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SUSQUEHANNA SES UNIT 2 CYCLE 3

STARTUP TEST SUMMARY

Prepared by:

Approved by:
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ABSTRACT

Susquehanna Unit 2
Cycle 3
Startup Test Summary

Susquehanna Unit 2 resumed commercial operation for Cycle 3 on June 24, 1988 following a 16 week refueling and maintenance outage. The Unit 2 Cycle 3 (hereafter referred to as S2C3) reload included:

	208	GE	8x8	initial core
*	320	ANF	9x9	once burned
	236	ANF	9x9	unirradiated fuel assemblies

The following startup tests, identified in the S2C3 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)

Susquehanna Unit 2
Cycle 3
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

Following the completion of core alterations associated with 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The U2C3 core was analyzed to have a 1.58% ΔK/K shutdown margin with the strongest rod fully withdrawn at BOC 3. (Startup and Operations Letter Report, Susquehanna Unit 2 Cycle 3). 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 (3/22/88) of all fuel before the reload commenced and a partial core verification was performed (4/19/88) after all irradiated bundles were placed in the core, before any new fuel was loaded.

The Cycle 3 final core verification consisted of two videotaped passes over the core. In preparation for the first pass a single bundle was determined to be misoriented; this discrepancy was corrected prior to videotaping. 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 4/22/88. Therefore, the as-loaded core configuration is consistent with the core design Advanced Nuclear Fuels used in the evaluation of the S2C3 Reload Licensing Analyses. The S2C3 core map is included as Figure 1.

60									LJW461	LJW529	LJW554	LJW518	LJW519	LJW412	LJW530
58								LJW512	X21152	X21114	X21140	X21072	X21073	X21001	X21138
56						LJW505	LJW099	X21098	X22465	X21047	X22466	X21110	X22467	X21100	X22468
54						LJW385	LJW568	X22325	X21068	X22473	X21048	X22474	X21056	X22475	X21008
52					LJW542	X21057	X22479	X21055	X22480	X21046	X22327	X21037	X22328	X21082	LJW762
50			LJW492	LJW541	X21044	X21033	X21058	X22483	X21155	X22484	LJW733	X22331	X21071	LJW739	X21043
48			LJW147	LJW599	X22487	X21084	X22488	X21096	X22333	LJW348	X22334	LJW513	X22335	X21123	X22336
