

From: Ross Moore <ross@oklo.com>
Sent: Tuesday, August 31, 2021 9:25 PM
To: Mazza, Jan
Cc: Williams, Donna; Kennedy, William; Caroline Cochran; Alex Renner; John Hanson
Subject: [External_Sender] Re: Re: Re: FW: Re: Public Meeting on Oklo topical reports
Attachments: Oklo slides - PB MCA TR public meeting - 9-1-21.pptx

Hi Jan,

Resending slides below. The last set apparently exceeded the file size for NRC email. Let me know if you have any questions.

Thanks!
Ross

On Tue, Aug 31, 2021 at 6:17 PM Ross Moore <ross@oklo.com> wrote:
Jan,

Thanks for the follow up. Attached are our slides for tomorrow's meeting. We did put the MCA comment first so that will be the first discussion point.

Let me know if you have any questions. Thanks!

Ross

On Tue, Aug 31, 2021 at 2:12 PM Mazza, Jan <Jan.Mazza@nrc.gov> wrote:

Hi Ross,

Just a reminder to send me any slides that Oklo plans to present during the meeting tomorrow. I will attempt to get them in public ADAMS ahead of the meeting in case we have members of the public that call in instead of signing on to Teams. We were hoping discuss the MCA question first since it only covers one item and then move on to the PBLM discussion, if that is agreeable with Oklo.

Also we have updated the agenda to accommodate a break in the middle of the meeting in case we need it. The Agenda is below. Thanks - Jan

Meeting Agenda

Time	Topic	Spe
3:00 – 3:10 pm	Introductions	NRC/Oklo
3:10 – 3:45 pm	Technical Discussion	Oklo/NRC
3:45 – 3:50 pm	Opportunity for Public Questions/Comments	NRC/Public
3:50 – 4:05 pm	Break	ALL
4:05 – 4:40 pm	Technical Discussion	Oklo/NRC
4:40 – 4:50 pm	Opportunity for Public Questions/Comments	NRC/Public
4:50 – 5:00 pm	Wrap up and Adjourn	ALL

From: Ross Moore <ross@oklo.com>

Sent: Thursday, August 26, 2021 9:34 AM

To: Kennedy, William <William.Kennedy@nrc.gov>

Cc: Mazza, Jan <Jan.Mazza@nrc.gov>; Williams, Donna <Donna.Williams@nrc.gov>

Subject: [External_Sender] Re: Re: FW: Re: Public Meeting on Oklo topical reports

Thanks Duke,

Feel free to reach out with any questions (or you can text/call my cell below). I'll be sure to include Donna on any future comms for these meetings while Jan is out.

Thanks again!

Ross

484-678-8543

On Wed, Aug 25, 2021 at 4:54 PM Kennedy, William <William.Kennedy@nrc.gov> wrote:

Ross,

Thanks for sending this. It will be helpful to focus the discussions.

Jan is out this week, so please copy Donna Williams on further emails.

Duke

From: Ross Moore <ross@oklo.com>
Sent: Wednesday, August 25, 2021 6:38 AM
To: Mazza, Jan <Jan.Mazza@nrc.gov>
Cc: Caroline Cochran <c@oklo.com>; Kennedy, William <William.Kennedy@nrc.gov>
Subject: [External_Sender] Re: FW: Re: Public Meeting on Oklo topical reports

Hi Jan,

Per your requested input.

1. I think the public meeting notice captures the proposed agenda accurately, I'm not sure if there's anything specific you think warrants an update.
2. Oklo attendees: Ross Moore, Caroline Cochran, Alex Renner, John Hanson
3. Purpose of the meeting is to reach alignment on key comments from the NRC completeness review to ensure the appropriate supplements can be made to the topical reports for full review.
4. Expectations: Oklo expects to discuss specific comments to get clarification and understanding on them and the decisions the staff is looking to make based on the supplemental information being requested, to support augmentation of the topical reports.
5. Specific information: We expect to discuss both topical reports. For the MCA topical report, we'd tentatively like to discuss item IV. For the Performance-based licensing methodology topical report, we'd tentatively like to discuss items I.C, I.D, II, and III.
6. We will look to prepare some presentation materials in advance of the meeting. I can provide slides as soon as they are finalized.

Let me know if you have any questions,

Thanks!

