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SUBJECT: "Susquehanna Steam Electric Station, Unit1, Cycle 4 Startup Test Summary."

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SUSQUEHANNA SES UNIT 1 CYCLE 4

STARTUP TEST SUMMARY

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ABSTRACT

Susquehanna Unit 1 Cycle 4 Startup Test Summary

Susquehanna Unit 1 resumed commercial operation for Cycle 4 on November 24, 1987 following a 10 week refueling and maintenance outage. The Unit 1 Cycle 4 (hereafter referred to as SIC4) reload included:

*	36	GE	8x8	initial core
	192	ANF	8x8	twice burned
	296	ANF	8x8	once burned
	240	ANF	9x9	unirradiated fuel assemblies

The following startup tests, identified in the SIC4 Reload Licensing Submittal, are discussed in this report:

- 1.0 Core Loading Verification and Audit
- 2.0 Control Rod Functional (Insert and Withdrawal Checks)
- 3.0 Subcritical Shutdown Margin Demonstration
- 4.0 In-Sequence Critical and Shutdown Margin Determination
- 5.0 TIP Asymmetry

In addition to the above mentioned tests, the startup program included a POWERPLEX input deck validation, scram time testing, core flow and LPRM calibrations, thermal limits monitoring and baseline recirculation data acquisition. A summary of these activities is also included in this report.

(ANF - Advanced Nuclear Fuels)



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Susquehanna Unit 1 Cycle 4 Startup Test No. 1 Core Verification and Audit

Purpose

The purpose of this test is to visually verify that the core is loaded per the analyzed designs.

Criteria

Upon completion of core alterations during the refueling outage, the core must be verified to conform with the reference core design used in the various licensing analyses. The verifications to be performed include fuel bundle location, fuel bundle orientation, and proper seating of the fuel bundles within the core. The verifications will be performed by the Reactor Engineering Group utilizing an underwater television camera. The verification will be videotaped so that an independent verification may be performed. Any discrepancies discovered in the loading will be promptly corrected and the affected bundles shall be reverified prior to unit startup.

Results

The U1C4 core was analyzed to have a $1.38\% \Delta K/K$ shutdown Margin with the strongest rod fully withdrawn at BOC 4. (Startup and Operations Letter Report, Susquehanna Unit 1 Cycle 4). This figure was significantly less than previous cycles, therefore the following precautions were taken to prevent a misloaded fuel bundle. During the offload all bundles were placed in the fuel pool in the order in which they were to be reloaded, a pool verification was performed (10/7/87) of all fuel before the reload commenced and a partial core verification was performed (10/22/87) after all irradiated bundles were placed in the core, before any new fuel was loaded.

The Cycle 4 final core verification consisted of two videotaped passes over the core. During the first pass, the fuel bundle serial numbers were recorded on the videotape to verify proper location. The second pass was performed to verify proper fuel assembly seating (assembly height check) and correct orientation.

The core tapes were independently verified to be correct by the Reactor Engineering Supervisor and a representative of Quality Control on 10/27/87. Therefore, the as-loaded core configuration is consistent with the core design Advanced Nuclear Fuels used in the evaluation of the SIC4 Reload Licensing Analyses. The SIC4 core map is included as Figure 1.

