PRIORITY 1
(ACCELERATED RIDS PROCESSING)

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR:9511270130 DOC.DATE: 95/11/15 NOTARIZED: YES DOCKET #
FACIL:50-387 Susquehanna Steam Electric Station, Unit 1, Pennsylva 05000387
50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
AUTH.NAME AUTHOR AFFILIATION
BYRAM,R.G. Pennsylvania Power & Light Co.
RECIP.NAME RECIPIENT AFFILIATION
Document Control Branch (Document Control Desk)

SUBJECT: Responds to NRC Bulletin 95-002, "Unexpected Clogging of RHR Pump Strainer While Operating in Suppression Cooling Mode."

DISTRIBUTION CODE: IE44D COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 8
TITLE: NRC Bulletin 95-02 Unexpected Clogging of RHR Pump Strainer While Ope

NOTES: 05000387

	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME	COPIES LTTR	COPIES ENCL
	POSLUSNY,C	1	1			
INTERNAL:	FILE CENTER 01	1	1	NRR/DRPW/PD3-2	3	3
	NRR/DSSA/SCSB	2	2			
EXTERNAL:	NRC PDR	1	1			
NOTES:		1	1			

P R I O R I T Y 1 D O C U M E N T

NOTE TO ALL "RIDS" RECIPIENTS:
PLEASE HELP US TO REDUCE WASTE! CONTACT THE DOCUMENT CONTROL DESK, ROOM P1-37 (EXT. 504-2083) TO ELIMINATE YOUR NAME FROM DISTRIBUTION LISTS FOR DOCUMENTS YOU DON'T NEED!

TOTAL NUMBER OF COPIES REQUIRED: LTTR 9 ENCL 9

PP&L Pennsylvania Power & Light Company
Two North Ninth Street • Allentown, PA 18101-1179 • 610/774-5151

Robert G. Byram
Senior Vice President-Nuclear
610/774-7502
Fax: 610/774-5019

NOV 15 1995

U.S. Nuclear Regulatory Commission
Attn.: Document Control Desk
Washington, D. C. 20555-0001

SUSQUEHANNA STEAM ELECTRIC STATION
RESPONSE TO NRC BULLETIN 95-02
PLA-4391 FILES R41-1A/R41-2

Docket Nos. 50-387
and 50-388

The purpose of this letter is to respond to the requested actions of NRC Bulletin 95-02, "Unexpected Clogging of a Residual Heat Removal (RHR) Pump Strainer While Operating in Suppression Pool Cooling Mode." The NRC's stated purpose of these actions is to "ensure that unacceptable buildup of debris that could clog strainers does not occur during normal operation." PP&L has been working since 1993 to address this concern in light of industry events, from both the normal operation and design basis accident perspectives. Our efforts to understand and mitigate this potential problem have been a high priority, commensurate with our view of its safety significance.

The attachment to this letter provides PP&L's response to each requested action. Any questions on this response should be directed to Mr. R. R. Sgarro (610) 774-7552.

Very truly yours,

R. G. Byram

Attachment

copy: NRC Region I
Ms. M. Banerjee, NRC Sr. Resident Inspector, SSES
Mr. C. Poslusny, NRC Sr. Project Manager, OWFN

210027

9511270130 951115
PDR ADOCK 05000387
Q PDR

JE44

PP&L RESPONSE TO NRC BULLETIN 95-02:

"UNEXPECTED CLOGGING OF A RESIDUAL HEAT REMOVAL (RHR) PUMP STRAINER WHILE OPERATING IN SUPPRESSION POOL COOLING MODE"

NRC Requested Action 1: "Verify the operability of all pumps which draw suction from the suppression pool when performing their safety functions (e.g., ECCS, containment spray, etc.), based on an evaluation of suppression pool and suction strainer cleanliness conditions. This evaluation should be based on the pool and strainer conditions during the last inspection or cleaning and an assessment of the potential for the introduction of debris or other materials that could clog the strainers since the pool was last cleaned."

