North Atlantic

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The Northeast Utilities System

August 18, 2000

Docket No. 50-443

CR# 00-08884

NYN-00070

United States Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555

Seabrook Station
"Response to Requests for Additional Information Pertaining to the 2nd Ten-Year Interval Inservice Test Program Plan Relief Requests"

On March 21, 2000, North Atlantic Energy Service Corporation (North Atlantic) forwarded the 2nd Ten-Year Interval Inservice Test (IST) Program Plan and associated relief requests to the Nuclear Regulatory Commission (NRC) for review. As a result of this submittal, North Atlantic received a request for additional information regarding relief requests PG-1, PR-1, PR-2, PR-3, VG-1 and VG-2 by letter dated August 9, 2000. The North Atlantic responses to the requested information are provided Enclosure 1. The Containment Building Spray Pump performance curves are provided in Enclosure 2 as identified in the response to Question 2 of relief request PR-1.

Should you have any questions regarding this letter, please contact Mr. James M. Peschel, Manager - Regulatory Programs, at (603) 773-7194.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.

J M Vargas for TCF

Ted C. Feigenbaum
Executive Vice President
and Chief Nuclear Officer

A047

cc: H. J. Miller, NRC Regional Administrator
R.M. Pulsifer, NRC Project Manager, Project Directorate I-2
R. K. Lorson, NRC Senior Resident Inspector

Enclosure 1 to NYN-00070

Relief Request PG-1

Question:

1. What are the full-scale ranges of the flow measurement instruments for the CC and RH systems?

Response:

The Component Cooling (CC) flow instrument full-scale range is 0-13000 gallons per minute (gpm). The Residual Heat Removal (RHR) flow instrument full-scale range is 0-700 gpm.

Question:

2. What are the reference values?

Response:

Three of four CC pumps have reference flow values of 11600 gpm. The other CC pump has a reference flow rate of 11700 gpm. One RHR pump has a reference flow value of 605.4 gpm. The other RHR pump has a reference flow rate of 559.44 gpm.

Relief Request PR-1

Question:

1. How does the pre-operational test data compare with the current pump test data?

Response:

The current Containment Building Spray (CBS) pump test is conducted at one point on the pump curve. The current pump test data has been at or above the pre-operational test data curve for each pump. The current pump test data shows no appreciable degradation in performance from the pre-operational test. These pumps experience very little operating time (about 10-15 hours) each cycle and this is primarily due to surveillance testing. The anticipated level of degradation from this amount of use is minimal and this is supported by the past test results.

Question:

2. Please provide data to demonstrate that the proposed testing meets the intent of the testing required by ISTB 4.3.e.1.

Response:

The performance curves for both Containment Building Spray pumps are provided in Enclosure 2. Both IST points identified were the latest taken and are representative of the historical IST data.

Relief Request PR-2

Question:

1. Are there any known degradation mechanisms below 6 Hz for these pumps?

Response:

North Atlantic has determined that there are no known degradation mechanisms below 6 Hz for the subject Service Water pumps. Seabrook Station has experienced past failures of these pumps related to the breakdown of the coatings used on the shafts and the clearances at the bearing surfaces. Historically, these failures have been discovered through the use of system operational indicators (e.g., failure of the pumps to start with low system header pressure) and not through the use of vibration monitoring.

Question:

2. Are these pumps monitored for degradation under any other (non-Code) program? For instance, is spectral analysis and trending performed for these pumps in a predictive maintenance program?

Response:

The subject pumps are vertical line shaft pumps that are periodically monitored for degradation by the Condition-Based Maintenance (CBM) safety-related program as well as the IST program. The CBM program takes vibration measurements utilizing full spectral analysis and trends the data for the Code required points on the motor bearings. In addition to the Code required points, the CBM program also measures pump shaft vibration. The monitoring of shaft vibration has proven to be a better indicator than the Code required monitoring of the motor bearings only. The CBM program additionally monitors operation of the pump motors by periodically sampling and trending the condition of the motor bearing lubricating oil and utilizing thermography.

In order to monitor vibration below 6 Hz, additional instrumentation would be required at a significant cost. Currently none of our vibration probes meet the combined range and accuracy requirements required by the Code for the subject pumps. The purchase of new equipment to monitor motor vibration of the subject vertical line shaft pumps for vibration that has not been indicative of pump condition is an unnecessary burden. Additionally, IST vibration monitoring alone has not been adequate to demonstrate continued pump reliability.

