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PWR  
Calvert Cliffs Nuclear Power Plant

EPRI TR-111031-CD  
Research Project 3343-01  
FINAL REPORT  
July 1998

## **Calvert Cliffs Nuclear Power Plant License Renewal Application**

Prepared by  
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**BGE COMPANY**

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# REPORT SUMMARY

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This report documents the first nuclear power plant license renewal application submitted to the U.S. Nuclear Regulatory Commission (NRC); a significant milestone event for the U.S. nuclear power industry. The option to operate a nuclear power plant beyond its initial license term of 40 years is an important factor in financial decisions and long-term planning for utility asset management and capital improvement. A major step towards demonstrating this option was realized on April 8, 1998, with the submittal of the License Renewal Application (LRA) for the Calvert Cliffs Nuclear Power Plant (CCNPP) to the Nuclear Regulatory Commission by Baltimore Gas and Electric (BGE) in accordance with the requirements of 10 CFR Part 54 and 10 CFR Part 51.

## **Background**

Over the past two decades, an important aspect of the nuclear industry has been the evolution of life cycle management of a nuclear power plant. The requirements to achieve a license to operate a plant up to 60 years is one result of this work. Interaction between utilities and the NRC has resulted in a definition of the technical approach and content of an LRA. The CCNPP LRA is the first to be submitted to the NRC for a commercial nuclear power plant. Its review and safety evaluation will set precedents for the industry.

## **Objectives**

To make available to other utilities in electronic form, the complete CCNPP 3-volume LRA as submitted to the NRC. Publication of this work has been carried out as part of the BGE-EPRI tailored collaboration project for life cycle management, initiated in 1991. As such the CD-ROM is available to EPRI members and other EPRI licensees.

## **Approach**

This report consists of this brief description plus a computer readable CD-ROM which contains:

- 
- The 3-volume License Renewal Application.
    - Volumes 1 and 2: Application Cover Letter plus General Information, Technical Information, and Technical Specifications.
    - Volume 3: Applicant's Environmental Report - Operating License Renewal Stage.
  - This Overview Report.
  - The installation files for the software (Acrobat Reader) that displays the documents.
  - Other files that support accelerated searching with the License Renewal Application.

## **Results**

This report's accompanying CD-ROM contains the application for the renewal of the operating licenses for CCNPP Units 1 and 2 pursuant to the provisions of 10 CFR Part 54 and 10 CFR Part 51 for contents of an application. The content and format for system and commodity reports, and the environmental report, were based on the templates developed by BGE and NRC, through public meetings, as accepted or acknowledged by NRC.

## **EPRI Perspective**

Nuclear power plants, as baseload suppliers of electricity, are major corporate assets. As the nuclear industry enters its fourth decade as a major producer of clean electricity, the structure of the utilities are undergoing a historical landmark transition of economic deregulation and to a competitive, market-driven industry.

A key aspect in the competitiveness of nuclear power plants is flexibility for run/refurbish/retire decisions. In turn, a key factor for such flexibility is the maximum possible operating license term -- a renewed license provides up to a 60-year operating window. Having a predictable regulatory process to achieve a renewed license is an important objective. The CCNPP LRA is a major step in achieving this objective.

## **Interest Categories**

Plant life cycle management  
Licensing and safety assessment

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**Keywords**

License renewal

Aging management

Life cycle management

PWR

Calvert Cliffs Nuclear Power Plant





# ABSTRACT

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This report contains the Calvert Cliffs License Renewal Application (LRA) submitted by Baltimore Gas and Electric Company (BGE) to the Nuclear Regulatory Commission (NRC) on April 8, 1998. This application for the renewal of the operating licenses for Calvert Cliffs Nuclear Power Plant (CCNPP) Units 1 and 2 contains the information pursuant to the provisions of 10 CFR Part 54 and 10 CFR Part 51 for contents of an application. The content and format for system and commodity reports, and the environmental report, were based on the templates developed by BGE and NRC, through public meetings, as accepted or acknowledged by NRC. This report consists of a computer readable CD-ROM which contains:

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# 1

## CALVERT CLIFFS NUCLEAR POWER PLANT LICENSE RENEWAL APPLICATION

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### **Background**

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The purpose is to make available to other utilities in electronic form, the complete CCNPP 3-volume LRA as submitted to the NRC. Publication of this work has been carried out as part of the BGE-EPRI tailored collaboration project for life cycle management, initiated in 1991. As such the CD-ROM is available to EPRI members and other EPRI licensees. A similar CD-ROM will be published by EPRI (TR-111030-CD) for the Oconee LRA.

