

From: [Beasley, Benjamin](#)
To: "[gardner@kairospower.com](#)"; "[peebles@kairospower.com](#)"; "[Jim Tomkins](#)"; "[Martin Bryan](#)"
Cc: [Cuadrado de Jesus, Samuel](#); [Helvenston, Edward](#); [Chereskin, Alexander](#)
Subject: Final RCI 349 on Salt Purity in the Chemistry Control System and the Inert Gas System
Date: Friday, August 05, 2022 10:01:00 AM

Darrell, Drew, Jim, and Marty,

The Request for Confirmation of Information (RCI) below was transmitted as draft on August 2, 2022. Since no changes were made as a result of the clarification call, this RCI is final. Please respond to this request within 30 days of August 2, 2022.

Regards,
Ben

~~~~~

Benjamin Beasley  
Senior Project Manager  
Advanced Reactor Licensing Branch 1  
Office of Nuclear Reactor Regulation  
301-415-2062  
[Benjamin.Beasley@nrc.gov](mailto:Benjamin.Beasley@nrc.gov)



---

**REQUEST FOR ADDITIONAL INFORMATION  
OFFICE OF NUCLEAR REACTOR REGULATION**

**Issue Date:** 8/2/2022

**Hermes Construction Permit Application**

Kairos Power, LLC

**Dockets:** 05007513--Hermes Non-Power Test Reactor

**EPIDS:** L-2021-NEW-0011

**RAI 349, QUESTION 409**

Section 50.34 of Title 10 of the *Code of Federal Regulations* (10 CFR 50.34), "Contents of applications; technical information," provides requirements for information to be provided in a Construction Permit (CP). 10 CFR 50.34(a)(3)(ii) states that a CP shall contain a description of the design bases and the relation of the design bases to the principal design criteria (PDC).

Section 3.1.1, "Design Criteria," of the Kairos Power (KP) Hermes Preliminary Safety Analysis Report (PSAR) references document KP-TR-003-NP-A, "Principal Design Criteria [PDC] for the Kairos Power Fluoride-Salt Cooled, High Temperature Reactor," Revision 1, to provide the PDC for the Hermes test reactor.

KP-FHR PDC 70, "Reactor coolant purity control," requires the system to maintain the purity of the reactor coolant within specified design limits.

In order to demonstrate how the design bases for the chemistry control system satisfy PDC 70, confirm the following information for Section 9.1.1:

- Will information in the FSAR show the selected location(s) for coolant chemistry sampling to be a well-mixed, representative sample of the coolant?

KP-FHR PDC 70, "Reactor coolant purity control," requires that coolant purity limits be based on consideration of air or moisture ingress due to a cover gas leak.

In order to demonstrate how the design bases for the inert gas system (IGS) satisfy PDC 70, confirm the following information for Section 9.1.2:

- Will the IGS be capable of measuring both air and moisture content of the cover gas?
- Can the entirety of the IGS be periodically checked for leakage?

In order to clarify the design bases of the IGS, confirm the following information for Section 9.1.2:

- Is the IGS needed to control the 'hot cell' temperature stated in Chapter 13, Table A5-1, "Key Input Parameters for Pebble Handling and Storage System Malfunction Event?"