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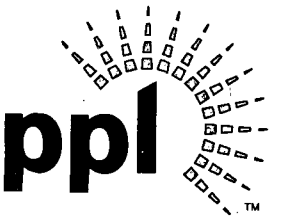

OCT 05 2007

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
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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 – SUPPLEMENT
PLA-6290**

**Docket Nos. 50-387
and 50-388**

References: 1) *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) *PLA-6194, 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 Extended Power Uprate Application RE: Health Physics Technical Review Request for Additional Information Responses," dated May 9, 2007.*

3) *PLA-6189, 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 Extended Power Uprate Application RE: Operator Licensing and Human Performance Technical Review Request for Additional Information Responses," dated May 3, 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).

A001 NRR

The purpose of this letter is to provide a supplement to Reference 1. The Supplement is provided in the Enclosure.

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: 10-5-07

Richard D. Pagodin
for B. T. McKinney

Enclosure: Supplemental Information

Attachment 1: Plant Layout Maps
Attachment 2: Condensate Pump Trip Test Proposed License Conditions

Copy: NRC Region I
Mr. R. V. Guzman, NRC Sr. Project Manager
Mr. R. R. Janati, DEP/BRP
Mr. F. W. Jaxheimer, NRC Sr. Resident Inspector

Enclosure 1 to PLA-6290
Supplemental Information

Introduction

Based on analyses recently concluded, it has been determined that five changes originally envisioned to be required to support the Constant Pressure Power Uprate (CPPU) are not required and therefore will not be implemented.

The basis for each determination is provided below:

Emergency Service Water (ESW) Fuel Pool Check Valve Modification:

A. Summary of Previously Submitted Information:

Reference 1, Attachments 4, 6 (PUSAR), 7 (List of Planned Modifications) and 8 (Startup Testing) identified that PPL would install a modification to eliminate an operator vital mission.

The relevant portion of Reference 1 Attachments 4 and 6 Table 8-1 is provided below:

Location	Function	CLTP Dose (REM)	CPPU Dose (REM)
Vital Missions			
Maintenance of Spent Fuel Pool (SFP) Cooling – Emergency Service Water (ESW) Valve Actuation[11]	Provide adequate cooling of SFP.		
	Mission (1) to control ESW makeup flow.	1.41[12.13]	2.26[12.13]
	Mission (2) to tie-in ESW system to SFP.	4.80[14]	NA[11]

Table Notes:

[11] For CLTP, two separate operator missions are required to provide ESW makeup to the spent fuel pool under LOCA conditions. One mission is to Elevation 749' of the reactor building to control ESW System makeup flow. The second mission is to Elevation 670' of the reactor building to tie-in the ESW system to the spent fuel pool. With CPPU, a modification is made which eliminates the requirement for the ESW tie-in mission.

[12] Mission involves ingress to reactor building at Elevation 749', check skimmer surge tank water level at control panel in corridor outside Room 1-514, perform operator actions inside Room 1-514 to control flow, and egress for a total duration of approximately 8 minutes.

[13] The total mission dose was calculated at 24 hours post-LOCA.

[14] The total mission dose was calculated at 40 hours post-LOCA."

In addition, Reference 2, PPL response to NRC Question 10, stated:

"SFP Cooling ESW Valve Actuation

The Susquehanna specific analysis of the mission to provide ESW makeup to the SFP under LOCA conditions as provided in Table 8-1 of the PUSAR is conservatively based on adjusting the operator access dose to the fuel pool cooling heat exchanger pump room to control ESW flow in three operator steps. The previously calculated CLTP doses are adjusted via scaling factors to reflect CPPU conditions. A breakdown of the mission dose for each of the three steps is presented below.

1. Ingress/Egress dose:

   = {Stairwell dose + RB 749 dose} x 2 (for ingress and egress)
   = {(10.1 R/hr x 1 min/60 min/hr) + (0.5 R/hr x 1.3 min. + 7.75 R/hr x 0.175 min)/60 min/hr} x 2
   = (0.168 R + 0.033 R) x 2 = 0.403 R

2. Access to Panel 1C206 to check skimmer surge tank water level:

   = Access to Panel 1C206 + Operator Dose at 1C206 Panel
   = Access to Panel 1C206 + 49.0 R/hr x 1 min/60 min/hr

Access to Panel IC206 Ingress/Egress Dose Estimate		
Travel Time (sec)	**Dose Rate (R/hr)**	**Dose (R)**
4.3	10.5	0.0126
3.0	13.0	0.0108
3.0	18.2	0.0151
3.0	26.0	0.0216
3.0	39.0	0.0325
Total		0.0927
Ingress/Egress x 2		0.185

   = 0.185 R + 0.817 R = 1.002 R

3. Dose in heat exchanger pump room to open valves:
   = normal + contained source dose rate x stay time
   = (0.04 R/hr + 0.0484 R/hr) x 2 min x 1 hr/60 min = 0.0029 R

Total CLTP dose = 0.403 + 1.002 + 0.0029 = 1.41 R

The CLTP dose of 1.41 R was increased by a factor of 1.067 to account for a suppression volume input correction in the source term adjusting this dose to 1.505 R.