60 58 56 52 50 46 44 40 36 32 30 28 24 20 18 16 14 12 10 8 6 4 2	XN1159 XN1190 XN1129 XN1124 XN1071 LJN082 LJN423 XN1047 XN1047 XN1119 XN1028 XN1085 XN1007	X12278 X12307 X12333 X12194 X12269 X12320 X12198 X12478 X12358 X12478 X12358 X12409 X12486 X12345 X12371 X12394	XN1102 X12216 XN1191 X12213 X13557 X12268 X13577 X12245 X13597 X12245 X13609 X12433 X12408 X13653 X12408 X13653 X12459 XN1095 X12462 XN1121	X12321 X13525 X12281 X13545 X12207 X13565 X12330 X13585 X12291 X12381 X13621 X12342 X13641 X12342 X13661 X12397 X13681 X12359	X12304 XN1106 X12241 X13537 X12246 X12293 X12258 X13578 X12290 X13598 X13610 X12380 X13634 X12422 X12383 X12434 X12434 X12434 X12435	XN1188 X12215 X13509 X12331 X13526 X12279 X13546 XN1080 X13566 XN1037 X13586 XN1037 X13586 XN1037 X13586 XN1117 XN1150 X13622 XN1041 X13642 XN1033 X13662 X12395 X13682 X12343 X13699 X12461 XN1153	X12308 XN1187 X12244 X13519 X12199 X12282 X13558 X12206 X12223 X13558 X12206 X12223 X12233 X13599 X13611 X12431 X12451 X12451 X12451 X12451 X12451 X12451 X12451 X12451 X12372	X12225 X13495 X12205 X13510 X12303 X13527 XN1149 X13547 XN1019 X13567 XN1019 X13567 XN1049 X13587 XN1049 X13587 XN1135 X1123 XN1107 X13643 XN1060 X13663 XN1133 X12367 X12367 X12367 X12469 X13715 X12453	X12224 XN1069 X12306 X13503 X12255 X12332 XN1189 XN1109 X12197 X13559 XN1109 X12197 X13559 XN1109 X13579 XN1122 X13600 X13612 XN1131 X13635 XN1084 X13655 X12477 XN1075 XN1154 X12344 X12344 X12370 X12370 XN1032 X12452	X13548 X12257 X13568 XN1158 X13588 XN1081 XN1024 X13624 XN1083 X13644 X12421 X13664	X12270 X13489 X12242 X12256 XN1089 X13520 XN1017 X13538 X12318 XN1103 X12253 X12226 X12217 X13601 X12453 X12454 X12417 XN1003 X12454 X12417 XN1003 X12356 X13674 XN1177 X13694 XN1073 X12420 X12420 X12420 X12410	X12315 X12294 X13497 X12280 X13512 X12265 X13529 X13529 X13549 X12289 X13569 X13549 X13569 X1369 X1369 X13665 X13625 X13645 X13645 X13645 X13645 X13645 X13665 X12379 X13665 X12405 X13702 X12396 X13717 X12384 X12353	X12295 X13490 X12232 X13504 XN1138 X12214 XN1031 X13539 XN1156 X12267 XN1059 XN1067 X12317 X13602 X13614 X12355 XN1086 XN1076 X12407 XN1132 X13675 XN1091 X12460 XN108 X13710 X12442 X13724 X12385	X12334 X12232 X13498 X12254 X13513 X12234 X13530 X12235 X13550 X12235 X13570 X12243 X13590 X12243 X13590 X12243 X13626 X12431 X13646 X12445 X13666 X12445 X13666 X12445 X13666 X12444 X13703 X12418 X13718 X12382 X12346	X12277 X13491 X12266 X13505 X13505 X13521 XN1070 X13540 XN1105 X13560 XN1105 X13560 XN1105 X13560 XN1004 XN1005 X12354 XN1005 X12354 XN1005 X12354 XN1029 X13656 XN1020 X13676 XN1030 X13695 XN1057 X13711 X12406 X13725 X12393	
	l FIGURF	3	5	7	9 UT 1 C	11	13	15	17	19	21	23	25	27	29	

FIGURE 1. SUSQUEHANNA UNIT 1 CYCLE 4 CORE LOADING

:

