Consumers Power Company

COPY

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • Area Code 517 788-0550

April 1, 1974

Mr. John F. O'Leary, Director
Directorate of Licensing
US Atomic Energy Commission
Washington, DC 20545

Re: Docket 50-155
DPR-6
Big Rock Point

Dear Mr. O'Leary:

This letter is written to inform you of a minor modification that will be performed on one control rod blade at the Big Rock Point Plant during the refueling outage that is presently in progress. This modification involves removal of the four lower rollers from one control rod blade and is part of an effort to achieve a long-term solution to operating problems that have been experienced in the past. These problems were involved with the loss of four rollers from a total of three peripheral control rod blades in the Big Rock Point reactor and were previously described in our letters to the Director of Licensing dated April 25, 1972 and May 1, 1973.

In an attempt to determine a long-term solution to the problems reported in the above-referenced letters, an analysis was undertaken of several possible modifications to the rollers on the lower portions of the peripheral control rod blades. This analysis considered removal of rollers as well as repair to the original design, welding the existing rollers to the control rod blade and installation of a device on the control rod blade that would disturb the flow conditions in the vicinity of the lower rollers.

The analysis concluded that removal of the bottom rollers from a peripheral control rod blade was the most feasible course of action. The weight of the control rod blade is 113 pounds and the maximum friction force that can be exerted with the rollers removed is calculated to be approximately 95 pounds; thus, a total maximum downward force of 208 pounds exists to retard insertion of the control rod blade into the core. The total upward hydraulic force that is exerted when inserting the control rod blade is approximately 1800 pounds; thus, a minimum upward force of approximately 1600 pounds exists to move the control rod blade.

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Restoration of the rollers to their original design was rejected because it was likely that if this course of action were taken the problem would recur. The possibility of affixing a device to the control rod blade that would disturb the flow conditions in the vicinity of the rollers (to eliminate roller vibration and subsequent failure) was rejected on the basis of the complexity of the analysis and critical positioning of the device. Rigidly welding the existing rollers to the control rod blade was rejected because the frictional forces would be only slightly reduced (approximately 13 pounds less) when compared to the analysis with the rollers removed. Also, welding of the rollers would be costly in terms of plant personnel radiation exposure.

The analysis was reviewed by the NSS vendor (General Electric Company). GE agreed with our recommendation to remove the lower rollers on a peripheral control rod blade. The purpose of the rollers is to reduce friction and prevent galling under heavy side loads. Heavy side loads are not expected to occur in the region below the core. GE recommended that any testing performed following removal of the lower rollers include a control rod drive settling friction test. This test provides a sensitive measurement of the drive line friction and will verify the results of the analysis.

GE assessed the mechanism a failure to be most likely caused by a lateral vibration of the impaired roller (Stellite 3) wearing down the soft pin (Haines 25). The 0.125 inch diameter pin is a wrought alloy with hardness ranging from Rockwell C-39 - C-46. They attributed the cause to be flow induced. Local flow turbulences are created in the lower regions of the core (in the vicinity of the lower bottom rollers when the peripheral control rod blades are fully withdrawn) as flow sweeps across the core support plate. The upper ends of the peripheral control rod blades and both ends of the inner 16 control rod blades are in an area that experiences far less flow turbulence. GE also considered that simple spinning of the roller on the pin due to the flow conditions was a possibility. However, this was not considered as likely as a lateral vibration mechanism.

The Big Rock Point's Safety Audit Review Board (SARB) has reviewed the analysis performed including all alternatives and GE recommendations. SARB recommended that the bottom rollers be removed from one peripheral control rod blade during the present refueling outage and that this blade be operated for one cycle with the rollers removed. SARB further recommended that prior to resuming operation with the lower rollers removed that testing (settling friction, scram time and notching) be performed to confirm that there is no significant effect with regard to control rod drive operation. These recommendations are being implemented by the plant staff during the present refueling outage.

Based on the outcome of the testing and operation of the control rod blade with the lower rollers removed for one-cycle, SARB will make further recommendations with regard to permanent corrective action for the remaining 15 peripheral control rod blades. If it is deemed desirable to

remove the lower rollers from the remaining 15 peripheral control rod blades, a Technicial Specification change will be proposed to appropriately modify a descriptive portion of the Technical Specifications.

Based on a review of the data as summarized above, SARB concluded that removal of the lower rollers from one peripheral control rod blade did not require a change to the descriptive portion of the Technical Specifications concerning control rod guidance and did not involve an unreviewed safety question or increase the probability or the consequences of a previous analyzed accident.

Yours very truly,

(Ralph B. Sewell)

RBS/pb

Ralph B. Sewell
Nuclear License Adminisrator

CC: JGKeppler, USAEC

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Consumers Power Company Jackson, Mich. 49201 Mr. R.B. Sewell	6-28-74	7-1-74	X			

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J.F. O'Leary	3 signed			XXX	XXX

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DESCRIPTION:
Ltr trans the following.....

ENCLOSURES:
Proposed change to tech specs for the Big Rock Point Plant.....

ACKNOWLEDGED

DO NOT REMOVE

PLANT NAME: Big Rock Point

FOR ACTION/INFORMATION 7-1-74 JB

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