Relief Request PR-3

Question:

1. Describe the hardship involved in meeting the comprehensive pump test instrument accuracy requirements (ISTB 4.7.1(a)) for the inlet pressure measurement.

Response:

With currently installed instrumentation, it would require a direct readout (e.g., use of a multimeter) to read the output signal on the level transmitter, which has an accuracy of 0.5%. This will require lifting leads to place a resistor across the terminals to enable a voltage reading or placing an ammeter in the circuit, in a similar method to the current transmitter calibration activity. There are four pumps that use one level transmitter and two other pumps that use another level transmitter. These tests would not be conducted concurrently; therefore the leads would be lifted from each transmitter numerous times in a two-year period (potentially as many as four times for one transmitter). This increases the chances of personnel error in re-terminating the wiring or potentially damaging the wiring or equipment to which it connects. Also, the instrument accuracy and uncertainty calculation states that the output readout device (voltmeter/ammeter) and the resistor have additional accuracy ratings, which must be considered when calculating the total accuracy of the instrumentation used to determine level by the direct readout method. Therefore, even by direct readout method off the transmitter, the total accuracy would be > 0.5%.

Question:

2. How does the accuracy of the inlet pressure measurement affect the accuracy of the differential pressure?

Response:

Pump inlet pressure is calculated by measuring the bay level and then mathematically converting the level to pressure at the pump suction. Differential pressure is then determined by subtracting the calculated suction pressure from the corrected discharge pressure. Therefore, the inlet pressure accuracy is a direct influence on the overall differential. If the inlet pressure accuracy is greater than 0.5%, then the DP accuracy is calculated as being at least that much above 0.5%, unless the discharge pressure accuracy is even greater.

The following is a typical differential pressure calculation for the subject pumps:

Calculated Differential Pressure (psid)	=	(Discharge Pressure + 24.8)	-	(0.445 x Water Level [ft.])
73.629 (psid)	=	(**65.828** + 24.8) -		(0.445 x **38.2**)

Relief Request VG-1

Question:

1. Please explain why you feel the proposed alternative testing is not in accordance with Code requirements.

Response:

ISTC 4.2.6 states that these valves "shall be tested by observing the operation of the actuator upon loss of valve actuating power..." North Atlantic interprets this statement to mean that the power must be interrupted at its source. As such, the loss of the power would be demonstrated by de-energizing the circuit at the breaker instead of the valve control switch. This would place an unnecessary burden on the surveillance-testing program. This would result in an increase the manpower and time to perform the tests, an increase in radiation exposure to personnel for valves located in radiation areas, and increases the possibility for human error in returning the component to service. Verification of the fail-safe response of these valves can be accomplished by the use of the valve control switch.

Relief Request VG-2

Question:

1. What type of diagnostic equipment and techniques will be used to measure stroke time?

Response:

North Atlantic currently tests or has tested certain solenoid-operated valves by the use of strip chart recorders measuring the current applied to the coil. This method has proven to be a more accurate indicator of actual valve stroke time and performance than measurement of stroke time with a stopwatch.

The valve vendor has recommended the above described time trace method as the way of monitoring the valve's performance. The valve vendor has indicated that stroke time measurements using the reed switches are not indicative of actual disc movement. It is only a go/no-go test that provides little information as it measures reed switch actuation not actual disc

position. The time trace method, if performed with the same test equipment demonstrates actual valve stem movement.

