



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

WASHINGTON, D.C. 20555-0001

May 4, 2001

**LICENSEE:** Virginia Electric and Power Company

**FACILITY:** North Anna Power Station, Units 1 and 2

**SUBJECT:** SUMMARY - APRIL 25, 2001, MEETING REGARDING NORTH ANNA FUEL  
TRANSITION PROGRAM

On April 25, 2001, a public meeting was held with representatives of Virginia Electric and Power Company (VEPCO), Framatome Advanced Nuclear Power, and NRC at NRC Headquarters in Rockville, Maryland. The purpose of the meeting was to discuss the analyses and approvals needed for VEPCO to transition from Westinghouse-designed fuel to Framatome-designed fuel at the North Anna Power Station.

VEPCO indicated that its goal is to complete by December 2001 all engineering analyses needed to support a license amendment request for the fuel transition. The license amendment request is planned to be submitted in March 2002. As part of the engineering analyses, VEPCO is revising two topical reports dealing with: (a) Relaxed Power Distribution Control, and (b) Reload Methods. The latter topical report is expected to be submitted about August 2001 to NRC for approval. The former topical report, according to VEPCO, does not require NRC approval.

NRC indicated it expected to complete its ongoing review of the Framatome small-break loss-of-coolant accident (LOCA) submittal related to top/side breaks about mid-May 2001, and to complete its review of a large-break LOCA submittal related to fuel temperature uncertainty in early June 2001. The NRC expects to complete its review of the other Framatome LOCA topical reports needed for the VEPCO reload by December 31, 2001.

A meeting attendance list is provided as Enclosure 1. An outline of related topical reports is provided as Enclosure 2. The briefing slides handed out by VEPCO to focus the meeting are provided as Enclosure 3.

A handwritten signature in black ink, reading "G E Edison".

Gordon E. Edison, Senior Project Manager, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

**Enclosures:**

1. Attendance List
2. Outline of Topical Reports
3. Briefing Slides

cc w/encls: See next page

May 4, 2001

LICENSEE: Virginia Electric and Power Company

FACILITY: North Anna Power Station, Units 1 and 2

SUBJECT: SUMMARY - APRIL 25, 2001, MEETING REGARDING NORTH ANNA FUEL  
TRANSITION PROGRAM

On April 25, 2001, a public meeting was held with representatives of Virginia Electric and Power Company (VEPCO), Framatome Advanced Nuclear Power, and NRC at NRC Headquarters in Rockville, Maryland. The purpose of the meeting was to discuss the analyses and approvals needed for VEPCO to transition from Westinghouse-designed fuel to Framatome-designed fuel at the North Anna Power Station.

VEPCO indicated that its goal is to complete by December 2001 all engineering analyses needed to support a license amendment request for the fuel transition. The license amendment request is planned to be submitted in March 2002. As part of the engineering analyses, VEPCO is revising two topical reports dealing with: (a) Relaxed Power Distribution Control, and (b) Reload Methods. The latter topical report is expected to be submitted about August 2001 to NRC for approval. The former topical report, according to VEPCO, does not require NRC approval.

NRC indicated it expected to complete its ongoing review of the Framatome small-break loss-of-coolant accident (LOCA) submittal related to top/side breaks about mid-May 2001, and to complete its review of a large-break LOCA submittal related to fuel temperature uncertainty in early June 2001. The NRC expects to complete its review of the other Framatome LOCA topical reports needed for the VEPCO reload by December 31, 2001.

A meeting attendance list is provided as Enclosure 1. An outline of related topical reports is provided as Enclosure 2. The briefing slides handed out by VEPCO to focus the meeting are provided as Enclosure 3.

/RA/

Gordon E. Edison, Senior Project Manager, Section 1  
Project Directorate II  
Division of Licensing Project Management  
Office of Nuclear Reactor Regulation

Docket Nos. 50-338 and 50-339

Enclosures:

1. Attendance List
2. Outline of Topical Reports
3. Briefing Slides

cc w/encls: See next page

DOCUMENT NAME: G:\PDII-1\NOANNA\0425Mtgsum.wpd

Distribution: See next page

OFFICE	PDII-1/PM	<input checked="" type="checkbox"/>	PDII-2/LA	<input checked="" type="checkbox"/>	PDII-1/PD	<input type="checkbox"/>
NAME	GEEdison:mw		EDunnington		REmch	
DATE	05/ 4 /01		05/ 3 /01		05/ 4 /01	