46		LJW451	X21060	X22341	X21015	X22491	X21025	X22492	X21083	X22342	X21085	X22343	LJW584	X22344	X21026
44	LJW413	LJW691	X22495	X21024	X22496	X21129	X22349	X21035	X21070	LJW732	X22350	X21036	X22351	X21141	LJW569
42	LJW478	X21128	X21125	X22499	X21097	X22500	LJW349	X22355	LJW741	X21099	X21142	X22356	X21112	LJW338	X21109
40	LJW504	X21086	X22503	X21153	X22359	LJW747	X22360	X21143	X22361	X21113	LJW755	X21111	X22362	X21151	LJW754
38	LJW462	X21126	X21017	X22505	X21139	X22367	LJW493	X22368	X21069	X22369	X21045	X22370	LJW706	X22371	X21067
36	LJW528	X21127	X22507	X21034	X22377	X21101	X22378	LJW705	X22379	X21059	X22380	LJW585	X22381	X21115	LJW763
34	LJW450	X21081	X21156	X22509	X21027	LJW746	X21009	X22387	X21087	LJW503	X21010	X22388	X21154	X22389	X21003
32	LJW384	X21018	X22511	X21095	LJW716	X21023	X22393	X21124	LJW570	X21002	LJW724	X21007	LJW717	X21137	LJW725
30	LJW378	X21306	X22513	X21217	LJW761	X21293	X22395	X21190	LJW565	X21320	LJW753	X21311	LJW760	X21175	LJW752
28	LJW410	X21231	X21168	X22515	X21297	LJW731	X21313	X22397	X21237	LJW527	X21314	X22398	X21166	X22399	X21321
26	LJW502	X21193	X22517	X21284	X22403	X21223	X22404	LJW580	X22405	X21263	X22406	LJW702	X22407	X21209	LJW714
24	LJW458	X21192	X21305	X22519	X21177	X22413	LJW538	X22414	X21247	X22415	X21273	X22416	LJW581	X22417	X21245
22	LJW525	X21236	X22521	X21165	X22423	LJW730	X22424	X21181	X22425	X21207	LJW722	X21205	X22426	X21163	LJW723
20	LJW552	X21194	X21191	X22523	X21219	X22524	LJW337	X22431	LJW736	X21221	X21180	X22432	X21206	LJW335	X21203
18	LJW449	LJW597	X22527	X21294	X22528	X21195	X22435	X21285	X21248	LJW745	X22436	X21286	X22437	X21179	LJW566
16		LJW411	X21264	X22441	X21303	X22531	X21295	X22532	X21233	X22442	X21235	X22443	LJW701	X22444	X21296
14			LJW135	LJW689	X22535	X21234	X22536	X21218	X22449	LJW336	X22450	LJW517	X22451	X21189	X22452
12			LJW537	LJW488	X21272	X21283	X21262	X22539	X21167	X22540	LJW744	X22457	X21249	LJW738	X21271
10					LJW489	X21261	X22543	X21259	X22544	X21274	X22459	X21287	X22460	X21232	LJW715
8						LJW379	LJW567	X22463	X21246	X22547	X21276	X22548	X21260	X22549	X21312
6						LJW526	LJW094	X21220	X22553	X21275	X22554	X21204	X22555	X21222	X22556
4								LJW516	X21164	X21208	X21178	X21250	X21251	X21319	X21176
2									LJW457	LJW500	LJW476	LJW510	LJW511	LJW448	LJW501
	1	3	5	7	9	11	13	15	17	19	21	23	25	27	29