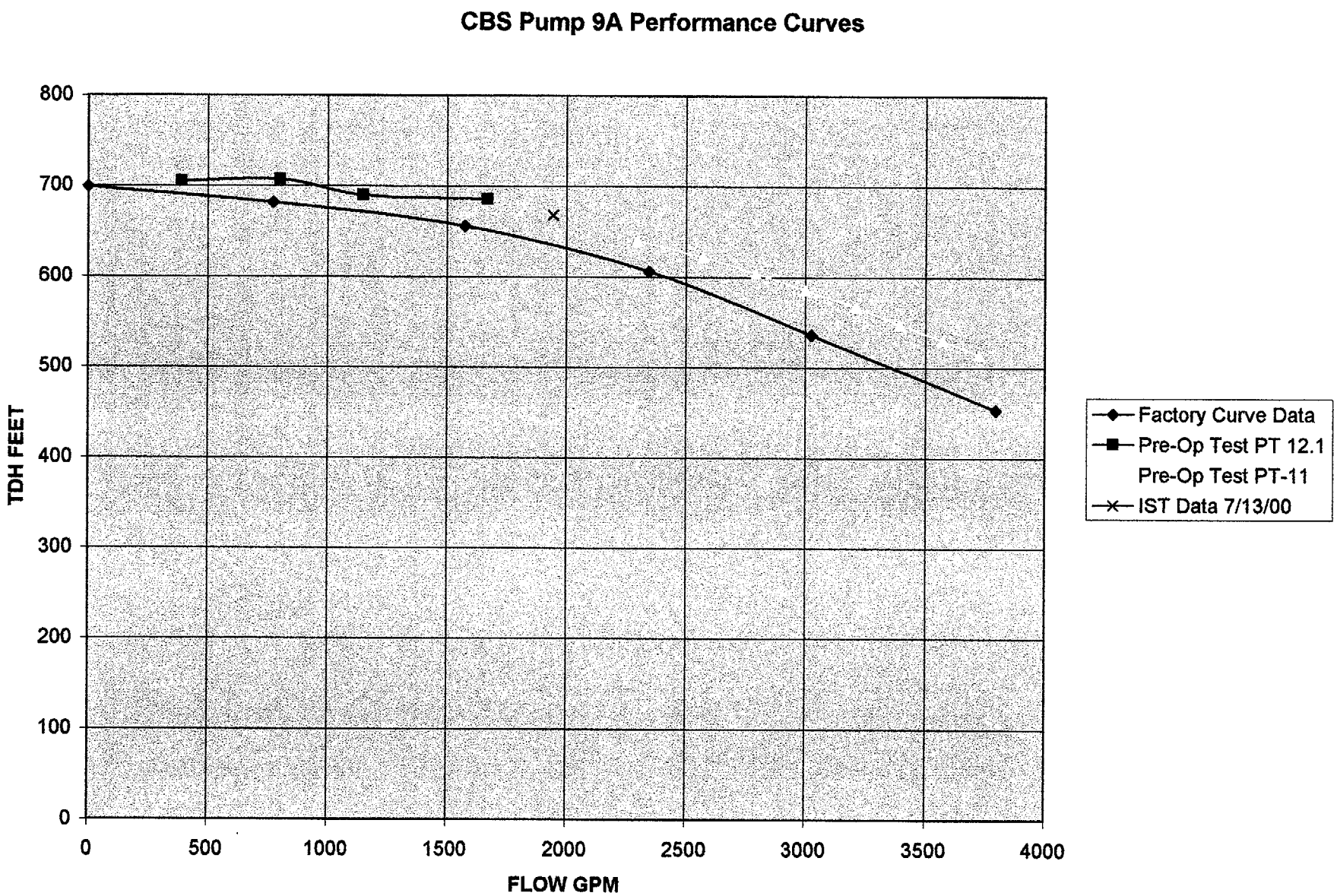
The stopwatch method does not actually demonstrate valve position, so augmented position indication tests need to be performed. Stroke time testing utilizing a stopwatch is not meaningful. Its performance often requires multiple control room people to monitor switch positions or annunciator lights.

2. Is quarterly exercising of the valves (without measuring stroke time), in addition to the proposed alternative testing, an option you have considered?

Response:

Many of the subject solenoid valves are periodically exercised during plant operation to align sample system flow, to allow the performance of gaseous radiation monitoring, or to makeup nitrogen to the Pressurizer Relief Tank or permit the removal of waste liquid drain flow. The subject valves, with the exception of RC-FV2881, RC-FV2894 and RC-FV2896, are exercised on a quarterly basis during the performance of ESFAS Slave Relay Testing required by the station Technical Specifications. These valves are containment isolation valves (with the exception RC-FV2881) whose leak tightness is periodically demonstrated as required by 10 CFR 50 Appendix J and the Technical Specifications. Failure of the valves to operate for testing functions or for operational alignment issues would result in corrective action via the corrective action program. North Atlantic does not have any evidence that indicates that periodic exercising of these valves improves their performance. These valves are sealed without means of lubrication. Additionally, these solenoid valves are not like motor-operated valves, which may derive some benefit from exercising testing. However, shifts in the nature of the time trace curve would indicate potentially degrading conditions. Corrective actions would then be initiated to investigate the cause for the change in the shape of the time trace curve.

