



Union of Concerned Scientists

Citizens and Scientists for Environmental Solutions

June 9, 2004

Mr. A. Randolph Blough, Director – Division of Reactor Projects
United States Nuclear Regulatory Commission Region I
475 Allendale Road
King of Prussia, PA 19406-1415

**SUBJECT: SAFETY CULTURE PROBLEMS AT THE SALEM AND HOPE CREEK
GENERATING STATIONS**

Dear Mr. Blough:

On May 21, 2004, PSEG Nuclear LLC (PSEG) provided the Nuclear Regulatory Commission (NRC) the results from three independent assessments recently conducted at the Salem and Hope Creek nuclear plant site: (1) Synergy in December 2003, (2) Utility Services Alliance (USA) in February 2004, and (3) Independent Assessment Team in May 2004.¹ PSEG will discuss these results and their plans to address them with the NRC during a public meeting scheduled for June 16th. The purpose of this letter is to provide the NRC staff with our perspectives on the results and the steps necessary to protect the public.

The USA assessment results are most disturbing. USA applied a rating system to 90 characteristics they rolled up into 12 attributes. USA rated the characteristics as Exceptional, Strength, Competent, Needs Some Improvement, and Needs Much Improvement.

PSEG SCORED “LESS THAN COMPETENT” ON ALL 12 ATTRIBUTES.

PSEG SCORED “LESS THAN COMPETENT” ON 73 OF 90 CHARACTERISTICS.

Scoring “Less Than Competent” on 73 of 90 characteristics and all 12 attributes might be reasonably viewed as posing a tangible risk to public health and safety warranting the reactors to be shut down. But to the nuclear industry and the NRC, it’s still good enough. In fact, even the worst possible score on every single one of the 90 characteristics would not, by itself, prompt the NRC to ask PSEG to shut down the reactors.

USA further determined the “*Plant Physical Condition Reflects Tolerance for Mediocrity.*” Quoting an old cliché, “you get what you pay for.” Salem and Hope Creek are not in good physical condition because PSEG didn’t pay to properly maintain the site in good condition. They paid for, and got, mediocrity. And I’m not alone in this belief. The Independent Assessment Team identified the:

**PERCEPTION THAT NUCLEAR IS NOT FIXING LONG STANDING
EQUIPMENT ISSUES BECAUSE CORPORATE IS NOT PROVIDING THE FUNDS**

¹ UCS acknowledges that PSEG voluntarily made these reports publicly available and commends the company for this initiative.

And then there's the Synergy assessment. Synergy concluded:

ORGANIZATION FAILS TO ESTABLISH TRUSTING RELATIONSHIPS

In fact, one of the lowest ratings Synergy reported was the work force's "*Confidence in Management*." If the work force at Salem and Hope Creek lacks confidence in PSEG's management, why should Main Street or Wall Street or the Board of Directors or Capitol Hill or NRC or any one trust them?

The independent assessments concluded that PSEG's performance across the board is "less than competent," that the prevailing perception is that corporate's stranglehold on the purse strings resulted in mediocre conditions at the plants, and that workers lack confidence in management. Collectively, these report cards beg the question of whether the reactors at Salem and Hope Creek should be shut down until the extensive degraded conditions are corrected. As the U.S. General Accounting Office reported last month, the NRC has no answer for this question:

Despite NRC's responsibility for ensuring that the public is adequately protected from accidents at commercial nuclear power plants, NRC does not have specific guidance for shutting down a plant when the plant may pose a risk to public health and safety, even though it may be complying with NRC requirements.²

This GAO statement embodies the NRC's approach to safety; namely, that compliance with federal regulations constitutes reasonable assurance that public health and safety will be adequately protected. The NRC lacks regulations requiring workers to have confidence in management or management to have confidence in workers. NRC cannot be expected to enforce regulations that do not exist. But Appendix B to 10 CFR Part 50 does indeed exist as excerpted below:

This appendix establishes quality assurance requirements for the design, construction, and operation of those structures, systems, and components. The pertinent requirements of this appendix apply to all activities affecting the safety-related functions of those structures, systems, and components; these activities include designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying.

