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U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
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Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION SUPPLEMENTAL INFORMATION APPLICABLE TO PROPOSED AMENDMENT NO. 233 TO LICENSE NPF-14 AND PROPOSED AMENDMENT NO. 198 TO LICENSE NPF-22: RELAXATION OF EXCESS FLOW CHECK VALVE SURVEILLANCE TESTING REQUIREMENT
PLA-5280

Docket No. 50-387 and 50-388

Reference: 1) PLA-5227, R.G. Byram to USNRC, Proposed Amendment No. 233 to License NPF-14: and Proposed Amendment No. 198 to License NPF-22: Relaxation of Surveillance Testing Requirements for Excess Flow Check Valves and Submittal of Pertinent IST Program Relief Requests dated 10/4/2000

The purpose of this letter is to provide supplemental information regarding our proposed, amendment requests made in Reference (1). The need for this supplemental information was developed during a teleconference held with the NRC staff on 2/16/01.

The questions and our responses are contained in Attachment 1.

PPL Susquehanna, LLC requests approval of the proposed Amendments prior to April 6, 2001

If you have any questions, please contact Mr. M. H. Crowthers at (610) 774-7766.

Sincerely,

R. G. Byram
Attachment

copy: NRC Region I
Mr. S. Hansell, NRC Sr. Resident Inspector
Mr. R. G. Schaaf, NRC Project Manager
Mr. D. J. Allard, PA DEP

A001

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PPL Susquehanna, LLC: Docket No. 50-387

SUPPLEMENTAL INFORMATION APPLICABLE TO PROPOSED AMENDMENT NO. 233 TO LICENSE NPF-14: RELAXATION OF EXCESS FLOW CHECK VALVE SURVEILLANCE TESTING REQUIREMENT SUSQUEHANNA STEAM ELECTRIC STATION UNIT NO. 1

Licensee, PPL Susquehanna, LLC, hereby files supplemental information in support of a revision to its Facility Operating License No. NPF-14 dated July 17, 1982.

This amendment involves a revision to the Susquehanna SES Unit 1 Technical Specifications.

PPL Susquehanna, LLC
By:

R. G. Byram
Sr. Vice-President and Chief Nuclear Officer

Sworn to and subscribed before me
this 12th day of March, 2001.

Notary Public

Notarial Seal
Nancy J. Lannen, Notary Public
Allentown, Lehigh County
My Commission Expires June 14, 2004

BEFORE THE
UNITED STATES NUCLEAR REGULATORY COMMISSION

In the Matter of :

PPL Susquehanna, LLC : Docket No. 50-388

SUPPLEMENTAL INFORMATION APPLICABLE TO PROPOSED AMENDMENT NO. 198 TO LICENSE NPF-22: RELAXATION OF EXCESS FLOW CHECK VALVE SURVEILLANCE TESTING REQUIREMENT SUSQUEHANNA STEAM ELECTRIC STATION UNIT NO. 2

Licensee, PPL Susquehanna, LLC, hereby files supplemental information in support of a revision to its Facility Operating License No. NPF-22 dated March 23, 1984.

This amendment involves a revision to the Susquehanna SES Unit 2 Technical Specifications.

PPL Susquehanna, LLC
By:

R. G. Byram
Sr. Vice-President and Chief Nuclear Officer

Sworn to and subscribed before me
this 12th day of March, 2001.

Notary Public

Notarial Seal
Nancy J. Lannen, Notary Public
Allentown, Lehigh County
My Commission Expires June 14, 2004

Attachment 1 to PLA-5280
Supplemental Information

Supplemental Information

Question 1

Susquehanna Steam Electric Station (SSES), Units 1 and 2, reported a larger number of EFCV failures than other plants in the Boiling Water Reactor Owners' Group survey. This results in calculated failure rates that are not bound by the NEDO-32977-A composite failure rate. The operating time (in valve years) used in the failure rate calculation for SSES, Units 1 and 2, in Table 4-1 of NEDO-32977-A was limited to one operating cycle for one unit (a total of 144 valve years). However, Attachment A of NEDO-32977-A indicates that SSES, Units 1 and 2, had accumulated 5568 valve years of operating time for tested EFCVs as of the time the data was collected for the topical report.

