



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

February 23, 2022

**KAIROS POWER, LLC – PLAN FOR AN AUDIT OF THE HERMES CONSTRUCTION  
PERMIT PRELIMINARY SAFETY ANALYSIS REPORT CHAPTERS 4 AND 13  
(CAC/EPID NO. 000955/05007513/L-2021-NEW-0011)**

**Applicant:** Kairos Power LLC  
**Applicant Address:** 707 W. Tower Ave, Alameda, CA 94501  
**Plant Name(s) and Unit(s):** Kairos – Hermes Test Reactor  
**Docket No.:** 05007513

**Background:**

On September 29, 2021, Kairos submitted a preliminary safety analysis report (PSAR) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML21272A375) in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," as part of its construction permit (CP) application for the proposed Hermes test reactor. The U.S. Nuclear Regulatory Commission (NRC) staff is conducting a detailed review of the CP application. Two key references in the PSAR are technical reports associated with Chapter 4, "Reactor Description," and Chapter 13, "Accident Analysis." Technical report KP-TR-017, "KP-FHR Core Design and Analysis Methodology," is referenced in PSAR Section 4.5, "Nuclear Design," and KP-TR-018, "Postulated Event Analysis Methodology," is referenced in Chapter 13. Because many of the assumptions and inputs used in the analyses in Chapter 13 are derived from Section 4.5 (e.g., reactivity coefficients, shutdown margin, etc.) these two sections are combined in this audit for efficiency.

**Purpose:**

The purpose of this audit is for the NRC staff to gain a better understanding of Chapters 4 and 13 of the PSAR, with an emphasis on documentation supporting technical reports KP-TR-017 and KP-TR-018. Observing the underlying documents associated with technical reports KP-TR-017 and KP-TR-018 support the staff's evaluation of the prescribed hypothetical fuel, Flibe, and vessel temperatures given in PSAR Figure 13.2-1 to help determine whether they are conservative and appropriate for use in the maximum hypothetical accident analysis described in PSAR Chapter 13. If the NRC staff identifies information that is needed to support a finding, Kairos will need to submit that information on the application docket.

### **Regulatory Audit Basis:**

The bases for the audit are the regulations of 10 CFR 50.34(a)(1)(i), 50.34(a)(4), and 100.11.

### **Regulatory Audit Scope**

This audit will focus on information provided by Kairos on the online reference portal.

### **Information and Other Material Necessary for the Regulatory Audit**

Documents associated with technical reports KP-TR-017 and KP-TR-018 which are referenced in PSAR Section 4.5 and Chapter 13, respectively.

### **Team Assignments**

Jeff Schmidt	Senior Reactor Systems Engineer, Audit Lead responsible for audit summary report preparation
Sam Cuadrado	Project Manager, responsible for audit logistics
Ben Adams	General Engineer
Andrew Bielen	Nuclear Engineer
Alexander Chereskin	Materials Engineer
Michelle Hart	Senior Reactor Engineer
Ed Helvenston	Project Manager
Jason Schaperow	Senior Reactor Systems Engineer
Alex Siwy	Nuclear Engineer

Additional audit team members may be added as needed.

### **Logistics**

Entrance Meeting	February 28, 2022 (4:00-5:00 pm ET)
Exit Meeting	August 31, 2022, or earlier

Audit meetings will take place in a virtual format, using Microsoft Teams or other similar platform. Audit meetings will be scheduled on an as needed basis after the entrance meeting and once the NRC staff has had the opportunity to read any documents placed in the online reference portal. The audit duration is anticipated to be approximately 6 months with activities occurring intermittently during that period. Informal interim reports on the status of topics being addressed by the audit will be provided to Kairos.

The audit period may be reduced or extended, dependent on the NRC staff and Kairos progress in addressing audit questions. Additional audit activities may be planned as necessary to support the NRC staff's understanding of information needed to complete the review of the application.

To improve the efficiency of the audit, Kairos and NRC staff discussed the use of an online reference portal, established by Kairos, that would allow NRC staff limited read-only access to the technical information provided by Kairos. Use of the online reference portal is acceptable provided that Kairos establishes measures to limit access to specific NRC staff (e.g., based on NRC e-mail addresses or the use of passwords which will only be assigned to NRC staff directly involved in the audit on a need-to-know basis), and to make the documents view-only (i.e.,

prevent NRC staff from saving, copying, downloading, or printing any documents). The conditions associated with the online reference portal must be maintained throughout the audit process. The NRC staff who should initially be granted access to the portal are those listed in the "Team Assignments" section above. As needed, the NRC audit project managers may provide Kairos with the names of additional NRC staff who are added to the audit team and should subsequently be granted access.

### **Special Requests**

None.

### **Deliverables**

At the completion of the audit, the audit team will issue an audit summary within 90 days after the exit meeting but will strive for a shorter duration. The audit summary will be declared and entered as an official agency record in ADAMS and be made available for public viewing.

### **References**

Title 10 of the *Code of Federal Regulations*.

Please contact Sam Cuadrado at 301-415-2946 or by email at [Samuel.CuadradoDeJesus@nrc.gov](mailto:Samuel.CuadradoDeJesus@nrc.gov) with any questions related to the conduct of the audit.

Date: February 23, 2022



Signed by Kennedy, William  
on 02/23/22

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

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**SUBJECT: KAIROS POWER LLC – PLAN FOR AN AUDIT OF THE HERMES  
CONSTRUCTION PERMIT PRELIMINARY SAFETY ANALYSIS REPORT  
CHAPTERS 4, SECTION 4.5 AND 13 (CAC/EPID NO. 000955/05007513/L-2021-  
NEW-0011) DATED FEBRUARY 23, 2022**

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**ADAMS Accession No.: ML22041B665 Audit Plan**

OFFICE	NRR/DANU/UTB2/LEAD	NRR/DANU/UARL/PM	NRR/DANU/UTB2/BC	NRR/DANU/UARL/BC
NAME	JSchmidt	BBeasley	Cde Messieres	WKennedy
DATE	2/14/2022	2/16/2022	2/16/2022	2/23/2022

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