



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

**KAIROS POWER LLC – HERMES CONSTRUCTION PERMIT PRELIMINARY SAFETY
ANALYSIS REPORT CHAPTER 6, SECTION 6.3 AUDIT PLAN
(CAC/EPID NO. 000955/05007513/L-2021-NEW-0011)**

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

Docket No(s): 50-7513

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. PSAR Chapter 6, "Engineered Safety Features," Section 6.3, "Decay Heat Removal System" (DHRS), describes the DHRS and its safety function of removing decay heat when the normal heat rejection system is unavailable. This function is credited in the safety analyses of PSAR Chapter 13, "Accident Analysis," to maintain acceptable reactor vessel and fuel temperatures.

Purpose:

The purpose of this audit is for the NRC staff to gain a better understanding of Section 6.3, with an emphasis on the DHRS components and how they function together to fulfill the system's safety function. Examining underlying documentation and engaging in audit discussions about the DHRS will facilitate the staff's understanding of the DHRS and its heat removal capability. 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)(3), and 50.34(a)(4).

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

The NRC staff request more detailed drawing(s)/diagram(s) of the DHRS and its components, in particular, the steam separator and its relationship to the thimbles and float valve as well as an illustration of fluid flow throughout the components/system. In addition, the NRC staff request documentation and/or discussion related to the following topics:

- Float valve purpose, fail-open performance, and redundancy.
- Parameters to be monitored to ensure availability of DHRS when demanded.
- Water supply to the storage tanks and any associated chemistry control.
- Potential performance issues (e.g., fouling and instability in the thimbles).
- Water tank isolation valve failure mode.

Team Assignments

Alex Siwy	Nuclear Engineer, Audit Lead responsible for audit summary report preparation
Jeff Schmidt	Sr. Reactor Systems Engineer
Ben Adams	General Engineer
Alexander Chereskin	Materials Engineer, (as needed)
Ben Beasley	Senior Project Manager, responsible for audit logistics
Ed Helvenston	Project Manager

Additional audit team members may be added as needed.

Logistics

Entrance Meeting	February 22, 2022, 1:00 p.m.
Exit Meeting	Early April 2022, precise date and time are to be determined

Audit meetings will take place in a virtual format, using Microsoft Teams or another 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 six weeks with activities occurring intermittently during that period. The audit period may be reduced or extended, dependent on the NRC staff and Kairos progress in addressing audit questions.

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 through the publicly available records component of ADAMS.

References

Title 10 of the *Code of Federal Regulations*.

Please contact Ben Beasley at 301-415-2062 or by email at benjamin.beasley@nrc.gov with any questions related to the conduct of the audit.

Date: February 17, 2022



Signed by Kennedy, William
on 02/17/22

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

cc: peebles@kairospower.com
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SUBJECT: KAIROS POWER LLC – HERMES CONSTRUCTION PERMIT PRELIMINARY
SAFETY ANALYSIS REPORT CHAPTER 6, SECTION 6.3 AUDIT PLAN
(CAC/EPID NO. 000955/05007513/L-2021-NEW-0011)
DATED: FEBRUARY 17, 2022

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