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U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop OP1-17
Washington, DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED LICENSE AMENDMENT NO. 285
FOR UNIT 1 OPERATING LICENSE NO. NPF-14
AND PROPOSED LICENSE AMENDMENT NO. 253
FOR UNIT 2 OPERATING LICENSE NO. NPF-22
EXTENDED POWER UPRATE APPLICATION
RE: VESSELS AND INTERNALS INTEGRITY TECHNICAL REVIEW
REQUEST FOR ADDITIONAL INFORMATION **Docket Nos. 50-387**
RESPONSES **and 50-388**
PLA-6210

References: 1) *PPL Letter PLA-6076, B. T. McKinney (PPL) to USNRC, "Proposed License Amendment Numbers 285 for Unit 1 Operating License No. NPF-14 and 253 for Unit 2 Operating License No. NPF-22 Constant Pressure Power Uprate," dated October 11, 2006.*

2) *Letter, R. V. Guzman (NRC) to B. T. McKinney (PPL), "Request for Additional Information (RAI) – Susquehanna Steam Electric Station, Units 1 and 2 (SSES 1 and 2) - Extended Power Uprate Application Re: Vessels and Internals Integrity Technical Review(TAC Nos. MD3309 and MD3310)," dated April 30, 2007.*

Pursuant to 10 CFR 50.90, PPL Susquehanna LLC (PPL) requested in Reference 1 approval of amendments to the Susquehanna Steam Electric Station (SSES) Unit 1 and Unit 2 Operating Licenses (OLs) and Technical Specifications (TSs) to increase the maximum power level authorized from 3489 Megawatts Thermal (MWt) to 3952 MWt, an approximate 13% increase in thermal power. The proposed Constant Pressure Power Uprate (CPPU) represents an increase of approximately 20% above the Original Licensed Thermal Power (OLTP).

The purpose of this letter is to provide responses to the Request for Additional Information transmitted to PPL in Reference 2.

The Enclosure contains the PPL responses.

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There are no new regulatory commitments associated with this submittal.

PPL has reviewed the "No Significant Hazards Consideration" and the "Environmental Consideration" submitted with Reference 1 relative to the Enclosure. We have determined that there are no changes required to either of these documents.

If you have any questions or require additional information, please contact Mr. Michael H. Crowthers at (610) 774-7766.

I declare under perjury that the foregoing is true and correct.

Executed on: 5-21-07

B. T. McKinney

Enclosure: Request for Additional Information Responses

Copy: NRC Region I
Mr. A. J. Blamey, NRC Sr. Resident Inspector
Mr. R. V. Guzman, NRC Sr. Project Manager
Mr. R. R. Janati, DEP/BRP

Enclosure to PLA-6210
PPL EPU
Request for Additional Information Responses

NRC Question:

Section 10.7, "Plant Life," of Attachment 4 to your submittal dated October 11, 2006, identifies irradiation-assisted stress corrosion cracking (IASCC) as a degradation mechanism influenced by increases in neutron fluence. PPL also states that it has a procedurally controlled program that is consistent with the Boiling Water Reactor Vessel and Internals Project (BWRVIP) issued documents for the augmented nondestructive examination of selected reactor vessel internal components (core spray piping, core spray spargers, core shroud and core shroud supports, jet pumps and associated components, top guide, lower plenum, vessel inner-diameter attachment welds, instrumentation penetrations and feedwater spargers) in order to ensure their continued structural integrity. This section indicates that the current inspection strategy for reactor internal components is expected to be adequate to manage any potential effects of the extended power uprate. Based on this, provide the following:

(a) Specify which vessel internals components will exceed the BWRVIP-26 threshold fluence level, 5 x 10^{20} neutrons per centimeter – squared (n/cm2) (E > 1 Mega electron Volt (MeV)), and become susceptible to cracking due to IASCC. For those components exceeding the threshold, clarify the current inspection program to be utilized in managing IASCC of the component. Identify the scope, sample size, inspection method, frequency of examination and acceptance criteria for the inspection programs.

(b) Confirm that the core plate, in-core flux monitoring guide tubes, and control rod guide tubes were considered in the determination of which components exceed the BWRVIP-26 threshold fluence level, 5 x 10^{20} n/cm2 (E > 1 MeV), as referenced in Section 2.1.3 of RS-001, Rev. 0, "Review Standard for Extended Power Uprates," and become susceptible to cracking due to IASCC.

