18

August 23, 2001

Note to: Barry Zalcman, NRR
Dick Eckenrode, NRR
Jerry Wilson, NRR
Jim Turdici, OCFO
Mike Dusaniwskyj, NRR
Marty O'Neill, OGC
Tim Harris, NMSS

From: Diane Jackson, NRR project manager
Amy Cubbage, NRR project manager

SUBJECT: COMMISSION PAPER ON STAFF ASSESSMENT OF EXELON'S LEGAL AND FINANCIAL WHITE PAPERS

Please find attached an outline of the Commission paper on Exelon's legal and financial white papers. The white papers and responders are divided in sections in the Commission paper as follows:

Cover Letter - Diane Jackson/ Amy Cubbage

Attachment Staff Assessment of Exelon's Legal and Financial White Papers
Introduction - Diane Jackson/Amy Cubbage, NRR

A. Operator Staffing Requirements - Dick Eckenrode, NRR
B. Fuel Cycle Impacts: Tables S3 and S4 - Barry Zalcman, NRR
C. Fuel Cycle Impacts: Waste Confidence Act - Tim Harris, NMSS/ Chip Cameron, OGC
D. Financial Qualifications - Mike Dusaniwskyj, NRR
E. Decommission Funding Requirements - Mike Dusaniwskyj, NRR
F. Minimum Decommissioning Cost Requirements - Mike Dusaniwskyj, NRR
G. Antitrust Review Requirements - Marty O'Neill, OGC
H. License Issues
   1. Number of Licenses for Modular Reactors - Marty O'Neill, OGC
   2. Commencement of License Life for COL and Modular Design COL - Marty O'Neill, OGC
   3. Duration of Design Approval - -Diane Jackson/ Jerry Wilson, NRR
I. Annual Fee Issues
   1. Annual Fee requirements - Jim Turdici, OFCO
   2. Commencement of annual fee for COL - Marty O'Neill, OGC
J. Financial Protection Requirements - Marty O'Neill, OGC
K. Testing of New Design Features - Diane Jackson/Jerry Wilson, NRR

Each issue has the following categories:

- Issue statement
- Current Regulations
- Preapplicant's Position
- Discussion
- **Recommendation or Conclusion**

9/19 NWA

Each responder is responsible to address the current regulations, discussion of the issue, and recommendation. We have provided the issue statement and preapplicant's position. The preapplicant's position has written from the information in the white papers. However, if you do not agree that Exelon has properly interpreted a regulation or made a mis-statement, then add this in the Discussion section of your writeup. But we should not remove or change their argument from what they submitted in the white papers. We need to fairly represent the argument made by Exelon. If you think I have summarized it incorrectly, please make the appropriate modifications. Also, comments on the cover letter and introduction are welcome but note that they are early drafts and not final.

You do not need to define acronyms unless it is unique to your issue. For example, use PWR, BWR, NEI, PBMR without spelling it out first. We will take care of this when we do the final paper.

For current regulations, include (when applicable), laws (e.g., Atomic Energy Act, Waste Confidence Rule), agency regulations (e.g., CFR, DOJ regulations), and staff guidance (e.g., SRP, Reg Guides). A good starting point are the white papers, which address some of the regulations. For the discussion, include (if applicable) the staff's considerations, options that the Commission may want to consider, pros and cons of the issue or options, and corrections to Exelon's argument.

Our schedule is as follows:

Milestone	Date
Input to FLO (responders should have management buy-in)	**9/10**
Forward draft to FLO management, responder's management, and Tech Editor	9/26
Receive comments from FLO management and responder's management	10/1
Forward final paper to LT Steering Committee	10/3
Comments from LT Steering Committee on final	10/9
Forward final paper to DOs (NRR, OCFO, NMSS, OGC, RES)	10/11
Receive DO comments	10/17
Forward to EDO	10/24
Forward to Commission	11/01
Possible Commission or TA Brief	2-3 weeks after receipt

Thank you in advance for your efforts on this Commission paper.

cc:
Marsha Gamberoni, NRR
Stuart Rubin, RES

DRAFT OUTLINE

FOR: The Commissioners

FROM: William Travers
Executive Director for Operations

SUBJECT: LEGAL AND FINANCIAL ISSUES RELATED TO EXELON'S PEBBLE BED MODULAR REACTOR (PBMR)

PURPOSE:

To inform the Commission of the staff response to Exelon Generation (Exelon) proposals for selected legal and financial issues and request Commission guidance for those areas where the agency may consider departing from current regulatory requirements.

