

November 7, 2001

LICENSEE: PSEG Nuclear LLC

FACILITY: Salem Nuclear Generating Station, Unit Nos. 1 and 2

SUBJECT: SUMMARY OF MEETING BETWEEN THE U.S. NUCLEAR REGULATORY COMMISSION (NRC) STAFF AND MEMBERS OF THE PUBLIC CONCERNING THE NRC'S REGULATORY OVERSIGHT OF STEAM GENERATORS AT THE SALEM NUCLEAR GENERATING STATION, AUGUST 16, 2001 (TAC NOS. MB2317 AND MB2318)

On Thursday, August 16, 2001, at 7:00 p.m., a meeting was held between representatives of the NRC staff, and members of the public interested in the Salem Nuclear Generating Station, Unit Nos. 1 and 2 (Salem). The purpose of the meeting was to discuss the NRC's regulatory oversight of steam generators (SGs) at Salem. The meeting was held at the Hampton Inn, Pennsville, NJ, and was open to interested members of the public, petitioners, intervenors, and other parties to attend as participants, or as observers pursuant to the "Commission Policy Statement on Staff Meetings Open to the Public" (see 65 FR 56964, dated September 9, 2000). The discussion lasted approximately 3 hours. A list of attendees is provided as Enclosure 1 to this meeting summary.

BACKGROUND

The NRC offered the public meeting in response to two letters, dated November 24, 2000, and January 6, 2001, written by Mr. Norm Cohen on behalf of the UNPLUG Salem Campaign. In those letters, Mr. Cohen requested that the NRC immediately release all the results of its recent inspection of the SGs at Salem, Unit No. 2, to the public by means of a public meeting at Artificial Island. Mr. Cohen had also requested that representatives of UNPLUG Salem be allowed to ask relevant questions of the steam generator inspectors. In a letter dated February 23, 2001, the NRC replied to what it understood to be the concerns raised by UNPLUG Salem in the November 24, 2000, and January 6, 2001, letters. The letter to Mr. Cohen included an offer to meet with representatives of UNPLUG Salem in a public forum in order to allow the NRC staff to further explain its programs related to licensee SG inspections.

Prior to the meeting, Mr. Cohen requested that he be given an opportunity to present information concerning SG tube ruptures. In addition, Mr. David Lochbaum, representing the Union of Concerned Scientists (UCS), indicated that UCS wished to present information related to the Hopenfeld Differing Professional Opinion (DPO). To accommodate these requests, the agenda was structured to allow sufficient time for the aforementioned presentations as well as additional time for other interested citizens to speak on related SG issues.

MEETING SUMMARY

The agenda included a presentation made by the staff about the NRC's regulatory framework pertaining to SGs. The purpose of this presentation was to allow members of the public to become more familiar with how the NRC performs its regulatory oversight duties as it relates to

the issue of SG structural integrity. A member of the NRC Region I staff, who recently inspected and audited PSEG's SG tubing examination program, also shared his insights into the most recent reactor oversight SG inspection.

The meeting began with opening remarks made by John Zwolinski, Director of the Division of Licensing Project Management, Office of Nuclear Reactor Regulation (NRR). Mr. Zwolinski stressed that the meeting represented an opportunity to share information and concerns about SGs. The meeting was then turned over to Mr. Francis (Chip) Cameron from the Office of General Counsel to facilitate the discussion and public forum sessions.

NRC Presentation on Regulatory Oversight of Steam Generators

The original purpose of the public meeting was to provide an opportunity for the NRC staff to further explain its programs related to licensee SG inspections. In order to better understand subsequent discussions on SG issues, the NRC staff believed that it was important for interested members of the public to be familiar with how the NRC performs its regulatory oversight duties. In addition, UNPLUG Salem has questioned why the licensee is responsible for performing the actual SG inspection, using the analogy that this arrangement represented "the fox guarding the hen house." UNPLUG Salem's question gets into the fundamental issue of how the NRC conducts its regulatory oversight function. Therefore, Mr. Edmund (Ted) J. Sullivan, Chief, Component Integrity and Chemical Engineering Section, presented an overview of the NRC's regulatory oversight of SGs. Copies of the slides from Mr. Sullivan's presentation are provided as Enclosure 2 to this meeting summary.

