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

KAIROS POWER, LLC – HERMES 2
ENVIRONMENTAL REPORT AUDIT PLAN
(CAC NO. 000955, 05000611 and 05000612; EPID NO. L-2021-NEW-0012)

APPLICANT INFORMATION:

Applicant:	Kairos Power, LLC
Applicant Address:	707 W. Tower Ave, Alameda, CA 94501
Plant Name(s) and Unit(s):	Kairos – Hermes 2 Test Reactors
Docket No(s).:	05000611 05000612

Background:

By letter dated July 14, 2023 (Agencywide Documents Access and Management System (ADAMS) ML23195A121), Kairos Power LLC (Kairos) submitted an Environmental Report (ER) in support of a construction permit (CP) application for the Hermes 2 test reactor project. By letter dated September 11, 2023, the U.S. Nuclear Regulatory Commission (NRC) notified Kairos of its acceptance of the CP application for detailed review (ML23233A167). The staff is reviewing the information in the ER (ML23195A125) per Title 10 of the *Code of Federal Regulations* (10 CFR) Part 51. The staff is preparing an Environmental Assessment (EA) in accordance with 10 CFR 51.30 to evaluate the environmental impacts from the proposed action. Additionally, the staff is pursuing an exemption to 10 CFR 51.20(b)(1), which requires preparation of an environmental impact statement (EIS) for issuance of a permit to construct a nuclear power reactor, testing facility, or fuel reprocessing plant under 10 CFR Part 50.

In its initial review of data and information within the corresponding context of the ER, the staff has identified information needs (Attachment 1) that would promote a better understanding of the detailed analysis and bases underlying the construction permit application. This environmental audit will provide the NRC staff an opportunity to discuss these items with the applicant's subject matter experts, staff and contractors. During the audit, the staff will discuss environmental matters related to the site and technical area such as land use, air quality and noise, ground and surface water, terrestrial and aquatic ecology, historical and cultural resources, socioeconomics and environmental justice, human health, radiological and non-radiological waste, fuel cycle, transportation of radioactive material, postulated accidents,

cumulative impacts, and alternatives to the proposed action. The audit will allow the staff to better understand the site, environmental interfaces of the project, and modeling results needed to draw appropriate environmental findings.

Purpose:

The NRC staff is conducting an environmental audit of the ER submitted by Kairos for the proposed Hermes 2 test reactors (ML23195A125), to seek clarification, improve understanding, and to verify information provided in the ER and supporting documentation.

Regulatory Audit Basis:

Requirements for environmental reports supporting construction permits are specified in 10 CFR 51.50, “Environmental Reports – construction permit, early site permit or combined license stage.” The ER for the Hermes 2 construction permit application follows the guidance in Chapter 19 of the Final Interim Staff Guidance (ISG) Augmenting NUREG-1537, Part 1, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content” (ML12156A069).

Regulatory Audit Scope:

Audit team members will review documents and other requested information outlined in the information needs list (Attachment 1). This list covers those environmental review areas outlined in the Background section of this audit plan. Attachment 2 lists those areas for which pre-arranged audit discussions will be worked out between the NRC and Kairos project managers to take place the first week of the audit (see discussion below for audit logistics.)

Environmental Review Team

Table 1 is a list of the NRC’s environmental review team assigned to the Kairos CP review and their role or review area, which includes NRC and staff and their contractor. Additional NRC staff may participate in some audit discussions based on coordination with related reviewers (see Attachment 2).

Table 1. Review Areas with assigned team members

Team Member	Role / Review Area
Peyton Doub	Environmental Review Supervisor (Acting)
Peyton Doub	Environmental Project Manager, Land Use, Alternatives
Tami Dozier	Environmental Project Manager Support
Madelyn Nagel	Air Quality and Noise, Socioeconomics and Environmental Justice, Climate Change, Other Miscellaneous
Brian Glowacki	Hydrogeology and Water Resources, Ecological Resources, Non-radiological Human Health
Rao Tammara	Radiological Human Health; Transportation of Radioactive Materials; Fuel Cycle and Radiological Waste Management; Postulated Accidents
Beau Goldstein	Historic and Cultural Resources
Joseph Giacinto	Peer Review: Water Resources and Hydrogeology; Climate Change
Laura Willingham	Peer Review: Air Quality
Donald Palmrose	Peer Review: Radiological Materials, Transportation, and Accidents
Dave Anderson, PNNL	Socioeconomics
Doug McFarland, PNNL	Historic and Cultural Resources
Tara O'Neill	Historic and Cultural Resources

Information and Other Material Necessary for the Regulatory Audit:

The NRC staff requests that all the documents and other requested information identified in Attachment 1 be provided by Kairos on the online reference portal.