Ross

On Mon, Aug 23, 2021 at 7:09 AM Mazza, Jan <Jan.Mazza@nrc.gov> wrote:

Hi Ross,

Please let me know when you will be able to provide the information about the public meeting requested below. I will be taking some leave this week and I will need this to finalize the meeting notice and for the technical staff to prepare.

Thanks - Jan

From: Mazza, Jan
Sent: Wednesday, August 18, 2021 4:40 PM
To: Ross Moore <ross@oklo.com>
Cc: Caroline Cochran <c@oklo.com>; Kennedy, William <William.Kennedy@nrc.gov>
Subject: RE: Re: Public Meeting on Oklo topical reports

Hi Ross,

Yes, 3:00-5:00pm EST on September 1, 2021 works for us. Also thank you for the additional public meeting dates. I will start working on notices for them and will await the agenda for the 9-1 meeting for that notice.

Thanks - Jan

From: Ross Moore <ross@oklo.com>
Sent: Wednesday, August 18, 2021 2:29 PM
To: Mazza, Jan <Jan.Mazza@nrc.gov>
Cc: Caroline Cochran <c@oklo.com>; Kennedy, William <William.Kennedy@nrc.gov>
Subject: [External_Sender] Re: Public Meeting on Oklo topical reports

Hi Jan,

Can we hold 3-5pm EST on 9/1?

There is not a great "recurring" time slot in September; however, I would also like to propose the following dates as subsequent meeting dates/times (which we can choose to cancel if not needed):

9/8 2-4pm EST

9/16 1-3pm EST

9/21 3-5pm EST

9/28 3-5pm EST

Let me know if those times work for your team.

In the meantime, I will also look to provide the additional information you requested for the public meeting notice information.

Ross

On Wed, Aug 18, 2021 at 1:10 PM Mazza, Jan <Jan.Mazza@nrc.gov> wrote:

Hi Ross,

Thank you for your email and interest in meeting to discuss the topical reports. This will be a good opportunity for the NRC technical reviewers and Oklo staff to have a common understanding of the information needed for the review of the topical reports. We would like to further understand certain aspects of your request to ensure a successful meeting. To do this, we will need the following information:

1. Proposed agenda (need this ASAP for the public meeting notice)
2. Who will attend from Oklo
3. Purpose of the meeting
4. Expectations for what Oklo would like to accomplish during the meeting (e.g., further understanding of NRC's requested information? how Oklo proposes to respond to required supplemental information?).
5. The specific supplemental information that Oklo would like to discuss. Is it for both topical reports?
6. Will Oklo provide presentation materials ahead of the meeting?

We considered your request for a less than 10 day meeting notice, however, based on staff availability we are proposing September 1 for the meeting. Both morning and afternoon are available. After reviewing the NRCs updated meeting categories and level of participation, it appears that this would be an "Observation Meeting" as you noted in your email. Also since this is an NRC noticed meeting, the Microsoft TEAMS platform will be used.

I would be happy to discuss this with you further if you have any questions.

Thanks - Jan

From: Ross Moore <ross@oklo.com>
Sent: Wednesday, August 18, 2021 9:12 AM
To: Mazza, Jan <Jan.Mazza@nrc.gov>; Kennedy, William <William.Kennedy@nrc.gov>
Cc: Caroline Cochran <c@oklo.com>
Subject: [External_Sender] Public Meeting on Oklo topical reports

Hi Jan and Duke,

We've had an opportunity to evaluate the comments from the completeness review and think appropriate next steps are to schedule a public meeting to discuss some of the comments further, as well as some proposed means of resolution. I know typically the notice period for a public meeting is 10 days; however, given the abbreviated timeline to update the reports, I'd like to

request a shorter notice period, if possible. I'm hopeful we can have a meeting next week to discuss. I'm thinking it would be an approximately 2-3 hour "observation" meeting.

If it's easiest to call to coordinate, please do. Thanks!