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  - Volumes 1 and 2: Application Cover Letter plus General Information, Technical Information, and Technical Specifications.
  - Volume 3: Applicant's Environmental Report - Operating License Renewal Stage.
- This Overview Report.
- The installation files for the software (Acrobat Reader) that displays the documents.
- Other files that support accelerated searching with the License Renewal Application.

### CD-ROM Contents

Following is the summary of contents of the 3-volume LRA included in this publication. Navigation to the document on the CD-ROM can be conducted by selecting (double mouse click) any section title listed below.

**Table 1-1**  
**Volume 1**

Application Cover Letter	
Attachment (1) - General Information, Technical Information, & Technical Specifications	
1.0	General Information
Appendix A	
Section 1.0	Introduction
Section 2.0	Integrated Plant Assessment (IPA) Methodology
Section 2.0A	Response to Request for Additional Information for the IPA Methodology
Section 2.1	Time-Limited Aging Analyses
Section 3.1	Component Supports

Section 3.1A	Piping Segments that Provide Structural Support
Section 3.2	Fuel Handling Equipment & Other Heavy Load Handling Cranes
Section 3.3A	Primary Containment Structure
Section 3.3B	Turbine Building Structure
Section 3.3C	Intake Structure
Section 3.3D	Miscellaneous Tank & Valve Enclosures
Section 3.3E	Auxiliary Building & Safety-Related Diesel Generator Building Structures
Section 4.1	Reactor Coolant System
Section 4.2	Reactor Pressure Vessels & Control Element Drive Mechanisms/Electrical System
Section 4.3	Reactor Vessel Internals System
Section 5.1	Auxiliary Feedwater System
Section 5.2	Chemical & Volume Control System
Section 5.3	Component Cooling System
Section 5.4	Compressed Air System

**Table 1-2**  
**Volume 2**

Attachment (1) - General Information, Technical Information, & Technical Specifications (cont.)	
Appendix A	
Section 5.5	Containment Isolation Group
Section 5.6	Containment Spray System
Section 5.7	Diesel Fuel Oil System
Section 5.8	Emergency Diesel Generator System

Section 5.9	Feedwater System
Section 5.10	Fire Protection
Section 5.11A	Auxiliary Building Heating & Ventilation System
Section 5.11B	Primary Containment Heating & Ventilation System
Section 5.11C	Control Room & Diesel Generator Buildings' Heating, Ventilating, & Air Conditioning Systems
Section 5.12	Main Steam, Steam Generator Blowdown, Extraction Steam, & Nitrogen & Hydrogen Systems
Section 5.13	NSSS Sampling System
Section 5.14	Radiation Monitoring System
Section 5.15	Safety Injection System
Section 5.16	Saltwater System
Section 5.17	Service Water System
Section 5.18	Spent Fuel Pool Cooling System
Section 6.1	Cables
Section 6.2	Electrical Commodities
Section 6.3	Environmentally Qualified Equipment
Section 6.4	Instrument Lines
Appendix B	UFSAR Supplement
Appendix C	Technical Specifications

**Table 1-3**  
**Volume 3**

Attachment (2) - Applicant's Environmental Report - Operating License Renewal Stage - Calvert Cliffs Nuclear Power Plant Units 1 & 2	
Section	



Summary	
1.0	Introduction
2.0	Alternatives Including Proposed Action
3.0	Affected Environment
4.0	Environmental Consequences & Mitigating Actions
5.0	Compliance Status
6.0	References
Appendix A	NRC National Environmental Policy Act Issues for License Renewal of Nuclear Power Plants
Appendix B	Clean Water Act Sections 316(a) & 316(b) Documentation
Appendix C	Offsite Well Impact Calculations
Appendix D	Special-Status Species Consultations
Appendix E	Cultural Resources Consultation
Appendix F	Severe Accident Mitigation Alternatives Analysis
Appendix G	NRC Transportation Assessments
Appendix H	Approvals & Certifications

### Using the CD-ROM

After installing the Acrobat Reader Software as described in the Installation section, the Calvert Cliffs License Renewal Application is accessed by opening the file, "CCNPPLRA.PDF." It starts with a picture of the Calvert Cliffs plant and buttons for accessing the contents of the three volumes. You may navigate via the tables that show the contents or directly from the table of contents at the beginning of each LRA volume (select the bookmark icon - second button from left on the tool bar -- if it is not already displayed).

