

# PSEG Nuclear, LLC

## Salem / Hope Creek

### Safety Culture Assessment



Conducted by

**Utilities Service Alliance**

**March 1 – 5, 2004**

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## **I. Executive Summary**

In December 2003, PSEG Senior Management requested the Utilities Service Alliance (USA) perform a Safety Culture Assessment at Salem / Hope Creek. The USA Board of Directors agreed to conduct the assessment using the USA methodology established to satisfy the requirements of Recommendation 2 of INPO SOER 02-4, "Reactor Pressure Vessel Head Degradation at Davis-Besse Nuclear Power Station." SOER 02-4 required nuclear utilities conduct a self-assessment to determine to what degree the organization has respect for nuclear safety and that nuclear safety is not compromised by production priorities.

The Salem / Hope Creek Safety Culture Assessment was conducted at the site between March 1 and March 5, 2004. This report documents the results of the assessment; however, the ultimate responsibility for implementing corrective actions rests with the Salem / Hope Creek leadership team. The team recommends use of the Salem / Hope Creek Corrective Action Program to document for resolution the issues discussed in this assessment report. Due to time constraints, the assessment team was not able to fully assess in all cases whether issues identified on one unit were common to the other units.

The assessment process uses the following five SOER 02-4 attributes as a basis to provide information to Salem / Hope Creek leadership team regarding the presence or absence of characteristics that support a strong site safety culture. A statement of the overall team conclusion follows each SOER 02-4 attribute.

***Attribute a: All employees are encouraged to identify degraded conditions and have demonstrated a willingness to escalate their concerns when the conditions are not corrected.***

**Team Conclusions:** No evidence was found to indicate site personnel would not escalate nuclear safety concerns when not addressed or not corrected. However, some personnel interviewed indicated reluctance to document issues in the Corrective Action Program (CAP) because of perceptions that the CAP is a burden and not an instrument for performance improvement. Another perception is that when a CAP notification is initiated, it will be assigned to the initiator resulting in more work for the initiator. In addition, some individuals interviewed indicated they very seldom receive feedback on issues identified and many times the issues identified do not get satisfactory resolution. Many also believe that management's focus is more on completion dates instead of corrective action effectiveness.

***Attribute b: Station personnel pursue resolution of important and long-standing equipment and materiel problems and execute plant shutdowns, if appropriate, to effect repairs.***

**Team Conclusions:** The corrective action program (CAP) has not been effective in improving station performance. Multiple repeat equipment issues exist due to ineffective corrective actions. Leadership weaknesses contribute to inadequate Work Management stakeholder accountability, work management process inefficiencies, and ultimately to equipment reliability problems. This conclusion is important from the standpoint of the staff's perception of management's ability to

provide the necessary resources, tools, and guidance to resolve issues and help improve plant performance. In some cases, the Salem / Hope Creek site is not learning from internal and external operating experience. Several repetitive events have occurred that were previously documented at the site or at other industry locations. This is indicative of a work environment that is not learning from operating experience.

However, as detailed in the Safety over Production Section of this report, several interviews indicate there has been a recent positive change in the staff's perception of the leadership team. They are now seeing management reinforcing safety and reliability over production concerns and recognizing staff members for meeting this expectation.

***Attribute c: Management is involved in important plant activities, especially those having the potential to affect nuclear safety, and exercises accountability and follow-up as appropriate.***

**Team Conclusions:** The senior leadership team has not established a compelling, visible message that reinforces a strong safety culture. As a result, the values, beliefs, and symbols of a strong safety culture were not apparent at Salem / Hope Creek. For example, some personnel do not exhibit strong reactivity management practices, nor do they effectively use the notification process or operating experience to improve performance. Also, the introductory letters in the General Employee Training materials are from the previous Chief Nuclear Officer. The plant physical condition reflects a tolerance or acceptance of conditions that are less than excellent. One example is the Hope Creek emergency diesel generators, which have more than 160 corrective maintenance material condition reports against them, some of which are over a cycle old. Also, Hope Creek Emergency Diesel Generator D has numerous oil leaks and oil weeps. The leaking oil collects in puddles on the engine deck plates, a condition that would not be expected at other nuclear sites.

***Attribute d: Managers seek critical feedback from both internal and external sources, and first-hand information is actively sought from those personnel intimately involved with the issues.***

**Team Conclusions:** The management team does not effectively use trending, performance monitoring, and internal or external operating experience to the level expected by a learning organization to improve performance. The lack of trending/performance monitoring applies to CAP notifications, system performance, as well as human performance.

The Quality Assurance function is not effectively utilized at Salem / Hope Creek to improve performance. QA Reports appear to be sufficiently intrusive, however improving performance by use of the QA function is hampered by ineffective line management acknowledgment, internalization, and implementation of corrective actions in response to QA findings. QA is not always delivering its message in an effective, convincing manner, either through its written reports or through verbal and face-to-face interactions. Senior Management has not adequately demonstrated its support of the QA Organization. Some QA personnel are reluctant to deliver a stronger message. QA personnel perceive that they have lost some "teeth" based upon feedback

received from previous Senior Management, which encouraged the use of more neutral language in Assessment Reports.

As stated earlier, the Salem / Hope Creek site has had several repetitive events that were previously documented at the site or at other industry locations. This is indicative of a work environment that is not taking full advantage of feedback from all available sources (including the QA Organization) to improve performance.

***Attribute e: Events determined to be significant by the station are recognized and aggressively addressed to determine their root causes and the corrective actions necessary to prevent recurrence.***

**Team Conclusions:** The numerous repetitive equipment issues documented in the Equipment Reliability Section of this report indicates weaknesses in the corrective action and work management programs. Repeat issues suggest a tolerance of poor performance by the management team. Interviews conducted during the assessment week indicated a lack of confidence in the site's ability to resolve equipment issues on the first attempt, on schedule, or in a timely manner. Some modifications (e.g. turbine building cooling modification) represent weaknesses in the design change process resulting in added operational burdens to the staff.

Multiple reactivity control events at Hope Creek are a sign that the leadership team is not aggressively addressing this important issue. The Hope Creek Station staff and management do not always demonstrate a healthy respect for reactor core reactivity with the team noting a number of significant reactivity vulnerabilities overall. The material condition of systems critical to monitoring and controlling core reactivity is not optimal. The health of the control rod drive system and neutron monitoring system is currently assessed as yellow. Hope Creek has experienced a number of reactivity events over the past year. In one instance, Operator actions were not conservative from a reactivity control perspective. QA noted in an assessment report that 20 of 33 completed corrective actions involving control of reactivity issues were inadequately implemented. In an October 21, 2003 letter on reactivity management, station management agreed with a quality assurance issue on reactivity management, yet management downplayed the significance of the issue by introducing their agreement with "Although these evolutions did not have an impact on nuclear safety..." The root cause evaluation team investigating reactivity management practices missed the importance of cultural values and beliefs during their evaluation.

## **II. Background**

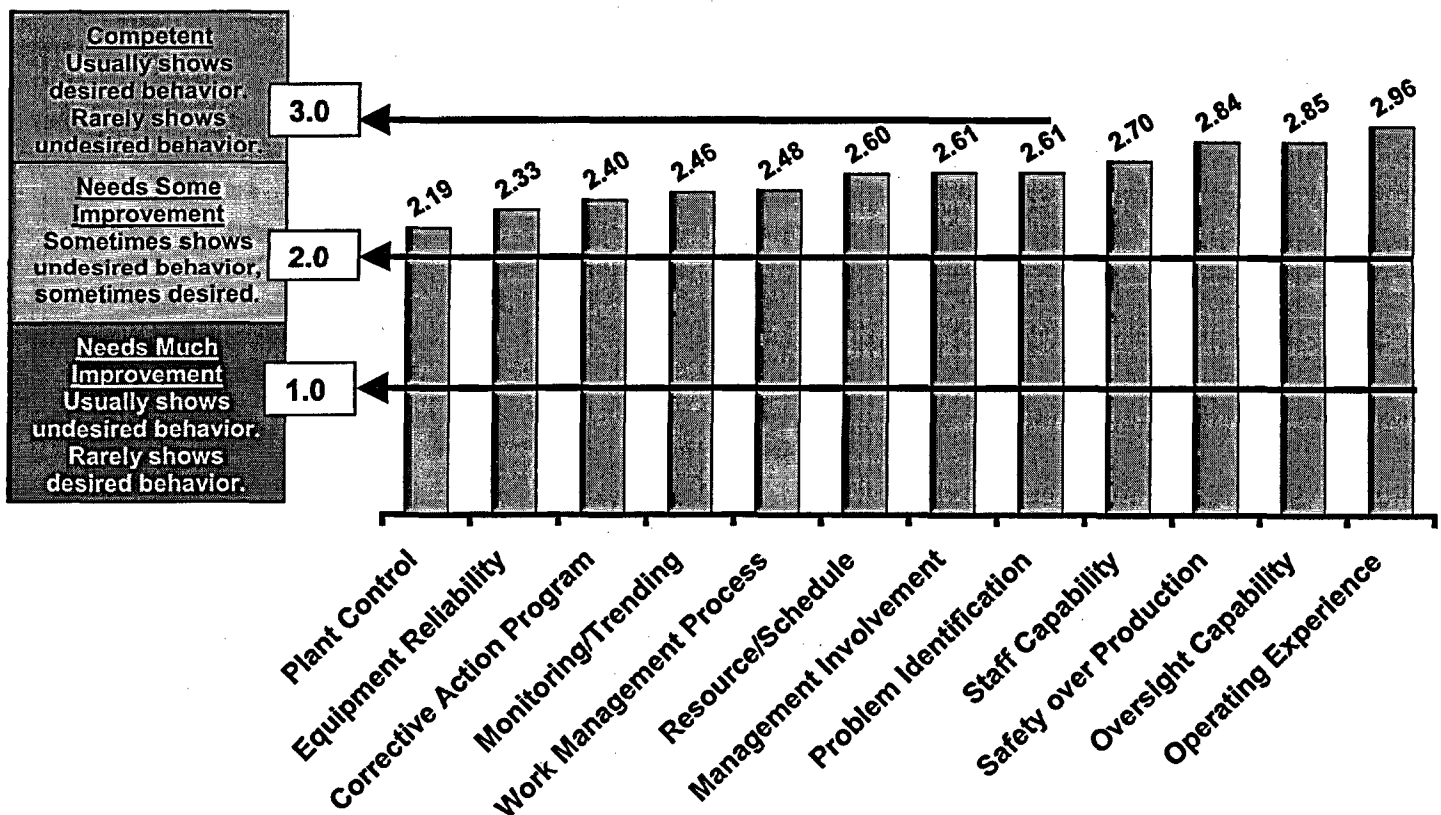
The foundation for the USA Safety Culture Assessment used at Salem / Hope Creek is stated in SOER 02-4 as follows:

*"A major contributor to this event was a shift in the focus at all levels of the organization from implementing high standards to justifying minimum standards. This reduction in standards resulted from excessive focus on meeting short-term production goals, a lack of management oversight, symptom-based problem-solving, justification of plant problems,*

No Strengths were identified during the Salem / Hope Creek Safety Culture Assessment. Three (3) Observations [one positive and two negative], and nine (9) Weaknesses were identified. The exit meeting assessment item and category (observation or weakness) is included in the table below with a reference to the applicable report section.