As used in this appendix, "quality assurance" comprises all those planned and systematic actions necessary to provide adequate confidence that a structure, system, or component will perform satisfactorily in service. Quality assurance includes quality control, which comprises those quality assurance actions related to the physical characteristics of a material, structure, component, or system which provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

10 CFR 50 Appendix B explicitly delineates 18 quality assurance criteria. Criterion XVI covers corrective actions:

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

² U.S. General Accounting Office, "Nuclear Regulation: NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown," GAO-04-415, May 2004.

NRC inspectors repeatedly find PSEG in violation of 10 CFR 50 Appendix B Criterion XVI. The last three mid-cycle assessment letters issued by NRC to PSEG pointed out breakdowns in the corrective action program:

Date	NRC Conclusion
March 4, 2004	<i>"...the [NRC] staff identified a substantive cross-cutting issue in the area of problem identification and resolution (PI&R). The cross-cutting issue involved instances of ineffective, untimely problem evaluations and corrective actions. ... The weaknesses impacted equipment reliability and involved deficient problem identification, or once identified, insufficient recognition of the problem's significance."</i>
August 27, 2003	<i>"...the staff identified a substantive cross-cutting issue in the area of problem identification and resolution (PI&R), particularly regarding instances of ineffective problem evaluations and untimely, ineffective corrective actions. ... These shortcomings continued to enable problems to recur and longstanding problems to go uncorrected. In a number of cases, poor implementation of maintenance work, insufficient coordination and work control, equipment reliability weaknesses, and engineering's deficient determinations of root causes were involved."</i>
March 3, 2003	<i>"...the staff has identified a substantive cross-cutting issue in the area of problem identification and resolution (PI&R), particularly regarding ineffective problem evaluations and untimely, ineffective corrective actions. Numerous inspection findings documented shortcomings within the problem identification and resolution area, and these shortcomings enabled problems to recur and longstanding problems to go uncorrected."</i>

Synergy, USA, and the Independent Assessment Team are aligned with NRC in the viewpoint that the corrective action program at Salem/Hope Creek is ineffective ("less than competent" in their parlance). Page 54 of the report by the Independent Assessment Team even reads:

The Corrective Action Closure Board (CACB) commenced reviewing the quality of corrective action closures on March 1, 2004. ... As of March 23, 2004, CACB had reviewed approximately 500 closures of corrective actions to determine quality. The review identified approximately eighty percent of NUCRs were closed with sufficient quality, while twenty percent were unacceptable and reopened to correct the deficiencies noted during the CACB review. Most of the inadequate closures (fifteen percent) were a result of either not completing the corrective action or not adequately resolving the problem.

The depths of the corrective action program's problem are further illustrated by what the Independent Assessment Team reported on page 48:

Trending of the use of the CAP [Corrective Action Program] is evidence that the workforce is willing to raise issues to management. The number of Notifications initiated at Salem and Hope Creek is on an upward trend, having increased sixteen percent from 16,935 in 2002 to 20,151 in 2003.

If the 15% inadequate closure rate reflects overall corrective action program performance, it means that approximately 2,540 and 3,023 problems were inadequately closed in 2002 and 2003, respectively. Five thousand five hundred and sixty three (5,563) improperly corrected problems at plants designed using a single failure criterion can significantly erode safety margins.

Citing just a few from the plethora of improperly corrected problems at Salem and Hope Creek:

- Page 2 of the USA report stated, *“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.”* The NRC’s SPAR model reported the emergency diesel generators as having a risk avoidance worth of 1.64, or more risk significance than an entire standby service water train (1.43), a containment vent path (1.39), a standby liquid control system pump (1.09), one entire train of the residual heat removal system (1.00), and one entire train of the low pressure core spray system (1.00).³ This risk significant system is not getting proper maintenance, and PSEG has zero excuse. It was just a year ago that NRC took escalated enforcement action against PSEG for improper maintenance on the emergency diesel generators at Salem. Specifically, the NRC noted:

*“...in 1990 and 1998, significant conditions adverse to quality were identified involving emergency diesel generator turbocharger compressor failures for two of the six emergency diesel generators, and the licensee [PSEG] did not take appropriate corrective actions to preclude repetition...”*⁴

PSEG apparently did not view the NRC’s escalated enforcement action last year at Salem as sufficient incentive to do proper maintenance of the Hope Creek emergency diesel generators.