Ross

484-678-8543

Hearing Identifier: Oklo_COL_Docs_Public
Email Number: 18

Mail Envelope Properties (CAOTUxf4n+onVYYcMz0u3YLCq0r_84E2b5EUcd0wwh9pRV1vySQ)

Subject: [External_Sender] Re: Re: Re: FW: Re: Public Meeting on Oklo topical reports
Sent Date: 8/31/2021 9:25:05 PM
Received Date: 8/31/2021 9:25:38 PM
From: Ross Moore

Created By: ross@oklo.com

Recipients:

"Williams, Donna" <Donna.Williams@nrc.gov>
Tracking Status: None
"Kennedy, William" <William.Kennedy@nrc.gov>
Tracking Status: None
"Caroline Cochran" <c@oklo.com>
Tracking Status: None
"Alex Renner" <alex@oklo.com>
Tracking Status: None
"John Hanson" <john@oklo.com>
Tracking Status: None
"Mazza, Jan" <Jan.Mazza@nrc.gov>
Tracking Status: None

Post Office: mail.gmail.com

Files	Size	Date & Time
MESSAGE	8655	8/31/2021 9:25:38 PM
image001.jpg	43724	
Oklo slides - PB MCA TR public meeting - 9-1-21.pptx		1838415

Options

Priority: Normal
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:

Meeting Agenda

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3:10 – 3:45 pm	Technical Discussion	Oklo/NRC
3:45 – 3:50 pm	Opportunity for Public Questions/Comments	NRC/Public
3:50 – 4:05 pm	Break	ALL
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4:50 – 5:00 pm	Wrap up and Adjourn	ALL

Public Meeting on Oklo Topical Reports

September 1, 2021



MCA and Performance-based Licensing Topical Reports

Why are they important?

- Articulate the methodologies used by Oklo in developing the licensing basis for its reactor designs
- Offer an alternative licensing approach to the current approaches being considered for Part 53
- Represent a technology-inclusive, risk-informed performance-based licensing methodology, available for use by any advanced reactor developer, to enable broader deployment as directed by NEIMA



MCA and Performance-based Licensing Topical Reports

What do they do?

- Focus on the requirements for assuring adequate protection, rather than regulatory guidance developed for other technologies
- Utilize iterative processes to simplify the design, with preferential use of inherent features and passive systems over complex, active systems
- Clearly demonstrate safety significant functions and features of the design and how to apply the necessary controls to ensure their reliability



MCA and Performance-based Licensing Topical Reports

Current status?

- Oklo submitted both topical reports to the NRC on 7/2/2021
- NRC staff performed completeness review and identified supplemental information to support review of both topical reports
- Oklo/NRC discussion through public meetings on the identified supplemental information and proposed resolution of NRC staff comments



Maximum Credible Accident Topical Report

accident scenarios (see Note 1 and Note 2).

IV. The MCA TR does not identify the necessary conditions and interfaces essential to the implementation of the methodology (e.g., hazard identification team composition, information needs, documentation requirements). Common elements among the approaches used to identify hazards, initiating events, and accident scenarios include the use of a qualified team, making all essential design information available to the team, and documentation of the process (see Note 1).

V. The MCA TR provides a high-level statement that the methodology should include the use of probabilistic risk assessment.

Note 1: The NRC staff's comparison of approaches for identifying hazards, initiating events, and accident scenarios included (1) standards and literature surveys of generic (i.e., non-technology specific) hazard identification techniques, (2) recent reports and regulatory guidance for advanced non-light-water reactors such as Nuclear Energy Institute (NEI) 18-04, "Risk-Informed Performance Based Technology-Inclusive Guidance for Non-Light Water Reactor Licensing Basis Development" (ADAMS Accession No. ML19241A472) and several case studies that implemented the approach outlined in NEI 18-04, (3) approaches used to license and certify light-water-reactor designs, (4) approaches used to license research and test reactors, and (5) approaches used to license fuel-cycle facilities. These techniques include, but are not limited to, failure modes and effects analysis, hazard operability analysis, master logic diagram, use of expert panels and standards committees, and combinations thereof.

- Certain design interfaces outlined in comment IV are comparable to the requirements imposed in 10 CFR Appendix B for design and documentation. Therefore, implementation of this topical report by an entity with an NRC approved QA plan should be sufficient to meet the comment provided.
- Proposed revision language: "Application of this methodology is intended to be performed by those with an NRC approved quality assurance program for design."



Performance-based Licensing Topical Report

generally accepted engineering standards are applied to the design of the reactor.

C. The PBLM TR does not address the regulatory requirement under 10 CFR 50.34(f)(3) that the application provide sufficient information to demonstrate that the quality assurance list required by Criterion II, Appendix B, 10 CFR Part 50 includes all structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR

- Section 4.4, provides for a systematic approach to classifying functions and features.
- Section 4.6, describes how quality assurance is then specifically applied to SSCs.
- It is unclear what specific information the NRC is requesting be supplemented based on the requirements articulated in 10 CFR 50.34(f)(3) and 10 CFR Part 50, Appendix B, Criterion II.