CPPU dose = 1.505 R x 1.5 = 2.26 R

The 1.5 factor is the CLTP to CPPU scaling factor discussed in the response to Question 8.

Mark-ups of plant layout maps showing the access route are provided in Attachment 1."

B. Basis Decision to Not Implement the Modification:

The purpose of this modification was to eliminate the need to perform a required post LOCA manual action/vital mission (mission (2) to tie-in ESW system to SFP). PPL has determined that a modification is not required to support CPPU.

Currently (CLTP), two separate operator access missions are planned in order to provide Emergency Service Water (ESW) make-up to the spent fuel storage pools (SFSPs) under post LOCA conditions.

One mission is to Elevation 670' of the Unit 1 reactor building to tie-in the ESW system to the SFSPs. The second mission is to Elevation 749' to control ESW system make-up flow.

In Unit 2, the ESW system tie-in mission is performed on Elevation 683' and the flow control mission is to Elevation 749', similar to Unit 1.

Under CLTP conditions, the Unit 1 mission dose assessments were determined to be bounding (due to the differences in the mission pathway between Unit 1 & 2) with a previously calculated mission dose to tie-in the ESW system estimated at 4.8 Rem. The Unit 1 mission to control ESW make-up flow was estimated at 1.4 Rem.

In preparing the CPPU application, it was conservatively estimated that the Unit 1 mission dose would increase and result in a value in excess of the GDC 19 Acceptance Criteria of 5 Rem. Therefore, a modification to install check valves (in lieu of the existing manually operated valves) was planned to eliminate the need to perform this mission.

This estimate was based on assuming a minimum time of 40 hours to reach the Technical Specification limit of 22 feet of water above top of active fuel following loss of spent fuel pool cooling and pool boiling. For this estimate, the spent fuel pools are isolated and maximum heat loads are used based on conservative assumptions for refueling times and

fuel batch offloads. No limits for heat loads for the spent fuel pools were assumed for this estimate.

Subsequently, design basis mission dose calculations were performed to update the CPPU estimate with the following changes:

- change to Alternative Source Term (in lieu of TID) methods, and
- the time required to provide ESW make-up to the SFP.

The calculation determined a CPPU Unit 1 ESW System tie-in mission dose of < 3.7 Rem TEDE and <1 Rem TEDE for the Unit 1 ESW system flow control mission. The Unit 2 mission can be accomplished with mission doses that are < 1 Rem TEDE.

The revised results demonstrate compliance with the 10 CFR 50.67 of 5 Rem TEDE. Accordingly, the planned modification was found to be unnecessary and is being eliminated.

C. Revision to Previously Submitted Information:

The previously submitted information is revised as described below:

Modify Table 8-1 under Vital Missions as follows:

Table 8.1 Post Accident Vital Occupancy / Mission Dose Summary [3] for NUREG 0737 II.B.2 Design Review of Plant Shielding

Location	Function	CLTP Dose (REM)	CPPU Dose (REM)
Maintenance of Spent Fuel Pool (SFP) Cooling [1, 2] –Emergency Service Water (ESW) Valve Actuation [11]	Provide adequate cooling of SFP.		
	Mission (1) to control ESW makeup flow	1.41 [12, 13]	0.64 [12, 13]
	Mission (2) to tie-in ESW system to SFP	4.80 [14,15]	3.61 [14,15]

Revise Reference 1 Table 8-1 Notes to read as follows:

[2] CPPU doses (Rem TEDE) are calculated based on AST Source Term for the DBA-LOCA.

[11] Two separate operator access missions are required to provide ESW makeup to the spent fuel pool under LOCA conditions. One mission is to access Elevation 749' of the reactor building to control ESW system makeup flow. The second

mission is to Elevation 670' of the reactor building to tie-in the ESW system to the spent fuel pool.

[13] The total mission dose was calculated at 24 hours post-LOCA for CLTP and CPPU.

