation 95-142-6B** was issued to address this.

Salem Storeroom Walkdown, this activity is shown on Appendix C, Salem matrix item L,

A walkdown of the Salem Storeroom weld rod issue area was conducted as part of the assessment of Repair Program welding activities. The Nuclear Department Repair Program Manual requires that welding materials shall be identified at all times as to electrode coding, type and manufacturers heat or lot number. Contrary to this requirement, Weld rod, heat number 6152, was stored in bins #22 and #24. Bin 22 displayed an Inspection Release Tag for



Heat No. 6325. Bin 24 displayed an Inspection Release Tag for Heat Number 6325 but contained mixed heat numbers, 6152, and 6325. There was no Inspection Release Tag for heat number 6152 material. This was brought to the attention of the stockholder who immediately removed the material and segregated it by heat numbers and returned the material to its correct location. Inspection Release Tags for heat number 6152 were prepared based on the folio and heat number. **Action Request M29-95-008-2M** was issued to address the deficiencies.

When reviewing Work Order No. 950109110 in the Salem Maintenance shop the documents indicated that weld filler material with these heat numbers had been issued for this work order.

A "Red" Hold tag in Bin No. 33 of the weld filler storage cabinet was dated 4/10/90. This was mentioned to the stockroom handler. Follow-up of this activity the next day indicated that the material was removed and discarded.

The audit team noted that both the rod oven and the probe thermometer used are calibrated. The calibration of both is redundant. The cost saving in calibrating only one of these devices could be set against the purchase of a multi channel recording thermograph which would better record the rod oven temperatures on an ongoing basis and provide a permanent record of procedural compliance. This has been addressed on **Observation 95-142-6A**.

### **Contractor Fabrication Shop**

The Audit team conducted a walkdown in the Contractor Fabrication shop to examine weld filler metal control after identifying deficiencies in the Salem and Hope Creek storerooms.

The Nuclear Repair Program Manual requires that low-hydrogen electrodes be stored in heated ovens after the original container has been opened. Contrary to this requirement, two open cans of weld electrode which require oven storage were observed outside an operating oven environment. Weld filler metal was stored in a locked cage, however, access appeared to be non-restricted as the cage's lock combination was displayed in the immediate vicinity. These conditions were immediately brought to the attention of the Supervisor responsible for the contents of the cage. He immediately discarded the filler metal. **Action Request M29-95-007-2M** was issued to address these deficiencies.

### **6.8 Review of Weld Procedure Specifications and Procedure Qualification Records**

The Audit team reviewed Welding Procedure Specifications and Procedure Qualification Records against the requirements of ASME Section IX, Welding and Brazing Qualifications.

Section IX of the ASME Code requires Welding Procedure Specifications to utilize process variables within the ranges qualified by the associated Procedure Qualification Record. Contrary to this requirement, three examples of Welding Procedure Specifications that contain parameters outside the range defined by the referenced Procedure Qualification Record were identified. In addition, one Welding Procedure Specification allowed small diameter electrode to be used with relatively high amperage, a condition which challenges the welder's ability to produce an acceptable weld. **Action Request M29-95 003-2M** has been issued to address these deficiencies.

### **6.9 QA Records Retrieval**

In preparing for the audit, Work Orders and Code Job Packages were retrieved from microfilm. No deficiencies were identified.

## Appendix A Personnel contacted During the Audit

<b>Name</b>	<b>Department</b>
K. Altenburg	Procurement & Material Control
R. Antanow	Salem Planning & Scheduling
J. Barnes	Salem Technical
R. Bisher	Hope Creek Maintenance
R. Bishop	NTC Records Coordinator
C. Boxer	Salem Planning & Scheduling
W. Borquinn	Salem Planning & Scheduling
D. Boyle	Salem Technical
D. Brown	Salem Maintenance
S. Bussey	Site Services
J. Byrwa	Nuc. Eng. & Support, Project Maintenance
M. Byrwa	Salem Maintenance
R. Cannizzaro	Salem Maintenance
T. Cellmer	Salem Planning & Scheduling
R. Chromanski	Salem Technical
L. Dalton	Nuclear Training Center
S. Davies	Salem Technical
J. DeFebo	Hope Creek Station QA
G. Depta	Salem Planning
W. Doughty	Hope Creek Maintenance
M. Crisafulli	Hope Creek Maintenance
W. Denlinger	Salem NDE Level III
J. Fest	Salem GM Staff
G. Figueroa	Salem Planning & Scheduling
T. Fish	USNRC Salem Station
V. Forte	Hope Creek Maintenance
C. Frew	Nuc. Eng. & Support, Project Maintenance
W. George	Salem Planning
A. Giardino	QA Programs and Audits
M. Goldberg	Site Services
W. Grau	Nuclear Licensing
W. Gostkowski	Hope Creek Maintenance
R. Griffith	QA/NSR
E. Harkness	Salem Maintenance
M. Headrick	Salem Scheduling
F. Higgins	Hope Creek Planning
T. Higgins	UE&C
M. Hicks	MQS Technician

Hope Creek & Salem Generating Stations Mechanical Maintenance Audit 95-142

H. Hiles	Salem Maintenance
T. Hopley	Hope Creek Maintenance
R. Hovey	General Manager - Hope Creek
T. Iannucci	Salem Maintenance
S. Johnson	Salem Technical
S. Lesh	Hope Creek Maintenance
J. Lewis	Hope Creek Maintenance
J. Lin	Mechanical Engineering
E. Maloney	Hope Creek Station QA
D. Martrano	QA/NSR
N. Masher	Salem Maintenance
R. Martin	MQS
C. Marschall	USNRC, Salem
F. McCloskey	Procurement & Material Control
D. McCormick	Salem Maintenance
H. McStay	Salem Maintenance
M. Metcalf	Salem Maintenance
W. Murr	Salem Operations
W. Nieheiser	Salem Operations
W. O'Brien	Salem Planning
J. O'Hanlon	Reliability & Assessment
M. Oliveri	Hope Creek NDE Level III
R. Olsen	Salem Operations
M. Festva	Salem LER Coordinator
S. Raguseo	Nuc. Eng. & Support, Project Maintenance
J. Ranalli	Mechanical Engineering
D. Rawlins	Hope Creek Maintenance
T. Robbins	Hope Creek Maintenance
A. Roberts	NDE Level III Administrator
D. Rogozenski	HC Technical
G. Sayer	Nuclear Proc. and Material Management
W. Schell	HC Technical
F. Schnarr	Reliability & Assmt
B. Sharadin	Hope Creek Planning
S. Skabicki	Salem Station QA
R. Skibinski	Hope Creek Station QA
J. Summers	General Manager - Salem
R. Summers	USNRC, Hope Creek
J. Sparks	Procurement & Material Control
T. Spencer	Salem Maintenance
W. Sutton	Hope Creek Maintenance
D. Tauber	Salem Station QA
M. Trum	Hope Creek Maintenance

Hope Creek & Salem Generating Stations Mechanical Maintenance Audit 95-142

R. Van De Decker  
R. Villar  
L. Wagner  
J. Weiderman  
I. Weisman  
F. Wiltsee  
T. Wysocki

Salem Maintenance  
Nuclear Licensing  
Hope Creek Maintenance  
Salem Tech. Dept. NSS Group Lead  
Nuclear Training Center  
Salem IR Coordinator  
Hope Creek Maintenance

## Appendix B

### Reference Documents Reviewed During the Audit

#### List of References:

##### Work Orders:

930921155

931207116

940123069

940306105

940328150

940412172

940504184

940520158

940520158

940520161

940520161

940830179

941002139

941004105

941013093

941102109

941105133

941202163

941228151

950103201

950105088

950109110

950111114

950112145

950123197

950124138

950124138

950125132

950201020

Code Job Package H-94-076

Code Job Package S-93-284

Code Job Package S-94-006

Code Job Package S-95-002

NC.NA-AP.ZZ-0009 (Q) Work Control Process

NC.NA-AP.ZZ-0010 (Q) Preventive Maintenance Surveillance Program

NC.NA-AP.ZZ-0003 (Q) Document Control Program

NC.NA-AP.ZZ-0006 (Q) Incident Report/Reportable Event Program and  
Quality/Safety Reporting System

NC.NA-AP.ZZ-0007(Q) ALARA Program  
NC.NA-AP.ZZ-0011(Q) Records Management Program  
NC.NA-AP.ZZ-0012(Q) Technical Specification Surveillance Program  
NC.NA-AP.ZZ-0014(Q) Training Qualification and Certification Program  
NC.NA-AP.ZZ-0015(Q) Safety Tagging Program  
NC.NA-AP.ZZ-0020(Q) Control of Nonconforming Comp. and Structures  
NC.NA-AP.ZZ-0021(Q) System Cleanliness Program  
NC.NA-AP.ZZ-0022(Q) Measuring and Test Equipment  
NC.NA-AP.ZZ-0023(Q) Scaffolding and Transient Loads Control  
NC.NA-AP.ZZ-0025(Q) Operational Fire Protection Program  
NC.NA-AP.ZZ-0028(Q) Code Job Package  
NC.NA-AP.ZZ-0057(Q) Action Tracking Program  
NC.NA-AP.ZZ-0058(Q) Corrective Action Program  
ND.PM-AP.ZZ-0300(Q) Storage and Handling of Materials  
ND.QA-AP.ZZ-0001(Q) QA Personnel Training, Qualification and Certification  
ND.QA-AP.ZZ-0026(Q) "Quality Assurance Audits"  
SC.SA-SD.ZZ-16  
SA-SD.ZZ-16, Self Assessment Management Practices  
SC.MD-PM.DG-0004(Q) Diesel Generator Every Four Refueling Preventive  
Maintenance  
SC.MD-PM.DG-0003(Q) Diesel Generator Every Two Refueling Preventive  
Maintenance  
SC.MD-DC.ZZ-0002(Q) Weld Rod Oven and Welding Machine Calibration  
PSBP 0301103  
PSE&G Nuclear Repair Program Manual  
PSE&G Welding and Brazing Manual  
Nuclear Training Center Lesson Plan 1105-803.011B-SOCK05  
Nuclear Training Center Lesson Plan 1105-803.01B-WMSS01  
Nuclear Training Center Lesson Plans:  
• Overview Training  
• Advance Training  
• Nap 28 Training  
ASME Section V, 1989 Ed.  
ASME Section XI, 1983Ed.  
ASME Section XI, 1986Ed.  
ASME Section IX, 1989 Ed.  
PSBP 0301103  
MMIS Database  
Vendor Technical Documents

# Hope Creek and Salem Generating Stations Mechanical Maintenance Audit 95-142

HOPE CREEK MATRIX	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Adequate procedures	●	●				●		●		●			●	●	●	●	●
Work package quality	●		●	●	●		●			●				●	●		
Trained personnel			●			●							●			●	
Supervisory oversight		●	●	●	●			●		●	●		●	●	●	●	
Communication			●	●					●		●	●	●			●	●
Procedure Compliance	●	●								●	●		●		●	●	●
Eff Mngment Oversight					●			●			●	●	●	●	●	●	●
Correct Material		●	●												●		
Planning & Scheduling										●		●	●		●		
Clear Inst & Dwgs	●									●					●		●
Inter-dept. support			●	●						●	●	●		●	●	●	●
Clearly def work scope	●									●	●		●		●		
Pre-job briefing					●					●	●		●		●		
Tagging			●	●													
Correct tools available	●					●							●				
M&TE														●			
Industrial safety	●		●		●	●				●	●		●				
Housekeeping				●									●				
Tech-Supv interface		●	●	●	●				●	●	●		●	●	●		
ALARA																	
Self-Assess/Corr Act	●					●				●			●			●	●
Work practice		●	●	●	●					●	●		●	●	●		●
Post-job reviews													●				
Repeat failure		●		●												●	

● =BAD  
 ● =GOOD

- A 94050418401 - Rebuild primary condensate pump
- B 941004105 -Fullers earth filter
- C 941202163 Act 1- Cap leaking diesel cooler
- D 950103201 - Aux heating steam boiler
- E 9501050880 - Jacket water leak "A" EDG
- F Welder training NTC
- G 940520161 Class 3 welding
- H Welder continuity
- I 1/31/95 General Supv Group meeting-maint shop
- J 940830179 Act 1
- K 940520158 Act 1 & 2
- L POD Meeting 1/30 & 1/31/95
- M 940412172 B EDG Exhaust leak
- N 941013093 D Circ Water
- O 940306105 A EDG Lube oil keep warm pump
- P Control of Weld Filler Metal
- Q Socket Weld Fit-up



## Hope Creek and Salem Generating Stations Mechanical Maintenance Audit 95-142

SALEM MATRIX	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
Adequate Procedures		●	●									●							●	●	
Work package quality	●	●							●	●					●						
Trained personnel	●	●							●			●			●				●	●	
Supervisory oversight	●	●	●			●	●		●			●			●				●		●
Dept focus goals				●									●	●							
Communication		●		●			●				●	●		●	●	●	●				
Procedure Compliance							●	●				●							●		
Eff Mngmt Oversight			●	●		●					●	●	●		●						
Correct Material							●														
Planning & Scheduling		●		●					●				●	●							
Clear Inst & Dwgs	●	●																	●		●
Inter-dept support		●		●								●	●	●	●	●					
Clearly def work scope		●							●										●		
Pre-job briefing							●												●		
Tagging		●																			
Correct tools available							●														●
<b>NOTE</b>																					
Industrial safety				●	●		●								●					●	
Housekeeping								●													
Tech-Supv interface																●	●				
ALARA							●														
Self-Assess -Corr Act						●						●					●			●	
Work Practice	●						●			●											
Post-job reviews							●														
Repeat failure		●										●							●		

● =BAD  
● =GOOD

- A Code Welding, Salem Maintenance Shop -W/O 95019110
- B Demin Transfer Pump Maintenance - W/O 941002139
- C Welder Continuity of Qualification
- D Unit 2 Outage Meeting 1/24,-25,-26/95
- E Valve 12RO21 - W/O 950112145
- F Supervisor Self-Assessment Report Follow-up
- G W/O 950125132
- H Housekeeping Turbine Building El. 88 below the condensers
- I W/O 950124138 - Stator water pump high vibration 1/26/95
- J W/O 950125229 - Door seal - 1/26
- K Stand-up meeting in Maintenance shop
- L Control of weld filler material
- M Unit 2 Outage meeting 1/27/95
- N Unit 1 P.O.D. Meetings 1/23,-24,-25/95
- O W/O 950124138 - Stator water pump high vibration 1/27/95
- P W/O 950124095 - CFCU leak Unit 2
- Q Craft interviews on communication
- R W/O 941229264 - 13 Charging pump maintenance
- S Welding training at the Nuclear Training Center
- T W/O 931207116 - CJP S-93-284

## Appendix D

### Audit Findings

#### 1: Findings Resulting from the Assessment of Ongoing Maintenance Activities

**M29-95-004-2S**: - Salem, 13 Charging Pump

Procedure for Maintenance work, did not include instructions or responsibilities for oil drain and refill.

**M29-95-010-2H**: - Hope Creek, EHC system.

A Supervisor directed the use of Loctite Quickset 404 in an unapproved application and directed the Technicians to torque the EHC system to 100 foot pounds. A procedure revision to include this value was submitted in October 1994. The current revision, issued in November 1994, did not include the specific torque values.

**M29-95-015-2H**: - Hope Creek, "A" EDG.

Socket weld fit-up was accepted and signed-off by a Supervisor prior to tack welding.

**M29-95-017-3H**: - Hope Creek, Service Water Chlorination Piping.

The supervisor did not complete entries in the Scaffold Control Log prior to the start of work and Mechanics started using the scaffold prior to its required inspection.

**M29-95-018-2H**: - Hope Creek, Leaking Diesel Room Cooler.

A drawing in the work package did not contain a valid date stamp for field use.

Two ladders and a compressed gas cylinder which had been set up the previous day, were not restrained as required. The failure to identify and resolve transient load deficiencies was previously documented on Hope Creek Station QA Action Request M35-94-006.

Technicians were issued Non Q brazing material to braze caps on a Nuclear Class 3 component. The inappropriate use of this material was prevented by the auditor.

**M29-95-016-2H** - Hope Creek.

Deficiencies were noted during the observation of in-process Maintenance activities on the "A" EDG Lube Oil Keep Warm Pump:

- Procedure issued to the field was inadequate to provide the necessary instructions to assemble the pump following repair.
- The pre-staged Idler Pin replacement part provided for repair was incorrect. The Pin was not for the pump installed on Hope Creek's EDG.
- The Parts List and Maintenance Manual provided to the Technicians by the System Engineer was "For Information Only", and was for a different model pump than that on the Hope Creek EDG.

## **2. Findings Resulting from the Assessment of Maintenance Inputs**

**M29-95-0025-2S** Salem

Salem Preventive Maintenance activities have been delayed without the concurrence of Technical Department System Engineers or Reliability and Assessment.

Components which are awaiting System Engineering reviews and analysis to approve Preventive Maintenance Deferral Requests have not received their scheduled Preventive Maintenance while the change is being processed.

## **3. Findings Related to Self-Assessments**

**M29-95-026-2H** - Hope Creek.

A revision to an Operations Department Surveillance procedure was not processed following a Self-Assessment observation and submittal of a revision request.

## **4. Findings Resulting from the Assessment of Management**

There were no Action Requests issued as a result of this Assessment Activity. A summary of the results are included in the Executive Summary, the Conclusions are presented in the Detailed Report Section 4, and the complete text is provided at Attachment 1 to the Audit Report.

## 5. Findings Resulting from an Assessment of Corrective Actions

### M29-95-023-3H & M29-95-024-3S Retention of QA Records:

Hope Creek and Salem Records for Licensee Event Reports and Incident Reports have not been transmitted to Central Records Facility for microfilming as required by NC.NA-AP.ZZ-0011(Q).

## 6. Findings Resulting from an Assessment of Repair Program Activities

### M29-95-002-2M, - M29-95-021-2H, - M29-95-022-2S: Welder qualification:

Welder continuity for qualification is maintained through rod issue slip dates, not actual process performance. The Welding and Brazing Manual requires that welders, once qualified, remain qualified by active welding or re-qualify by the methods described in the ASME Code.

