

Enclosure 1

**Kairos Power Response to NRC Request for Confirmation of Information
for the Review of the Hermes 2 PSAR Chapter 5**

(Non-Proprietary)

Kairos Power Hermes 2 Test Reactor
Construction Permit Application
Preliminary Safety Analysis Review
Chapter 5 Requests for Confirmation of 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." Title 10 of the Code of Federal Regulations (10 CFR) 50.34(a) provides requirements for the information that shall be included in the preliminary safety analysis report (PSAR) submitted as part of a construction permit (CP) application. Paragraph 50.34(a)(3)(ii) states that the PSAR shall contain a description of the proposed facility's design bases and the relation of the design bases to the principal design criteria (PDC). Kairos Power submitted a Preliminary Safety Analysis Report (PSAR) as part of its CP application in accordance with 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities."

On October 3, 2023, the NRC issued its plan for conducting a preliminary safety audit (ML23268A446) related to the Kairos Power 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 Kairos Power 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.

RCI-03

Background Provided by the NRC

NUREG-1537 identifies the following acceptance criteria in Section 3.1, "Design Criteria:"

- *Design criteria should include references to applicable up-to-date, standards, guides, and codes. They should be stipulated for those features discussed in the format and content guide for this section, as outlined below:*
 - *design for the complete range of normal reactor operating conditions*
 - *design to cope with anticipated transients and potential accidents*
 - *design redundancy to protect against unsafe conditions in case of single failures of reactor protective and safety systems*
 - *design to facilitate inspection, testing, and maintenance*
 - *design to limit the likelihood and consequences of fires, explosions, and other potential manmade conditions*
 - *quality standards commensurate with the safety function and potential risks*
 - *design bases to withstand or mitigate wind, water, and seismic damage to reactor systems and structures*
 - *analysis of function, reliability, and maintainability of systems and components*

Request for Confirmation of Information

Kairos Power will provide a final design for the intermediate heat transport system (IHTS) and the safety-related rupture disks (including design features, potential qualification testing, or other justification) with the operating license application that justifies that the rupture disks will reliably perform their safety function to provide overpressure protection preventing a gross failure of the intermediate heat exchanger. At a minimum, the final design will address the following items:

- *The design of the IHTS piping geometry and location of the rupture disks to adequately relieve pressure and provide a relief path for the steam from a postulated superheater tube break,*
- *The operating environment of the rupture disks, including temperature and chemistry (e.g. hydrogen fluoride exposure)*
- *The potential for adverse impact on rupture disk function from material aging or degradation due to environmental effects (e.g. extended time at elevated temperatures impacting material properties and rupture disk performance),*
- *The potential for salt vapor deposition to impede rupture disk function, and*
- *Design considerations (e.g. redundancy and independence) that would provide adequate reliability for the final design.*

Kairos Power Response

This information has been confirmed to be correct as stated.