Mr. Sullivan explained that the Atomic Energy Act (as amended) gives the NRC the sole authority to issue operating licenses to companies that own and operate commercial nuclear power plants. Congress established the Atomic Energy Commission, and later the NRC, to oversee and regulate commercial nuclear power plants. This arrangement differs from other countries that have created government-run corporations or agencies that are responsible for actually operating nuclear facilities. Therefore, in keeping with its Congressionally mandated authority, the NRC establishes regulations through a formal process known as "rulemaking." As a result of this process, the NRC does not have the responsibility to perform the actual examination of SG tubing, since this responsibility rests with the nuclear power plant operators. The NRC provides guidance on how licensees are to meet its regulations, as well as provides information on industry operating experience. Owners and operators of nuclear power plants must continually ensure that they meet the appropriate regulations, license conditions, and Technical Specifications (TS) requirements. In the case of SG structural integrity, this is done through a licensee-established inservice inspection (ISI) program. Licensees are further required to maintain records that can be audited by the NRC, as well as submit reports on the public docket summarizing their activities. NRC inspectors periodically inspect and audit licensee programs to verify that its regulations and requirements are being met.

There are any number of licensee activities related to SGs that the staff may audit, including a review of inspection data (i.e., eddy current data). A more extensive review of eddy current (EC) data may be performed by the NRC staff if the situation warrants (e.g., severe degradation or new degradation mechanisms). Mr. Sullivan further pointed out that it would be impractical for the NRC to perform the data acquisition and analysis functions that are a part of the licensee's inspection process. This effort is very labor-intensive, and would require on the order of a dozen or more personnel working around the clock in concert with a licensee's planned

refueling outage. Given that there are 69 pressurized water reactor plants with steam generators operating on various outage schedules, it would be extremely difficult for the NRC to analyze this volume of data; however, more fundamentally, since licensees, not the NRC, own and operate the plants, it is the licensees' responsibility to analyze inspection data and to take corrective actions as required. Therefore, instead of gathering and analyzing a second set of data, NRC inspectors audit official records and samples of EC data, review licensee procedures, check personnel qualifications, interview technicians, and perform other related activities to ensure that the licensee is adequately inspecting and evaluating its SG tubes. This is one of the reasons why each licensee is responsible for performing effective detailed examinations and structural integrity assessments of its SGs.

NRC Presentation on Steam Generator Inspection Activities at Salem

Mr. Michael Modes continued with an overview of NRC inspection activities at Salem. A copy of the slides from his presentation are included as Enclosure 3 to this meeting summary.

Mr. Modes briefly described various elements of the NRC's recently revised Reactor Oversight Process (ROP). These elements included how (1) NRC inspectors involved in assessing reactor safety focus in on the ways licensees prevent accident-initiating events from occurring; (2) licensees ensure that systems important to mitigating the consequences of accidents are available during plant operations; (3) licensees maintain the integrity of barriers designed to prevent the release of radioactive material to the environment; and (4) licensees are prepared to handle certain emergency situations with the local public.

Mr. Modes also described the recent on-site inspection of PSEG Nuclear's steam generator ISI program. He stated that he and another inspector reviewed several procedures and reports associated with the EC inspection of the Salem steam generators, including the degradation assessment report, a signal/noise ratio study, and EC examination procedures. In addition, he interviewed PSEG employees and contract personnel responsible for EC non-destructive examination (NDE) of SG tubes. The NRC conducted these interviews to assess the licensee and contractor's knowledge of steam generator degradation phenomena. The inspectors also reviewed samples of EC NDE data obtained from several tubes, and verified that approved probes were used to acquire EC inspection data. This review included EC data obtained from three small radius U-bend tubes as well as other locations that were vulnerable to cracking.

Questions and Answers Following NRC Presentations

Question: Could you explain what is meant by "vulnerable?"

Answer: Based upon many years of industry experience, we know that the small cracks that are found in steam generator tubes do not occur randomly; that is the cracking does not take place uniformly throughout the entire length and population of tubes. There is a tendency for cracking to occur at common locations, such as at the tube sheet, adjacent to support plates, and in the U-bend region. We refer to these locations as "vulnerable" areas, and this is where we focus our attention during our on-site inspections.