FIGURE 1 SUSQUEHANNA UNIT 2 CYCLE 3 FINAL CORE LOADING PATTERN

	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59
60	LJW495	LJW452	LJW507	LJW506	LJW468	LJW494	LJW464								
58	X21149	X21006	X21074	X21075	X21147	X21117	X21161	LJW520							
56	X22469	X21103	X22470	X21121	X22471	X21050	X22472	X21105	LJW098	LJW532					
54	X21013	X22476	X21065	X22477	X21049	X22478	X21079	X22326	LJW573	LJW404					
52	LJW711	X21093	X22329	X21038	X22330	X21051	X22481	X21066	X22482	X21064	LJW483				
50	X21054	LJW734	X21076	X22332	LJW748	X22485	X21158	X22486	X21063	X21042	X21053	LJW482	LJW543		
48	X22337	X21136	X22338	LJW521	X22339	LJW352	X22340	X21107	X22489	X21091	X22490	LJW697	LJW187		
46	X21029	X22345	LJW707	X22346	X21090	X22347	X21092	X22493	X21030	X22494	X21022	X22348	X21061	LJW407	
44	LJW572	X21146	X22352	X21039	X22353	LJW749	X21077	X21040	X22354	X21130	X22497	X21031	X22498	LJW589	LJW453
42	X21122	LJW351	X21119	X22357	X21145	X21104	LJW740	X22358	LJW353	X22501	X21106	X22502	X21134	X21131	LJW560
40	LJW719	X21162	X22363	X21120	LJW718	X21118	X22364	X21144	X22365	LJW726	X22366	X21160	X22504	X21089	LJW531
38	X21080	X22372	LJW575	X22373	X21052	X22374	X21078	X22375	LJW544	X22376	X21148	X22506	X21020	X21133	LJW463
36	LJW710	X21116	X22382	LJW708	X22383	X21062	X22384	LJW574	X22385	X21102	X22386	X21041	X22508	X21132	LJW496
34	X21004	X22390	X21159	X22391	X21011	LJW533	X21088	X22392	X21012	LJW727	X21028	X22510	X21157	X21094	LJW406
32	LJW756	X21150	LJW764	X21014	LJW757	X21005	LJW571	X21135	X22394	X21032	LJW765	X21108	X22512	X21019	LJW405
30	LJW721	X21188	LJW713	X21318	LJW720	X21323	LJW564	X21201	X22396	X21302	LJW712	X21230	X22514	X21307	LJW403
28	X21322	X22400	X21171	X22401	X21315	LJW497	X21238	X22402	X21316	LJW742	X21298	X22516	X21169	X21244	LJW446
26	LJW759	X21210	X22408	LJW579	X22409	X21266	X22410	LJW699	X22411	X21224	X22412	X21291	X22518	X21198	LJW522
24	X21258	X22418	LJW700	X22419	X21280	X22420	X21256	X22421	LJW487	X22422	X21186	X22520	X21308	X21199	LJW456
22	LJW750	X21174	X22427	X21214	LJW751	X21212	X22428	X21182	X22429	LJW743	X22430	X21172	X22522	X21239	LJW498
20	X21216	LJW341	X21213	X22433	X21183	X21226	LJW737	X22434	LJW365	X22525	X21228	X22526	X21200	X21197	LJW470
18	LJW563	X21184	X22438	X21289	X22439	LJW728	X21255	X21290	X22440	X21196	X22529	X21301	X22530	LJW683	LJW409
16	X21299	X22445	LJW578	X22446	X21240	X22447	X21242	X22533	X21300	X22534	X21310	X22448	X21265	LJW447	
14	X22453	X21202	X22454	LJW509	X22455	LJW364	X22456	X21229	X22537	X21241	X22538	LJW591	LJW173		
12	X21282	LJW735	X21254	X22458	LJW729	X22541	X21170	X22542	X21267	X21292	X21281	LJW535	LJW486		
10	LJW758	X21243	X22461	X21288	X22462	X21279	X22545	X21270	X22546	X21268	LJW536				
8	X21317	X22550	X21269	X22551	X21277	X22552	X21257	X22464	LJW562	LJW402					
6	X22557	X21225	X22558	X21215	X22559	X21278	X22560	X21227	LJW100	LJW499					
4	X21187	X21324	X21252	X21253	X21185	X21211	X21173	LJW508							
2	LJW524	LJW408	LJW515	LJW514	LJW546	LJW523	LJW455								

FIGURE 1 SUSQUEHANNA UNIT 2 CYCLE 3 FINAL CORE LOADING PATTERN (CONT.)

Susquehanna Unit 2
Cycle 3
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 4/19/88. No control rods overtraveled and subcriticality was maintained as each rod was individually fully withdrawn and reinserted.

Susquehanna Unit 2
Cycle 3
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 2 Cycle 3 is 0.75%Δ K/K (0.38%Δ K/K needed to shutdown the reactor under the worst case conditions plus an R-value, which for S2C3 equals zero plus a prediction uncertainty of 0.37%). 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 1.283%Δ K/K. The required shutdown margin to be demonstrated was calculated to be 1.0065%Δ K/K. This is .75%Δ K/K plus a correction factor for the recirculation loop temperature (125 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 1.283%Δ K/K with a reactor coolant temperature of 68 degrees F. Due to the reactor coolant temperature of 125 degrees F, the aforementioned correction factor was emplyed and the actual shutdown margin demonstrated was 1.026% Δ K/K (1.283 - temperature correction).