### M29-95-003-2M: Welding and Brazing Manual Discrepancies:

A review of the Welding and Brazing Manual revealed deficiencies for Weld Procedure Specification (WPS) 48 and Welding Procedure Qualification (PQR) 137 and 190 with regard to compliance with ASME IX Para QW-100.1, QW-451/QW-200.2 (f), and QW-200.4

### M29-95-007-2M: Weld filler metal control:

Weakness in weld filler metal control was also observed during the National Board Survey in the Fall of 1994.

In the Contractors' fabrication shop, weld filler metal requiring oven storage, was found in an opened container outside an oven environment. This could result in the use of degraded filler metal for welding.

### M29-95-008-2M: Weld filler metal control:

#### Hope Creek Storeroom,

Weld filler metal requiring oven storage, was found in an opened container outside an oven environment. This could result in the use of degraded filler metal for welding. The Manufacturers heat number was not evident on the Inspection Release Tag.

#### Salem Storeroom,

Mixed heat numbers stored within a single bin

No Inspection Release Tag prepared for heat number 6152.

Hope Creek & Salem Generating Stations Mechanical Maintenance Audit 95-142

**M29-95-020-3S**: Repair Program training not completed:

Nuclear Repair Program training has not been provided to a Salem Maintenance Supervisor responsible for oversight of Code Job Package work.

Copies of the Action Requests are attached to this Audit Report.

FOR ANY COMMENTS ON THE SUBJECT OR CONTENT OF THIS AUDIT REPORT, COPY THIS PAGE AND WRITE YOUR COMMENTS ON THE BACK OF THE COPY, FOLD AND SEAL THE PAGE AND DROP IT IN THE COMPANY MAIL.

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<b>FROM</b>

<b>MAIL TO</b>
<b>AUDITS SUPERVISOR</b>
<b>QA AUDITS</b>
<b>MAIL CODE N14</b>
<b>NUCLEAR B.U. ADMIN BLDG.</b>

**Attachement 1**

**Salem Mechanical Maintenance Audit  
Management Assessment**

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Management Assessment**



**SALEM MECHANICAL MAINTENANCE AUDIT  
MANAGEMENT ASSESSMENT**

**EXECUTIVE SUMMARY**

This assessment of Mechanical Maintenance management is based on a review of recent external and internal assessments of Mechanical Maintenance, two days of intensive interviewing of line management and support management, process reviews, and a comparison of management interview data with worker interview data obtained in Corrective Action Assessment QA-PA-94-002. Concerns were extracted from each of the interviews and then an assessment was made of those concerns to identify patterns which impact Mechanical Maintenance effectiveness. The result was a strong indication that the most significant contributor to deficient performance in Mechanical Maintenance is poor performance in the area of work scheduling and schedule adherence. The impact that this is having is wasted resource and a diversion of management/supervisory attention away from the leadership practices that are necessary to address cultural issues. Learning from experience within Mechanical Maintenance is improving but the corrective action side of the learning formula, including accountability for closure and follow-up for effectiveness, still need improvement. In the past major opportunities to learn and improve from Quality Assurance reports were missed. A positive shift in the attitude towards the benefit of learning from Quality Assurance observations appears to be occurring but there are still areas within the organization that do not understand that benefit.

**METHODOLOGY**

Maintenance management was assessed by using targeted interviews and attendance at planning and informational meetings. A vertical slice of Mechanical Maintenance from first line supervisor up through Manager were scheduled for interviews over a two day period. In addition, some "confirming" interviews of persons in parallel positions were performed. For critical support functions which had been reported as adversely impacting Maintenance performance, such as planning/scheduling and experience assessment, targeted management interviews were also conducted. An interview format was developed to provide guidance for questioning for the vertical slice interviews. Topics covered included:

- Job Expectations
- Management Controls
- Work/Process Improvements

Root Cause Analysis  
Assessments/Evaluations  
Contractor Utilization  
Work Coordination/Scheduling  
Interface with QA  
Industrial Safety  
Procedure Usage  
Communications  
Training and Qualifications

Positions interviewed in the vertical slice included:

Manager Mechanical Maintenance (Level 4)  
Maintenance Engineer (Level 3)  
Senior Nuclear Maintenance Supervisor (Level 2)  
Nuclear Maintenance Supervisor (Level 1)

"Confirming" interviews were conducted for Supervisor and Senior Supervisor positions.

Critical support function interviews included three interviews of experience assessment and one interview pertaining to planning.

The results of each interview or meeting attendance is recorded in the report with direct quotes and examples where applicable. Each write-up was reviewed for concerns based on the experience of the evaluator. Following the interview process, the concerns were reviewed to identify patterns of organizational behaviors. The importance or credibility of concerns was determined by the frequency with which they occurred during interviews/meetings.

#### DETAILS OF MAINTENANCE LINE INTERVIEWS

**Level 1 Interview Results and Concerns** - The Maintenance Supervisor has the responsibility to "verify the overall job is ready to work". The interviews revealed that this includes tagging walk-downs and occasional review of the work package, though it was stated that time often does not permit this latter function to be accomplished. Apparently the practice of not reviewing the package can also extend to the work team. This is a violation of the published Work Standards.

With respect to the tagging verification, there are occasions where tagging errors of a "minor" nature occur that are resolved by prompt interaction between the Maintenance Supervisor and the Shift Supervisor with no follow-up. This failure to recognize the need to learn from these types of experiences, to eliminate problems that could cause more serious events, is either not recognized or not done for other reasons.

Prior to work start in the morning, the supervisor meets with his entire team for "pre-job briefings". The thought of doing it as

a group is that each work group can benefit from hearing what the other is doing. This practice probably detracts from the focus that a good pre-brief needs. During the meeting the supervisor regularly reviews, with his work team, portions of the Work Standards Handbook. He felt that this is an effective way to communicate management expectations. An independent observation from another outside member of the audit team concluded that this practice appears to be generic in the Mechanical Maintenance Department and very effective.

Incident Reports (IRs) are initiated on the gut feeling that an event should be investigated. This may be acceptable, but it should be checked out against management expectations. The supervisor seemed overwhelmed by the number of IRs. The concept of identifying events for tracking purposes but only evaluating those that have significant learning potential is not evident, at least at this level of the organization.

The Supervisor arranges most support services on the day that a job is scheduled to begin. He feels that he is adequately supported in this way. An account of such a "false" start was given by another audit team member. In this Hope Creek example, the start of real work was delayed several days. If proper scheduling was being done, these services would be scheduled in the planning phase and would require only confirmation by the supervisor. When asked why this is not done, the reply was that "things change fast" making the work schedule obsolete before it starts. The supervisor stated that there is a large amount of emergent work sent to Maintenance which impacts his ability to get work done. The nature of the emergent work was not evaluated, but past experience indicates that poor planning contributes significantly to "emergent" work.

The supervisor described an event in which a faulty job plan resulted in the need to revise a work package and cut a small drain line. The result was an inadvertent breach of containment. The supervisor was very cognizant of his own culpability in the event, perhaps to the extent of not seeing the major failure in job planning. Subsequent discussions with other audit team members revealed that planner training is principally via OJT and may be insufficient. Occasionally, when reviewing work packages, a wrong procedure is identified as having been inserted. These problems are resolved on the spot by obtaining the correct copy. No programmatic follow-up is used resulting in missed learning opportunities.

The supervisor was clear on procedure use expectations including use and correcting errors. He was confident that his discipline used procedures in accordance with management expectations but was certain that same level of performance did not exist across all maintenance trades. He supported that position with examples.

In general, the supervisor was sincere in his intent to do a quality job. Areas of concern include:

1. For various reasons including expediency, learning opportunities from precursor events are being bypassed.
2. Poor performance in work planning and especially scheduling is diverting valuable supervisory time away from more important responsibilities.
3. Communications between Level 1 supervision and higher levels of the organization who have the authority and the will to eliminate fundamental problems has not occurred in the past.
4. Poor scheduling of all activities pertaining to Maintenance and Maintenance support are creating a drain on available resources reducing the ability to more aggressively improve the material condition of the plant.
5. "Group" pre-job briefings may lack effectiveness.

**Level 1 (confirming) Interview Results and Concerns** - This interview was performed to corroborate and expand on information from the above interview. There were no significant differences in areas common to both interviews. Additional areas covered in the interview and viewed as potential concerns include:

1. Back shifts are not unitized and no work is "scheduled" for back shift. In fact, the interviewee questioned the purpose of having a back shift. He was of the opinion that managers who were generally positive on the unitization concept were not fully aware of the limited application on back shift.
2. The frequency of rescheduling due to emergent work were estimated to be in the range of 15-20%. The supervisor acknowledged that he had to scramble to keep his workers fully occupied, but when pushed on the nature of the reassigned work, described very low value activities. This is consistent with concern 4 from the Level 1 interview.
3. Procedures were inconsistently included in the work packages. An example was given where the demin. transfer pump does not have a procedure for overhaul but the screen wash pump does. Neither of these pumps are safety related and the interviewee identified this as a procedure inconsistency.

4. This supervisor appears to do an excellent job of collecting performance data and providing feedback via the performance review system. He cautioned, however, that the frequent rotation of supervision and work teams was resulting in many situations where performance reviews were being conducted on people who had only worked for a supervisor for a short period of time, making accurate performance reviews very difficult.
5. This individual viewed the Mechanical Maintenance Supervisors as the driving force within the organization who actually "get things done" when what is planned is superseded by emergent priorities. This relates back to previously stated concerns about work planning and the impact on the ability of supervisors to properly utilize their time.
6. The interviewee stated that rework is hard to track because frequently other crews and not the original crew corrects rework problems. Additionally, rework is not tracked for individual crews, so crew performance is not clearly known.
7. Tagging problems do occur, generally minor in nature. As with the Level 1 interview, this interviewee tends to do real time resolution of minor changes without follow-up, so organizational learning is inhibited. His judgement is that Operations is "understaffed and too busy". This is an excuse for their performance and the reason why it is felt that trying to follow-up small errors would be futile.
8. Communications in Mechanical Maintenance is "10 times better" than it was 18 months ago (My personal concern is that this is occurring via "skip" communications and not via the line).

**Level 2 Interview Results and Concerns** - This Senior Supervisor identified scheduling as being a significant issue impacting Mechanical Maintenance effectiveness. He stated that this was a particular concern during the outage where he noted a "different agenda" between Operations and Outage Planning. He cited examples where he would come in early in the morning and find 100% of the work which he had planned to start that morning was changed to different work. He stated that this had a severe impact on first line supervision. Regarding the ability of his own organization to meet schedule commitments, the interviewee stated that during the outage they had done well and only experienced one major delay with respect to a welding operation. When questioned about rework, the Senior Supervisor cited a

particular job for discussion. During his response he stated that he always tried to "tell the guys they are doing a good job". (This may be a concern. Do to lack of pinpointing the wrong behaviors they may be reinforced.) During the rework discussion, he cited bad tagging, and like others who have been interviewed, stated that he does not "press the issue". He stated that there were valuable lessons learned from the experience and that Nuclear Network had been utilized to obtain the solution to the rework problem.

In discussing cultural issues, it was noted that the more experienced and highly skilled workers were more likely to be associated with resistance to new expectations. He felt that newer members of the work force had the potential to change, but there was a tendency for them to learn the old culture from the more seasoned workforce.

In discussing control over contractors, the Senior Supervisor stated that control over large contractors was not as good as control over small contractors. The reason given for this is that with smaller contractors, Public Service supervision can keep close tabs on their work and ensure that the Work Standards Handbook are properly enforced. With larger contracts, it is expected that the contractor management will do this and it does not work as well.

We discussed the selection of first line supervision and he noted that a targeted selection process is used and while he had been trained in the methodology, he was not involved in first line supervision selection. He noted that multiple applications are reviewed for each job. When asked what single thing he would change if he had the opportunity, the interviewee quickly identified "get a schedule and live by it". He also stated that he had just had a meeting with the Seniors in Planning and they agreed to act on planning feedback sheets the same day and get back with feedback to the initiators in two weeks. This is in contrast to the two month response time formerly. In supporting his identification of scheduling as being the most critical factor, he stated a specific example regarding a freeze seal job which got a delayed start from the original planned day, but through careful work and coordination, they had been able to arrange a restart of the job one day later. He had completely prepared for the job obtaining expensive resources and getting tools and personnel in place and when the time came for the job to start, he still didn't have a work package. When he checked into the problem it turned out that incomplete engineering work was delaying the package, no one had told him, and the job did not begin until the following day. A significant loss of productivity occurred in the mean time.

In general, the Senior Supervisor exhibited a high degree of ownership for the behaviors and performance in his areas of Mechanical Maintenance. Areas of concern include:

1. The identification of a "different agenda" between Operations and Outage Planning during the outage, and the severe impact that had on mechanical maintenance effectiveness.
2. The attitude of not "pressing" tagging issues. (This is consistent with other interviews.)
3. The inculcation of old culture to new employees is symptomatic of first line supervision not being present in the field so the new employees are looking to others for leadership.
4. The concern that larger contractors do not implement work standards as well as smaller contractors indicates potential deficiency in contractor management, including control over work standard compliance through performance monitoring and contractual awards and penalties. (This area was not looked into so the aforementioned is only a "possibility")
5. The non-involvement of Senior Supervisors in the selection of first line supervisors may be healthy during the organizational change process, but in the future they should probably be involved.

**Level 2 (confirming) Interview Results and Concerns** - In responding to a lead-off question of what one thing he would change in Maintenance if he could, this Senior Supervisor stated that he would like to see Operations become a "team player". He tied this comment directly to the scheduling issue stating that between Operations and the Planning Section, he had a very difficult time maintaining schedule adherence. He believes that lack of teamwork is the fundamental reason that scheduling does not work at Salem. The impact of emergent work was considered the single biggest problem with the poor scheduling. When challenged on what could be done to reduce rework, this Senior Supervisor stated that the key was better root cause, including input from mechanics. He cited a success story of a service water pump failure root cause performed by mechanics that identified and eliminated a repetitive failure. Later in the interview, he also identified a problem with follow-up on corrective actions identified from root cause analyses. (This is consistent with observations of an interview data on the root cause/corrective action programs.)

Verbatim compliance to procedures is the expectation, but it was felt that procedure problems emanating from the PUP process were impacting the ability to carry out that expectation. Regarding communications, this Senior Supervisor felt that they had improved significantly, referring to the practice of the manager in conducting "skip" meetings. He feels that these communications are effective in helping to turn around negative attitudes in the Maintenance Department. In unsolicited commentary on the unitization effort, it was noted that there are several implementation problems with respect to the impact that it has on the selection of vacations by members of the workforce. But in general, it was felt that unitization was required in order to bring better focus.

We discussed the practice of supervisory field observations. His expectation is that the supervisors would conduct a minimum of one observation every sixty days. He also thinks that it is important that the tough jobs are looked at and not the easy jobs, but does not feel that this is currently the practice. He says that there are observation guidelines, but the expectation on how to make the observations is not clear. With respect to performance appraisals, this Senior Supervisor felt that the present implementation was not effective, although he saw this as getting better. He had a concern that newer workers entering the workforce were biased in their attitudes towards their work by their exposure to older members. Finally, when asked about the organization's response to an excellent QA observation of service water pump maintenance conducted in September which had cited many of the problems identified in the SALP, the interviewee stated that it had been poorly communicated.

This confirming interview with the Senior Supervisor strongly corroborated other interviews. The concerns include:

1. The strong opinion that lack of teamwork on the part of Operations was a major contributor to scheduling problems.
2. Procedure adherence may be being impacted by the procedures upgrade program output.
3. The cited weaknesses in the field observation program with respect to expectations on how observations are to be made and the selection of "easy" jobs to surveil.
4. The observation that follow-up on corrective actions is weak.
5. The passing on of poor culture from older workers to new workers.



6. The poor communication of a very important Quality Assurance observation that offered a large potential for learning.

**Level 3 Interview Results and Concerns** - The Unit Mechanical Maintenance Engineer interviewed was a recent appointee to the job. Because he was new he brought some very unbiased perspectives to the interview. One of the things that he had noted early on in his new job was a lack of face-to-face meetings with first line supervisors. He felt that this was going to be instituted rapidly and that appropriate coaching of the supervisors around their ability to bring change to their organizations would occur. In discussing this, he gave his opinion that the present observation program was adding little value because the results were not being acted on by first line supervisors. He also felt that there was a need for improved training in the performance appraisal process.

The Unit Maintenance Engineer stated that the Senior Supervisors were a key to the Maintenance backlog. He stated specifically that as of the day of this interview (Wednesday), there was no Maintenance work scheduled past the following Tuesday. He noted that there is a process improvement team working on Work Control which includes participation by another Unit Maintenance Engineer. He was of the opinion that they would be utilizing experience from other utilities in determining what improvements should be made. He thought there was a significant disconnect between the way the process is written to be done at present, and the way it is actually being done. Regarding schedule adherence, he was of the opinion that 50% or more of work was not "signed on" at the scheduled start time. He said the reason for this is shared between Operations and Maintenance. It was his opinion that Operations had low accountability to the schedule. When asked if schedule adherence is measured, he stated it was, but that the measurement had little meaning since if work got done in the week it was supposed to get done, it was counted as a success. (I would agree that this is insufficient since it is the DAILY work scheduling conflicts that are impacting Maintenance productivity and the ability of the first line supervisor to focus on the right things in his job.)

In discussing improving repeat maintenance performance, the interviewee indicated that the "text book" answer is the new root cause program. While acknowledging that this is an important part of the solution he stated that it is important that they get "real inputs" from the persons who are involved in events and participation by system engineers in the process. He indicated that a recent realignment in System Engineers to provide a dedicated Maintenance support group was a significant improvement and great help to Maintenance.

Finally, the Unit Maintenance Engineer stated that the key to Maintenance improvement lay with the first line supervisors but right now they were very strapped for supervision due to supervisory training.

