

September 29, 2021

10 CFR 50
Project No. 99902069

US Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Kairos Power LLC
Submittal of the Preliminary Safety Analysis Report for the Kairos Power Fluoride Salt-Cooled, High Temperature Non-Power Reactor (Hermes)

Reference: Letter, Kairos Power LLC to Document Control Desk, "Kairos Power Regulatory Engagement Plan," December 10, 2020 (ML20345A356)

With this letter, Kairos Power LLC (Kairos Power) is applying to the US Nuclear Regulatory Commission (NRC) to obtain a construction permit under 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," for a non-power test reactor employing the Kairos Power Fluoride Salt-Cooled, High Temperature Reactor (KP-FHR) technology. The non-power test reactor is referred to as Hermes. The intent to submit this application was described in the Kairos Power Regulatory Engagement Plan (Reference 1).

This application for a construction permit for the Hermes reactor includes the following:

- Enclosure 1, General Information, provides the general information required by 10 CFR 50.33(a)-(e), (h), and (j); 10 CFR 50.34(a)(9); and 10 CFR 50.55(a).
- Enclosure 2, Preliminary Safety Analysis Report (PSAR), provides the PSAR as required by 10 CFR 50.34(a).
- Enclosure 3, Exemptions, provides exemption requests necessary to support issuance of the construction permit. Note that additional exemptions are expected to be provided with the application for an Operating License.
- Enclosure 4, Financial Information, provides the financial qualification information required by 10 CFR 50.33(f)(1). Enclosure 4 of this letter contains confidential financial information and Kairos Power requests it be withheld from public disclosure in its entirety in accordance with the provisions of 10 CFR 2.390. An affidavit supporting the withholding request is provided in Enclosure 9.

The Environmental Report required by 10 CFR 50.30(f) will be submitted by separate letter at a later date as permitted by 10 CFR 2.101(a)(5).

Two technical reports are included accompanying the application. Technical Report KP-TR-017-P, "KP-FHR Core Design and Analysis Methodology," describes the nuclear design methods used for this application and supports Section 4.5 and Chapter 13 of the PSAR. Technical Report KP-TR-018-P, "Postulated Event Analysis Methodology," describes methodology for performing analyses in Chapter 13 of the PSAR. These reports are provided in Enclosures 5 and 6, respectively, and contain proprietary information. Kairos Power requests this content be withheld from public disclosure in accordance with the provisions of 10 CFR 2.390.

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An affidavit supporting the withholding request is provided in Enclosure 9. Additionally, the information indicated as proprietary in these technical reports has also been determined to contain Export Controlled Information, and must be protected from disclosure pursuant to the requirements of 10 CFR 810. Non-proprietary versions of these reports are provided in Enclosures 7 and 8, respectively.

In accordance with 10 CFR 50.30(e) and 10 CFR 170, Kairos Power understands there is a filing fee and that fees for construction permit reviews are based the full costs of the review. Kairos Power requests these fees be invoiced for payment.

Within the 10 CFR 50 licensed facility, several activities will be embedded that are subject to other licenses. These include 10 CFR 70, "Domestic Licensing of Special Nuclear Material"; 10 CFR 40, "Domestic Licensing of Source Material"; and 10 CFR 30, "Rules of General Applicability to Domestic Licensing of Byproduct Material," to receive, possess, produce, use, and transfer, as applicable, special nuclear material, source material, and byproduct material, respectively. Requests for licenses under these parts will be provided with a future application and request for operating license under 10 CFR 50.34(b) or earlier, if needed, to support activities on the construction site.

If you have questions or need additional information, please contact me at hastings@kairospower.com or (704) 336-9596, or Darrell Gardner at gardner@kairospower.com or (704)-769-1226.

I declare under penalty of perjury that the foregoing is true and correct.
Executed on September 29, 2021.


