March 7, 2000

LICENSEE: Baltimore Gas and Electric Company

FACILITY: Calvert Cliffs Nuclear Power Plant, Unit No. 1

SUBJECT: SUMMARY OF THE FEBRUARY 23, 2000, MEETING REGARDING THE CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 SPRING 2000 STEAM GENERATOR TUBE INSPECTION (TAC NO. MA7986)

On February 23, 2000, the U.S. Nuclear Regulatory Commission (NRC) staff held a meeting at the NRC offices in Rockville, Maryland, with representatives from Baltimore Gas and Electric Company (BGE), the licensee for Calvert Cliffs, Unit No. 1, to discuss the licensee's plans for inspecting steam generator tubing in the upcoming spring 2000 refueling outage. The list of meeting attendees is included as Enclosure 1. Enclosure 2 is a copy of the slides presented by the licensee at the meeting.

The licensee presented the tube inspection scope and associated protocol. The inspection technology regarding bobbin coil and plus point coil probes was presented. The licensee also discussed tube repair methods and in-situ pressures tests. The licensee identified the inspection expansion criteria and examinations of the upper tube bundle.

At the end of the meeting, the NRC staff concluded that the licensee's presentation is useful for the staff to understand the licensee's upcoming steam generator tube inspection.

/RA/

Alexander W. Dromerick, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosures: As stated

cc w/encls: See next page

Document Name: G:\PDI-1\CC1-2\MA7986sum.wpd

OFC	PM/PDI-1	LA/PDI-1	(A)SC/PDI-1
NAME	ADromerick:cn	SLittle	MGambaroni
DATE	3 / 3 /00	3/3 /00	3/4 /00
COPY	YES/NO	YES/NO	YES/NO

OFFICIAL RECORD COPY

DF01

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

March 7, 2000

LICENSEE: Baltimore Gas and Electric Company

FACILITY: Calvert Cliffs Nuclear Power Plant, Unit No. 1

SUBJECT: SUMMARY OF THE FEBRUARY 23, 2000, MEETING REGARDING THE CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1 SPRING 2000 STEAM GENERATOR TUBE INSPECTION (TAC NO. MA7986)

On February 23, 2000, the U.S. Nuclear Regulatory Commission (NRC) staff held a meeting at the NRC offices in Rockville, Maryland, with representatives from Baltimore Gas and Electric Company (BGE), the licensee for Calvert Cliffs, Unit No. 1, to discuss the licensee's plans for inspecting steam generator tubing in the upcoming spring 2000 refueling outage. The list of meeting attendees is included as Enclosure 1. Enclosure 2 is a copy of the slides presented by the licensee at the meeting.

The licensee presented the tube inspection scope and associated protocol. The inspection technology regarding bobbin coil and plus point coil probes was presented. The licensee also discussed tube repair methods and in-situ pressures tests. The licensee identified the inspection expansion criteria and examinations of the upper tube bundle.

At the end of the meeting, the NRC staff concluded that the licensee's presentation is useful for the staff to understand the licensee's upcoming steam generator tube inspection.

Alexander W. Dromerick

Alexander W. Dromerick, Sr. Project Manager, Section 1
Project Directorate I
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosures: As stated

cc w/encls: See next page

Calvert Cliffs Nuclear Power Plant
Unit Nos. 1 and 2

President
Calvert County Board of
Commissioners
175 Main Street
Prince Frederick, MD 20678

James P. Bennett, Esquire
Counsel
Baltimore Gas and Electric Company
P.O. Box 1475
Baltimore, MD 21203

Jay E. Silberg, Esquire
Shaw, Pittman, Potts, and Trowbridge
2300 N Street, NW
Washington, DC 20037

Mr. Bruce S. Montgomery, Director
NRM
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Resident Inspector
U.S. Nuclear Regulatory
Commission
P.O. Box 287
St. Leonard, MD 20685