60	LJU206 XN1178	XN1171	XN1185	XN1142	XN1130	LJS824									٠
58	X12288 X12335	X12296	X12328	X12271	X12324	X12229	LJS845								
56 -	X13492 X12299							XN1096	LJS783						
54	X12275 X13499	X12239	X13500	X12251	X13501	X12311	X13502	X12309	XN1148						
52	X13506 X12263	X13507	X12285	X12261	X12312	X13508	X12212	XN1140	X12220	LJU173					
50	XN1170 X13514	XN1051	X13515	XN1023	X13516	X12262	X13517	X12249	X13518	X12313	XN1077	LJS785			6
48	X13522 X12237	X12221	X12276	X13523	X12201.	X12337	X12314	X13524	X12338	XN1100	X12322	XN1157	,		
46	XN1087 X13531	XN1040	X13532	XN1053	X13533	XN1111	X13534	X12202	X13535	X12252	X13536	X12219	LJS847		
44	X13541 XN1169	X13542	XN1164	X13543	X12196	XN1162	XN1120	X12283	X12286	X13544	X12284	XN1082	X12287 [,]	LJS848	
42	XN1064 X13551	XN1046	X13552	X12325	X13553	X12204	X13554	X12340	X13555	X12247	X13556	X12222	X12310	XN1145	
40	X13561 X12236	X12274	X12302	XN1166	X12260	X13562	XN1014	X13563	XN1163	X12298	X12210	X13564	X12336	XN1022	
38	XN1147 X13571	XN1093	X13572	X12264	X13573	XN1144	X13574	X12211	X13575	X12259	X13576	X12273	X12195	XN1165	
36	X13581 X12250	XN1034	XN1090	X12227	XN1112	X13582	XN1052	X12230	XN1043	X13583	X12339	X13584	X12272	XN1126	
34	X12327 X13591	X12326	X13592	X12218	X13593	XN1180	X13594	X12238	X13595	X12301	X13596	X12248	X12323	XN1097	
32	XN1002 X12209	X13603	XN1062	X13604	XN1035	X13605	XN1116	X13606	XN1115	X13607	X12300	X13608	X12203	LJS817	
30	XN1063 X12473	X13615	XN1074	X13616	XN1118	X13617	XN1135	X13618	XN1182	X13619	X12390	X13620	X12483	LJS918	
28	X12365 X13627	X12364	X13628	X12464	X13629	XN1146	X13630	X12448	X13631	X12391	X13632	X12436	X12361	XN1044	
26	X13637 X12438	XN1009	XN1078	X12455	XN1183	X13638	XN1139	X12458	XN1176	X13639	X12351	X13640	X12412	XN1114	
24	XN1012 X13647	XN1094	X13648	X12428	X13649	XN1184	X13650	X12475	X13651	X12423	X13652	X12413	X12487	XN1013	
22	X13657 X12446	X12414	X12392	XN1021	X12424	X13658	XN1065	X13659	XN1038	X12388	X12474	X13660	X12348	XN1010	
20	XN1025 X13667	XN1098	X13668	X12363	X13669	X12484	X13670	X12352	X13671	X12435	X13672	X12468	X12374	XN1181	
18	X13677 XN1061	X13678	XN1168	X13679	X12488	XN1161	XN1155	X12399	X12402	X13680	X12400	XN1011	X12403	LJS851	
16	XN1001 X13687	XN1175	X13688	XN1079	X13689	XN1172	X13690	X12482	X13691	X12440	X13692	X12465	LJS852		
14	X13696 X12447	X12467	X12416	X13697	X12481	X12349	X12378	X13698	X12350	XN1160	X12360	XN1128			
12	XN1143 X13704	XN1042	X13705	XN1068	X13706	X12426	X13707	X12437	X13708	X12377	XN1018	LJS887			
10	X13712 X12427	X13713	X12401	X12425	X12376	X13714	X12476	XN1173	X12466	LJT001					
8	X12415 X13719	X12449	X13720	X12439	X13721	X12375	X13722	X12373	XN1186						
6	X13726 X12389	X13727	X12387	X13728	X12450	XN1039	X12456	XN1045	LJS878	-					
4	X12404 X12347	X12386	X12366	X12411	X12362	X12457	LJS854								
2	LJS957 XN1179	XN1141	XN1167	XN1174	XN1113	LJS825									
				-										H.	
													*		

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FIGURE 1. SUSQUEHANNA UNIT 1 CYCLE 4 CORE LOADING

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Susquehanna Unit 1 Cycle 4 Startup Test No. 2 Control Rod Functional (Insert and Withdrawal Checks)

Purpose

The purpose of this startup test is to assure proper control rod function and demonstrate that criticality will not occur due to the withdrawal of a single rod.