- Page 2 of the USA report stated, *“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.”* The events cited by USA as evidence supporting its conclusion DID NOT include the following two events where the NRC took escalated enforcement actions:

In 1998, the NRC proposed a \$55,000 fine on PSEG for reactivity control problems at Hope Creek: *“The first violation occurred in November 1997 during the conduct of the shutdown margin test while the reactor was in the cold shutdown condition with the vessel head removed. ... Since operators experienced difficulty withdrawing several of the designated rods, the control rod drive (CRD) hydraulic system drive water pressure was increased, in accordance with the stuck control rod abnormal procedure, to free the stuck rods. However, after individual rods were freed, the operators did not immediately restore the drive water pressure to the normal range, as required. ... This created the potential for control rod withdrawal at speeds exceeding design limits for reactivity addition. Subsequent review revealed that several rods were, in fact, withdrawn from the core at speeds faster than normal, although not in excess of the design limits.”*⁵

In 1996, the NRC proposed a \$150,000 fine on PSEG for reactivity control problems at Hope Creek: *“...the licensee [PSEG] did not plan the appropriate surveillance testing on certain safety related equipment following maintenance. Specifically, although maintenance had been conducted on 68 control rods (such as packing adjustments on scram inlet and outlet valves, or replacement of scram solenoid pilot valves) during the*

³ U.S. Nuclear Regulatory Commission memo from Mark F. Reinhart to Cynthia Carpenter, “Results of the Hope Creek Generating Station SDP Phase 2 Notebook Benchmarking Visit,” August 26, 2002.

⁴ U.S. Nuclear Regulatory Commission letter from Hubert J. Miller to Roy A. Anderson at PSEG Nuclear LLC, “Salem Generating Station – NRC Inspection Report 50-272/02-010 and 50-311/02-010 – Final Significance Determination for a White Finding and Notice of Violation,” May 1, 2003.

⁵ U.S. Nuclear Regulatory Commission letter from Hubert J. Miller to Harold W. Keiser at Public Service Electric & Gas Company, “Notice of Violation and Proposed Imposition of Civil Penalty - \$55,000,” March 20, 1998.

November 1995 through March 1996 outage, the licensee did not plan for testing the scram insertion time, but rather planned for deferral of testing until after the plant startup even through the TS [technical specifications] would require testing prior to the startup. ... Contrary to the above, on February 15, 1991, the plant started up without completion of surveillance tests required for 24 control rods following maintenance and on April 25, 1994, the plant was started up without completing the required surveillance testing on two control rods following maintenance.”⁶

Reactivity control has been a problem at Hope Creek for the past decade and remains a problem today. NRC’s escalated enforcement actions in the past – totaling \$200,000 – apparently had little impact and are likely to have little effect now that the NRC issues color cards instead of fines.

The main point remains that 10 CFR 50, Appendix B, Criterion XVI requires that plant owners perform adequate corrective actions. The recent assessments and repetitive failures show beyond any reasonable doubt that PSEG is simply not complying with this federal regulation. The question, therefore, is whether the NRC will enforce this regulation or allow PSEG to continue violating it.

By merely warning PSEG that it is violating 10 CFR 50, Appendix B, Criterion XVI, the NRC acts as an enabler for PSEG’s “less than competent” performance. PSEG may *want* to do better, may even *promise* to do better, but it has little incentive to do so because NRC allows all three reactors to operate despite the repeated warnings. By not enforcing this regulation, the NRC is aiding and abetting PSEG’s incompetence.

The NRC cannot allow history to repeat itself. On January 29, 1997, the NRC announced it had placed Salem Units 1 and 2 on its “Watch List.”⁷ The NRC went on to explain:

“...the staff noted that Salem should have been placed on the Watch List previously because of Salem’s past safety performance. The staff also indicated that the agency increased its attention and resources at Salem commensurate with a Watch List plant. Finally, the staff concluded that, notwithstanding the improvements at Salem, it would not have been removed from the Watch List at this time had it been previously identified, because it was yet to demonstrate a period of safe performance at power.”

Thus, the NRC admitted it responded belatedly to signs of declining performance at Salem. The signs of declining performance at Salem and Hope Creek are far more compelling now than they were in 1996 and 1997. In addition, PSEG deserves no mercy now since it failed to abide by the many promises it made to the NRC and the public along the path to restarting Salem Units 1 and 2 in the late 1990s.

