



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

March 13, 2023

Mr. Peter Hastings
Vice President, Regulatory Affairs
and Quality
Kairos Power LLC
707 W Tower Ave.
Alameda, CA 94501

SUBJECT: KAIROS POWER LLC – FINAL SAFETY EVALUATION FOR TOPICAL
REPORT “METALLIC MATERIAL QUALIFICATION FOR THE KAIROS POWER
FLUORIDE SALT-COOLED HIGH-TEMPERATURE REACTOR” (REVISION 4)
(EPID NO. L-2021-TOP-0022/CAC NO. 000431)

Dear Mr. Hastings:

This letter provides the final safety evaluation (SE) for the Kairos Power LLC (Kairos) topical report (TR) “Metallic Material Qualification for the Kairos Power Fluoride Salt-Cooled High-Temperature Reactor,” Revision 4. By letter dated June 30, 2020, Kairos submitted Revision 0 of the TR for the U.S. Nuclear Regulatory Commission (NRC) staff review (Agencywide Documents Access and Management System (ADAMS) Accession No. ML20182A799). On November 25, 2020, the NRC staff provided its review questions to Kairos (ML20332A076). The review questions were discussed during a closed meeting held between the NRC staff and Kairos on January 13, 2021. By letter dated June 30, 2021, Kairos submitted Revision 1 of the TR (ML21181A385) to address the NRC staff review questions. By letter dated April 26, 2022, Kairos submitted Revision 2 of the TR (ML22116A246) to address questions discussed during a closed meeting held between the NRC staff and Kairos on February 2, 2022, and February 14, 2022. By letter dated August 19, 2022, Kairos submitted Revision 3 (ML22231B221) to address technical items discussed with the NRC staff during closed meetings held on July 18, 2022, and August 10, 2022. By letter dated September 20, 2022, Kairos submitted Revision 4 (ML22263A456) to address technical items discussed with the NRC staff during a closed meeting held on September 12, 2022.

The NRC staff’s final SE for “Metallic Material Qualification for the Kairos Power Fluoride Salt-Cooled High-Temperature Reactor,” Revision 4, is enclosed. The NRC staff provided Kairos a draft of the SE for the purpose of identifying proprietary information on December 19, 2022 (ML22355A307). On December 23, 2022, Kairos confirmed that the proprietary information in the draft SE was appropriately marked (ML23058A225).

Enclosure 1 to this letter contains Proprietary and Export Controlled Information. When separated from Enclosure 1, this letter is DECONTROLLED.

P. Hastings

- 2 -

The Advisory Committee on Reactor Safeguards (ACRS) was briefed on this TR on January 12, 2023, and February 1, 2023. The ACRS provided its recommendations for the publication of this SE in a letter dated February 15, 2023 (ML23037A951). The enclosed SE is final, and a redacted version will be made publicly available.

The NRC staff requests that Kairos publish an accepted version of this TR within 3 months of receipt of this letter. The accepted version shall incorporate this letter and the enclosed SE after the title page. The accepted version shall include an "-A" (designating accepted) following the TR identification number.

If you have any questions, please contact Richard Rivera at Richard.Rivera@nrc.gov.

Sincerely,



Signed by Jessup, William
on 03/13/23

William Jessup, Chief
Advanced Reactor Licensing Branch 1
Division of Advanced Reactors and Non-Power
Production and Utilization Facilities
Office of Nuclear Reactor Regulation

Project No.: 99902069 and Docket No.: 05007513

Enclosures:

1. Proprietary (Non-Public) Safety Evaluation
2. Redacted (Public) Safety Evaluation

cc via ListServ: Distribution at Kairos Power FHR and Kairs Power Hermes

P. Hastings

- 3 -

SUBJECT: KAIROS POWER LLC – FINAL SAFETY EVALUATION FOR TOPICAL REPORT “METALLIC MATERIAL QUALIFICATION FOR THE KAIROS POWER FLUORIDE SALT-COOLED HIGH-TEMPERATURE REACTOR” (REVISION 4) (EPID NO. L-2021-TOP-0022/ CAC NO. 000431) DATE: MARCH 13, 2023

DISTRIBUTION:

Public
WJessup, NRR
BBeasley, NRR
SPhilpott, NRR
CDemessieres, NRR
AChereskin, NRR
MAudrain, NRR
MGordon, NRR
MWright, OGC
WWang, ACRS
SCuadrado, NRR
CSmith, NRR
DGreene, NRR
RidsACRS_MailCTR
RidsNrrDanuUal1 Resource
RidsNrrDanuUal2 Resource

ADAMS Accession Nos.:

Pkg: ML23062A727

Letter: ML23062A730

Safety Evaluation: ML23039A169

Redacted Safety Evaluation: ML23062A728

NRR-106

OFFICE	NRR/DANU/UAL1:PM	NRR/DANU/UAL1:LA	OGC/NLO
NAME	RRivera	DGreene	MWright
DATE	3/6/2023	3/8/2023	3/10/2023
OFFICE	NRR/DANU/UAL1/BC		
NAME	WJessup		
DATE	3/13/2023		

OFFICIAL RECORD COPY