Category	Exit Meeting Item	Report Section/Page No.
Weakness	Reactivity Management	Plant Control / page 7
Weakness	Corrective Action Process	Corrective Action Program Rigor / page 10
Weakness	Trending	Monitoring/Trending / page 13
(-) Observation	Observation Program	Monitoring/Trending / page 13
Weakness	Work Management	Work Management Process / page 15
Weakness	Inventory/Spare Parts	Work Management Process / page 15
Weakness	Change Management	Resource and Schedule / page 16
(-) Observation	Overtime Controls	Resource and Schedule / page 16
(+) Observation	Senior Management	Management Involvement / page 17
Weakness	Design Control Process	Staff Capability / page 19
Weakness	QA Compliance Oriented	Oversight Capability / page 22
Weakness	Operating Experience Program	Operating Experience / page 24

**Figure 1 Ranking of Safety Culture Attributes**



- In an October 21, 2003 memorandum responding to QA findings on reactivity management, management agreed with a quality assurance issue on reactivity management, yet management downplayed the significance of the issue by introducing their agreement with “Although these evolutions did not have an impact on nuclear safety...” This type of statement may unintentionally soften the message of the reactivity control by stating a direct nuclear safety consequence did not occur; therefore, the issue is seen as not important or significant.

## ***Equipment Reliability (Average Score 2.33)***

***Definition: Safety systems and equipment are maintained to high performance and reliability levels, and workarounds are vigorously eliminated.***

This attribute is the second lowest score of the 12 rollup attributes shown on Figure 1. This average includes scoring from three behavioral characteristics of the EODMM [1.B.1.d (2.54), 3.B.3.e (2.24), and 4.B.3.a (2.20)]. The assessment process for this characteristic did not differentiate between safety and non-safety equipment. This attribute is important from the standpoint of the staff’s perception of management’s ability to provide the necessary resources, tools, and guidance to resolve issues and help provide them with a reliable plant.

The team concluded:

- Equipment Reliability issues have a negative impact on the staff’s desire to bring up equipment issues when they have repeatedly brought the same issues up before without adequate resolution. (See Corrective Action Program Rigor page 10, and Problem Identification page 18.).
- Inefficiencies in the work management process contribute to Equipment Reliability issues (see Work Management Process, page 15).
- Design Control inadequacies have challenged the operations department (see Staff Capability page 19).
- Inadequacies in monitoring and trending have a negative impact on Equipment Reliability (see Monitoring/Trending, page 13).

Several interviewees cited reliability or repetitive issues with SW 17 valve, Service Water and Circulating Water System problems, LPRM operability determinations, Turbine Building Cooling Units, Positive Displacement Charging Pump, CRDMs and related equipment, turbine oil conditioning filter skid, water treatment equipment, oil leaks and roof leaks, etc.

One significant example of poor equipment reliability is the multiple failures or degradation of circulating water pumps at Salem. Although it appears that the current root cause evaluation being conducted on the Circulating Pump 13B problems is on the correct path for resolution, multiple previous attempts to address the issue have failed over the years. Attachment 5 is a comparative case study performed by the USA team showing similarities between the Pump 13B issues and the recent industry event concerning reactor vessel head degradation.

The following statements from several interviews indicate management's inability to instill a low tolerance for unreliable equipment and the staff's frustrations with reliability issues:

"There is a letter stating expectations for equipment deficiencies but few people are aware of this letter"

"Salem PMs may be suspended for some period of time"

"Work Control is broke. Problems with getting equipment fixed."

"Many are tired of writing up the same problem over and over."

"CAP is considered "just more work," not a way to improve"

"Staff still believes that some items will not get fixed because "that's the way it is" "

"If Operations does not push an issue personally, it will not get done."

The team noted that the plant physical condition reflects management and staff tolerance for degraded equipment condition. One example is the Hope Creek emergency diesel generators, which have more than 160 corrective maintenance material condition reports against them, some of which are over a cycle old. In addition, Hope Creek Emergency Diesel Generator D has numerous oil leaks and oil weeps. The leaking oil collects in puddles on the engine deck plates, a condition that would not be expected at other nuclear sites. The material condition of the emergency diesel generators (one of the mitigating systems) should always remain high on the site's priority list.

### **Corrective Action Program Rigor (Average Score 2.40)**

***Definition: Investigations are performed on important or repetitive problems as well as adverse trends from non-consequential events. Root causes as well as generic implications are identified. Corrective actions prevent recurrence. Process and program issues are rigorously reported and corrected. Corrective actions are identified and tracked to completion. Dates for action are commensurate with the importance of the item, station priorities, and the consideration of preventing recurrence. Significance determination is integrated with problem identification. Site priority is given to conditions that impact the safe, reliable operation of the station. Management takes deliberate action and provides feedback on the disposition of identified problems. Personnel understand the threshold of problem reporting. The threshold for problem identification is appropriate.***

This attribute is the third lowest score of the 12 rollup attributes shown on Figure 1. This average includes scoring from nine behavioral characteristics of the EODMM and LM [3.B.1.a (2.71), 4.B.3.a (2.20), 6.h (2.26), GG (2.19), 5.B.3.e (2.40), 1.B.2.c (2.50), 1.B.3.a (2.38), 1.B.3.c (2.39), and 1.B.2.a (2.58)]

The Corrective Action Program has not been effective in improving station performance due to a reluctance to document issues, a lack of persistence in identifying problems, and eroded confidence in the process to resolve issues. Team members also identified failures to implement the requirements of the corrective action program, such as failure to capture issues that should have had operability reviews.

a. Personnel are sometimes reluctant to document issues in corrective action notifications because of perceived or actual consequences. The following examples tend to show a belief that CAP is not seen as “real work” important to improving station performance. Rather it is viewed as a burden or additional work. This is a significant cultural issue that must be addressed.

- The resulting work will most likely be assigned back to the originator.
- Due dates that are imposed for completion of corrective action (CAP) related work can place a priority on CAP work that is higher than normal work responsibilities, even though the regular work may be more important to the plant.
- Supervision and management in many work groups make a clear distinction between CAP work and “real work” and tend to characterize CAP work as an extra burden rather than the process to improve performance.
- Root cause and apparent cause evaluations are considered tedious and time consuming, which adds to the perception that corrective action notifications are an added burden.
- Some personnel stated that they have pressed others to document notifications for issues that they had actually identified to avoid writing notifications “on themselves,” and/or to prevent assigning the resultant work to themselves.

b. Many PSEG personnel lack persistence in identifying problems because of the following barriers to issuing corrective action notifications:

- Personnel cited a management expectation for extensive research to provide significant detailed analysis before issuing a corrective action notification, in order to avoid being told that the notification is “premature.” This can lead to a delay in obtaining a required operability review and timely corrective actions.
- Some personnel stated that they avoid issuing corrective action notifications because they struggle with the SAP software system and need help to use it.

c. Employee frustration with failure of the corrective action process to resolve issues has eroded confidence in the process.

- Corrective action notification originators are not typically contacted for input and do not get feedback on the disposition of identified problems. Personnel are not familiar with methods to obtain information and state that they are usually unaware of status changes or corrective action progress.
- Personnel feel a need to expedite their identified issues to assure that they will be corrected; otherwise, their issues will not get appropriate attention.



After one week on site, the team noted a lack of objective evidence of a clear, strong, nuclear safety culture message. Several interviewees indicated some management does reinforce safety as a priority, however, when asked for a specific management policy or specific formal training on this issue; the policy could not be articulated or located. While many of those interviewed believe the new management team has exhibited good balance between safety and production concerns, the objective evidence (*e.g., values, beliefs, and symbols*) in some areas does not support this belief. As a result, the assessment team could not articulate senior management's safety culture message either. The senior leadership team has not yet established and communicated a compelling, visible message that reinforces a strong safety culture.

- **Values:** Evidence indicates that some personnel do not value strong reactivity management practices. See "Plant Control" (page 7) concerning lack of evidence for sound reactivity management practices. In one case, it appears that management downplayed the value of an issue by rationalizing that a practice or behavior did not have an impact on safety. In an October 21, 2003 letter on reactivity management, management agreed with a quality assurance issue on reactivity management, yet downplayed the significance of the issue by introducing their agreement with "Although these evolutions did not have an impact on nuclear safety..." The Onsite Independent Review Quarterly Report for the 4<sup>th</sup> Quarter 2003 states "This lack of resolve in meeting procedural requirements at the point of contact is a contributor to the site-wide issues involving Reactivity Management..."
- **Beliefs:** The assessment team found evidence where some site personnel do not take full advantage of the corrective action program. See discussions in "Corrective Action Program Rigor" (page 10). They believe the CAP process is a burden and not a vehicle to improve performance. The Onsite Independent Review Quarterly Report for the fourth Quarter 2003 states "Weaknesses have been identified with Corrective Action Program Effectiveness..." Many personnel perceive management's focus for the corrective action program is on completion dates and ages of issues instead of quality and effectiveness of corrective actions.
- **Symbols:** The plant physical condition, symbol, in several areas reflects a tolerance for mediocrity. The Hope Creek Emergency Diesel Generators have more than 160 corrective maintenance materiel condition problems. Some of the problems are more than one cycle old. Hope Creek Emergency Diesel Generator D has numerous oil leaks and oil weeps. The leaking oil collects in puddles on the engine deckplates, a condition that would not be expected at other nuclear sites. The Hope Creek safety related service water intake structure had numerous leaks, lights out of service, and other deficiencies.

An important contributor to a culture that shares the belief that nuclear safety is the overriding priority is management's ability to establish and reinforce nuclear safety expectations and conservative decision-making as well as recognizing people for doing so. In several of the interviews conducted, staff personnel indicated that the new management team is beginning to recognize individuals for making conservative decisions. Positive effects from this management behavior is illustrated in the following interview responses to questions concerning management's reluctance to repair or to shut down and fix things even though production is at stake:

## **Attachment 5 Circulating Water Pump 13B Case Study**

On November 22, 2003, the lower portions of Salem's CW Pump 13B pump casing were found detached from the pump and lying in the forebay. After repair and return to service, a month later (12/24/03) the same pump dropped the same parts into the forebay.

The USA Safety Culture Assessment team reviewed the site's behavioral characteristics potentially contributing to the repeated failure of Circulating Water Pump 13B. The review indicates site performance and behaviors associated with this complicated issue do not adequately fulfill principles for a strong organizational safety culture. Because the CW System is non-safety related and is designed with good redundancy, this event does not have the nuclear safety consequences or significance of the Davis-Besse Head Degradation Event. However, for this issue many behaviors at PSEG are similar in nature to behaviors that existed at Davis-Besse.