Logistics:

Entrance Meeting January 17, 2024
Exit Meeting February 7, 2024 (Tentative)

Audit meetings will take place in a virtual format, using Microsoft Teams, or via other, similar platform. The NRC and Kairos audit managers will schedule meetings as needed upon Kairos review of this audit plan. The audit duration is anticipated to be approximately 3 weeks with activities occurring regularly throughout the first week and intermittently thereafter. Attachment 2 describes sessions to be pre-arranged for the first week. Follow-up sessions will be scheduled, if needed, until audit closure.

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, a publicly noticed exit meeting will be held at which time a summary of audit activities and discussions will be presented along with the status of staff information needs identified as part of the audit. In addition, the audit team will issue an audit summary within 90 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:

ISG 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 (ML12156A069)

Contacts:

Please contact Peyton Doub at 301-415-6703 or via email at Peyton.Doub@nrc.gov about any issues related to the conduct of the audit.

J Peyton Doub Signed by Doub, Joseph
on 01/05/24

J. Peyton Doub, Environmental Project Manager
Environmental Project Management Branch 3
Division of Rulemaking, Environmental
and Financial Support
Office of Nuclear Materials, Safety
and Safeguards

KAIROS POWER, LLC – HERMES 2 ENVIRONMENTAL REPORT PRE- SUBMITTAL AUDIT PLAN (CAC NOS. 000955, 05000611 and 05000612; EPID NO. L-2021-NEW-0012)

DATED:
January 5, 2024

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ADAMS Accession No. ML23353A069

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DATE	12/21/2023	12/21/2023	01/04/2024	01/05/2024

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Attachment 1
Kairos Hermes 2 CP Application Environmental Audit Information Needs List

Information Need ID	ER Section	Information Needed
Site and Technical Overview (Planned EA Chapters 1 and 2)		
ST-1	1.2	Provide an update on the anticipated schedule for beginning construction and operations of the first proposed Hermes reactor (Hermes 1).
Cumulative Impacts (Multiple Review Areas)		
CM	4.13	No info needs beyond those identified below for specific resources.
Land Use and Visual Resources (Planned EA Section 3.1)		
LU-1	4.1	Identify the present status of site ownership.
LU-2	4.1	Estimate the combined area of land occupied by the Hermes 2 and Hermes 1 projects.
LU-3	4.1	Indicate how the presence of the Hermes 2 structures may affect the views from the Key Observation Points addressed in the ER for the Hermes 1 reactor.
LU-4	App A	Indicate the voltage and ROW length and width extending off of the Kairos site.
Air Quality and Noise (Planned EA Section 3.2)		
AN-1	4.2	Identify in a table the total emissions of operations related equipment (similar to total emissions table for construction, Table 4.2-1).
AN-2	4.2	Estimate the maximum noise level and duration that may be experienced for the nearest resident or other noise sensitive receptor.
AN-3	4.2	Describe whether noise generated from the three Hermes reactors (the two Hermes 2 reactors plus Hermes 1) would be attenuated to less than 65 dBA. Would simultaneous operation of three reactors interact synergistically to produce noise levels higher than 65 dBA? Would Kairos use mitigation to reduce noise levels to less than 55 dBA, which is recognized by EPA as the preferred target?
Water Resources and Hydrogeology (Planned EA Section 3.3)		
WR	4.3, 4.4	No Info Needs Identified
Ecological Resources (Planned EA Section 3.4)		
EC	4.5	No Info Needs Identified
Historical and Cultural Resources (Planned EA Section 3.5)		

HC-1	4.6	Because the Hermes 2 ER was completed before the cultural resources geoarchaeological reconnaissance investigation, which covers both the Hermes 1 and Hermes 2 undertakings and construction locations, the new information on cultural and historic resources from that report are not in the ER. Provide an executive summary of the reconnaissance geoarchaeological investigation, results, and regulatory findings, to supplement information provided by the ER to be added to the docket.
Socioeconomics and Environmental Justice (Planned EA Section 3.6)		
SE-1	4.7, 4.12	Section 2.1 of the ER provides total estimated staff numbers for the construction, operation and decommission stages of the project. Provide additional information about the residence of employees for each stage (breakdown by county) and indicate the percentage of the in-migrating labor force.
SE-2	4.7, 4.12	Section 3.3.2.4 of the Hermes 2 ER discusses tax payment information. Provide tax payment estimates (property taxes, payment in lieu of taxes, etc.) of the proposed project for all construction, operational and decommissioning activities. Also add the analysis of the tax consequences compared to the total tax revenue in the county (ranges, percentages, etc.).
SE-3	4.7, 4.12	Section 2.1 of the Hermes 2 ER provided the total estimated staff numbers for the construction, operation and decommission stages of the proposed project. Provide the shift schedules for the construction, operation, and decommissioning workforce (both at regular time and peak times), as well as the duration for the peak times. Also, clarify whether the number of full-time positions is a combination of full-time workers on weekdays and part-time workers during the weekends and later evenings.
SE-4	4.7, 4.12	Provide the most recent baseline traffic info for the major road accessing the site. Provide the traffic assessment about how construction, operation and decommission workforce, plus the shipments and deliveries of the Hermes 2 will affect the level of service (LOS) of the major road intersections.
SE-5	4.7, 4.12	Section 2.1 of the Hermes 2 ER provided the estimated information of the shipments and deliveries for the construction, operation and decommission stages of the proposed project. Please further provide the delivery methods (trucks or other methods)? If trucks, indicate what kind of trucks, how many trucks will be needed, the load limits for the trucks, and the durations of the deliveries for the fuel, coolant and any other equipment.
Human Health: Non-Radiological (Planned EA Section 3.7.1)		
HN-1	4.8.1	At time of construction of the Hermes 2 reactors, indicate whether there may be radiological or hazardous materials present on site resulting from construction and operation of the Hermes 1 reactor.
HN-2	4.8.1	The EIS for construction of the Hermes 1 reactor also uses 100 tons per year (TPY) as a bounding figure, stating that air emission would