Criteria

Control Rod Functionals include mobility, overtravel and subcritical checks. These may be performed as each control cell is loaded in its final configuration.

Each control rod will be cycled individually to ensure mobility. As each rod is fully withdrawn, it will be checked for overtravel by continually applying a withdrawal signal. Subcriticality will also be verified with the rod withdrawn.

Results

Due to Shutdown Margin considerations, no control rod functionals were performed on fully loaded control cells until the partial core verification was completed on 10/22/87. No control rods overtraveled and subcriticality was maintained as each rod was individually fully withdrawn and reinserted.

Susquehanna Unit 1 Cycle 4 Startup Test No. 3 Subcritical Shutdown Margin Demonstration

Purpose

The purpose of this startup test is to assure at least the minimum required shutdown margin exists with the strongest worth control rod fully withdrawn.

Criteria

The minimum required shutdown margin at BOC for Susquehanna Unit 1 Cycle 4 is $0.75\%\Delta K/K$. This test will verify at least this amount by performance of a subcritical shutdown margin demonstration. The highest (strongest) worth control rod is fully withdrawn, then a diagonally adjacent rod is slowly notched out verifying subcriticality at each step until the analytically determined reactivity worth of the control rods at their respective notch position equals or slightly exceeds the required amount of SDM.

Results

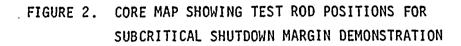
The reactor remained subcritical with the highest worth control rod fully withdrawn and an additional diagonally adjacent rod pulled to a notch position with a calculated worth of 1.143 A K/K. The required shutdown margin to be demonstrated was calculated to be 1.042 A K/K. This is .75 A K/K plus a correction factor for the recirculation loop temperature (141 degrees F) at the time of the test. Using data supplied by ANF it was determined that the following rods pulled to the indicated position would demonstrate a shutdown margin of 1.143 A K/K.

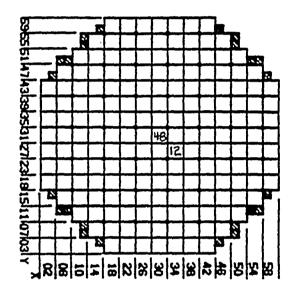
ROD	POSITION	TOTAL WORTH & A K/K
30-31*	48	_
34-27	12	1.143

*analytically determined strongest rod.

Due to the preliminary BOC SDM calculation of $1.38\%\Delta$ K/K, precautions were taken during the performance of this test to reduce individual rod notch worths. Overtravel checks were performed on both rods and the notch-down procedure was used to minimize the effect of the high incremental notch worths of the adjacent rod.

As rods were pulled, subcriticality was verified after each notch. Subcriticality was also verified with the rods at the above indicated positions, thus satisfying the purpose of this startup test. Figure 2 is a core map showing the test rod positions.





Susquehanna Unit 1 Cycle 4 Startup Test No. 4 In-Sequence Critical and SDM Determination

Purpose

The purpose of this startup test is to calculate the actual shutdown margin of the cycle 4 core and to demonstrate that no reactivity anomaly existed.

Criteria

1) Shutdown Margin

Technical Specification 3.1.1 requires an adequate shutdown margin to ensure the reactor can be made subcritical from all operating conditions. This value, $.38\% \ K/K$ has been determined to be the minimum requried SDM to bring a reactor subcritical under the worst case conditions - a cold, xenon-free core at the most reactive point in the cycle with the highest worth control rod unavailable for reactivity control. At beginning of cycle, the required SDM value must be increased by a factor, R, if it is determined that core shutdown margin is less at another point in the cycle than the initial shutdown margin (for Cycle 4, R = 0). A prediction uncertainty of .37% A K/K is also added at BOC to assure the validity of the analytical calculations. The required beginning-of-cycle SDM for Susquehanna Unit 1 Cycle 4 is 0.75% A K/K; the actual SDM will be calculated from data obtained during the initial startup criticality.