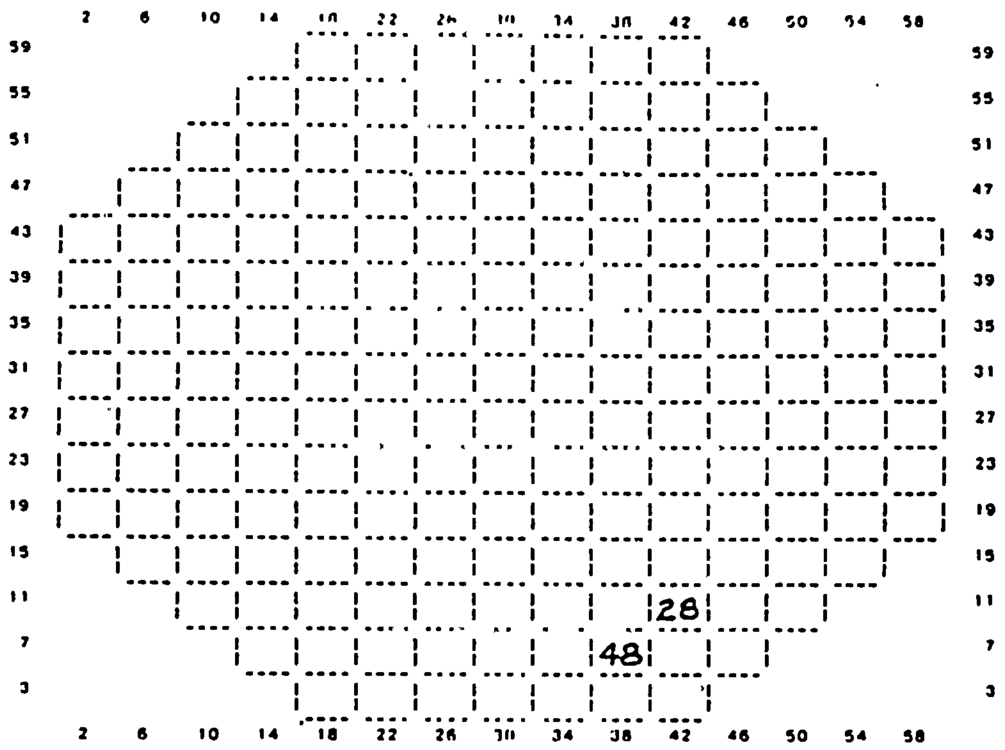
ROD	POSITION	TOTAL WORTH % Δ K/K(68°F)	TOTAL WORTH %Δ K/K (125°F)
38-07*	48	-	-
42-11	28	1.283	1.026

*analytically determined strongest rod.

Due to the preliminary BOC SDM calculation of 1.58%Δ 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.

FIGURE 2. CORE MAP SHOWING TEST ROD POSITIONS FOR SUBCRITICAL SHUTDOWN MARGIN DEMONSTRATION



Susquehanna Unit 2
Cycle 3
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 3 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%Δ K/K has been determined to be the minimum required 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 3, R = 0). A prediction uncertainty of .37%Δ K/K is also added at BOC to assure the validity of the analytical calculations. The required beginning-of-cycle SDM for Susquehanna Unit 2 Cycle 3 is 0.75%Δ 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%Δ 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 1.430%Δ K/K and the difference between actual Keff and predicted Keff at criticality was -0.148%Δ 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 occurred was rod 22-47, notch 14, step 36. A special log was initiated to record SRM count rates and recirculation loop temperatures. The average period was 135.3 seconds and the average loop temperature 140.2 degrees F which yield period and temperature corrections of 0.461 E-3Δ K/K and 3.25 E-3Δ K/K respectively.

1) Shutdown Margin

The equation used to calculate SDM

$$SDM = \frac{Kcrit - Ksro}{Kcrit * Ksro} - \Delta p \text{ (period)} - \Delta p \text{ (temp)}$$

Kcrit is Keff at the actual critical control rod position (1.00224) and Ksro is Keff predicted with the strongest rod out (0.98447).