OFFICIAL RECORD COPY

**DISTRIBUTION:**

PUBLIC

NoAnna R/F

G. Edison (Hard Copy)

E. Dunnington (Hard Copy)

B. Sheron

RidsNrrAdpt

J. Zwolinski/C.Carpenter

RidsNrrDlpm

H. Berkow

RidsNrrDlpmLpdii

R. Emch (Hard Copy)

M. King

K. Landis, RII

RidsRgn2MailCenter

OGC

RidsOgcRp

ACRS

RidsAcrcAcnwMailCenter

K. Clark (e-Mail)

S. Rosenberg (e-Mail)

R. Caruso

A. Attard

F. Akstulewicz

J. Staudenmeier

W. Lyon

R. Margolis

S. Bailey

F. Orr

C. Liang

Virginia Electric & Power Company

cc:

Mr. C. Lee Lintecum  
County Administrator  
Louisa County  
P.O. Box 160  
Louisa, Virginia 23093

Mr. Donald P. Irwin, Esquire  
Hunton and Williams  
Riverfront Plaza, East Tower  
951 E. Byrd Street  
Richmond, Virginia 23219

Dr. W. T. Lough  
Virginia State Corporation  
Commission  
Division of Energy Regulation  
P. O. Box 1197  
Richmond, Virginia 23209

Old Dominion Electric Cooperative  
4201 Dominion Blvd.  
Glen Allen, Virginia 23060

Mr. Stephen P. Sarver, Director  
Nuclear Licensing & Operations  
Support  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060-6711

Office of the Attorney General  
Commonwealth of Virginia  
900 East Main Street  
Richmond, Virginia 23219

Senior Resident Inspector  
North Anna Power Station  
U.S. Nuclear Regulatory Commission  
1024 Haley Drive  
Mineral, Virginia 23117

North Anna Power Station  
Units 1 and 2

Mr. David A. Heacock  
Site Vice President  
North Anna Power Station  
P. O. Box 402  
Mineral, Virginia 23117

Mr. David A. Christian  
Sr. Vice President and Chief Nuclear Officer  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Blvd.  
Glen Allen, Virginia 23060-6711

Mr. Richard H. Blount, II  
Site Vice President  
Surry Power Station  
Virginia Electric and Power Company  
5570 Hog Island Road  
Surry, Virginia 23883-0315

Robert B. Strobe, M.D., M.P.H.  
State Health Commissioner  
Office of the Commissioner  
Virginia Department of Health  
P.O. Box 2448  
Richmond, Virginia 23218

Mr. William R. Matthews  
Vice President - Nuclear Operations  
Virginia Electric and Power Company  
Innsbrook Technical Center  
5000 Dominion Boulevard  
Glen Allen, Virginia 23060-6711

