

UNITED STATES NUCLEAR REGULATORY COMMISSION

WASHINGTON, D.C. 20555-0001

May 9, 1997

LICENSEE:

Commonwealth Edison Company (ComEd)

FACILITIES:

Dresden Nuclear Power Station, Units 2 and 3 LaSalle County Station, Units 1 and 2 Quad Cities Nuclear Power Station, Units 1 and 2

SUBJECT:

9705150362 970509

PDR

ADOCK 05000237

PDR

SUMMARY OF MEETING CONCERNING THE USE OF SIEMENS ATRIUM 9B FUEL

On April 3, 1997, the staff met with Commonwealth Edison Company (ComEd) and Siemens Power Corporation (SPC) to discuss the Advanced Nuclear Fuel for Boiling Water Reactors (ANFB) correlation for ATRIUM 9B fuel application and mixed core analysis. LaSalle, Units 1 and 2; Dresden, Units 2 and 3; and Quad Cities, Units 1 and 2, will be using ATRIUM 9B fuel; however, Quad Cities, Unit 2, will be the lead ComEd plant. The discussion focused on actions ComEd will take to address this concern for Quad Cities, Unit 2. A list of attendees is provided as Enclosure 1.

ComEd and SPC discussed with the staff the ANFB critical power correlation data base for 9x9 fuels with an internal water channel. The ANFB critical power correlation data base does not cover a wide enough range of conditions to accurately establish the Additive Constant uncertainty used in the Minimum Critical Power Ratio (MCPR) Safety Limit analysis. The proposed resolution for Quad Cities, Unit 2, to load fuel and to proceed to power operation was discussed. The licensee will provide the staff a technical specification (TS) request which will address the MCPR safety limit once additional information is provided by SPC. A copy of the licensee's presentation is included as Enclosure 2.

Quad Cities will be able to load the ATRIUM 9B fuel assemblies after staff approval of the TS request dated June 10, 1996, concerning the transition from General Electric to SPC fuel and the approval of the coresident Topical Report, EMF-96-051(P). Startup and power operation of Unit 2, with ATRIUM 9B fuel would not begin until approval from the staff of any MCPR safety limit changes developed from the further analysis to be provided to the staff and ComEd by SPC regarding the Additive Constant uncertainty used in the MCPR safety analysis, as mentioned above.

Subsequent to the meeting of April 3, 1997, the licensee on April 21, 1997, submitted an exigent TS change request to increase the MCPR safety limit for Unit 2. Also on April 29, 1997, the licensee submitted an emergency TS request to allow fuel load on Unit 2 not to exceed Operational Mode 3. Amendment No. 173 was issued by the staff allowing the use of Siemens ATRIUM-9B fuel in Operational Modes 3, 4, and 5 which includes fuel loading. DEOI 10 Commonwealth Edison Company

Approval of Topical Report EMF-96-051(P), issuance of the June 6, 1996, TS request, along with the exigent TS request, are all required for plant startup.

2 -

Original signed by: Robert M. Pulsifer, Project Manager Project Directorate III-2 Division of Reactor Projects - III/IV Office of Nuclear Reactor Regulation

Docket Nos. 50-237, 50-249, 50-373, 50-374, 50-254, 50-265

Enclosures: 1. List of Attendees Licensee's Presentation 2.

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LIST OF ATTENDEES

MEETING WITH COMMONWEALTH EDISON COMPANY (COMED) AND SIEMENS POWER CORPORATION (SPC)

April 3, 1997

	NAME	<u>COMPANY</u>	TELE	PHONE NO.	
1.	Tony Attard	NRC	(301)	415-2876	
2.	Tai Huang	NRC	(301)	415-2867	
3.	Robert Pulsifer	NRC	(301)	415-3016	
4.	Larry Phillips	NRC/SRXB	(301)	415-3232	
5.	Al Chernick	ComÉd	(309)	654-2241	X3100
6.	Ed McVey	ComÉd	(630)	663-3079	
7.	M. McDonough	ComEd	(309)	654-2241	X3370
8.	Mark Wagner	ComEd	(630)	663-6645	
9.	Richard Collingham	SPC	(509)	375-8392	
10.	Michael Garretť	SPC	(509)	375-8294	
11.	Jim Lvons	NRC/SRXB	(301)	415-2895	
12.	Bob Copeland	SPC	(509)	375-8290	-
13.	Don Curet	SPC	(509)	375-8563	
14.	Ron Frahm	NRC	(301)	415-2866	
15.	Egan Wang	NRC	(301)	415-1076	

