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Exelon Generation

Docket No.: Project 713

May 25, 2001

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

RE: April 30, 2001 Meeting at NRC Headquarters between NRC Staff and Exelon Generation

Subject: Pebble Bed Modular Reactor (PBMR) 10 CFR Part 52 Applications and Licensing Plan

Dear Sir/Madam:

As discussed during the referenced meeting, Exelon Generation has proposed a plan to obtain an Early Site Permit, Combined License, and Standard Design Certification for the initial PBMR facilities in the United States in accordance with 10 CFR Part 52. The plan sequence, timing, and projected duration of each regulatory element regarding application and NRC review is provided in the attached documents (1 through 4).

Since these Part 52 processes have not yet been fully exercised by a US merchant generator-applicant, Exelon requests that the NRC review and provide feedback on the Exelon plan in order to ensure that there is a common understanding of the process to be followed for the PBMR (including the sequence and timing of the major milestones).

Exelon desires this exchange of information to assess the feasibility of seeking license and certification of the PBMR. Therefore, it is requested that the NRC's conclusions be provided to Exelon before August 2001. In particular, Exelon would like to explore the NRC's views on the following questions:

- Is the proposed sequencing (Early Site Permit, Combined License, and Design Certification) conceptually acceptable, and in accordance with your interpretation of the current regulations?
- Are the proposed durations and schedules feasible?
- What are the assumptions that frame the NRC's views?

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Thank you for your consideration and assistance in connection with these pre-application matters. We look forward to working with you and the NRC staff to address these first-of-a-kind important regulatory issues.

Sincerely,

James A. Muntz
Vice President, Nuclear Projects

Attachments (4)

cc: William Travers, EDO
Samuel Collins, Director NRR
Ashok Thadani, Director RES
Thomas King, RES
William Borchardt, Associated Director NRR
Richard Barrett, NRR
Amy Cubbage, NRR
Diane Jackson, NRR
Stuart Rubin, RES
Jerry Wilson, NRR
Janice Moore, OGC
Ron Simard, NEI

ATTACHMENT 1

PROPOSED LICENSING AND CERTIFICATION PROCESS FOR THE PBMR

Purpose

In conjunction with its international partners, Exelon Generation (Exelon) is currently participating in a detailed feasibility study of the Pebble Bed Modular Reactor (PBMR). If the results of this study are favorable, Exelon intends to apply for authority to construct and operate one or more PBMRs in the United States. For the purposes of this paper, it is assumed that the results of the feasibility study will support moving forward to implementation in the United States and the initial project schedule milestones, described in the next section, are achievable. Based upon that assumption, this paper identifies and recommends the process and timing for licensing and certification of a PBMR facility in the United States.

Background

Currently, it is expected that the final design for the PBMR will be available in 2002, that construction of a full-scale prototype of the PBMR could be completed in South Africa by the end of 2004, and that demonstration testing of that PBMR could occur during 2005.

Assuming favorable results from the detailed feasibility study regarding the project and South Africa demonstration plant construction and testing, Exelon desires to construct PBMR facilities in the United States. Under the scenario currently envisioned by Exelon, the first facility would consist of up to ten modules, and may be located at a site which has previously received NRC review under a construction permit or operating license proceeding. Under the proposed scenario, the first module would receive the necessary license and would be constructed and ready to load fuel approximately six months after completion of prototype testing in South Africa, and the completion of construction of the remaining modules would be staggered at initially 6 month intervals, working towards 3 month intervals.

Applications

The following applications for the PBMR will be submitted to the Nuclear Regulatory Commission (NRC):

1) Exelon will submit applications for one or more Early Site Permits (ESP) under Subpart A of 10 CFR Part 52. The first ESP application could be submitted in mid 2002.

2) In early 2002, Exelon will submit antitrust information as currently required or take actions appropriate for merchant plant applications if NRC were to create a class of merchant plants excepted from antitrust review under Section 105(c) (7) of the Atomic Energy Act.