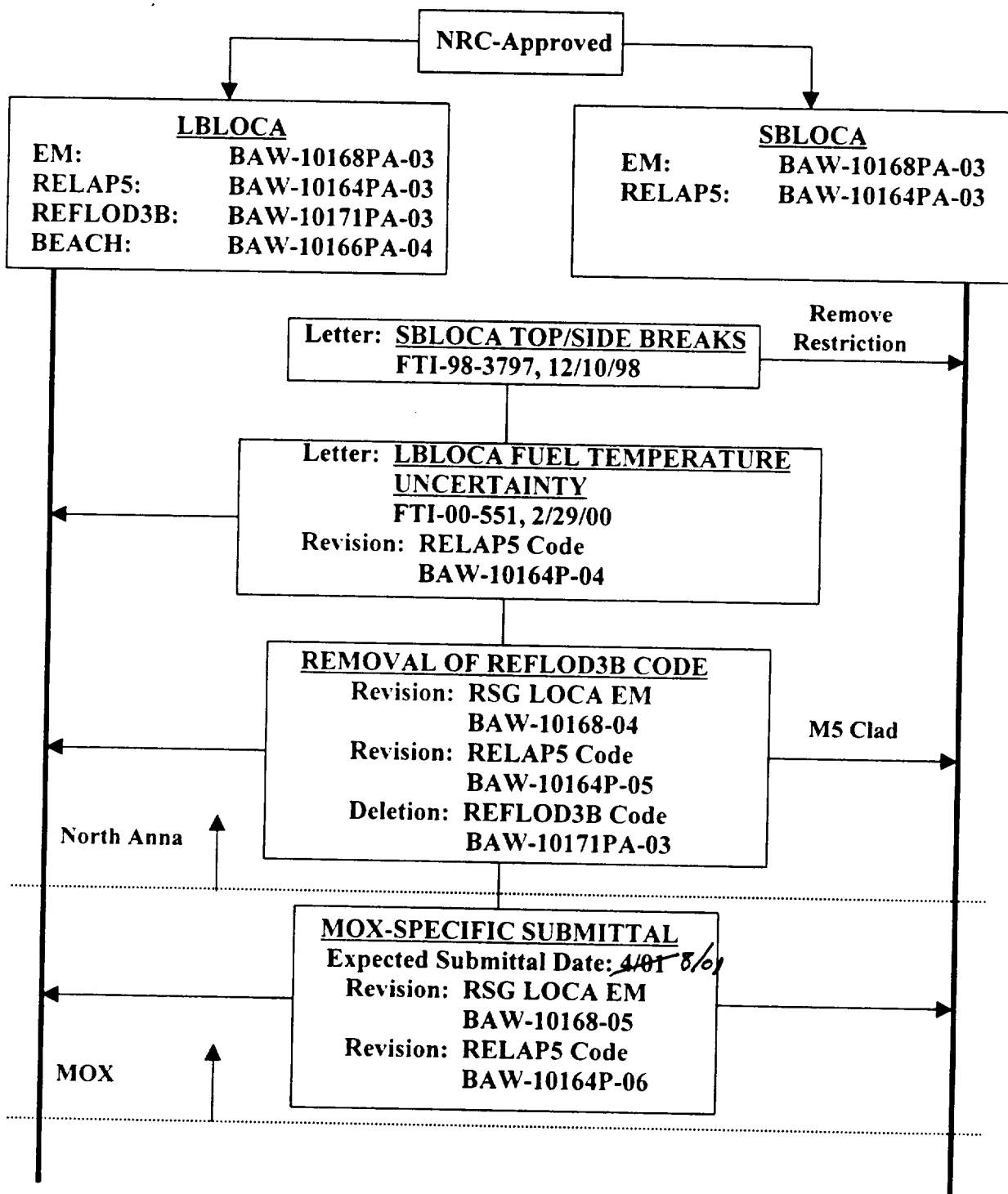
**N. ANNA MEETING**  
**WEDNESDAY, APRIL 25, 2001**

**ATTENDEES**

<b><u>Name</u></b>	<b><u>Affiliation</u></b>
G. E. Edison	NRC
Ralph Caruso	NRC/SRXB
Bert Dunn	FRA-ANP/LOCA
Dennis Gottuso	Framatome ANP
C. K. Nithianandan	FRA-ANP/LOCA
Brian V. Haibach	Framatome ANP
John R. Biller	Framatome ANP
Tom Shaub	Dominion
Gary Darden	Dominion
James F. Mallay	Framatome ANP
Tony Attard	NRR/DSSA/SRXB
Francis Akstulewicz	NRR/DSSA/SRXB
Joseph Staudenmeier	NRR/DSSA/SRXB.
Warren C. Lyon	NRR/DSSA/SRXB
Robert S. Margolis	Dominion
Stewart Bailey	NRR/DLPM
Frank Orr	NRR/SRXB

**ENCLOSURE 1**

# TOPICAL REPORT/LETTER REPORT PERSPECTIVE



---

---

*North Anna Fuel Transition Program  
Review Status Meeting  
NRC-One White Flint  
April 25, 2001*

April 25, 2001 - 1

Enclosure 3

---

*Meeting Objectives  
Presentation Topics*

*G. L. Darden - Dominion*



---

➤ *Dominion*

- G. L. Darden-Program Manager/Nuclear Safety Analysis
- R. S. Margolis-Asst. Program Mgr/Nuclear Safety Analysis
- E. T. Shaub-Nuclear Licensing

➤ *Framatome ANP*

- J. R. Biller-LOCA Analysis
- B. M. Dunn-LOCA Analysis
- C. K. Nithianandan-LOCA Analysis
- D. A. Gottuso-Project Manager
- B. V. Haibach-Project Engineer
- J. Mallay-Director-Regulatory Affairs

- 
- *Discuss North Anna Fuel Transition Program Review Needs*
  - *Discuss Issues Concerning LOCA EM Review Status and Plans*
  - *Provide Status of Dominion Topical Report Changes*
  - *Agree on Action Plan for Successful Transition Licensing*

