

Kairos Power Hermes 2 Test Reactor
Construction Permit Application Environmental Review
Requests for Confirmatory Information

Regulatory Basis:

Construction permit (CP) requirements are specified in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities.” Kairos submitted an Environmental Report (ER) as part of its CP application in accordance with 10 CFR Part 51, “Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions.” The Nuclear Regulatory Commission’s (NRC) regulations at 10 CFR Part 51, which implement Section 102(2) of the National Environmental Policy Act (NEPA) of 1969, include requirements for applicants to provide information as may be useful in aiding the NRC staff in complying with NEPA. Review guidance for the staff is provided in the Final Interim Staff Guidance for Augmenting NUREG–1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors”, Parts 1 and 2 (ML12156A069 and ML12156A075).

Request for Confirmation of Information

On January 5, 2024, the NRC issued its plan for conducting an environmental audit (ML23353A069) related to the Kairos Hermes 2 CP application. As part of the audit, the staff reviewed documents on the applicant electronic information portal (ML20014E6412), provided in response to the staff Information Needs outlined in Attachment 1 of the audit plan. Additionally, the staff held discussions with applicant staff related to these audit items. To the best of the staff’s knowledge, some of the information reviewed is not on the docket or accessible in the public domain; therefore, the staff requests that Kairos Power submit confirmation that the information listed below is correct or provide the associated correct information.

Land Use

RCI LU-01:

Based on the staff’s review of ER Section 4.1, and audit activities related to Information Need LU-1, please confirm that Kairos has control of the Hermes 2 property, subject to applicable deed restrictions, through a lease arrangement with the City of Oak Ridge Industrial Board.

Kairos Power Response:

This information has been confirmed to be correct as stated, with the clarification that the lease agreement is with the Industrial Development Board of the City of Oak Ridge.

RCI LU-02:

Based on the staff’s review of ER Section 4.1, and audit activities related to Information Need LU-2, please confirm that Kairos Power believes that the visual analysis of the site would result in the same conclusions reached in the Hermes ER if Hermes 2 were present adjacent to Hermes.

Kairos Power Response:

This information has been confirmed to be correct as stated.

Historic and Cultural Resources

RCI HC-01:

Does the below executive summary accurately capture the intent, results, and recommendations of the geoarchaeological report?

Kairos Power LLC applied to the U.S. Nuclear Regulatory Commission (NRC) for construction permits for the Hermes 1 and Hermes 2 reactor projects in Oak Ridge, Tennessee. The two proposed undertakings would be within the 185-acre site (Project Site) in the Heritage Center Industrial Park of the East Tennessee Technology Park and could disturb up to approximately 138 acres of land that was previously occupied by Buildings K-31 and K-33. These buildings were formerly part of the U.S. Department of Energy Oak Ridge Gaseous Diffusion Plant complex on the Oak Ridge Reservation.

The NRC determined the direct effects Area of Potential Effects (APE) for both undertakings is the 185-acre Project Site. Due to the nature of the Project Site, and through the NRC's NHPA Section 106 Consultation process for Hermes 1, a decision was made to conduct a geoarchaeological reconnaissance survey as part of Identification of Historic Properties (applicable to both undertakings). This survey of the Project Site was performed in August 2023. The report assesses the potential for deeply buried archaeological deposits within the Project Site, determines whether additional archeological investigations were warranted, and provides a recommendation for regulatory findings. The findings from this report will also be used to support the NHPA Section 106 Consultation process for Hermes 2.

The geoarchaeological reconnaissance survey identified extensive prior disturbances related to artificial fill emplacement and construction of spreader footing foundations. Along the northern peripheries of the Project Site, highly weathered, natural upland soils developed in residuum weathered from limestone were noted and were determined to exhibit low geoarchaeological potential. Other areas were found to contain natural alluvial soils beneath a thin layer of fill and exhibit high geoarchaeological potential.