Enclosure 2 to NYN-00070


CBS Pump 9A Performance Curves
TDH FEET
800
700
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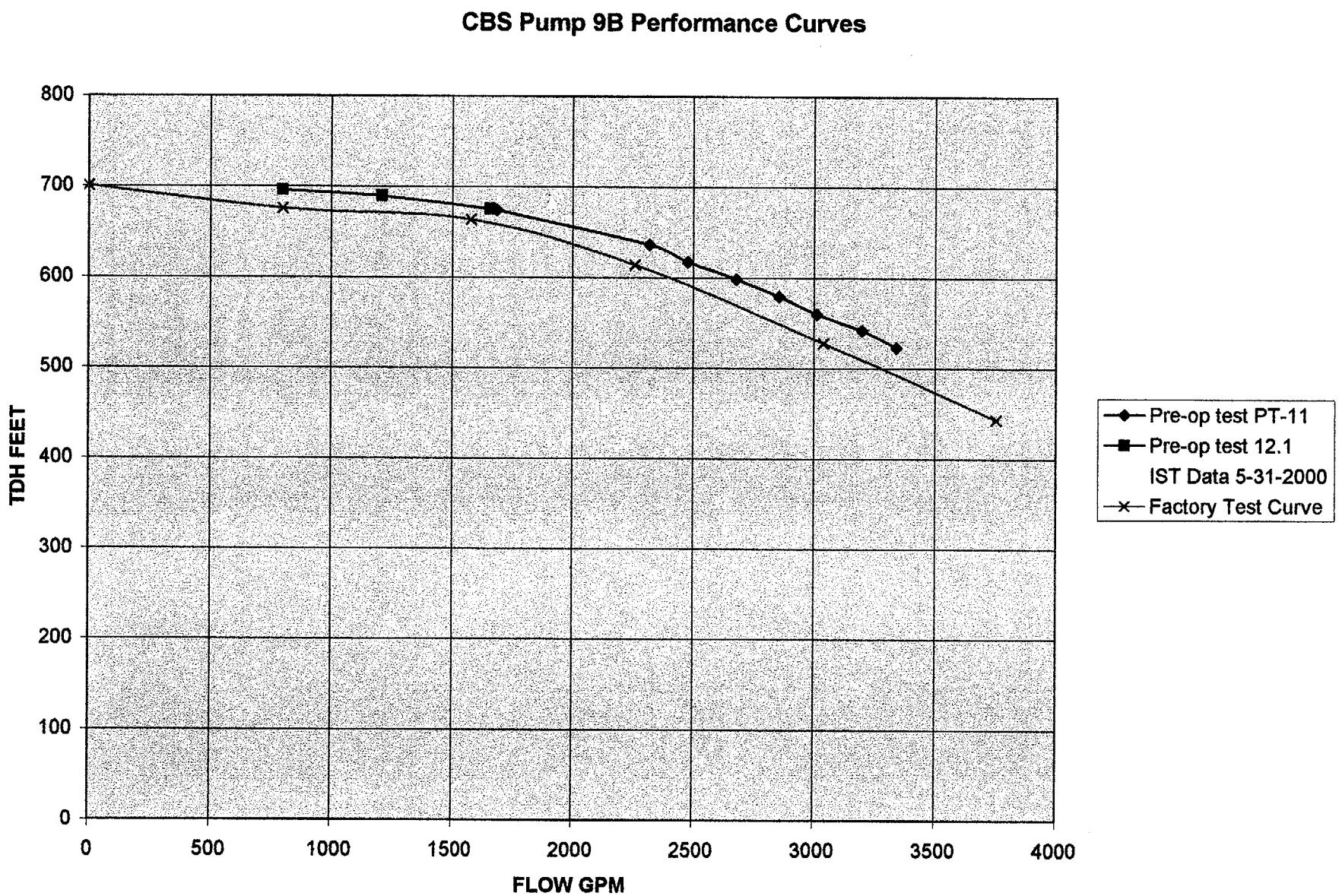
3500
4000
FLOW GPM
Factory Curve Data
Pre-Op Test PT 12.1
Pre-Op Test PT-11
IST Data 7/13/00


CBS Pump 9B Performance Curves
TDH FEET
800
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FLOW GPM
Pre-op test PT-11
Pre-op test 12.1
IST Data 5-31-2000
Factory Test Curve