The USA Safety Culture Assessment Process includes a scorecard of ninety (90) behavioral attributes extracted from INPO's "Principles for Effective Operational Decision-Making," "Warning Flags from Plants in Extended Shutdowns," and other USA standards. Learning opportunities associated with approximately 70 of the 90 behavioral attributes exist for just this one issue. A few of the applicable discussions in the "Principles for Effective Operational Decision-Making" include the following:

- **Personnel at all levels recognize and are intolerant of conditions and behaviors that challenge or reduce margins of plant safety or reliability.**
- **Supervisors and managers take actions to resolve problems and provide feedback to personnel.**
- **The station culture encourages and reinforces a questioning attitude within the workforce.**
- **Decision-makers exhibit strong technical competence, strive to understand broad technical problems, ask challenging questions to confirm technical assumptions, and are sensitive to the aggregate impact of problems, including business aspects.**

Comparing the site's behavioral characteristics associated with the CW Pump 13B issue with the Davis-Besse Case Study provides an excellent learning opportunity for the entire site organization as it progresses towards operational excellence. A few of the comparisons include the following:

## Site Knowledge of a Known Hazard with the Potential to Degrade Plant Equipment

**Davis-Besse Hazard:** Boric Acid

**Salem Hazard:** Brackish Water and grass.

### Addressing symptoms and failing to get to the root cause.

**Davis-Besse:** Containment Air Cooler (CAC) Fouling, Radiation Monitor Filter Plugging, red boric acid lava flows on the reactor head, increasing trends in containment radiation, and RCS leakage.

**Salem:** Multiple cases of loose or missing bolts, inspections indicating flange corrosion, bolting flange alignment, impeller failures, and pump casing material issues.

### Outage Management

**Davis-Besse:** To remain on the outage schedule, decisions were made to remove scaffolding before thorough reactor head cleaning and nozzle inspection.

**Salem:** To remain on schedule, prohibiting the construction of scaffold towers to perform circulating pump casing external inspections.

### Management Involvement and Oversight

**Davis-Besse:** Limited containment entries, inadequate oversight of the corrective action program, overly focused on production concerns or outage duration, and acceptance of degraded conditions (i.e., starting up with known leaking valves and CRD flanges).

**Salem:** General acceptance of corrective actions in the past and past high tolerance for degraded equipment condition and system reliability. Management was not asking the hard question: "Is it fixing the cause or is it fixing the symptom?"

### Oversight/Inspection

**Davis-Besse:** Overreliance on the written word provided by others concerning head cleanliness. Glowing reports from QA without going out and looking.

**Salem:** Limited QA, line, and management involvement in underwater inspections of the CW pumps. May/June 2003 inspections were not completed over the objections of engineering. Three months later, 26 of 44 bolts found missing on Pump 13B guide barrel.

Internal and External Operating Experience	
<p><b>Davis Besse:</b> <u>External OE:</u> Head degradation at two other plants in early 1990s. Numerous industry events associated with boric acid corrosion. Nozzle leakage at Oconee in 2001 with CRD nozzle circumferential cracking.</p> <p><u>Internal OE:</u> Severe pressurizer spray valve corrosion and significant regulator enforcement action. Severe steam generator shell corrosion due to boric acid leakage with the same symptoms as the head degradation event (CAC fouling etc).</p>	<p><b>Salem:</b> <u>External:</u> Similar CW pump failures at Duane Arnold, D.C. Cook, and Fermi 2.</p> <p><u>Internal:</u> Pump barrel loose or replaced in 1990, 1992, and 2002. February 2002, pump bell hanging by two bolts. August 2002, 2 bolts missing. Bolting issues associated with fiberglass bell mouth.</p>
Benchmarking	
<p><b>Davis Besse:</b> Overconfidence in performance and limited interface with industry. (i.e., silo effect)</p>	<p><b>Salem:</b> Predictive maintenance at other stations concerning CW pump vibrations predicted impending failure of their CW pump. Can enhancements improve Salem / Hope Creek predictive maintenance?</p>
Corrective Action Program	
<p><b>Davis Besse:</b> Inadequate cause evaluations, failure to recognize significance of issues, inadequate trending. Overreliance on previous cause evaluations concerning engineering assumptions (i.e., boric acid corrosion does not occur because the reactor head temperature is greater than 500° Fahrenheit).</p>	<p><b>Salem:</b> Past cause evaluation inadequate. Engineering judgment flawed on use of backing rings to correct bolting/flange alignment.</p> <p>Current cause evaluation is much improved. Use of fault tree methodology, time lines, and event and causal factors charts improves success in determining real root cause. Adequacy of the two level 1 CRs and associated corrective actions can improve reliability.</p>

**INDEPENDENT REVIEW RESPONDING TO THE  
JANUARY 28, 2004 NRC LETTER  
REGARDING THE  
SAFETY CONSCIOUS WORK ENVIRONMENT  
AT THE  
SALEM AND HOPE CREEK GENERATING STATIONS**

**May 4, 2004**

**James O'Hanlon, Team Leader  
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sufficient steps to assess the work environment. Although it appears to the Team that PSEG has taken appropriate initial and immediate actions in response to these two recent initiatives as reflected in PSEG's February 27, 2004 letter to the NRC, it is too soon for the Team to further characterize or assess the sufficiency of PSEG's response. In this regard, PSEG plans to consider the findings and recommendations of these initiatives, together with this report, in formulating a comprehensive set of actions to enhance the work environment.

In requesting that PSEG conduct an in-depth review, NRC referred PSEG to NRC's inspection record and certain unspecified unresolved conflicts involving operational decision-making. PSEG also asked the Team to consider any impact on the work environment from the corporate / site interface. In organizing its findings, the Team first reviewed the SCWE implications of: (1) NRC's inspection record (Section V.A); (2) events involving operational decision-making and unresolved conflicts (Section V.B), including their SCWE and broader management implications (Section V.C); and (3) the corporate / site interface (Section V.D). The Team then made findings relative to the four SCWE criteria: (1) employee willingness to raise concerns (Section V.E); (2) effectiveness of the normal processes for resolving concerns (Section V.F); (3) effectiveness of the Employee Concerns Program (ECP) (Section V.G); and (4) management effectiveness in detecting and preventing retaliation and chilling effect (Section V.H).

The Team's conclusions as to the four criteria in assessing SCWE are:

1. Do personnel feel free to raise nuclear safety concerns without fear of retaliation for doing so?

Conclusion

Personnel will raise nuclear safety concerns. Some individuals did express some hesitancy in raising issues for fear of retaliation, while others expressed similar hesitancy because of issues having been raised yet not resolved, the lingering effects from the unresolved issues cited in this report, or an ineffective corrective action program.

2. Is the site problem identification and resolution process effective (primarily the corrective action program) when addressing employee concerns?

Conclusion

While management has been receptive to issues perceived to be significant or involving a nuclear safety issue, management has been less receptive and ineffective in addressing other employee concerns, particularly longstanding equipment problems, principally due to ineffective implementation of the corrective action program and work management practices.

3. Are there alternate mechanisms, such as an Employee Concerns Program, available for personnel to raise nuclear safety concerns and are they effective?

Conclusion

Although the Employee Concerns Program has the requisite elements of an acceptable program, it could be enhanced. As implemented, the ECP has been ineffective in that a significant fraction of site personnel (15-20 percent) do not view it as a viable alternative to raise

concerns, and the program did not identify to management with sufficient clarity the SCWE issues reflected in the findings of this report, the Synergy Survey, and USA Assessment.

4. Is management effective at detecting and preventing retaliation and addressing any chilling effect in response to employee concerns?

#### Conclusion

The Team did not review the merits of individual claims of retaliation currently pending at the company; however, based upon the numerous interviews the Team did conduct, and the relatively small number of such claims, the Team could not identify a systemic issue involving management's ability to detect and prevent retaliation. In contrast, as best illustrated in Section V. B., "Unresolved Conflicts," management has not been effective at understanding or addressing the potential for a chilling effect in response to how management has addressed highly visible employee concerns and actions associated with operational events.

The Team's conclusions and recommendations as to the nine elements of a healthy SCWE, derived from NRC's Policy Statement, are:

1. Documentation and communication of management's SCWE expectations

#### Conclusion

PSEG recently issued an appropriate SCWE Policy, but now needs to effectively communicate that policy and assure it is reflected in implementing procedures, training, and promotional material.

#### Recommendation

Assure management expectations and standards regarding SCWE and professionalism are established and communicated.

- Assure the recently issued SCWE policy is reflected in all implementing procedures, as well as SCWE training and promotional material.
- Document expectations regarding procedural compliance, conservative decision-making, and roles and responsibilities for operational decisions.
- Emphasize management's responsibility to promote and act in conformance with these standards and expectations.

2. Training on, and reinforcement of management's SCWE expectations

#### Conclusion

SCWE and supervisory skills training has been insufficient and needs to be upgraded.

#### Recommendation

Train all personnel on the recently-issued SCWE policy, upgrade existing supervisory skills training, and thereafter, promote and reinforce SCWE on an ongoing basis. This training should include:

- Revising site access training to incorporate the revised SCWE policy.
- Training all personnel on SCWE, including contractors, concerning how to raise an issue and what to expect from management in responding. Consider using the

### **3. Elements and implementation of the Corrective Action Program**

#### **Conclusion**

Implementation of the Corrective Action Program and work management processes have been ineffective as set forth in this report and the USA Assessment.

#### **Recommendation**

Correct identified deficiencies in the implementation of the Corrective Action Program and work management processes as set forth in this report and the USA Assessment. In this regard:

- Leadership needs to re-establish the roles and responsibilities of those involved in these programs and re-emphasize adherence to these processes.
- Re-establish management's expectations as to the appropriate threshold for raising issues in light of the practice that has developed relative to longstanding issues.
- Develop and effectively implement a plan to aggressively address longstanding equipment problems. Involve Operations in the process, ensure sufficient resources are applied, and communicate status to the site.

### **4. Elements and implementation of the Employee Concerns Program**

#### **Conclusion**

Although the Employee Concerns Program has the requisite elements of an acceptable program, it could be enhanced, and, as implemented, it has been ineffective in the two respects previously noted.

#### **Recommendation**

Upgrade ECP consistent with the findings in this report, including elements, such as:

- Define core ECP responsibilities and then assure resources are adequate.
- Establish and follow a rigorous administrative process for core ECP functions, including case management, investigations, and documentation.
- Augment and enhance ECP promotional materials and activities.

### **5. The quality and use made of SCWE self assessments**

#### **Conclusion**

Recent work environment assessments performed by Synergy and USA are appropriate diagnostic assessments, the results of which are currently under review by management. Comparable assessments should be conducted on a periodic basis.

#### **Recommendation**

Continue PSEG SCWE self assessment activities, including:

- Periodically perform a survey similar to the recent Synergy Survey so as to monitor progress and trends.