Performance-based Licensing Topical Report

generally accepted engineering standards are applied to the design of the reactor.

C. The PBLM TR does not address the regulatory requirement under 10 CFR 50.34(f)(3) that the application provide sufficient information to demonstrate that the quality assurance list required by Criterion II, Appendix B, 10 CFR Part 50 includes all structures, systems, and components (SSCs) important to safety.

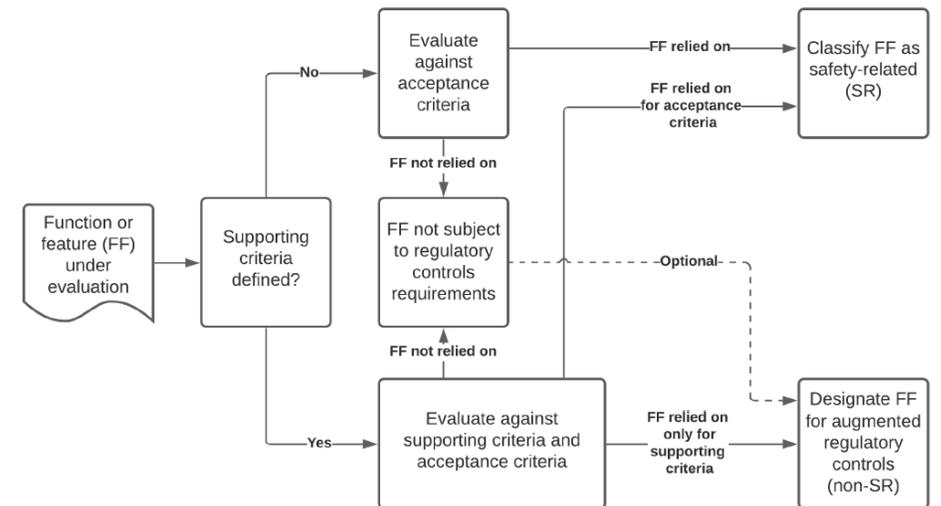
D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR

- Section 4.4, provides for a systematic approach to classifying functions and features.

4.4 Classifying functions and features

4.4.1 Evaluation approach

The methodology identifies the safety relevance of each function and feature of the design as it contributes to the licensing basis event analysis. To make this determination, each function and feature is evaluated individually to determine whether the function or feature is relied on to meet the acceptance criteria and supporting criteria (if defined). Figure 4-1 schematically shows the evaluation process for functions and features described in the following sections.



Performance-based Licensing Topical Report

generally accepted engineering standards are applied to the design of the reactor.

C. The PBLM TR does not address the regulatory requirement under 10 CFR 50.34(f)(3) that the application provide sufficient information to demonstrate that the quality assurance list required by Criterion II, Appendix B, 10 CFR Part 50 includes all structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR

- Section 4.6, describes how quality assurance is then specifically applied to SSCs.

4.6 The role of quality assurance as a programmatic control:
assigning quality assurance requirements

4.6.1 Quality assurance approach



Performance-based Licensing Topical Report

generally accepted engineering standards are applied to the design of the reactor.

C. The PBLM TR does not address the regulatory requirement under 10 CFR 50.34(f)(3) that the application provide sufficient information to demonstrate that the quality assurance list required by Criterion II, Appendix B, 10 CFR Part 50 includes all structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR

- 10 CFR 50.34(f), “Additional TMI-related requirements,” paragraph (3)(ii) states:
 - *“(ii) Ensure that the quality assurance (QA) list required by Criterion II, app. B, 10 CFR part 50 includes all structures, systems, and components important to safety. (I.F.1)”*
- It is unclear what specific information the NRC is requesting be supplemented based on the requirements articulated in 10 CFR 50.34(f)(3) and 10 CFR Part 50, Appendix B, Criterion II.



Performance-based Licensing Topical Report

structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR 50.2 definition of safety-related SSCs. The report does not discuss other requirements inherent in the current regulatory framework, which include:

1. Safely shutting down the reactor under a broad spectrum of licensing basis events ranging from anticipated operational occurrences to design basis accidents
 2. Providing adequate defense-in-depth and mitigation measures to protect against beyond-design-basis events
 3. Addressing uncertainty in selecting licensing basis events and design basis accidents
 4. Ensuring that the overall risk to the public from the operations of the facility under normal conditions, transients, and during and after accidents is acceptably low, consistent with Commission policy
- E. The PBLM TR does not identify how the principal design criteria (PDC) are developed for the facility. The PBLM TR states

- The topical report comprehensively discusses the 10 CFR 50.2 definition of safety-related and the technology-specific nature of items (1) and (2).
- Could the staff elaborate on both the technical and regulatory basis for the inclusion of the material requested in I.D.1?



