UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 15, 2009

LICENSEE: Exelon Nuclear

FACILITY: LaSalle County Station, Unit 2

SUBJECT: SUMMARY OF MARCH 18, 2009, PRE-APPLICATION MEETING (FOLLOW-UP) WITH EXELON GENERATION COMPANY, LICENSE AMENDMENT REQUEST FOR UNIT 2 SPENT FUEL STORAGE RACK MODIFICATIONS

On March 18, 2009, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Exelon Generating Company (EGC) at the NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss a pre-application license amendment request for Unit 2 spent fuel storage rack modifications. A list of attendees is provided as Enclosure 1.

The licensee presented information regarding the proposed design and performance of the neutron absorber NETCO-SNAP-IN® Insert (See Enclosure 2). This presentation also provided details with respect to long-term spent fuel management strategy, NETCO-SNAP-IN® Insert criticality analysis, spent fuel pool (SFP) criticality control, and NETCO-SNAP-IN ® Insert deployment strategy at the LaSalle County Station.

The NRC staff also discussed the SFP configuration with the licensee and how dry cask operations and proposed rack modifications are integrated with the spent fuel management strategy. Also discussed, was the dual-code approach, methodologies, assumptions and conservatisms used in performing the criticality analysis with the proposed rack modifications.

Members of the public were in attendance. Public Meeting Feedback forms were not received.

Please direct any inquiries to me at 301-415-3154, or SPS1@nrc.gov.

Stephen Sands, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-374

Enclosures:
1. List of Attendees
2. Licensee Handout

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LIST OF ATTENDEES

March 18, 2009, MEETING WITH EXELON NUCLEAR

PRE-APPLICATION MEETING TO DISCUSS NETCO-SNAP-IN® INSERTS FOR

LASALLE UNIT 2 SFP

Name	Organization	Phone Number
Stephen Sands	NRC/NRR/DORL/LPLIII-2	301-415-3154
Russell Gibbs	NRC/NRR/DORL/LPLIII-2	301-415-7198
Adam Levin	Exelon	630-657-2193
Edward Fowles	Areva	509-375-8764
Philip Hansett	Exelon	815-415-3920
Greg Cranston	NRC/DSS/SRXB	301-415-0546
Peter Wicyk	Exelon	815-415-2469
Kenneth Lindquist	NETCO	845-331-8511
Terrence Simpkin	Exelon	630-657-2800
Kenneth Nicely	Exelon	630-657-2803
Jill Fisher	Exelon	630-657-2165
Matt Yoder	NRC/NRR/DCI/CSGB	301-415-4017
Deann Raleigh	LIS Scientech	240-626-9556
Mike Mahoney	NRC/NRR/DORL/LPLIII-2	301-415-3867
Kent Wood	NRC/NRR/DSS/SRXB	301-415-4120
Emma Wong	NRC/NRR/DCI/CSGB	301-415-1217
Patrick Simpson	Exelon	630-657-2823

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LaSalle County Station Unit 2 Spent Fuel Storage Racks

Pre-Submittal Meeting

March 18, 2009

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Opening Remarks

Patrick Simpson
Licensing Manager

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Purpose

- ✓ Overview LaSalle County Station (LSCS) spent fuel pool (SFP) management strategy
- ✓ Summarize NETCO-SNAP-IN® inserts criticality analysis and deployment strategy
- ✓ Obtain NRC feedback

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Agenda

- ✓ Opening Remarks . . . . . Pat Simpson
- ✓ Long-Term Spent Fuel Management. . . . . Adam Levin Strategy
- ✓ NETCO-SNAP-IN® Insert Criticality . . . . . Ed Fowles Analysis
- ✓ SFP Criticality Control . . . . . Phil Hansett
- ✓ NETCO-SNAP-IN® Insert Deployment . . . . . Adam Levin Strategy
- ✓ Closing Remarks . . . . . Pat Simpson
- ✓ NRC Feedback . . . . . NRC

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Long-Term Spent Fuel Management Strategy

Adam Levin
Director, Spent Fuel and Decommissioning

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Spent Fuel Management
Objectives

- ✓ Maintain $k_{eff} \leq 0.95$ if fully flooded with unborated water, which includes an allowance for uncertainties
- ✓ Comply with B.5.b storage configuration requirements
- ✓ Maintain full core discharge capability
  - Based on good operating practice; there is no licensing basis requirement

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Strategic Elements
Single Unit Full Core Discharge Capability

- ✓ SFPs are cross-connected and have the ability to move spent fuel between Units 1 and 2 to fully discharge core
  - Requires 764 plus ~300 open locations (i.e., full core plus reload)
  - Full core discharge capability may be needed for maintenance (e.g., jet pump maintenance and fuel support piece replacements)
- ✓ Currently there are 947 available locations and 645 unusable locations due to Boraflex degradation

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Strategic Elements
Management of Boraflex Degradation