8. Management's responses to claims of retaliation

Conclusion

A uniform system is not in place to assure all claims of retaliation are promptly and uniformly reviewed, and management has not sufficiently understood or considered the chilling effect in response to such claims.

Recommendation

Establish a process to assure prompt and uniform investigation of retaliation claims regardless of where they are raised in the organization. This fact-finding function should not remove ultimate responsibility from line management in responding to claims of retaliation.

9. Management of and interface with contractor personnel

Conclusion

Management of and interface with contractor personnel does not present a programmatic challenge to the SCWE at the Salem and Hope Creek site; however, one contractor indicated a hesitancy to raise an issue because he was a contractor.

Recommendation

Assure providers of contract personnel establish a comparable SCWE program, including a SCWE policy, training, and a requirement that PSEG is notified of any retaliation claim and provided the results of any review.

In addition to the four criteria and nine elements, the Team focused on SCWE implications from certain unresolved events involving operations, the NRC inspection record, and corporate / site interface. The Team's conclusions and recommendations as to these areas are:

1. Unresolved Events

Conclusion

While none of the unresolved events that are described in this report involved reactor operations that put either the plant or public at risk, these events demonstrate that some in management, as well as some among the workforce:

- Place a greater emphasis on production and schedule considerations than conservative decision-making.
- Tolerate degraded equipment conditions and expect personnel to work around operational challenges presented by such conditions.
- Tolerate procedural non-adherence.

These events also demonstrate that some in management:

- Do not clearly communicate standards or the rationale behind their actions, or provide feedback to those raising issues.
- Have taken actions, or failed to take actions, that have had a chilling effect on the willingness of certain employees to raise concerns.

- Become involved in decisions more appropriately the responsibility of Operations.

Management is addressing and making progress in overcoming many of these perceptions, but has not yet regained the trust and confidence of Operations. For example, management is in the process of ensuring that the responsibility and decision-making authority remains within Operations, but needs to further clarify expectations in light of these earlier misperceptions, and then act over an extended period of time consistent with those expectations. This effort is made more difficult by some in the workforce who have not accepted the need to strictly adhere to procedures. In some cases, mixed messages from management's actions with respect to procedural adherence compound the difficulty.

#### Recommendation

Although former management is largely responsible for allowing the conditions to exist that caused these unresolved conflicts to occur and linger, the current Salem / Hope Creek management team must visibly embrace the above recommendations (particularly recommendations 1, 2, 3, and 6) and lead implementation over time to regain the trust and confidence of the workforce.

#### 2. NRC Inspection Record

##### Conclusion

The record reflects the site's failure to:

- Consistently translate engineering information into work documents.
- Consistently take prompt and effective correction action.
- Adequately identify or properly classify procedural violations.

##### Recommendation

- Review the corrective action program data base to determine if there are similar findings identified regarding the process for translating engineering requirements into working documents. From this review, determine the scope of the problem, and if additional corrective actions are warranted.
- Determine if the findings in Section V.A. of this report represent a systematic problem, and determine if additional corrective actions are appropriate.
- Perform a review of the Root Cause Analysis and the corrective action statement for the "A" Emergency Diesel to determine that the correct level of analysis is specified for copper content.
- Reconsider the evaluation findings of Notification 20140525 to ensure consistency of the facts with the findings. Verify that the messages sent in the corrective actions are consistent with management's standards and expectations for procedural adherence.

### 3. Corporate / Site Interface

#### Conclusion

- As to working-level personnel and mid-level management, the interface has not caused a past or current SCWE issue in that the vast majority of individuals within this group have not linked the interface with the raising or addressing of concerns. Some working-level personnel and mid-level site managers, however, have assumed a negative impact from the interface in that they infer: (1) site management is not fixing longstanding equipment issues because corporate is not providing the necessary funds, and (2) site management's conduct in the course of the unresolved conflict events resulted from perceived pressure from corporate to place production and scheduling issues over conservative decision-making.
- As to senior site and corporate management, again this group has not linked the interface with the raising or addressing of concerns. Nonetheless, several within this group are frustrated because they believe corporate guidance has not been clearly communicated, and the roles and responsibilities among nuclear officers and their corporate counterparts, particularly in the areas of HR, Labor Relations, Budget, and Financial Planning, have not been clearly defined. Further, some employees have perceived the business planning process and incentive compensation process as communicating a greater emphasis on production and schedule than on conservative decision-making.

#### Recommendation

PSEG needs to more effectively communicate between corporate and nuclear. It also needs to clearly define the interplay between PSEG Nuclear, PSEG Power, and PSEG relative to such support functions as financial planning, HR support, and Labor Relations, and thereafter, document the respective roles and responsibilities in appropriate guidance documents, such as the PSEG Power Play Book. Specifically, corporate should:

- Improve the direct communications link from corporate to the site.
- Improve the communication of corporate issues to the site, including business planning, incentive compensation, corporate structure, and reorganizations.
- Provide better senior level and middle management level direct interfaces between corporate and the site.
- Establish and maintain a nuclear succession plan to assure stability.
- Review goals and revise as necessary to assure proper relationships among safety and production parameters.
- Revise Power Behaviors to include a safety value and list it first.
- Review incentive compensation to assure alignment with recommendations 4-6 above.
- Site management must embrace and consistently communicate corporate goals and behaviors.

The vast majority of the survey questions were positive statements to which employees rated their degree of agreement or disagreement. A few questions sought ratings of adequacy of an area of performance or the environment, and others requested a yes or no response. The Synergy response scales had a "mid-point" value of 3. Thus, scores greater than 3 represented positive or adequate responses and less than 3 represented negative or less than adequate responses. Synergy computed means and standard deviations for each question. Synergy further calculated weighted mean value scores for its "cultural models" based on its experience (conducting over 80 surveys at more than 35 commercial nuclear sites) on the significance of the information elicited by the question to the culture or work environment.

### 3. General Findings

Considering the broad scope of the Synergy Survey, some, but not all, of its findings are relevant to the Independent Assessment. The areas of the Synergy Survey of most relevancy to the Independent Assessment are "Composite" ratings of SCWE and the ECP. In addition, the evaluation of certain aspects of the "Nuclear Safety Values, Behaviors and Practices," "Leadership Behaviors and Practices," and "Personnel Management Behaviors and Practices," areas of the Synergy Survey also provided information relevant to the Independent Assessment.

Of particular interest to the Independent Assessment, the Synergy Survey resulted in the following findings:

- 99.2 percent of the survey respondents indicated that they would inform their supervisor if they identified a potential nuclear safety issue or concern. A similar number (97.6 percent) indicated that PSEG genuinely encourages its employees to identify potential nuclear safety concerns or issues, and 96.5 percent stated that their immediate supervisor receives raising potential nuclear safety concerns or issues favorably.
- The Salem and Hope Creek site's SCWE is rated "Acceptable"; however, it does not compare favorably to the rest of the nuclear industry. The specific numerical rating of 4.31, places the site in the 11th percentile of commercial nuclear power plant sites within the Synergy industry database.
- The Salem and Hope Creek ECP is rated "Adequate," but again, its relative stature places it in the 16th percentile of commercial nuclear power plant sites within the Synergy industry database.
- The Salem and Hope Creek site is rated in the low end of "Good" in the area of Nuclear Safety Values, Behaviors and Practices, placing it in the 11th percentile of commercial nuclear power plant sites within the Synergy industry database.
- The Salem and Hope Creek site is rated at the low end of "Adequate" in the area of Leadership Behaviors and Practices, placing it in the 11th percentile of commercial nuclear power plant sites within the Synergy industry database.
- The Salem and Hope Creek site is rated at the low end of "Good" in the area of Personnel Management Behaviors and Practices, placing it in the 44th percentile of commercial nuclear power plant sites within the Synergy industry database.

#### **4. The Independent Assessment Team's Evaluation of the Synergy Survey**

The Synergy findings are consistent with those of the USA Assessment, as well as the findings of this Independent Assessment. Synergy Consulting Services is a well-respected organization providing consulting and assessment services to a large segment of the nuclear power industry. Synergy has conducted more than 80 cultural assessments within the nuclear industry at more than 35 nuclear power plant sites. Synergy's data collection and analytical methods have been accepted as able to provide useful and accurate information regarding a nuclear plant's culture. Accordingly, the findings arising out of the Synergy Survey listed above are considered to accurately reflect the Salem and Hope Creek culture, and are considered valuable data points in the current Independent Assessment.

PSEG Nuclear management appears to be taking a comprehensive response to the Synergy Survey. Upon receipt of the results, management created seven employee-led teams to analyze the results and provide to management proposed corrective actions, and also took other actions outlined in PSEG's February 27, 2004 letter to NRC. Management is intending to consider those recommendations, together with those from the USA Assessment and this review, and develop an integrated plan. Although management's initial response is sound, it is too soon for this Team to further characterize or assess the sufficiency of the response.

#### **B. USA Safety Culture Assessment**

##### **1. Purpose and Scope of the USA Safety Culture Assessment**

The specific objectives of the USA Assessment were to evaluate the station's culture against the five attributes of a strong safety culture identified in INPO SOER 02-04, namely:

- Employees are encouraged to identify degraded conditions and demonstrate a willingness to escalate their concerns when the conditions are not corrected.
- Station personnel pursue resolution of important and long-standing equipment and material problems, and execute plant shutdowns, if appropriate, to effect repairs.
- Management is involved in important plant activities, especially those having the potential to affect nuclear safety, and exercises accountability and follow-up as appropriate.
- Managers seek critical feedback from both internal and external sources, and first-hand information is actively sought from those personnel intimately involved with the issues.
- Events determined to be significant by the station are recognized and aggressively addressed to determine their root causes and the corrective actions necessary to prevent recurrence.

##### **2. Process**

The USA Assessment combined data review, interviews, and behavioral observations to assess station management behaviors against key principles outlined in INPO Document, "Principles for Effective Operational Decision-Making" and related documents. The USA Assessment was conducted in three phases: (1) Pre-screening Data Collection and Review; (2) Assessment Implementation; and (3) Final Report Preparation with Recommendations.

The ECP Manager summarized the results of the third quarter SCWE self evaluation to the NRB stating that "there is a SCWE at PSEG Nuclear, LLC, however, there are numerous and significant challenges to it." In particular, the ECP Manager highlighted "reorganization," "increased level of expectations," and "enforcing accountability" as major challenges, which have led to "uncertainty" and a "setback to the manager / union relationship." The ECP Manager also highlighted four site organizations he characterized as "hot spots," indicating that they exhibited some level of SCWE challenges. These organizations were Security, Chemistry, Operations, and Engineering.

