



UNITED STATES  
 NUCLEAR REGULATORY COMMISSION  
 WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATING TO EVALUATION OF RESPONSE TO NRC BULLETIN NO. 90-02

COMMONWEALTH EDISON COMPANY

LASALLE COUNTY STATION, UNIT 2

DOCKET NO. 50-374

1.0 BACKGROUND

Reference 1, which presents Commonwealth Edison Company's (CECo, the licensee) evaluation of LaSalle County Station, Unit 2, Cycle 5, in accordance with Bulletin No. 90-02, indicated that although CECo no longer places irradiated fuel channel boxes on new/fresh fuel assemblies, previous channel box management practices included the re-use of channel boxes. As a result, some channel boxes from the LaSalle County Station initial cycle discharge batch were placed on the fresh fuel assemblies that were loaded in LaSalle Unit 2, Cycle 2 and LaSalle Unit 2, Cycle 3 (as discussed in Reference 2). These channel boxes had received a single cycle of irradiation, yielding channel box exposures from 4 to 14 GWD/MTU, prior to their placement on the LaSalle Unit 2, Cycle 2 and Cycle 3 reloads. It is those remaining single cycle exposed channel boxes from LaSalle Unit 2, Cycle 1, that were not used in LaSalle Unit 2, Cycle 2 and Cycle 3, that are proposed for use in the upcoming LaSalle Unit 2, Cycle 5.

The licensee points out that because LaSalle County Station is a C-Lattice plant, with uniform water gaps around the assemblies, there is less channel box bow as a function of exposure and a smaller impact on local peaking (and hence critical power margins) relative to comparable D-Lattice plants. NRC in-house data, collected from various sources supports this conclusion.

This safety evaluation covers the staff review of the Commonwealth Edison Company strategy for re-use of channel boxes in the upcoming Cycle 5 reload for LaSalle County Station, Unit 2.

2.0 EVALUATION

2.1 Projected LaSalle Unit 2, Cycle 5, Channel Box Configuration

In their September 6 submittal, the licensee provided a core map and tabulated data indicating the location of the re-used channels and the Cycle 5 projected fuel exposures. The 131 assemblies scheduled for re-use in Cycle 5 will be loaded primarily on the core periphery, thus minimizing the number of channel boxes placed in limiting, high-power locations while maintaining core symmetry. Eighteen fuel assemblies from Cycle 4 will be rechanneled with new channel boxes for the upcoming Cycle 5.

## 2.2 Channel Box Bow Analysis Methodology

CECo uses General Electric's (GE) generic channel box bow methodology to determine the R-Factor adjustments for LaSalle Unit 1, Cycle 5. This was evaluated and submitted by CECO to the NRC in Reference 3 and approved by the NRC in Reference 4. This methodology has been shown to adequately predict the mean of the channel box bow throughout this exposure range for both C-Lattice and D-Lattice plants. The maximum projected channel box exposure for LaSalle Unit 2, Cycle 5, is approximately 48 GWD/MTU, significantly below the maximum channel box exposure of 54 GWD/MTU which was used in GE's generic channel box bow analysis.

Since the projected end of Cycle 5 exposure is less than 54 GWD/MTU, the NRC-approved GE core average channel box bow methodology is appropriate.

In the course of performing cycle-specific analyses for LaSalle Unit 2, Cycle 5, the licensee decided to replace all re-used channel boxes that may end up in potentially limiting locations in the core. Data identifying those assemblies that will be re-used along with their location in the core, was provided to the NRC via Reference 1.

## 3.0 MCPR SAFETY LIMIT EVALUATION

As part of CECO's request of GE to perform a cycle-specific analysis for LaSalle Unit 1 Cycle 5 core loading, CECO requested GE to evaluate the impact of the channel box bow on the Minimum Critical Power Ratio (MCPR) Safety Limit due to increased measurement uncertainties. GE's evaluation concluded that the variations in the channel bow data were within the tolerances used in their generic methodology (Reference 5). Since the LaSalle Unit 1, Cycle 5 loading bounds the LaSalle Unit 2, Cycle 5 loading in terms of number and exposure of re-used channel boxes, CECO concluded that no adjustments to the MCPR Safety Limit are needed to ensure fuel cladding integrity. GE has concurred with CECO's conclusion as stated in Reference 1, Attachment B.

The conclusion reached by CECO is that the previously exposed single-cycle re-used channel boxes do not present a problem to the Linear Heat Generation Rate Limit, the MCPR Operating Limit, or the MCPR Safety Limit since these channels will be loaded into non-limiting locations of the LaSalle Unit 2, Cycle 5 core. The licensee pointed out that during cycle operations, all assemblies in the core will be using an R-factor adjustment strategy consistent with the GE generic channel box bow methodology, thus ensuring that the MCPR Safety Limit is protected throughout LaSalle Unit 2, Cycle 5, even in the event of a limiting abnormal operating occurrence.

Finally, as indicated in Reference 1, CECO has discontinued the previous practice of channeling fresh fuel with previously irradiated channels and is committed to assuring that any residual re-used channels will have no impact on safety. CECO anticipates that all residual re-used channel boxes will be completely discharged by the end of Cycle 7 on Unit 1 and the end of Cycle 6 on Unit 2.

#### 4.0 CONCLUSION

Based on the above evaluation, the NRC staff has concluded that the licensee's submittal on Cycle 5 reload design with re-used channel boxes, and the methods used to account for the channel box bow impact on the core operating limits is acceptable, because the data and the methodology used provide reasonable assurance that the thermal margin to the critical power ratio safety limit is maintained.

If in future cycles channel box re-use is considered, further review and prior approval by the NRC staff will be required.

#### 5.0 REFERENCES

1. Letter from Peter L. Piet (CECo) to USNRC, "LaSalle County Nuclear Power Station Unit 2 Fuel Channel Evaluation for LaSalle 2 Cycle 5," September 6, 1991.
2. Letter from M. H. Richter (CECo) to USNRC, "Dresden Station Units 1&2, Quad Cities Units 1&2, LaSalle Units 1&2--Response to NRC Bulletin 90-02," April 26, 1990.
3. Letter from M. H. Richter (CECo) to USNRC, "LaSalle County Nuclear Power Station Unit 1 -- Fuel Channel Evaluation for LaSalle 1, Cycle 5," January 7, 1991.
4. Letter from J. B. Hickman (USNRC) to T. J. Kovach (CECo), "Safety Evaluation for LaSalle Unit 1--Fuel Channel Evaluation for Cycle 5," February 28, 1991.
5. Letter from P. W. Marriott (GE) to T. E. Murley (USNRC), "Fuel Channel Bow," August 22, 1989.

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