- ✓ RACKLIFE projections (i.e., six-month look ahead)
  - Project additional 200 cells to be declared unusable on July 1, 2009
- ✓ BADGER testing – July 2009
- ✓ Pool water chemistry and temperature

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Strategic Elements
3-of-4 Storage Configuration

- ✓ Needed as soon as possible to restore full core discharge capability
- ✓ With dry cask storage and NETCO-SNAP-IN® insert deployment
  - Best case: 3-of-4 storage configuration no longer required after delivery of first insert batch (September 2010 target)
  - Worst case: some 3-of-4 storage configuration required through 2016
- ✓ Rapidly growing population of fuel channels and other Class B/C low-level radioactive waste (LLRW) irradiated hardware
  - 513 fuel channels stored in unusable locations
  - Additional 160 fuel channels may be discharged in February 2010
  - Channels relocated to cells with blocking devices, as possible

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Strategic Elements
3-of-4 Storage Configuration (cont.)

- ✓ Fuel assembly management
  - Restore flexibility in fuel shuffles for refueling outages
  - Restore flexibility in meeting B.5.b requirements
- ✓ Plans for Class B/C LLRW management under development
  - Onsite dry storage systems in design
  - Potential deployment in late 2010 or early 2011

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Strategic Elements
Dry Cask Storage and Rack Inserts

- ✓ Dry Cask Storage
  - Target date for operation is November 2009
  - Improvement from 2011 original plans when BADGER testing revealed accelerated degradation in 2006
  - Plan to load six dry casks to regain 408 locations in 2009
  - Load six systems each year (minimum) through at least 2012
  - Annual refueling operations at dual-unit sites results in limited windows for dry cask storage operations
- ✓ NETCO-SNAP-IN® Inserts
  - Target date for operation is September 2010
  - Driven by licensing, manufacturing, and materials testing schedules
  - First-of-a-kind large-scale deployment
  - Field demonstration completed successfully in October 2007

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NETCO-SNAP-IN® Insert Criticality Analysis

Edward Fowles
AREVA NP Inc.

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Criticality Analysis with Inserts
Major Analysis Assumptions

- ✓ There is no longer any Boraflex in the spent fuel storage racks
- ✓ A chevron shaped neutron absorbing insert has been installed in the corner of each "accessible" storage cell

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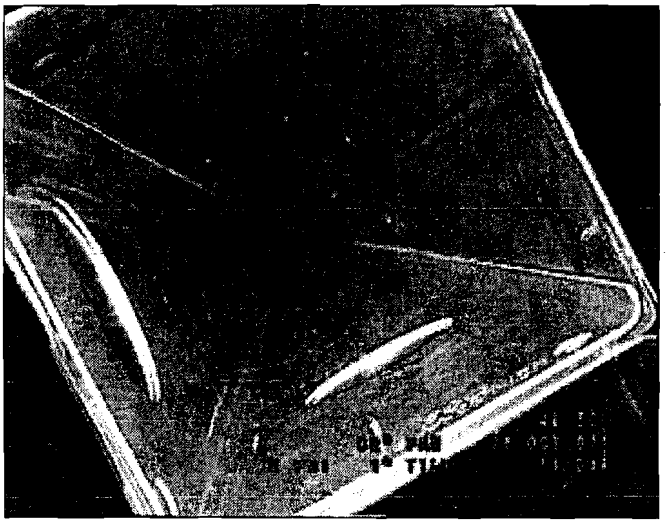
NETCO-SNAP-IN® Insert



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Criticality Analysis with Inserts
Computer Codes

- ✓ CASMO-4
  - Approved at LSCS for use with MICROBURN-B2 for in-core licensing calculations
  - Used to establish maximum reactivity lattices
  - Used for comparison calculations to establish manufacturing uncertainties
  - Shown by Studsvik to produce reliable in-rack results relative to criticality experiments
- ✓ KENO V.a (SCALE 4)
  - Benchmarked against critical experiments to establish a code bias and uncertainty
  - Major contributor in defining the final k_{eff} used for comparison to the 0.95 regulatory limit

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Criticality Analysis with Inserts
Reactivity Limits for LSCS Fuel Assemblies

- ✓ CASMO-4 lattice comparisons at maximum in-rack reactivity levels using temperatures between 4°C and 100°C
- ✓ All assemblies used and proposed to date were evaluated, including GE 8x8, GE-14, ATRIUM-9, ATRIUM-10, and ATRIUM 10XM leads (8)
- ✓ Bounding ATRIUM-10 fuel lattices defined to be more reactive than the legacy fuel and expected future assembly designs
  - A10T-4.57L10G38 from 96" to 150"
  - A10B-4.57L10G60 from 0" to 96"

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Criticality Analysis with Inserts
REBOL Lattices

- ✓ REBOL means reactivity equivalent at beginning of life
  - Sometimes called REFFE – reactivity equivalent fresh fuel enrichment
  - Necessary because KENO V.a does not perform depletion calculations
- ✓ Defined using CASMO-4 to be at least 0.010 Δk more limiting than the bounding top and bottom ATRIUM-10 lattices
- ✓ Each lattice is defined using a single U235 enrichment level and no Gd_2O_3