PP&L Response:

PP&L has performed a detailed operability evaluation of the pumps associated with the four key systems at Susquehanna SES Units 1 and 2 which can take suction from the suppression pool. They include: Residual Heat Removal (RHR), Core Spray (CS), High Pressure Coolant Injection (HPCI), and Reactor Core Isolation Cooling (RCIC). The evaluation describes the design basis for each system, as well as a review of each system's strainer design. As requested by the NRC, the scope of the evaluation is focused on the potential for clogging during normal operation, since the related issue of strainer clogging post-LOCA will be addressed by a separate ongoing NRC/Industry effort. Our evaluation addresses each of the considerations noted in requested action 1 above, as well as the more detailed September 29, 1995 BWR Owners' Group (BWROG) guidance referenced by the bulletin.

All of the pumps evaluated have been found to be operable. A summary of our documented evaluation is provided below. Operability was based on the following key elements:

<u>Strainer Condition:</u> PP&L believes that as-found strainer condition is highly indicative of whether or not fiber is present in the pool. The event at Limerick-1 provided strong evidence that operation of one RHR pump for suppression pool cooling is sufficient to draw fiber onto the associated strainer. Industry events (Limerick-1, Perry) and full-scale testing show that the fiber then serves to filter other pool debris, and that once a combined debris bed forms on a strainer, it tends to remain after the pump is secured.

Inspections of all of the strainers in question were performed by divers during the 1995 Refueling and Inspection Outages on each unit (Unit 1 8th RFIO, 3/95; Unit 2 7th RFIO, 9/95). The strainers had not been previously inspected since early in the operating life of each unit. Hundreds of hours were logged in the suppression pool cooling mode of RHR on each unit during the cycles preceding these outages. All strainers were found to be free of any accumulation of fiber; their condition is documented on videotape. As a result PP&L believes that our pools have been and continue to be free of any accumulation of fiber.

Suppression Pool Cleanliness: During the 1995 RFIOs, foreign material that had accumulated since initial post-construction cleanings was removed from the suppression pool of each unit. This is consistent with the BWROG recommendations, which then emphasize documentation of the basis for whatever discernible debris is left behind. A relatively small amount of foreign materials was found in each pool, as compared to recent NRC Information Notices documenting this condition at other facilities. Any items that were not retrieved were evaluated under PP&L's Condition Report process. Unretrieved items were only allowed to remain in the pool based upon an evaluation that they were sufficiently small and/or negatively buoyant.

With regard to pool sludge (i.e., corrosion products), the BWROG recommendations noted that complete removal was unnecessary, but that the presence of corrosion products should be minimized to the extent practical. Unit 1 had a very light dusting of corrosion products on the pool floor. Unit 2 appeared to have a slightly greater amount, but for the most part accumulation was on the order of one-eighth of an inch, with slightly greater accumulation in areas where it could be created by pool currents. The aforementioned strainer events and tests have demonstrated that corrosion products alone do not create clogging; fibrous material must create a filter to capture them.

Suppression Pool Water/Sludge Sampling: In order to establish beyond visual inspection that fiber was not present in the pool water/sludge, samples were taken and analyzed. No fiber was found in any of these samples.

Foreign Material Control: Once it was established that fiber did not exist on the strainers, in the pool water, nor in the pool sludge, the next critical link was to ascertain that Foreign Material Exclusion (FME) practices had been sufficiently strong during and after the RFIOs to ensure that these conditions had not changed.

As noted above, a relatively small quantity of foreign material was removed from each pool during the 1995 RFIOs, despite the fact that the last purposeful effort to accomplish this had been shortly after the initial startup of each unit (Unit 1-1982; Unit 2-1984). This indicates that controls prior to 1995 had been effective. Enhancements to containment FME practices in preparation for the 1995 RFIOs have further reduced the potential for introduction of debris into the pools (further details are provided in response to Requested Action 4. below). Based on these activities, PP&L is confident that our FME efforts will ensure that the results of the most recent pool and strainer inspections will remain valid.