Question: When inspections are done, do they inspect every tube?

Answer: During Salem's most recent Unit No. 2 inspection, the licensee performed a 100% inspection of its tubes (approximately 13,000 tubes) using a bobbin coil probe. It is well understood in the industry that the bobbin coil probe is not as reliable at picking up circumferential cracks in tubes as it is with axial cracks. Therefore, the licensee supplemented its inspection by using a rotating pancake probe in the more vulnerable locations, such as the tubesheet area. We understand that PSEG looked at 6 inches above and 6 inches below where the tube meets the tubesheet.

Question: Do NRC inspectors personally look at the tubes?

Answer: No. However, in order to adequately address this question, one has to know how steam generator tubes are inspected. Tube examinations can be broken down into two distinct phases: (1) data acquisition, and (2) independent data analysis. First, detailed tubing examinations are performed from the inside of the tubes. Access to inspect the condition of the tubes is made possible when the licensee opens one of the steam generator manways, specifically, the hot-leg manway. It is from this area that personnel specially trained and qualified in the use of EC equipment are able to insert the various probes which acquire the data that is used to evaluate the structural condition of individual tubes. The EC data is independently reviewed by teams of qualified data analysts (QDAs) who look for indications of flaws. Once these flaws are characterized and sized, the licensee evaluates this data with pre-determined criteria to determine which tubes to plug or repair.

Question: Are the SG tubes susceptible to a collection of stuff in the tubes, such as like crud buildup in your arteries?

Answer: There can be what is known as "sludge" buildup, however unlike your arteries, sludge builds up on the outside of SG tubes at support plates rather than accumulate on the inside of the tubes. This crud or sludge buildup is, by itself, not a reason to take a particular tube out of service. Rather, what happens is that the sludge may make it very difficult for EC probes to acquire reliable data. When there is a data quality problem, the licensee has to take corrective action, such as reacquiring the data or removing tubes from service.

Question: Who chooses how many and what tubes to inspect?

Answer: Salem TSs specify the minimum number of tubes to examine, and based upon the results of that inspection, additional tubes may be required to be examined. In addition, a portion of the tubes selected for the initial inspection must be randomly selected. As a practical matter, many licensees (including PSEG) have chosen to perform a bobbin coil inspection in 100% of its unplugged tubes, in addition to other targeted inspections using different types of probes, at each inspection interval. During periodic inspections, the NRC reviews the licensee's data, and may question the selection of tubes inspected.

Question: Do NRC inspectors check equipment used for inspections?

Answer: The NRC reviews the work orders, procedures and the methodology, etc., used by licensees and their contractors to ensure that the licensee has properly checked and calibrated the test equipment used during SG inspections.

Question: Is there an NRC inspector currently on site at Salem?

Answer: Yes. There are currently two NRC inspectors assigned to the Salem Nuclear Generating Station. The Senior Resident Inspector's name is Ray Lorson (introduced at the meeting), and the other Resident Inspector is Fred Bower. Additional inspectors from the Region office, who are experts in certain subject areas, may be periodically assigned to Salem on a temporary basis in order to assist our Resident Inspectors.

Union of Concerned Scientists Presentation

Mr. David Lochbaum, Nuclear Safety Engineer, representing the UCS, illustrated the UCS's concerns in a presentation titled "Nuclear Plant Steam Generators: 'a "loaded gun," and accident waiting to happen.'" A copy of the slides from this presentation is provided as Enclosure 4 to the meeting summary. The "loaded gun" analogy was taken from a statement made by NRC Commissioner Rogers in August 1988, and Mr. Lochbaum questioned the amount of time it has taken to resolve Commissioner Rogers' concerns as well as the DPO raised by former NRC employee Joram Hopenfeld. Mr. Lochbaum briefly described the Indian Point 2 SG tube failure event on February 15, 2000, further expressing the concern that the reactor containment structure does not provide a sufficient barrier to fission product release in the event of an SG tube rupture, and/or other severe accident scenarios. The UCS presentation included many quotations taken from the Advisory Committee for Reactor Safeguards (ACRS) report on the Hopenfeld DPO, dated February 2001. In concluding his presentation, Mr. Lochbaum stressed to members of the public that "it's the squeaky wheel that gets the grease," and urged those in attendance to keep pushing their concerns with regulatory agencies such as the NRC. For more information, please see Enclosure 4.