4. The Independent Assessment Team's Evaluation of the PSEG SCWE Self Evaluations

The PSEG SCWE survey is an adequate tool to obtain at least some of the information necessary to assess the SCWE. However, the survey, together with the review of certain SCWE PIs, has not been effective to assess and enhance the work environment. This appears to have resulted from a combination of an unclear message from the ECP Manager to PSEG management as to what needs to change, coupled with a lack of responsiveness by nuclear management to the message. For example, while sites with strong SCWEs routinely show positive results well above ninety percent in most or all four SCWE attributes, PSEG's results were in the seventy-five to ninety percent range. Of particular concern is that these results have not shown significant improvement over several years. Further, although the ECP Manager properly identified challenges to SCWE at Salem and Hope Creek, no recommendations to address these challenges appeared in his NRB presentation, or are reflected in the minutes of the NRB meetings. Finally, other nuclear sites have found it particularly useful to gather survey respondent data of sufficient specificity to permit a more focused examination of the work environment. In particular, requesting participants to identify the Unit and Department for which they work would allow better identification of SCWE-challenged pockets within the organization and allow focused corrective actions by management.

D. Winston & Strawn Review

1. Purpose and Scope of the Winston & Strawn Review

In a letter dated March 25, 2003, a former PSEG employee (the concerned individual or CI) claimed that she was terminated by PSEG in retaliation for raising nuclear safety concerns. The CI claimed that the concerns motivating her termination consisted of issues she relayed to senior management regarding their "leadership weaknesses, failings, and inadequate attention to employee-raised issues." These issues were purportedly based on her own observations and information provided to her by other members of the PSEG Nuclear organization. In this regard, the CI described a number of specific interactions she had with members of the management team.

PSEG chartered the law firm Winston & Strawn (Winston) to conduct an investigation into all of the CI's concerns. The scope of the investigation was identified in a charter, which stated that Winston would address the following concerns:

- A. Has senior management created a work environment within PSEG Nuclear that is conducive to raising and addressing nuclear safety concerns?

leakage; Salem boron dilution discrepancy; Salem source range anomalies; and the Hope Creek main steam isolation valve drifting closed on loss of isolation gas.

What follows for each of the fourteen events is (1) a description; (2) observations/perceptions; and (3) SCWE and related implications. The description of each event is based upon information the Team gained from the interviews and, in some cases, documents such as NRC Inspection Reports. The Team did not attempt to describe the events in detail, but has provided enough information to give the reader context for the SCWE significant aspects of the event. The documented perceptions are based upon information provided, and opinions and feelings expressed by individuals either involved in or having knowledge of the event. The Team limited its review and conclusions to the apparent unresolved conflict. Although establishing a SCWE is the primary responsibility of management, these events show that inappropriate actions were taken and decisions made by personnel at all levels of the organization.

1. Circulating Water System Level Instrumentation (Salem, December 2003 – January 2004)

a. Description

Differential pressure instrumentation senses the water elevation change across the circulating water system screens. This instrumentation causes circulating water pumps to trip if the differential pressure across the screens increases to a certain level. Instrumentation readings become erratic in freezing weather. Operations management issued a temporary standing order (TSO) to address this recurring problem, which allowed for the bypass of the trip functions of the instrumentation associated with a screen, so that the corresponding circulating water pump would not be unnecessarily tripped. Some Operations personnel expressed concern over bypassing the automatic trip functions and the use of a TSO, rather than a procedure change, to specify operator actions.

b. Observations/Perceptions

- There was a difference of opinion regarding the operation of the circulating water system. Some operators felt that bypassing the automatic circulating water pump trip function was not conservative. Contrary opinion considered it to be an appropriate, yet difficult decision because it went against common sense. An Assistant Operations Manager (AOM) said he wrote an on-the-spot change to the procedure to prevent unit trips or transients from the freezing sensors. (Management / Labor Interface, Non-Conservative Decision-Making)
- Some operators felt that a TSO was written simply out of convenience and that the proper course of action was to generate a procedure change. In this regard, two AOMs referenced the writing of an on-the-spot procedure change to bypass the automatic trip functions. (Procedure Adherence)
- Some Nuclear Equipment Operators (NEOs) stated that they did not have a clear understanding of the conditions and expected compensatory actions. An NEO raised concerns regarding bypassing the trip function to the circulating water supervisor and the shift manager, but did not write a Notification because of the TSO. (Communication of Issues)

- Some operators viewed management's actions as an example of a production mentality, in particular, that management failed to take actions specified by plant procedures or take the actions to correct the recurring instrumentation problem and, instead, tolerated degraded conditions. (Schedule and Production Issues)
- An NEO indicated that his immediate supervision advised him they weren't going to challenge the decision to bypass the trip function. (Chilling Effect)

c. SCWE and Related Implications

Management was not effective in resolving this issue and tolerated a recurring instrumentation problem. Management's perceived preference for production over procedural adherence could discourage the raising of concerns that have the potential to impact safe plant operation. Management was not effective in communicating and addressing differences of opinion regarding the operation of the circulating water system. Management did not effectively communicate why the compensatory actions taken were appropriate and in accordance with conservative decision-making. Management also did not effectively communicate appropriate operator expectations and actions regarding use of a TSO, versus a system operating procedure change.

2. Subcriticality (Hope Creek, November 2003)

a. Description

Operators were returning the unit to service following an outage. Operators needed to ready the reactor core isolation cooling system (RCIC) for service prior to reactor pressure reaching 150 psig to comply with Technical Specification requirements. In order to prevent exceeding 150 psig, the operators stopped withdrawing control rods. As a result of a previous reactivity event in March 2003, management prohibited the operators from using the bypass valve jack when the reactor is critical to control reactor pressure (hence temperature) and the heat-up continued. The negative reactivity temperature coefficient caused the reactor to go subcritical. The procedure did not provide clear direction as to what actions needed to be taken prior to resuming the start-up.

b. Observations/Perceptions

- A member of the operating shift did not view management's decision to prohibit the use of the bypass valve jack to be well thought out. The plant manager also thought the corrective action from the previous event was inappropriate. A member of Operations management viewed the operators' decision to re-commence the start-up after the reactor went subcritical as a non-conservative decision. (Non-Conservative Decision-Making)
- Management believed the operators did not properly plan the start-up by not having RCIC available. The operators felt that prohibiting the use of the bypass valve jack as a means of pressure control was the source of the problem. The operators involved with the start-up felt that they did a good job. Quality Assurance initiated a Level I Notification against resuming the start-up because the procedures did not cover the specific operator decisions and actions. (Differing Views of Performance, Procedure Adherence)



c. SCWE and Related Implications

The event calls into question management's effectiveness in resolving a problem. This event also indicates that management standards and expectations regarding procedure use and adherence have not been followed, clearly understood, or well communicated.

3. Feedwater Regulating Valve (Salem Unit 1, October 2003)

a. Description

Operators took manual control of a feedwater regulating valve in response to an annunciator trouble alarm. Field reports indicated that the likely source of the problem was the digital feedwater control system and not the valve. Some of the crew believed early in the event that the valve was stuck. Troubleshooting efforts, including mechanically agitating the valve, and training operators in the simulator for the shutdown continued for a number of hours. Eventually, the valve was declared inoperable and the plant entered Technical Specification shutdown actions.

b. Observations/Perceptions

- Two Nuclear Control Operators (NCOs) told the Control Room Supervisor (CRS) and/or the Shift Manager (SM) that they didn't agree with the field reports indicating that the valve was not stuck. (Management / Labor Interface)
- A number of operators and a CRS viewed the event as an example of non-conservative decision-making. At least two NCOs and a CRS on Salem 2 felt that the time to conclude that the valve was stuck and shut down the plant was excessive. Others felt the valve should have been declared inoperable immediately. One NCO viewed the delay as supervision's and management's attempt to prove operability. Another CRS, however, didn't consider the actions to be non-conservative; similarly, a Shift Technical Advisor (STA) felt the conservative decision was to wait and see how the valve would respond. (Non-Conservative Decision-Making, Schedule and Production Issues)
- One NCO believes that the decision was elevated to management above shift management, and that this is why it took so long to begin the shutdown. (Inappropriate Decision Level)
- Multiple parties, including a member of senior plant management, agree that it took too long (approximately 12 to 16 hours) to conclude that the valve was mechanically stuck and begin to shut down the plant. (Untimely Decisions)
- Two NCOs on shift when the issue arose, and at least one NEO, heard second-hand that the valve was mechanically agitated or struck with a tool (*i.e.*, trying hard to prove it wasn't stuck). An Assistant Operations Manager (AOM) said he directed personnel to stop hitting the valve with a tool because it wasn't moving. (Differing Views of Performance)
- An AOM first heard about the issue when he came in at 8 a.m., versus 3 a.m. when the problem was discovered, and said he understood that the crew and technicians didn't really think the valve was stuck, rather that it was an actuator problem. Also, the AOM understood that the CRS had twice asked if anyone [on shift] had any

issues. Two NCOs indicate that they communicated their views on the valve being stuck to the CRS and / or SM during the shift and were surprised when they came back in the next night and the plant still wasn't shut down. An STA said that when he left the shift nobody was arguing to take the unit down. Another AOM said the most vocal feedback was from an NCO about the time it took to make the decision to shut down, but the SM claims that the NCO didn't express those concerns the night the issue arose. Within a few days of the problem, an NCO questioned the AOM about the length of time it took to make the shutdown decision, and a couple of days later he raised the same issue to a member of senior plant management. An AOM said that he had to wait for an independent STA evaluation (approximately December 2003) and didn't provide feedback to the NCO regarding the decision-making process in this matter until approximately February 2004. (Communication of Issues)

c. SCWE and Related Implications

The seeming lack of response to the two NCOs who, early in the event thought the valve was stuck, coupled with a perception that management was taking too long and trying too hard to prove it wasn't stuck, is not conducive to an environment seeking to promote the value of employees who are willing to raise concerns. Also, the length of time it took to conclude that the valve was stuck and begin to shut down suggests ineffective problem resolution. The extensive delay (three or four months) in providing meaningful feedback to the individual who questioned how long the decision-making process took, could discourage other workers from raising issues and concerns to their management.

This event also supports some employees' continued view of management as being more focused on production and scheduling, rather than on conservative decision-making. The event also illustrates the lack of effective communication between management and the line. There are numerous examples of communications breakdown in this event, to include: the AOM who felt he should have been notified in the early morning hours when the problem was first discovered; the personnel, including management, who believed that it took too long to declare the valve inoperative and begin the shutdown; and the length of time it took to provide meaningful and detailed feedback to the individual raising the timeliness concern.

