



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

March 17, 2022

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

FROM: Samuel Cuadrado, Project Manager
Advanced Reactor Licensing Branch
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

A handwritten signature in black ink, appearing to read "S. Cuadrado".

Signed by Cuadrado de Jes
on 03/17/22

SUBJECT: KAIROS POWER LLC - SUMMARY OF JANUARY 27 AND 28,
2021, PUBLIC MEETING TO DISCUSS KAIROS POWER LLC'S
HERMES TEST REACTOR CONSTRUCTION PERMIT
APPLICATION

On January 27 and 28, 2021, the U.S. Nuclear Regulatory Commission (NRC) staff held pre-application meetings with Kairos Power LLC (Kairos) to discuss the construction permit (CP) application for the Hermes test reactor (i.e., non-power reactor). The meetings were held via webinar and each consisted of a public (Observation) session followed by a non-public (closed) session to allow discussion of proprietary material. The meeting notices can be found in the Agencywide Documents Access and Management System (ADAMS) under Accession Nos. ML21022A386 and ML21014A390, respectively. The presentation slides for the public meeting sessions can be found at ADAMS Accession No. ML21021A364. The attendance list is included as an enclosure to this document.

Day 1, January 27, 2021

The public session of the meeting started with Mr. Darrell Gardner, Senior Director of Licensing for Kairos, who provided an overview of the licensing strategy for the CP application of the Hermes test reactor. Kairos stated that it is currently in the pre-application phase and for the last 2 years has submitted several topical reports for NRC staff's review. Kairos noted that it plans to submit its CP application for its Hermes test reactor pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) 50.21(c). Mr. Gardner described the Hermes test reactor as an approximately 50 megawatt thermal (MWth) version of what would eventually be the commercial plant with reactors of 320 MWth per unit. Kairos also stated that through its pre-application interactions with the staff it expects to get alignment on what level of detail of information is needed for its test reactor preliminary safety analysis report (PSAR). For the development of its test reactor, Kairos intends to generally follow, with some exceptions, the basic chapter format and content outlined in NRC's NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors: Format and Content" (ADAMS Accession No. ML042430055), and associated Interim Staff Guidance, "Interim Staff Guidance Augmenting NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the

Licensing of Non-Power Reactors: Format and Content,” for Licensing Radioisotope Production Facilities and Aqueous Homogeneous Reactors” (ADAMS Accession No. ML12156A069). However, it was noted by Kairos that NUREG-1537 does not provide explicit differentiation in the expected content for a PSAR versus a final safety analysis report (FSAR) and doesn’t seem to be technology neutral as it focusses more on light-water reactors. The staff stated that it is currently working on revising NUREG-1537 to be more technology neutral. The public session continued with Mr. Oded Doron, Director of Engineering Design for Kairos, providing an overview of the Hermes test reactor design and safety features which included a description of: tri-structural isotropic (TRISO) fuel, reactor coolant Flibe ($2\text{LiF}-\text{BeF}_2$), low pressure primary system, and barriers to the release of radionuclides. A brief description of the systems configuration was also provided.

During the closed session Kairos discussed in more detail its licensing strategy, content of the PSAR, the safety analysis with an overview of the maximum hypothetical accident (MHA), and the design and configuration of the reactor and plant systems.

Day 2, January 28, 2021

The public session of the meeting started with a presentation by Margaret Ellenson, Senior Licensing Engineer for Kairos. She provided an overview of the site selection and development of the environmental report for the Hermes test reactor CP application. Kairos’s intent is to meet the requirements in 10 CFR 100.10, “Factors to be considered when evaluating sites,” and 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions,” for its site factors and the environmental report, respectively. Kairos discussed its site selection process and stated that the selected site for its test reactor is the East Tennessee Technology Park (former Department of Energy K-33 gaseous diffusion plant site) which is approximately 3 miles northwest of the Clinch River nuclear site. Kairos noted that it plans to generally follow the NRC guidance in NUREG-1537 Chapter 12, “Conduct of Operations,” and Chapter 19, “Environmental Review,” of the associated Interim Staff Guidance to develop its environmental report. An overview of the environmental report chapters was also provided by Kairos.