[14] The total mission dose calculated for CLTP post LOCA was 40 hours. The time was dictated by the decay heat assumed to be in the fuel pools. The SSES administrative isolated fuel pool decay heat load limits are specified in the SSES Technical Requirements Manual. The CPPU calculation is based on these limits (which were not used for the CLTP analysis) which result in a required time of 66 hours to provide ESW make-up instead of 40 hours.

[15] Mission involves ingress into the reactor building at elevation 670' to tie-in ESW to SFP (via actuation of valves 153500 and 153501) and egress with a total exposure duration to contained sources of approximately 1.5 minutes.

Reference 1 Attachment 7 List of Modification

Delete the following Modification and Description

ESW to Fuel Pool Check Valve (Non-Outage)	• Valve change to reduce mission dose for post-LOCA manual action

Revise Reference 2 PLA 6194 NRC question 10 PPL response as follows:

SFP Cooling ESW Valve Actuation

The mission doses to provide ESW makeup to the SFP under LOCA conditions are evaluated using CPPU DBA-LOCA activity sources, an operator access time of 66 hours post-accident and AST methodology. Currently two separate operator missions are planned in order to provide Emergency Service Water (ESW) make-up to the spent fuel storage pools (SFSPs) under post LOCA conditions.

Under CPPU conditions, the Unit 1 mission dose assessments were determined to be bounding due to the differences in the mission pathway between Unit 1 & 2. Therefore, only the Unit 1 mission doses are provided in the PUSAR.

A mark-up of the plant layout map showing the access route for the ESW System tie-in to SPF cooling is provided in Attachment 1. Reference 2 provides a markup for the mission to control ESW makeup flow.

A breakdown of the dose rates used to arrive at the Unit 1 ESW mission doses is provided below for each mission:

Mission Doses - SFP Cooling Control of ESW System Make-up Flow

1. Ingress/Egress dose:

   = {Stairwell dose + RB 749 dose} x 2 (for ingress and egress)
   = {(5.46 R/hr x 1 min/60 min/hr) + (0.32 R/hr x 1.3 min. + 3.54 R/hr x 0.175 min)/60 min/hr} x 2
   = (0.091 R + 0.017) x 2 = 0.216 R

2. Access to Panel 1C206 to check skimmer surge tank water level:

   = Access to Panel 1C206 + Operator Dose at 1C206 Panel
   = Access to Panel 1C206 + 20.7 R/hr x 1 min/60 min/hr

Access to Panel IC206 Ingress/Egress Dose Estimate		
Travel Time (sec)	**Dose Rate (R/hr)**	**Dose (R)**
4.3	4.49	0.0054
3.0	5.53	0.0046
3.0	7.62	0.0064
3.0	11.0	0.0092
3.0	16.6	0.0138
Total		0.0394
Ingress/Egress x 2		0.0788

   = 0.0788 R + 0.345 R = 0.424 R

3. Dose in heat exchanger pump room to open valves =
   = normal + contained source dose rate x stay time
   = (0.04 R/hr + 0.026 R/hr) x 2 min x 1 hr/60 min = 0.0022 R

Total CPPU dose = 0.216 + 0.424 + 0.0022 = 0.64 R

Mission Doses – SFP Cooling - ESW System Tie-In

CALCULATED OPERATOR DOSES FOR ACCESS TO ROOM I-105 ON RB ELEV. 670' – INGRESS –UNIT 1 ESW SYSTEM TIE-IN

Operator Access Step	Travel Distance (ft)	Time (hr)	DR (R/hr)	Dose (Rem)
1	10.9	1.14E-03	8.77E-01	1.00E-03
2	9.5	9.90E-04	1.86E+00	1.84E-03
3	8.8	9.17E-04	4.35E+00	3.99E-03
4	8.8	9.17E-04	5.52E+00	5.06E-03
5	7.3	7.60E-04	1.10E+02	8.38E-02
6	4.2	3.00E-04	3.30E+02	9.90E-02
7	5.1	3.64E-04	1.64E+03	5.96E-01
8	4.8	3.42E-04	6.02E+02	2.06E-01
9	10	7.13E-04	1.30E+02	9.26E-02
10	10	7.13E-04	4.34E+01	3.10E-02
11	10	7.13E-04	5.54E+01	3.95E-02
12	8.8	6.28E-04	1.89E+02	1.19E-01
13	5.5	3.92E-04	1.21E+03	4.73E-01
14	10.1	5.98E-04	2.57E+02	1.54E-01
15	10.1	5.98E-04	6.08E+01	3.63E-02
16	10.1	5.98E-04	2.59E+01	1.55E-02
17	6.6	9.83E-04	1.14E+01	1.12E-02
18	13	1.17E-03	6.27E+00	7.34E-03
19	13	1.17E-03	5.34E+00	6.24E-03
	Total Ingress			**1.98E+00**