BACKGROUND:

The Pebble Bed Modular Reactor (PBMR) is a modular high temperature gas cooled reactor design begin pursued for licensing in the United States by Exelon Generation. A PBMR module contains its own reactor and power conversion system to produce approximately 116 MWe. Exelon defines a "PBMR facility" as up to ten small reactors or modules operated from one control room.

In a letter dated, December 5, 2000, Exelon expressed interest in pre-application activities with the staff. In a meeting with the staff on April 30, 2001, the staff began its preapplication review. As part of the meeting, Exelon discussed several legal and financial areas that Exelon believes merits special consideration by the staff due to the unique nature of a either a modular design or gas-cooled reactor design. By letter dated May 10, 2001, Exelon submitted nine white papers requesting an agency response on multiple legal and financial issues. The nine white papers addressed requirements on:

- Operator staffing
- Fuel cycle impacts
- Financial qualifications
- Decommission funding
- Minimum decommissioning costs
- Antitrust review
- Number of licenses
- Annual fees
- Financial protection

Exelon plans to use this information as part of their feasibility study that will assist them in the decision to proceed with licensing in the US. Exelon will make their decision in December 2001.

CONCLUSIONS:

The staff requests approval of, or alternate guidance on, these proposed positions to be taken in the preapplication review of Exelon's PBMR.

STAKEHOLDER INVOLVEMENT:

Do we need this?

COORDINATION:

[The Office of the General Counsel has reviewed this paper and has not legal objection.]

RECOMMENDATIONS:

That the Commission:

- Approve the staff recommendations in Attachments 1 and 2.
-

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William D. Travers
Executive Director
for Operations

Attachment: Staff Assessment of Exelon's Legal and Financial White Papers

ATTACHMENT 1

Staff Assessment of Exelon's Legal and Financial White Papers

As part of the preapplication review, Exelon Generation (Exelon) has submitted for Commission response nine white papers on selected legal and financial issues. Exelon is currently participating in a detailed feasibility study of the PBMR. If the results are favorable, Exelon intends to seek licensing and operation of a PBMR facility as a merchant power plant in the United States. Exelon has identified these issues as regulations that could pose undue and unintended burden when applied to gas-cooled modular reactor facilities or merchant plants. Exelon believes that certain regulations were not designed for and do not contemplate gas-cooled modular facilities being operated as merchant plants. As a result of the interactions with Exelon, the staff has also identified an issue for Commission attention (Items K - M). The regulations addressed in this paper include the following:

A. Operator Staffing Requirements in 10 CFR 50.54(m)
B. Fuel Cycle Impacts: Tables S3 and S4 in 10 CFR 50.51 and 50.52
C. Fuel Cycle Impacts: Waste Confidence Act in 10 CFR 50.23
D. Financial Qualifications in 10 CFR 50.33(f)
E. Decommission Funding Requirements in 10 CFR 50.75
F. Minimum Decommissioning Cost Requirements in 10 CFR 50.75(c)
G. Antitrust Review Requirements in 10 CFR 50.33a
H. License Issues:
    1. Number of Licenses in 10 CFR 50.10
    2. Commencement of License Life for COL and Modular Design COL
    3. Duration of Design Approval
I. Annual Fee Issues:
    1. Annual Fee requirements in 10 CFR Part 171
    2. Commencement of annual fee for COL
J. Financial Protection Requirements in 10 CFR Part 140
K. Testing of New Design Features in 10 CFR Part 52

For the first PBMR facility, Exelon will include within its license application a request for an exemption for most of these regulations and in other cases will provide information to resolve the matters addressed by the regulation.