RHR and CS Suction Pressure Indications: As a final check, historical suction pressure measurements for CS and RHR (HPCI and RCIC testing is performed with the pump aligned to the Condensate Storage Tank, not the suppression pool) during quarterly flow testing, and available data from RHR suppression pool cooling operation, were examined in accordance with the BWROG recommendations. As expected, given the as found condition of the pool and strainers, no adverse trends of discernible decreases in suction pressure that would suggest the presence of suction strainer clogging were noted.

NRC Requested Action 2: "The operability evaluation in requested action 1 above should be confirmed through appropriate test(s) and strainer inspection(s) within 120 days of the date of this bulletin."

PP&L Response:

Based on the operability evaluation performed in response to NRC requested action 1, PP&L's position is that sufficient activities have been completed in support of the 1995 RFIOs of each unit to preclude the need for further confirmatory actions. PP&L's activities address NRC's stated concerns and comply with the BWROG recommendations (it should be noted that the Unit 1 work was implemented *prior* to both the Limerick event and the issuance of the BWROG recommendations). To review, during each unit's 1995 RFIO, PP&L has:

- inspected all strainers
- inspected the pool floor
- removed all retrievable foreign material from the pool
- evaluated and dispositioned discernible remaining material, including corrosion products, for their potential impact on strainer performance
- sampled pool water/sludge for fiber
- applied enhanced containment FME practices during the outages
- evaluated pump suction pressure indication trended data

These activities and their results (as summarized in our response to requested action 1), have provided recent confirmation that a clogging threat does not exist in either of the units' suppression pools; therefore, PP&L believes that the intent of requested action 2 has been met.

Susquehanna Unit 1 is currently in a forced outage. For the reasons specified above, further actions to reconfirm pool and strainer cleanliness are not necessary. However, since the opportunity has presented itself, PP&L will sample the pool water as a conservative confirmatory action, and will follow the BWROG guidance in dispositioning sample results.

NRC Requested Action 3: "Schedule a suppression pool cleaning. The schedule for cleaning the pool should be consistent with the operability evaluation in requested action 1 above. In addition, a program for periodic cleaning of the suppression pool should be established, including procedures for the cleaning of the pool, criteria for determining the appropriate cleaning frequency, and criteria for evaluating the adequacy of the pool cleanliness."

PP&L Response:

As stated in response to requested action 1 above, PP&L believes that the Susquehanna SES suppression pools are sufficiently free from foreign material to avoid any potential contribution to strainer clogging. As mentioned previously, each pool was cleaned of foreign material in 1995, and any material left behind has been formally evaluated within the Condition Report program. No fiber has been identified in water or sludge samples. Pool sludge permitted to reside in the pool was visually estimated to be on the order of one-eighth of an inch or less in average accumulation across the pool floor.

At future RFIOs, we will inspect the strainers and the pool (including water/sludge sampling) in accordance with the BWROG recommendations, and with consideration of any other relevant experience that occurs. This will include cleaning as necessary based on our inspection/sampling results. A pool cleaning program beyond what is described above will be established, if necessary, based on pool cleanliness assumptions embedded in PP&L's final resolution to the post-LOCA debris clogging concern, once it has been approved by NRC.

NRC Requested Action 4: "Review FME procedures and their implementation to determine whether adequate control of materials in the drywell, suppression pool, and systems that interface with the suppression pool exists. This review should determine if comprehensive FME controls have been established to prevent materials that could potentially impact ECCS operation from being introduced into the suppression pool, and whether workers are sufficiently aware of their responsibilities regarding FME. Any identified weaknesses should be corrected. In addition, the effectiveness of the FME controls since the last time the suppression pool was cleaned and the ECCS strainers inspected, and the impact that any weaknesses noted may have on the operability of the ECCS should be assessed."