CALCULATED OPERATOR DOSES FOR ACCESS TO ROOM I-105 ON RB ELEV. 670' – EGRESS – UNIT 1 ESW SYSTEM TIE-IN

Operator Access Step	Travel Distance (ft)	Time (hr)	DR (R/hr)	Dose (Rem)
1	10.9	6.17E-04	8.77E-01	5.41E-04
2	9.5	5.38E-04	1.86E+00	1.00E-03
3	8.8	4.98E-04	4.35E+00	2.17E-03
4	8.8	4.98E-04	5.52E+00	2.75E-03
5	7.3	4.13E-04	1.10E+02	4.56E-02
6	4.2	2.38E-04	3.30E+02	7.85E-02
7	5.1	2.89E-04	1.64E+03	4.73E-01
8	4.8	2.72E-04	6.02E+02	1.64E-01
9	10	5.66E-04	1.30E+02	7.35E-02
10	10	5.66E-04	4.34E+01	2.46E-02
11	10	5.66E-04	5.54E+01	3.13E-02
12	8.8	4.98E-04	1.89E+02	9.42E-02
13	5.5	3.11E-04	1.21E+03	3.75E-01
14	10.1	5.72E-04	2.57E+02	1.47E-01
15	10.1	5.72E-04	6.08E+01	3.48E-02
16	10.1	5.72E-04	2.59E+01	1.48E-02
17	6.6	9.40E-04	1.14E+01	1.07E-02
18	13	7.36E-04	6.27E+00	4.62E-03
19	13	7.36E-04	5.34E+00	3.93E-03
	Total Egress			**1.58E+00**

Valve Manipulation Dose				
Valve 153500	----	4.17E-03	4.75E+00	1.98E-02
Valve 153501	----	4.17E-03	7.77E+00	3.24E-02

TOTAL Unit 1 ESW Tie-In Mission Dose @ 66 hours

Operator Access Dose To Elevation 670' For ESW System Tie-In	Ingress + Egress + Elev 670 Access + Valve station = 1.98 + 1.58+ .0198 + .0324 = **3.61 Rem**

Reactor Recirculation Runback Limiter Runback Rate Change:

Reference 1 identifies in Attachments 4, 6 (Table 5-2, Sections 7.4 and 10.5) and in Attachment 7 that the Reactor Recirculation Runback Limit Runback Rate will be changed. The GE analysis of a reactor feedwater pump (RFP) trip shows that the reactor may SCRAM on low level under certain conditions. Due to analysis conservatisms, it is not expected that a RFP trip will cause a low water level SCRAM. Therefore, it is not necessary to increase the recirculation runback rate to avoid a reactor SCRAM. Increasing the recirculation runback rate would result in a more rapid reduction in turbine power level during the runback than exists today. Increasing the turbine power reduction rate causes a proportional reduction in the turbine pressures. An increased pressure

reduction in the main turbine moisture separators causes an increase in the moisture separator drain tank water level during the runback. SSES Unit 2 has experienced moisture separator drain tank high water level trips in the past. In summary, PPL has determined that increasing the recirculation runback rate does not significantly contribute to margin to a reactor water low water level SCRAM, but does increase the risk of a moisture separator drain tank high water level turbine trip (and subsequent SCRAM). Therefore, PPL has decided not to increase the recirculation runback rate.

Emergency Operating Procedure Changes Related to Specification of Minimum Steam Cooling Pressure, Minimum Steam Cooling Reactor Water Level, and Maximum Core Uncovery Times:

Reference 2 PPL response to NRC question 1a states:

> "The Minimum Steam Cooling Pressure, Minimum Steam Cooling Reactor Water Level, Minimum Debris Retention Injection Rate, and Maximum Core Uncovery Time values specified in the EOPs will be revised due to the increased reactor power level and increase in decay heat load."

Upon further review and analysis, the statement should be changed as follows:

> "The Minimum Debris Retention Injection Rate, the Decay Heat Removal Pressure, and the RPV pressure reference to "Maximize Use of Bypass Valves" values specified in the EOPs will be revised due to the increased reactor power level and increase in decay heat load."