UNPLUG Salem Presentation

Mr. Norm Cohen, representing UNPLUG Salem, began his presentation with portions of a video tape produced by the Prairie Island Coalition titled "Good Nukes - *Almost* Good Enough." Excerpts of the spoken text of the video are provided as Enclosure 5 of this meeting summary. The video also expressed concerns about SG tube cracking, postulating various scenarios that could, in their view, lead to a core meltdown. The video further made a comparison to the Chernobyl accident stating that cascading tube ruptures could create contaminated areas similar to the size of the contaminated zone surrounding Chernobyl.

Mr. Cohen continued his presentation, outlining many concerns previously raised in recent correspondence to the NRC. These issues included:

- UNPLUG Salem believes that its concerns are very similar to those raised in the Hopenfeld DPO. Mr. Cohen also reiterated his claim that the NRC has, to this date, avoided answering his concerns about the Hopenfeld DPO.

- UNPLUG Salem is aware of an individual who was allegedly fired by PSE&G after bringing up chemistry concerns to the company. Mr. Cohen stated that this person subsequently sued his former employer and won. He added that the former employee's settlement agreement prevents him from talking to the NRC about his concerns, and that he will only speak to the NRC if he is subpoenaed.
- Mr. Cohen also reiterated his call for additional information on steam generator materials. He stated that, without Charpy tests, lot numbers, heat treatment certifications, and other related test data, "anyone can say anything about the [steam generator's] corrosion resistance." UNPLUG Salem has previously requested this information in order to perform its own independent evaluation of Salem's SGs, and Mr. Cohen stated that the NRC has refused to require the licensee to give the UNPLUG Salem this data.
- Alloy 600 was a poor choice for the replacement SGs because PSEG tried to cut corners to save a few dollars when better and safer alternatives were available. Mr. Cohen further questioned whether the replacement SGs in Salem Unit No. 1 are going to last any longer or as long as the original Alloy 600 used in the old steam generators given that the only difference was the manner of the tubing's heat treatment. He also indicated that the NRC defended the use of Alloy 600 by licensees in its responses to UNPLUG Salem, and asked whether the NRC still holds to that opinion in light of the February 2001 ACRS report.
- PSEG does not want to spend the time or the money to go the extra step to provide a better quality water for the steam generators and prolong their useful lives. Other utilities have gone to this higher quality water for good reason, not just to spend money. Therefore, since PSEG is not changing either the type of process water treatment or the alloy used in the steam generators, why won't similar cracks develop in less time when these generators have actually experienced similar service life?
- Why doesn't PSEG use "coupons" in its steam generators in order to measure the erosion in the tubes?

NRC Steam Generator Action Plan

One of the more prominent issues raised by some of the meeting participants, including Messrs. Lochbaum and Cohen, was the Hopenfeld DPO. The NRC's framework for evaluating and dispositioning the issues raised by Dr. Hopenfeld, as well as the ACRS Ad Hoc Committee's report on the same subject, is the Steam Generator Action Plan (SGAP). Therefore, Mr. Rick Ennis, Project Manager, Office of Nuclear Reactor Regulation, gave a presentation on action items associated with the Hopenfeld DPO and ACRS report being evaluated through the SGAP. Copies of the slides from Mr. Ennis' presentation are provided as Enclosure 6 to this meeting summary.

Mr. Ennis opened by stating that the purpose of the SGAP is to: (1) direct and monitor the NRC's efforts in the SG tube integrity area; (2) ensure that the associated issues are appropriately tracked and dispositioned; and (3) ensure the NRC's efforts result in an integrated SG regulatory framework (e.g., licensing, inspection, research).

The action plan consolidates numerous activities related to SGs including:

- Evaluation and implementation of recommendations from the NRC's Indian Point Unit 2 (IP2) SG Tube Failure Lessons-Learned report;
- Evaluation and implementation of recommendations from the NRC staff's review of the Office of the Inspector General's (OIG) report related to the NRC's response to the IP2 SG tube failure;
- NRC review of industry initiative NEI 97-06, "Steam Generator Program Guidelines," Generic License Change Package;
- Resolution of NRC Generic Safety Issue (GSI) 163, "Multiple Steam Generator Tube Leakage;"
- Evaluation and implementation of recommendations from the ACRS Ad Hoc Subcommittee report related to Dr. Hopenfeld's DPO on SG issues; and
- Resolution of Generic Safety Issue (GSI) 188, "Steam Generator Tube Leaks/Ruptures Concurrent with Containment Bypass, From Breach of Main Steam or Feedwater Line."

