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SUBJECT: Forwards revised Cycle 2 stability test program, including commitment to take data at approx 42% rated flow near 100% rod line.

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SEP 16 1986

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Project Director
BWR Project Directorate No. 3
Division of BWR Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

SUSQUEHANNA STEAM ELECTRIC STATION
REVISED UNIT 2 CYCLE 2 STABILITY TEST PROGRAM
PLA-2718 FILE R41-2 Docket No. 50-388

Reference: Letter, PLA-2637, H. W. Keiser to E. Adensam, dated April 30, 1986.

Dear Ms. Adensam:

Via the referenced letter, PP&L transmitted our proposed stability test program for Susquehanna Unit 2 Cycle 2 startup. Attached please find a revised program which incorporates the results of subsequent discussions with the NRC staff. These revisions include:

1. a commitment to take data at approximately 42% rated flow near the 100% rod line, and

2. more specific information that was not available at the time the original plan was submitted.

Any questions on this document should be directed to Mr. R. Sgarro at (215) 770-7855.

Very truly yours,

H. W. Keiser
Vice President-Nuclear Operations

Attachment

cc: M. J. Campagnone NRC
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STABILITY TEST PROGRAM FOR SUSQUEHANNA UNIT 2 CYCLE 2

1.0 INTRODUCTION

The Cycle 2 fuel reload for Susquehanna Unit 2 consists of 324 ENC 9x9 fuel assemblies. This will be the first BWR reload consisting of 9x9 fuel assemblies loaded into a high power density BWR reactor in the United States. The introduction of 9x9 fuel assemblies in domestic BWRs has raised the question of BWR hydraulic stability. Calculations with ENCs NRC approved COTRAN stability methodology and supplemental calculations with an advanced stability methodology currently being reviewed by the NRC (COTRANSA2) show the Susquehanna Unit 2 core is stable. To further verify core hydraulic stability with the introduction of a reload of ENC 9x9 fuel assemblies into Susquehanna Unit 2, a stability demonstration test will be performed by PP&L during startup of Cycle 2 and during single loop operation tests following the startup of Cycle 2.

2.0 SUMMARY

The purpose of this test is to demonstrate that the insertion of the Exxon Nuclear Company (ENC) 9x9 fuel array does not adversely affect the stability of the Susquehanna Unit 2 reactor plant. The test is to be run during a normal startup and single loop operating conditions following the startup. No special test maneuvering will be done; special rod movements or imposed pressure variations are not necessary. Test data will be taken from existing instrumentation and data ports. A noise magnitude measurement will be obtained and compared to the baseline noise level specified in Susquehanna Unit 2 Technical Specifications to determine variations from the previous operating cycle. Data recorded during the test will be used in post test COTRAN calculations to determine the core decay ratios. Results

of these analyses will be completed approximately 90 days following the stability demonstration test.

3.0 TEST EQUIPMENT

No special test equipment will be installed for this test. All data are to be recorded on the currently installed GETARS system.

4.0 PROCESSED SIGNALS

Signals to be recorded on the GETARS equipment are shown in Table 1. The signals will be obtained from two APRMs, eight LPRMs, reactor vessel pressure narrow range recorder, total core flow sensor, and an internal clock. Tentative LPRM locations and levels are shown in Table 1. Final LPRM locations will be selected based on the actual power distribution and rod patterns at the time of the test.

In addition to the signals being recorded by the GETARS equipment, the POWERPLEX® CMSS must be operable during the test.* The OPS$ and WRA$ file sets for a core monitoring calculation obtained within two hours of the commencement of the test should be saved. Also, the GAF$-file (located under $2>Monitor) and the DAY$-file obtained for the duration of the stability test should be saved. This data will be used to perform post test calculations.

5.0 DATA ACQUISITION

The data shall be taken during reactor startup and during single loop operation (SLO) following startup. Figure 1 shows the "detect and

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*POWERPLEX® CMSS; Software Specifications for the Susquehanna Steam Electric Station, XN-NF-83-35, Revision 1.

suppress" area of operation in Susquehanna Unit 2. Data will be obtained at two test points on the power versus flow map. The first point to measure is the highest power to flow ratio attained during the normal startup. This point corresponds to the operating statepoint required by Technical Specifications which establishes the baseline noise level for stability monitoring, i.e., approximately 48% rated flow and the 100% rod line power. The second stability test point will be measured approximately one week later during single loop operation. Noise data is to be recorded during the SLO tests at approximately 42% rated flow and the 100% rod line power. No special rod motion or pressure perturbation will be made during the recording of the data.

Recording of stability data at each test point will take approximately 30 minutes. The core should be as near equilibrium conditions as possible during the data acquisition stage of the test (i.e., no control rod, power, or flow maneuvers).

6.0 ACTION REQUIREMENTS

The reactor noise shall be monitored throughout the test by PP&L plant staff. If, at any time, the noise levels exceed three times the previous cycle's detect and suppress baseline noise level, the operating staff shall immediately initiate corrective action to restore the noise levels within required limits within two hours by increasing core flow and/or initiating an orderly reduction of core thermal power.

7.0 POST TEST ANALYSIS

The data collected during the startup stability test will be used as input to post test stability analyses with COTRAN. These COTRAN analyses are performed after the test so the decay ratio for the

actual configuration tested (exposures, core loading, rod positions, power/flow points, etc.) can be calculated. Calculated decay ratio results will be made available approximately three months after the performance of the test.

8.0 SUMMARY OF RESPONSIBILITY

- PP&L will be responsible for execution of the test.

- PP&L will be responsible for hookup and operation of the GETARS and POWERPLEX® system.

- ENC will be responsible for post test COTRAN analyses.

Table 1 Monitored Variables for
Susquehanna Unit 2 Stability Test

Signal	Level	Core Location
APRM-A		
APRM-B		
LPRM	A	16-17
LPRM	A	48-49
LPRM	B	48-49
LPRM	B	32-33
LPRM	C	32-33
LPRM	B	48-33
LPRM	C	32-09
LPRM	D	48-17
Reactor Vessel Pressure (Narrow Range)		
Total Core Flow		
Internal Clock		

FIGURE 1

CORE POWER vs CORE FLOW