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FACIL:50-388 Susquehanna Steam Electric Station, Unit 2, Pennsylva 05000388
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RECIP.NAME RECIPIENT AFFILIATION
BUTLER,W.R. Project Directorate I-2

SUBJECT: Forwards application for Amend 78 to License NPF-22, modifying Tech Specs 4.5.1.c.2 & 4.7.3.c.2.

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Executive Vice President and Chief Operating Officer
215 / 770-5043

NOV 20 1989

Director of Nuclear Reactor Regulation
Attention: Dr. W. R. Butler, Project Director
Project Directorate I-2
Division of Reactor Projects
U.S. Nuclear Regulatory Commission
Washington DC 20555

SUSQUEHANNA STEAM ELECTRIC STATION
PROPOSED AMENDMENT NO. 78 TO NPF-22:
HPCI AND RCIC 150 PSI TEST CRITERIA
PLA-3301 FILES R41-2, A17-2 DOCKET NO. 50-388

Dear Dr. Butler:

This letter is an emergency request for NRC approval of a change to the provisions of the Susquehanna SES Technical Specifications for Unit 2. The requested changes, attached in marked-up form, propose that certain requirements of Specifications 4.5.1.c.2 and 4.7.3.c.2 be only modified for the startup following the Third Refueling and Inspection Outage for Susquehanna SES Unit 2.

BACKGROUND

On November 16, 1989 with Susquehanna SES Unit 2 in the STARTUP mode, the 18 month Surveillance test was run on the Reactor Core Isolation Cooling (RCIC) System to verify the requirement of Technical Specification 4.7.3.c.2. This Specification requires verification that the system will develop a flow of greater than or equal to 600gpm in the test flow path when steam is supplied to the turbine at a pressure of 150, +15, -0 psig. Contrary to the requirements of this specification, the maximum flow achieved in the test flow path was 530 gpm.

The cause of the inability of the RCIC to achieve the specified flow at 150 psig is attributable to a modification to the test flowpath throttle valve which was installed during the Third Refueling and Inspection Outage. During previous testing the throttle valve has undergone severe cavitation when subjected to surveillance testing at 920 psig (Surveillance 4.7.3.b). The modification was performed in order to correct this cavitation problem at the higher test pressure condition. In the process, the modified test throttle valve, in the wide-open condition, has too great a pressure drop to allow the pump to be fully tested at the lower test pressure condition. Specifically, when low pressure testing was attempted, the test line system resistance prevented the RCIC pump from running out far enough on the pump curve to confirm the numerical criteria in the Technical Specification.

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On November 18, 1989, the 18 month surveillance test was run on the High Pressure Coolant Injection (HPCI) system to verify the requirement of Technical Specification 4.5.1.c.2. The HPCI system did not achieve the specified flow in the test flow path. The cause of the inability of HPCI to achieve the specified flow is attributable to a modification of the test flow path throttle valve. This modification of the HPCI test flow path throttle valve is the same as the modification to the RCIC test flow path throttle valve.

JUSTIFICATION FOR THE CHANGE

Technical Specifications 4.5.1.c.2 for the HPCI system and 4.7.3.c.2 for the RCIC system describe surveillance testing requirements for these systems at nominal steam supply pressure of 150 psig. The intent of this surveillance testing is to verify that these systems are capable of injecting their rated flows of water into the Reactor Pressure Vessel (RPV) at their minimum design steam pressures. Since actual injection into the RPV is not practical during surveillance testing, an alternate flowpath is used wherein the test water is diverted back to the Condensate Storage Tank (CST). By simulating the necessary head and flow conditions, it is possible to verify that the HPCI and RCIC pumps are capable of actual injection to the RPV. One consequence of testing in this mode is that a throttle valve with a wide range of Cv's is required to achieve necessary pressure drops for the 150 psig and 920 psig test conditions.

Calculations have been performed which demonstrate that the HPCI and RCIC systems are capable of achieving rated injection flow to the RPV inspite of not achieving the present flow rate criteria for the test line as specified in the Technical Specifications. It has been shown that the HPCI and RCIC pump curves are above the head/capacity points corresponding to vessel injection. (See attached pump curves).