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Criticality Analysis with Inserts
Evaluated Normal Conditions

- ✓ Depletion at bounding moderator void levels
- ✓ Actual assembly geometry modeled
- ✓ Assemblies modeled using beginning of life mechanical parameters
- ✓ Storage with or without a fuel channel
- ✓ Uniform versus distributed enrichment
- ✓ Rack and assembly manufacturing tolerances
- ✓ Mixed assembly types
- ✓ Locations without insert and without an assembly
- ✓ Spacers not modeled

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Criticality Analysis with Inserts
Evaluated Abnormal Conditions

- ✓ Misplaced assembly
- ✓ Missing insert (most limiting accident)
- ✓ Dropped assembly
- ✓ Limiting assembly position conditions
- ✓ Limiting assembly orientation conditions

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Criticality Analysis with Inserts
Modeling Conservatisms

- ✓ All lattices of all assemblies are at maximum reactivity
- ✓ REBOL lattices are at least 0.007 Δk more reactive than the maximum reactivity lattices supported by this analysis
- ✓ Conservative assumptions have been made throughout this analysis (e.g., water temperature, insert modeling, spacers neglected, fuel rod pitch, no natural uranium, infinite array boundary conditions, etc.)

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Criticality Analysis with Inserts
Conclusions

- ✓ All assemblies manufactured for use in the LSCS reactors, and ATRIUM-10 assemblies that do not exceed the stated reactivity limitations, meet the 0.95 k_{eff} regulatory limit when stored in the Unit 2 SFP

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SFP Criticality Control

Phil Hansett
Senior Reactor Engineer

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SFP Criticality Control

- ✓ Analysis demonstrates that regulatory requirement to maintain $k_{eff} \leq 0.95$ is met
- ✓ Current additional margin to criticality
  - Criticality analyses
    - Core resident – maximum uncontrolled, cold, in-core $k_{\infty} = 1.252$
    - Pool resident – maximum uncontrolled, cold, in-core $k_{\infty} = 1.275$
    - Bounding future design – maximum uncontrolled, cold, in-core $k_{\infty} = 1.275$
  - Only five assemblies total are near peak reactivity
  - B.5.b requirements make it unlikely that fuel near peak reactivity in core will be placed near each other, or other peak reactivity assemblies in pool

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NETCO-SNAP-IN® Insert Deployment Strategy

Adam Levin
Director, Spent Fuel and Decommissioning

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Deployment Strategy

- ✓ Delivery of inserts expected to begin in July 2009
  - Initial batch of 182 expected
  - Extensive dimensional and tolerance receipt inspections
- ✓ Monthly deliveries scheduled from August 2009 through January 2010, and again from March 2010 through June 2010
- ✓ By June 2010, total of 1875 inserts expected onsite
  - ~1245 storage locations will be unusable as of July 1, 2010
  - All unusable cells will be recovered by summer 2010
  - Cells will not be available for use until NRC approval is granted
- ✓ Delivery of 400 inserts per year scheduled from 2011 through 2016
  - Stay ahead of unusable cells due to Boraflex degradation (i.e., 400 per year)
  - Sufficient backlog in the event degradation accelerates

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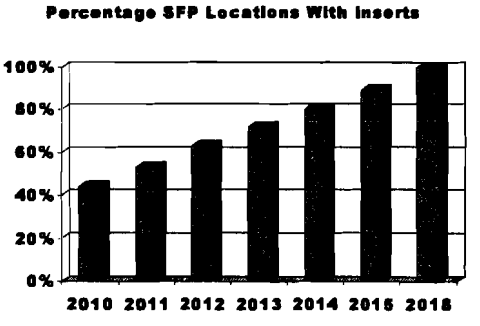
Deployment Strategy
Considerations

- ✓ With deployment strategy working as envisioned, LSCS can maintain full core discharge capability without reliance upon 3-of-4 storage configuration
- ✓ If all cells were declared unusable today, insert installation would cover 100% of locations by 2017



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Deployment Strategy
Considerations (cont.)

- ✓ Risks to insert deployment and the need to maintain the capability of a 3-of-4 storage configuration through 2016
  - Near term need to restore full core discharge capability
  - Dry cask storage initial campaign
  - Additional accumulation of Class B/C LLRW in pools (e.g., channels)
  - NETCO-SNAP-IN® insert manufacturing and deployment capability
  - NETCO-SNAP-IN® insert licensing
- ✓ Partial delays in dry cask storage and/or insert deployment will lead to need for some 3-of-4 storage configuration; however, the goal is to minimize this impact

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Closing Remarks

Patrick Simpson
Licensing Manager

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Closing Remarks

- ✓ Goal is to restore and maintain full core discharge capability
- ✓ Exelon plans to submit a license amendment request to reflect use of NETCO-SNAP-IN® rack inserts
- ✓ Criticality analysis demonstrates compliance with applicable regulatory requirements

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NRC Feedback

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