The question before the NRC is what to do at Salem and Hope Creek in light of the information from Synergy, USA, and the Independent Assessment Team? The NRC has sufficient evidence to justify an Order requiring all three reactors to be immediately shut down and kept down until the safety culture and physical condition problems are markedly improved. The results from the NRC’s inspections over the past 18 months combined from the results from the Synergy, USA, and Independent Assessment Team evaluations constitute significantly more compelling evidence than that used by the NRC in the past 30 years in issuing Orders to shut down reactors:

- Peach Bottom – The NRC Ordered both reactors to be shut down after discovering that a pattern of control room operators being inattentive to their duties.⁸

⁶ U.S. Nuclear Regulatory Commission letter from Hubert J. Miller to Leon R. Eliason at Public Service Electric & Gas Company, “Notice of Violation and Proposed Imposition of Civil Penalties - \$150,000,” October 23, 1996.

⁷ U.S. Nuclear Regulatory Commission Press Release No. 97-013, “NRC Staff Identifies Nuclear Power Plants Warranting Increased Regulatory Attention,” January 29, 1997.

⁸ U.S. Nuclear Regulatory Commission Press Release No. 87-53, “NRC Staff Orders Shutdown of Peach Bottom Nuclear Power Plant,” March 31, 1987.

- Surry Units 1&2, Beaver Valley Unit 1, Maine Yankee and FitzPatrick – The NRC Ordered the five reactors to be shut down and remain shut down until seismic analyses for piping and piping supports were corrected.⁹
- Pilgrim – The NRC Ordered the reactor to be shut down to inspect fuel channel boxes for signs of damage and to repair any damage prior to restart.¹⁰

I respectfully ask the NRC staff to consider for a moment what it would tell the surviving workers and family members if one of the degraded reactors at Salem/Hope Creek experienced an accident before PSEG fixes all the known problems.

Would you be able to honestly tell those devastated people that you had done everything in your power to protect them?

Could you tell these distraught people with clear conscience that all of the problems you knew about had nothing to do with the accident that tragically impacted their lives?

How would you explain to an orphaned 10-year old that you deemed it okay for three reactors with “Less Than Competent” performance across the board and in mediocre physical condition to operate?

How would you explain your confidence in PSEG in the face of overwhelming evidence that the people who work there every day lacked such confidence?

I truly hope that you never have to face these questions for real.

I truly hope that you have the right answer for this real question:

What is NRC going to do about Salem and Hope Creek?

More monitoring is not enough.

Continued correspondence is not enough.

Safety repairs are needed to protect the public.

The NRC should Order PSEG to shut down all three reactors at Salem and Hope Creek until tangible improvements in safety culture and plant physical condition are completed.

If PSEG truly had safety as its foremost priority, the NRC would not have to Order the reactors to be shut down. PSEG would have voluntarily shut down the reactors upon receipt of the USA results showing “Less Than Competent” performance across the board. PSEG did not volunteer to put safety first, so NRC should compel the company to do so.

The fact that Salem and Hope Creek look fairly well in the reactor oversight process (ROP) should be given zero weight in the NRC’s decision-making process. The ROP is supposed to evaluate licensee performance and distinguish between good and bad performers so NRC can focus its resources on the under-performers. The ROP fails to meet this objective when it assigns Salem / Hope Creek to the

⁹ U.S. Nuclear Regulatory Commission Press Release No. 79-52, “NRC Staff Orders Five Nuclear Plants Shut Down to Resolve Piping Questions,” March 13, 1979.

¹⁰ U.S. Nuclear Regulatory Commission letter from Voss A. Moore to James M. Carroll, Vice President and General Counsel, Boston Edison Company, December 17, 1973.

“licensee response” column and USA rates performance in 73 of 90 characteristics as “Less Than Competent.” The ROP fails to assess the true conditions at this facility.