ENCLOSURE 1

ComEd/NRC Meeting For Quad Cities

April 3, 1997

ENCLOSURE 2

Purpose of Meeting

- Identify actions and schedule needed to support plant startup
- Present plan for resolution of ANFB uncertainty concern for ATRIUM[™]–9B

Agenda

- Purpose--M Wagner (ComEd)
- ComEd Plant Status--E McVey (ComEd)
- Current TS Requirements--E McVey (ComEd)
- ANFB Uncertainty Nonconformance--R Collingham (SPC)

Agenda (continued)

- Interim Approach--R Collingham (SPC)
- Co-Resident Fuel Application Report--M Garrett (SPC)
- Actions Required for Startup/Schedule--E McVey (ComEd)

ComEd BWR PLANT STATUS

• LASALLE STATION

- UNIT 1
 - IN AN EXTENDED MAINTENANCE OUTAGE
 - HAS AN ALL GE FUEL CORE
 - WILL BE TRANSITIONING TO SIEMENS POWER CORPORATION (SPC) FUEL BEGINNING WITH THE NEXT REFUEL OUTAGE, SCHEDULED TO BEGIN FALL OF 1998
 - NRC HAS APPROVED A LICENSE AMENDMENT CHANGE IN SUPPORT OF UNIT 1 SPC TRANSITION, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING ITS NEXT REFUEL OUTAGE
- UNIT 2
 - IN AN EXTENDED REFUEL OUTAGE
 - WILL BE LOADING 292 ATRIUM-9B FUEL ASSEMBLIES DURING THIS REFUEL OUTAGE FOR CYCLE 8 OPERATION; THE CORESIDENT FUEL IS GE9 FUEL
 - NO DATE IS CURRENTLY ESTABLISHED FOR CORE LOAD AND STARTUP
 - NRC HAS APPROVED A LICENSE AMENDMENT CHANGE IN SUPPORT OF UNIT 2 SPC TRANSITION, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING THE CURRENT REFUEL OUTAGE
 - NRC HAS APPROVED A SIEMENS TOPICAL REPORT SUBMITTED ON THE LASALLE UNIT 2 DOCKET FOR THE APPLICATION OF THE ANFB CRITICAL POWER CORRELATION TO CORESIDENT GE FUEL FOR UNIT 2 CYCLE 8

ComEd BWR PLANT STATUS

DRESDEN STATION

- UNIT 2
 - CURRENTLY OPERATING IN CYCLE 15 WITH SPC
 9X9-2 FUEL AND 8 ATRIUM-9B LEAD USE
 ASSEMBLIES
 - WILL BE TRANSITIONING TO ATRIUM-9B FUEL BEGINNING WITH THE NEXT REFUEL OUTAGE, SCHEDULED TO BEGIN 3-7-98
 - COMED HAS SUBMITTED A LICENSE AMENDMENT REQUEST TO THE NRC IN SUPPORT OF THE USE OF ATRIUM-9B FUEL, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING THE 1998 REFUEL OUTAGE
- UNIT 3
 - BEGAN REFUEL OUTAGE ON 3-29-97
 - WILL BE LOADING 232 ATRIUM-9B FUEL ASSEMBLIES DURING THIS REFUEL OUTAGE FOR CYCLE 15 OPERATION; THE CORESIDENT FUEL IS SPC 9X9-2 FUEL
 - CORE LOAD IS SCHEDULED TO BEGIN ~5-12-97 WITH STARTUP SCHEDULED TO BEGIN 6-5-97
 - COMED HAS SUBMITTED A LICENSE AMENDMENT REQUEST TO THE NRC IN SUPPORT OF THE USE OF ATRIUM-9B FUEL, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING THE CURRENT REFUEL OUTAGE
 - NRC APPROVAL OF THIS LICENSE AMENDMENT IS REQUIRED IN SUFFICIENT TIME TO SUPPORT DRESDEN UNIT 3 STARTUP

ComEd BWR PLANT STATUS

QUAD CITIES STATION

– UNIT 1

- CURRENTLY OPERATING IN CYCLE 15 WITH AN ALL GE CORE (GE8, GE9, AND GE10 FUEL)
- WILL BE TRANSITIONING TO SIEMENS POWER CORPORATION (SPC) FUEL BEGINNING WITH THE NEXT REFUEL OUTAGE, SCHEDULED TO BEGIN SPRING OF 1998
- COMED HAS SUBMITTED A LICENSE AMENDMENT REQUEST TO THE NRC IN SUPPORT OF THE USE OF ATRIUM-9B FUEL, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING THE 1998 REFUEL OUTAGE

