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August 18, 1988

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Byron Station Units 1 and 2
Proposed Alternate Schedule For Compliance
With NRC Bulletin 88-09 "Thimble Tube
Thinning In Westinghouse Reactors"
NRC Docket No. 50-454/455

Reference: NRC Bulletin No. 88-09: Dated July 26, 1988.

Dear Sir:

The above referenced letter was issued to request that addressees establish and implement an inspection program to periodically confirm neutron monitoring system thimble tube integrity.

The bulletin stated that addresses that could not meet the schedule described in Item 2 of Actions Requested submit to the NRC an alternate schedule with justification for the requested deviation.

Byron station Unit 1 which is currently scheduled to enter its second refueling outage on September 2, 1988, is proposing an alternative schedule for establishing and implementing an inspection program as described in the bulletin. Justification for the requested deviation is as follows:

In order to satisfy the schedule of actions requested in the Bulletin, significant perturbations to the Unit 1 refueling outage schedule would be required. Based on the following technical justification, Byron Station proposes to satisfy the actions of the Bulletin during the third refueling outage of Unit 1 when all activities can be efficiently planned. (This refueling outage is currently scheduled for January 1990) Byron Unit 2 will comply with the Bulletin's requested schedule.

The inspection for thinning of Byron Unit 1 incore flux thimble tubes can be delayed until the third refueling outage with reasonable assurance that significant tube thinning, which could result in pressure boundary leakage, will not occur. Technical justification for this assurance rests in the fact that the Byron Unit 1 reactor vessel lower internals package includes Bottom-Mounted-Instrument (BMI) anti-vibration sleeves.

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The BMI sleeves were originally installed to minimize flow induced vibration of the thimble tubes, because the vibration interfered with the proper function of the Loose Parts Monitoring System (LPMS). The sleeves are thin-walled tubes that extend from the top of the lower core plate downward through the length of the instrumentation guide columns and selected core support columns. The sleeves are fabricated with an axial curvature so that they "spring lock" into position. A sleeve effectively decreases the diameter of the hole through which a thimble tube must pass. Decreasing the gap between the thimble tube and its structural support minimizes the potential for vibration.

Westinghouse has determined the cause of thimble tube wear to be flow induced vibration of the thimble tube inside of the reactor vessel lower internals instrumentation guide columns. Extensive analysis has determined that the threshold or onset of vibration is strongly dependent on the clearance between the thimble tube and the inside diameter of the guide columns and on the axial flow rate in that annular area. One Westinghouse study concluded that with the standard Westinghouse thimble tube, the column inside diameter should be less than 0.545-inch to minimize flow induced vibration. A smaller inside diameter would be even more effective in reducing vibration. Reducing the inside diameter of the columns in the lower internals decreases the potential for thimble tube vibration by reducing the flow rate through the column. This minimizes the fluid forces which cause the thimble tube to vibrate. Benefits may also be achieved by increasing the outside diameter of the thimble tube.

Westinghouse Drawing 1096E25, "Core Support Column", lists the inside diameter of the core support column at Byron Unit 1 as 0.600-inch. Westinghouse Drawing 1416E54, "Sleeve, Instrument Guide Tubes", indicates the nominal inside diameter of the BMI sleeves as 0.464-inch. Both Byron Units have standard Westinghouse thimble tubes. Thus the Byron Unit 1 clearance is less than that specified in the aforementioned Westinghouse study.

In the unlikely event of a thimble tube failure, licensed operators would take action to minimize the consequences of the event. If a thimble tube leak were to occur, the first symptom would be a leak detector alarm at the Movable Incore Detector System (MIDS) control panel, indicating water accumulation in a common drain line for the ten path rotary transfer devices. The next warning of a leak would be provided by the Seal Table Room Area Radiation Monitor alarm. Depending upon leak size (maximum leak rate expected due to a double ended guillotine shear of one thimble tube is 35 gallons per minute), other symptoms would include charging-letdown flow mismatch, lowering pressurizer level and increased containment sump pump cycle frequency. The plant's Technical Specification action requirements for reactor coolant system leakage would be implemented. A containment building entry would be made to determine if the leak could be stopped by shutting the manual isolation valve for the affected tube at the seal table. If the isolation valve were inaccessible due to adverse seal table room conditions, than a controlled plant shutdown, cooldown and depressurization would be accomplished in accordance with the abnormal operating procedure for excessive reactor coolant leakage, and then the appropriate isolation valve would be closed to stop the leak. At all times reactor coolant inventory would be maintained by increasing the normal charging flow rate to compensate for the coolant loss through the thimble tube break.

This alternative schedule was discussed with Mr. Jack Ramsey (NRR Technical contact) on August 11, 1988.

Please address any further questions that you may have to this office.

Very truly yours

Wayne E Morgan

W. E. Morgan
Nuclear Licensing Administrator

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cc: A.B. Davis
Resident Inspector/Byron
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