The advantages of publishing as a CD-ROM are:

- Considerable reduction of the amount of paper in a form that can be readily distributed.

- Finding a specific subject matter is rapid. Users can navigate to a specific chapter from the tables of contents, or use the text search capability.
- Users can print any pages of interest from specific reports.

The Acrobat Reader™ software that accesses the CD-ROM is widely used and will operate with both Windows and Macintosh operating systems. The files on the CD-ROM have been purposefully software protected to prevent their alteration. This has been done in two ways: 1) by suppressing the ability to select and paste to the clipboard, and 2) by preventing licensees of the full suite of Acrobat software from being able to modify the files.

Using the Acrobat Reader is via menu bar selections and tool bar icons. The purpose of the menu bar functions is clear from the descriptions.

The On-line Guide, accessible after installation, provides detailed information for using Acrobat Reader.

The files with the extension ".PDF" are Acrobat Reader files.

## **Searching the LRA for Information**

One means of searching is by navigating within the LRA to a chapter subject of interest. This is done by means of links within each volume's table of contents. Selecting a line in these tables will jump to the first page of the section.

The second means of searching is by word "find", similar to this feature in word processing software. This is initiated by selecting the first "pair of binoculars" icon on the tool bar. The search starts from the current position and proceeds sequentially to the next occurrence.

A third means of searching is by text strings. The volumes on the CD-ROM have been processed to quicken such searching. An index of the search results, and their location within the report is also provided as a result of such a search. To do this, select the second "pair of binoculars" icon on the tool bar and type in search information. Use the last four buttons on the tool bar to navigate among your search results and to see how many pages on which the text occurs. Using the advanced search is not as intuitive as other features of the software and readers are encouraged to review the more detailed instructions on searching which can be found by pulling-down the "Help" menu and selecting "Plug-in Help."

Readers should note that the ability to print is available; however, text cannot be copied and pasted into other documents.

## Installation

The installation directions for the Windows version of the Acrobat Reader software are on the CD-ROM and normally involve clicking on the setup.exe file/icon which can be found in the hierarchy of folders: Install/ Rdr\_Srch/32bit (or 16bit - see the README.WRI file to determine which you should use). Be sure you install the version of Acrobat Reader that is on the CD-ROM.

For those who need a Macintosh version of Adobe Reader, please obtain it from Adobe's Web Site at:

<http://www.adobe.com/prodindex/acrobat/readstep.html>

The README.WRI file also provides instructions on obtaining the Macintosh version on a separate CD.

Computer system requirements are:

Windows Requirements	Macintosh Requirements
<ul style="list-style-type: none"><li>• 386-, 486-, or Pentium-based personal computer</li></ul>	<ul style="list-style-type: none"><li>• 68020 (Macintosh II series) or greater processor</li></ul>
<ul style="list-style-type: none"><li>• Microsoft Windows 3.1 or greater</li></ul>	<ul style="list-style-type: none"><li>• MacOS 7.0 or later</li></ul>
<ul style="list-style-type: none"><li>• 8 MB application RAM</li></ul>	<ul style="list-style-type: none"><li>• 4 MB application RAM</li></ul>
<ul style="list-style-type: none"><li>• 4 MB hard disk space</li></ul>	<ul style="list-style-type: none"><li>• 4 MB hard disk space</li></ul>
<ul style="list-style-type: none"><li>• CD-ROM drive</li></ul>	<ul style="list-style-type: none"><li>• CD-ROM player</li></ul>

For further details or problems:

1. Open the Install Directory/Folder on the CD-ROM.
2. Open the Rdr\_Srch Directory/Folder.
3. Open the 16 bit or 32 bit Directory/Folder, depending on your hardware.
4. Open the file README.WRI File.