- UŃIT 2

- BEGAN REFUEL OUTAGE ON 3-1-97
- WILL BE LOADING 216 ATRIUM-9B FUEL ASSEMBLIES DURING THIS REFUEL OUTAGE FOR CYCLE 15 OPERATION; THE CORESIDENT FUEL IS GE9 AND GE10 FUEL
- CORE LOAD IS SCHEDULED TO BEGIN 4-23-97
- WITH STARTUP SCHEDULED TO BEGIN 5-13-97
- COMED HAS SUBMITTED A LICENSE AMENDMENT REQUEST TO THE NRC IN SUPPORT OF THE USE OF ATRIUM-9B FUEL, TO BE IMPLEMENTED PRIOR TO STARTUP FOLLOWING THE CURRENT REFUEL OUTAGE
- COMED HAS SUBMITTED A SIEMENS TOPICAL REPORT ON THE QUAD CITIES UNIT 2 DOCKET FOR THE APPLICATION OF THE ANFB CRITICAL POWER CORRELATION TO CORESIDENT GE FUEL FOR Q2C15
- NRC APPROVAL OF THE LICENSE AMENDMENT AND THE TOPICAL REPORT IS REQUIRED IN SUFFICIENT TIME TO SUPPORT UNIT 2 STARTUP

ANFB/ATRIUM-9B Additive Constant Uncertainty Nonconformance

SPC

Siemens Power Corp.

Siemens Power Corporation

3/20/97 name.PPT LB:97:001

Outline - Nonconformance/Resolution

- Nonconformance
- Plants Affected
- Resolution
 - Generic
 - Interim
- Summary

Siemens Power Corporation

3/20/97 me.PPT LB:97:001

Purpose of Resolution

Present actions being taken to address the nonconformance identified during the recent NRC vendor inspection relative to the uncertainty of ANFB Additive Constants used for 9x9 fuels with an internal water channel in the MCPR Safety Limit Analyses

These actions will protect the acceptance criteria of assuring 99.9% of the rods will not experience dryout during normal operation and AOO's

These actions are scheduled to allow all affected plants to be started as scheduled; first scheduled startup is in less than 6 weeks

Siemens Power Corporation

ATRIUM-9B

ATRIUM-9B is the latest SPC 9x9 fuel with an internal water channel

Siemens Power Corporation

Filename.PF

3/20/97 me.PPT LB:97:001

Nonconformance

- The ANFB critical power correlation data base for 9x9 fuels with an internal water channel does not cover a wide enough range of conditions to accurately establish the Additive Constant uncertainty used in the MCPR Safety Limit analysis
- There is no Nonconformance relative to the ANFB correlation or the value of the Additive Constants
- Resolution is to increase the Additive Constant uncertainty and address impact on MCPR Limits

Affected Plants

A SPC Nonconformance Report has been issued which requires a Part 21 Evaluation; Plants affected are:

• WNP-2

- Shutdown for refueling
- Affected reload fuel will be in third cycle or greater cycle
- Supply System has been notified by phone
- ABB current fuel supplier
- Further actions will be considered as part of Part 21
 Evaluation
- Scheduled startup is in July 1997

Affected Plants (cont.)

Kuosheng

- Reloads operating with ATRIUM-9B
- Notification as part of SPC Nonconformance process

Leads

- In several plants
- Safety limit not impacted by leads
- Evaluated as part of SPC Nonconformance process

Affected Plants

ComEd BWR's

- All plants will introduce ATRIUM-9B fuel as part of the next refueling.
- Scheduled startups
 - Quad Cities 2 Cycle 15 May 13, 1997
 - Dresden 3 Cycle 15 June 1997
 - LaSalle 2 Cycle 8 July 1997

Resolution - Generic

Develop a statistically based methodology for using existing critical power data to address the range of conditions not explicitly covered in the tests of 9x9 fuels with internal water channels; result will be an increase in Additive Constant uncertainty

- Methodology to be completed by April 10
- Methodology to be documented and submitted to NRC for review by April 19

Because of the minimal review time, an Interim Approach is to be implemented

Action Plan - Interim Approach

Impose a conservative adder to the MCPR Operating Limit until the new statistical uncertainty methodology is approved and implemented

- Establish increase in Additive Constant uncertainty by new statistical methodology
- Double this increase for extra conservatism
- Determine increase in Safety Limit using this conservative value
- Apply the Safety Limit increase to the MCPR Operating Limit through COLR procedures
- Apply this Interim Approach to Quad Cities 2 and other ComEd BWR's as necessary