3) Exelon will submit an application for a Combined License (COL) under Subpart C of 10 CFR Part 52 for a PBMR facility consisting of up to 10 PBMR modules. This application will be submitted in late 2002 or early 2003, when the design of the PBMR is sufficiently complete.

4) Exelon, or a domestic company owned by Exelon and its international PBMR partners, will submit an application under Subpart B of 10 CFR Part 52 for final design approval (FDA) and design certification (DC) of a PBMR facility consisting of up to 10 PBMR modules. This application will be submitted following issuance of the COL.

Given the time required for NRC review and approval of each application, and the prerequisites for issuance of approval of each application, Exelon anticipates that approval of the applications would occur in the following sequence:

1) It is expected that the ESP will be approved prior to approval of the COL application. If it were assumed that the ESP process for an existing site would take less than two years, the ESP could be issued in mid 2004.

2) Antitrust review (if necessary) is expected to be completed within 18 months of the application with associated findings issued in 2003.

3) As indicated above, it is expected that the COL will be issued after issuance of the ESP. Furthermore, Subpart C of Part 52 does not require prototype testing prior to issuance of a COL. If it were assumed that the COL process would take about two years, the COL would be issued by the first half of 2005.

4) Under 10 CFR § 52.47(b)(2)(i)(B), a design certification cannot be issued until the completion of acceptable prototype testing. Therefore, design certification of the PBMR could not occur until 2006, at the earliest.

Interrelationship Among the Applications

Contents of the Applications

The application for the ESP will include the information required by 10 CFR § 52.17. The application will primarily consist of three reports: 1) an Environmental Report (ER) using the same format and providing the same type of information as an ER for a COL; 2) a Site Safety Analysis Report, providing the applicable information specified in Section 52.17(a)(1); and 3) site emergency plan information specified in Section 52.17(b)(1). The ESP application may also include a site redress plan under 10 CFR § 52.25 that, in conjunction with the NRC's environmental impact statement (EIS) for the ESP, will enable Exelon to conduct non-safety activities at the site prior to issuance of the COL.[1]

[1] Exelon may also request permission to conduct other site activities under 10 CFR § 50.10(e)(3) and/or § 50.12(b).

The application for the COL will include the information required by 10 CFR §§ 52.75, 52.77,[2] 52.78, and 52.79. This application will primarily consist of the following:

- The application will incorporate by reference the Environmental Report and other information that are part of the ESP application. As required by 10 CFR § 52.79(a)(1), the COL application will demonstrate that the PBMR falls within the specified parameters in the ESP application.

- The application will include a final safety analysis report (FSAR). The FSAR will incorporate by reference the Site Safety Analysis Report in the ESP application.

- The application will include inspections, tests, analyses, and acceptance criteria (ITAAC) and other information required by 10 CFR § 52.79(b).

- As explained more fully in a separate submission by Exelon, the COL application will request that a single COL be issued encompassing up to ten modules. Exelon envisions that the bulk of the COL will contain conditions that will be equally applicable to all modules. Additionally, as necessary, Exelon believes that the COL could contain separate conditions or ITAAC applicable to particular modules.

- Completion of demonstration testing is not a legal prerequisite for issuance of a COL, and the COL application will be submitted prior to performance of demonstration testing in South Africa. However, the COL could state that demonstration testing will be conducted to confirm the design and analyses that form the bases for the COL. The COL could state that this confirmatory testing may be completed on the demonstration PBMR in South Africa and/or on the first module authorized to operate in the United States.[3]

The application for the FDA and design certification will include the information required by 10 CFR § 52.47. This application will primarily consist of a Design Control Document (DCD), which will include: 1) ITAAC and interface criteria under Section 52.47(a)(vi) and (vii); and 2) a Tier 2 document with the same form and applicable content as a final safety analysis report for a COL. It is expected that the design certification ITAAC will consist of a subset of the ITAAC in the COL, and that the Tier 2 document will consist of a subset of the information in the FSAR for the COL.