The minimum required SDM for Unit 2 Cycle 3 at beginning of cycle was 0.75%ΔK/K; the calculated shutdown margin based on this test was 1.43%ΔK/K, thus satisfying the acceptance criteria.

2) Reactivity Anomaly

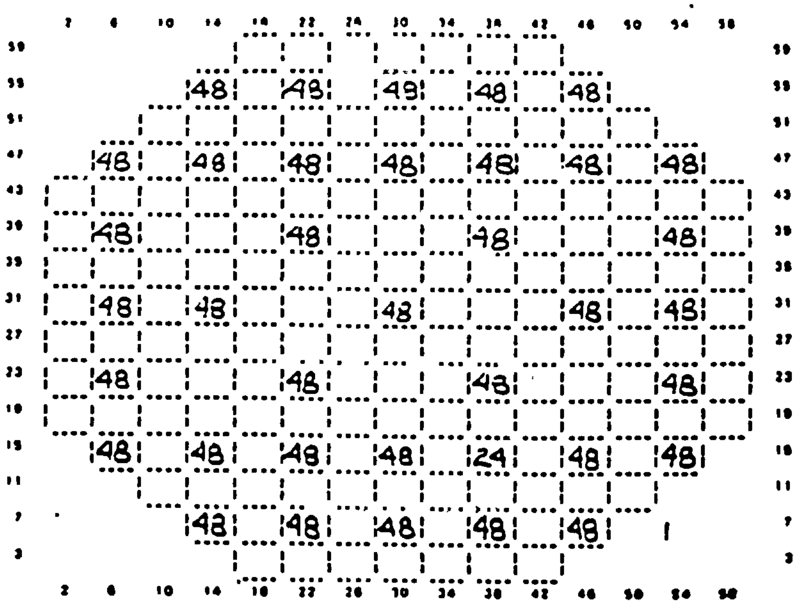
The reactor went critical at step 36 with Kcrit of 1.00224. The equation used to calculate reactivity difference was

$$\text{Reactivity difference} = \frac{Kcrit - 1}{Kcrit} - \Delta p \text{ (period)} - \Delta p \text{ (temp)}$$

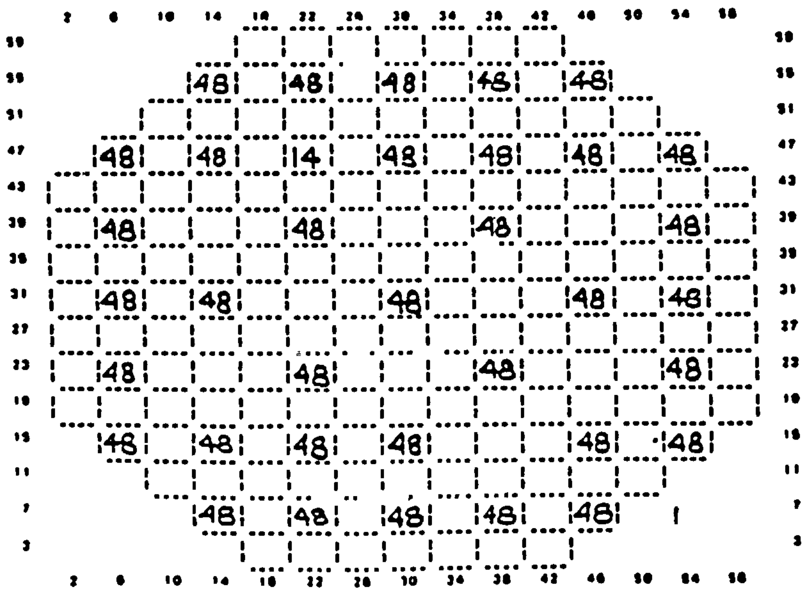
The calculated reactivity difference was -0.15%ΔK/K. This satisfies ± 1%ΔK/K acceptance criteria.

