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**Proposed Generic Communication**  
**Control Rod Insertion Problems**

Duquesne Light Company (DLC), operating company for Beaver Valley Unit 1, license No. DPR-66 and Beaver Valley Unit 2 license No. NPF-73 is providing comments to the proposed NRC Bulletin 96-01 Supplement 1 "Control Rod Insertion Problems," as published in the Federal Register on May 20, 1997 (Volume 62, Number 97).

In summary, there is insufficient justification to warrant the requested actions. The bulletin supplement does not show that the incomplete rod insertion phenomenon, as it is currently understood, challenges a plant's ability to meet established shutdown margin requirements. Without a demonstrated change in the originally licensed design basis, the imposition of additional verification testing is not warranted without a backfit analysis.

DLC recommends that the NRC work with the industry, through industry groups like the Westinghouse Owners Group and NEI, in any necessary further work on this issue. Given this cooperative effort on an issue we believe is well in hand, issuance of this supplement would not be necessary.

Sincerely,

ED&R-11A

*Sushil C. Jain*

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c: Mr. D. M. Kern, Sr. Resident Inspector  
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DUQUESNE LIGHT COMPANY  
Nuclear Power Division  
Beaver Valley Power Station, Units 1 and 2

Safety and Backfit Assessment  
Westinghouse Rod Cluster Control Assembly Operability

Introduction

From the issuance of Bulletin 96-01, Duquesne Light Company performed extensive testing and analysis to verify control rod insertability at the Beaver Valley Power Station (BVPS) units. In response to the proposed Bulletin 96-01 Supplement, we have also performed a safety assessment of BVPS Units 1 and 2 shutdown margin which conservatively envelopes several instances of full insertion difficulty at several other pressurized water reactors. The following discussion addresses whether there is a demonstrated need for additional testing on the basis of originally licensed BVPS shutdown margin, and outlines the backfit considerations necessary to weigh the increased risk and cost of frequent plant shutdowns to perform the proposed testing.

Safety Assessment

*Reported Events*

The major safety concern with an incomplete rod insertion is loss of shutdown margin. The amount of uninserted worth involved in Bulletin 96-01 trip scenarios is small relative to the licensing basis assumption of the highest worth rod assumed to remain fully withdrawn.

In 1996 Duquesne Light Co. performed rod drop and drag testing at Beaver Valley Unit 1 and Unit 2 in accordance with the original NRC Bulletin 96-01. The results of this testing demonstrated complete control rod insertion and verified the availability of the required shutdown margin. Core designs at Beaver Valley typically have a reactivity value for shutdown margin in excess of the design basis requirement of 1770 pcm. This excess of required margin can easily exceed 1000 pcm. Conservative calculations performed by Duquesne Light Co. show that incomplete rod insertion of 30 steps in all 48 control rods could easily be accommodated by this excess margin.

Data from the proposed supplement indicates that only a small number of control rods have experienced incomplete insertions, and these incomplete insertions were limited to just a few steps above full insertion. With conservatism regarding both the number of rods and the extent they do not insert, shutdown margin can still be maintained in excess

of design basis requirements. Further rod drop testing to address shutdown margin concerns is not warranted.

### *Recommended Actions*

The proposed bulletin supplement requests verification of full insertability for rodded assemblies beginning at a burn-up of 35,000 mwd/mtu. This limit applies to 12 foot cores without Intermediate Flow Mixing (IFM) vanes. The text of the supplement describes events of incomplete rod insertion for 12 ft cores only at much higher burnup values. Incomplete rod insertion at the 35,000 mwd/mtu has only occurred in the South Texas units with a 14 ft core design. There is no basis to conclude that incomplete rod insertion can be expected to occur beginning at the 35,000 mwd/mtu in 12 ft cores without IFM.

Furthermore, the proposed bulletin requests that control rods be verified fully insertable every 2500 mwd/mtu following initial verification. The data presented in the bulletin appears to show that the incomplete rod insertion is limited to just a few steps, *and does not deteriorate appreciably with additional burnup*. The need for repeated testing, and the test interval selected, should be based on demonstrated deterioration of the incomplete rod insertion phenomenon with increased burn-up. In addition, fixing the test interval at 2500 mwd/mtu does not provide latitude for modification of the interval based on accumulated experience.

Further safety assessment of NRC recommendations in the supplement also needs to be performed in light of the potential increase in reactor trip probability/core melt frequency associated with the increased number of controlled plant shutdowns and startups needed for rod drop testing. The potential for higher core damage may effectively reduce benefits the Commission anticipates from more rod drop data.

### Backfit Rule Considerations

The backfits described in the proposed bulletin supplement are not justified under the compliance exception of the backfit rule. BVPS control rod performance and shutdown margin have remained within design basis throughout the operating life of both units.

To complete Section 50.109 requirements, direct and indirect costs should also be considered: (1) direct labor for plant operator, technician and engineering personnel to perform and evaluate test results, including increased radiation exposure at plants requiring containment entry, (2) replacement power costs associated with critical path outage activities for drag testing or time at hot standby for drop testing, and (4) boron/dilution costs. For BVPS, drop testing would cost approximately \$450,000 for replacement power alone.

## Conclusions

The bulletin supplement appears to only repeat 1996 testing performed by Duquesne Light Company and the industry in the original NRC Bulletin 96-01. This testing established a database on which to characterize the incomplete rod insertion phenomenon, and to establish no violation of design basis shutdown margin. More data collection appears to offer little additional assurance of safe shutdown capability, and instead may increase safety risk. The NRC should perform a backfit assessment which weighs potentially increased safety risk and substantial operating costs against less certain benefits.