While new in his position, this Unit Maintenance Engineer was clearly focused on improvement and had a sound grasp on the fundamentals that were involved. Concerns identified from the interview included:

1. The weak accountability of Operations to the 7-day work scheduling process.
2. Poor adherence to the daily work schedule.
3. The measurement of schedule adherence which tended to minimize the schedule adherence issues which are impacting Maintenance effectiveness. (This is the concern of accomplishing work within the work week versus achieving actual start and end times.)
4. A concern (on my part) that the Work Control process improvements will not aggressively identify, obtain, and implement the best that presently exists in the industry. (There is no basis for this other than the fact that this was the only mention of the process improvement team, and there did not appear to be much "energy" around the topic.)

**Level 4 Interview Results and Concerns - The Mechanical Maintenance Manager** is very new in the position but carries with him extensive experience in leading and managing craft personnel. He has learned that bypass communications directly to craft personnel is a valuable tool. He instituted, for the present, the practice of meeting directly with all craft three times a week. This is critically important at this time since his organization is excessively layered and partially populated by long time incumbents who may not have the same level of commitment to his expectations as he himself does. Feedback on craft personnel receptivity to this communication was found to be very high by the audit team. Additionally he has effectively "flattened" his organization by including Level 2 supervision in his staff meetings.

In starting his job as Manager he interviewed his management/supervisory team to identify what barriers they were experiencing which prevented them from being more effective. The result was consistent with what other interviews in this audit revealed. Near term priorities discussed included response to INPO assist visit findings and addressing "self" identified

issues. The INPO issues include:

1. Weakness in pre-job briefings.
2. Weak root cause analysis.
3. Poor trouble shooting controls.

The corrective action plan includes a schedule, a commitment to have INPO re-evaluate at the end of the year, and a personal goal/commitment to the plant GM to attain an "improved" status. The plan includes the appointment of a "champion" for each area who has the personal accountability to lead the resolution.

The three highest priority self identified issues include:

1. Increased training beyond the bare minimum to accomplish tasks, with an emphasis on Supervisory training,
2. improved communication throughout the organization, and
3. create motivation to come to work.

The Plant GM has agreed to these priorities. The resolution of these issues is being accomplished through a set of goals which are linked to the Business Plan and to individual performance plans. The Manager has also committed to share these goals with craft personnel to gain their support.

Other issues that the Manager sees as concerns include:

1. Poor use of performance evaluations.
2. Imbalances of work load which place the first line supervisor in an impossible situation for meeting all management expectations. For instance, he, the first line supervisor, supervises 12 people with 8 job starts per day.
3. The first line supervisor spends more time in support of the work function than in coaching and counselling.
4. A good root cause program is the key to reducing repeat maintenance.
5. The need for human interaction training - The example given was an adversarial response by craft workers to an individual performing a work observation.

The direction and energy of the manager can support necessary change. He appears to value external observations from INPO and

QA for input to his improvement process. He also uses informal self- assessment to develop lessons learned. Of concern is:

1. The planning/scheduling function does not report to him, yet is critical to his success.
2. In parallel with upgrading the planning function, a paradigm shift will be required within the management team that rigid schedule adherence is the only way to conduct business.
3. The management/supervisory team has excess levels and still has individuals holding expectations associated with a past culture that is not aligned with the correct culture that the new manager is driving for.

#### DETAILS OF SUPPORT FUNCTION INTERVIEWS

**Experience Assessment (Maintenance)** - This interview was conducted with a maintenance support manager, who includes as part of his responsibility, oversight of aspects of the experience assessment process including determinations of reportability within Maintenance. He described a process of organizational learning which combines root cause analysis and corrective action programs not atypical to what would be normally expected at a nuclear utility. Events are identified via criteria and distributed to the appropriate line management to ensure that an evaluation is performed. There is monthly performance monitoring to assure timeliness of evaluations. It was stated, however, that extensions to the program's 30-day deadline can be, and regularly are, extended with permission from low level staff persons. Staff work is done for each investigation to assess similar events which have occurred internally to determine if a repetitive situation is occurring. Other staff work includes trending of causes. If adverse trends are detected, that in itself can be an initiator for another investigation.

At present there are between 300 and 400 incidents under review. In addition, there are 75 LERs and 50-60 SERTs. The general impression is that the numbers are overwhelming the organization. There was no indication of a good process to screen out the best events to learn from, relegating others to tracking only.

The system being used is appropriately comprehensive and is in the process of being further automated. The concerns include:

1. The low level at which extensions can be granted for completing an investigation.

2. The apparent practice of trying to investigate too many events when a few good investigations can yield the same payback.

**Experience Assessment (Nuclear)** - This interview was with a manager who reports directly to the Vice President - Operations and has specific responsibilities in the area of experience assessment. During the course of this interview, there was a very high correlation with the interview of the experience assessment (Maintenance) person. This particular individual had the expanded responsibility of managing the program for the entire nuclear organization. A concern was reported, however, that many supposedly completed reports were returned to him without identified root causes. When this occurs a staff function is initiated to go out, talk to the originator, and determine appropriate causal factors. Good analysis of event data is performed by the nuclear level experience assessment organization, including repeat incident reports. This report is reviewed monthly with line management and is utilized by the site general managers in reporting to executive management. This is a new report and has only been used for reporting twice, but promises to be a powerful tool for correcting more significant problems if it is properly utilized. The interviewee opined that line management interests in using experience assessment data was increasing, particularly since the April 7th event. Analysis of data is also done to identify common causal factors. Again, the program appears to be well thought out and sufficient to support good organizational learning. The following concerns were identified:

1. Causal factor data did not appear to be utilized to identify specific organizational weaknesses, i.e. maintenance mechanical vs. maintenance controls.
2. The program was well exercised on the front end, that is, up until causal factors are identified, however, the return side of the learning curve, the corrective action program, appeared to lack a disciplined approach, closure, and follow-up for effectiveness.

**Experience Assessment (Quality Assurance)** - The Quality Assurance organization has the responsibility for the implementation of a more automated corrective action system. This system runs on the MMIS (a Tena system also used for the work order process). A pilot of this system was operated in the Materials Procurement Section and worked well. Problems encountered included: a) lack of typing skills, b) unfamiliarity with MMIS, c) not user friendly, d) poor training, and e) design deficiencies with the system. The system works in a hierarchical mode with deficiency evaluation forms (DEFs) as the root document

emanating in various other types of incident evaluation reports. Despite the variety of reports, common causal factors are utilized enabling generic deficiencies to be identified despite the type of investigation that is being conducted. Based on comments during the interview, it appears as though sponsorship for the program may need strengthening.

Overall the program appears to be very promising (and extremely similar to a very successful program at PECO run on the same system) and should increase the effectiveness of the experience assessment program. The only concern is:

1. The implementation and use of this new system may overshadow the learning process rather than support it. (i.e. The organization could wind up serving the process instead of the process serving the organization.)

**Planning and Scheduling Manager** - The interviewee was brand new in his job, although it was clear that he already had attained a good understanding of scheduling performance. He stated that the goal was 85% schedule adherence with 10% emergent work. Presently the number is 77% adherence with 25% emergent work (it is not exactly clear how the mathematics work out on this, but that was not considered important). He was of the opinion that emergent work is not a schedule problem. He identified Operations as being the primary priority setters at the station and that scheduling was done in response to their needs. In order to mitigate the impact of adjustments in Operations' priorities, a short term and long term Operations priority list is maintained based on when the work can be started considering restraints such as parts availability etc. This list is maintained in the daily POD print-out. When questioned about potential problems in the area of maintenance planner training, identified in an earlier audit by QA, the response was that QA input on the problem was insufficient to take action. (The problem that had been identified by QA was that JPM qual cards had not been completed.) The manager plans to rely heavily on "feedback sheets". He will use these as a report card on planner performance. Recently he reviewed 150 feedback sheets from the Controls side of Maintenance and found that 50% of the sheets indicated no problems and that the second highest observation was inadequate departmental procedures which is not a part of the responsibilities of his section. He stated that self-assessments conducted by planning are being successful in finding their own problems.

The manager was new in his role and had been aggressive in assessing the problems and performance in the group. The concerns are:

1. The goals for schedule adherence, especially as currently being measured on the basis of work week completion, are far below what will be necessary to improve mechanical maintenance effectiveness.
2. It appears as though the manager has not yet gained the same appreciation for the impact of emergent work on mechanical maintenance effectiveness as the managers in Mechanical Maintenance.
3. The philosophy that the station is "Ops lead" when determining work priorities fails to recognize that a holistic approach to scheduling, i.e. balancing all needs, may produce a safer more effective power plant than being guided solely by the needs of the Operations department. (Obviously there are a subset of operations priorities which are overriding.)
4. The response to the QA question about planner training may be a concern and needs more evaluation. On the surface the problems seems like a simple matter of insufficient completion of qual cards that could be easily assessed and quickly addressed.
5. The fact that the largest cause of problems with work packages was identified by feedback sheets as inadequate departmental procedures should be a significant concern. Chronic procedure problems frequently leads to poor procedure use.

#### MEETING OBSERVATIONS

##### 7:30 All Hands Stand-Up Meeting

The meeting is led by the department manager. It is attended by the entire Mechanical Maintenance Department. About half of the meeting was devoted to individual employee recognition and appeared successful in both reinforcing proper behaviors and improving morale. The meeting leadership was shared with other management. Two negative observations require mention:

1. During a brief talk by a second level supervisor, reference was made to outage performance in general followed by the reinforcing statement that Mechanical Maintenance's performance was "outstanding". There was no attempt at pinpointing the specific behaviors being reinforced so the comment may have had the effect of reinforcing poor outage performance.
2. During a brief talk by a first line supervisor, the entire organization was cautioned to pay close

attention to calibration stickers to ensure that equipment is in calibration. The caution was preceded by the remark that "You may have noticed that QA is here". The clear message was that you pay attention to calibration stickers when QA is looking. No mention was made of the other reasons and benefits of the practice.

The meeting was an excellent example of skip communications. It had only a minor impact on manhours available for Maintenance activities. It was morale building and potentially reinforcing of proper behaviors except as noted. The concern is:

1. Maintenance supervision may be thinking that they are accomplishing the shaping of desired behaviors when in fact they are reinforcing inappropriate ones. They do not appear to have a good understanding of this critical part of their job.

#### Daily POD Meeting:

The POD meeting reviewed the progress which had been made on work that day. It covered a number of other issues regarding priorities and discussed emergent work. There did not seem to be much challenge regarding schedule adherence and neither was much time spent discussing the seven day "look ahead".

The concerns from this meeting were:

1. Lack of challenge with respect to schedule adherence.
2. It appeared as though the seven day "look ahead" schedule does not receive rigorous attention. There were no discussions relative to support of maintenance activities that far in advance.

#### OBSERVATIONS ON THE QA INTERFACE

There is a historical record of the line organization being unresponsive to QA input. Observation MAINT-002 (SWSOPI) reported on 09/27/94 contained concerns which were later cited in the SALP report. These included poor job preparation and implementation, poor safety practices, insufficient pre-job briefing, insufficient procedural guidance, lack of attention to detail, and poor inter-department cooperation, all resulting in extended equipment out of service time. There was enough learning potential in this one document to begin addressing most of the departmental issues. In the future, the line organization



must value this kind of input as an opportunity to improve. This appears to be the conviction held by the present Mechanical Maintenance Manager. QA was not effective in obtaining the attention or commitment of the management to which they report to initiate change in the line organization. This also appears to be changing under new management. The concern is:

1. Portions of the Salem management/supervisory team have spent an extended period of time under a QA interface paradigm that does not utilize the QA output as a significant vehicle to learn and improve.
2. In the past, QA did not issue findings and follow-up on the effectiveness of corrective actions when they should have. Observation MAINT-002 (SWSOPI) is a good example. It was very challenging and contained a number of findings that should have been documented as Action Requests to assure that a corrective action process with accountability was followed.

#### CONCLUSIONS

The following general conclusions were formulated from a review of the concerns from each interview. It is important to recognize that these conclusions are based on interview results and not documented historical data. However, the conclusions are only drawn on well corroborated interview information:

1. Scheduling - Poor performance in the area of scheduling and schedule adherence are significantly impacting Maintenance effectiveness. This problem is resulting in wasted resource and diversion of supervisory attention away from activities that will be required to improve the work culture. The poor performance in this area is being sustained and reinforced by a method of measuring performance which does not assess the real problem. Presently, schedule adherence success is noted if work gets done in the same week in which it was scheduled, but the real impact of poor scheduling and schedule adherence is the failure to achieve start and finish times when the schedules said they would occur.

Operations is frequently cited as being the major contributor to the scheduling of emergent work. The station regards itself as "Operations centered" and persons having responsibility for schedule adherence seem to regard perturbations in the schedule as inevitable. There was no evidence from any of the

interviews that a concerted effort was being made to determine what the emergent work was really composed of.

Services such as HP support, tagging, crane support, security, scaffolding, etc. which should be successfully scheduled are not, requiring first line supervision to perform last minute preparations to get work started. In general, interview data indicated a lack of commitment to schedule adherence by support groups. The role of Operations in supporting the schedule by clearance application was particularly noted as experiencing difficulty.

2. Leadership - Leadership in the workforce is vested in the older workers instead of in the first line supervisors. The first line supervisors devote much of their time to rearranging work and obtaining support services instead of exercising their leadership responsibilities. The manager is bringing management leadership back into the organization by using "skip" meetings on a very frequent basis. Ultimately, however, the first line supervisors must understand this as their primary responsibility and recapture the leadership that belongs to them. Two things that are presently preventing that are poor scheduling and their own paradigm regarding their role.
3. Communications - As was identified in a number of interviews, communications has improved significantly in recent months. Most frequently cited was the "skip" level meetings held by the Maintenance Manager. This is an important improvement in the short term to support organizational change. In the long term "skip" level communications should be more in support of regular line communications and not substituting for it. Communications through the present line organization will be diminished by the number of layers of organization between the manager and the first line supervisor. The present Mechanical Maintenance organization has a number of 1 over 2 or 1 over 3 relationships (in levels 2 and 3) which may be necessary to support the activity generated by dysfunctional scheduling. In the past, important Quality Assurance observations were not communicated through the line organization. In conjunction with the fact that QA did not typically issue findings, important learning opportunities were eliminated. Observations of first and second line supervision communicating to the organization, and the results of interviews, indicate that lower levels of the Maintenance management/supervisory team have more to

learn about the use of communications in shaping human behaviors.

4. Organizational Learning - There is strong alignment throughout the management team that good causal factor analysis is the key to improving performance in the area of repeat maintenance. There were a number of successes identified in the interviews and some level of frustration. It appeared to the evaluator that there may be a focus on serving the system rather than learning. There appears to be an expectation that all events are pushed through "the process" instead of gathering the important learnings from a few significant events and using the rest of the data for performance monitoring.

The failure to aggressively follow-up on minor tagging errors is particularly disturbing because of the safety impact that these errors can potentially have. A similar situation was identified from one interview relative to incorrect procedures being found on a repetitive, albeit infrequent, basis in work packages.

5. Procedure Usage - The management expectation for procedure usage was very clear and strongly held throughout the management organization. A review of interview data from Corrective Action Assessment QA-PA-94-002 indicates that this expectation is also strongly held by the workforce. This strong understanding of the expectation notwithstanding, the SALP report identified procedure adherence and procedure adequacy as problem areas. Similarly, QA observation MAINT-002 issued on September 27, 1994 identified procedure adherence problems. Interview data, particularly at the first and second levels of Maintenance supervision, identified problems with procedure quality and consistency which generated frustrations in the workforce. This was not linked explicitly to the identified problems of procedure adherence, but is undoubtedly linked to that issue.

6. Field Observations (Self-Assessment) - No one in the interview process felt that the field observation process was working well. A number of reasons given included:

- a) Management expectations on how the observations were to be conducted were not clear.
- b) Observers tended to go with the "easy" work and not observe the more challenging assignments.

- c) First line supervision did not follow-up on the results of the observations.
- d) The expectation held for the frequency of observations seems low. Further, while identifying Observation as a program may be important during this organizational change process, there should be an understanding that it is imbedded in the first line supervisors job and that the rest of the management team occasionally utilizes it to verify that management expectations are being carried out.

The problems with the observation program may indicate a weakness in management sponsorship and top down coaching by mechanical maintenance managers.

- 7. General - As a general observation, the managers which are being put into place in mechanical maintenance understand the issues and have the energy and understanding of the methods which must be used to bring about change. It will be very important that they focus on the most important issues to improve initially. There remains within the supervisory management team some old attitudes, but the current practices used for selecting new supervision, BLD training, and the improved use of performance reviews should easily correct this. An issue which surfaced in two interviews centered on the rapid change in personnel that has occurred with the organization in recent years. While that is necessary to get the right people and organization in place, it can also be having a negative impact on the effort to institute a new culture.

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## Attachment 2

### Types of Self-Assessments

*Routine Self-Assessment:* Those activities performed by the individual, supervisor, and organization on an ongoing basis to assure that management's expectations are met. This promotes work being performed correctly the first time.

*Periodic Self-Assessment:* A point in time when the organization steps back and assesses its work against the standards which support management expectations and the organization's mission. The goal is to determine if *Routine Self-Assessments* were successful. The *Periodic Self-Assessment* is a retrospective look to determine the extent to which work activities comply with requirements and work activities were efficient and effective.

*Preemptive Self-Assessment:* Those actions done prior to a significant evolution or change to ensure the plans address all the potential problems that can be expected. The *Preemptive Self-Assessment* is a prospective look to ensure a planned evolution or change can be successfully accomplished and the activities can be done correctly when they are scheduled to occur.

*Reactive Self-Assessment:* When an outside assessment agency identifies a problem that the responsible organization had not identified or when a situation occurs that is unexpected, the organization not only needs to determine the root causes of the issue, but it also needs to determine why its own self-assessment did not discover the issue. The *Reactive Self-Assessment* is performed when the work is not done correctly the first time and the organization did not self-identify the condition.