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[2] This section (through its reference to 10 CFR § 50.33a) requires submission of antitrust information nine months prior to submission of the COL application. As explained in a separate submission, Exelon believes that it would be appropriate for the NRC to create a class of merchant plants that is excluded from antitrust review. If NRC creates such a class, Exelon would not need to submit this antitrust information.

[3] Although unlikely, it is conceivable that construction and prototype testing in South Africa will not be completed at the time the NRC authorizes the first PBMR module to operate in the United States. In that event, full prototype testing can be performed on the first PBMR in the United States. Because such testing can only occur after fuel load, it would not be appropriate to include a requirement for prototype testing as an ITAAC. Instead, a requirement for prototype testing could be included as a license condition.

Sequence of Review of the Applications

FDA/DC and COL Applications

The application for the FDA/DC will be submitted after issuance of the COL. The DC ITAAC and the Tier 2 document in the FDA/DC application will be a subset of the information in the COL application.

As a result, the NRC staff and ACRS reviews would be reduced by using the results of the approval of the COL application. The remaining review would focus on any new information in the FDA/DC application (e.g., the Tier 1 certified design, and the results of prototype testing).

Design Certification and Prototype Testing

As indicated above, prototype testing is a prerequisite to issuance of a design certification. Possibly, at the time of submission of the FDA/DC application, prototype testing on the PBMR will not be complete in South Africa, and therefore the results of the testing may not be included in the initial application. Upon completion of prototype testing, the applicant for design certification will provide the results of the testing to NRC as an amendment to the application. The NRC staff would then confirm that the results are consistent with the design and analyses that form the bases for the Tier 2 document. The Commission would then publish a proposed design certification rule for public comment and opportunity for informal hearing pursuant to 10 CFR § 52.51, and based on a satisfactory outcome, proceed to issue the final design certification rule.

Completion of ITAAC

As required by 10 CFR § 52.97(b), the COL will include ITAAC for the PBMR. Since the design of each module will be identical, the COL will only need to include one set of ITAAC. These ITAAC will in turn be applicable to each PBMR module.

Exelon currently expects that construction of the PBMR modules will be completed at staggered intervals. As contemplated in 10 CFR § 52.103(g), the NRC must find that the entire set of ITAAC is satisfied for each module. In general, this will necessitate a separate finding that each individual ITAAC has been satisfied for each module. However, there may be some ITAAC that can be satisfied by a single finding applicable to all modules. For example:

- Some ITAAC may require type testing. A finding of satisfaction of those ITAAC would be equally applicable to all modules, because the type testing would be independent of construction of any particular module.

- Some ITAAC may be in the form of Design Acceptance Criteria (DAC). A finding of satisfaction of a DAC would be equally applicable to all modules, because development of the design details to satisfy the DAC will be independent of construction of any particular module.

- Some ITAAC may apply to common facilities (e.g., the structures associated with the common control room). A finding of satisfaction of an ITAAC for a common facility will be equally applicable to all modules using the common facility.

- Some ITAAC may apply to construction activities that are conducted simultaneously for one or more modules (e.g., Exelon may decide to complete substantial foundation work for all modules at the same time). In such an event, it may be possible to satisfy the ITAAC with a single finding covering the work for all modules.

In any event, because construction of the modules will be completed at different times, there will be a need for a separate § 52.103(g) finding for each module.

Anticipated Milestones

Attachments 2, 3 and 4 provide tabular and visual summaries for the ESP, COL and DC processes. In summary, the representative milestone schedules are fully consistent with NRC's rules, involve no short cuts, and are achievable by both Exelon and the NRC.[4]

[4] There are currently 8 operating nuclear plants (Palo Verde, Braidwood, Byron, Catawba, Clinton, Seabrook, South Texas Project, and Callaway) that received construction permits (CPs) in 1975-76 (the first two years of the existence of NRC). The time between docketing of the CP application and issuance of the CP ranged from about 18 months to 36 months, with an average time of 26.5 months.

