



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

**REQUEST FOR CONFIRMATION OF INFORMATION
OFFICE OF NUCLEAR REACTOR REGULATION
HERMES 2 CONSTRUCTION PERMIT APPLICATION
DOCKET NOS. 50-611 AND 50-612
EPID L-2023-CPS-0000**

Request for Confirmation #3

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).

NUREG-1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors," Part 2, 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

Kairos 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 for 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 increased reliability against potential failure modes not considered based on the preliminary design.