Peter Hastings, PE
Vice President, Regulatory Affairs and Quality

Enclosures:

- 1) General Information (Non-proprietary)
- 2) Preliminary Safety Analysis Report (Non-proprietary)
- 3) Exemptions (Non-proprietary)
- 4) Financial Information (Proprietary)
- 5) KP-FHR Core Design and Analysis Methodology, KP-TR-017-P (Proprietary)
- 6) Postulated Event Analysis Methodology, KP-TR-018-P (Proprietary)
- 7) KP-FHR Core Design and Analysis Methodology, KP-TR-017-NP (Non-proprietary)
- 8) Postulated Event Analysis Methodology, KP-TR-018-NP (Non-proprietary)
- 9) Affidavit Supporting Request for Withholding from Public Disclosure (10 CFR 2.390)

xc (w/enclosure):

William Kennedy, Acting Chief, Advanced Reactor Licensing Branch
Stewart Magruder, Project Manager, Advanced Reactor and Licensing Branch
USNRC, Region II

Enclosure 9

Kairos Power LLC Affidavit and Request for Withholding from Public Disclosure (10 CFR 2.390)

I, Peter Hastings, hereby state:

1. I am Vice President, Regulatory Affairs and Quality, at Kairos Power LLC ("Kairos"), and as such I have been authorized by Kairos to review information sought to be withheld from public disclosure in connection with the development, testing, licensing, and deployment of the Kairos reactor and its associated structures, systems, and components, and to apply for its withholding from public disclosure on behalf of Kairos.
2. The information sought to be withheld, in its entirety, is contained in Kairos' Enclosures 4, 5, and 6 to this letter.
3. I am making this request for withholding, and executing this affidavit in support thereof, pursuant to the provisions of 10 CFR 2.390(b)(1).
4. I have personal knowledge of the criteria and procedures utilized by Kairos in designating information as a trade secret, privileged, or as confidential commercial or financial information. Some examples of information Kairos considers proprietary and eligible for withholding under §2.390(a)(4) include:
 - a. Information which discloses process, method, or apparatus, including supporting data and analyses, where prevention of its use by Kairos competitors without license or contract from Kairos constitutes a competitive economic advantage over other companies in the industry;
 - b. Information, which if used by a competitor, would reduce his expenditure of resources or improve his competitive position in design, manufacture, shipment, installation, assurance of quality;
 - c. Information which reveals cost or price information, production capacities, budget levels, or commercial strategies of Kairos, its customers, its partners, or its suppliers;
 - d. Information which reveals aspects of past, present, or future Kairos or customer funded development plans or programs, of potential commercial value to Kairos;
 - e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection; and/or
 - f. Information obtained through Kairos actions which could reveal additional insights into reactor system development, testing, qualification processes, and/or regulatory proceedings, and which are not otherwise readily obtainable by a competitor.
5. Kairos' information contained in Enclosures 4, 5, and 6 to this letter contains details could provide a competitor with a commercial advantage if the information were to be revealed publicly, including:
 - a. Kairos' financial information, in Enclosure 4;
 - b. Technical information for the Kairos Power fluoride salt-cooled high-temperature reactor for core design, in Enclosure 5; and

- c. Technical information for the Kairos Power fluoride salt-cooled high-temperature reactor for postulated event analysis, in Enclosure 6.
6. Pursuant to the provisions of §2.390(b)(4), the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld:
- a. The information sought to be withheld from public disclosure is owned and has been held in confidence by Kairos.
 - b. The information is of a type customarily held in confidence by Kairos and not customarily disclosed to the public. Kairos has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitute Kairos policy and provide the rational basis required.
 - c. The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR 2.390, it is to be received in confidence by the Commission.
 - d. This information is not readily available in public sources.
 - e. Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Kairos, because it would enhance the ability of competitors to provide similar products and services by reducing their expenditure of resources using similar project methods, equipment, testing approach, contractors, or licensing approaches. This information is the result of considerable expense to Kairos and has great value in that it will assist Kairos in providing products and services to new, expanding markets not currently served by the company.
 - f. The information could reveal or could be used to infer price information, cost information, budget levels, or commercial strategies of Kairos.
 - g. Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Kairos of a competitive advantage.
 - h. Unrestricted disclosure would jeopardize the position of Kairos in the world market, and thereby give a market advantage to the competition in those countries.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: September 29, 2021



Peter Hastings
Vice President, Regulatory Affairs and Quality