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

August 13, 2020

MEMORANDUM TO: Benjamin Beasley, Chief
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power Production and Utilization Facilities
Office of Nuclear Reactor Regulation

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

SUBJECT: AUDIT PLAN FOR THE OKLO POWER LLC. AURORA REACTOR COMBINED LICENSE APPLICATION REVIEW, STEP 1, MAXIMUM CREDIBLE ACCIDENT – HEAT TRANSFER IN REACTOR SYSTEM

By letter dated March 11, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20075A000), Oklo Power LLC (Oklo), submitted a combined license (COL) application for one micro-reactor to be located at the Idaho National Laboratory located in Idaho. This proposed plant is to be designated as the Aurora. By letter dated June 5, 2020 (ADAMS Accession No. ML20149K616), the U.S. Nuclear Regulatory Commission (NRC) informed Oklo of their decision to accept the application for docketing and that a two-step approach will be used in order to gain alignment on four key safety and design aspects of the licensing basis prior to establishing a schedule for the licensing review. One of those key safety and design aspects is the identification of a maximum credible accident (MCA).

The purpose of this audit is to enable the NRC staff to understand the modeling parameters of the ANSYS Mechanical model used in the Aurora safety analysis, and to identify whether requests for additional information are necessary.

Docket No. 52-049

Enclosure:
Audit Plan

cc w/encl.: Distribution via list serv

CONTACT: Jan Mazza, NRR/DANU/UARL
301-415-0498

SUBJECT: AUDIT PLAN FOR THE OKLO POWER LLC. AURORA REACTOR COMBINED LICENSE APPLICATION REVIEW, STEP 1, MAXIMUM CREDIBLE ACCIDENT – HEAT TRANSFER IN REACTOR SYSTEM DATED: August 13, 2020

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**U.S. NUCLEAR REGULATORY COMMISSION**
**AUDIT PLAN FOR THE OKLO POWER LLC. AURORA REACTOR**
**COMBINED LICENSE APPLICATION REVIEW**
**STEP 1, MAXIMUM CREDIBLE ACCIDENT – HEAT TRANSFER IN REACTOR SYSTEM**

## AUDIT PLAN

| | |
|---|---|
| APPLICANT: | Oklo Power LLC. |
| APPLICANT CONTACTS: | TBD, Oklo Power LLC |
| DURATION: | August 18 – August 28, 2020 |
| LOCATION: | Oklo Power LLC<br>230 E. Caribbean Dr.<br>Sunnyvale, CA 94089<br><br>Audit will be conducted via teleconference and electronic reading rooms |
| AUDIT TEAM: | Timothy Drzewiecki, Reactor Systems Engineer, Audit Team Leader, NRR/DANU/UART<br>Boyce Travis, Reactor Systems Engineer, NRR/DANU/UART<br>Joseph Kelly, Sr. Reactor Systems Engineer, RES/DSS/CRAB |

Enclosure

## I. BACKGROUND

By letter dated March 11, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20075A000), Oklo Power LLC (Oklo), submitted a combined license (COL) application for one micro-reactor to be located at the Idaho National Laboratory located in Idaho. This proposed plant is to be designated as the Aurora. By letter dated June 5, 2020 (ADAMS Accession No. ML20149K616), the U.S. Nuclear Regulatory Commission (NRC) informed Oklo of their decision to accept the application for docketing and that a two-step approach will be used in order to gain alignment on four key safety and design aspects of the licensing basis prior to establishing a schedule for the licensing review. One of those key safety and design aspects is the identification of a maximum credible accident (MCA).

The NRC staff's review of the MCA during Step 1 includes, in part, an examination of the calculations presented in Chapter 2 and Section 5.6 of the final safety analysis report (FSAR). The NRC staff's audit follows the guidance in Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits," Revision 1 (ADAMS Accession No. ML19226A274).

## II. PURPOSE

The purpose of this audit is to understand the inputs to and the structure of the ANSYS Mechanical model described in the FSAR, Section 5.6, as well as the associated assumptions and conditions used to calculate those inputs pertaining to heat transfer, and to identify whether requests for additional information (RAIs) are necessary.

## III. REGULATORY AUDIT BASIS

10 CFR Part 52.79(a) requires, in part, that: [t]he final safety analysis report shall include the following information, at a level of information sufficient to enable the Commission to reach a final conclusion on all safety matters that must be resolved by the Commission before issuance of a combined license:

- (a)(5) - An analysis and evaluation of the design and performance of structures, systems, and components with the objective of assessing the risk to public health and safety resulting from operation of the facility and including determination of the margins of safety during normal operations and transient conditions anticipated during the life of the facility, and the adequacy of structures, systems, and components provided for the prevention of accidents and the mitigation of the consequences of accidents.

## IV. REGULATORY AUDIT SCOPE

The scope of this audit is limited to the heat transfer analyses presented in FSAR Section 2.2, "Reactor System," and Section 5.6 "Safety analysis."

## V. DOCUMENTS / INFORMATION NECESSARY FOR THE AUDIT

The NRC staff requests that the calculations used to develop the results presented in FSAR Section 2.2.2.5.1.3 and FSAR Section 5.6.4 be made available for audit.

In particular, NRC staff is seeking information on the thermal resistances between the reactor cell can and heat pipe, and between the heat pipe and heat exchanger system.

## VI. SPECIAL REQUESTS

The NRC staff requests that subject matter experts be made available to discuss the input parameters and assumptions used in the ANSYS Mechanical model.

## VII. AUDIT ACTIVITIES AND DELIVERABLES

The NRC audit team will examine the calculations identified in Section V of this report and discuss the contents with subject matter experts. Additionally, the NRC staff may perform confirmatory calculations to confirm their understanding. The initial audit agenda is:

- Day 1
  - Entrance meeting
  - 4 hours of audit
- Day 2
  - 4 hours of audit
  - Exit meeting

The agenda may be expanded if needed for NRC staff to achieve the purpose of the audit. The audit will be complete when NRC staff understand the inputs to and the structure of the ANSYS Mechanical model described in the FSAR, Section 5.6, as well as the associated assumptions and conditions used to calculate those inputs pertaining to heat transfer, and have identified whether RAIs are necessary. The need for RAIs will be discussed during the exit meeting. At the completion of the audit, the audit team will issue an audit summary within 45 days that will be declared and entered as an official agency record in ADAMS.

If necessary, any circumstances related to the conduct of the audit will be communicated to Timothy Drzewiecki (NRC) at 301-415-5184 or email: Timothy.Drzewiecki@nrc.gov