Mr. Ennis added that the action plan currently has 40 major milestones and may be found on the NRC's web site at: <http://www.nrc.gov/NRC/REACTOR/SGAP/index.html>. The staff notes that, due to the events of September 11, 2001, the NRC is reviewing all material on its web site. In the interim, only selected content is available. Therefore, this web site is currently not available.

The ACRS Ad Hoc Subcommittee Chairman, Dr. Powers, stated that staff has responded appropriately and consistently with the expectations of the ACRS by formulating research on the issues. He also stated that the ACRS had not identified anything particularly urgent for the staff to undertake. However, the ACRS is encouraging the NRC staff to determine promptly whether the effects of forces associated with depressurization during a main steamline break constitute a generic safety issue and, if so, to resolve this issue expeditiously. The staff subsequently determined that these issues should be classified as a generic safety issue (GSI-188) which has been incorporated into the SGAP.

A summary of the action items associated with the Hopenfeld DPO and the ACRS report may be found in Enclosure 6. Mr. Ennis also stated that the NRC believes it is safe for pressurized water reactors (PWRs) to continue to operate while work continues on the SG DPO-related issues because:

- Plants are designed and operated with defense-in-depth;
- Licensees follow tube inspection and maintenance procedures intended to ensure that safety margins against tube burst and leakage are maintained;
- Licensees continually monitor primary-to-secondary leakage to ensure that plants with significant leakage are shut down;
- Inspections and monitoring cannot guarantee that a tube will not fail; however, plants are designed with safety systems and procedures to bring reactors to a safe shutdown should an SG tube failure occur;
- Operational experience and technical analyses indicate that plants are safe to continue operation;
- The ACRS report did not identify any issues of immediate significance to public health and safety.

Mr. Zwolinski also remarked that the NRC staff is moving forward to address the issues raised in the Hopenfeld DPO through the action plan, and will ensure that each and every concern is properly dispositioned.

Public Forum: Questions and Comments

Question: Is there a piece of an SG tube here today that I can hold, and how many from the NRC have held a piece of this tubing?

Answer: A sample of SG tubing was not available for the meeting. The staff notes that samples of tubing are limited, and acknowledges that they could be helpful in explaining various issues to those less familiar with SG construction.

Question: I believe Mr. Lochbaum told us that the differential pressure across the tubing will be higher than its design [in the event of a main steamline break]. Is this true?

Answer: New tubing used in steam generators is designed to withstand approximately 11,000 pounds per square inch (psi) pressure. This pressure far exceeds the maximum differential pressure seen even in the most severe accident scenarios. It would take a crack on the order of greater than 85% of its through-wall thickness to cause a tube to rupture under main steamline break conditions. The probability of detecting such a crack is usually very high, and tubes are required to be taken out of service (plugged) if indications of a crack reach 40% of its through-wall thickness.

Question: Were the new SGs installed in Salem Unit No. 1 ever hydrostatically tested to see if they were strong enough to withstand the design pressures?

Answer: Yes. The replacement SGs were designed, constructed and installed in accordance with the requirements of Section III of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for Class 1 components. Prior to installation, the tube side and the shell side were hydrostatically tested. The SG tubing was tested at a pressure of about 3,100 psi-gauge (psig), which is 125% higher than its design pressure of 2,485 psig.

In addition to these questions, two members of the public spoke about their concerns associated with nuclear power and the possibility for an increased risk in cancer if one lived too close to the Salem reactors. The staff understands that many members of the public are concerned about the possibility of an increased risk in cancer due to nuclear power plant operations.

The staff notes that the NRC strictly regulates the amount of radioactive effluents produced by licensee facilities to levels that would result in an extremely low probability of increased cancer risk to citizens living near these facilities. In order to monitor radioactive releases to the public, licensees are required to have sensitive instrumentation that can detect the amount of radioactivity being discharged into plant waste systems. Licensees must also maintain strict

controls to minimize releases, and are further required to file an annual effluent report to the NRC. The report must characterize all quantities and types of isotopes that are released into the waste stream to ensure NRC regulations are being met.