Mr. Richard I. McLean, Manager
Nuclear Programs
Power Plant Research Program
Maryland Dept. of Natural Resources
Tawes State Office Building, B3
Annapolis, MD 21401

Regional Administrator, Region I
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

Mr. Joseph H. Walter, Chief Engineer
Public Service Commission of
Maryland
Engineering Division
6 St. Paul Centre
Baltimore, MD 21202-6806

Kristen A. Burger, Esquire
Maryland People's Counsel
6 St. Paul Centre
Suite 2102
Baltimore, MD 21202-1631

Patricia T. Birnie, Esquire
Co-Director
Maryland Safe Energy Coalition
P.O. Box 33111
Baltimore, MD 21218

Mr. Loren F. Donatell
NRC Technical Training Center
5700 Brainerd Road
Chattanooga, TN 37411-4017

Mr. Charles H. Cruse
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702

Template NRR-111

Meeting Summary Dated March 7, 2000

HARD COPY
File Center
PUBLIC
PD I-1 R/F
A. Dromerick
OGC
ACRS

cc: Licensee & Service List (with all enclosures)

E-MAIL
J. Zwolinski/S. Black
E. Adensam
M. Gamberoni
S. Little
J. Tsao
E. Sullivan
L. Lund
S. Coffin
S. Peterson
M. Oprendek, RGN-I

LIST OF ATTENDEES
BALTIMORE GAS AND ELECTRIC COMPANY
CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NO. 1
FEBRUARY 23, 2000

Name	Organization
Alexander Dromerick	NRR/PD I-1
John Haydin	BGE/Calvert Cliffs
Lee Friant	BGE/Calvert Cliffs - NDE
Getachew Tesfaye	BGE
Joseph M. Mate	BGE/Calvert Cliffs
Alan Thornton	BGE/Calvert Cliffs
John Tsao	NRR/DE/EMCB
Ted Sullivan	NRR/DE/EMCB
Louise Lund	NRR/DE/EMCB
Stephanie Coffin	NRR/DE/EMCB

Enclosure 1

BGE

CALVERT CLIFFS

2000 Unit 1 SG Tube Inspection

NRC Presentation

White Flint, Maryland

February 23, 2000

Enclosure 2

NRC Meeting Agenda
Calvert Cliffs Unit 1
Steam Generator Inspection

1. **Introduction** — A. Thornton
2. **Primary Side Activities** — J. Mate
   A. Eddy current inspection scope
   B. Inspection protocol
   C. Tube repairs
   D. In-Situ Pressure Tests
   E. Upper Bundle Inspection
   F. Summary of Examination
3. **Secondary Side Activities** — J. Mate
4. **NRC Interactions** — G. Tesfaye

Steam Generator Inspection Team

BGE:

Al Thornton	SG Project Manager
John Haydin	SG System Manager
Joe Mate	SG NDE Engineer
Getachew Tesfaye	SG Regulatory Engineer
Lee Friant, PhD	NDE Level III

APTECH Engineering:

Primary tube integrity assessment vendor

Framatome/Rockridge Technologies:

Primary tube inspection and repair vendor

BGE

Background Information

* CE Model 67 SGs
  - 8519 tubes per SG
  - tube OD/wall - 0.75"/0.048"
  - tube material - Alloy 600 HT/MA
  - H/L Tube Plugs - Alloy 690
* 17.5 EFPY
* T_{hot} 594° F (since start up)
* Plugging history
  SG 11- 604 (7.1%)
  SG 12 - 776 (9.1%)
* SG Replacement on U-1, 2002

BGE

SG Work Scope Objectives

* Maintain SG tube integrity between inspections
* Proactively inspect and repair SG tubes
* Operate full cycle between inspections
* Meet regulatory requirements and commitments
* Apply site and industry experience

BGE

Exam Preparations

* **Degradation Assessment**
  - ➢ site specific degradation
  - ➢ industry degradation
  - ➢ eddy current techniques/applicability
  - ➢ expansion criteria
  - ➢ repair criteria
* **Site specific analysis guidelines**
* **Site specific analysts' exam**
* **Free span cracking structural integrity assessment**