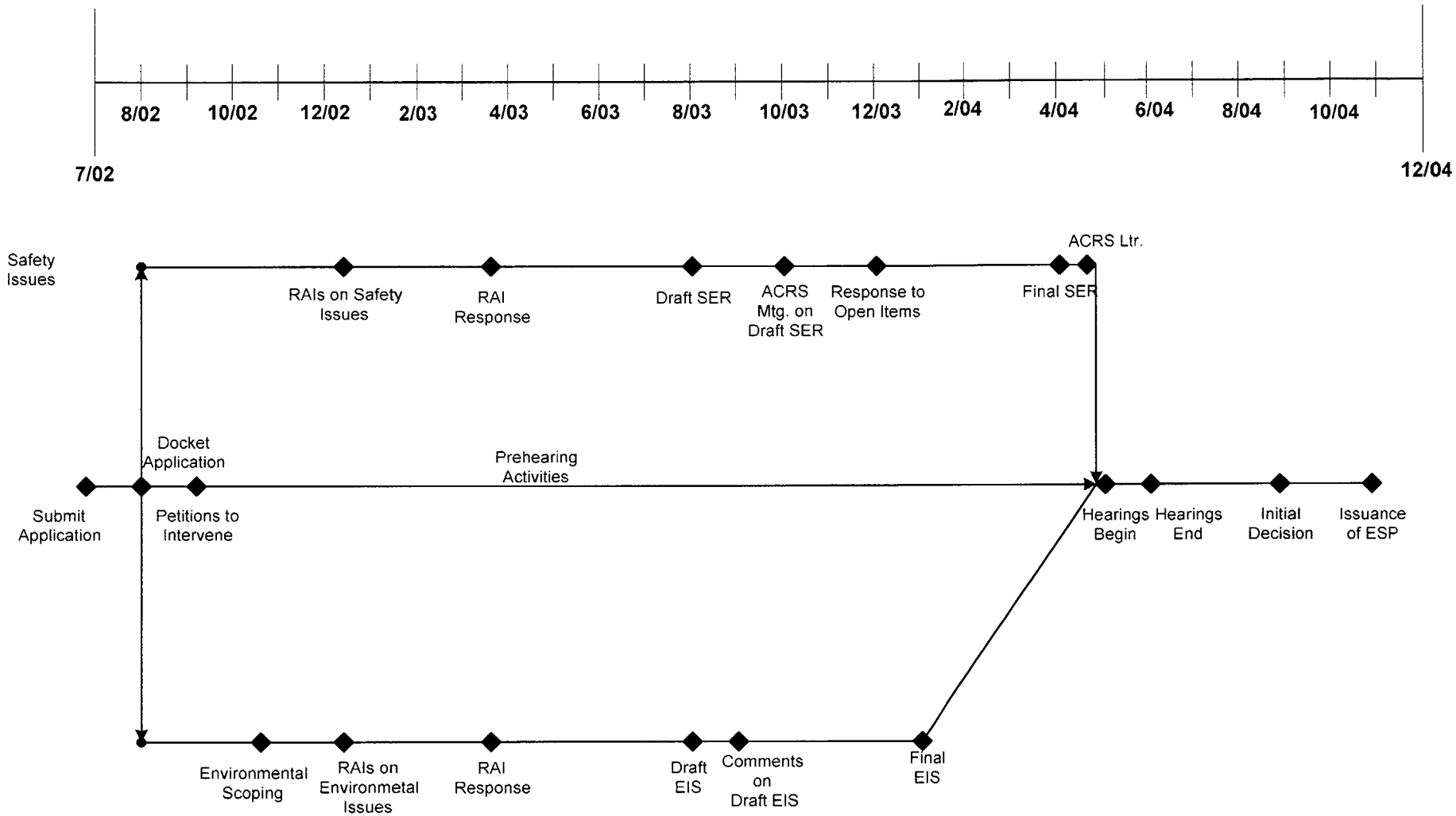
ATTACHMENT 2

MILESTONE SCHEDULE FOR ESP PROCEEDING

ESP Activity	Rule/Timing	Approximate Date
Submit application for siting one or more nuclear facilities. Application includes information required by 10 CFR § 52.17 (Site Safety Analysis Report and Environmental Report).	10 CFR § 52.17 10 CFR § 2.101	7/1/02
NRC staff reviews the application for completeness.	Section 2.101(a)(2) states that this will generally occur within 30 days of filing the application.	8/1/02
NRC publishes notice of hearing on ESP Application.	This is required by § 2.104 and occurs shortly after initial staff review.	8/8/02
NRC publishes notice of intent to prepare EIS and conduct scoping process.	This is required by § 51.26.	8/8/02
Last date for petitions to intervene.	No set period, but typically 30 days. See § 2.105(d).	9/7/02
NRC staff Request for Additional Information (RAI) on ESP application	This process should begin as soon as possible after the application is received, but typically 30 days after docketing. Whenever possible, public-meeting discussions with the Staff should take place to expedite exchange of information in the application.	9/8/02*
Environmental scoping meeting.	This meeting is not required. See § 51.27(a)(4). If held, it will usually be about 6 weeks after notice of intent to prepare an EIS.	9/21/02
EIS scoping period ends and NRC issues scoping summary.	This is required by § 51.29(b), and usually occurs within 30 days of the scoping meeting.	10/21/02
NRC staff final RAIs on ESP application.	No set timeframe. This is assumed to be complete 4 months after docketing.	12/21/02*
Applicant responds to RAIs.	This is assumed to be complete 1-3 months after the last RAI.	3/21/03*
Draft EIS (DEIS) issued for comment.	This is required by §§ 51.70 and 51.75. This is approximately 4 months after applicant responds to RAIs.	8/1/03*
Draft SER on siting issues issued.	This is approximately 4 months after applicant responds to RAIs.	8/1/03*
End of comment period of DEIS.	Minimum 45-day comment period per § 51.73.	9/18/03
ACRS meeting on draft SER on ESP siting issues.		10/1/03
Response to open items in draft SER on ESP siting issues.		12/1/03*
Final EIS (FEIS).	Per §§ 51.90 and 51.91.	1/18/04
SER on ESP siting issues.		4/1/04*
ACRS meeting on SER on ESP siting issues.		4/15/04
ACRS submits letter on ESP siting issues.	This is required by § 52.23.	4/22/04
Hearings begin on ESP siting issues	This is required by § 52.21.	5/1/04
Hearings end on ESP siting issues	Length depends on the range of issues and parties	6/1/04

ESP Activity	Rule/Timing	Approximate Date
ASLB issues initial decision on the ESP.	Section 2.754 provides for a 55-day period for submitting proposed findings of fact and conclusions of law, and Appendix A.VI(d) to Part 2 states the expectation that the initial decision will be issued 35 days later.	9/1/04
NRC staff issues ESP following Commission review; site activities begin under § 52.25 and § 50.10(e)(3).	Section 2.760 states that the Commission will seek to issue a decision within 60 days of the ASLB initial decision. Commencement of activities under § 50.10(e)(3) assumes that there are no unresolved safety issues related to the activities.	11/15/04

* Items marked with the asterisk are very dependent on the effectiveness of project management of the Applicant and NRC Staff resources in conducting reviews and responses with a sense of urgency appropriate to bringing merchant plants to market. With effective communication and project management of each controllable step, this overall process timeline can be reduced.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Safety Issues
RAIs on Safety Issues
RAI Response
Draft SER
ACRS Mtg. on Draft SER
Response to Open Items
Final SER
ACRS Ltr.
Docket Application
Prehearing Activities
Submit Application
Petitions to Intervene
Hearings Begin
Hearings End
Initial Decision
Issuance of ESP
Environmental Scoping
RAIs on Environmetal Issues
RAI Response
Draft EIS
Comments on Draft EIS
Final EIS