Furthermore, the National Cancer Institute (NCI) recently performed a study noting that there has been an increase in cancer incidents rates in the last decade of the last century. NCI attributed these results entirely to the increase in the longevity of the population. When the NCI corrects incident rates relative to age, they find that for all cancers, the cancer incident rates are either stable or declining. The NCI was also requested by Congress to examine cancer mortality rates around 52 nuclear plants, and did not find any causal link between death due to leukemia or any other cancer form associated with nuclear power plant operations.

With no additional questions or comments from members of the public, Mr. Cameron reviewed a specific list of unanswered questions from the meeting. Mr. Cameron stated that the NRC would provide additional information concerning these issues in the meeting summary. The following section provides the NRC's post-meeting responses to the issues raised by UNPLUG Salem and other members of the public. The meeting adjourned at approximately 10:00 p.m.

Post-Meeting Responses to Issues Raised By UNPLUG Salem

Hopenfeld DPO

The unresolved issues stemming from the Hopenfeld DPO are currently being managed through the SGAP. A description of the plan was presented by Mr. Rick Ennis, and is included as a part of this meeting summary. Members of the public are encouraged to visit the SGAP web page at: <http://www.nrc.gov/NRC/REACTOR/SGAP/index.html>.

Providing Information to the NRC

During the meeting, Mr. Cohen said that he is aware of an individual who was allegedly fired by PSEG after bringing up chemistry issues to the company, and that this person still has lingering concerns about Salem. Mr. Cohen added that this person would only speak to the NRC if subpoenaed due to a settlement agreement with PSEG. In order to find out more information about the person known to UNPLUG Salem, a member of the NRC staff called Mr. Cohen. The staff is particularly concerned that this person may have information that could possibly be of safety or regulatory interest, and wished to talk to this individual. The staff is also sensitive to the statement made by Mr. Cohen that this person would like to maintain his/her anonymity because of an agreement with PSEG. Therefore, based upon the NRC staff's most recent conversation with Mr. Cohen, UNPLUG Salem will provide the name of this person to the staff if given permission to do so by the individual. As of this date, the staff has not heard from Mr. Cohen.

The NRC encourages anyone with information which could result in a safety concern or a matter of regulatory interest to bring these facts to the attention of the NRC. Our allegation process allows individuals to talk to the NRC and, except in special circumstances, remain anonymous. One situation where we cannot ensure anonymity is employee discrimination. In employee discrimination cases, the person's name would be essential to resolving the allegation. However, we will strive to thoroughly investigate all matters brought to our attention and to maintain allegeders' anonymity where possible.

Information Available for Public Inspection

The NRC understands that UNPLUG Salem would like to have access to detailed SG inspection information for the purpose of performing an independent assessment of Salem's SGs by experts retained by UNPLUG Salem. The information UNPLUG Salem is seeking is not in the possession of the NRC; rather, it is maintained by the licensee in accordance with records retention requirements.

As previously stated during the presentation on the NRC's regulatory framework, the Atomic Energy Act (as amended) gives the NRC the authority to issue operating licenses to companies that own and operate commercial nuclear power plants. Congress established the NRC as the sole authority to oversee and regulate commercial nuclear power plant facilities. However, when it created this regulatory framework and oversight role, Congress wrote in Title 42 of the United States Code (42 USC) 2133, that the NRC shall issue licenses:

"[to those] who are equipped to observe and who agree to observe such safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish; and...who agree to make available to the Commission such technical information and data concerning activities under such licenses as the Commission may determine necessary to promote the common defense and security and to protect the health and safety of the public. All such information may be used by the Commission only for the purposes of the common defense and security and to protect the health and safety of the public."

As such, the NRC has the authority to obtain the information it needs to protect public health and safety; however, it does not retain all the information it uses in performing its regulatory oversight duties. Certain records are maintained by licensees at their facilities, and are subject to inspection by the NRC. An example of one regulatory requirement for records retention is provided by Appendix B to 10 CFR Part 50, "Quality Assurance Criteria for Nuclear Power Plants." It states, in part, that "[s]ufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include...inspections, [and] tests..." The result of this regulation is that licensees retain a significant amount of detailed information on the suitability of thousands of plant components, and this information is subject to NRC inspection.