- 
- *Status of Transition Program Activities*
  - *LOCA Evaluation Model Review Issues & Status*
  - *Dominion Topical Revision Status*
  - *Transition Program Schedule and Review Milestones*
  - *Licensing Review Action Plan*
  - *Questions/Action Items*
    - *Optional LOCA Evaluation Model Technical Discussion*

---

## *Status of Transition Program Activities*

*G. L. Darden - Dominion*

---

➤ *Engineering Design & Analysis*

- Design Input Preparation
  - Dominion supplied numerous items from existing analyses
  - Involved obtaining certain key data from current fuel vendor
- Detailed engineering analysis underway
  - Fuel mechanical/thermal analysis
  - Fuel thermal/hydraulics & mixed core analysis
  - LOCA analysis model qualification
  - Fuel Assembly mechanical design
  - Scoping analyses for NSSS events
- Activities on schedule for Dec 2001- supports Mar 2002 LAR

---

➤ *Transition Program Licensing Activities*

- SER for revisions (RELAP5 Rev. 4 & 2/29/00 EM letter) to existing LBLOCA methods expected soon
- Topical revisions for 'Standalone' RELAP5 LOCA model
  - Submitted Jul 2000
  - Current meeting intended to kick off review
  - 'Standalone' model is being employed for NAPS analysis
- Dominion revisions underway for 2 topical reports
  - Relaxed Power Distribution Control
  - Reload Methods (submit in 2001)
- Dominion submits License Amendment Request - Mar 2002

---

---

*LOCA Evaluation Model Review Issues & Status*

*J. R. Biller – Framatome ANP*

---

➤ *LOCA EM Review Issues and Status*

- North Anna LOCA Licensing Needs
- Status of Submittals Under Active NRC Review
  - SBLOCA Submittal--Top/Side Breaks
  - LBLOCA Submittal--Fuel Temperature Uncertainty (RELAP5 Rev. 4 & 2/29/00 EM letter)
- 'Standalone' RELAP5 Submittal Ready for Active NRC Review
- Major 'Standalone' RELAP5 LBLOCA EM Changes
- Prosecution of 'Standalone' RELAP5 EM Licensing Review



- 
- *LBLOCA: Fuel Temperature Uncertainty*
    - Intend to Use Multiple Hot Channel Heat Structures
    - Intend to Use Reduced Fuel Temperature Uncertainties (Exclusive of Hot Pin)
  
  - *LBLOCA: 'Standalone' RELAP5 LBLOCA EM*
    - Intend to Use This Methodology for NAPS transition
    - Requested Licensing Review Completion is Dec 2001



*Status of Submittals Under  
Active NRC Review*



- 
- *SBLOCA Submittal--Top/Side Breaks*
    - Response Letter Under NRC Review
    - Expected Issue Date ?
  
  - *LBLOCA Submittal--Fuel Temperature Uncertainty*
    - SER Under NRC Review
    - Staff Need to Address 'Standalone' RELAP5 Submittal in this SER ?
    - Expected Issue Date ?



*Submittal Ready for Active  
NRC Review*



---

➤ *'Standalone' RELAP5 Licensing Submittal*

- Entire LBLOCA Calculation Done by RELAP5
- RELAP5: BAW-10164P, Revision 5, July 2000
- RSG EM: BAW-10168P, Revision 4, July 2000
- OTSG EM: BAW-10192P, Revision 1, July 2000
  - No Current Licensing Need for OTSG EM