ATTACHMENT 3

MILESTONE SCHEDULE FOR PBMR COL PROCEEDING

COL Activity	Rule/Timing	Approx.Date
Submit COL application for 10 PBMR modules.[1]		12/1/02
NRC staff reviews the COL application for completeness.	Section 2.101(a)(2) states that this will generally occur within 30 days after filing the application.	1/2/03
NRC publishes notice of hearing on COL application.	This is required by § 2.104.	1/9/03
NRC publishes notice of intent to prepare EIS on COL application.	This is required under § 51.26. May be limited if ESP pending or approved	1/9/03
NRC begins issuing RAIs.	This process should begin as soon as possible after the application is received, but typically 30 days after docketing. Whenever possible, public-meeting discussions with the Staff should take place to expedite exchange of information in the application.	1/9/03
Last date for petitions to intervene in COL application.	No set period, but typically 30 days. See § 2.105(d).	2/9/03
NRC staff finishes issuing RAIs.	No set timeframe.	5/15/03*
Applicant responds to RAIs on COL application.	No set timeframe. This is assumed to be complete 1-4 months after the last RAI.	8/15/03*
NRC staff issues draft SER.		12/15/03*
NRC issues draft EIS for comment, which supplements information in EIS for ESP.	This is required by §§ 51.70 and 51.74 and usually occurs 4 months after applicant responds to RAIs.	12/15/03*
End of comment period on draft EIS.	Minimum 45-day comment period per § 51.73.	2/1/04
ACRS meeting on draft SER.		2/15/04
Applicant responds to open items in draft SER.		4/15/04*
Final EIS.	Per §§ 51.90 and 51.91.	5/1/04
SER.		8/15/04
ACRS meeting on SER.		9/1/04
ACRS letter.	This is required by § 52.87.	9/15/04
Hearings begin.		10/1/04
Hearings end.	Length depends on the range of issues and parties	11/1/04
ASLB issues initial decision on COL.	Section 2.754 provides for a 55-day period for submitting proposed findings of fact and conclusions of law, and Appendix A.VI(d) to Part 2 states the expectation that the initial decision will be issued 35 days later.	2/1/05

[1] Under 10 CFR § 50.33a(6), the antitrust portion of the application must be filed at least 9 months and no more than 36 months prior to the rest of the application.

COL Activity	Rule/Timing	Approx.Date
NRC staff issues COL following Commission review.	Section 2.764 states that the Commission will seek to issue a decision within 60 days of the ASLB initial decision.	4/15/05
ITAAC satisfied for first module; first module authorized to operate under § 52.103.	As provided by § 52.103, there will be an opportunity for hearings on satisfaction of the ITAAC. However, NRC may authorize operation notwithstanding any pending hearings.	12/01/06