Whereas certain plant-specific information is kept by licensees and is not available for public inspection, final records and documents in the possession and control of the NRC are made available to the public, unless exempted for certain specific reasons. Our regulations further state that this information "...will be made available for inspection and copying at the NRC Web site, <http://www.nrc.gov>, and/or at the NRC Public Document Room..."

The NRC believes that the regulatory framework for making final reports and documents available to the public strikes the proper balance between retaining that information "necessary to...protect the health and safety of the public" and being open with the public. For example, some of the information that must be retained by the licensee includes "raw" EC data that consists of large amounts of digitized electronic data. It would be impractical for the NRC to retain this information because, as previously stated, this data is in a format that would require a significant number of highly specialized analysts to review. The responsibility for scrutinizing this information resides with the licensee.

Information available to the public on steam generator inspections at Salem includes:

- NRC inservice inspection (ISI) program inspection module is a part of the overall Reactor Oversight Process. Our ISI program inspection typically includes a review of procedures and technical reports associated with the licensee's tubing examinations, interviews with licensee and contract personnel to assess licensee competence, and a review of a limited sample of EC nondestructive examination data. The results are documented in an inspection report which is made available to the public. Details of the ISI and other inspection modules may be found on the NRC Web site, at <http://www.nrc.gov/NRC/IM/index.html> under the title of "Inspection Procedures."
- NRC Inspection Reports document the results of on-site inspections. For example, during the most recent Salem, Unit No. 2, October 2000 outage, PSEG performed a detailed examination of the steam generator tubes in accordance with its ISI program. NRC Inspection Report Nos. 05000272/2000-009 and 05000311/2000-009, dated December 8, 2000, can be found in the Agency-wide Documents Access and Management System (ADAMS) by referencing Accession No. ML003776007.
- Salem Steam Generator Plugging Reports are required by Salem Technical Specifications (TSs). PSEG provided its Salem Unit No. 2 steam generator plugging report in a letter dated November 16, 2000 (Accession No. ML003770394), and its Unit No. 1 steam generator plugging report in a letter dated May 22, 2001 (Accession No. ML011420106).
- Annual Reports are also required by the Salem TSs. PSEG submitted its most recent annual summary report on February 27, 2001. The report contains information associated with the Salem Unit No. 2 steam generator examinations performed in 2000. The document contains a description of the scope of tubing examinations, a summary of the EC results from refueling outages 2R11, information about tube plugging activities, and other inspection-related information. A copy of the 2000 Annual Report may be found in ADAMS by referencing Accession No. ML010800160.

Use of Alloy 600

We understand that UNPLUG Salem is concerned that the replacement SGs for Salem, Unit No. 1, will perform no better than the ones that were removed in 1996. The organization believes that Alloy 600 was a poor choice of tubing material for the replacement SGs because "better and safer alternatives were available."

Alloy 600 is a material commonly used to fabricate commercial nuclear power plant SG tubes. Alloy 600 is the generic name associated with the trade names Inconel 600 and Pyromet 600, and is a corrosion-resistant high-nickel alloy. When steam generators were first fabricated, manufacturers often used what is called mill-annealed Alloy 600 tubing. Experience has shown that most of the SG tubes which have required plugging over the years have been made of mill-annealed Alloy 600 material. As time progressed, SG manufacturers began using thermally treated Alloy 600. Thermally treated Alloy 600 is designed to improve the metal's properties to make it less likely that it would experience the types of corrosion we have seen with mill-annealed Alloy 600 tubing.

Industry experience with thermally treated Alloy 600 tubing in SGs has been that it has demonstrated substantially increased resistance to corrosion-related degradation than mill-annealed Alloy 600 tubing, even in SGs replaced nearly 20 years ago.

