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

July 2, 2020

Mr. Matthew Sunseri, Chairman
Advisory Committee on Reactor Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: SAFETY EVALUATIONS OF THE KAIROS POWER, LLC TOPICAL REPORTS KP-TR-006-P, REVISION 1, "SCALING METHODOLOGY FOR THE KAIROS POWER TESTING PROGRAM," AND KP-TR-005-P, REVISION 1, "REACTOR COOLANT FOR THE KAIROS POWER FLUORIDE SALT-COOLED HIGH TEMPERATURE REACTOR"

Dear Chairman Sunseri,

In your letters dated May 27, 2020 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20142A301), and June 1, 2020 (ADAMS Accession No. ML20148M230), the Advisory Committee for Reactor Safeguards (ACRS) reported on its review of the U.S. Nuclear Regulatory Commission (NRC) staff's safety evaluations (SE) of the Kairos Power, LLC (Kairos Power) topical reports KP-TR-006-P, Revision 1, "Scaling Methodology for the Kairos Power Testing Program," and KP-TR-005-P, Revision 1, "Reactor Coolant for the Kairos Power Fluoride Salt-Cooled High Temperature Reactor."

Your letters contained the following conclusions and recommendations:

Letter on "Scaling Methodology for the Kairos Power Testing Program":

1. Topical report KP-TR-006-P, with the limitations and conditions imposed by the staff SE report, provides an acceptable methodology to scale momentum and heat transfer phenomena for the Kairos reactor under normal operations and transient conditions.
2. The SE report should be issued.

Letter on "Reactor Coolant for the Kairos Power Fluoride Salt-Cooled High Temperature Reactor":

1. The thermophysical properties and design specification limits in Tables 1 and 4 of KP-TR-005-P with the limitations and conditions imposed by the staff SE report provide acceptable initial values for design and safety analyses of the Kairos Power Fluoride High Temperature Reactor (KP-FHR).
2. Limitations and conditions imposed by the staff require an updated version of information in Tables 1 and 4 of KP-TR-005-P be submitted after confirmatory data are obtained under an approved quality assurance program.
3. The SE report should be issued.
4. The proposed Kairos reactor design and limited operational experience with molten salt coolants present several technical issues that could affect either the coolant material properties or the coolant specifications. It is important that information in Tables 1 and 4

be finalized because material properties and coolant specifications are required for acceptance of data obtained from scaled testing using surrogate fluids and are fundamental input to many reactor safety analyses.

The NRC staff appreciates the ACRS's review and agrees with its recommendations. The staff plans to issue the SE reports by mid-July 2020 and looks forward to future interactions with the ACRS.

Sincerely,

/RA RTaylor for/

Ho K. Nieh, Director
Office of Nuclear Reactor Regulation

Project No. 99902069

cc: Chairman Svinicki
Commissioner Baran
Commissioner Caputo
Commissioner Wright
Commissioner Hansen
SECY

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