



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

**KAIROS POWER, LLC – HERMES PRELIMINARY SAFETY ANALYSIS REPORT
PRE-SUBMITTAL AUDIT PLAN
(CAC NO. 000431, 99902069; EPID NO. L-2021-LRN-0077)**

APPLICANT INFORMATION

Applicant: Kairos Power LLC

Applicant Address: 707 W. Tower Ave, Alameda, CA 94501

Plant Name(s) and Unit(s): Kairos – Hermes Test Reactor

Project No(s).: 99902069

Background:

Kairos Power LLC (Kairos) began pre-application discussions with the U.S. Nuclear Regulatory Commission (NRC) staff on their Kairos Power Fluoride-Salt-Cooled, High-Temperature Reactor (KP-FHR) in October 2018. In December of 2020, Kairos announced that the Hermes test reactor would be used to support future development of the KP-FHR. Over the past several years, Kairos has submitted several topical and technical reports that apply to both the Hermes, as well as the full-scale KP-FHR reactor. As discussed in meetings held on January 27, 2021 and March 3, 2021, Kairos plans to submit an application for a construction permit (CP), including a preliminary safety analysis report (PSAR), for the Hermes test reactor in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic licensing of production and utilization facilities." This PSAR is expected to follow the guidance in NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content" (Agencywide Documents Access and Management System (ADAMS) Accession No. ML042430055).

Purpose:

Consistent with their significant pre-application engagement, Kairos volunteered for this audit to provide the NRC staff an opportunity to assess the readiness of the draft PSAR before it is formally submitted for the NRC staff's review. The audit will allow the NRC staff to (1) identify any required information that is missing from the application, (2) identify technical or regulatory issues that may complicate the acceptance or technical reviews of the application, and (3) become familiar with the content of the application, particularly in areas where Kairos plans to propose new concepts or novel design features. The NRC staff will summarize its observations related to items (1) and (2) in an audit report to be provided to Kairos, as discussed below.

Regulatory Audit Basis:

The bases for the audit are the regulations in 10 CFR Part 50, Sections 50.34(a), "Preliminary safety analysis report," and 50.35, "Issuance of construction permits."

Regulatory Audit Scope

The NRC staff will use parts of NRC's Office of Nuclear Reactor Regulation (NRR) Office Instruction LIC-116, "Pre-application Readiness Assessment" (ADAMS Accession No. ML20104B698), as guidance for conducting this audit. This audit will cover all the chapters of the PSAR including appendices on the emergency plan and quality assurance plan. It will also include technical reports on core design and the transient evaluation model.

Information and Other Material Necessary for the Regulatory Audit

The NRC staff requests that all the documents in the audit scope be provided by Kairos on the online reference portal.

Team Assignments

Jeff Schmidt	Sr. Reactor Systems Engineer, Audit Lead responsible for audit summary report preparation
Tim Lupold	Sr. Mechanical Engineer
Alex Siwy	Nuclear Engineer
Ben Adams	Nuclear Engineer
Michelle Hart	Sr. Reactor Engineer
Alexander Chereskin	Materials Engineer
Margaret Audrain	Materials Engineer
Imtiaz Madni	Sr. Reactor Systems Engineer
Ken Mott	Emergency Preparedness Specialist
Khoi Nguyen	Electrical Engineer
Sheila Ray	Sr. Electrical Engineer
David Heeszel	Geophysicist
Yuan Cheng	Hydrologist
Jason White	Meteorologist
Amitava Ghosh	Geotechnical Engineer
Joe Ashcraft	Electronics Engineer
Suzanne Ani	Material Control and Accounting Physical Scientist
Odunayo Ayegbusi	Reactor Operations Engineer (Quality Assurance)
Michael Takacs	Security Specialist, Research and Test Reactors
William Schuster	Reactor Inspector, Research and Test Reactors
Stewart Magruder	Sr. Project Manager (responsible for audit logistics)
Sam Cuadrado	Project Manager
Richie Rivera	Project Manager
Ed Helvenston	Project Manager, Research and Test Reactors

Additional audit team members may be added as needed.

Logistics

Entrance Meeting August 11, 2021
Exit Meeting August 26, 2021, or earlier, Time TBD

Audit meetings will take place in a virtual format, using Microsoft Teams, or via 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 review any documents placed in the online reference portal. The audit duration is anticipated to be approximately 3 weeks with activities occurring intermittently during that period. The NRC staff estimates that the level of effort for the audit is approximately 300 hours.

Special Requests

The NRC staff requests that Kairos Power ensure that their technical staff are available to answer questions during the audit.

Deliverables

At the completion of the audit, the audit team will issue an audit summary within 30 days after the exit meeting. The audit summary will be declared and entered as an official agency record in ADAMS and be made available for public viewing through the publicly available records component of ADAMS.

References

Title 10 of the *Code of Federal Regulations*.

NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content," February 1996

NRR Office Instruction LIC-116, "Pre-application Readiness Assessment"

Please contact Stewart Magruder (NRC) at 301-348-5766 or by email at stewart.magruder@nrc.gov about any issues related to the conduct of the audit.

Date: August 11, 2021

/RA/

Stewart Magruder, Sr. Project Manager
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

KAIROS POWER, LLC – HERMES PRELIMINARY SAFETY ANALYSIS REPORT PRE-SUBMITTAL AUDIT PLAN (CAC NOS. 000431, 99902069; EPID NO. L-2021-LRN-0077) DATED AUGUST 11, 2021

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ADAMS Accession Nos.:

ML21218A037 (Package);

ML21218A045 (Audit Plan)

OFFICE	NRR/DANU/UARL/PM	NRR/DANU/UARL/LA	NRR/DANU/UART/LEAD
NAME	SMagruder	SLent	JSchmidt
DATE	08/06/2021	08/06/2021	08/10/2021
OFFICE	NRR/DANU/UART/BC	NRR/DANU/UARL/BC	NRR/DANU/UARL/PM
NAME	MOrenak	WKennedy	SMagruder
DATE	08/11/2021	08/11/2021	08/11/2021

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