In order for the HPCI system to achieve rated injection (5,000 gpm) to the RPV at a nominal steam pressure of 150 psig, it is necessary for the HPCI pump to produce a developed head of 530 feet which corresponds to a pump discharge pressure of 248 psig. The current 150 psig testing done with the modified test line throttle valve wide open produced a flow of 4,850 gpm at a discharge pressure of 600 psig. If the pump curve is extrapolated beyond its currently limited value of 4,850 gpm to 5,000 gpm, it is analyzed to produce a head of 1250 feet with a pump discharge pressure of 561 psig. Comparing these numbers with the injection requirements, it is shown that the HPCI system is capable of achieving rated injection flows to the RPV at its minimum steam pressure operating condition. Excess head would be controlled by reducing HPCI pump speed through turbine control valve throttling.

For the RCIC system to achieve rated injection (600 gpm) to the RPV at a nominal steam pressure of 150 psig, it is necessary for the RCIC pump to produce a developed head of 517 feet which corresponds to a pump discharge pressure of 242 psig. The current 150 psig surveillance testing done with the modified test line throttle valve wide open and the turbine at 2900 rpm produced a flow of 530 gpm at a discharge pressure of 480 psig. If the pump curve at this speed is extrapolated beyond its currently limited value of 530

gpm to 600 gpm, it is analyzed to produce a head of 1030 feet with a pump discharge pressure of 466 psig. Based upon this extrapolation the RCIC pump is capable of achieving its rated injection flow to the RPV at its minimum steam pressure operating condition.

Furthermore, when the HPCI and RCIC pumps were tested at nominal steam pressures of 920 psig, all acceptance criteria were satisfied as presently specified in the Technical Specifications. The pumps were subjected to their pump Inservice Inspection (ISI) testing at this high-pressure condition, and it has been confirmed that there has been no degradation of pump performance.

NO SIGNIFICANT HAZARDS EVALUATION

The proposed changes do not:

I. Involve a significant increase in the probability or consequences of an accident previously evaluated.

The changes to the Technical Specifications testing criteria for low pressure is due to the modifications to the test line throttle valves and not to any modifications in the injection lines, pumps or turbines. Meeting the new testing criteria proves that the pumps are capable of achieving rated injection to the RPV at a nominal steam pressure of 150 psig. This change does not modify the analyzed injection rates at minimal steam conditions only the test acceptance criteria for assuring that these injection rates are met.

II. Create the possibility of a new or different kind of accident from any previously evaluated.

Based on the analysis presented in Item I above, the changes to test acceptance criteria at minimal steam pressure does not affect the ability of the HPCI or RCIC systems to inject rated flow into the RPV. Since only the test acceptance criteria were changed, the possibility of a new or different kind of accident from any previously evaluated was not created.

III. Involve a significant reduction in the margin of safety.

The proposed changes do not alter the required injection rates into the RPV. They only change the acceptance criteria in the test flowpath for proving these injection rates. Therefore, the changes do not decrease the margin of safety.

BASIS FOR EMERGENCY CHANGE

10CFR50.91 provides guidance on the information required to support an application for an emergency change.

First, it requires the applicant to justify that an emergency exists i.e., "... failure to act in a timely way would result in derating or shutdown of a nuclear unit...". Under the current configuration, the HPCI and RCIC Systems can not be tested in the test flow loop to the Technical Specifications because of a recent modification to the test throttle valve in each system. The test loops can not be modified in a timely manner to support startup following the Third Refueling and Inspection Outage. The injection pathway into the RPV has not been modified during this outage. By not changing the acceptance criteria in the Technical Specification Susquehanna SES Unit 2 would have to remain shutdown until the test lines could be modified. This shutdown is unnecessary since as shown on the attached figure pump performance exceeds the Technical Specification requirements. The required operation of the HPCI and RCIC systems are not affected, only the test line pressure drop has been affected.

Second, 10CFR50.91 requires a licensee to "... explain why this emergency situation occurred and why it could not avoid the situation...". The discovery of this problem was a result of the performance of surveillance testing. This problem was caused by the modification to the test line throttle valves creating larger than anticipated pressure drops at the minimal steam pressure conditions since the problem of throttle valve cavitation was seen at the maximum steam pressure. When this conflict was discovered a request for Enforcement Discretion was requested in order to continue testing both the HPCI and RCIC systems since the problems are with the test line and not the systems performance to inject rated flow into the RPV. The appropriate internal processes were implemented in support of this submittal.

PP&L requests that this change be made effective as of November 20, 1989.

Any questions regarding this submittal should be directed to Mr. C. T. Coddington at (215)770-7915.