Examination of soils and geotechnical data logs from 16 previous geotechnical borings revealed artificial fill materials across the Project Site. Fill ranged from 6.4 to 19 feet thick in areas that were previously truncated (i.e., "cut" areas) during construction of the former K-31/K-33 buildings, and from 8.9 to 20 feet thick in former low-lying areas ("fill" areas) adjacent to a former stream. Natural soil surfaces beneath the fill that could potentially contain intact archeological deposits were identified only within the fill areas. All cut areas were found to exhibit low geoarchaeological potential. Based on the current investigations, five geoarchaeological mapping units were identified, each with specific monitoring recommendations.

NRC determined that the proposed project would have no adverse effect to historic properties, as none are known to exist within the direct effects APE. While the current study suggests that certain portions of the Project Site exhibit the necessary conditions for containing deeply buried archeological materials, this does not mean any such sites have been identified or are present. Rather, it only indicates that natural conditions in some areas are conducive to archeological site

preservation. Thus, in the absence of any known archeological sites within the Project Site, the geoarchaeological investigations currently support NRC's finding of no adverse effect to historic properties. However, given the conditions conducive to site preservation in some areas, a detailed Archeological Resources Monitoring and Unanticipated Discovery Plan was developed. Through the Hermes 1 Section 106 process, both documents were accepted by consulting Tribes and concurred with by the State Historic Preservation Office (SHPO).

Kairos Power Response:

This information has been confirmed to be correct as stated.

Socioeconomics and Environmental Justice

RCI SE-01:

Based on the staff's review of ER Section 2.1, and audit activities related to Information Need SE-3, please confirm:

- *The estimated duration of construction for each unit of Hermes 2 is 2 years. Total duration of the Hermes 2 construction is estimated to be 3 years, with an overlap in construction of the two units of approximately 1 year, which conservatively could be considered as the duration of peak activity.*
- *In total, there is expected to be 101 full-time positions for operations of Hermes 2. Of these total positions, 59 workers are expected to be required onsite during normal weekday operations (including nightshift), with fewer workers required on the weekend.*
- *As Hermes 2 will apply online refueling, there are no planned outages or maintenance activities that would substantially increase workforce size on site during operations.*

Kairos Power Response:

This information has been confirmed to be correct as stated, with two clarifications. First, per enclosure 1 of the Hermes 2 CPA (ML23195A123), the earliest projected date of start of construction to the earliest projected date of completion of construction is 2 years, with the latest projected date of completion of construction being 5 months later. Also per enclosure 1 of the Hermes 2 CPA (ML23195A123), the completion of construction for the second unit is expected to be one year after the first unit. The projected duration of peak activity is estimated to be approximately 1 year.

Second, there may be planned outages or maintenance activities unrelated to refueling needs. Some maintenance activities could approximately double the workforce size on site during operations but these activities are not expected to last more than a few months and are not expected to occur more than a few times during the operational life of Hermes 2.

RCI SE-02:

Based on the staff's review of ER Section 2.1, and audit activities related to Audit Item SE-5,

please confirm that primarily trucks are used for the shipments and deliveries (as opposed to train or barge) for Hermes 2 construction. Kairos Power is not expecting to need local access road improvements to handle the volume and weight of deliveries to the site to accommodate the proposed action.

Kairos Power Response:

This information has been confirmed to be correct as stated.

Human Health: Radiological

RCI HR-01:

Based on the staff's review of ER Section 4.8, and audit activities related to Information Need HR-1, please confirm that the Hermes test reactor annual maximally exposed individual (MEI) dose of 2.4 mrem/yr is expected to bound the Hermes 2 reactor construction worker dose.

Kairos Power Response:

This information has been confirmed to be correct as stated.

RCI HR-02:

Based on the staff's review of ER Section 4.8, and audit activities related to Information Need HR-2, please confirm the Hermes 2 CP ER MEI dose of 4.8 mrem/yr from the operation of Hermes 2 is expected to bound the Hermes test reactor decommission worker's annual dose.

Kairos Power Response:

This information has been confirmed to be correct as stated.

Transportation of Radioactive Material

RCI TR-01:

Based on the staff's review of ER Section 4.10, and audit activities related to Information Need TR-1, please confirm that the Hermes 2 spent TRISO fuel stored until decommissioning would likely be shipped in a two-to-three-year time period during decommissioning.

Kairos Power Response:

This information has been confirmed to be correct as stated.