Provide failure data (including corrective actions taken) for the accumulated EFCV operating time, including failure data from additional testing since the topical report was issued. If the additional failure data does not demonstrate that the EFCV failure rate at SSES, Units 1 and 2 is bound by the topical report composite failure rate, provide a discussion of corrective actions (including maintenance, procedures, personnel training, valve characteristics and test methodology evaluations and revisions) that have been implemented to limit future EFCV failures.

Response

PPL Excess Flow Check Valves (EFCV) test data from the SSES Unit 2 4th Refueling Outage (Spring 1991) to the Unit 1 11th Refueling Outage (Spring 2000) is as follows:

Operating time [years] = 1672 years
Operating time [hours] = 1.45 E7 hours
Number of Failures = 10 (5 failures on Unit 1 and 5 failures on Unit 2)

These test results are based on Unit 1 and 2 tests that include 100 EFCVs per unit per outage (Note that the NEDO reports incorrectly 96 valves per unit.). The test frequency includes ten (10) eighteen-month test intervals and two (2) twenty-four month test intervals. The data also includes testing performed on 8 EFCVs that were installed on the MSIV Leakage Control Systems up until the systems were removed from both units.

From 1991 to 1997, SSES recorded 14 instances of EFCV failures to check. During this time frame, it was assumed conservatively that a problem existed with the valves, and as a result, 13 valves were replaced. For 9 of the replaced valves, insufficient investigative work was performed to determine the cause. For one of the replaced valves, it was

subsequently determined by calculation that the test pressure (reactor pressure of ~500 psi) was insufficient to develop enough flow at the valve to cause the valve to check. Three of the 14 valves that failed the test were bench tested. The bench testing did not repeat the failures. It is believed that the test failures were due to inadequate test methods and were not actual valve failures. Thus prior to 1997, PPL considers that 9 test failures occurred. It is not known whether these represent actual valve failures or not.

In the 1997 to 1998 time frame, as knowledge was gained via internal investigations (i.e. calculations and bench tests) and participation with industry groups, it became apparent that the test failures occurred due to the inability to establish adequate test conditions. The valves are designed to check when exposed to a differential pressure of 3 to 10 psid. Differential pressures within this range were not always assured due to:

- Tests performed at reduced reactor pressure.
- Tests performed with long lengths of tubing downstream of the EFCV. Long tubing lengths provide resistance to flow that can prevent adequate test conditions.

Since 1997, 2 valve failures have been reported. One of these valves was replaced. No cause determination was performed. The other valve was retested after the tubing downstream of the valve was shortened to lower the flow resistance. The valve successfully passed the test. As a result, alternate testing methods were incorporated into procedures to help assure values of differential pressure were sufficient and achieved during the test. Typically, this involved reducing the length of tubing downstream of the valve to increase flow and differential pressure.

Thus of the 10 test failures, 9 EFCVs failed prior to 1997 and 1 EFCV failed after 1997. None of these have been confirmed to be valve failures.

In order to ensure that EFCV performance is adequately monitored and issues properly resolved, PPL is taking the following actions:

- Performance criteria and a specific function have been established in the Maintenance Rule Program. A separate containment isolation function will monitor EFCV performance. The isolation function for EFCVs will be monitored under the Maintenance Rule.
- In addition, and as stated in the TS bases, the EFCVs in each sample are selected to be representative of the various plant configurations, models, sizes and operating environments. This ensures that any potential common problem with a specific type or application of EFCV is detected at the earliest possible time.