### Self-Assessment Programmatic Components<sup>1</sup>:

1. Is the purpose/mission (products, services, results) defined?
2. Are the customers, requirements and expectations defined?
3. Are the product/processes/activities that are key to the success of the organization identified?
4. Are the key measures of success (obtained from customer input and outside benchmarking) determined for:
  - Effectiveness
  - Efficiency
  - Compliance
5. Is a plan developed for who/how/when to assess progress for each key activity of success including:

- Training needs for the individuals/team (roles of players, interviewing techniques, root cause analysis, collection of information, etc.)
  - Sources of data (internal, external, peer and customer sources) to determine information needs and personnel to be interviewed
  - Methods established to collect data
  - Methods and criteria established to evaluate data
  - Performing real-time observations
6. Are the self-assessment plans implemented and performed using the desired techniques?
  7. Is the data consolidated, checked for inconsistencies, and followed up as needed?
  8. Is the actual performance compared to desired level of performance to identify gaps?
  9. Are the results categorized (strengths, weaknesses, etc.) in relation to:
    - Selected products, services or activities, and
    - Self-assessment processes and techniques
  10. Are reviews conducted for appropriate challenge and buy-in of results obtained?
  11. Is sponsorship obtained for corrective action plans?
  12. Are issues entered into the appropriate tracking or corrective action system including:
    - Identification of interim or compensatory actions
    - Determination of causal factors and generic implications
    - Identification of corrective actions to prevent recurrence
    - Prioritization and assignment of corrective actions
  13. Are successes celebrated?
  14. Are action plans developed to close gaps in performance?
  15. Are results documented within the group and conveyed to appropriate levels of management?
  16. Are corrective actions tracked to closure?
  17. Are follow-ups performed to determine corrective action effectiveness?
  18. Are future plans determined to revisit the area assessed?

TO: Nuclear Support &amp; Services Department (Nuclear Department Welding Engineer)

RESPONSE DUE: February 27, 1995

Audit No. 95-142

Checklist No. 6

Page 1 of 2

## FINDINGS:

The Nuclear Department Welding Engineer maintains welder continuity verification based upon dates that weld filler material is issued rather than the date that a welder performs welding.

## DISCUSSION:

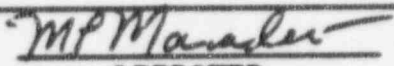
During interviews with maintenance department supervision, the following observations were made:

- \* Salem and Hope Creek Generating Station welder continuity identification is based upon the Stockroom Material Issuance Production slip provided by stockroom personnel during weld material issuance. The information contained on these records includes identification of Inspection Release Tags, welder designation and name and is given to the responsible maintenance supervisor for use during completion of the welder continuity matrix.

The use of this method for identifying welder continuity does not provide assurance that a welder has actually completed a welding process during a specified period of time and consequentially may result in the use of non-qualified personnel to perform welding activities.

## CORRECTIVE ACTION:

Identify the breakdown of the levels in defense of quality to identify appropriate corrective action. In addition, increased attention to this area in the self assessment processes is suggested.


  
ORIGINATOR
2/1/95  
DATE

  
APPROVED
2/3/95  
DATE

## RESPONSE EVALUATION

SAT. CLOSED \_\_\_\_\_ UNSAT. \_\_\_\_\_

APP. B CRITERION \_\_\_\_\_

EVALUATED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

SAT./TO BE VERIFIED \_\_\_\_\_

CAUSE CODES:

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

TO: Nuclear Support & Services Department (Nuclear Department Welding Engineer)

RESPONSE Due: February 27, 1995

Audit No. 95-142

Checklist No. 6

Page 2 of 2

**REFERENCES:**

1. Nuclear Department Repair Program Manual, Section 9: Control of Processes Paragraph 9.2.2.4 (b) states the following:

"The Maintenance Supervisor or Project Manager from the Repair Group is responsible for selecting and assigning welders to perform welding operations and for assuring that selected individuals are currently qualified for the process to be employed."

2. PSE&G's Welding & Brazing Manual, Section 3: Control of Welder Performance Qualification Paragraph 5.1 (e) states the following:

"Maintain welder requalification system to ensure welders, once qualified, remain qualified by active welding or requalify by the methods described in the ASME Code."

**DISTRIBUTION:**

Director - QA/NSR  
Manager - NSR  
Manager- Site Services  
Manager- Station QA Sales  
Manager- Station QA Hope Creek  
Response Coordinator - QA Audits  
QA Analysis  
AR File



TO: Nuclear Support &amp; Services Department (Nuclear Department Welding Engineer)

RESPONSE DUE: February 27, 1995

Audit No. 95-142Checklist No. 6Page 1 of 2

## FINDING:

The following conditions were noted by the technical specialist during maintenance audit 95-142. The Nuclear Department Welding & Brazing Manual was reviewed with the following conditions identified:

Welding Procedure Specification (WPS) 48 is supported by Welding Procedure Qualifications (PQR) 137 and 190.

- \* PQR 137 supports a maximum deposited SMAW weld thickness of 3/4". The WPS does not limit the allowable weld metal deposit via the SMAW process. The WPS does indicate using E6010 for open root, Page 2 amperage range section does not limit the number of SMAW weld passes.
- \* PQR 137 supports a base metal thickness range of 1/16" (0.062") to a maximum of 3/4" (0.750") (QW-451/QW-200.2(f), QW-200.4) but the WPS allows use on material up to 8" thick.
- \* PQR 190 supports a base metal thickness range of 3/16" (.1875") to a maximum thickness of 8". The WPS specifies it may be used on material as thin as 1/16" (0.062")
- \* WPS page 2 allows the use of 3/32" (0.09375") to 5/32" (0.15625") E-6010 electrodes in the amperage range of 60 to 100 amps. The use of these ranges combined with the electrode size is outside those practical to yield welds of acceptable quality.

The previously identified observations indicate inattention to detail and consequentially may result in the production of welds outside the boundaries of quality if utilized.

*SF*  
*J.R. O'Neil*  
ORIGINATOR

*2/1/95*  
DATE

*Mark Mander*  
APPROVED

*2/4/95*  
DATE

**RESPONSE EVALUATION**

SAT. CLOSED \_\_\_\_\_ UNSAT. \_\_\_\_\_

APP. B CRITERION \_\_\_\_\_

EVALUATED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

SAT./TO BE VERIFIED \_\_\_\_\_

CAUSE CODES:

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

TO: Nuclear Support & Services Department (Nuclear Department Welding Engineer)

RESPONSE DUE: February 27, 1995

Audit No. 95-142

Checklist No. 6

Page 2 of 2

**CORRECTIVE ACTION (Cont'd)**

Identify the breakdown of the levels in defense of quality in order to identify appropriate corrective action. In addition, determine the locations these materials may have been used with further consideration given to consequences and issues of reportability. Evaluate the consequences of the identified discrepancies.

Identify the means to preclude future similar occurrence and the measures to preclude recurrence.

**REFERENCES:**

ASME Section IX, 1986 ed. Paragraph QW-100.1, QW451/QW-200.2 (f), and (QW-200.4).

**DISTRIBUTION:**

Director - QA/NSR  
Manager - NSR  
Manager- Site Services  
Manager- Station QA Salem  
Manager- Hope Creek QA  
Response Coordinator - QA Audits  
QA Analysis  
AR File

TO: E. Harkness - Maintenance Engineer

RESPONSE DUE: 3/01/9

Audit No. 95-142

Checklist No. 1

Page 1 of 3

**REQUIREMENT:**

**Appendix B Criterion V. "INSTRUCTIONS, PROCEDURES, AND DRAWINGS"**

"Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings...."

**Appendix B Criterion VI. "DOCUMENT CONTROL"**

"... These measures shall assure that documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and are distributed to and used at the location where the prescribed activity is performed..."

**DISCUSSION/FINDING:**

Contrary to the above requirements the following concerns were observed during the in-process observation of workorder # 950111114 for the 13 Charging Pump Repacking Job. Maintenance personnel assigned to this job were draining lubricating oil from the charging pump case using procedure SC.MD-CM.CVC-0005(Q) rev. 3. During an audit review of the procedure at the job site, the QA representative noted that no instructions existed for draining the oil. The Maintenance Technician performing the task appeared to be knowledgeable in the steps necessary to drain the oil. No apparent discrepancies were observed.

A follow up discussion was held with the Maintenance Supervisor to address the concern regarding the lack of instruction in the procedure. The supervisor noted that a revision (rev. 4) was in progress to add the instructions regarding the draining of the oil from the pump. The supervisor had also placed an asterisk next to step 5.3.5 in the existing procedure (rev. 3) that would logically be the point at which the oil was to be drained. This asterisk and related steps were discussed with the technicians during the pre-job brief. This was confirmed by the QA representative during a post job discussion with the technician who had performed the task. The supervisor did not feel that instructions necessary to inform the technicians as to how to drain the oil, that was within the "skill of the craft".

Continued

W. Williams / S. Lawrence  
ORIGINATOR

2/3/94  
DATE

NIP Mander  
APPROVED

2/7/95  
DATE

**RESPONSE EVALUATION**

SAT/CLOSED \_\_\_\_\_ UNSATISFACTORY \_\_\_\_\_

SAT/TO BE VERIFIED \_\_\_\_\_

APPENDIX B CRITERION V, VI

CAUSE CODES: D

EVAL BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED: \_\_\_\_\_

DATE: \_\_\_\_\_

AR Continuation form: Audit No. 95-147 Checklist No. 1 Page 2 of 3**DISCUSSION/FINDING Cont.**

The supervisor also did not believe a field change adding instructions for draining the oil were necessary due to the low risk associated with this particular step in the overall job.

However, during a follow up discussion with the Maintenance Supervisor, the QA representative questioned the lack of instruction in rev. 3 of the procedure regarding the refilling of the pump with oil. The Maintenance Supervisor confirmed the lack of instructions for refilling the pump with oil including whether or not to reuse the drained oil were essential steps to the job completion. A review of the proposed revision 4 to the procedure confirmed that these steps were identified to be added. The Maintenance Supervisor stated that the fill instructions were critical to the existing procedure and would, therefore, have the new procedure (rev. 4) issued to the field prior to refilling the #13 charging pump with oil.

A procedure revision was in process that addressed the deficiencies noted above. Previous discussions with the Maintenance Supervisor concluded that the troubleshooting and repacking of the charging pump was not considered a critical path job. The decision of the supervisor to proceed into the job without waiting for the issuance of the revised procedure is not a good work practice. Nor is the fact that the technicians were willing to work the job without proper instruction. This represents a breakdown of the first and second levels of defense of quality (worker, supervisor).

Further discussion with the Maintenance Manager, indicated that the activity for refilling of the pump oil was considered to be an operations responsibility not maintenance. Without a clear understanding as to who is responsible for the refilling of the oil, the potential exists that the pump could be returned to service without the oil being replaced resulting in damage to the pump.

The lack of instructions in the existing revision 3 to procedure SC.MD-CM.CVC-0005(Q) is an apparent violation of 10CFR50 Appendix B criterion as previously stated. Similar deficiencies in procedural adequacy have been noted by the USNRC and INPO evaluations in the past.

**CORRECTIVE ACTIONS:**

Your evaluation and response to this Action Request is to address the following as a minimum:

- Determine who has the responsibility to refill the pump with oil. Update the appropriate documentation as necessary to define this responsibility (procedure revision, addition of work order activity, etc.)
- Determination of cause for the breakdown of the first and second levels of defense and actions to prevent recurrence including the decision to proceed without the revised procedure.

Continued

TO: E. Harkness - Maintenance Engineer

RESPONSE DUE: 3/01/9'

AR Continuation form: Audit No. 95-142 Checklist No. 1 Page 3 of 3**CORRECTIVE ACTIONS Cont.:**

- Take immediate actions to resolve the identified procedural inadequacies.
- Evaluation as to whether this type of work was previously performed without appropriate procedural guidance for draining and refilling of pump oil. Also, determine whether any operability concerns exist due to the lack of instruction for refilling the pump with oil.

**ACTION REQUEST DISTRIBUTION:**

General Manager - Salem Operations  
Director QA/Nuclear Safety Review  
Manager - QA Programs & Audits  
Manager - Station QA - Salem  
Manager - Station QA - Hope Creek (Acting)  
Manager - Nuclear Safety Review  
Maintenance Manager - Salem - Mechanical  
Principal Engineer - QA Audits  
Action Request File  
Stairs

TO: Nuclear Engineering Department (Manager Special Projects)  
 RESPONSE DUE: February 27, 1995

Audit No. 95-142Checklist No. 6Page 1 of 3

## FINDINGS:

Weld filler material located within United Engineers and Constructors (UE&C) weld filler material storage area is not being controlled in accordance with Procurement and Material Control Department procedures and PSE&G's Welding and Brazing Manual requirements. This finding exhibits a lack of control of weld filler material and consequentially may result in the use of inadequate filler material within safety and non-safety related systems.

## DISCUSSION:

1. During the Mechanical Maintenance audit a walkdown was conducted at the Contractor Fabrication Shop located on the Salem Generating Station side on January 27, 1995 and yielded the following observations:

a) The UE&C and Bechtel Engineering weld filler material resides within two separate locked cages located at the rear of the building.

- \* The weld filler material located within the UE&C cage is locked, however, access appears to be non-restricted due to the identification of the cage's lock combination within the immediate vicinity. An attempt to obtain access to Bechtel's cage using combinations displayed within the vicinity yielded no successful entry.

b) An investigation of the contents of UE&C cage identified the following:

- \* Two open cans of weld electrodes requiring oven retention was observed being stored outside of an operating oven environment. This material was identified as American Welding Society (AWS) Classification 1/8" E309-16, Heat Number 33537 and 1/8" 9018B31 P.) No. 0428585 and E309-16 Heat No. 33537.

*John R. O'Neil*  
 ORIGINATOR

*2/1/95*  
 DATE

*Mark Mander*  
 APPROVED

*2/1/95*  
 DATE

## RESPONSE EVALUATION

SAT. CLOSED \_\_\_\_\_

UNSAT. \_\_\_\_\_

SAT./TO BE VERIFIED \_\_\_\_\_

APP. B CRITERION \_\_\_\_\_

CAUSE CODES:

EVALUATED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

TO: Nuclear Engineering Department (Manager Special Projects)

RESPONSE DUE: February 27, 1995

Audit No. 95-142Checklist No. 6Page 2 of 3

## CORRECTIVE ACTION:

Immediate corrective action was taken by UE&C personnel to correct the deficiency by removal and discarding the identified weld filler material.

The maintenance of weld filler material control in accordance with the stated observations constitutes conditions adverse to quality. Identify the breakdown of the levels in defense of quality in order to identify appropriate corrective action. In addition, determine the locations these materials may have been used with further consideration given to consequences and issues of reportability.

Identify the means to preclude future occurrence and the necessary measures to prevent recurrence.

## REFERENCE:

The following identifies the reference document and stated requirement which has been compromised. The number and alpha designation identified refer to the corresponding discussion

1(a) ND.PM-AP.ZZ-0300(Q) Rev. 4 : "Storage & Handling of Materials", paragraph 4.1.5 states the following:

"Access to storage areas should be controlled to prevent theft and uncontrolled issuance of material."

1(b) ND.PM-AP.ZZ-0300 (Q) Rev. 3, Paragraph 5.2.2 states the following:

"Welding electrodes that deteriorate from the effects of moisture are purchased in air tight metal cans. Once opened, the electrodes should be stored in heated ovens to prevent the absorption of moisture. Exhibit 3, Classification and Storage Requirements for Welding Electrodes, identifies the opened can storage requirements for each AWS classification."

TO: Nuclear Engineering Department (Manager Special Projects)

RESPONSE DUE: February 27, 1995

Audit No. 95-142Checklist No. 6Page 3 of 3

## REFERENCES (cont'd):

1(b) ND.PM-AP.ZZ-0400 Rev. 1, Paragraph 5.5.6 states the following:

"The Storekeeper shall maintain opened cans of weld rods requiring heated storage in ovens in accordance with PM-AP.ZZ-0300 (Q)."

1(b) PSE&G's Nuclear Department Welding & Brazing Manual, 8.7 states the following:

"Heated portable electrode holding ovens of approximately 10 pounds capacity shall be located by the welder at the welding location for the purpose of storing covered electrodes of the low hydrogen type. The oven top is to remain in the closed position and shall only be opened for the removal of rods that are immediately deposited in a weld joint. The heating element of the portable oven shall be set and capable of maintaining a temperature of 125 to 350 degrees fahrenheit with the lid closed. A calibration sticker shall be affixed to the oven ensuring that the oven has been calibrated within twelve (12) months of usage."

1(b) HC.MD-AP.ZZ-0151 (Q) Rev. 9 "Department Control Of Welding", Paragraph 5.3.3 states the following:

"Low Hydrogen electrodes shall be stored in heated ovens after the original containers have been open. Electrodes shall be segregated and identified while in ovens to maintain traceability to heat and lot numbers. The temperature of the ovens shall be maintained in accordance with the applicable section of the ASME code, and using manufacturer's guidelines."

## DISTRIBUTION:

Director- QA/NSR

Manager- Nuclear Engineering Projects

Manager- Special Projects

Manager-NSR

Manager- QA Programs &amp; Audits

Manager-Station QA Hope Creek

Manager Station QA Salem

QA Audit Response Coordinator

QA Analysis

AR File



Audit No. 95-142      Checklist No. 6      Page 1 of 4

**DESCRIPTION:**

**FINDINGS:**

Weld filler material was not controlled in accordance with Procurement and Material Control Department procedures and PSE&G's Welding and Brazing Manual requirements at Salem and Hope Creek Generating Station Storerooms. These findings exhibited a lack of control of weld filler material and consequentially may result in the use of inadequate filler material within safety and non-safety related systems. In addition, the use of misrepresented weld electrode heat numbers may result in the loss the material traceability.

**DISCUSSION:**

Contrary to stated procedure requirements (reference requirements) the following observations were made:

1. A mechanical maintenance audit welding material walkdown was conducted at Hope Creek Generating Station's Storeroom facility on January 25, 1995 and yielded the following observations:
  - a. An open can of weld electrode requiring oven retention was observed being stored outside of an operating oven environment. This material was American Welding Society (AWS) Classification 3/32" ENiCrMo-3 (Category 60 6719), Heat Number 8C1C-1A.
  - b. The observed can's associated Inspection Release Tag indicated category number, AWS classification, purchase order number (0245409-0000). An indication of the associated Heat Number was not apparent.