4. Feedwater Pump High Vibration Alarm (Hope Creek, Fall 2003)

a. Description

A vibration alarm activated on a feedwater pump. Procedural guidance required lowering the pump's speed to clear the alarm. Shift management, however, instructed Operations personnel to delay implementation of this procedural step until Engineering evaluated the situation. This evaluation indicated that continued operation, without taking additional action, was acceptable. Operators questioned the direction to not follow the procedural guidance.

b. Observations/Perceptions

- One Control Room Supervisor (CRS) indicated that the procedure was unclear and that the vibration level was probably not exceeded, yet the pump should, nonetheless, have been backed down when they received the high vibration indication. A Nuclear Control Operator (NCO) said the indications were that they weren't dealing with an instrument failure, but Engineering said they were not near the point of tripping the pump, and that it was okay to continue to run it. Another NCO said management's

position was that they weren't really sure they had a high vibration level, so they (management) violated the first rule--*believe your indications*. The NCO was surprised by this event because it occurred under the plant's new management team. (Non-Conservative Decision-Making)

- One NCO believed that the decision to continue operating was made at a higher level than the shift manager (SM). The SM acknowledged recommending to the AOM that they didn't need to lower the pump's speed based on Engineering's input and an anticipated procedural change, which never materialized. (Inappropriate Decision Level)
- An NCO indicated that the plant operated for several days after exceeding the procedural guidance and before they removed the pump from service and completed an on-the-spot procedural change. (Untimely Decisions)
- Interviewees described confusion regarding the applicable procedural guidance. A NCO stated that the pump must be backed down when the vibration reached a certain level. Another NCO stated that the pump was to be removed from service because of the high vibration, and the procedure wasn't changed until the limit in the procedure had been exceeded. The SM recalled that the licensed operators questioned why the procedure was not being followed. The SM said that, in the future, they will respond as they would in a training scenario (*i.e.*, follow the procedure) if a similar event occurs. The SM also advised that, recently, the crew took a feedwater pump off-line and received positive reinforcement for doing so. (Procedure Adherence)
- The testimony of several NCOs indicates that either they did not understand or were not effectively informed of Operations management and Engineering's rationale for continued operation with the high vibration on the pump. (Communication of Issues)
- Based on the continued operation with the high vibration, at least one NCO felt the message was that if management doesn't like what they see, they will ignore it. The SM believes the operators perceived that acting contrary to procedural guidance was done to satisfy management's desire not to reduce power. (Schedule and Production Issues)

c. SCWE and Related Implications

The perception that management chose production or operational goals over strict adherence to procedural requirements can discourage operator willingness to raise procedural questions. Operators could infer that management is predisposed to analyze away such questions. Such behavior, in essence, dismisses their concerns, without offering them a sound basis or rationale for doing so.

There is also considerable sentiment that, in this event, management valued production-driven decision-making over conservative, prudent decision-making. The lack of alignment between the operators' and management's perceptions and understanding of the rationale for continuing to operate the pump also challenges the workforce's view of management's expectations for procedural compliance.

5. High Off Gas Flow (Hope Creek, March 2003)

a. Description

Prior to the Hope Creek spring 2003 outage, personnel detected elevated off gas flow rates. The flow eventually exceeded the procedural guidance limits. The situation was documented via a log entry and Notification, and shift personnel questioned the continued operation of the plant with the elevated flow. The procedural limit was subsequently changed, with an operator also questioning perceived weaknesses in the evaluation allowing the limit to be raised. The flow limit was subsequently changed back to its original value after the condition was corrected during the outage.

b. Observations/Perceptions

- A Nuclear Control Operator (NCO) questioned the evaluation for continued operation during a shift meeting. The Shift Manager (SM) emphatically reiterated the new limit number and called the NCO into a private meeting after the briefing. The NCO said the SM advised him that he didn't appreciate him bringing up those questions in that forum (*i.e.*, the shift briefing). The rest of the shift the NCO was kidded (good-naturedly) by a Nuclear Equipment Operator (NEO) about raising the issue. The message to the NCO was not to bring up such issues during a shift briefing. (Management / Labor Interface, Inappropriate Behavior, Chilling Effect)
- Several NCOs, and at least one NEO, viewed continuing to run with the elevated flow rate as non-conservative decision-making, driven by management's desire to keep the plant running, no matter what they needed to do. (Non-Conservative Decision-Making, Schedule and Production Issues)
- The plant continued to operate with off gas levels above the original procedural limit. Further, the testimony indicates that operations continued, even after the adjusted limit was exceeded, and until the scheduled outage. (Untimely Decisions)
- One Control Room Supervisor (CRS) indicated that the procedure didn't specifically require the plant to shut down upon exceeding the off gas limit. For that reason, continuing to operate while troubleshooting was acceptable to him. Other operators, however, thought that not backing down in power was the wrong decision. An NCO cited the crew being questioned by the assistant operations manager (AOM), after a training exercise and prior to the actual event, as to why, with a fuel leak and elevated release levels, it took them so long to take the unit off-line in the training scenario. An NCO also described another NCO as checking with other members of the crew and then recommending they take the unit off-line in the face of the elevated off gas levels. (Differing Views of Performance)
- Numerous operators noted that management appeared to have a flexible view of procedural guidance in this case (*i.e.*, they were willing to draw new lines in the sand). One NCO observed that after the condition was corrected (during the outage), the procedure was changed back to its normal limit. (Procedure Adherence)
- Management failed to effectively communicate the justification for operating beyond the original procedural limit. For example, when a NCO questioned apparent weaknesses in the evaluation justifying raising the limit, he was told what the new

limit was, without further discussion. Further, numerous operators questioned the advisability of continuing to operate with the rising off gas level. (Communication of Issues)

c. SCWE and Related Implications

Management's response to this event could impact the willingness of workers to raise, revisit, challenge, or push an issue that management has already addressed. The general lack of agreement with management's decision to continue operating with the elevated off gas levels indicates that management was ineffective in communicating their justification for continuing to operate, and/or their resolution of the issue.

This event also represents another instance in which management is seen as being willing to circumvent a procedure that does not comport with the perceived goal of keeping the plant running, notwithstanding the reality of plant conditions. It also questions the quality and effectiveness of management's ability to communicate the basis for its actions regarding personnel matters.

6. Reactivity Event (Hope Creek, March 2003)

a. Description

Operators were performing a shutdown to repair a stuck turbine bypass valve, an action on which they had trained the previous evening. They were depressurizing the reactor using the bypass valve jack to control reactor pressure. Operators adjusted the electro-hydraulic control set point near the actual reactor pressure and a perturbation occurred on the bypass valves, resulting in a change in reactor pressure, level, and power.

The operators resumed the depressurization process using the bypass valve jack. The operators experienced a bypass valve cycling to 75 percent open and a drop in reactor water level. The reactor water level control system automatically started to restore level by increasing feedwater flow. The feedwater's low temperature led to a rise in reactor power. The reactor approached the Average Power Range Monitor's (APRM) scram set point of 15 percent before conditions stabilized. The operators took manual actions to control feedwater flow and adjusted the intermediate range monitors to stay within the appropriate range. The operators then continued with the shutdown.

b. Observations/Perceptions

- Although the operators involved in the event believed their actions in stabilizing the plant's conditions were appropriate, management removed the operators, including the shift manager, from shift operations for remediation. Operations personnel viewed management's actions as unfair and unwarranted, and part of a pattern of blaming the operating crew for plant events. (Differing Views of Performance, Management / Labor Interface)
- The operators felt they had "saved the plant" by their actions, while management viewed their actions as "heroic" but non-conservative. Some interviewees believe some operators still do not fully accept that their actions were inappropriate or recognize the significance of the event. The Shift Manager (SM) felt that the crew, himself included, wasn't sufficiently conservative in responding to this event. The current Operations Manager (OM) said the plan of action did not look like a good

one, and that they were working too hard to save the plant, versus protecting the plant (i.e., allowing the plant to SCRAM). (Non-Conservative Decision-Making, Differing Views of Performance)

- Senior management contends that the operators did not follow procedures and should have manually tripped the unit. The SM stated that the operators did not act in full compliance with the procedure, because that was not how they trained in the simulator for the shutdown. (Procedure Adherence)
- The reactivity event occurred while shutting down to repair a stuck turbine bypass valve. Operations did not notify management of the unexpected change in reactor power at the time of the occurrence. The SM acknowledges not writing a Notification for the event until a day or two later. Senior site management didn't see a Notification until sometime the following day. (Communication of Issues)
- Operators, who received training the evening before to support the shutdown, felt time pressures during the training session. The Control Room Supervisor (CRS) felt that the procedure provided to them for validation and training purposes was inadequate. The short amount of time they were being given, approximately one-half of a shift, was not sufficient to establish a procedure and train effectively. The SM said that when they got to training, all they had was a draft of a procedure and no infrequently performed tests and experiments (IPTE) paperwork, which was very frustrating to the crew trying to work through the simulator training for the shutdown. (Schedule and Production Issues)
- In response to the event, a member of senior management issued a letter critiquing the event, providing expectations on conservative decision-making, and requesting a written affirmation from all Operations license holders. The operators were upset by senior management's letter and the union grieved it. The operators' lack of acceptance of management's expectations may indicate resistance on the part of operators to accept their role in non-conservative decisions. (Inappropriate Behavior, Management / Labor Interface)

c. SCWE and Related Implications

Although operators felt that there was not adequate time for procedure development and training, they did not voice their concerns to Operations management outside their shift. This may be indicative of operators being reluctant to escalate issues to a higher level to get them addressed. The letter from senior site management, wherein it stated expectations and requested a written affirmation from Operations personnel, was perceived by some as threatening. Differing views of the event's significance, operator performance, procedure adherence and usage, and the communication of issues associated with this event also indicate a weakness in management standards and expectations being effectively communicated and understood by Operations personnel. This event also reflects operators making non-conservative decisions and then not accepting responsibility for their actions when management attempted to enforce higher standards involving conservative decision-making.

7. Turbine Bypass Valve (Hope Creek, March 2003)

a. Description

The No. 2 turbine bypass valve didn't fully close as expected during a reactor start-up, at about 10 percent power after the generator was synchronized. Plant operators and maintenance personnel spent two days troubleshooting the valve. Throughout this period, the plant remained at power. Operations decided to develop a plan to shut down and repair the valve. The bypass valve closed during the shutdown. [Note: The reactivity event discussed above occurred during the course of this shutdown.]