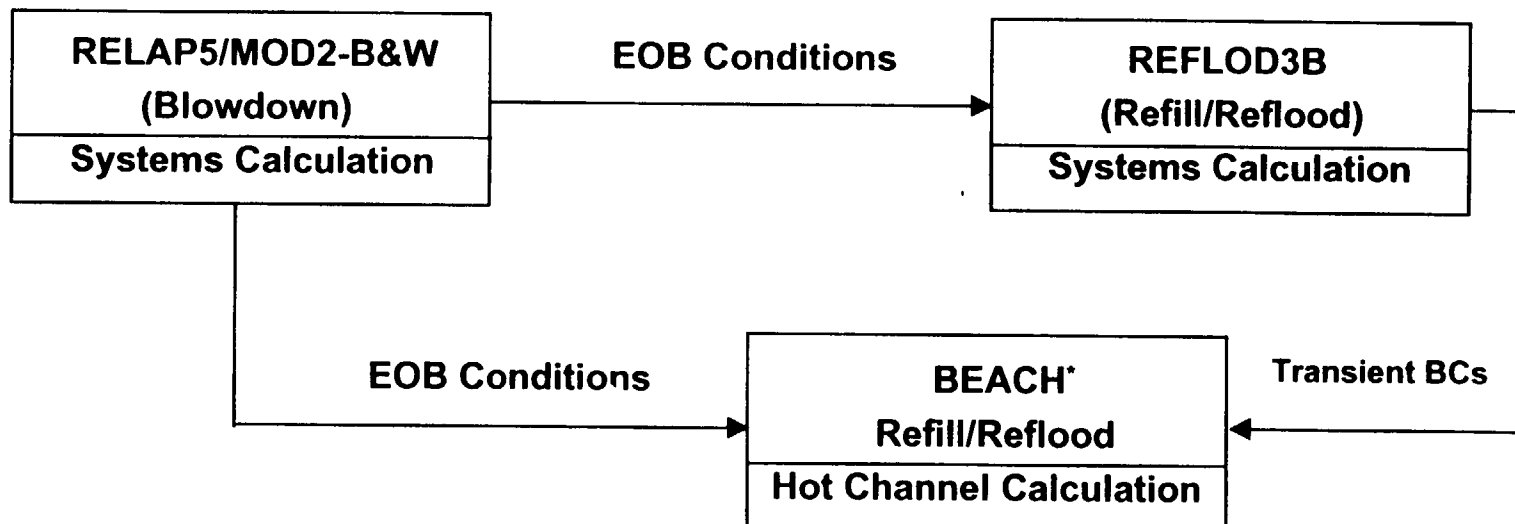
**Dominion**

*Submittal Ready for Active NRC  
Review--Background*



**FRAMATOME**

➤ *Current NRC-Approved LBLOCA Code Package*



▪ **'Standalone' RELAP5 Removes REFLOD3B Code**

\*BEACH Is a Set of Subroutines within RELAP5

- 
- *REFLOD3B Replaced by RELAP5--Previous Slide*
  - *Major Areas of Change to EM / RELAP5*
    - Refined Noding--Loops, DC, LP/LH, Core, SG Inlet
    - Option to Wilson Bubble Rise Model--DC, LP/LH
    - Dissolution of Nitrogen Modeled
    - Broken Loop ECC Mechanistically Modeled
    - Core Nodes Dynamically Coupled
    - Average Radial Peaking within Hot Bundle
    - CCFL Correlation at Core Exit Junctions
    - Distributed Rupture Zone
  - *Benchmark-Based*
    - UPTF, SCTF, and REBEKA-6



**Dominion**

*Major 'Standalone' RELAP5  
LBLOCA EM Changes, Cont'd*



- 
- *Framatome Discussed Technical Aspects of Revisions  
in Detail at October 2000 Meeting with Staff*
    - If Staff Desires, Framatome Prepared to Further Discuss  
Today



**Dominion**

*Prosecution of 'Standalone'*  
*RELAP5 EM Licensing Review*



**FRAMATOME**

- 
- *At NRC's, Request List of Major Areas of Change to EM / RELAP5 Recently Provided*
    - Identified Major Technical Components, e.g. a Heat Transfer Revision
    - Help Staff Determine Review Expertise Required
    - Help Staff Estimate Review Schedule
    - Need Request Asking for Review of 'Standalone' RELAP5 ?
  - *Communications*
    - Suggest Written w/Established Distribution List as Means of Keeping All Informed with a Consistent Set of Information
    - Technical Requests Would Be Expected As Written RAIs
    - Framatome Will Take Responsibility to Prepare/Distribute Telecom Minutes
    - Periodic Meetings--Seem Helpful to Maintain Focus



**Dominion**

## *Prosecution of 'Standalone'*

*RELAP5 EM Licensing Review,*



**FRAMATOME**

**ANP**

*Cont'd*

---

- *Have Initial Resources and Schedule Been Set ?*
- *Expected Start Date of Technical Review ?*
- *Proposed Date to Issue RAls ?*
  - Requested Response Period Span ?
- *Anticipated SER Issue Date ?*
- *Any Anticipated Specific Problem Areas / Issues ?*
  - Anything Framatome ANP, Dominion, and/or Staff Can Do to Mitigate