PPL Response 1(a):

The SSES Unit 1 and 2 RPV internal inspection program is based on BWRVIP inspection guidelines. These guidelines consider the effects of fluence and are based on component configuration and industry experience. Additionally the SSES inspection program considers vendor recommendations and industry operating experience.

The following defines the inspection program for vessel internal components that exceed the BWRVIP-26 threshold fluence level, 5 x 10^{20} neutrons per centimeter – squared (n/cm2) (E > 1 Mega electron Volt (MeV)) and defines for each component the inspection scope, sample size, inspection method, frequency and acceptance criteria:

- **Shroud** - The shroud inspections are performed in accordance with the BWRVIP-76 Core Shroud Inspection and Flaw Evaluation Guidelines. BWRVIP -76 defines the scope, sample size, inspection method, frequency of examination and

acceptance criteria. The SSES shrouds are classified as Category C per BWRVIP-76. SSES has inspected all horizontal shroud welds (H1, H2, H3, H4, H5, H6A, H6B and H7) and all shroud vertical welds per the BWRVIP-76 requirements. Only portions of H4 and H5 welds and their associated vertical welds will exceed 5E20 n/cm^2. The horizontal welds are inspected ultrasonically. The vertical welds have been inspected using both EVT-1 and ultrasonic's. Only one vertical weld between H4 and H5 on the Unit 1 shroud contains a short non-through wall flaw. All horizontal welds on the Unit 1 and 2 shrouds contain non-through wall flaws except weld H3, which has no relevant indications. Inspection frequency and scope of future inspections will be based on the results of the next inspection in 2009 (U2) and 2010 (U1). Crack growth rate and fracture toughness for all identified flaws has been evaluated for the affects of fluence in accordance with BWRVIP-76. These evaluations verify structural integrity and define the inspection frequency.

- **Top Guide** - The top guide inspections are performed in accordance with the BWRVIP-26-A BWR Top Guide Inspection and Flaw Evaluation Guidelines. BWRVIP -26-A defines the scope, sample size, inspection method, frequency of examination and acceptance criteria. The SSES Units utilize wedges to provide lateral support and to increase the seismic margin of the top guides. For this configuration, BWRVIP-26-A requires the inspection of the top guide hold down assemblies only. All hold down assemblies are visually inspected every 10 years. The grid beams, whose fluence exceeds the IASCC threshold, are not required to be inspected. BWRVIP-26-A, section 2.2.1 states, "There are no safety consequences resulting from failure at a single beam intersection. Failure of an upper beam would have no consequence, and failure of a lower beam may cause some core instrument damage but would not affect safe shutdown. Also, grid beams are interlaced such that a large number of complete separations would need to occur before control rod insertion would be affected."

- **In-Core Flux Monitoring Dry Tube Assembly** - The upper part of the dry tube assembly is located within the reactor core, adjacent to fuel assemblies. As such, they are exposed to high fluence. Therefore, it is assumed that the dry tubes will exceed the IASCC threshold with or without EPU. However, BWRVIP-47-A, BWR Lower Plenum Inspection and Flaw Evaluation Guidelines, does not require inspection of in-core flux monitoring dry tube assemblies. BWRVIP-47-A, section 2.3.3 states the basis for not requiring inspection is that the failure of the dry tubes does not impair safe shutdown. The SSES inspection program for dry tubes is based on GE SIL 409, revision 2. SSES has replaced all the dry tube assemblies with the dry tubes that are constructed with IASCC-resistant material. The upper two feet of these dry tube assemblies will be inspected visually for damage within 20 years of the replacement date and every two outages thereafter.

PPL Response 1(b):

The core plate, in-core flux monitoring guide tubes, and control rod guide tubes have been evaluated to determine which components exceed the BWRVIP-26 threshold fluence level, 5 x 10^{20} n/cm2 (E > 1 MeV), as referenced in Section 2.1.3 of RS-001, Rev. 0, "Review Standard for Extended Power Uprates."

The peak EPU calculated maximum neutron fluence for the core plate that is based on the RAMA Code fluence evaluation is estimated to be 3.9 E20 n/cm^2 for Unit 1 and 3.3 E20 n/cm^2 for Unit 2 for 32 EFPY, which is below the BWRVIP threshold.

The control rod and lower portion of the in-core flux monitoring guide tubes are located below the core plate and will also be below the IASCC threshold. The upper portion of the in-core flux monitoring guide tubes is addressed in response 1(a).