2) Reactivity Anomaly

Core reactivity is monitored to prevent excessive reactivity additions due to unforeseen reactivity changes or reactivity anomalies. At BOC, a $1\% \Delta$ K/K difference between predicted and actual critical control rod positions might indicate improper core loading or a computer code that is unreliable. Data gathered during the in-sequence critical, specifically the Keff at the notch position of the control rod at which criticality occurs is compared to predicted critical control rod position Keff and a % reactivity difference is calculated.

Results

The calculated SDM was 1.46 K/K and the difference between actual Keff and predicted Keff at criticality was 0.08 K/K.

Control rods were withdrawn in the B sequence until the reactor was on a stable, positive period. The notch position at which criticality concurred was rod 38-47, notch 18, step 35. A special log was initiated to record SRM count rates and recirculation loop temperatures. The average period was 194 seconds and the average loop temperature 153.5 degrees F which yield period and temperature corrections of .332 $10^{-3} \Delta K/K$ and 3.42 x $10^{-3} \Delta K/K$ respectively.

1) Shutdown Margin

The equation used to calculate SDM

 $SDM = \frac{Kcrit - Ksro}{Kcrit * Ksro} - Ap$ (period) -Ap (temp)

Kcrit is Keff at the actual critical control rod position (1.00457) and Ksro is Keff predicted with the strongest rod out (0.98642)

The minimum required SDM for Unit 1 Cycle 4 at beginning of cycle was $0.75\% \Delta K/K$; the calculated shutdown margin based on this test was $1.46\%\Delta K/K$, thus satisfying the acceptance criteria.

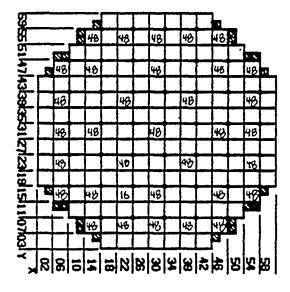
2) <u>Reactivity Anomaly</u>

The reactor went critical at step 35 with Kcrit of 1.00457. The equation used to calculate reactivity difference was

Reactivity difference - $\frac{Kcrit - 1}{Kcrit}$ - Δp (period) - Δp (temp)

The calculated reactivity difference was 0.08 & K/K. This satisfies $\pm 1 \& K/K$ acceptance criteria.

A comparison of the predicted versus actual critical control rod patterns is included as Figure 3.



PREDICTED CRITICAL PATTERN

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ACTUAL CRITICAL PATTERN

Susquehanna Unit 1 Cycle 4 Startup Test No. 5 Tip Asymmetry

Purpose

The purpose of this test is to check core symmetry by performing a statistical uncertainty analysis on the Traversing In-Core Probe (TIP) System. Also, by the performance of this test, the proper operation of the TIP system will be assured.

Criteria

The X^2 test of significance will be performed with the significance level fixed at 1%. The test will be performed utilizing an octant symmetric rod pattern at a power level greater than 75% of rated power. The startup test criteria for symmetric TIP differences is that the X² value calculated shall be less than the critical X_2^2 value. Since Susquehanna has 19 symmetric TIP pairs, the calculated X² value must be less than a. critical X² value of 36.19 (as determined by ANF). If the calculated X² value exceeds the critical value, the instrumentation and data processing system should be reviewed for any problems which may contribute to abnormal TIP asymmetries. A second determination of X² should be then made. If the new measured value of X² exceeds the critical value, the fuel vendor shall be consulted and appropriate action taken to assure that a larger than anticipated TIP asymmetry does not adversely affect the safe operation of the reactor.

Results

A complete set of TIP data was obtained at the completion of Susquehanna Unit 1 BOC4 Startup Testing Program at rated thermal power. The nodal TIP values (Nodes 3 through 22) were summed up for each symmetric TIP pair using equation 5.1 with the results summarized in Table 1. Using Equations 5.2 and 5.3, the variance and X² were calculated to be 4.96 and 2.62 respectively. The X² value of 2.62 is well within the 36.19 limit established by ANF.