Discussion of these issues are on the following pages, including a brief summary of the issue, current regulations, preapplicant's positions, discussion of the staff considerations and a proposed recommendation for the Commission response.

A. Operator Staffing

Issue

Should a PBMR facility be allowed to operate more than two reactors per control room and be allowed to operate with a staffing complement that is less than that currently required by regulations.

Current Regulations

[Dick Eckenrode]

For example: The NRC has established the requirements for control room staffing in 10 CFR 50.54(m)(2)(iii) which states a senior operator must be present in the control room at all times and a license operator or senior operator must be present at the control of a fueled nuclear power unit. Section 50.34(m)(2)(i) provides a table identifying the minimum staffing requirements for an operating reactor.

Standard Review Plan 13.1.2, Section II.C states that at any time a licensed nuclear unit is being operated in modes other than cold shutdown, the minimum shift crew shall include two licensed senior reactor operators, one of whom shall be designated as the shift supervisor, two licensed reactor operators, and two unlicenced auxiliary operators.

Preapplicant's Position

The PBMR is designed to have multiple reactors (up to ten) operated from one control room. Each reactor has its own power conversion system. Exelon has not yet determined the appropriate number of operators that would be required to operate multiple reactors from one control room. However, since the PBMR is a passive plant that does not require early operator intervention to mitigate accidents, staffing level will be less than those indicated in Section 50.54(m) would be appropriate for the PBMR.

The regulation does not contain any staffing requirements for more than two units at a site with a common control room. Exelon proposes to justify the licensed operator staffing requirements for 3 or more PBMR modules at a site with a common control room.

Exelon proposes to request an exemption on the minium staffing requirements and location of the SROs and ROs required by Section 50.54(m). Additionally, Exelon will request exemptions from Section 50.54(m) in design certification to avoid duplicate reviews for subsequent PBMRs.

Discussion

[Dick Eckenrode]

Conclusion

[Dick Eckenrode]

B. Environmental Impacts of the Fuel Cycle and Transportation: Tables S3 and S4

Issue

Current regulations address environmental impacts for PWRs and BWRs, however, the impacts from a PBMR could be very different.

Current Regulations

[Barry Zalcman]

Preapplicant's Position

The environmental impacts attributable to the fuel cycle and transportation for the PBMR facility as required by 10 CFR 51.51 and 51.52 (Table S3 and S4) are limited to the impacts from LWRs. The issue is unresolved for a PBMR. Exelon proposes to identify the environmental impacts attributable to the fuel cycle and transportation for a set of modular reactors that constitute a PBMR facility. Since the impacts are generic for all PBMR facilities, the results should serve as a basis for rulemaking. Exelon proposes that rulemaking be initiated to create tables similar to Table S3 and S4 for the PBMR or that the issue be generically resolved for PBMR during design certification rulemaking.

Discussion

[Barry Zalcman]

Recommendation/ Conclusion

[Barry Zalcman]

C. Environmental Impacts of the Fuel Cycle and Transportation: Waste Confidence Rule

Issue

Should PBMR fuel be included in the Waste Confidence Rule.

Current Regulations

[Tim Harris]

Preapplicant's Position

In the Waste Confidence Rule, as revised, the Commission made a generic determination that, if necessary, spent fuel generated from any reactor can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin or at either onsite or offsite independent spent fuel storage installations. 10 CFR 51.23(a) does not distinguish between types of spent fuel. Additionally, in making its findings in support of the Waste Confidence Rule, the Commission explicitly considered non-LWR fuel, including fuel from gas cooled reactors. Accordingly, the Waste Confidence Rule is broad enough to cover fuel irradiated in a gas-cooled reactor like a PBMR. Exelon would like to clarify that long time onsite storage of spent fuel beyond the licensed lifetime of the PBMR is not a concern under the NRC Waste Confidence Rule of 10 CFR 51.23.