Therefore, the staff has concluded that using thermally treated Alloy 600 tubes represents a notable improvement over the mill-annealed Alloy 600 material, and is acceptable for use in SGs. Another material, Alloy 690, provides significantly improved corrosion resistance over mill-annealed Alloy 600 and is also used to make SG tubes. However, the staff emphasizes that the most important consideration affecting public health and safety is that individual licensees implement an effective ISI program that is tailored to the type of SG in service. Specifically, PSEG needs to be able to justify that sufficient safety margins exist to safely operate Salem between inspections through periodic examination and analysis of its tubes no matter which material is used.

SG Water Chemistry

UNPLUG Salem has stated that “PSEG does not want to spend the time or the money to go the extra step to provide a better quality water for the steam generators and prolong their useful lives. Other utilities have gone to this higher quality water for good reason, not just to spend money.”

The NRC staff believes that its regulatory requirements establish an appropriate level of safety to ensure public health and safety is protected. As such, the NRC does not regulate plant water chemistry through the use of prescriptive requirements. This is acceptable because:

- It is in the owner’s best interest to maintain the best chemistry possible;
- Inadequate chemistry will be reflected in subsequent tubing exams;
- Even if a licensee adopted poor chemistry standards, the degradation is slow enough that it would be observed and identified at the next inspection prior to reaching minimum wall thickness criteria.

PSEG has adopted, along with other utilities, Electric Power Research Institute (EPRI) water chemistry guidelines, and the NRC maintains that these controls are adequate.

Why doesn’t PSEG use coupons in its SGs?

The staff assumes the “coupons” mentioned by Mr. Cohen are similar to coupons that have been used in reactor vessels (RVs). Routine analysis of material specimens taken from the primary side are normally only used to monitor changes in the fracture toughness properties of ferritic materials used in RVs. Specimens of RV material are periodically withdrawn from the RV to help determine the conditions under which the vessel can be operated with adequate margins of safety against fracture throughout its service life.

As previously discussed, SG tubing degradation is monitored through EC examinations performed in accordance with the licensee’s ISI program. In addition, licensees will closely monitor secondary side water chemistry using EPRI Guideline NP-6239, "PWR Secondary Water Chemistry Guidelines," or equivalent appropriate guidelines. Under these programs, licensees monitor operating parameters, such as pH, cation conductivity, free sodium, dissolved oxygen, specific conductivity, chlorine, fluorine, suspended solids, silica, total iron, copper,

ammonia, and residual hydrazine. The staff maintains that these controls are sufficient to monitor SG tubing degradation between inspection periods. Tubes are not placed in the SGs with the sole purpose of being used as coupons and removed at a later date. However, licensees may elect to occasionally remove a tube from the SG to assess the condition of the tube as well as verify indications that were identified in the tube by EC testing. This assessment may include conducting a "burst test" in order to verify that the tubes will maintain their structural integrity at design pressures.

For additional information concerning the meeting, please contact the Salem Project Manager, Robert Fretz, at 301-415-1324.

/RA/

Robert J. Fretz, Project Manager, Section 2
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-272 and 50-311

Enclosures: 1. Meeting Attendees
2. NRC Regulatory Framework Presentation Slides
3. NRC Regulatory Oversight Presentation Slides
4. UCS Presentation Slides
5. Spoken Text From Prairie Island Coalition Video
6. Steam Generator Action Plan Slides

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DATE	10/30/01	10/31/01	11/05/01	11/05/01	11/06/01

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MEETING ATTENDEES
MEETING BETWEEN THE NRC STAFF AND MEMBERS OF THE PUBLIC
CONCERNING THE NRC'S REGULATORY OVERSIGHT OF STEAM GENERATORS
AT THE SALEM NUCLEAR GENERATING STATION
AUGUST 16, 2001

NRC, Office of Nuclear Reactor Regulation

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NRC, Office of General Counsel

Francis (Chip) X. Cameron

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Norm Cohen, UNPLUG Salem Campaign
Kent Tosch, New Jersey, Department of Environmental Protection
Dennis Zannoni, New Jersey, Department of Environmental Protection
Paul Williams, UNPLUG Salem Campaign
Lou and Rena Amada, Jersey Shore Nuclear Watch
Paul Lili
Miriam and Bob Hayes
Frieda Berryhill
Sean O'Sullivan
A. Kapsalopoulou
Alan Muller, Delaware Green Party
Jack Kasley, Press AC

Note: Other attendees elected not to sign sheet or name was indistinguishable on sign-in sheet.

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