After the valve closed, a meeting took place to discuss whether the plant could or should be restarted without determining the cause for the valve sticking open. An Assistant Operations Manager (AOM) wanted to remain shutdown to fix the valve because Operations did not understand why the valve stuck open. Others, including the Shift Manager (SM) and an outage representative, wanted to consider restarting the plant. Because no decision was made, a meeting was held involving senior site management and others. The AOM was required to justify shutting the plant down and keeping it down to fix the valve. The final decision was to shut down the plant and fix the valve.

b. Observations/Perceptions

- After recognizing that the valve was not operating properly (*i.e.*, they could stroke it open, but it wouldn't go fully closed), the operating shift decided to develop a plan to shut down. A Control Room Supervisor (CRS) said he understood that a member of senior site management was opposed to taking the plant off-line to fix the valve and pressured the AOM during a "heated discussion." A Nuclear Control Operator (NCO) felt that it took too long to take the unit off-line with a stuck open bypass valve. He viewed the time spent trying to fix it and get it shut, so as to keep operating, as non-conservative. (Non-Conservative Decision Making, Schedule and Production Issues)
- Although the decision was ultimately made to shut down the plant, senior plant management was directly involved in a decision that was more appropriately within the purview of licensed operators. The AOM was required to provide a significant amount of justification for shutting down, beyond what he thought was necessary. A SM heard the rumor that a PSEG Power officer called the control room and told Operations to stop depressurizing and get ready to start-up. The Team's interviews did not substantiate this rumor. A CRS understood that the AOM had a "heated" discussion with a member of senior site management, who said they weren't taking the unit off-line. A member of senior site management asked the AOM what they were going to fix, and specifically, what it was going to take to make the plant operable. A member of senior site management acknowledged that the AOM appeared to believe he was being challenged on his decision to bring the plant down, but that wasn't the intention, rather to gain alignment on the basis for the AOM's position. (Decision Unduly Challenged, Inappropriate Decision Level, Communication of Issues)
- The initial decision and action to begin shutting down the plant took nearly forty-eight hours. Plans to continue cooling down the unit after the reactivity event and the

valve shut were further delayed for three-to-four hours by the AOM's meeting with senior management. (Untimely Decisions)

- An AOM felt he had to respond to an inordinate number of questions in order to justify shutting down the plant. A CRS heard that the discussion was "heated." The AOM described the senior site manager's style as potentially intimidating to others, but not to him. (Inappropriate Behavior)
- In the wake of the reactivity and turbine bypass valve events, a member of senior site management was viewed by at least one CRS as putting out a two-page letter on how incompetent Hope Creek Operations was, which the CRS interpreted as management saying, if you disagree with me (*i.e.*, over the shutdown to fix the valve), you'll be sorry. Senior site management indicated that because of Operations' performance in conjunction with the reactivity event, management was seeking written affirmation from Operations personnel on conservative decision-making. (Inappropriate Behavior, Chilling Effect)

c. SCWE and Related Implications

A member of senior site management's perceived aggressive questioning of the AOM during a heated discussion to justify a conservative decision could likely discourage personnel from acting in a similar conservative manner. The involvement of senior-level management in this operational decision may further discourage challenging or presenting alternative views. This event also has been viewed by some as another example of senior management inappropriately inserting themselves into the decision-making process and sending the message that production and schedule drive operational decision-making.

8. Start-up Without Five Circulating Water Pumps (Salem Unit 2, February – March 2003)

a. Description

An intake grassing event at Salem 2 caused a trip of the unit. Operations management had decided that five circulating water pumps would be available before commencing the start-up. A member of senior site management, after a discussion with Operations management, decided that (the previously agreed upon) five circulating water pumps were not all needed to commence start-up.

b. Observations/Perceptions

- Operations personnel viewed senior site management's decision to be non-conservative, and an example of management's preference of production over safety. However, there were no technical specification constraints over starting the unit without the fifth circulating water pump, and management did not view that action as a challenge to safety. (Non-Conservative Decision Making, Production and Schedule Issues)
- Senior site management, not Operations shift management, drove the start-up decision. (Inappropriate Decision Level)
- A member of senior site management challenged Operations management's decision to hold start-up until five circulating water pumps were available during what has



been characterized as a "heated" conversation with the Assistant Operations Manager (AOM). (Decision Unduly Challenged, Chilling Effect)

- Operators also believed that they met management expectations by taking a stand on getting plant problems resolved, and were disappointed that senior management didn't support Operations' ownership of the plant. The rationale for the decision-making was poorly communicated, and it contradicted what the shift had been previously told. (Differing Views of Performance, Communication of Issues)
- A member of senior site management was described as growing impatient and decided to move the unit forward. The senior site manager's challenge of Operations management's decision, and the manner in which it was challenged, was considered by some operators as inappropriate behavior. The AOM said a member of senior site management accused the operators of being afraid to run the plant, a discussion that led him to feel verbally abused. (Inappropriate Behavior)

c. SCWE and Related Implications

The behavior and manner in which a member of senior site management challenged Operations management's decision to wait until the fifth circulating water pump became available could have resulted in a chilling effect for those who were aware of the decision-making process. Operators felt that their decision not to continue with the start-up was an example of conservative decision-making, but management's overruling of that decision may discourage similar conservative acts or the raising of concerns. This event also furthers the perception that production and scheduling concerns took precedence over conservative decision-making. When a member of senior site management intervened in the operational decision-making process to proceed with the reactor start-up with less than five circulating water pumps available, he essentially removed command and control from the licensed operators.

9. "B" Diesel Generator Exhaust Leak (Hope Creek, February-March 2003)

a. Description

Exhaust leakage from the "B" Diesel generator was allowed to occur for an extended period of time and was not effectively addressed by management. An operator assigned to the diesel generator area was taken to the hospital after inhaling diesel exhaust. Other Operations personnel also complained of negative physical side effects of the exhaust. Between the bargaining unit and Operations management, it was determined that Self Contained Breathing Apparatus (SCBA) would ensure the safety of personnel working in the diesel generator area when the diesel generator was in operation. The diesel generator was repaired during the March 2003 outage.

b. Observations/Perceptions

- Operators viewed subjecting operators to a hazardous environment and utilizing SCBAs, rather than correcting the problem, as non-conservative. One Control Room Supervisor (CRS) opined that it appeared that management came up with a compensatory measure for every safety concern they brought up. (Non-Conservative Decision-Making)
- The diesel generator exhaust problem had been allowed to continue, without correction, for an extended period of time. (Untimely Decisions)

- It is widely believed within the Operations Department that a member of senior site management had threatened bargaining unit management with insubordination if personnel were provided with SCBAs and they still refused to do the work. One bargaining unit individual felt that management's actions and statements showed a "lack of concern." The current Operations Manager (OM) described this issue as a "cornerstone event." (Communication of Issues, Chilling Effect, Inappropriate Behavior, Management / Labor Interface)
- The organization believed that the repair could not be made within the diesel generator Limiting Condition for Operation (LCO) window; thus, management would not make the repairs. Operators perceived management's decision not to immediately repair the leakage, and instead require compensatory personnel safety measures, as an indication that management placed production over safety. Radiation Protection (RP) personnel also became involved in this issue and questioned the decision to proceed with the work. (Schedule and Production Issues)

c. SCWE and Related Implications

Interaction among a member of senior site management, Operations personnel, and union leadership created the perception (real or imaginary) that discipline would follow for refusing to perform the work while wearing SCBAs. This could negatively impact employees' willingness to raise similar safety issues. The failure of management to address the exhaust issue in a timely and satisfactory fashion contributed to the feeling that management was ineffective in resolving personal safety issues. This event also contributed to the belief that management viewed production as more important than safety. In this case, management was not willing to risk taking the diesel out of service to correct what was viewed as a significant safety issue. One individual stated the decision wasn't consistent with a company that professes safety to be "number one."

10. Early Lifting of Power Operated Relief Valve (Salem Unit 1, October-November 2002)

a. Description

In October 2002, a power operated relief valve (PORV) lifted prematurely at about 1800 psi (nominal lifting should occur at 2400 psi). When the PORV lifted, the operators lowered pressure to reseal the valve. When this was not successful, operators began to take action to depressurize the plant to repair the PORV. A member of senior site management requested that the reactor depressurization be delayed until Engineering could evaluate all available information.

The repair work revealed that maintenance had not been properly performed on the PORV during the prior outage, in that the bushing shims were left out during re-assembly. A review of the associated paper work determined that the workers and supervisor who had been responsible for the maintenance had failed to install bushing shims but reported otherwise. As a result, site management terminated the supervisor and two mechanics. The union grieved the termination of the two mechanics and had the terminations reversed.

b. Observations/Perceptions

- Senior site management's intervention gave the Assistant Operations Manager (AOM) the impression that management considered his command to lower pressure for stability as "going in the wrong direction" (i.e., from putting the unit back on-line). (Inappropriate Decision Level, Untimely Decisions)
- The termination of the two mechanics created considerable tension between the bargaining unit and PSEG management. The terminations were not well coordinated within the company and, as a result, the two workers were subsequently returned to work. (Management / Labor Interface)
- The decision to fire the two mechanics created a difference of opinion between the bargaining unit and PSEG management on the level of discipline warranted in this event. (Differing Views of Performance)
- The mechanics and the supervisor did not follow the procedure for re-assembly of the power operated relief valve. (Procedure Adherence)
- Neither the basis for the initial decision to terminate the mechanics, nor management's rationale to reinstate them, was effectively communicated to the work groups, including first-line supervision. (Communication of Issues, Chilling Effect)

c. SCWE and Related Implications

Management took adverse action against two mechanics and a supervisor. Management, however, rescinded its decision with regard to the mechanics after the union grieved the decision, and without communicating the basis for its reversal. This potentially impacts SCWE because it could support a perception that management has taken inappropriate actions against its employees, which, in turn, could chill workers' willingness to raise issues or challenge management decisions. Management's actions and its failure to communicate the basis for these actions also has led to a perception among some of the workforce that it is unable or unwilling to hold bargaining unit personnel accountable for poor performance, or that it has lowered its standards and expectations for performance. Tension between bargaining unit personnel and supervisors is heightened, as a result of what is perceived as disparate standards applicable to these two groups. A similar situation in Operations (i.e., attempted termination of a bargaining unit member and subsequent reinstatement) created considerable negative energy in that work environment.

11. 22 MS 42 Steam Leak (Salem Unit 2, September 2002)

a. Description

In September 2002, Salem Unit 2 valve 22 MS 42 developed a steam leak in the turbine building, which impinged on plant electrical equipment. Operations management and shift personnel assessed the situation and determined that it was unsafe to close the valve in order to isolate the leak and, for that reason, decided to shut down the unit. Contrary to this decision, and either without prior notification to, or clearly communicating his intentions to the shift Operations personnel, an Assistant Operations Manager (AOM) closed the valve and stopped the steam leak.

b. Observations/Perceptions

- Operators indicated that the AOM acted inappropriately by shutting the valve because he was not authorized to do so, and put himself at personal risk. (Management / Labor Interface, Non-Conservative Decision Making)
- Operators perceived the AOM's operation of equipment without their knowledge or permission as a challenge to Operation's command and control. (Inappropriate Decision Level)
- Some individuals, including the AOM, perceived his actions to have been appropriate, thereby demonstrating a difference of opinion regarding performance. (Differing Views of Performance)
- Operations personnel viewed the AOM's actions and, in particular, his failure to communicate his intentions, as contrary to safety and as violating the tenant of "practice what you preach." (Communication of Issues)
- Some operators considered the AOM's actions to be a misguided or heroic attempt to keep the unit on-line. Another AOM felt the AOM's actions sent the message they were going to keep the unit on-line. (Schedule and Production Issues)

c. SCWE and Related Implications

The AOM's actions communicated the message that management need not act in accordance with its own expectations regarding communications, conservative decision-making, and personnel safety.