Discussion

[Tim Harris]

Recommendation/ Conclusion

[Tim Harris]

D. Financial Qualifications

Issue

Can a group of non-utility plants be given the same status as utilities and be excepted from submitting detailed financial qualifications information?

Current Regulations

[Mike Dusaniwskyj]

Preapplicant's Position

Exelon finds the requirement to submit detailed financial qualifications under Section 50.33(f) to be burdensome and unwarranted for applicants that have assets or parental guarantees. For the first PBMR application, Exelon proposes to submit estimates for the total construction costs and total annual operating costs for each of the first five years of operation of the entire PBMR facility and the source of funds to cover such operating costs as required by Appendix C of Part 50. Exelon also proposes that rulemaking be initiated to define in Section 50.33(f) that a new category of merchant generating companies (non-utilities) have the same status as utilities if it satisfies certain criteria.

Discussion

[Mike Dusaniwskyj]

Recommendation/ Conclusion

[Mike Dusaniwskyj]

E. Decommissioning Funding

Issue

Can Exelon, as a non-utility, propose an alternate method for decommission funding, such as partial prepayment?

Current Regulations

[Mike Dusaniwskyj]

Preapplicant's Position

Most licensees have used the prepayment option for decommissioning funding. A requirement of 100% prepayment for new plants might jeopardize the economic viability of any new plant to be operated on a merchant basis because of the higher present worth of the prepayment relative to other funding mechanisms which allow payments at a later time. Exelon is considering whether some other funding arrangement, authorized under 10 CFR 50.75(e), may be feasible for a PBMR operated as a merchant plant. For example, Exelon is considering to a proposal to allow a plant to accumulate funding at an accelerated rate. At the time of the first application, Exelon would like to propose an alternate decommissioning funding method for the PBMR that could involve a partial payment of the total decommissioning cost estimate and annual contributions over the next 20 years. Exelon believes that the NRC can grant an exemption from Section 50.75(e)(1) to permit this alternative funding approach (or another new alternative method). Exelon has not yet decided on an alternate funding method. However, if the NRC is conceptually opposed to the use of partial prepayment with accelerated funding over 20 years, Exelon needs to know as soon as possible. Exelon also proposes that rulemaking be initiated to modify Section 50.75(e)(1) to explicitly authorize the use of the to-be-proposed alternative funding method.

Discussion

[Mike Dusaniwskyj]

Recommendation/ Conclusion

[Mike Dusaniwskyj]

F. Decommissioning Cost Estimate

Issue

Can a PBMR licensee submit decommissioning cost estimates specifically for a PBMR and on a per module basis?

Current Regulations

[Mike Dusaniwskyj]

Preapplicant's Position

The current regulations specify decommissioning cost estimates for BWRs and PWRs but not for a gas-cooled reactor. The design of a PBMR is significantly different than the design of a BWR or PWR. As a result, the cost estimates are not appropriate for a PBMR module or facility. Exelon proposes that the first PBMR application include a decommissioning cost estimate specifically for a PBMR. Exelon proposes that the cost estimate apply to a single module since the construction of the modules will be staggered.

Discussion

[Mike Dusaniwskyj]

Recommendation/ Conclusion

[Mike Dusaniwskyj]

G. Antitrust Review Authority

Issue

Can the NRC except a non-utility group of plants or merchant plants from the antitrust review?

Current Regulations

[Marty O'Neill]

Preapplicant's Position

Pursuant to Section 105(c)(77) of the AEA, NRC is required to determine whether activities under the license would create or maintain a situation "inconsistent with the antitrust laws". In some instances, these reviews and associated hearings have resulted in imposing various antitrust conditions in the license. These conditions often involved access to transmission. The antitrust provision have limited applicability in the modern electric industry and serve no useful purpose with respect to the proposed operation of the nuclear reactor as a merchant plant. Recognizing the current status of competition in the electric utility industry and the competitive realities surrounding the operation of a merchant nuclear plant, the NRC should make a determination that merchant plant applicants that meet certain criteria (e.g., exempt wholesale generators (EWGs) or generators authorized to sell power at wholesale at market based rates) are excepted from NRC antitrust review. Reasons that merchant plant will not create any situation inconsistent with the antitrust laws include:

- By definition merchant plants operate in a competitive market
- EWGs do not control transmission systems
- Federal Energy Regulatory Commission Order 888 obligates transmission providers to file open access transmission tariffs
- There are a large number of different generating companies owning and operating merchant plants and competing in the generation market.