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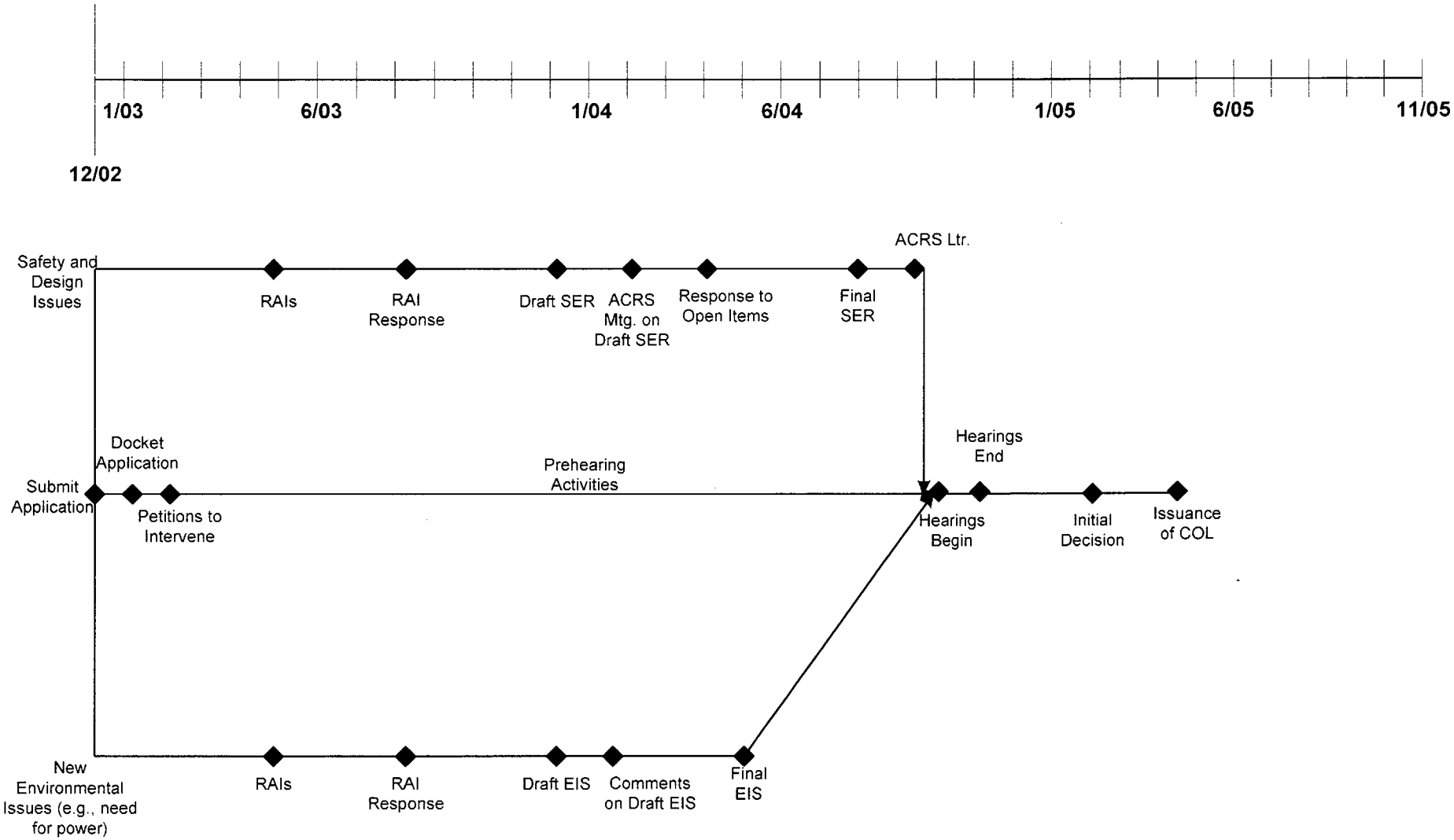
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Safety and Design Issues
RAIs
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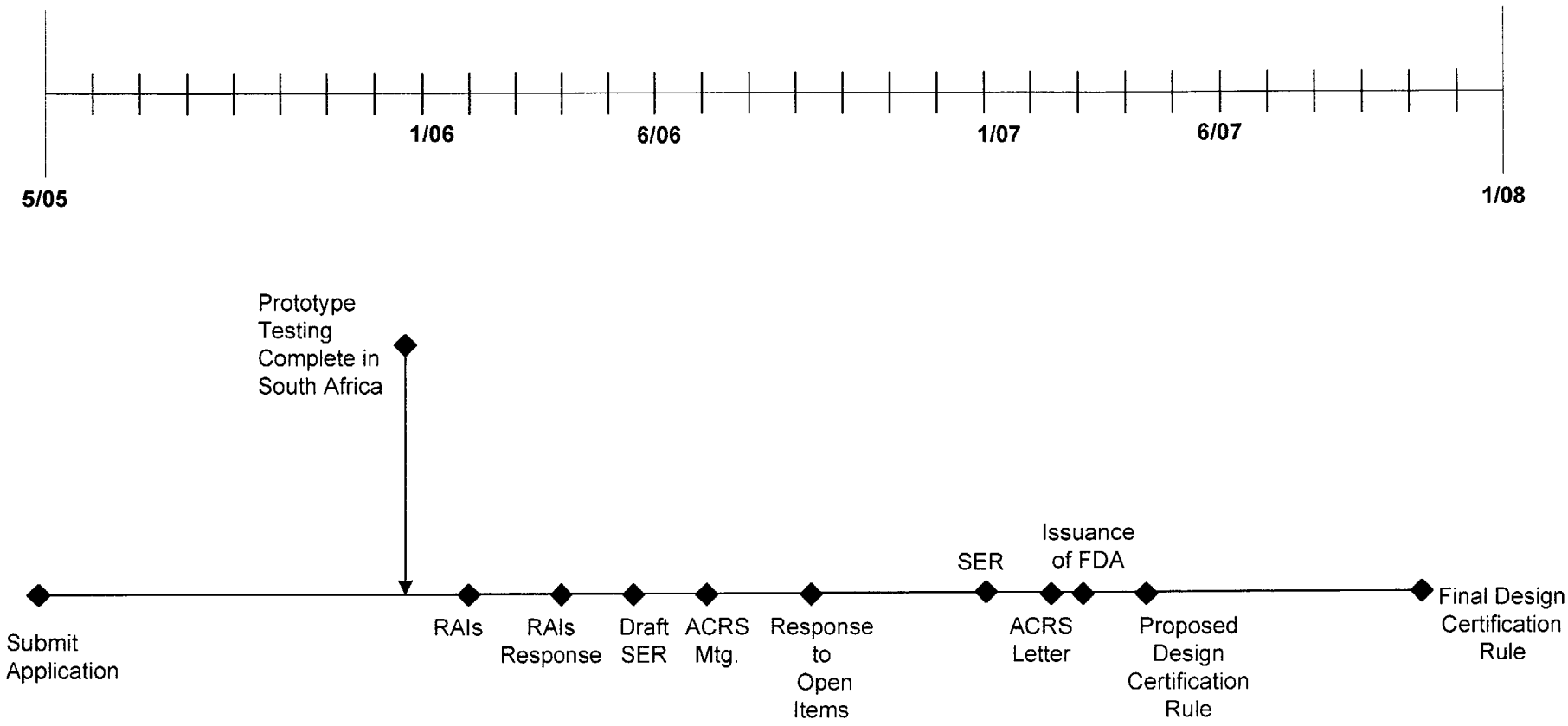
ACRS Ltr.
Submit Application
Docket Application
Petitions to Intervene
Prehearing Activities
Hearings Begin
Hearings End
Initial Decision
Issuance of COL
New Environmental Issues (e.g., need for power)
RAIs
RAI Response
Draft EIS
Comments on Draft EIS
Final EIS