---

## *Dominion Topical Reports Revision Status*

*G. L. Darden - Dominion*

---

## ➤ *Overview of Proposed Changes*

- Accommodate use of Dominion methodology for evolutionary fuel feature changes; FRA-ANP is current example; other changes could occur in future
- Changes address generic methodology items impacted by use of FRA-ANP fuel; reload calculations will confirm that FRA-ANP fuel meets limits
- Changes to VEP-NE-1-A, “Relaxed Power Distribution Control Methodology,” to be made via Dominion’s Generic Letter 83-11 program per 3/8/01 NRC Staff letter
- Changes to VEP-FRD-42A, Rev. 1, “Reload Nuclear Design Methodology” to be submitted for Staff review & approval
  - changes caused by fuel design differences
  - changes due to adoption of approved FRA-ANP fuel analysis requirements
  - reflect Dominion codes employed as discussed in prior supplements to VEP-FRD-42A

---

---

➤ *Accommodating Fuel Design Features*

- Nuclear Core Design Items
  - key design features are essentially the same
  - minor design differences can be modeled
  - Dominion has previously demonstrated this capability
    - modeling & prediction of evolutionary W fuel changes
    - power distribution predictions for Framatome LTAs in North Anna Unit 1 (comparison to flux map data)
- Safety Analysis Items
  - fuel is a functional equivalent to W fuel
  - minor differences will be incorporated into models

---

➤ *Accommodating Fuel Analysis Features*

- Nuclear Core Design Items
  - no other inherent fuel differences result in the need for a new type of analysis or analysis approach
- Safety Analysis Items
  - such differences (if any) will be captured by defining key safety analysis parameters applicable to Framatome fuel
  - approved DNB correlations will be used
  - approved Statistical DNB methodologies will be used
  - confirm transient analysis key parameters with additions as required for Framatome fuel
  - confirm that parameter values are 'well-behaved' to allow use of Dominion bounding parameter value analysis approach

---

➤ *Status of Effort*

- NRC Staff issued letter reflecting review of acceptability for topicals affected by fuel transition (3/8/01)
- Dominion is revising Relaxed Power Distribution Methodology topical report VEP-NE-1-A under Generic Letter 83-11 program
- Dominion is drafting changes to VEP-FRD-42
- Submittal of VEP-FRD-42 Rev. 2 expected Aug 2001

---

## *Transition Program Schedule and Review Milestones*

*G. L. Darden - Dominion*



## *Key Licensing Review Milestones*



---

### ➤ *License Amendment Request for North Anna Transition*

- Dominion Submits LAR – Mar 2002
- Target Date for first RAI – Jun 2002
- Target Date for last RAI – Oct 2002
- Prepare Draft SER for LAR - Dec 2002
- NRC issues SER for LAR – Jan 2003
- Delivery of First FRA-ANP Reload Batch - Feb 2003

---

➤ *Dominion Reload Methodology Topical Report*

- Revision to report VEP-FRD-42 to accommodate use of methodology for Framatome fuel
- Dominion submits revised reload methods topical – Aug 2001
- Target for first RAI – Dec 2001
- Target for last RAI – Apr 2002
- Target to issue SER for reload topical – Aug 2002



- 
- *LOCA Evaluation Models for North Anna Effort*
    - NRC approval of FRA-ANP Fuel Temperature Uncertainty - Apr 2001
    - Target for written RAI \_\_\_\_\_ (from earlier 'Standalone' discussion)
    - NRC approval of FRA-ANP 'Standalone' RELAP5 LBLOCA EM revisions – Dec 2001

---

## *Licensing Review Action Plan*

*G. L. Darden - Dominion*

- 
- *Licensing Review Priority*
    - Key Objective is licensing of first core for Feb 2003 delivery
    - Focus must be maintained in support of this goal
  - *Communications*
    - Propose conducting on a periodic schedule:
      - Teleconferences (biweekly)
      - Meetings (every 6 weeks)
      - Written (as needed)
  - *Requests for Additional Information*
    - Establish target date for NRC Staff to issue RAIs
    - Dominion proposes that RAIs be written
    - Dominion/Framatome committed to prompt response
  - *Staff Actions*
  - *Dominion/Framatome Actions*

---

*Summary*  
*Questions*  
*Action Items*

*G. L. Darden - Dominion*