Exelon proposes the NRC initiate a proceeding, and seek approval from the Attorney General, to define a new category of merchant generating companies (non-utilities) and except them from antitrust reviews. Exelon also proposes that rulemaking be initiated to not subject newly-defined "merchant plants" to an antitrust review. Exelon is working with NEI to support the creation of the excepted class for merchant plants. If the NRC does not reach a decision by the end of the year, Exelon will need to provide the antitrust information or request an exemption to permit Exelon to defer filing of antitrust information until after the NRC makes a decision to except merchant plant operators from antitrust review.

Discussion

[Marty O'Neill]

Conclusion

[Marty O'Neill]

H. License Issues

H.1 Number of Licenses

Issue

How many licenses can be issued for a set of modular reactors that constitute a PBMR facility?

Current Regulations

[Marty O'Neill]

Preapplicant's Position

The definition of a "utilization facility" in Section 101 of the AEA is broad and could be interpreted as including a set of integrated reactor modules. In 10 CFR 50.2 a "utilization facility" is defined as "any nuclear reactor". Under this section, each modules could be classified as a "nuclear reactor." However, the AEA as well as the corresponding regulation in 10 CFR 50.10(a) make it unlawful for a person to possess or use a utilization facility except as authorized by a license issued by the Commission. Neither the AEA or the NRC regulation require that each utilization facility have a separate license. Exelon believes that the Commission could, consistent with the language of both Section 101 of the AEA and 10 CFR 50.10, issue a single license for multiple modules (reactors).

Issuing a single license for multiple PBMR modules would have several beneficial effects. First, issuance of a single license for multiple modules (i.e., reactors) would enable the modules to be treated legally, as well as practically, as a single nuclear facility (e.g., Price Anderson, annual fees and operating staffing). Further, issuance of a single license for a facility consisting of multiple modules would have other benefits, such as administrative efficiency and promotion of standardization among modules. Exelon proposes that the first PBMR application will apply for a single license for a set of multiple modules (reactors). Exelon proposes that rulemaking be initiated to clarify that a "set" of modules may be treated as a single nuclear facility for licensing and "other purposes."

Discussion

[Marty O'Neill]

Recommendation

[Marty O'Neill]

H.2 Commencement of License Life for COL and Modular Design COL

Issue

When should the license start for a COL? If one license is approved for multiple modular reactors, how should the license life be applied?

Discussion

[Marty O'Neill]

Recommendation/ Conclusion

[Marty O'Neill]

H.3 Duration of Design Approval

Issue

For a modular reactor design, how long after initial COL approval should construction of new modules be permitted?

Discussion

[Diane Jackson/Jerry Wilson]

Conclusion

[Diane Jackson/Jerry Wilson]

I. Annual Fee Issues

I.1 Annual Fee Assessment

Issue

How should annual fees be assessed for a set of modular reactors that constitute a PBMR facility?

Current Regulations

[Jim Turdici]

Preapplicant's Position

The current regulations under 10 CFR 171.15(a) states that each person licensed to operate a power reactor shall pay an annual fee "for each unit for each license" which could impose a separate fee for each module (reactor). Therefore, the annual fee for a 10-module PBMR facility would be greatly disproportionate to the annual fee for an equivalent sized BWR or PWR. This could place a modular reactor design at a competitive disadvantage with other designs and act as a disadvantage to the development of modular reactors. In 51 Federal Register at 24084, the NRC comments that "the Commission has determined that the bulk of its licensee-related activities have and will continue to be directly related to the regulation of large power reactors." Exelon presumes that this statement links the decision to require fees for each reactor instead of the entire facility or site. In 1986, when the rule was originally considered, almost all commercial nuclear power facility were large reactors and a multiple modular facility had not yet been developed or approved.