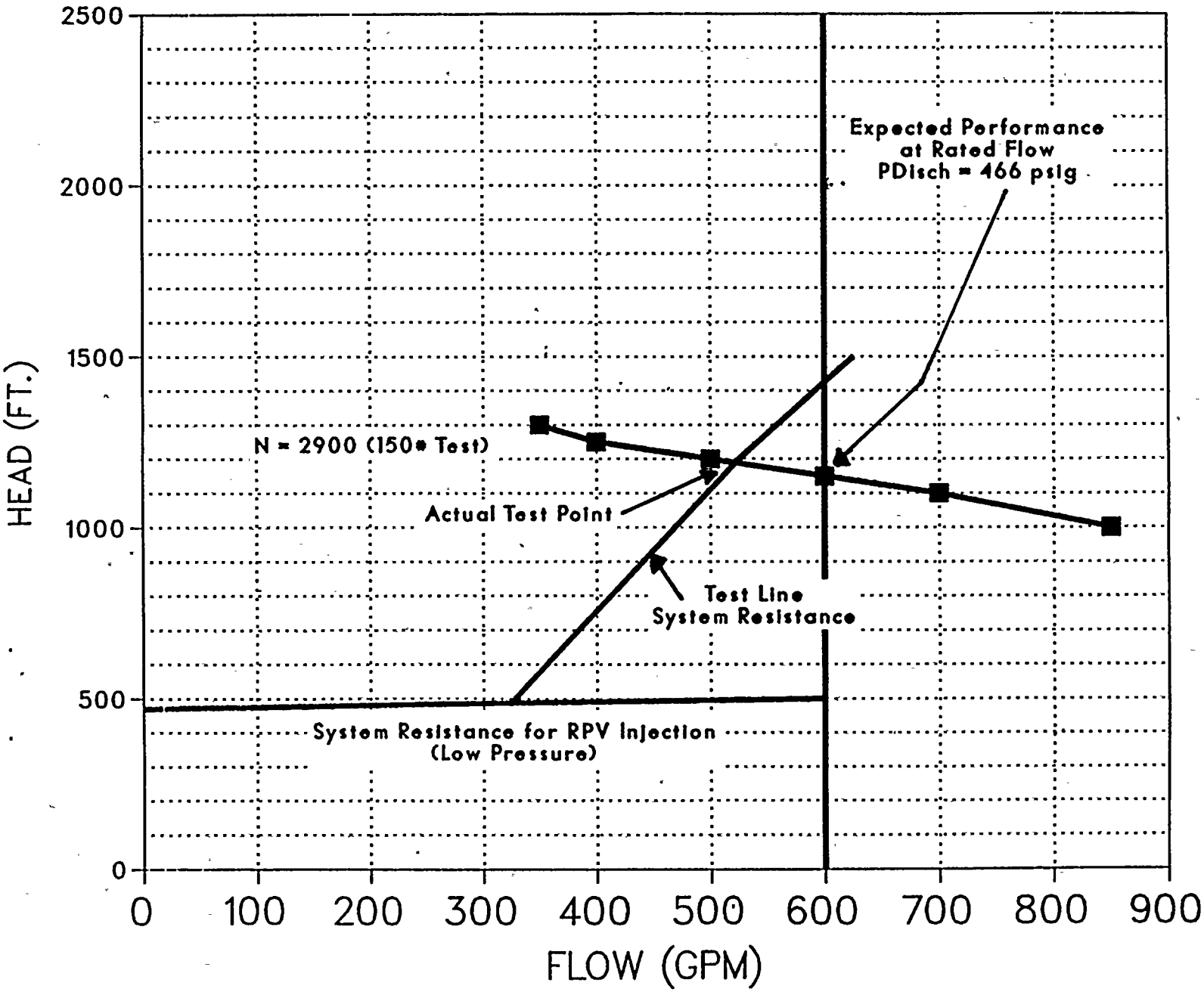
Very truly yours,

J. T. Kauffman
Executive Vice President and Chief Operating Officer

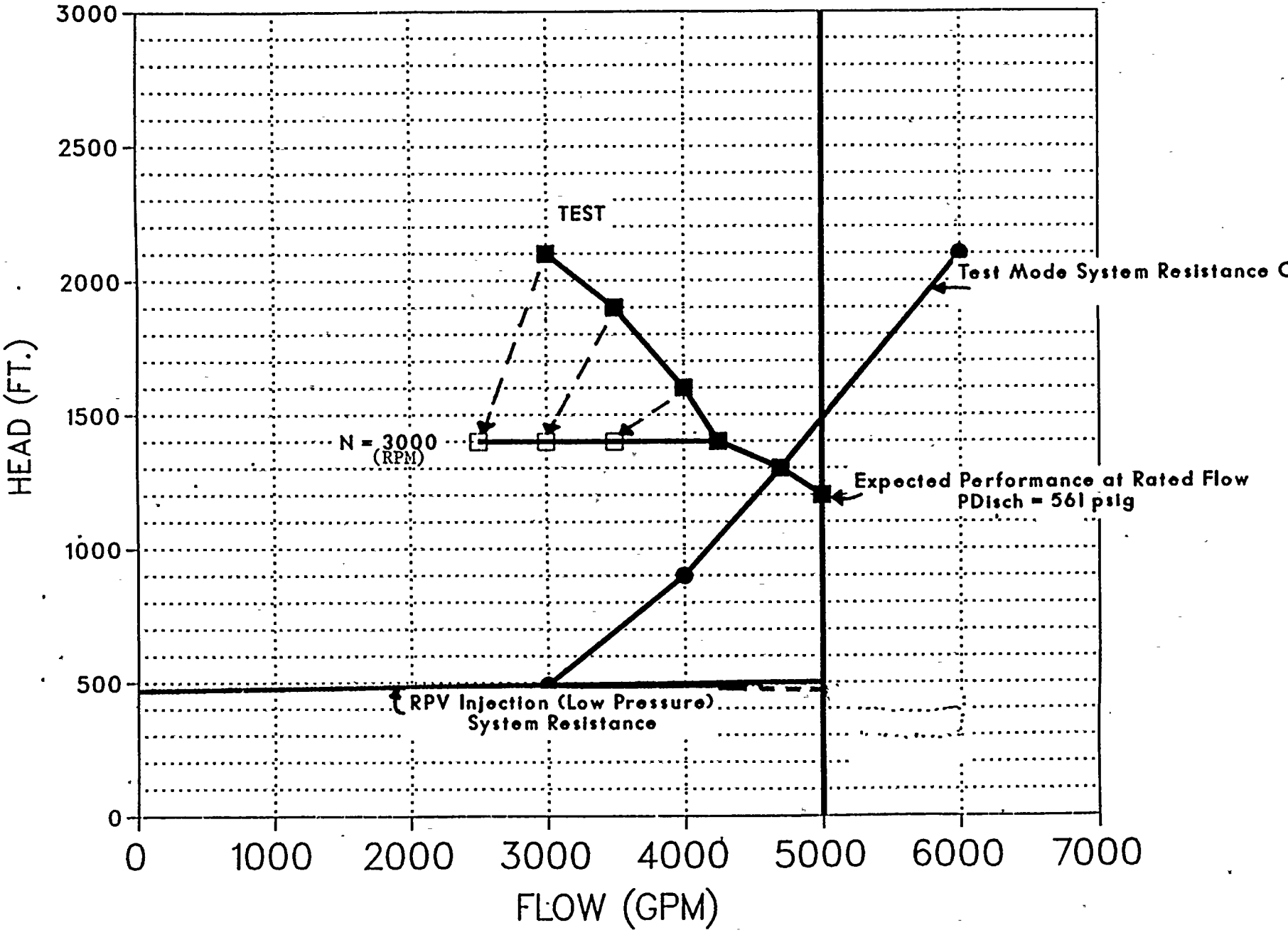
Attachment(s)

cc: NRC Document Control Desk(original)
NRC Region I
Mr. G. S. Barber, NRC Sr. Resident Inspector
Mr. T. M. Gerusky, Pennsylvania DER
Mr. M. C. Thadani, NRC Project Manager

RCIC CURVE


2500
2000
1500
1000
500
0
HEAD (FT.)
0
100
200
300
400
500
600
700
800
900
FLOW (GPM)
Expected Performance
at Rated Flow
PDisch = 466 psig
N = 2900 (150# Test)
Actual Test Point
Test Line
System Resistance
System Resistance for RPV Injection
(Low Pressure)

HPCI CURVE


3000
2500
2000
1500
1000
500
0
HEAD (FT.)
TEST
N = 3000 (RPM)
Test Mode System Resistance Curve
Expected Performance at Rated Flow
PDisch = 561 psig
RPV Injection (Low Pressure)
System Resistance
0
1000
2000
3000
4000
5000
6000
7000
FLOW (GPM)