- As also stated in the TS bases, EFCV failures are evaluated to determine if additional testing is warranted to ensure overall reliability, and acceptable performance.
- Samples sizes are expanded if generic problems are identified in the cause determination.
- The corrective action program will categorize an EFCV test failure as a Level 2. The Level 2 condition report will require bench testing of the failed EFCV and determination of the cause of the failure.
- EFCV test procedures have been reviewed and revised as necessary to:
    - Ensure proper test conditions are specified in the prerequisite section of the procedure. Test pressure is established at nominal system pressure. Test pressure will be based on the specific application for the tested valves(s). In addition, alternate test methodology will be procedurally directed, controlled, and documented.
    - Require that an excess flow check valve that fails testing is documented in the corrective action program as a Level 2 for which a cause determination is made.
    - Incorporate additional test controls which include; requiring the use of technicians with specialized surveillance group certification, requiring the technicians to document any test anomalies observed that may aid in a cause determination; and identification as a test prerequisite that the excess flow check valves are considered to have a maintenance rule function with specific performance criteria.

Based upon the above, the SSES failure rate data for SSES is deemed to demonstrate reliable EFCV performance. This performance history demonstrates that the risk of an EFCV failure to close is low.

The BWROG Topical demonstrates low consequences result from an EFCV failure. The consequences will only occur in the case of an instrument line break. The EFCVs are not required to function in any design basis event. This low risk of failure along with the controls implemented and additional controls to be implemented described above will ensure that the risk of EFCV failure remains acceptably low going forward.

Question 2

Provide a discussion on the vulnerability of instrument lines and equipment and any operational impact an instrument line break may have (jet impingement, separation criteria).

Response

The NEDO-32977-A report, page 10, Section 3.2 "Operational Consequences", states the following "Separation of equipment in the reactor building minimizes the operational impact of an instrument line break on other equipment due to jet impingement."

Regulatory Guide 1.11 'Instrument Lines Penetrating Primary Reactor Containment" requires instrument lines to be "protected or separated to prevent failure of one line from inducing failure of another line."

PPL FSAR Section 3.13 "Compliance with NRC Regulatory Guides" identifies that the design of the instrument lines penetrating primary reactor containment complies with the provisions of the Regulatory Guide 1.11.

Based on the above, the PPL design is consistent with the design requirements described in the NEDO and the Regulatory Guide 1.11. The separation of equipment would be expected to minimize the operational impact of an instrument line break on another line and on other equipment.

Question 3

The proposed bases differ from approved Technical Specification Task Force Item No. 334 (TSTF-334), Revision 2, which addresses relaxation of EFCV surveillance frequencies as justified in NEDO-32977-A. Please explain the differences from TSTF-334, Revision 2.

Response

PPL provided, in Attachment 5 of the PPL submittal, information copies of the PPL SR 3.6.1.3.10 bases that support the subject Technical Specification change. The PPL SR bases include all but the first and third sentence of TSTF Insert 2 bases. These two sentences were not included verbatim in the PPL bases for the following reasons:

The first sentence of the TSTF insert 2 which states " The nominal 10 year interval is based on performance testing as discussed in NEDO-32977-A " Excess Flow check Valve Testing Relaxation." was changed to " The nominal 10 year interval is based on

other performance-based testing programs, such as Inservice Testing (snubbers) and option B to 10CFR50, Appendix J." The PPL bases statement is consistent with the referenced NEDO and is considered to be a more direct reference (than the NEDO) to the bases for the test frequency (i.e. performance based testing). It should be noted that the NEDO document has been added to the bases section as a reference.

The third sentence of the TSTF insert 2 which states "Operating experience has demonstrated that these components are highly reliable and that failures to isolate are very infrequent." was not included in the PPL bases. This statement was not included as it was felt to be redundant to the PPL bases statement "EFCV failures will be evaluated to determine if additional testing in that test interval is warranted to ensure overall reliability and that failures to isolate are very infrequent." The continual evaluation of overall reliability as communicated in the PPL bases statement was felt to be a better focus rather than past performance history as communicated in the TSTF statement.