



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

September 28, 2021

MEMORANDUM TO: William B. Kennedy, Acting Chief
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

FROM: Jan M. Mazza, Project Manager
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

A handwritten signature in cursive script that reads "Jan Mazza".

Signed by Mazza, Jan
on 09/28/21

SUBJECT: SUMMARY OF SEPTEMBER 16, 2021, MEETING BETWEEN THE
U.S. NUCLEAR REGULATORY COMMISSION STAFF AND OKLO
POWER, LLC, TO DISCUSS MAXIMUM CREDIBLE ACCIDENT
METHODOLOGY AND PERFORMANCE-BASED LICENSING
METHODOLOGY TOPICAL REPORTS (EPID NOS. L-2021-TOP-
0016 AND L-2021-TOP-0017)

A virtual observation public meeting was held on September 16, 2021, between the U.S. Nuclear Regulatory Commission (NRC) staff and representatives from Oklo Power, LLC (Oklo) using the Microsoft Teams platform. The meeting notice, Oklo meeting slides, Oklo topical reports ("Maximum Credible Accident Methodology" and "Performance-Based Licensing Methodology"), and NRC completeness review results are located in the NRC's Agencywide Documents Access and Management System (ADAMS) at Accession Nos. ML21236A234, ML21259A007, ML21184A000, ML21201A010, and ML21201A104, respectively. The meeting attendees are included in the enclosure to this document.

The purpose of the meeting was for NRC staff and Oklo staff to discuss the supplemental information needed for the Maximum Credible Accident Methodology and Performance-Based Licensing Methodology topical reports, as identified during the NRC completeness reviews.

Prior to the meeting, Oklo provided slides requesting clarification on the supplemental information needed for both of the topical reports in specific areas:

Maximum Credible Accident Methodology and Performance-Based Licensing Methodology
Completeness Determinations Item I

The focus of Item I for both methodologies was to communicate that the topical reports did not provide a regulatory evaluation explaining how the methodologies satisfy the current regulatory requirements. Oklo explained that they plan to supplement both topical reports in this area to

CONTACT: Jan M. Mazza, NRR/DANU
(301) 415-0498

clarify what the reports are intended to “do” and “not do.” An example was that the development of the principal design criteria (PDC) is not part of the Performance-Based Licensing Methodology topical report. The NRC staff noted that it appears the PDC would then have to be developed prior to beginning the methodology. In addition, the relationship between the design bases and PDC is unclear. Topical report figure A-3, “Relationship of principal design criteria to the design bases,” appears to show that the design bases stem from the PDC. However, the text in the topical report indicates the design bases are developed from the accident scenarios applicable to the facility and then grouped under the PDC, without explaining how the PDC are determined. Oklo responded that the intent of the methodology is the focus on identifying functions and features and their design bases to determine the programmatic controls.

Summary: Oklo intends to supplement the topical reports to clarify their scope and applicable requirements addressed. Oklo also agreed to clarify that the design bases are developed from the safety analysis.

Maximum Credible Accident Methodology Completeness Determination Item II

The focus of Item II was to communicate that the topical report does not delineate the steps needed to execute a structured, systematic approach to identify initiating events/hazards/event sequences (e.g., use of one or more of the methods such as failure modes and effects analysis (FMEA), hazard and operability analysis, master logic diagram, etc.). In Item II it was also noted that following a structured, systematic method based on inductive or deductive logic was identified as a common element among all the approaches for identifying hazards, initiating events, and accident scenarios that the NRC investigated as a point of comparison. Oklo proposed to supplement the topical report to include examples of previously determined acceptable approaches based on approved NRC guidance. The NRC staff responded that Item II requests that Oklo provide specific steps to identify initiating events/hazards/event sequences, not just examples of previous work. Oklo noted that it may not be possible to provide specific steps since the methodology is intended to be generic.

Summary: Oklo will provide supplemental information regarding the steps needed to execute a structured, systematic approach to identify initiating events/hazards/event sequences.

Maximum Credible Accident Methodology Completeness Determination Items I and III Performance-Based Licensing Methodology Completeness Determination Item I

The focus of Item I for both methodologies was to communicate that the topical reports did not provide a regulatory evaluation explaining how the methodologies satisfy the current regulatory requirements. The focus of Item III for the Maximum Credible Accident Methodology topical report was to communicate that the methodology does not identify the techniques for providing margin to address uncertainties associated with the performance of new and novel features in identifying initiating events/hazards/event sequences. Oklo proposed to supplement the topical reports to include a section that explains how each topical report interfaces with other licensing approaches (e.g., licensing basis event selection, performance-based licensing, etc.).