Examination Philosophy

* **Focus Plus Point probe use on areas with the highest potential for structurally limiting degradation**
  - H/L TTS - axial and circ ODSCC
  - Steam blanket region - axial ODSCC (R 6-13)
* **Upper bundle free span cracking not a structural threat**
  - degradation morphology
  - pulled tube burst tests
  - in-situ pressure tests

Eddy Current Exam

Bobbin Exam:

* 100% Full Length

Plus Point Exam:

* 100% H/L Top of Tubesheet
* 100% Steam Blanket
* 20% Low Row U-bends
* 20% C/L Top of Tubesheet
* Upper Bundle -Based on Bobbin Performance

Expansion Strategy

* **Evaluate the need to expand the exam based on the EPRI PWR S/G Examination Guidelines, Rev. 5**
  - ➢ indication characteristics
  - ➢ location of indications
  - ➢ indication density
  - ➢ metallurgical considerations
  - ➢ eddy current probe and technique capabilities

BGE

Examination Protocol

* **Independent Primary and Secondary Analysis Teams**
* **Independent Analysts**
* **All analysts are QDA qualified**
* **Analyst Performance Tracking and Feedback System**
* **Primary and Secondary Data Management**

Tube Repairs

* **Repair based on detection or confirmation with a Plus Point Probe**
* **Plus Point Data will be used to disposition all bobbin indications**
* **Repair options:**
  - Tube plugging
  - Alloy 800 Tube Sleeves
* **Stabilizers will be installed in tubes containing circumferential defects or loose part degradation that are not sleeved.**

In-Situ Pressure Tests

* **In-Situ pressure testing of SG tubes:**
  - ➢ in-situ pressure tests anticipated on 3 - 5 tubes
  - ➢ evaluate as-found tube conditions
  - ➢ benchmark the performance based tube integrity model
  - ➢ tubes selected based on limiting indication characteristics

Inspection Technology

Bobbin Inspection Techniques:

* Maximize bobbin inspection effectiveness
* Utilize low frequency screening to enhance detection
* Bobbin technique PODs used to develop upper bundle inspection strategy

Upper Bundle Exam

Overview

* **Maintain acceptable probability of burst safety margin**
* **CCNPP SG multi-cycle model**
* **Predicts 2000 condition based on previous inspection results**
* **Applies site specific PODs**
* **Predicts probability of tube burst and leak rate**

Upper Bundle Exam

* **Unit 1 Steam Generator Mode l**
  - ➢ inspection technique POD is based on CCNPP SG pulled tube data(1996)
  - ➢ Bobbin inspection technique POD validated by 1997 Unit 2 and 1998 Unit 1 Plus Point Exams
  - ➢ real time validation of inspection predictions

Examination Summary

Exam maintains SG tube integrity:

* **100% Plus Point inspection of areas with highest potential for structurally limiting degradation**
* **Upper bundle approach maintains POB margin:**
  - Extensive 1996 Plus Pt. exam
  - Pulled tube burst pressures
  - Very low probability of burst
  - Use of condition monitoring
* **Conservative tube repair policy**

Secondary Side Activities

* **Steam Generator Internals Visual Inspection**
  - Inspected in 1996 and 1998 - No degradation found
  - No plans to inspect secondary side in the 2000 RFO

BGE

Conclusion

The 2000 SG work scope:

- maintains CCNPP's focus on nuclear safety
- aggressively identifies and repairs degraded tubes
- provides for inspection scope expansions as necessary to maintain tube integrity
- provides for in-situ tests to validate tube integrity

BGE

NRC Interactions

* **Maintain open communications with the NRC**
* **Brief the NRC Resident Inspector prior to the outage**
* **Resident Inspector**
  - **access to daily Steam Generator Report**
  - **weekly Steam Generator Oversight Committee meetings**
* **Follow-up phone call to NRR**