Resolution - Generic

When the new statistical methodology is approved:

- Use approved methodology to determine MCPR Safety Limit
- Revise Technical Specifications to incorporate revised MCPR Safety Limit (if Safety Limit is calc. to change)
- Remove Administrative adder on MCPR Operating Limit by COLR procedures
- Do for all ComEd plants consistently

Summary of Resolution

- Nonconformance immediately addressed by conservative, statistically based MCPR Operating Limit adder to protect the 99.9% acceptance criteria
- Safety Limit will directly incorporate the new statistical uncertainty methodology when approved
- Other Plant Specific submittals should proceed independently of this uncertainty concern

Impact of ANFB Nonconformance on ANFB Coresident Fuel Report

- Nonconformance impacts the additive constant uncertainty for 9x9 fuel designs with internal water channels (such as the ATRIUM-9B).
- The statistical methodology will result in an increase in the additive constant uncertainty for ATRIUM-9 fuel.
- The statistical methodology will not result in a change to the ANFB correlation.
- Approval of the topical reports for ANFB application for GE fuel is not dependent on corrective actions underway to resolve the nonconformance.

ANFB Coresident Fuel Report -Application of ANFB to GE Fuel

- SPC has submitted topical reports describing application of ANFB to the coresident GE fuel in transition cycles at Quad Cities and LaSalle.
- The topical reports describe a method for applying ANFB to GE fuel coresident with any SPC fuel type.
- The reports describe how additive constants and uncertainty are determined for GE fuel.
- No change to the ANFB correlation is required.
- Additive constants for GE fuel are established using the methodology approved for SPC fuel with the exception that calculated critical power data provided by the utility is used rather than measured data.

ANFB Coresident Fuel Report (continued)

- Additive constant uncertainty for GE fuel is based on two components:
 - Standard deviation between ANFB and the GE GEXL correlation
 - Standard deviation between GEXL and measured critical power data.
- The ANFB-GEXL correlation uncertainty is obtained from comparisons of ANFB predicted CPR to GEXL predicted CPR for the same assembly conditions.
- The GEXL correlation uncertainty relative to test data is provided by the utility.
 - The additive constant uncertainty for GE fuel is determined by statistically combining the ANFB-GEXL and GEXL-Data uncertainties.

ANFB Coresident Fuel Report (continued)

- The additive constants and the additive constant uncertainty for GE fuel are independent of the SPC fuel present in transition cores.
- The additive constants nor the additive constant uncertainty for the coresident SPC fuel are used in the topical reports describing application of ANFB to GE fuel.

Mixed Core MCPR Safety Limit Analyses

- The topical reports for ANFB application to GE fuel do not address mixed core safety limit issues.
- SPC addresses mixed core configurations in cycle specific MCPR safety limit analyses
 - actual core loading used
 - additive constant uncertainties appropriate for each fuel type used
- Additive constant uncertainty for GE fuel is obtained using the methods described in ANFB coresident fuel topical reports.
- Additive constant uncertainty for ATRIUM-9B fuel is obtained using the statistical methods currently being developed and documented for NRC review.

Impact of Increased Additive Constant Uncertainty on SLMCPR

- Current MCPR safety limit analyses are based on an ATRIUM-9B additive constant uncertainty of 0.01.
- Increasing the ATRIUM-9B uncertainty to the maximum value for any SPC fuel design (0.02) has the following impact:

 Quad Cities 2 Cycle 15 	+0.01
Dresden 3 Cycle 15	No change
LaSalle 2 Cycle 8	No change
Percentage increase in uncertainty MCPR safety limit is exceeded:	at which current Tech Spec

Quad Cities 2 Cycle 15 60%
Dresden 3 Cycle 15 280%
LaSalle 2 Cycle 8 300%

Actions Needed for Quad Cities Startup

- Quad Cities critical path licensing schedule
 - Fuel load--April 23
 - Startup--May 13
- TS amendment and Co-Resident Fuel topical report approval necessary

Schedule

- April 19
 - SPC submits generic uncertainty topical report
 - SPC transmits interim procedure for uncertainty and MCPR operating limit determination (to be used first at Quad Cities)
- April 22--NRC approval of TS package and Co-Resident Fuel Application Report
- April 23--Quad Cities fuel load starts

Schedule (continued)

- May 13--ComEd submits COLR with revised operating limit
- May 13--Quad Cities Plant Startup
- May 12--Dresden Fuel Load
- June 5--Dresden Startup