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Consumers Power Company

General Offices: 212 West Michigan Avenue, Jackson, Michigan 49201 • (517) 788-0550

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Mr James G Keppler
Office of Inspection and Enforcement
Region III
US Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

DOCKET 50-155 - LICENSE DPR-6 -
BIG ROCK POINT PLANT - RESPONSE
TO IE BULLETIN 79-12: "SHORT
PERIOD SCRAMS AT BWR FACILITIES"

The subject bulletin dated May 31, 1979 required Consumers Power Company to provide information relative to actions intended to prevent scrams resulting from short periods during reactor start-up. This letter provides the requested information.

Big Rock Point is significantly different than newer BWRs, such as those cited in the subject bulletin. Big Rock Point has a small, closely coupled core with far fewer control rods than larger plants (32 compared to 177). These differences are significant in relation to the susceptibility of Big Rock Point to short period scrams and the practicality of some of the actions taken to prevent short period events. In particular, the small number of control rods and the smaller number of notches per rod make Big Rock Point's reactor start-ups significantly different from those of larger plants.

Big Rock Point instrumentation does provide for a scram in the event of a short reactor period. Big Rock Point utilizes out-of-core neutron instrumentation. There are seven channels, two start-up, two intermediate and three power operation (picoammeter) channels. Only the intermediate channels provide for a scram on a short reactor period (10 seconds or less); this feature is automatically bypassed when two of the three power operation channels reach 4%. The start-up channels provide an alarm for periods less than 20 seconds.

Responses to the specific questions asked by the subject bulletin are detailed below:

Question 1: Review and revise, as necessary, your operating procedures to ensure that an estimate of the critical rod pattern be made prior to each approach to critical. The method of estimating critical

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rod patterns should take into account all important reactivity variables (eg, core xenon, moderator temperature, etc).

Response: Operating procedures already require that an estimate of critical rod pattern be made prior to each reactor critical approach. The operator is cautioned to use this estimate as a guide only and to expect criticality with each notch withdrawn

Question 2: Where inaccuracies in critical rod pattern estimates are anticipated due to unusual conditions, such as high xenon, procedures should require that notch-step withdrawal be used well before the estimated critical position is reached and all SRM channel indicators are monitored so as to permit selection of the most significant data.

Response: Big Rock Point procedures require that "notch-step withdrawal" be used for all rod movements during reactor start-up. All nuclear instrument channels are required to be operable during start-up and the operators are required to monitor all neutron instrumentation.

Question 3: Review and evaluate your control rod withdrawal sequences to assure that they minimize the notch worth of individual control rods, especially those withdrawn immediately at the point of criticality. Your review should ensure that the following related criteria are also satisfied:

a. Special rod sequences should be considered for peak xenon conditions.

b. Provide cautions to the operators on situations which can result in high notch worth (eg, first rod in a new group will usually exhibit high rod worth).

Response: The control rod withdrawal sequence specified for Big Rock Point has been selected to minimize notch worths. The calculations verifying notch worths are detailed in the regions where high notch worths are encountered. All notch worths are significantly less than Technical Specifications limits.

With respect to the specific items addressed in this question:

a. Analyses have been performed assuming no xenon present and again assuming peak xenon conditions. These analyses showed that notch worths do not change greatly between these conditions. A special rod withdrawal sequence for peak xenon conditions is thus considered unnecessary.

b. The integrated notch worth curve for the approved control rod withdrawal sequence is available for operator use. As previously noted, the operators are cautioned to anticipate

criticality with each notch withdrawn and all rod withdrawals are performed in a notch-by-notch mode. This is considered sufficient precaution and obviates the need for special operator attention during unique situations.

Question 4: Review and evaluate the operability of your "emergency rod in" switch to perform its function under prolonged severe use.

Response: Big Rock Point does not have an "emergency rod in" switch. A jog bypass switch exists which could be used to accomplish continuous rod insertion if it is held in the "run" position simultaneously with the reactivity switch being held in the "insert" position. The jog bypass switch is utilized for control rod testing performed prior to any critical approach. Thus, the operability of this feature is verified prior to each start-up.

Question 5: Provide a description of how your reactor operator training program covers the considerations above (ie, items 1 thru 3).

Response: Reactor physics is addressed in detail in operator requalification and licensing training. All information in the Big Rock Point Technical Data Book, including approved rod withdrawal sequences, is covered in this training program. At least evey two years, specific aspects such as reactivity verses reactor period, control rod worths, notch worths and Technical Specifications requirements are covered.

Technical Data Book information, such as the approved rod withdrawal sequence, integrated notch worth curve and reactivity verses period tables for beginning and end of cycle, are used to enable operators to identify potential short period situations.

The administrative controls applied to reactor start-up are also reviewed. These require the operator to expect criticality with each notch withdrawn and to perform all rod withdrawals in a notch-by-notch mode; they also require that the operator prevent stable reactor periods of less than 30 seconds from occurring.

This training is considered very thorough. Operators completing this training have proven to be knowledgeable of reactor physics and responsive to reactor conditions.

David A. Bixel

David A Bixel
Nuclear Licensing Administrator

CC Director, Office Nuclear Reactor Regulation
Director, Office of Inspection and Enforcement