*SF*  
John R. O'Neil  
ORIGINATOR
2/1/95  
DATE
Mark Mendenhall  
APPROVED
2/14/95  
DATE

<p> <input type="checkbox"/> SAT/CLOSED      <input type="checkbox"/> SAT/TO BE VERIFIED  <input type="checkbox"/> UNSATISFACTORY      APPENDIX B CRITERION <input type="checkbox"/> </p> <p>CAUSE CODES:</p> <p>EVAL BY: _____ DATE: _____</p> <p>APPROVED: _____ DATE: _____</p>	<p>DISTRIBUTION:</p>
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Audit No. 95-142Checklist No. 6Page 2 of 4DISCUSSION (Continued):

- c. A review of the procedure's Exhibit 3 indicated ENiCrMo-3 (ASME Classification SFA-5.11) type electrodes as an indefinite maximum exposure time.
2. A mechanical maintenance audit welding material walkdown was conducted on January 24, 1995 at the Salem Generating Station Storeroom facility and yielded the following observations:
- a. 3/32" ENiCrMo (Category 606728) Weld rod available for dispensing resided within Bins #22 and #24.
- b. Bin 22 possessed a corresponding Inspection Release Tag indicating Heat No. 6325. The residing rod material indicated heat number 6152 as evidenced by the flag tags attached to the rod.
- c. Bin 24 possessed a corresponding Inspection Release Tag indicating Heat No. 6325. The residing rod indicated a mixture of heat numbers 6152 and 6325 as evidenced by the flag tags attached.
- d. An investigation of the Inspection Release Tags enclosed within the cabinet indicated no evidence of a Inspection Release Tag having been prepared for heat number 6152 material.

A review of Work Order No. 950109110 activities occurring within the Salem Maintenance Shop indicated that weld filler material possessing the same similar heat numbers may have been issued for this task.

CORRECTIVE ACTION:

Immediate corrective action was taken to correct the deficiency by sorting, removal and discarding of the affected material. The maintenance of weld filler material in accordance with the stated observations constitutes condition adverse to quality.

Identify the breakdown of the levels in defense of quality in order to identify appropriate corrective action. In addition, determine the locations these materials may have been used with further consideration given to consequences and issues of reportability.

Audit No. 95-142Checklist No. 6Page 3 of 4

## DESCRIPTION:

CORRECTIVE ACTION (Continued):

Identify the means to preclude future occurrence and the necessary measures to preclude recurrence.

REFERENCE:

The following identifies the referencing document and stated requirement having been compromised as a result of the observations made. The number and alpha designation identified refer to the corresponding discussion

- 1(a) ND.PM-AP.ZZ-0300(Q) Rev. 3, Paragraph 5.2.2 states the following:

"Welding electrodes that deteriorate from the effects of moisture are purchased in air tight metal cans. Once opened, the electrodes should be stored in heated ovens to prevent the absorption of moisture. Exhibit 3, Classification and Storage Requirements for Welding Electrodes, identifies the opened can storage requirements for each AWS classification."

- 1(a) ND.PM-AP.ZZ-0400 Rev. 1, Paragraph 5.5.6 states the following:

"The Storekeeper shall maintain opened cans of weld rods requiring heated storage in ovens in accordance with PM-AP.ZZ-0300(Q)."

- 1(a) PSE&G's Nuclear Department Welding & Brazing Manual, 8.7 states the following: "Heated portable electrode holding ovens of approximately 10 pounds capacity shall be located by the welder at the welding location for the purpose of storing covered electrodes of the low hydrogen type. The oven top is to remain in the closed position and shall only be opened for the removal of rods that are immediately deposited in a weld joint. The heating element of the portable oven shall be set and capable of maintaining a temperature of 125 to 350 degrees fahrenheit with the lid closed. A calibration sticker shall be affixed to the oven ensuring that the oven has been calibrated within twelve (12) months of usage."

Audit No. 95-142Checklist No. 6Page 4 of 4

## DESCRIPTION:

REFERENCE (Continued):

- 1(a) HC.MD-AP.ZZ-0151(Q) Rev. 9 "Department Control of Welding", Paragraph 5.3.3 states the following:

"Low Hydrogen electrodes shall be stored in heated ovens after the original containers have been open. Electrodes shall be segregated and identified while in ovens to maintain traceability to heat and lot numbers. The temperature of the ovens shall be maintained in accordance with the applicable section of the ASME code, and using manufacturer's guidelines.

- 1(b), 2(b), ND.PM-AP.ZZ-0400(Q) "Issuance of Materials", Paragraph 5.5.7  
2(c), 2(d) states the following:

"Stockhandlers shall not issue welding rods from different heat or lot numbers against a single class/ code and shall issue only one class/ code against a single SMIP."

- 1(a) HC.MD-AP.ZZ-0151(Q) Rev. 9 "Department Control of Welding", Paragraph 5.3.1 state the following:

"Welding materials shall be identified at all times as to electrode coding (when applicable), classification, and manufacturers heat or lot number which is recorded on the materials issue slip at time of issues."

Distribution:

Director - QA/NSR  
General Manager - Nuclear Support & Services  
Manager - NSR  
Manager - QA Programs & Audits  
Manager - Station QA (Hope Creek)  
Manager - Station QA (Salem)  
QA Audit Response Coordinator  
QA Analysis  
AR File

Audit No. 95-142

Checklist No. 1

Page 1 of 3

**DESCRIPTION:**

**FINDING:**

Maintenance Department personnel did not adhere to procedural requirements as delineated in NC.NA-AP.ZZ-0038 and NC.NA-AP.ZZ-0009.

**DISCUSSION:**

The following discrepancies were noted during Audit 95-142 while observing Mechanical Maintenance Technicians in the process of making repairs under Work Order 941004105. The "B" EHC Fullers Earth Filter system cover was observed to be leaking. The procedure being used for this activity was HC.MD-CM-CH-001(Z), Revision 9.

**ITEM A**

The Maintenance supervisor directed the technicians to use glue (Loctite Quickset 404) to hold the gasket in place during the assembly process, however, the procedure did not call for the gasket to be glued in place prior to assembly. Loctite Quickset 404, which had a usage class 5 sticker on it, was provided to the technicians by the supervisor. Usage class 5 is to be removed from surfaces prior to returning a component to service, however, this material was not removed from the component and consequently could be introduced into the EHC System.

The supervisor was questioned why the material was not removed. He stated that NC.NA-AP.ZZ-0038 usage classes only applied to reactor systems.

CICP 200-0184, which is for Loctite Quickset 404, was subsequently reviewed in the SACL. The CICP classification identified is usage class 3, not usage class 5, and may not be used in direct contact with plant system, and may not be drained or flushed to plant waste processing systems.

John Eggenhoffer  
ORIGINATOR

2/13/95  
DATE

MPM  
APPROVED

2/13/95  
DATE

\_\_\_\_ SAT/CLOSED      \_\_\_\_ SAT/TO BE VERIFIED  
\_\_\_\_ UNSATISFACTORY      APPENDIX B CRITERION \_\_\_\_

CAUSE CODES:

EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

DISTRIBUTION:

Audit No. 95-142Checklist No. 1Page 2 of 3DESCRIPTION:REQUIREMENT:

1. CICP No. 200-0184
2. NC.NA-AP.ZZ-0038(Q), Rev. 2, Paragraph 5.3.1.a:

"The Work Supervisor or Planner verifies all aspects of the CICP are addressed and that the mechanisms for the planned use are within the limitations of the CICP."

ITEM B

The Maintenance Supervisor directed the Technicians to torque the EHC system cover to 100 foot pounds. The supervisor was questioned as to where the torque value came from as it was not in the procedure. He stated that the value came from the vendor and that a procedure revision, to include the torque values, was submitted in October 1994. The procedure, being used in the field was issued in November 1994, was the current revision and did not include specific torque values.

Instruction was provided to the Technicians which violated NC.NA-AP.ZZ-0009 in that the implementing procedure should have been revised to specify the torque value prior to continuing the work.

NOTE: The Technicians did question their supervisor if a procedure change was required, he told them no.

REQUIREMENT:

NC.NA-AP.ZZ-0009(Q), Revision 7, Paragraph 5.1.1.d states in-part: "If the procedure is incorrect, the procedure shall be corrected prior to resuming the work."

CORRECTIVE ACTION:

Evaluate this Action Request with respect to the breakdown of the Levels in the Defense of Quality in order to identify and implement appropriate corrective action.

DESCRIPTION:

DISTRIBUTION:

General Manager - H.C. Operations  
Director - QA/NSR  
Manager - Station QA - HC  
Manager - NSR

Response Coordinator - QA Audits  
QA Analysis  
AR File

Audit No. 95-142

Checklist No. 1

Page 1 of 2

DESCRIPTION:

Finding:

Socket weld fit-up has been accepted and signed-off as a Supervisor Hold Point prior to the fit-up tack welds being performed. Consequently, socket weld fit-up may be altered prior to the tack welding resulting in an unacceptable fit-up.

Discussion:

During Mechanical Maintenance Audit 95-142, the Supervisor Hold Point for socket weld fit-up was observed. The fit-up was accepted prior to tack welding. When questioned the Maintenance Supervisor stated that he routinely performs fit-up inspections in this manner, i.e., prior to tack welding. Note in this instance, the scribed lines were subsequently verified and the "pull-back" was acceptable. This was indicative of good performance by the first line of defense, the welder, in ensuring correct fit-up.

Corrective Action:

Evaluate the extent of possible unacceptable socket welds relative to the supervisor's statement on socket weld fit-up and the immediate impact to the overall acceptability of Maintenance Department practices relative to welding requirements.

Analyze this finding with respect to the Levels in Defense of Quality in order to identify and implement effective Corrective Action.

SFWP874

SR  
Russ Merendino  
ORIGINATOR

2/10/95  
DATE

MP Mander  
APPROVED

2/13/95  
DATE

SAT/CLOSED  
 UNSATISFACTORY  
CAUSE CODES:  
EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

SAT/TO BE VERIFIED  
APPENDIX B CRITERION \_\_\_\_\_

DISTRIBUTION:



DESCRIPTION:

Requirement

Nuclear Department Welding and Brazing Manual, Section 1 Rev. 4  
Section 8.3.5 Socket Weld Joints

Section 8.3.7 Fit-up inspection  
Enclosure 5

Note:

This finding and the practices employed at Salem were discussed with the Salem Maintenance Senior Supervisor. No concerns relative to Salem were identified; however, the Senior Supervisor committed to providing a "refresher" discussion with Salem Maintenance personnel.

Distribution:

General Manager - Hope Creek Operations  
General Manager - Salem Operations  
Salem Maintenance Manager - Mechanical  
Nuclear Department Welding Engineer  
Director - QA/NSR  
Manager - NSR  
Manager - Station QA (Salem)  
Manager - Station QA (Hope Creek)  
Response Coordinator - Hope Creek  
Response Coordinator - QA Audits  
QA Analysis  
AR File

Addl No. 95-142

Checklist No. 1

Page 1 of 3

DESCRIPTION:

Finding:

NC.NA-AP.ZZ-009(Q) requires that work that can affect the performance of equipment classified as Q...at Hope Creek...should be performed in accordance with approved directives, procedures and instructions. Paragraph 5.1.1.d requires that if the procedure is incorrect the procedure shall be corrected prior to resuming work. The following deficiencies were noted:

Work Order/Activity: Work Order 940306105, "A" EDG Lube Oil Keep Warm Pump Inspection, - Date: February 2, 1995.

- Procedure HC.MD-CM.KJ-004(Q) approved and issued to the field was inadequate to provide necessary instructions to assemble the pump following component repair.
- The prestaged Idler Pin replacement part provided for repair was incorrect. The Pin was not for the pump installed on Hope Creek's EDG.
- The Parts List and Maintenance Manual provided to the technicians was for "information only" and was also for a different model pump than that on the Hope Creek EDGs.
- Internal parts for the pump are procured Non-Q purchase class 4 from a Local supplier.
- Technician skill of the craft prevented installation of a part that could have prevented returning the EDG to service had the part been installed as provided.
- Both the procedure and applicable maintenance manual pump assembly steps cannot be followed as written.

SFWP875

<p><u>SF</u> Russ Merendino ORIGINATOR</p>	<p><sup>PA</sup> Bill Williams DATE</p>	<p><u>MP</u> Mander APPROVED</p>	<p><u>2/13/95</u> DATE</p>
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<p>_____ SAT/CLOSED                      _____ SAT/TO BE VERIFIED</p> <p>_____ UNSATISFACTORY            APPENDIX B CRITERION _____</p> <p>CAUSE CODES:</p> <p>EVAL BY: _____                      DATE: _____</p> <p>APPROVED: _____                      DATE: _____</p>	<p>DISTRIBUTION:</p>
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Audit No. 95-142Checklist No. 1Page 2 of 3

## DESCRIPTION:

Consequently, the maintenance of a safety related pump was not performed in a manner which would ensure satisfactory performance of its function.

Details to the above observations are stated below:

Description:

During Maintenance Audit 95-142, the following conditions were noted during in-process observation of field activities:

Procedure HC.MD-CM.KJ-004(Q) pertained to the work order beginning at step 5.10. The technicians disassembling the pump had checked off each step following the procedure up to step 5.12.3. Step 5.12.3 states: "Visually verify pump components are free of defects (i.e., nicks, cracks, scratches or excessively worn). Replace as necessary." Parts had been staged for replacement. Essentially, this pump required a complete rebuild of its internals, including light removal of metal buildup and nicks on the inside of the pump housing. The procedure did not provide any critical information on accomplishing this task.

During the initial phase of the rebuild, the technician recognized a replacement part (Idler pin) was drilled and tapped for an external grease fitting. The original pump part was solid. The technician stopped and turned the concern over to his supervisor.

It was around this point it was recognized the pump casing markings and the vendor manual provided "for information only" by the System Engineer did not match. The supervisor contacted the pump vendor rep (Gorman Rupp) and requested clarification for the pump type and correct part (Idler Pin). The vendor responded and provided a fax copy of the correct Rotary Gear pump in use at Hope Creek. The supervisor took the fax copy to TDR to incorporate into the tech manual and provided the corrected copy to the technician for information only use in the field. Review of this tech manual was left up to the technicians. Review of the manual was ongoing rather than prior to the commencement of the job.

Audit No. 95-142Checklist No. 1Page 3 of 3

## DESCRIPTION:

Corrective Action:

Evaluate this Action Request with respect to the breakdown of the Levels of Defense of Quality in order to identify and implement appropriate Corrective Action.

Distribution:

General Manager - Hope Creek Operations  
Director - QA/NSR  
Manager - NSR  
Manager - Station QA (Hope Creek)  
Response Coordinator - Hope Creek  
Response Coordinator - QA Audits  
QA Analysis  
AR File

Audit No. 95-142

Checklist No. 1

Page 1 of 2

DESCRIPTION:

Finding:

In-process work activities relative to the erection and use of scaffold in Safety Related areas at Hope Creek did not meet the requirements of Nuclear Business Unit Procedures. Consequently, controls of personnel safety and control of transient loads were not maintained.

An outdated vendor manual was found available for use in the field, consequently, work activities could have been completed which did not meet current requirements.

Description:

Work Activity W/O 940830179,

Scope: - Replace Service Water Chlorination piping in Service Water Intake Structure.

During field observation of in-process activities for Audit 95-142, the following deficiencies were noted:

Supervisor did not complete entries in the Scaffold Control Log prior to the start of work, - NAP 23, paragraph - 5.6.1a.

Mechanics started using scaffolding prior to the inspection and scaffold tag being hung, - NAP 23, paragraph - 5.6.3.

On the job, an outdated copy of Public Service Blue Print (PSBP) #314514 was found in Tool Tapering Kit #97-8349, - NAP-3, paragraph 5.5.

SF  
Russ Merendino  
ORIGINATOR

2/10/95  
DATE

MPM  
APPROVED

2/13/95  
DATE

\_\_\_\_ SAT/CLOSED  
\_\_\_\_ UNSATISFACTORY  
\_\_\_\_ SAT/TO BE VERIFIED  
\_\_\_\_ APPENDIX B CRITERION

DISTRIBUTION:

CAUSE CODES:  
EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

TO: M. Trum, Maintenance Manager - Hope Creek

RESPONSE DUE: -

Audit No. 95-142

Checklist No. 1

Page 2 of 2

DESCRIPTION:

Corrective Action:

Evaluate the finding with respect to the levels in the Defense of Quality in order to identify and implement appropriate Corrective Action.

Distribution:

General Manager - Hope Creek Operations

~~Manager - WSR~~

~~Manager - WSR~~

Manager - Station QA - Hope Creek

Response Coordinator - QA Audits

QA Analysis

AR File

Audit No. 95-142

Checklist No. 1

Page 1 of 2

**DESCRIPTION:**

**FINDING:**

In-process Mechanical Maintenance work activities did not comply with all procedural requirements as delineated in Nuclear Business Unit Procedures.

**DISCUSSION:**

While observing in-process field activities associated with Work Order 941202163 and Code Job Package 94-0122 (ASME Code repair on a leaking cooling coil on the 1G-VE412 Diesel Room Cooler), the following deficiencies were noted:

A drawing in the work package did not have a current date stamp for field use on it (past 14 day requirement). Paragraph 5.5 of NAP-3 states that working copies are valid for 14 days from the date of the copy stamp. Had this drawing been used for work activities, errors could have occurred from the use of a possible outdated drawing.

Upon arriving at the job site, there were two ladders and a compressed gas cylinder that had been set up the day before by the work crew. The ladders and compressed gas cylinder were not restrained in any manner. This is not in accordance with NAP 23 paragraphs 5.9 & 5.10 (seismic restraint) and consequently, could result in personnel injury or damage to plant equipment.

Copper caps on tubing being worked were about to be brazed in-place when the auditor observing the work questioned the technicians as to why they were going to use non-safety related brazing material on a Nuclear Class 3 component. The technicians stated that their supervisor had issued the

SF John Eggenhoffer  
ORIGINATOR

2/10/95  
DATE

MP Marades  
APPROVED

2/13/95  
DATE

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\_\_\_\_ UNSATISFACTORY  
CAUSE CODES:  
EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

\_\_\_\_ SAT/TO BE VERIFIED  
APPENDIX B CRITERION \_\_\_\_

DISTRIBUTION:

Audit No. 95-142Checklist No. 1Page 2 of    **DESCRIPTION:****DISCUSSION:** (Continued)

material to them, which was tagged NSR. The auditor suggested the supervisor contact the welding engineer, who subsequently confirmed that certified material had to be used (Nuclear Department Repair Program Manual, section 4.1, 8.1, & 9.2.2.3).