The new sections are intended to cover several of the completeness determination items, including uncertainty for new and novel features. Oklo noted that it was unclear whether the NRC staff’s comment on uncertainties was referring to the down-selection process and not necessarily new and novel features. The NRC staff clarified that this Item includes the treatment of new and novel safety features as required by title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.43(e). The NRC staff needs to understand how these structures, systems, and components will perform under a range of operating conditions (e.g., performance of a reactor trip system) because uncertainties in accomplishing the functions

impact the assessment of event sequences with downstream impacts on accident identification and treatment of structures, systems, and components. The NRC staff noted that there was a sentence in the Performance-Based Licensing Methodology that implied using the methodology would alleviate the need for testing prior to licensing. The NRC staff further noted that in the absence of demonstration of the performance of innovative safety features either through analysis, appropriate test programs, experience, or a combination thereof, there would be large uncertainties. The NRC staff needs to understand how this is dealt with since compliance with 10 CFR 50.43(e) would be needed to support the licensing action. Oklo responded that it did not intend to say that testing would not be required; rather, they were trying to explain how the licensing basis is related to the safety of the plant (i.e., how programmatic controls could be used to demonstrate performance).

Summary: Oklo will provide supplemental information in the topical reports related to these items.

Maximum Credible Accident Methodology Completeness Determination Item III and Note 2

The focus of Item III for the Maximum Credible Accident Methodology topical report was to communicate that the methodology does not identify the techniques for providing margin to address uncertainties associated with the performance of new and novel features in identifying initiating events/hazards/event sequences. Note 2 provided clarifying examples including (1) generic hazard identification techniques involve the use of guide words and other approaches that reflect the level of certainty regarding hazard-related phenomena and structure, system, and component performance (e.g., risk-prioritization in FMEA), (2) advanced non-light-water reactor hazard identification performed as Nuclear Energy Institute 18-04 exercises have used probabilistic risk assessment and accounted for uncertainty in the assessment of events, (3) NUREG-1520, "Standard Review Plan for Fuel Cycle Facilities License Applications," provides specific acceptance criteria to address uncertainty associated with the hazard identification approach used as part of the integral safety assessment. Oklo asked NRC staff to clarify which acceptance criteria in NUREG-1520 it is referring to in Note 2. The NRC staff responded that Table 3-1, "Information Requirements for the ISA Summary," of NUREG-1520 highlights acceptance criteria for an integrated safety analysis (ISA). Items from Table 3-1 that staff identified as relevant to a maximum credible accident methodology for an advanced reactor include:

- ISA method(s) description in Section 3.4.3.2(5)
- ISA team description in Section 3.4.3.2(5)
- Definition of "unlikely", "highly unlikely", and "credible" in Section 3.4.3.2(9)
- Description of accident sequences in Section 3.4.3.2(3c)
- Characterization of high and intermediate consequence accident sequences in Section 3.4.3.2(3c)

In the items identified above, the information in Section 3.4.3.2(9) contains the specific acceptance criteria referred to in Note 2 from the NRC Form 898. The NRC staff emphasized that the acceptance criteria in NUREG-1520 work together as an integrated set of criteria and that some criteria in NUREG-1520 (e.g., 3.4.3.2(3c) and 3.4.3.2(5)) reference NUREG-1513, "Integrated Safety Analysis Guidance Document." Acceptance criteria provided in Sections 3.4.3.2(3c) and 3.4.3.2(5) of NUREG-1520, that reference NUREG-1513, highlight additional considerations for completeness of the hazard identification and assessment and are relevant to uncertainty treatment.

Summary: Oklo will provide supplemental information in the topical reports related to these items.

Meeting Conclusion

The NRC and Oklo discussed the form in which the supplemental information must be submitted (i.e., updated topical reports, letter, etc.). The NRC agreed to provide Oklo a definitive answer, but noted at a minimum the response must be formally submitted in writing for docketing and address each item in the completeness determinations. Oklo and the NRC agreed to continue discussions during the next public meeting.

Docket No.: 52-049

Enclosure:
Meeting Attendees

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 DATED: SEPTEMBER 28, 2021

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OFFICE	NRR/DANU/UARL/PM	NRR/DANU/UARL/LA	NRR/DANU/UARL/BC	NRR/DANU/UARL/PM
NAME	JMazza	SLent	WKennedy	JMazza
DATE	09/27/2021	09/27/2021	09/27/2021	9/28/2021

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ATTENDEE LIST

Public Meeting with Oklo to Discuss Maximum Credible Accident Methodology and Performance-Based Licensing Methodology Topical Reports – September 16, 2021	
Name	Affiliation
Mazza, Jan	U. S. Nuclear Regulatory Commission (NRC)
Orenak, Michael	NRC
Lupold, Timothy	NRC
Drzewiecki, Timothy	NRC
Hart, Michelle	NRC
Williams, Donna	NRC
Shams, Mohamed	NRC
Siwy, Alexandra	NRC
Jung, Ian	NRC
Kennedy, William	NRC
Ross Moore	Oklo Power, LLC (Oklo)
Caroline Cochran	Oklo
Alex Renner	Oklo
John Hansen	Oklo
Matis, Lisa	Public
Christopher P. Chwasz	Public
Christopher S. Lohse	Public
Thomas Eiden	Public
Ewa Muzikova	Public
Junaid Razvi	Public
NICHOL, Marcus	Public
Krsek, Robert	NRC
Johnson, Dante	NRC
Walker, Shakur	NRC
Adam Stein	Breakthrough Institute