The Minimum Debris Retention Injection Rate will change due to the increase in decay heat from the CPPU.

The Minimum Steam Cooling Pressure is not changing as the Safety Relief Valve setpoints and rated flows, number of fuel assemblies, and peak linear heat generation rate are not affected by the CPPU.

The Minimum Steam Cooling Reactor Water Level is not changing as the elevation of the bottom of active fuel and the level of the fuel assembly that must be covered to maintain peak cladding temperature are not affected by the CPPU.

The Maximum Core Uncovery Time is not changing as the generic fuel parameters used in the calculation bound the time limits in the EOPs.

The Decay Heat Removal Pressure will change as the rated reactor power level increases for the CPPU.

The RPV pressure reference to "Maximize Use of Bypass Valves" is changing as the Turbine Throttle Pressure decreases to maintain RPV pressure constant for the CPPU.

Reference 1 Change entitled: "Feedwater Pump / Condensate Pump Trip Change"

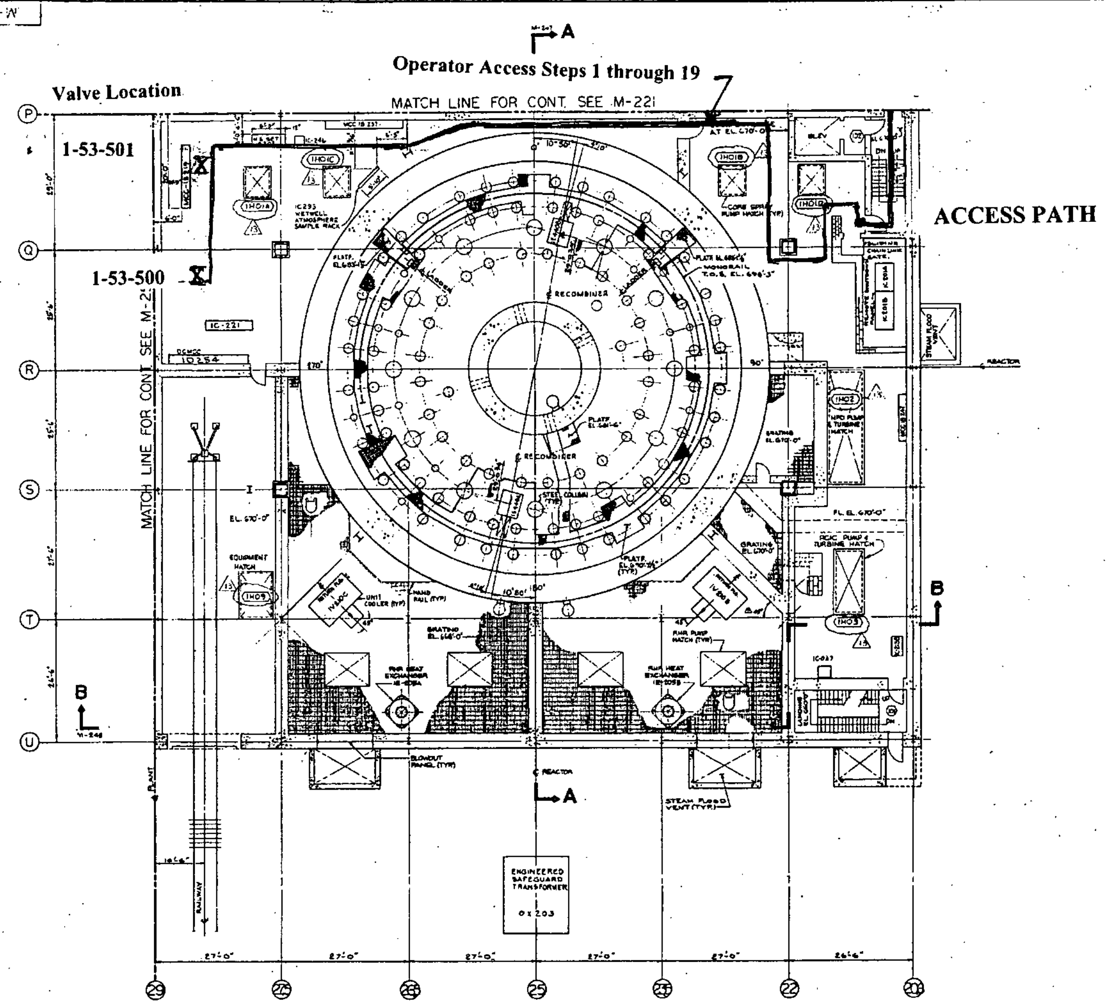
PPL has determined after further review that the proposed change is no longer required. The request for NRC review of this change is hereby withdrawn. The change was described in Reference 1 as follows:

> "Analyses in support of the proposed CPPU indicate that under certain conditions, a trip of one feedwater pump could result in a reactor SCRAM on low water level. This possibility requires revision of the current statement in the FSAR that a single feedwater or condensate pump trip will not result in a reactor SCRAM on low water level. The trip of a condensate pump will result in the trip of a feedwater pump that will result in a reactor SCRAM. A change to the licensing basis is proposed for CPPU to indicate in the FSAR that a trip of one feedwater pump or one condensate pump may result in a reactor SCRAM."

Proposed Condensate Pump Trip Test:

In Reference 1 PPL proposed performance of the subject test at 3733 MWt on the first unit to reach 3733MWt. Based on discussions with the NRC staff, it was determined that a second test is warranted and that license conditions should be proposed that will provide assurance that the proposed tests will confirm the capability of the feedwater to supply water to the Reactor Pressure Vessel after the condensate pump trip at full CPPU conditions. The second test will be performed at 3733 MWt on the second unit that reaches operation at 3733MWt. Attachment 2 contains the proposed corresponding License Conditions.

Attachment 1 to PLA-6290
Plant Layout Maps



ESW SYSTEM TIE-IN TO SFP COOLING

REFERENCE DRAWINGS	
BECHTEL NO.	P P & L NO.
M-221	E-106331-1
M-248	E-106333-9
M-251	E-106334-2

PENNSYLVANIA POWER & LIGHT COMPANY

EQUIPMENT LOCATION
REACTOR BLDG. UNIT 1
PLAN OF EL. 670'-0"

JOB No.	DRAWING No.	REV.
8856	M-241	13
Q	E-106333 SH 2	

Attachment 2 to PLA-6290
Condensate Pump Trip Test Proposed License Conditions

Proposed License Conditions - Condensate Pump Trip Tests

3.4.2 Transient Testing

The following license conditions are discussed in SE Section 2.5.4.4.

3.4.2.1

PPL will demonstrate through performance of transient testing that the loss of one condensate pump will not result in a complete loss of reactor feedwater on both SSES Units 1 and 2. The test shall be performed on each unit during the unit's CPPU power ascension test program and prior to exceeding 336 hours of plant operation at the nominal power level of 3733 MWt with feedwater and condensate flow rates stabilized. PPL shall confirm that the plant response to the transient is as expected in accordance with the acceptance criteria that were established. Evaluation of the test results shall be completed and all discrepancies resolved in accordance with corrective action program requirements and the provisions of the power ascension test program prior to continued operation of either Susquehanna unit above 3733 MWt. PPL shall present an evaluation that demonstrates the acceptability of not performing the test described in License Condition 3.4.2.2 to the NRC within 30 days of completion of the second units test. NRC will have 90 days to review and approve the evaluation. The test described in License Condition 3.4.2.2 shall only be performed (when the required test conditions are achieved) if NRC approval of the evaluation is not received by SSES within 90 days of submittal of the evaluation.

3.4.2.2.

If the tests specified in License Condition 3.4.2.1 are not sufficient to validate the SSES hydraulic analysis demonstrating that a single condensate pump trip will not result in a loss of all feedwater at full CPPU power level as determined by License Condition 3.4.2.1, SSES shall perform the test at full CPPU conditions (i.e. 98%-100% of 3952MWt). PPL shall perform the test prior to exceeding 336 hours of operation at the nominal full CPPU power level (98% to 100% of 3952 MWt) as measured from the determination that License Condition 3.4.2.1 requires the test with feedwater and condensate flow rates stabilized at the nominal CPPU full power level. PPL will demonstrate through performance of transient testing on either Susquehanna Unit 1 or Unit 2 (whichever unit is first to achieve the specified conditions) that the loss of one condensate pump will not result in a complete loss of reactor feedwater. PPL shall confirm that the plant response to the transient is as expected in accordance with the acceptance criteria that were established.

Evaluation of the test results shall be completed and all discrepancies resolved in accordance with corrective action program requirements and the provisions of the power ascension test program prior to continued operation of either Susquehanna unit above the

nominal power level of the prior tested phase (based on PPL's current implementation schedule, Unit 1 will have completed a Phase 1 transient test at a power level of 3733 MWt for License Condition 3.4.2.1 prior to Unit 2 achieving the nominal full CPPU power level of (98% to 100% of 3952 MWt)).