It should be noted that the auditor assisted the supervisor in finding the correct certified material for the job. Also, the brazing material was not identified in the work pack.

One of the Technicians turned on an acetylene bottle without checking to see if the regulator was in the off position, it was not and the regulator was pressurized. Although there was no serious consequence, this is not an accepted practice as taught in the training center, nor does this practice meet the intent of the PSE&G Safety Manual, paragraph's 2.7 & 2.8. The regulator can become overpressurized, resulting in damage and possible injury.

**CORRECTIVE ACTION**

Evaluate this Action Request with respect to the breakdown of the Levels in the Defense of Quality in order to identify and implement appropriate corrective action.

**Distribution:**

General Manager - Hope Creek Operations  
Director - QA/NSR  
Manager - NSR  
Response Coordinator - QA Audits  
QA Analysis  
AR File



TO: Salem Maintenance Unit 1 Boiler Repair Supervisor (L. Nociti)  
 RESPONSE DUE: March 20, 1995

Audit No. 95-142 Checklist No. 6 Page 1 of 2

**FINDING:**

Salem Maintenance Supervisory personnel were not trained in accordance with the Nuclear Repair Program Manual's requirements.

**DISCUSSION:**

During a January 24, 1995 walkdown of the Salem Generating Station Maintenance Shop; Hugh Mc Stay, a Salem Maintenance Supervisor was identified as the responsible supervisor for Work Order. 950109110 (CJP S-95-002). A review of the Nuclear Training Center's Training Records on February 13, 1995 identified this individual as being deficient in receipt of Nuclear Repair Program Manual Training. This finding indicates an inadequate control of departmental personnel training attendance and failure to comply with the Nuclear Department Repair Program Manual training requirements.

**CORRECTIVE ACTION:**

Determine the extent of Salem Maintenance supervision and planning personnel actively involved in the implementation of the Nuclear Department Repair Program Manual. Identify those individuals being deemed deficient in having not received Nuclear Department Repair Program Manual Training (Overall, Advanced, Nap-28, as applicable). Individuals having been identified as deficient will be scheduled for attendance for the Nuclear Department Repair Program Manual Training at the Nuclear Training Center at their earliest convenience.

Identify the breakdown of the levels in defense of quality in order to identify appropriate corrective action. Identify the means to preclude future occurrence and the necessary measures to preclude recurrence.

J.R. O'Neil  
 ORIGINATOR

2/15/95  
 DATE

M.P.P. Mander  
 APPROVED

2/21/95  
 DATE

**RESPONSE EVALUATION**

SAT. CLOSED \_\_\_\_\_ UNSAT. \_\_\_\_\_

SAT./TO BE VERIFIED \_\_\_\_\_

APP. B CRITERION \_\_\_\_\_

CAUSE CODES:

EVALUATED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

DATE: \_\_\_\_\_

**REFERENCES:**

The following identifies the referencing document and stated requirement having been compromised as a result of the observation made.

1. " Nuclear Department Repair Program Manual", Rev. 12, Paragraph 2.3.1.2 states the following:

" Indoctrination and Training to the applicable requirements of the code and this program, shall be given to employees to assure continued proficiency in their assignments. This training shall be conducted by either the Nuclear Training Center (NTC) or alternately provided as departmental training. All departmental training shall be documented in accordance with Nuclear Department Administrative Procedures. The results of all indoctrination and training shall be documented and maintained on file by the NTC.

As a minimum, the following information shall be documented on department indoctrination and training records:

Subject Matter

Name of Instructor

Name of Trainee

Date of Training

Duration of Training

**DISTRIBUTION:**

Director - QA/NSR

Manager - NSR

Response Coordinator - QA Audits

QA Analysis

AR File

Manager QA Programs & Audits

Salem QA Manager

Salem Unit 1 Maintenance Engineer

Salem Unit 2 Maintenance Engineer

Salem Mechanical Maintenance Manager

Audit No. 95-142

Checklist No. 6

Page 1 of 2

DESCRIPTION:

Finding:

The information provided by the Hope Creek Maintenance Department to the Nuclear Department Welding Engineer for the purpose of maintaining welder continuity for qualification is based on the dates that weld filler metal is issued rather than the date that the welder performs welding. Consequently, this may result in welder qualification being maintained without the required processes being performed.

Discussion:

During Audit 95-142, Mechanical Maintenance, Hope Creek maintenance supervisors were interviewed to identify the method of documenting welder continuity for the purpose of maintaining qualification. Continuity is documented based on the Stockroom Material Issue Production Slip (SMIPS) issued by stockroom personnel during weld filler metal withdrawal.

The use of this method for identifying welder continuity does not provide assurance that the welder has completed a welding process during a specified period of time.

Corrective Action:

Evaluate this Action Request with respect to the breakdown of the Levels in Defense of Quality in order to identify and implement appropriate Corrective Action.

JOWP887

John R. O'Neil  
ORIGINATOR

3/21/95  
DATE

M.P. Mander  
APPROVED

2/22/95  
DATE

SAT/CLOSED  
 UNSATISFACTORY  
CAUSE CODES:  
EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

SAT/TO BE VERIFIED  
APPENDIX B CRITERION \_\_\_\_\_

DISTRIBUTION:

Audit No. 95-142

Checklist No. 6

Page 2 of 2

DESCRIPTION:

References:

1. Nuclear Department Repair Program Manual, Section 9: Control of Processes Paragraph 9.2.2.4(b) states the following:

"The Maintenance Supervisor or Project Manager from the Repair Group is responsible for selecting and assigning welders to perform welding operations and for assuring that selected individuals are currently qualified for the process to be employed."

2. PSE&G's Welding & brazing Manual, Section 3: Control of Welder Performance Qualification Paragraph 5.1(e) states the following:

"Maintain welder requalification system to ensure welders, once qualified, remain qualified by active welding or requalify by the methods described in the ASME Code."

Distribution:

General Manager - Hope Creek Operations  
Director - QA/NSR  
Manager - Station QA - Hope Creek  
Manager - Nuclear Safety Review  
Manager - QA Programs & Audits  
Response Coordinator - QA Audits  
QA Analysis  
AR File

Audit No. 95-142

Checklist No. N/A

Page 1 of 2

DESCRIPTION:

Requirement(s):

NC.NA-AP.ZZ-0006(Q) Rev. 6

Section 3.4 - states:

"LER Coordinators are responsible for: Ensuring IRs/LERs/SRs are retained in accordance with the record retention program."

Section 5.6.1 - states:

"LER Coordinator shall ensure that records relating to IRs/LERs/SRs are retained in accordance with the Record Retention Program NC.NA-AP.ZZ-0011(Q)."

NC.NA-AP.ZZ-0011(Q) Rev. 2

Section 5.2.4.c states that:

"Records should normally be transferred to the CRF within 90 days of completion. Prior to the transfer of records to the permanent storage facility measures shall be implemented to ensure the protection of records .... If longer intervals are established (more than 90 days) the Records and Document Control manager shall concur in writing."

Contrary to the above requirements, it was identified during the review of corrective actions assigned to the Maintenance Department at Hope Creek Station that LERs/IRs are not being consistently microfilmed within the 90 days. Further investigation determined that no agreement has been established to go beyond the 90 days with the Document and Records Manager. Currently there are closed files dating back to 1993 being stored within the LER Coordinators office in standard file cabinets.

NC.NA-AP.ZZ-0011(Q) also requires that a Records Coordinator be designated and defines the individual's responsibilities including the determination of what documents are to be retained as records in accordance with the Records Type List (RTL). The Records Coordinator is also responsible for getting records added to the RTL, which currently are not listed.

Continued

[Signature]  
ORIGINATOR

2/22/95  
DATE

[Signature]  
APPROVED

2/22/95  
DATE

SAT/CLOSED       SAT/TO BE VERIFIED  
 UNSATISFACTORY      APPENDIX B CRITERION XVII  
CAUSE CODES: X  
EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

DISTRIBUTION:

SEE PAGE 2 & 2

AR Continuation form:

Audit No. 95-142Checklist No. L/RPage 2 of 2

## DESCRIPTION:

## CORRECTIVE ACTIONS:

Although the above identified finding does not affect plant operation, the loss of those records would make it difficult to demonstrate compliance with our commitments to the NRC, record retention requirements and evaluate previously identified problems/corrective actions taken. Also, based on conversations with the Manager - Nuclear Licensing & Regulation and Supervisors, the loss of those completed records could hinder our ability to get plant life extensions.

Your evaluation and response to this Action Request must contain the following as a minimum:

- Establish a methodology or schedule, with the approval of the Records & Document Control Manager for microfilming the appropriate records within identified files that exceed the 90 day time frame or establish a more manageable transmittal time frame if 90 days is too restrictive. Also, identify what documentation within the files is considered appropriate for retention based on the available guidance. Review your internal controls to ensure that once the schedule or new transmittal frequency is established that this problem does not recur.
- Determine the cause for the breakdown of the first and second levels of defense.
- Clarify responsibilities as defined within NC.NA-AP.ZZ-0011(Q).
- Provide an expected completion date for corrective actions.
- Review existing records generated or maintained by your department in order to determine whether their retention is required (i.e., SERT items, CD files) in accordance with NC.NA-AP.ZZ-0011(Q).

**ACTION REQUEST DISTRIBUTION:**

General Manager - Hope Creek Operations  
Director - QA/Nuclear Safety Review  
Manager - QA Programs & Audits  
Manager - Station QA - Salem  
Manager - Station QA - Hope Creek (Acting)  
Manager - Nuclear Safety Review  
Technical Manager - Hope Creek  
Principal Engineer - QA Audits (Acting)  
QA Analyst  
Action Request File  
Stairs

TO: M. Metcalf - Maintenance Manager - Salem

RESPONSE DUE: 3/20/95

Audit No. 95-142

Checklist No. 6

Page 1 of 2

DESCRIPTION:

Finding:

The information provided by the Salem Maintenance Department to the Nuclear Department Welding Engineer for the purpose of maintaining welder continuity for qualification is based on the dates that weld filler metal is issued rather than the date that the welder performs welding. Consequently, this may result in welder qualification being maintained without the required processes being performed.

Discussion:

During Audit 95-142, Mechanical Maintenance, Salem maintenance supervisors were interviewed to identify the method of documenting welder continuity for the purpose of maintaining qualification. Continuity is documented based on the Stockroom Material Issue Production (SMIPS) issued by stockroom personnel during weld filler metal withdrawal.

The use of this method for identifying welder continuity does not provide assurance that the welder has completed a welding process during a specified period of time.

Corrective Action:

Evaluate this Action Request with respect to the breakdown of the Levels in Defense of Quality in order to identify and implement appropriate Corrective Action.

JOWP888

John R. O'Neil  
ORIGINATOR

2/21/95  
DATE

MP Manole  
APPROVED

2/22/95  
DATE

SAT/CLOSED       SAT/TO BE VERIFIED  
 UNSATISFACTORY      APPENDIX B CRITERION

CAUSE CODES:

EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

DISTRIBUTION:

Audit No. 95-142Checklist No. 6Page 2 of 2

## DESCRIPTION:

References:

1. Nuclear Department Repair Program Manual, Section 9: Control of Processes Paragraph 9.2.2.4(b) states the following:

"The Maintenance Supervisor or Project Manager from the Repair Group is responsible for selecting and assigning welders to perform welding operations and for assuring that selected individuals are currently qualified for the process to be employed."

2. PSE&G's Welding & Brazing Manual, Section 3: Control of Welder Performance Qualification Paragraph 5.1(e) states the following:

"Maintain welder requalification system to ensure welders, once qualified, remain qualified by active welding or requalify by the methods described in the ASME Code."

Distribution:

General Manager - Salem Operations  
Director - QA/NSR  
Manager - Station QA - Salem  
Manager - Nuclear Safety Review  
Manager - QA Programs & Audits  
Response Coordination - QA Audits  
QA Analysis  
AR File



TO: J. Fest - Assistant to Salem Station GM

RESPONSE DUE: 3/22/95

Audit No. 95-142

Checklist No. 1/1

Page 1 of 2

DESCRIPTION:  
Requirement(s):

NC.NA-AP.ZZ-0006(Q) Rev. 6

Section 3.4 - states:

"LER Coordinators are responsible for: Ensuring IRs/LEs/SRs are retained in accordance with the record retention program."

Section 5.6.1 - states:

"LER Coordinator shall ensure that records relating to IRs/LEs/SRs are retained in accordance with the Record Retention Program NC.NA-AP.ZZ-0011(Q)."

Records Type List (RTL) requires that:

"Technical Staff is required to maintain LEs & SRs in the Central Records Facility (CRF) on 16mm roll for life of plant + 25 years and that IRs be maintained for at least 5 years on 16mm rolls."

NC.NA-AP.ZZ-0011(Q) Rev. 2

Section 5.2.4.c states that:

"Records should normally be transferred to the CRF within 90 days of completion. Prior to the transfer of records to the permanent storage facility measures shall be implemented to ensure the protection of records ... If longer intervals are established (more than 90 days) the Records and Document Control manager shall concur in writing."

Contrary to the above requirements, it was identified during the maintenance audits review of corrective actions at Salem Station associated with LEs/IRs that the LEs/IRs are not being consistently microfilmed within the 90 days time frame nor has an agreement been established to go beyond the 90 days. It was noted that IRs are currently being sent for microfilming but a backlog exist. Some of the items within the backlog are from 1993. Currently LEr files exist dating back to 1991 and are being stored within the LEr Coordinators office in standard file cabinets. Further discussions with the LEr Coordinator and Supervision indicated that responsibilities regarding LEr retention were not clearly understood.

Continued

Ed Lawrence  
ORIGINATOR

2/22/95  
DATE

M.P. Mauls  
APPROVED

2/22/95  
DATE

SAT/CLOSED

UNSATISFACTORY

SAT/TO BE VERIFIED

APPENDIX B CRITERION XVII

DISTRIBUTION:

SEE PAGE 2 of 2

CAUSE CODES: X

EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

AR Continuation form:

Audit No. 95-142Checklist No. 2/4Page 2 of 2**DESCRIPTION cont:**

Based on the Records Type List (RTL) that responsibility belongs to Technical Staff or LER Coordinators as defined in NC.NA-AP.ZZ-0006(Q).

NC.NA-AP.ZZ-0011(Q) requires that a Records Coordinator be designated and defines that individual's responsibilities include the determination of what documents are to be retained as records in accordance with RTL. The Records Coordinator is also responsible for getting records added to the RTL, which currently are not listed and should be maintained.

**CORRECTIVE ACTIONS:**

Although the above identified finding does not affect plant operation, the loss of those records would make it difficult to demonstrate compliance with our commitments to the NRC, our record retention requirements and evaluate previously identified problems/corrective actions taken. Also, based on conversations with the Manager - Nuclear Licensing & Regulation and Supervisors, the loss of those completed records could hinder our ability to get plant life extensions.

Your evaluation and response to this Action Request should include the following:

- Establish a methodology or schedule, with the approval of the Records & Document Control Manager for microfilming the records within identified files that exceed the 90 day time frame or establish a more manageable transmittal time frame if 90 days is to restrictive.
- Identify documentation within the existing files required for retention based on the guidance provided in ANSI N45.2.9 and NC.NA-AP.ZZ-0011(Q). Record retention requirements for LERs should be coordinated with Nuclear Licensing. Also, review your internal controls to ensure that this problem does not recur.
- Determine the cause for the breakdown of the first and second levels of defense.
- Provide an expected completion date for corrective actions.
- Review existing records generated or maintained by your department in order to determine whether their retention is required (ie., SERT items, Special Reports) in accordance with NC.NA-AP.ZZ-0011(Q).

**ACTION REQUEST DISTRIBUTION:**

General Manager - Salem Operations  
Director-QA/Nuclear Safety Review  
Manager - QA Programs & Audits  
Manager - Station QA - Salem  
Manager - Station QA - Hope Creek (Acting)  
Manager - Nuclear Safety Review  
Principal Engineer - QA Audits (Acting)  
QA Analyst

TO: General Manager Salem Operations, John Summers  
 RESPONSE DUE: March 27, 1995

Audit No. 95-142Checklist No. 6Page 1 of 3

## DESCRIPTION:

## FINDING:

Salem Preventive Maintenance Activities have been delayed without the concurrence of Technical Department System Engineers or Reliability and Assessment. Consequently, station components may not be maintained in satisfactory operating condition.

## DISCUSSION:

During audit 95-142, a review of overdue preventive maintenance activities revealed that components which are awaiting system engineering reviews and analysis to approve Preventive Maintenance Deferral Requests (PMDR) have not received their scheduled preventive maintenance. While the change mechanism is being processed the scheduled preventive maintenance (PM) is not being performed. This review included generic preventive maintenance work orders pertinent to both mechanical and instrument & control activities.

The review of overdue PM's identified components which were overdue for their scheduled preventive maintenance. The following work orders are examples:

W/O #	Classification	Component Description	Overdue Date
950118053	?, ?	RMS Spare Drawer Misc. Instr. Control	1/25/95
940912005	SR, Seis. 1	S1-1VHE20-MTRX FHB Vent Exh. Motor	1/25/95 1/25/95
941213059	NSR, Seis. 3	S1-1INV1A2Y Computer Inverter	12/27/94 (COMP) 2/9/95
921030012	NSR, Seis. 2	11 Vacuum Pump	7/28/94

*John R. O'Neil*  
 ORIGINATOR

*2/23/95*  
 DATE

*Matt Mander*  
 APPROVED

*2/23/95*  
 DATE

## RESPONSE EVALUATION

SAT. CLOSED \_\_\_\_\_ UNSAT. \_\_\_\_\_

APP. B CRITERION \_\_\_\_\_

EVALUATED BY: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_

SAT./TO BE VERIFIED \_\_\_\_\_

CAUSE CODES:

DATE: \_\_\_\_\_

DATE: \_\_\_\_\_

TO: General Manager Salem Operations, John Summers  
 RESPONSE DUE: March 27, 1995

Audit No. 95-162Checklist No. 6Page 2 of 3CORRECTIVE ACTION:

W/O #	Classification	Component Description	Overdue Date
920301039	NSR, Seis. 2	S1-1SWE111 11 SW Hoist	1/1/93
930517006	NSR, Seis. 3	TL 4220 Temperature Indicator	9/29/93
940827008	SR, Seis. 1	Relay Room Panels	1/25/95

Analyze this action request with respect to the breakdown of the levels of defense of quality in order to identify and implement corrective action.

