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

September 18, 2020

OKLO AURORA – STEP 1 TECHNICAL REVIEW AUDIT SUMMARY MAXIMUM CREDIBLE ACCIDENT HEAT TRANSFER IN REACTOR SYSTEM

APPLICANT INFORMATION

Applicant: Oklo Power LLC.

Applicant Address: 230 E Caribbean Dr. Sunnyvale, CA 94089

Plant Name: Aurora

Docket No.: 52-0049

Audit Location/Dates:
Audit was conducted via video conference.
Audit Entrance: August 27, 2020
Audit Exit: August 28, 2020

Audit Team Members

Tim Drzewiecki	Reactor Systems Engineer, Audit Team Lead, NRR/DANU/UART
Boyce Travis	Reactor Systems Engineer, NRR/DANU/UART
Joseph Kelly	Senior Reactor Systems Engineer, RES/DSS/CRAB

Participating Applicant Staff
Patrick Everett
John Hanson

Documents Audited

- MCA_audit_heat_transfer_Aug_27_2020.pdf
- ANSYS Mechanical Model :
  Repository: oberon_results_archive
  Filename: FINAL_7wm2k_7wmk_225c_explicit_contacts_102pct_nodata.wbpz
  Git commit: 0f3261e

Audit Activities
Oklo presented on the heat transfer modelling performed using the ANSYS mechanical code with a focus on the thermal bonding between (1) the reactor cell can and heat pipe, and (2) the heat pipe and heat exchanger. The NRC noted the following:

- The key dimensions presented in Table 2-1 of the final safety analysis report (FSAR) **[[ ]]**. Hot dimensions are used in the ANSYS mechanical model. Hot dimensions are obtained by assuming the following:

  - **[[**
  - **[[**
  - **[[**

- Thermal bonding between the reactor cell cans and heat pipe [**]** is modeled in ANSYS Mechanical **[[ ]]** with the following parameters:
  - **[[ ]]**
  - **[[ ]]**
  - **[[ ]]**
  - **[[**

)]].

- Heat pipes are thermally bonded to the heat exchanger tubing **[[ ]]** and heat exchanger tubes are modeled in ANSYS Mechanical as a homogenous material that is located in the heat exchanger region with the following parameters:
  - **[[ ]]**
  - **[[ ]]**
  - **[[ ]]**
  - **[[**

    ]

Oklo opened the ANSYS Mechanical model and guided NRC staff through the inputs specific to the thermal bonding between (1) the reactor cell and heat pipe, and (2) the heat pipe and heat exchanger. During this process, NRC staff was able to verify that the ANSYS Mechanical model used input parameters for the thermal bonding that are consistent with the description above.

The NRC staff performed simple hand calculations using the input assumptions stated by Oklo during their presentation and obtained similar values to those presented in the FSAR.

Exit Briefing
An exit briefing was held on August 28, 2020. During this exit briefing, the audit team restated the purpose of the meeting, summarized the audit activities, recapped the key outcomes of the audit, and highlighted areas where additional information may be warranted.

RAIs or Potential RAIs
The NRC staff identified the following areas where requests for additional information (RAIs) will be requested:

1. An update to the FSAR to include information on the thermal bonding between (1) reactor cell can and heat pipe, and (2) heat pipe and heat exchanger will be needed to support the safety case of the Aurora.
2. Evidence to validate the thermal bonding design and modeling assumptions will be needed to support the use of an innovative means to transfer heat from the fuel.

Open Items

The NRC staff identified information important to the safety case of the Aurora design during this audit. The NRC staff is seeking to (1) incorporate this information into appropriate licensing documentation, and (2) obtain additional information to support the thermal bonding design and modeling assumptions that support the Aurora safety case. The NRC staff plans to address these open items through the RAI process.

Deviations from Audit Plan

Due to efficient communication between Oklo and the NRC staff, the lengths of the audit meetings were significantly reduced from the estimates provided in the audit plan (ADAMS Accession No. ML20225A227).

Principal Contributor: Timothy Drzewiecki, NRR

Date: September 18, 2020

/RA/

Timothy J Drzewiecki

Timothy Drzewiecki
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ADAMS Accession Nos. Package ML20246G616; Audit Summary ML20246G641(non-Public) Audit Summary ML20262G985 (Public-Redacted) *via e-mail

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OFFICE	NRR/DANU/UART/BC*	NRR/DANU/UARL/BC*	NRR/DANU/UART*
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DATE	8/28/2020	8/31/2020	9/18/2020

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