12. Loss of Core Monitoring System (Hope Creek, 2002)

a. Description

Following a power uprate, and during full power operation, the core monitoring system (CMS) was lost. Because of the loss, a Nuclear Control Operator (NCO) felt that the power level could not be adequately monitored and recommended a power reduction until the CMS was returned to service or other more precise measuring equipment became available. The Control Room Supervisor (CRS) agreed with the NCO's recommendation, but the Shift Manager (SM) overruled the recommendation. The plant remained at full power.

b. Observations/Perceptions

- The NCO who recommended the power reduction felt the SM tried to get him to change his position on the issue. The NCO said that after he raised the issue some front-line supervisors stopped talking to him. (Management / Labor Interface, Chilling Effect, Inappropriate Behavior)
- The NCO felt that because they only had a gross estimate of the power level, a small power reduction was the proper course of action and, subsequently, wrote a Notification on non-conservative decision-making. Another NCO, through hearsay, understood that the unit had lost the CMS, but didn't reduce power as recommended by the NCO, which didn't seem a prudent course of action. He said the actions left other NCOs wondering why they didn't reduce power. Conversely, the SM said he understood that the power level was trending down before they lost the CMS, and that

they were below the licensed power level. Consequently, he didn't see the need to lower power. (Non-Conservative Decision-Making)

- The Assistant Operations Manager (AOM) concedes that it should have been the CRS's decision on whether to reduce power. (Inappropriate Decision Level)
- The NCO doesn't believe shift management took the appropriate action given the condition of the plant. (Differing Views of Performance)
- One NCO, not directly involved in the event, did not think that the SM's actions were prudent, suggesting that the SM's rationale for not reducing power was not effectively communicated and / or understood by operators. The NCO who wrote the Notification said it was closed out without anyone speaking to him. (Communication of Issues)
- The power reduction recommended by the NCO, based on his assessment of the condition of the plant, was endorsed by the CRS, but not acted on by higher management (i.e., the SM). The SM opined that previous signals from management emphasizing production may have influenced his decision not to reduce power. He described those signals as hints of overriding pressure for production from former senior managers. (Schedule and Production Issues)
- In hindsight, the SM would do things differently because of the impact his directions had on the CRS and NCO. (Chilling Effect)

c. SCWE and Related Implications

The NCO's experience in this matter, wherein his recommendation was seemingly ignored and he felt snubbed by some supervisors after raising the issue, is not conducive to an environment where employees are encouraged to, and feel comfortable raising concerns. The cited lack of communication on the closure of the Notification calls into question the effectiveness of the site's feedback process, which is another impediment to the willingness of employees to raise concerns. This event may also have had a chilling effect on others who may have been involved in, or familiar with this event and the real or perceived treatment experienced by the NCO. In addition, the signal sent, either intentionally or unintentionally, in conjunction with this and other events, is that production or scheduling concerns are more important than conservative or prudent decision-making.

13. Reactor Head Vent Procedure Change (Salem Unit 1, Fall 2001)

a. Description

While restarting Salem Unit 1, the reactor head vents failed to stroke in the required amount of time. This was a surveillance requirement for mode progression, and, therefore, the failure prevented continued power ascension. In order to progress with the start-up, a senior member of site operations sought an on-the-spot procedure change that would have accepted the extended current stroke times; however, shift management would not change the procedure.

b. Observations/Perceptions

- One Control Room Supervisor (CRS) understood second-hand that senior site operations management requested the on-the-spot procedure change to allow the start-up to progress. A former Assistant Operations Manager (AOM) describes that

surveillance as a requirement for mode change, and because the vents wouldn't stroke in the correct period of time, they were preventing a mode change, so the senior member of site operations first sought to just move on, then to change the stroke time in the procedure to the time they had achieved. Another AOM said they had lost the closed indication on one valve when stroking it, and the senior member of site operations started asking questions about the requirement for limit switches and wanted the requirement changed via an on-the-spot procedure change, which he (the AOM) advised couldn't be done. The two AOMs involved in discussions with senior management indicated that the request for procedure changes was inappropriate, describing a situation with senior management interjecting itself into operational decision-making during the restart process. (Non-Conservative Decision-Making, Inappropriate Decision Level)

- One CRS heard second-hand that senior site operations management gave the Shift Manager (SM) a "hard time" when he refused to agree to the procedure changes. An AOM said that, in response to rejecting the request, senior site operations challenged the decision for fifteen to thirty minutes before the AOM made it clear that he wasn't going to make the change. (Decision Unduly Challenged, Inappropriate Behavior)
- According to an AOM, a senior member of site operations initially displayed a willingness to just move forward when they couldn't meet the surveillance requirements, and then tried to change a procedure to fit the current conditions to allow the plant to change modes. Another AOM corroborated the attempt to change the procedural requirements to fit the then current plant conditions. (Procedure Adherence)
- One AOM perceived the insistence on the on-the-spot change as an indication that management viewed getting the plant back on-line as more important than procedural adherence or doing the right thing. (Schedule and Production Issues)

c. SCWE and Related Implications

Two mid-level Operations managers viewed a senior member of site operations management to have inappropriately attempted to change a procedurally-governed surveillance requirement to fit existing plant conditions (*i.e.*, stroke time). The perception that a senior manager behaved inappropriately in response to a mid-level manager's decision not to change a surveillance procedure to accelerate the start-up is not conducive to the raising of concerns, particularly those related to procedural compliance. One mid-level Operations manager opined that the actions were driven by the need to get the plant back on-line (*i.e.*, production), versus doing the right thing. This is another event, although historical in nature, that challenges the site's expectations relative to performance standards and feeds the belief held by some that production and schedule considerations, at least at one point in time, took precedence over safety and conservative operational decision-making.

14. Lightning Strike and Run-Back (Hope Creek, 1999-2000)

a. Description

Hope Creek was at full power when lightning struck an off-site power line. An automatic "run-back" signal resulted in a power reduction. The operators stabilized the plant and returned it to full power. During the shift changeover, Operations staff discovered that the plant had lost

the feedwater heaters and exceeded the feedwater temperature limit. Later, the Chief Nuclear Officer (CNO) called a meeting and told the operators words to the effect, "you don't have the authority to raise power on my unit."

**b. Observations/Perceptions**

- The CNO considered the on-shift operators' decision to return the plant to full power without consulting higher management inappropriate and non-conservative. (Non-Conservative Decision Making, Inappropriate Decision Level, Differing Views of Performance)
- The operators were not aware of management's expectation to contact senior management before raising the plant's power level. One Nuclear Control Operator (NCO) stated that the CNO's position was that no shift manager had the ability to raise power without senior management involvement. To the NCO, the message appeared to be that some on-shift management teams were not as conservative as senior management expected them to be. One manager believes Operations became "disempowered," with station management getting to the point where they couldn't make any management decisions. He doesn't believe, however, that there was ever any confusion over the operators' ability to lower power to put the plant in a safe position. (Communication of Issues)
- An operator commented that, although he understood that they had made a mistake, he thought the CNO's response and the outcome were overly harsh (i.e., the operators didn't have the authority to raise power). (Inappropriate Behavior)

**c. SCWE and Related Implications**

Senior site management's actions, either intentionally or unintentionally, may have created sufficient doubt in the operators' minds that it affected their ability and / or willingness to exercise their legitimate license holder responsibilities. This may have created a void in the operational decision-making process that more senior site management filled and which invited subsequent charges of non-conservative and production-driven decision-making.

**C. Collective SCWE Significance of Unresolved Conflicts**

While none of the unresolved events involved reactor operations that put either the plant or public at risk, the collective SCWE significance of these events demonstrate that some in management, as well as some among the workforce: (1) place a greater emphasis on production and schedule considerations than conservative decision-making; (2) tolerate degraded equipment conditions and expect personnel to work around operational challenges presented by such conditions; and (3) tolerate procedural non-adherence. The events also demonstrate that some in management: (1) do not clearly communicate standards or the rationale behind their decisions, or provide feedback to those raising issues; (2) have taken actions, or failed to take actions, that have had a chilling effect on the willingness of certain employees to raise concerns; and (3) become involved in decisions more appropriately the responsibility of Operations.

Management is addressing and making progress in overcoming many of these perceptions, but has not yet regained the trust and confidence of Operations. For example, management is in the process of ensuring that the responsibility and decision-making authority remains within Operations, but needs to further clarify expectations as to these misperceptions,

and then act over an extended period of time consistent with those expectations. This effort is made more difficult by some in the workforce who have not accepted the necessary standards and requirements for strict adherence to procedures. In some cases, mixed messages from management's actions with respect to procedural adherence compound the difficulty.

**D. The Impact of the Corporate / Site Interface on the Work Environment**

The Team next considered the impact, if any, of the corporate / site interface on the work environment for raising and resolving concerns. PSEG's earlier SCWE assessments did not identify this interface as an issue impacting SCWE. The Team asked as part of its standard questions whether those interviewed had any SCWE issues involving the site / corporate interface, including management's commitment to safety or expenditures of funds and commitment of resources. In response to these questions, working-level personnel and mid-level site management did not identify a direct SCWE issue in that the vast majority of both groups indicated that the corporate interface neither impacted workers' willingness to raise issues, nor site management's perceived or actual ability to address issues. Nonetheless, some working-level personnel and mid-level site managers assumed a negative impact from the corporate / site interface in two respects. First, some assumed that site management is not fixing longstanding equipment issues because corporate is not providing the necessary funds. Others, including some of whom were involved in the unresolved conflicts, assumed that site management's conduct in the course of those events resulted from a perceived pressure from corporate to place a greater emphasis on production and scheduling considerations than conservative decision-making. Because the interviews disclosed that this group of working-level personnel and mid-level managers had no direct knowledge of any such pressure, the Team next interviewed all nuclear officers, certain other senior nuclear management, and their principal corporate contacts to determine if, at the executive level, there exists a perception that corporate impacts the site work environment for raising and resolving concerns.

The Team did not elicit information during the executive-level interviews to suggest that corporate directly and negatively impacts the site environment for raising and resolving concerns. Nonetheless, the Team did identify a number of corporate practices and policies which have the potential to negatively impact the site SCWE and have been interpreted by some personnel at the site to suggest that an emphasis in production over conservative decision-making is desired by corporate management.

Corporate policies, practices, business planning, and compensation may have had the unintended consequence of having site management focus on production and schedule, at times, over conservative decision-making. Corporate policies and practices may have similarly had an unintended consequence of leaving longstanding equipment issues unresolved. Specifically, and apart from SCWE, both site and corporate management did express some frustration with respect to the lack of clarity as to their respective roles and responsibilities relative to some support functions. The areas involve such support services as Human Resources, Labor Relations, Budget, and Financial Planning. While the level of uncertainty and frustration is clearly less than what existed under the prior nuclear management team, there remains a lingering issue. Although not directly related to SCWE, uncertainty and inconsistency in implementation of HR, Labor Relations, and budgetary policies and practices erodes employee and site management confidence in corporate and may indirectly impact a healthy work environment.