During the closed session Kairos discussed its site activities; site and environmental data sources and collection to be used to develop Chapter 2 of their PSAR and their environmental report; and preliminary environmental permitting plan for their test reactor.

Throughout the 2-day meeting sessions Kairos answered questions from the staff regarding currently planned project activities, design features, and associated environmental impact evaluations. Kairos indicated their intention to continue in pre-application interactions with the NRC’s safety and environmental staff as project details mature.

Discussions at these meetings prepared the staff for the upcoming submittal and review of the CP application and provided feedback to Kairos on the staff’s expectations regarding the content of the application.

Project No. 99902069

Enclosure:
List of attendees

SUBJECT: KAIROS POWER LLC - SUMMARY OF JANUARY 27 AND 28, 2021, PUBLIC MEETING TO DISCUSS KAIROS POWER LLC'S HERMES TEST REACTOR CONSTRUCTION PERMIT APPLICATION DATED: MARCH 17, 2022

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NAME	SCuadrado	SLent	WKennedy	SCuadrado
DATE	8/5/2021	8/5/2021	3/13/2022	3/17/2022

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List of Attendees

NAME	ORGANIZATION
Darrell Gardner	Kairos Power LLC (Kairos)
Drew Peebles	Kairos
Michael Laufer	Kairos
Edward Blandford	Kairos
Per Peterson	Kairos
Peter Hastings	Kairos
Mark Peres	Kairos
Oded Doron	Kairos
Brian Song	Kairos
Margaret Ellenson	Kairos
Jordan Hagaman	Kairos
Andrew Lingenfelter	Kairos
Jim Tomkins	Kairos
Nicole Schlichting	Kairos
John Price	Kairos
Brandon Haugh	Kairos
Apurba Das	Kairos
Anthonie Cilliers	Kairos
Nader Satvat	Kairos
Alan Kruizenga	Kairos
Nicolas Zweibaum	Kairos
Micah Hackett	Kairos
Craig Gerardi	Kairos
Katie Dignan	Kairos
Jeff Olson	Kairos
Lou Martinez	Kairos
Casey Tompkins	Kairos
Seth Langford	Kairos
Henry Korellis	Kairos
Seth Cadell	Kairos
Matthew Denman	Kairos
Matthew Warner	Kairos
Peiwen Whysall	Kairos
John Muratore	Kairos
Gareth Whatcott	Kairos
Zackary Rad	Kairos
Fatih Sarikurt	Kairos
Kevin Johnson	Kairos
Max Fratoni	Kairos
Pushpal Swarnkar	Kairos
Joel Hughes	Kairos
Merritt Diaz	Kairos
Alexander Schwans	Kairos
Moonkyu Hwang	Kairos
Blaise Collin	Kairos
Quan Zhou	Kairos
Haihua Zhao	Kairos
Evan Cummings	Kairos

Enclosure

Ryan Latta	Kairos
Audrey Angelos	Kairos
Ray Schiele	Tennessee Valley Authority
Mo Shams	U.S. Nuclear Regulatory Commission (NRC)
Brian Smith	NRC
Samuel Cuadrado	NRC
Richard Rivera	NRC
Greg Casto	NRC
Benjamin Beasley	NRC
Steve Lynch	NRC
Edward Helvenston	NRC
John Honcharik	NRC
Tami Dozier	NRC
Michael Balazik	NRC
Alexander Chereskin	NRC
Christopher Van Wert	NRC
Michelle Hayes	NRC
Michael Spencer	NRC
Weidong Wang	NRC
Richard Clement	NRC
Jeffrey Schmidt	NRC
Michelle Hart	NRC
Jonathan Ortega	NRC
Boyce Travis	NRC
Stewart Magruder	NRC
Thomas Scarbrough	NRC
Dayna Dority	NRC
Peyton Doub	NRC
Nathan Sanfilippo	NRC
Ryan Nolan	NRC
Dong Park	NRC
Scott Burnell	NRC
Lance Sterling	Public
David L. Daigle	Public
Thomas Metcalf	Public
Austin Clark	Public
Sam Sham	Public
Kenneth Charles Wagner	Public
David Lyle Luxat	Public