Furthermore, doing well in ROP space cannot offset non-compliance with federal safety regulations. The NRC issued PSEG operating licenses for the Salem and Hope Creek reactors following licensing proceedings with associated opportunities for public intervention based upon its determination that the facilities were built in conformance with federal regulations and reasonable assurance that they would be operated with continued conformance:

1. The Nuclear Regulatory Commission (the Commission) having found that:

- A. The application for license filed by the Public Service Electric and Gas Company, Philadelphia Electric Company, Delmarva Power and Light Company, and Atlantic City Electric Company (the licensees) complies with the standards and requirements of the Atomic Energy Act (the Act) of 1954, as amended, and the Commission’s rules and regulations set forth in 10 CFR Chapter I and all required notifications to other agencies or bodies have been duly made;*
- B. Construction of the Salem Nuclear Generating Station, Unit No. 1 (facility) has been substantially completed in conformity with Provisional Construction Permit No. CPPR-52 and the application, as amended, the provisions of the Act and the rules and regulations of the Commission;*
- C. The facility will operate in conformity with the application, as amended, the provisions of the Act, and the rules and regulations of the Commission;*
- D. There is reasonable assurance: (i) that the activities authorized by this operating license can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the rules and regulations of the Commission;¹¹ [emphasis added]*

The operating licenses have not been revised to alter the bases for their issuance. It is an inherent, explicit part of the bases for issuing the operating licenses that the NRC had reasonable assurance that the facilities would be operated without endangering public health AND in compliance with federal regulations. Even if the ROP results accurately represented the safety conditions at Salem and Hope Creek (and the “Less Than Competent” scores across the board in the USA assessment strongly suggest the results are inaccurate), only criterion 1.D(i) would be satisfied. Criterion 1.D(ii) would not be met with the longstanding, broad-based violations of 10 CFR 50, Appendix B, Criterion XVI.

When the Commission issued the operating licenses following public licensing proceedings, the public had every right to expect that the Commission would require the licensee to abide by the terms and conditions of these licenses. That’s the law. PSEG’s perennial poor performance on corrective actions violates 10 CFR 50, Appendix B, Criterion XVI. The public expects the Commission to do now what it implicitly said it would do when it issued operating licenses conditional on compliance with federal regulations; namely, not allow a reactor to operate in non-compliance. The Commission should uphold its fiduciary promise to the public and Order PSEG to shut down the Salem and Hope Creek reactors until such time that the company can remedy its corrective action program deficiencies.

¹¹ U.S. Atomic Energy Commission letter dated August 13, 1976, from Karl Kniel, Chief – Light Water Reactors Branch No. 2, to F. P. Librizzi, General Manager – Electric Production, Public Service Electric and Gas Company, “Issuance of Facility Operating License for Salem Nuclear Generating Station, Unit No. 1.”

As an absolute minimum, the NRC must Order PSEG to demonstrate tangible improvements in safety culture and plant physical condition within an explicit time frame.¹²

If, for some reason the NRC is unwilling to Order these three reactors to be shut down until the many safety problems are fixed, then the NRC must, as an absolute minimum, take the measures it took to protect the public living near the Salem and Hope Creek plants from security threats.

Following the tragic events of 09/11, the NRC issued a series of Orders to PSEG requiring security upgrades. The first Order in February 2002 mandated PSEG to take steps like increased security patrols, augmented security forces, additional security posts, and increased vehicle standoff distances. Subsequent Orders in April 2003 mandated PSEG to implement an upgraded Design Basis Threat, limits on working hours for security force personnel, and enhanced training for security responders.¹³

The NRC steadfastly maintains that there's been no credible threat against any specific U.S. nuclear power plants, yet it ordered PSEG to make security upgrades within an explicit timetable.

The results from the Synergy, USA, and Independent Assessment Team assessments reflect a clear and present danger at Salem and Hope Creek that is more credible and more specific than any of the publicly reported evidence that prompted NRC to issue the security orders. How can the NRC possibly justify taking less aggressive action at Salem and Hope Creek for abundant safety concerns than it has taken for less abundant security concerns?

The NRC today probably has more information about the safety threat at Salem/Hope Creek than the U.S. intelligence community had in August 2001 about the terrorist threat facing the United States. Governmental inquiries have established that the CIA and FBI under-reacted to the information it received prior to 09/11. The NRC must not under-react to the clear and present danger at Salem/Hope Creek. The NRC must act now to make competence at this nuclear facility a fact rather than a promise.

Sincerely,

<ORIGINAL SIGNED BY>

David Lochbaum
Nuclear Safety Engineer
Washington Office

¹² UCS recommends six months as sufficient time to demonstrate the improving trends.

¹³ U.S. Nuclear Regulatory Commission, "Point Paper on Current Homeland Protection and Preparedness Issues," available online at <http://www.nrc.gov/what-we-do/point-paper.pdf>

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