Exelon believes it is not reasonable to treat multiple PBMR modules at a site the same as multiple PWRs or BWRs at a site. For several reasons, the regulatory effort for a 10-module facility could be similar to or lower than the resources for a large BWR or PWR. First, the modules at a site may have a single license. Second, the design is simpler and safer than the design of the PWR or BWR, thereby simplifying NRC's oversight responsibilities. Further, the NRC assesses the annual fee to recover costs that cannot be assigned to any particular facility. This would penalize Exelon for selecting a modular design rather than a large LWR design and would discourage the development of a newer and safer technology.

Exelon proposes that rulemaking for 10 CFR 171.15 be initiated and completed prior to the first PBMR application to specify that only one annual fee will be required for each "set" of PBMR modules. In the rulemaking, NRC should define the term "modular facility," limiting the facility to be no more than 1500 MWe.

Discussion

[Jim Turdici]

Recommendation

[Jim Turdici]

I.2 Commencement of Annual Fees

Issue

When should annual fees commence for a COL holder?

Current Regulations

[Marty O'Neill]

Discussion

[Marty O'Neill]

Recommendation

[Marty O'Neill]

J. Financial Protection

Issue

Should the Price-Anderson Act be applied to each modular reactor or for the PBMR facility?

Current Regulations

[Marty O'Neill]

Preapplicant's Position

The requirement in 10 CFR 140.11 that each nuclear reactor have financial protection has significant implications for modular facilities. Without relief, a 10 ten-module facilities would assume secondary financial liability roughly equal to the entire financial protection that is available under Price-Anderson today. This result would be contrary to the intent of the Price-Anderson Act in spreading the risk of liability across the industry.

Although 10 CFR 140.11 requires financial protection requirements on each "nuclear reactor," the AEA requires each "license" to have a condition requiring a "licensee" to maintain financial protection. Section 170(b) of the AEA requires each licensee to have primary financial protection for facilities and to have secondary financial protection for facilities designed for a rated capacity of 100 megawatts or more.

Exelon proposes for the first PBMR application that multiple reactor modules be treated as an equivalent sized LWR. Exelon's potential liability for retrospective premiums in the event of an accident at another plant should not be substantially higher than the liability of an equivalent sized LWR, merely because Exelon is using a modular design rather than a large LWR design. In the application, Exelon will show that the risks of a severe accident at a 10-module PBMR facility are less than the risks of a severe accident at a LWR. And therefore, the risk that another nuclear plant will incur retrospective liability under the Price-Anderson Act as a result of an accident at the PBMR facility is less than the risk of such liability from an accident at a LWR. In the first application, Exelon will also provide additional support for such an exemption, including providing a technical justification for the exemption based upon a comparison of the risks of a PBMR facility and an LWR. Exelon also proposes that rulemaking be initiated to state that financial protection requirements apply to a licensee for a nuclear facility and define that a facility may include multiple reactor modules at a site. The definition of utilization facility and nuclear reactor in 10 CFR 50.2 should also be amended to include multiple reactor modules at a site. Exelon suggests that the total size of each modular nuclear reactor facility be limited to no more than 1500 MWe. Such a limit provides reasonable basis for rulemaking by placing a modular nuclear facility on a equivalent footing with a current LWR for purposes of the Price-Anderson Act.

Discussion

[Marty O'Neill]

Conclusion

K. Testing of New Design Features

Issue

Should applicants be required to complete necessary testing to demonstrate new design technology prior to issuance of a COL?

Current Regulations

[Diane Jackson/Jerry Wilson]

Preapplicant's Position

This is a staff identified issue. Exelon has requested to be informed of the agency's decision.

Discussion

[Diane Jackson/Jerry Wilson]