Symmetric TIP Pair	Absolute Relative Difference dm
1	1.04
2	3.08
2 3	4.35
4	3.22
4 5	6.57
6	1.92
7	0.02
8	0.02
8 9	6.15
10	1.89
11	3.61
12	0.98
13	0.94
14	3.27
15	0.85
16	2.07
17	3.45
18	0.18
19	
19	4.22

Table 1 Absolute Relative Difference

Equation 5.1

$$dm = \frac{100 (T_{m1} - T_{m2})}{(\frac{T_{m1} + T_{m2}}{2})}$$
Note: $T_{m1} = \sum_{k=3}^{22} T(k)$ for TIP₁ and $T_{m2} = \sum_{k=3}^{22} T(k)$ for TIP₂

where TIP1 and TIP2 are symmetric TIP pairs

Equation 5.2 (Variance)

$$s^{2} \tau P_{\overline{1}j} = \frac{M=1}{36} = 4.96$$

Equation 5.3

$$x^2 = \frac{19 \text{ s}^2 \text{TIPij}}{36} = 2.62$$

Susquehanna Unit 1 Cycle 4 Startup Program Summary

Rod Scram Time Testing

Purpose

To demonstrate the maximum scram insertion times of all rods following core alterations.

Criteria

Susquehanna Technical Sepcification 4.1.3.2 states that scram insertion times of all control rods shall be demonstrated through measurement with reactor coolant pressure greater than 950 psig prior to exceeding 40% thermal power after core alterations. For Unit 1 cycle 4, one-half of all control rods scram times were to be determined by performing a black-and-white scram from the B sequence and using GETARS scram data. The remaining rods were to be individually scram time tested.

Results

Due to a GETARS software problem, control rod scram times from the black-and-white scram wre not printed out directly, but had to be calculated from the GETARS stored files. The remaining rods were individually scram timed November 25-26, 1987.

All control rod scram insertation times were determined to be within Technical Specification limits. The results are included as Table 2.

	ROD	ROD POSITION	TIME AS FOUND	T.S. LIMIT
MAXIMUM INDIVIDUAL ROD SCRAM INSERTION TIME T.S. 3.1.3.2	26–27	05	3.36	7.00
AVERAGE SCRAM INSERTION TIME OF OPERABLE RODS T.S.3.1.3.3		45 39 25 05	0.34 0.65 1.40 2.50	0.43 0.86 1.93 3.49
AVERAGE SCRAM INSERTION TIME OF SLOWEST 2x2 ARRAY T.S. 3.1.3.4		45 39 25 05	0.36 0.71 1.55 2.71	0.45 0.92 2.05 3.70

TABLE 2: Results of Scram Time Testing of All Control Rods S1C4.

Susquehanna Unit 1 Cycle 4 Startup Program Summary

POWERPLEX INPUT DECK VALIDATION

Purpose

To ensure the POWERPLEX input deck is updated correctly before the start of every new fuel cycle.

Criteria

POWERPLEX is the ANF software system designed to perform in-core monitoring of BWR cores. Core monitoring is performed by the module, XTGBWR, a three-dimensional reactor simulator code which calculated bundle nodal powers. The POWERPLEX input deck consists of all constants needed for the execution of this code and subsequent calculation of the margin to thermal limits. These constants must be updated prior to the start of every new fuel cycle in order to ensure satisfactory core monitorings of the new core configuration. The deck is updated by an ANF core management engineer and validated jointly by members of the Reactor Engineering Group at Susquehanna and the Nuclear Fuels Group in Allentown.

Results

The POWERPLEX input deck was verified to be correct and successfully loaded into the POWERPLEX system prior to SIC4 startup.

Susquehanna Unit 1 Cycle 4 Startup Program Summary

The following is a short summary of additional Reactor Engineering activities performed during the Startup Testing Program.

Thermal Limit Monitoring

Thermal Limits were checked throughout the startup period through review of the POWERPLEX core monitoring program, MONITOR, output. At no time did thermal limits exceed Technical Specification limits.

TIP System - OD-1 Performance

A full set of TIPS was run at 30% power to update the core power distribution before the first core performance calculation was initiated. Subsequent TIP sets were performed at 70 and 100% power in conjunction with two LPRM calibrations. The LPRM currents were updated and the LPRM GAFS found to be with the acceptable range.