PP&L Response:

The focus of PP&L's FME program at Susquehanna is on outage-related activities, since the Mark II containment does not permit access to the drywell or wetwell during operation. In preparation for the 1995 RFIOs in which each pool was inspected for foreign material, FME enhancements were implemented. As noted in our response to NRC requested action 1, however, previous FME controls had been effective in minimizing foreign material intrusion into the suppression pools. Also, in December 1994, prior to the 1995 RFIOs, the NRC inspected the

SSES FME program in accordance with Temporary Instruction 2525/125, and independently determined it to be effective. Therefore, the further enhancements applied during the outages should ensure an even stronger program. Examples of recent FME enhancements include:

Supplemental Containment FME Walkdowns: In previous RFIOs, containment inspections were conducted at the end of a RFIO, prior to containment closeout. During the 1995 RFIOs, additional drywell and wetwell "walkdowns" were conducted twice daily, using an established set of "walkdown expectations." These expectations were based in part on the importance of FME to the resolution strategy of the strainer plugging issue.

Downcomer Covers: Downcomers in the drywell have jet deflector caps which significantly mitigate the potential for debris to be introduced into the downcomer. During the 1995 RFIOs, temporary covers were installed to provide additional assurance that debris could not be introduced via this pathway.

Downcomer Drain Fittings: Fittings were installed to provide positive protection against introducing foreign material (e.g., hoses) into the pool during draining evolutions.

Worker Awareness: During the RFIOs, sensitivity to FME was increased significantly, with specific training for certain personnel in addition to enhanced job briefings. Reinforcement was provided through various communications media, and increased supervisory presence.

Formal Training: As part of its accredited training program, PP&L has recently developed training module AD9501, "Foreign Material Exclusion," to implement plant-specific training on INPO SOER 95-1, "Reducing Events Resulting from Foreign Material Intrusion." Other existing training courses have been revised to heighten awareness of FME issues.

Clearly, inadequate FME was a primary contributor to the industry events that have occurred. PP&L has reviewed our FME practices in light of these events, and believe that they incorporate the necessary lessons learned. Based on these activities, PP&L has not found any adverse impacts on operability due to weaknesses in FME practices.

Interfacing programs (e.g. training), industry initiatives (e.g., BWROG, NRC work), and continuing assessments should assure continued sensitivity to potential FME enhancements.

NRC Requested Action 5: " Consider additional measures such as suppression pool water sampling and trending of pump suction pressure to detect clogging of ECCS suction strainers."

PP&L Response: Both of these items have been addressed above in response to NRC requested actions 1 and 2. With respect to these activities during operation:

Water Sampling: PP&L is investigating potential ways to take unfiltered samples on-line, should the need arise. However, based on activities to date, we have not identified a need for on-line sampling.

Pump Suction Pressure Trending: Previous reviews of IST pump flow testing results and RHR Suppression Pool Cooling operational data have indicated no adverse trends. Based on this finding and the actions PP&L has taken to mitigate the potential for foreign material intrusion, we do not plan to provide any reviews beyond those that exist in our current programs at this time.

AFFIDAVIT

COMMONWEALTH OF PENNSYLVANIA)
: SS
COUNTY OF LEHIGH)

I, ROBERT G. BYRAM, being duly sworn according to law, state that I am Senior Vice President - Nuclear of Pennsylvania Power & Light Company and that the facts set forth on the attached Response to NRC Bulletin 95-02 issued pursuant to 10CFR50.54(f) are true and correct to the best of my knowledge, information and belief.

Robert G. Byram
Senior Vice President - Nuclear

Sworn to and subscribed
before me this 15th day
of November, 1995.

Martha C. Sedora
Notary Public

Notarial Seal
Martha C. Sedora, Notary Public
Allentown, Lehigh County
My Commission Expires Jan. 15, 1998
Member, Pennsylvania Association of Notaries