Performance-based Licensing Topical Report

structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR 50.2 definition of safety-related SSCs. The report does not discuss other requirements inherent in the current regulatory framework, which include:

1. Safely shutting down the reactor under a broad spectrum of licensing basis events ranging from anticipated operational occurrences to design basis accidents
 2. Providing adequate defense-in-depth and mitigation measures to protect against beyond-design-basis events
 3. Addressing uncertainty in selecting licensing basis events and design basis accidents
 4. Ensuring that the overall risk to the public from the operations of the facility under normal conditions, transients, and during and after accidents is acceptably low, consistent with Commission policy
- E. The PBLM TR does not identify how the principal design criteria (PDC) are developed for the facility. The PBLM TR states

- Could the staff elaborate on the regulatory basis to support the supplemental material requested in I.D.2?



Performance-based Licensing Topical Report

structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR 50.2 definition of safety-related SSCs. The report does not discuss other requirements inherent in the current regulatory framework, which include:

1. Safely shutting down the reactor under a broad spectrum of licensing basis events ranging from anticipated operational occurrences to design basis accidents

2. Providing adequate defense-in-depth and mitigation measures to protect against beyond-design-basis events

3. Addressing uncertainty in selecting licensing basis events and design basis accidents

4. Ensuring that the overall risk to the public from the operations of the facility under normal conditions, transients, and during and after accidents is acceptably low, consistent with Commission policy

E. The PBLM TR does not identify how the principal design criteria (PDC) are developed for the facility. The PBLM TR states

- Can the staff clarify what is meant by “uncertainty in selecting” licensing basis events?



Performance-based Licensing Topical Report

structures, systems, and components (SSCs) important to safety.

D. The PBLM TR discusses the use of dose as the single acceptance criterion, which only addresses item (3) of the 10 CFR 50.2 definition of safety-related SSCs. The report does not discuss other requirements inherent in the current regulatory framework, which include:

1. Safely shutting down the reactor under a broad spectrum of licensing basis events ranging from anticipated operational occurrences to design basis accidents
2. Providing adequate defense-in-depth and mitigation measures to protect against beyond-design-basis events
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4. Ensuring that the overall risk to the public from the operations of the facility under normal conditions, transients, and during and after accidents is acceptably low, consistent with Commission policy

E. The PBLM TR does not identify how the principal design criteria (PDC) are developed for the facility. The PBLM TR states

- Could the staff elaborate on the specific Commission policy referenced in this comment and its associated regulatory basis?



Performance-based Licensing Topical Report

II. The PBLM TR does not address any exemptions from regulatory requirements, pursuant to 10 CFR 50.12, "Specific exemptions," that may be needed to implement the PBLM.

- In development of the topical report, Oklo did not identify any exemptions that must be requested to support licensing under this methodology. Could the staff clarify the comment on exemptions that might be necessary?



Performance-based Licensing Topical Report

III. The PBLM TR relies on programmatic controls (preoperational testing, Inspections, Tests and Analyses, Acceptance Criteria, startup testing, etc.) to verify adequate performance of the as-built system. The TR does not address other aspects of the design, analysis, operation, and maintenance of SSCs that impact public safety, including, but not limited to:

- A. Margin in the design and analysis to address aleatory and epistemic uncertainties
- B. Design and analysis provisions to address long-term operations including appropriate consideration of time-dependent phenomena
- C. Provisions to ensure qualification of SSCs to operate in their anticipated environments
- D. Design, analysis, fabrication, and construction provisions to ensure confidence in the safety of SSCs prior to initiating testing
- E. Provisions to ensure reliability and capability of SSCs throughout their lifecycle, including appropriate consideration of material degradation mechanisms.

- Oklo's methodology describes a process for identifying what functions and features require programmatic controls, but does not prescribe the programmatic controls, only that they should be justified based on the safety basis of the function or feature.
- This should be a design-specific selection that allows for flexibility in demonstrating the necessary requirements for safety-related and important to safety equipment are met.





Questions?