Power Distribution Comparison with Offline Monitoring

Favorable results were obtained when actual core power distribution data was compared to SIMULATE core modelling code data. The SIMULATE code is used by the Nuclear Fuels core management engineer to predict power distributions throughout the cycle. This comparison, at 0.242 GWD/MTU is included as Figure 4.

Core Flow Calibration

A core flow calibration was performed at 97% core flow. Jet pump and recirculation loop flow instrumentation was adjusted to ensure correct core flow indication and correct calculation of the flow biased rod block and scram setpoints by the APRM flow units.

Recirculation Loop Baseline Data Acquisiton

Recirculation loop data was collected throughout the startup program to provide baseline data for plant performance monitoring in two loop and single loop operation. This data is used throughout the cycle during the performance of the technical section Jet Pump Operability Surveillance.

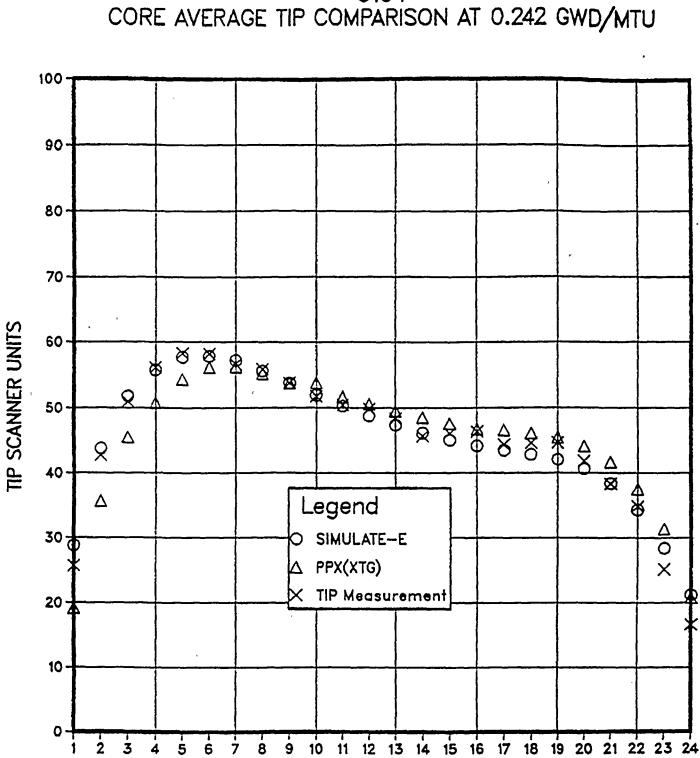
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Neutron Noise Baseline Data Recording

APRM and LPRM baseline neutron flux noise data was collected as outlined in Technical Specification 4.4.1.1.1.4. This data was analyzed and incorporated into the Neutron Flux Noise Level Recording surveillance.



U1C4



Core Axial Node



Pennsylvania Power & Light Company

Two North Ninth Street • Allentown, PA 18101 • 215 / 770-5151

FEB 2 2 1988

Harold W. Keiser Vice President-Nuclear Operations 215/770-7502

Mr. William T. Russell Regional Administrator-Region 1 U.S. Nuclear Regulatory Commission 475 Allendale Road King of Prussia, PA 19406

SUSQUEHANNA STEAM ELECTRIC STATION UNIT 1 STARTUP REPORT PLA-2984 FILE R41-2A

Docket No. 50-387

Dear Mr. Russell:

Attached is a copy of the Susquehanna SES Unit 1 Startup Report for the Unit 1 Cycle 4 startup. This report is submitted in accordance with Technical Specifications Section 6.9.1.1 through 6.9.1.3. The report addresses those startup tests described in our application for reload dated June 19, 1987 (PLA-2875).

Very truly yours,

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H. W. Keiser Vice President-Nuclear Operations

Attachment

cc: NRC Document Control Desk (w/original)
NRC Region I
Mr. M. C. Thadani - NRC Project Manager
Mr. F. I. Young - NRC Resident Inspector

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