REQUIREMENT:

NC.NA-AP.ZZ-0010 (Q) Rev. 2, Paragraph 3.1

- " All Nuclear Operations Departments are responsible for:
- \* Ensuring assigned PM tasks are performed and documented.
  - \* Ensuring appropriate feedback to the PM Program is made through the Preventive Maintenance Change request (PMCR) process.
  - \* Ensuring proper routing of data and materials collected in support of condition monitoring programs.
  - \* Ensuring proper documentation of as found and as left information.
  - \* Providing initial assessment of cause of equipment failures discovered.
  - \* Reviewing PM recommendations applicable to the department.
  - \* Generating PM reports to reflect the status of their PM work."

TO: General Manager Salem Operations, John Summers  
RESPONSE DUE: March 27, 1995

Audit No. 95-142Checklist No. 6Page 3 of 3

NC.NA-AP.ZZ-0002(Q) Rev. 0, Attachment 3

"The Station Maintenance Manager is responsible for performing corrective and preventive maintenance, surveillances, testing, inspection, and planning and scheduling. The department is divided...."

**DISTRIBUTION:**

Vice President Nuclear Operations  
Director QA/NSR  
Salem Mechanical Maintenance Manager  
Salem Controls Maintenance Manager  
Salem Operations Technical Manager  
Salem Station Planning Manager  
Salem QA Manager  
Manager/NSR  
Manager QA Programs & Audits  
Response Coordinator - QA Audits  
QA Analysis  
AR File

TO: Marty Trum - Manager - Maintenance Department

RESPONSE DUE: 3/23/95

**Description:**

A follow up review was performed to verify corrective actions taken had been completed on the following supervisor observation completed as part of the *Routine Self-Assessment* program. SC.SA-SD ZZ-16 Rev. 3, "Self Assessment Management Practices", a supervisory oversight program:

Item: Activity/Observation Plant Tour Report dated 6/10/94 written by Mark Crisafulli  
Activity Observed: Checkmate stroke time test of 1KJSV-7534D IAW HC.OP-IS.KJ-0104 and HC.MD-GP ZZ-0100  
Corrective Action: Initiated an MPR [Maintenance Procedure Revision] against procedures to correct discrepancy

**Discussion**

A procedure revision request had been written (attached to the observation) for Procedure # HC.OP-IS.KJ-0104.

The Procedure revision requested that:

- "Step 5.1.10 on page 6 of 11 requests the electrician to install switched jumper when it should actually request the electrician to remove the switched jumper. The work 'install' should be changed to 'remove'."

**Finding:** The procedure revision change never took place and the procedure has been used on a quarterly surveillance since June 1994, the last date was 2/95. The procedure had last been reviewed 8/24/94

A mechanism does not exist to address observations made involving a deficiency "owned" by another department. A mechanism to facilitate this transfer of responsibility and accountability would ensure corrective actions would not get 'lost' in the transfer.

**Corrective Actions**

1. Provide the breakdown in the second level of defense of quality.
2. Develop a mechanism in which observations made involving a deficiency "owned" by another department is transferred effectively. Ensure corrective actions would not get 'lost' in the transfer of the responsibility and accountability.

Manoel S. Pinto 3/23/95  
 ORIGINATOR DATE

[Signature]  
 APPROVED

3/23/95  
 DATE

SAT/CLOSED     
  SAT/TO BE VERIFIED     
  UNSATISFACTORY     
 APPENDIX B CRITERION XVI

CAUSE CODES: \_\_\_\_\_  
 EVAL BY: \_\_\_\_\_ DATE: \_\_\_\_\_ APPROVED: \_\_\_\_\_ DATE: \_\_\_\_\_

- Distribution**
- General Manager - HC Operations
  - Director - QA/NSR
  - Manager - QA Programs & Audits
  - Manager - NSR
  - Manager - Operations
  - Response Coordinator - QA Audits
  - QA Analysis (H. Lowe)
  - Nuclear Review Board
  - AR File

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-1A

### **DATE**

March 17, 1995

### **ORGANIZATION**

Salem Mechanical Maintenance

### **PERSON CONTACTED**

M. Metcalf

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

S. Faulkner (For Technical Specialists)

### **OBSERVATION**

Ineffective command and control and lack of accountability was observed at the Salem Unit 2 outage meetings on January 24, 25, and 26. This condition was noted by auditors from three different plants: Trojan, Hope Creek and Peach Bottom.

Note: These comments were brought to the attention of the Salem Maintenance Manager at a debrief meeting, and improved meeting content was noted the following day.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-1B

### **DATE**

March 17, 1995

### **ORGANIZATION**

Salem Maintenance & Planning

### **PERSON CONTACTED**

M. Metcalf

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

S. Faulkner (For Technical Specialist)

### **OBSERVATION**

Work order 950124138 to perform alignment and vibrations checks did not have the alignment procedure referenced or included in the work package. This was noted by the QA auditor and brought to the attention of the job supervisor. The procedure was in the work package the following day.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.



**QA OBSERVATION**

**ASSESSMENT NUMBER**

95-142

**OBSERVATION NUMBER**

95-142-1C

**DATE**

March 17, 1995

**ORGANIZATION**

Salem Maintenance & Planning

**PERSON CONTACTED**

M. Metcalf

**RESPONSE DUE DATE**

June 17, 1995,

**AUTHOR**

S. Faulkner (For Technical Specialist)

**OBSERVATION**

Some Salem Library copy work orders are assigned to work without an update review. The planners name and extension are out-of-date and the referenced procedures are not current.

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-1D

### **DATE**

March 17, 1995

### **ORGANIZATION**

Salem Maintenance & Planning

### **PERSON CONTACTED**

M. Metcalf

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

R. Merendino (Hope Creek QA)

### **OBSERVATION**

Work order 941002139 - Salem 13 Demin. Transfer Pump, challenges to the Maintenance process and the Technician:

- No vent and drain path for the pump had been provided; this was identified by the auditor during the pre-job walkdown with the supervisor.
- No procedure for this job, it was categorized "within the skill level of the Mechanic." The Technician was unsure of how to continue when he did not have enough supporting information in the package. Later discussion indicated that a procedure would be developed for this work.
- The pump drawing in the work package was unclear, a clearer copy is available through DMS.
- The vendor manual supplied with the work package applied to sixteen different types of pumps and was insufficiently detailed for the work.
- No acceptance tolerances were supplied for the pump component parts.

- Torquing requirements for re-assembly were not provided or referenced. When questioned, the supervisor said the vendor manual would be used. This information is not in the vendor manual.

Note The Mechanical Maintenance Manager was given the auditor's write-up for this observation. It will be used as a basis for process improvement discussions.

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

**QA OBSERVATION****ASSESSMENT NUMBER**

95-142

**OBSERVATION NUMBER**

95-142-2A

**DATE**

March 24, 1995

**ORGANIZATION**

Salem Technical Department

**PERSON CONTACTED**

J. Ranalli

**RESPONSE DUE DATE**

June 24, 1995,

**AUTHOR**

J. O'Neil

**OBSERVATION**

Reliability and Assessment Central Preventive Maintenance Group personnel expressed concern for the continued aging of electrical system components located in the Nuclear Instrumentation System NIS and Electrohydraulic Control Instrumentation (EHC) systems which cannot be addressed via normal Reliability Centered Maintenance processes and may require refurbishment or replacement in the future.

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-2B

### **DATE**

March 17, 1995

### **ORGANIZATION**

Salem Planning & Scheduling

### **PERSON CONTACTED**

W. George

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

S. Faulkner & K. Goebel

### **OBSERVATION**

A review in MMIS of recurring Corrective Maintenance work orders for Salem Heating Water System revealed a large number of repetitive work orders written to replace heater unit motors. A total of seventy-eight work orders, active and history were found for Units 1 & 2

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-3A

### **DATE**

March 17, 1995

### **ORGANIZATION**

Salem Mechanical Maintenance  
Hope Creek Mechanical Maintenance

### **PERSON CONTACTED**

T. Spencer  
L. Wagner

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

M. Painter

### **OBSERVATION**

The effectiveness of Salem and Hope Creek Stations' Self-Assessments is diminished due to lack of follow-up to confirm or evaluate the effectiveness of Corrective Actions.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

**QA OBSERVATION****ASSESSMENT NUMBER**

95-142

**OBSERVATION NUMBER**

95-142-3B

**DATE**

March 17, 1995

**ORGANIZATION**

Hope Creek Chemistry  
Salem Chemistry

**PERSON CONTACTED**

P. Opsall  
G. Suey

**RESPONSE DUE DATE**

June 17, 1995,

**AUTHOR**

M. Painter

**OBSERVATION**

The Nuclear Business Unit does not have a guidance document for performing Self-Assessments. Such a document could provide consistency of Management expectations, definitions, structure, frequency and documentation requirements. Guidance would also be beneficial in the areas described in Self-Assessment Programmatic Components.

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

**QA OBSERVATION**

**ASSESSMENT NUMBER**

95-142

**OBSERVATION NUMBER**

95-142-3C

**DATE**

March 17, 1995

**ORGANIZATION**

Salem Mechanical Maintenance  
Hope Creek Mechanical Maintenance

**PERSON CONTACTED**

T. Spencer  
L. Wagner

**RESPONSE DUE DATE**

June 17, 1995,

**AUTHOR**

M. Painter

**OBSERVATION**

A mechanism is not used to address Self-Assessment observations involving another department. A mechanism to facilitate this transfer of responsibility would ensure that corrective actions do not get lost in the transfer.

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.



## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-3D

### **DATE**

March 17, 1995

### **ORGANIZATION**

Hope Creek Mechanical Maintenance

### **PERSON CONTACTED**

L. Wagner

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

M. Painter

### **OBSERVATION**

Guidance does not exist for the Work Order feedback process for Planning and Scheduling. Guidance would help eliminate current ambiguity associated with the process and ensure consistency with regard to where the feedback is entered into MMIS.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-6A

### **DATE**

March 17, 1995

### **ORGANIZATION**

Nuclear Procurement and Material Management

### **PERSON CONTACTED**

G. Sayer

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

J. O' Neil (For Technical Specialist)

### **OBSERVATION**

The audit team noted that both the rod oven and the probe thermometer are calibrated. The calibration of both is redundant. The cost saving in calibrating only one of these devices could be set against the purchase of a multi channel recording thermograph which would better record the rod oven temperatures on an ongoing basis and provide a permanent record of procedural compliance.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-6B

### **DATE**

March 17, 1995

### **ORGANIZATION**

Nuclear Procurement and Material Management

### **PERSON CONTACTED**

G. Sayer

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

J. O' Neil

### **OBSERVATION**

The Nuclear Department Welding Engineer does not have an opportunity to review Procurement and Material Management Procedures which deal with the control of weld filler metal. Improved inter-departmental communication in this area could have avoided a conflicting information in the Procurement and Material Control procedure governing storage of weld filler metal for ENiCrMo-3 (ASME Classification SFA -5.11)

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-6C

### **DATE**

March 17, 1995

### **ORGANIZATION**

Nuclear Training Center

### **PERSON CONTACTED**

L. Dalton

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

J. O' Neil (For Technical Specialist)

### **OBSERVATION**

The Nuclear Training Center, while focusing on teaching specific hands-on welding skills does not take the opportunity to use technically correct terminology for welding positions, brazing joint types, and weld bead patterns. This can make the welders sound less technically proficient and knowledgeable to regulators and plant evaluators.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

## **QA OBSERVATION**

### **ASSESSMENT NUMBER**

95-142

### **OBSERVATION NUMBER**

95-142-6D

### **DATE**

March 17, 1995

### **ORGANIZATION**

Saiem Station QA

### **PERSON CONTACTED**

J. Barnes

### **RESPONSE DUE DATE**

June 17, 1995,

### **AUTHOR**

J. O' Neil (For Technical Specialist)

### **OBSERVATION**

Conflicting information, regarding the Code class of a component (2 vs. 3) and NDE acceptance criteria (ASME III vs. ANSI B31.7), in Code Job Packages was noted. This may be due to training weakness or indicative of a lack of attention of detail.

### **RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

**QA OBSERVATION**

**ASSESSMENT NUMBER**

95-142

**OBSERVATION NUMBER**

95-142-4A

**DATE**

March 25, 1995

**ORGANIZATION**

Salem Mechanical Maintenance

**PERSON CONTACTED**

J. Summers

**RESPONSE DUE DATE**

June 25, 1995,

**AUTHOR**

S. Faulkner (For Technical Specialist)

**OBSERVATION**

Additional management attention is required to address the effect of poor practices in the areas of work scheduling and schedule adherence at Salem

**RESPONSE:**

\*The response should address action to be taken and proposed completion date. If no action is deemed necessary, the logic for this conclusion should be presented.

QUALITY ASSURANCE AUDIT 95-142  
MECHANICAL MAINTENANCE, SALEM AND HOPE CREEK

DISTRIBUTION

L. ELIASON  
J. HAGAN  
S. LaBRUNA  
J. SUMMERS  
R. HOVEY  
J. BENJAMIN  
M. METCALF  
M. TRUM  
J. CLANCY  
J. RANALLI  
T. CELLMER  
F. HIGGINS  
E. HARKNESS  
T. SPENCER  
L. WAGNER  
A. GIARDINO  
D. TAUBER  
J. DeFEBO  
B. HALL  
J. FEST  
I. WEISSMAN  
W. ROGERS III  
J. CASH  
A. ORTICELLE  
B. ANDRUYCK  
NUCLEAR REVIEW BOARD  
AUDIT TEAM & TECHNICAL SPECIALISTS  
AUDIT FILE  
STAIRS ←

4/25/95 8:55 AM

List of inspection items for Salem SII

Problem Identification and Root Cause Determinations (Greg)

General

How effectively are the problem / deficiency reporting systems working?

Are there problems / deficiencies that should have gotten into the system, but didn't?

What recent examples of root cause analysis are available for review?

Specific

Interview working level people and work up (Equip Operators, maint crafts and their foreman, reactor operators, shift supervisors ...)

Find out how does the root cause analyses and what has been done recently

How are they making us of Operating Experience feedback?

Deliverable: Deficiency identification and disposition flow chart showing the paths by which the various forms of deficiency identification can travel for disposition. Show what person(s) / group(s) are responsible for action along the paths.

Work Prioritization, Planning/Scheduling and Controls (Tracy)

General

Pull together the various existing lists of equipment problems needing correction - this should comprise a total plant set of equipment problems needing correction stemming from the various reporting systems for equipment problems and deficiencies.

Determine how the plant is prioritizing what they work on

Assess the quality of the work packages being provided to maintenance

*M/100*



Assess the scheduling of work as to risk and integration with shift activities

#### Specific

Interface with planners, schedulers, shift supervisors

Deliverable: Equipment / system work item flow chart showing how work items are selected and how they are processed to the point of being accomplished in the plant.

#### Operability Determinations (Steve)

What instances can be identified from control room logs where an OD should have been pursued?

What instances can be identified from control room logs where more equipment was taken out of service than should have been from an operability standpoint?

What is the extent of engineering involvement in ODs? In what instances should engineering have been more involved?

Surveillance Testing: What pieces of equipment are operated just prior to the S/T or fail on an initial test attempt, are adjusted, and then run again - passing the S/T? Check for this and other forms of "preconditioning."

#### Operational Work-arounds (Steve)

OK

#### Preventive and Corrective Maintenance (Tracy)

#### Management Oversight (Michele)

TTM interested in mgmt accountability program

Deliverable: Management oversight matrix showing who monitors what aspects of performance for safety purposes.

#### Miscellaneous

Parts availability to support in plant work - Steve

Boric acid transfer pump S/T and equipment history - Steve

safety sys pump vibration problems - trending data - Tracy

condition of air systems - Steve

EDGs constantly in and out of service

containment vent isolation system

CCW chillers

## SALEM SPECIAL INSPECTION

### MAINTENANCE

Report No.: 50-272 & 311/95-80

Dates: April 24 - May 19, 1995

Purpose: To assess how effectively the licensee is currently performing from a safety perspective in the areas of prioritizing and conducting work on plant equipment.

#### Areas of Review/Objectives:

##### Work Prioritization

- Review outstanding work and the prioritization system for this work. Understand how work items are identified and prioritized. How is the prioritization used in the scheduling process? Determine what work is waiting for a refueling outage.
- Evaluate the maintenance backlog, the timeliness of work completion, and the adequacy of the maintenance department staffing for handling the backlog.
- Review the preventive maintenance program to determine if PMs are performed as required and assess how revisions are made to required PM frequencies. Evaluate the adequacy of the maintenance history program as it relates to preventive and predictive maintenance. (Safety system pump vibration problems - trending data)
- Assess system engineer involvement in the identification and prioritization of work items.

##### Maintenance Planning and Scheduling

- Evaluate the effectiveness of the maintenance planning process.
- Evaluate the effectiveness of the maintenance scheduling process, including coordination of system outages and on-line maintenance. Assess the scheduling of work as to risk and integration with shift activities.
- Evaluate the implementation of the scheduled maintenance and assess the process for schedule revision, including communication of maintenance status. How is emergent work handled? Who drives and controls the work schedule?

## Areas of Review/Objectives (cont'd):

### Work Controls

- Evaluate the performance of maintenance personnel by direct observation of maintenance field activities.
- Assess the quality of work packages including the adequacy of maintenance procedures. Assess training of maintenance personnel.
- Assess management oversight of routine activities and management involvement in identification and correction of problems.
- Evaluate the quality and adequacy of post-maintenance tests relative to the maintenance performed.
- Evaluate the quality of maintenance performed by reviewing failed post-maintenance tests and repetitious equipment failures.
- Assess maintenance interfaces with operations, including operations involvement in the work control process. Are the control room operators knowledgeable of out-of-service equipment?
- Assess engineering involvement in the conduct of maintenance. How is engineering involved in troubleshooting and identification of corrective actions?
- Evaluate the effectiveness of quality control involvement in the maintenance process.