		be less than the 100 TPY allowed by the Clean Air Act. Indicate whether the combined air emissions could exceed 100 TPY if the Hermes 1 reactor and the two Hermes 2 reactors were under construction at the same time.
HN-3	4.8.1	Indicate whether control measures would be implemented to reduce the electrical hazard posed by the transmission lines to workers.
Human Health: Radiological (Planned EA Section 3.7.2)		
HR-1	4.8.2	Indicate the estimated Hermes 2 construction worker dose from the operation of the Hermes 1 test reactor.
HR-2	4.8.2	Indicate the estimated doses from the operation of Hermes 2 on workers participating in the decommissioning of the Hermes 1 test reactor.
Nonradiological Waste: Non-Radiological (Planned EA Section 3.8)		
NW-1	4.9	Indicate whether the two Hermes 2 reactors would be separately registered as small quantity generators (SQGs) under the Resource Conservation and Recovery Act (RCRA) or included in that for the Hermes 1 test reactor.
NW-2	4.9	Indicate whether there would be waste streams during operations for anhydrous hydrogen fluoride, Flibe, and BeNaF.
Fuel Cycle and Radiological Waste Management (Planned EA Section 3.9)		
FC-1	Chapter 2	Discuss potential sources of HALEU needed to operate the Hermes 2 reactors, recognizing that no reprocessing facility is currently in operation in the United States.
FC-2	Chapter 2	Provide clarification on how 46 annual shipments of Dry Active Waste (DAW) would be bound the impact assessment for operation of two Hermes 2 reactor. The ER for the Hermes 1 reactor indicated a larger quantity of DAW for only one reactor.
Transportation of Radioactive Material (Planned EA Section 3.10)		
TR-1	4.10	Provide clarification on how the ER estimates six truck shipments for shipping a year's supply of fuel for the Hermes 2 reactors.
TR-2	4.10	Clarify why 23 shipments per year of low-level radioactive waste can be used to assess impacts from operations of the two Hermes 2 reactors. For example, how does this compare to the Hermes 1 reactor, which was also estimated to produce 23 shipments per year.
TR-3	4.10	Provide an analysis of the effects of transportation of spent TRISO fuel.
Postulated Accidents (Planned EA Section 3.11)		
AC	4.11	No Info Needs Identified
Alternatives (Planned EA Chapter 4)		

AL	Chapter 5	No Info Needs Identified

Attachment 2
Anticipated Kairos Hermes 2 CP Application Environmental Audit Sessions for Week 1

Audit Sessions Anticipated	Attendees	Information Needs to Be Covered
Introductory Meeting (Audit Kickoff)	All audit participants	
Site and Technical Overview/ Proposed Action Session	All audit participants	ST-1, LU 1, 2, 3, 4
Cultural and Socio Session: Historic and Cultural Resources Socioeconomics and EJ	Beau Goldstein Doug McFarland (PNNL) Tara O'Neill (PNNL) Dave Anderson (PNNL) Tami Dozier	HC-1 SE-1, 2, 3, 4, 5
Radiological Session: Radiological Human Health Fuel Cycle and Rad Waste Transportation of Radiological Material	Rao Tammara Don Palmrose (Optional)	HR-1, 2 FC-1, 2 TR-1, 2, 3
Miscellaneous Session: Air Quality and Noise Non-Rad Human Health Non-Rad Waste	Madelyn Nagel Brian Glowacki Laura Willingham (Optional)	AN-1, 2, 3 HN-1, 2, 3
Review Areas Not Needing a Session: Cumulative Impacts Water Resources and Hydrogeology Ecological Resources Postulated Accidents Alternatives	N/A	N/A