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

FIGURE 3 COMPARISON OF PREDICTED VS ACTUAL CRITICAL ROD PATTERNS



PREDICTED CRITICAL PATTERN



ACTUAL CRITICAL PATTERN

Susquehanna Unit 2

Cycle 3

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 X^2 value calculated shall be less than the critical X^2 value. Since Susquehanna has 19 symmetric TIP pairs, the calculated X^2 value must be less than a critical X^2 value of 36.19 (as determined by ANF). If the calculated X^2 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 X^2 should be then made. If the new measured value of X^2 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 2 BOC3 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 X^2 were calculated to be 4.94 and 2.61 respectively. The X^2 value of 2.61 is well within the 36.19 limit established by ANF.

Table 1
Absolute Relative Difference

Symmetric TIP Pair	Absolute Relative Difference dm
1	0.95
2	1.93
3	1.19
4	0.31
5	5.88
6	0.64
7	0.66
8	3.61
9	0.06
10	1.83
11	1.21
12	6.12
13	0.86
14	2.99
15	4.01
16	1.61
17	6.60
18	2.63
19	3.47

Equation 5.1

$$dm = \frac{100\ (Tm1 - Tm2)}{\frac{(TM1 + TM2)}{2}}$$

Note: $Tm1 = \sum_{K=3}^{22} T(k)$ for TIP_1 and $TM_2 = \sum_{K=3}^{22} T(k)$ for TIP_2

where TIP_1 and TIP_2 are symmetric TIP pairs

Equation 5.2 (Variance)

$$S^2TIP_{ij} = \frac{\sum_{M=1}^{19} dm^2}{38} = 4.94$$

Equation 5.3

$$X^2 = \frac{19\ S^2TIPij}{36} = 2.61$$

Susquehanna Unit 2
Cycle 3
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 2 Cycle 3, 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

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	46-31	05	3.73	7.00
AVERAGE SCRAM INSERTION TIME OF OPERABLE RODS T.S.3.1.3.3		45	0.31	0.43
		39	0.62	0.86
		25	1.36	1.93
		05	2.44	3.49
AVERAGE SCRAM INSERTION TIME OF SLOWEST 2x2 ARRAY T.S. 3.1.3.4		45	0.33	0.45
		39	0.67	0.92
		25	1.41	2.05
		05	2.53	3.70

TABLE 2: Results of Scram Time Testing of All Control Rods S2C3.

Susquehanna Unit 2
Cycle 3
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 [illegible] module using XTGBWR, a three-dimensional reactor simulator code which calculates 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 monitoring 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 S2C3 startup.

Susquehanna Unit 2
Cycle 3
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/LPRM CALIBRATIONS

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 57% and 100% power in conjunction with two LPRM calibrations. The LPRM currents were updated and the LPRM GAFS found to be within the acceptable range.

Core Flow Calibration

A core flow calibration was performed at 99% 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.