### Inspection Activities:

- \* Review administrative procedures related to maintenance planning, scheduling, and work control.
- \* Review process for identification and prioritization of work. Review various lists of outstanding equipment problems, compare with identified work items (backlog), and assess safety impact of potentially degraded equipment.
- \* Gain an understanding of the day to day process for planning, scheduling, and controlling maintenance activities through interviews of personnel involved in the process (planners/schedulers, shift supervisors, etc.) and observation of meetings and work authorization activities. Develop a flow chart showing how work items are selected and how they are processed to the point of being accomplished in the plant.
- \* Observe maintenance activities in the field.

- \* Review maintenance performance, post-maintenance testing, and machinery history documentation.

Inspection Procedures:

IP 93802, Operational Safety Team Inspection

IP 40500, Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems

IP 62702, Maintenance Program

TI 2515/126, Evaluation of On-Line Maintenance

INTERVIEW QUESTIONS  
MAINTENANCE MANAGER MECHANICAL

1. Describe your role and responsibilities in the organization.

2. Describe what you did yesterday.

•Was that a typical day for you for the most part?

2a. What maintenance activity is personally your top priority/lowest priority?

How are emerging maintenance activities prioritized?

How do you use information available to you from QA, ISEG, NRC assessments, etc.

3. When were you in the field last?

•Who did you talk to?

•What was your main concern?

4. What MIS do you use?

•Are they effective

•Do they need improvement

5. What percent of your day is spent on/or in the following:

- a. Formal planning meetings
- b. private meetings
- c. in the field
- d. writing reports/documentation
- e. reviewing reports

6. What is your view on communications in the maintenance ranks and with other disciplines.

•What is your view on support to maintenance from Engineering/Operations/Procurement/Management

7. What is your present opinion on the following:

- Corrective Action Process
- Root Cause Evaluations
- Operability Determinations
- Quality of Maintenance jobs performed
- Quality of procedures/work packages
- Quality of maintenance workers/supervisors
- Amount of rework performed
- Quality of maintenance worker training
- Contractor work

8. Do you feel NRC/INPO played a role in the declining of performance at Salem?

9. What one thing would you change at this site?

10. Using a scale from 1 to 5 (1 being "not at all" and 5 being "completely") to what degree does each of these statements describe business at Salem?

Management wants problems identified	1	2	3	4	5
When in doubt, proceed conservatively	1	2	3	4	5
Procedures and safety practices are followed	1	2	3	4	5
Resources are provided to do the job right	1	2	3	4	5
Do the job right the first time	1	2	3	4	5
Pay attention to detail	1	2	3	4	5
QA has a positive impact on plant safety	1	2	3	4	5

Problem Identification and Root Cause Analysis

1. Problem Identification:

The purpose of this section is to determine if the licensee has got adequate practices and processes in place to: (1) identify problems/deficiencies in plant equipment, plant programs, and personnel performance; (2) formally track identified problems and proposed resolutions to those problems; and (3) assess adequacy of resolution to correct identified problems, including identification of broader generic issues/concerns.

REVIEW

a. Familiarization with plant programs

1. Interviews w/ plant management to determine which plant organizations have responsibility for area and which programs address problem identification.
  - Interview cognizant line management and licensee staff.
  - Gather and familiarize oneself w/ plant procedures which define programs (e.g., Admin. procedures, TS Sect. 6, deficiency worksheets, etc...)
2. Request printouts of current data from problem identification tracking system(s). Is the system comprehensive?
  - What issues are maintained in the system and where did they originate?
  - Does the database include operating experience feedback? (i.e., INPO reports SOERS, SERS, LERS, NRC Bulletins, GLs, INs, etc...).
  - Does the system contain QA audits and self-assessment findings?

b. Performance-based sampling of licensee's system(s)

1. From the data provided by the licensee, pick a representative sample (n = 5 - 10, issues identified and analyze the means by which the issue was identified and placed into the system, how any proposed resolution was developed, how the resolution to the issue is being handled, and how plant personnel are informed of the issue and resolution.
2. Interview licensee maintenance craft and/or operators to determine if problems are being adequately addressed and resolved through the



formal processes. Determine if personnel understand management expectations regarding problem identification and use of licensee system(s) for resolving problems.

3. Discuss with cognizant licensee management/staff big picture regarding problem identification program. Determine if licensee is trending and/or analyzing information in the database for potential generic implications. If so, has anything been found and how has it been addressed.
4. Analyze the licensees self-assessment abilities regarding problem identification. Determine if licensee is aggressive in resolving self-assessment concerns and if self-assessments generate significant findings.

## 2. Root Cause Analysis

The purpose of this section is to determine if the licensee has got adequate programs and practices in place to: (1) identify root cause(s) for plant personnel performance problems and plant equipment problems; (2) develop corrective actions based on the identification of root cause(s); (3) assess adequacy of corrective actions to a given problem; (4) assess whether root cause(s) are indicative of broader generic plant issues.

### REVIEW

- a. Familiarization with plant root cause analysis
  1. Interviews w/ plant management to determine which plant organizations have responsibility for area and which programs address root cause analysis.
    - Interview cognizant line management and licensee staff.
    - Gather and familiarize oneself w/ plant procedures which define programs (e.g., Admin. procedures, TS Sect. 6, deficiency worksheets, HPES, LER coding process).
  2. Request printout of licensee significant event reports (SERTs), LERs, deficiency reports, HPES reports etc. which contain root cause analyses/determinations.
- b. Performance-based sampling of licensees system(s)
  1. From the data provided by the licensee, pick a representative sample (n = 5 - 10) issues identified and analyze how the licensee determined the root cause of the event/issue.
    - What system is used for root cause determination?
    - Is there a pre-defined root cause code used? If so what is it based on?
    - Who is responsible for root cause determination? What is their training/experience in root cause determination?
    - Is root cause determination an inter-department process? How are communication channels established?
    - What types of analyses are used to determine root cause? (e.g., Hazard Analysis, Barrier Analysis, Change Analysis Event and Causal Factors Analysis, etc...).

NOTE: IN REVIEWING THE LICENSEES ROOT CAUSE ANALYSES IT MAY BE

USEFUL TO DETERMINE IF THE QUESTIONS FROM THE NRC HPIP MODULE (NUREG/CR-5455) ON SORTM GENERATE THE SAME RESULT AS THE LICENSEES DETERMINATION.

2. Determine if personnel understand management expectations regarding root cause analysis and use of licensee system(s) for determining root cause.
  - How does management disseminate expectations regarding root cause analysis?
  - Does the staff understand management expectations? Is the staff consistent in their interpretation?
  - How does the cognizant organization and management feedback information regarding events and root cause determination to the licensee staff?
  
3. Discuss with cognizant licensee management/staff the big picture regarding root cause analysis. Determine if licensee is trending and/or analyzing information from LERs, SERT reports, deficiency reports, HPES, etc... for potential generic implications.
  - Does the cognizant organization trend root cause data for generic implications? How is this performed? How is management appraised of findings and how often? How are changes to programs/practices generated as a result of analyses?
  - Sample changes made to the plant as a result of past events and root cause analyses. How has the licensee determined that changes have been effective?
  - For similar events, if corrective actions are different than previously implemented changes, did the licensee determine why the previous corrective measures were not successful?
  
4. Analyze the licensees self-assessment abilities regarding root cause analyses.
  - Is there an independent assessment of root cause analysis performed by the licensee?
  - Does the licensee audit root cause analyses? Who is responsible for these audits?
  - Is the licensee aggressive in following up and resolving self-assessment findings? How is this judged?
  - Does management "reject" root cause determinations as superficial? Is management committed to determining in-depth root cause (e.g., does not allow general descriptions such as "procedure inadequate," "training inadequate," "cognitive personnel error," etc...).

- Does the licensee look for "programmatic" weaknesses in describing root causes of events?

## SALEM SPECIAL INSPECTION

### MAINTENANCE

Report No.: 50-272 & 311/95-80

Dates: April 24 - May 12, 1995

Purpose: To assess how effectively the licensee is currently performing from a safety perspective in the areas of prioritizing and conducting work on plant equipment.

#### Areas of Review/Objectives:

##### Work Prioritization

- Review outstanding work and the prioritization system for this work. Understand how work items are identified and prioritized.
- Evaluate the maintenance backlog, the timeliness of work completion, and the adequacy of the maintenance department staffing for handling the backlog.
- Evaluate the adequacy of the maintenance history program as it relates to preventive and predictive maintenance.

##### Maintenance Planning and Scheduling

- Evaluate the effectiveness of the maintenance planning process.
- Evaluate the effectiveness of the maintenance scheduling process, including coordination of system outages and on-line maintenance.
- Evaluate the implementation of the scheduled maintenance and assess the process for schedule revision, including communication of maintenance status.

##### Work Controls

- Evaluate the performance of maintenance personnel by direct observation of maintenance field activities.
- Assess the adequacy of maintenance procedures and training of maintenance personnel.
- Assess management oversight of routine activities and management involvement in identification and correction of problems.

- Evaluate the quality and adequacy of post-maintenance tests relative to the maintenance performed.
- Evaluate the quality of maintenance performed by reviewing failed post-maintenance tests and repetitious equipment failures.
- Assess maintenance interfaces with operations and engineering, including operations involvement in the work control process.
- Evaluate the effectiveness of quality control involvement in the maintenance process.

#### Inspection Activities:

- \* Review administrative procedures related to maintenance planning, scheduling, and work control.
- \* Review process for identification and prioritization of work. Review work backlog and assess safety impact of potentially degraded equipment.
- \* Gain an understanding of the day to day process for planning, scheduling, and controlling maintenance activities through interviews of personnel involved in the process and observation of meetings and work authorization activities.
- \* Observe maintenance activities in the field.
- \* Review maintenance performance, post-maintenance testing, and machinery history documentation.

#### Inspection Procedures:

IP 93802, Operational Safety Team Inspection

IP 40500, Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems

IP 62700, Maintenance Implementation

TI 2515/126, Evaluation of On-Line Maintenance

Salem Team Inspection Plan  
Management Oversight

What programs are available for management to use to oversee the operation of the facility?

Information is typically available to management from two sources, internal and external. Internal sources of information come from line self assessment. This can include at least the following:

- self checking by workers
- independent verification by their peers
- supervisory oversight of activities
- management tours and feedback
- SORC review of activities
- special task force observations of unique or infrequently performed activities

External sources of information include assessments by independent groups such as:

- Quality Control
- Quality Assurance
- Offsite Safety Review Committees
- Independent safety engineering groups
- Individual Consultants
- Special task forces of offsite experts
- NRC

Management should have ways to identify areas for improvement, to initiate corrective actions, and then follow through to verify that corrective actions were completed in a timely manner.

How does management use the information available to them from QA, NRC, ISEG, offsite review committee? Do they ignore the findings, or do they use them to improve?

How is management involved in daily activities, are they on top of things?

How are emerging activities prioritized? Is safety significance recognized? Is there so much going on that it is possible for management to miss big issues?

What is the safety mentality? Cost, compliance, safety?

Management and supervisors in plant? Are they visible? Do they add value?

Are managements' expectations known down through the organization?

What are the performance indicators used by management to assess current performance? Are they effective?

## OPERABILITY DETERMINATIONS

Who makes determinations?

Operability determination notebook in control room.

Generic Letter 91-18: training; familiarity & use by operators

Input from: ops management; system engineering; maintenance; QA/NSR

LCO logs vs. degraded equipt. list/ ARs/ WOs/IRs etc.

Production vs. operability/availability vs. safety

Design basis knowledge - "ability to perform intended (design) function"

Procedure (flowchart) for operability (NAP 6 ?)

SORC & 50.59 evaluations

### Interview:

Senior reactor operators on shift

Operations Department management

System engineers

SORC chairmen

Ops training staff



## OPERATIONAL WORK-AROUNDS

History of work-arounds & result of EDO visit last summer

What is on the current Salem work-around list

Degraded component list/open WOs/ARs etc. vs. work-around list

System engineering priorities and input to Ops

QA/NSR review and impact on work-around list

Risk assessment/impact on plant operation

### Interviews:

Senior reactor operators on shift

Ops management

System engineers

QA/NSR

Maintenance schedulers/planners

What daily safety issues are they missing?

What do the working level people say? Can  
a coherent picture be put together at  
that level?

What has the mgmt done in the past 20 days?

Do they know their root causes? Do they  
pretend & have compassion?

How they prioritized their safety concerns

- hardware
- procedure
- people

What progress is being made currently?

What do people at all levels think is  
happening to fix things?

What things does the MRC team think they miss?

# Salem Charter / Plans

Sylvia Semmons  
Director of the  
Team

- o NRC Areas of Concern
- o What are they doing about the findings  
o the Assessment team (needs/actions)
- o Look at areas the A-Team ~~was~~ didn't
  - o SS shift work control / burden
  - o Work Control, risk assessment
  - o Training / linkage with plant
- o Work records
  - o BCP conditions
  - o root cause determination for past  
problems & current situation
  - o ISBG / by byer / self assessment
  - o QA organization
  - o Control of Contractor Work
  - o Supervisory oversight

via this schedule  
6.5.83

ATTACHMENT 1  
WORK ORDER PRIORITIES

When assigning work order priorities, consider the safety significance of the malfunctioning SSC and how other malfunctioning components may influence its significance to safety.

"A" Emergency Work Requiring Immediate Action

Emergency actions may be taken to prevent or mitigate the consequences of an accident, prevent the release of radioactive material to the environment or to protect human life and/or property. "A" priority classifications should be performed at the discretion of the Nuclear Shift Supervisor. Rule: If entering a LCO of 72 hours or less, it should be categorized as a priority "A".

"B" These malfunctions require corrective action to start as soon as possible but normally by the next scheduled work day.

If the malfunction has caused a load reduction, the repairs are so extensive that a unit shutdown to comply with Tech. Specs. is likely, causes an immediate impact on critical path outage work or poses a significant personnel safety hazard, this priority should be used.

- o Repair of hazardous material leaks
- o Loss of a service water pump
- o Loss of water treatment system capability or chemical feed system to operate or regenerate
- o Failure of a hydrogen recombiner
- o Loss of equipment that cause breach of chemistry specifications
- o Non radiological waste treatment system discharging in excess of environmental permit condition
- o Charging pump failure
- o Identified RCS leak identified greater than 10 GPM

## ATTACHMENT 1 (Continued)

## NON OUTAGE PRIORITIES

- o Containment of radioactive leaks (liquid or gaseous) in accessible areas of the plant. (This excludes the Containment at power).
- o Repair, calibration or restoration of "PASS" (Post Accident Sampling System) components.

Corrective Maintenance - Malfunction is not threatening to safe plant operation, does not affect component operation within the system, but has affected component operation and should be addressed quickly. There is clear potential for developing into a larger problem.

- o Repair of radioactive leaks (liquid or gaseous) which have been temporarily contained as part of the corrective action of a "B" priority work order
- o Inoperable control room instrumentation
- o Inoperable field instrumentation that is used for Operations and Chemistry log readings
- o Leaks (continuous flow) which result in a decrease in plant material condition (boric acid leaks, oil leaks, steam leaks)
- o Bulk chemical leaks (acid, caustic, ammonia)
- o Inoperable primary water pump, CVCS monitor tank pump
- o Inoperable water treatment system pump
- o Ventilation filter changeout

Preventive Maintenance - Those activities which provide the most benefit to safe, reliable operation of the plant.

- o Tech. spec. Surveillances
- o Environmentally qualified equipment
- o Instrumentation that is used for Tech. Spec, related Operations and Chemistry log readings

ATTACHMENT 1 (Continued)

"2" Corrective Maintenance - Relatively minor malfunction. These would not be expected to develop into a larger problem in the near future.

- o Inoperable local instrumentation not normally used for Operations and Chemistry log readings

Preventive Maintenance - Those activities which provide moderate benefit to operation of the plant.

- o Local instrumentation not normally used for Operations and Chemistry log readings

"3" Minor deficiencies not affecting component operation but which should be addressed to eliminate "nuisance" or "Eyesore" type situations. Corrective or preventive maintenance work activities performed to buildings, structures or equipment not related to producing electricity or regulatory compliance.

- o Lathe maintenance
- o Weld rod oven calibrations
- o Lavatory equipment
- o Non-safety related HVAC

"4" Plant Betterment Activities - These work activities will normally be performed in blocks. Work orders in this priority may be held for contract or summer/seasonal employee work.

- o Painting
- o General Housekeeping
- o Insulating

"5" Safety - Any work pertaining to the safety of personnel regardless of severity.

OUTAGE PRIORITIES

"01" The following types of malfunctions/work activities should be addressed/performed during an outage.

ATTACHMENT 1 (Continued)

Corrective Maintenance - Malfunction renders technical specification related equipment inoperable or causes the unit to operate in a reduced load capacity. These have the clear potential for developing into a larger problem if left uncorrected.

- o Inoperable S/G Safety valve

Preventive Maintenance - Those activities shown to require a unit outage to perform that provides the most benefit to the operation of the plant.

- o Tech. Spec. Surveillances
- o Environmentally qualified equipment
- o Instrumentation that is used for Tech. Spec. related Operations and Chemistry log readings

Normal Refueling Activity - Those activities required to be performed during a refueling outage.

- o Head lift
- o Fuel shuffle

\*02" The following types of malfunctions/work activities should be addressed/performed during the outage.

Corrective Maintenance - Relatively minor malfunction requiring a unit outage to correct which does affect component operation.

- o 2SJ71 Leaking by
- o 2SJ69 Packing leak

Preventive Maintenance - Those activities shown to require a unit outage that provide moderate benefit to operation of the plant.

- o Local instrumentation not normally used for Operations and Chemistry log readings

\*03" These types of work activities should be performed if time permits.



ATTACHMENT 1 (Continued)

Corrective or preventive maintenance to buildings, structures or equipment not related to, or requiring regulatory compliance.

- o Routine relamping of containment
- o Painting containment
- o Insulating
- o Non-Tech Spec, non regulatory low priority PM's