ATTACHMENT 4

MILESTONE SCHEDULE FOR PBMR FDA AND DC

FDA/DC Activity	Rule/Timing	Approx.Date
Submit application, which includes a Design Control Document.	10 CFR § 52.47	5/1/05
NRC staff reviews application for completeness.	§ 2.101(a)(2) provides for a 30-day review period.	6/1/05
Prototype testing is completed in South Africa, and test results are submitted to the NRC.		12/31/05
NRC staff issues RAIs on standard design issues.		2/1/06*
Applicant responds to RAIs on standard design issues.		4/1/06*
NRC issues draft SER on standard design issues.		5/15/06*
ACRS meeting on draft SER on standard design issues.		7/1/06
Applicant responds to open items in draft SER on standard design issues.		9/15/06*
NRC issues SER on standard design issues.		1/15/07*
ACRS meeting on SER on standard design issues.		2/1/07
ACRS letter on standard design issues.	This is required by § 52.53.	2/15/07
NRC staff issues FDA for PBMR.		3/1/07
Proposed design certification rule for PMBR.		4/15/07
Final design certification rule for PBMR.	This assumes that there are no informal hearings on the proposed rule under § 52.51. If there are hearings, issuance of the final rule could be delayed until 2008.	11/15/07

* Items marked with the asterisk are very dependent on the effectiveness of project management of the Applicant and NRC Staff resources in conducting reviews and responses with a sense of urgency appropriate to bringing merchant plants to market. With effective communication and project management of each controllable step, this overall process timeline can be reduced.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