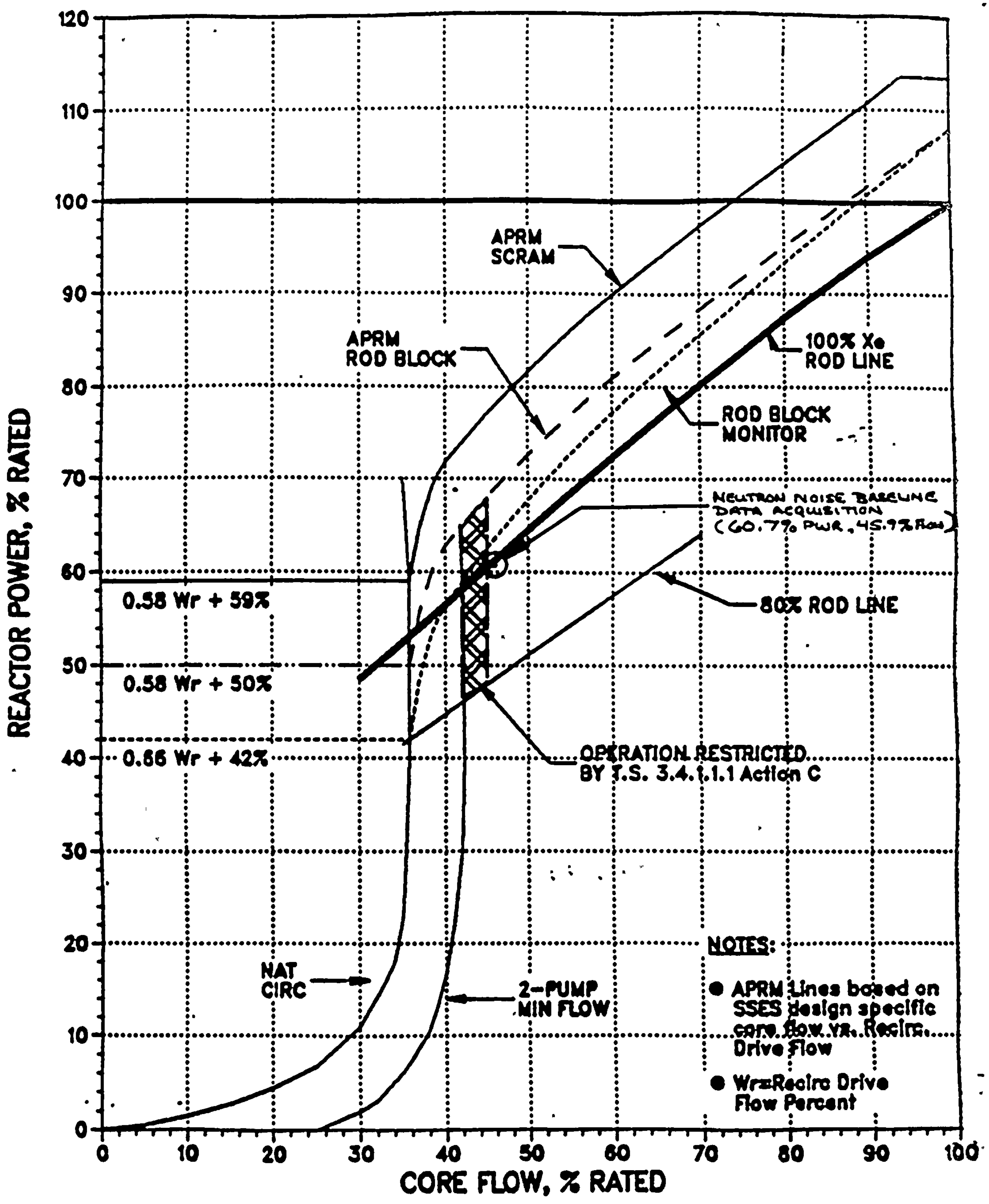
Recirculation Loop Baseline Data Acquisiton

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.

Neutron Noise Baseline Data Recording

APRM and LPRM baseline neutron flux noise data was collected per Technical Specification 4.4.1.1.1.4, with the reactor operating at 60.7% power and 45.9% core flow. Figure 4 graphically depicts the operating conditions. The data was analyzed and incorporated into the Neutron Flux Noise Level Recording surveillance. The data was sent to ANF and Oak Ridge National Laboratory. ANF is to anlayze the data and provide PP&L with an assessment of decay ratio and stability. Results obtained by PP&L indicate the S2C3 core to be stable.

FIGURE 4 TWO LOOP OPERATION CORE POWER VS CORE FLOW



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SEP 23 1988

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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 2 STARTUP REPORT
PLA-3093 FILE R41-2A Docket No. 50-387

Dear Mr. Russell:

Attached is a copy of the Susquehanna SES Unit 2 Startup Report for the Unit 2 Cycle 3 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 December 23, 1987 (PLA-2953).

Very truly yours,

H. W. Keiser

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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