



POLICY ISSUE

(Information)

September 13, 2023

SECY-23-0080

FOR: The Commissioners

FROM: Daniel H. Dorman
Executive Director for Operations

SUBJECT: ENVIRONMENTAL REVIEW APPROACH FOR THE KAIROS
POWER, LLC, HERMES 2 CONSTRUCTION PERMIT APPLICATION

PURPOSE:

This paper informs the Commission of the U.S. Nuclear Regulatory Commission (NRC) staff's intent to prepare an environmental assessment (EA) in support of the staff's review of the Kairos Power, LLC (Kairos) Hermes 2 construction permit (CP) application, submitted on July 14, 2023 (Agencywide Documents Access and Management System Accession Package No. [ML23195A121](#)).

SUMMARY:

The NRC's regulations in 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," implement the National Environmental Policy Act (NEPA). In accordance with 10 CFR 51.20(b)(1), the staff is required to develop an environmental impact statement (EIS) for issuance of a testing facility CP. Kairos' CP application requests that Hermes 2 be licensed as a testing facility under Section 104 of the Atomic Energy Act of 1954, as amended, and Title 10 of the *Code of Federal Regulations*

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(10 CFR) Part 50, “Domestic Licensing of Production and Utilization Facilities.” The Hermes 2 test facility would consist of two fluoride salt-cooled test reactor units to be located at the East Tennessee Technology Park in Oak Ridge, TN, on the same site as Kairos’ proposed Hermes 1 test reactor. As required by 10 CFR 50.30(f) and 10 CFR 51.50(a), the Hermes 2 application included an environmental report (ER).¹ The application explained that the ER provides information to NRC to facilitate preparation of an EIS.² Recognizing exemptions may be necessary, the staff nonetheless intends to prepare an EA³ to determine if an EIS is necessary⁴ to satisfy the NRC’s NEPA obligations for the Hermes 2 CP environmental review. If the staff determines that a finding of no significant impact (FONSI) is warranted, exemption(s) from the NRC’s regulations would be required for the staff to issue the Hermes 2 CP.

BACKGROUND:

All agencies of the Federal Government are required to comply with the procedures in Section 102(2) of NEPA, except where compliance would be inconsistent with other statutory requirements. Subpart A, “National Environmental Policy Act – Regulations Implementing Section 102(2),” of 10 CFR Part 51 implements NEPA in a manner that is consistent with NRC’s domestic licensing and related regulatory authority under the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974, as amended. These regulations also reflect the Commission’s policy to voluntarily take account of the regulations of the Council on Environmental Quality, subject to certain conditions.

To perform a licensing action, the NRC considers the environmental impacts of the proposed action under NEPA. Under the NRC’s regulations, all licensing and regulatory actions subject to Subpart A of 10 CFR Part 51 require an EA except those identified in 10 CFR 51.20(b) as requiring an EIS, those identified in 10 CFR 51.22(c) as categorical exclusions, and those identified in 10 CFR 51.22(d) as other actions not requiring environmental review. Upon completion of an EA, the NRC staff determine whether to prepare an EIS or a FONSI on the proposed action to satisfy NEPA.

On July 18, 1974, the Atomic Energy Commission added 10 CFR Part 51 to its regulations.⁵ These 1974 regulations included a requirement to prepare and circulate an EIS prior to issuance of a CP for a testing facility.⁶ On March 3, 1980, the NRC proposed revisions to 10 CFR Part 51 that would, among other things, restructure 10 CFR Part 51 into several

¹ An ER is a document submitted to the Commission by an applicant to aid the Commission in complying with section 102(2) of NEPA (see 10 CFR 51.14(a), “Definitions”). The ER for Hermes 2 (enclosure 3 of the CP application) is available at [ML23195A125](#).

² An EIS is a detailed written statement as required by section 102(2)(C) of NEPA. (10 CFR 51.14(a))

³ An EA is a concise public document for which the Commission is responsible that serves to: (1) briefly provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact; (2) aid the Commission’s compliance with NEPA when no environmental impact statement is necessary; and (3) facilitate preparation of an environmental impact statement when one is necessary. (10 CFR 51.14(a))

⁴ Pursuant to 10 CFR 51.31(a), upon completion of an EA the appropriate NRC staff director will determine whether to prepare an EIS or a FONSI on the proposed action. A FONSI is a concise public document for which the Commission is responsible that briefly states the reasons why an action, not otherwise excluded, will not have a significant effect on the human environment and for which therefore an environmental impact statement will not be prepared. (10 CFR 51.14(a))

⁵ “Final Rule, Licensing and Regulatory Policy and Procedures for Environmental Protection,” 39 *Federal Register* (FR) 26279 (July 18, 1974). When the NRC was established on January 19, 1975, it retained 10 CFR Part 51 as part of its regulations.

⁶ 39 FR 26280 (promulgating 10 CFR 51.5(a)(1)).

subparts⁷ while maintaining the requirement for an EIS for a CP for a testing facility⁸ and explicitly excluding a CP for a testing facility from the list of items for which an EA would be prepared.⁹ In its proposed rule, the Commission explained:

The primary purpose of the NEPA process is to make environmental information available to public officials and citizens before decisions are made and actions taken. The process is intended to help public officials make decisions that are based on an understanding of environmental consequences and take actions that will protect, restore and enhance the environment.¹⁰

On March 12, 1984, the NRC finalized the proposed rule and maintained the requirement for an EIS for a CP for a testing facility.¹¹ The requirement remains in effect today, essentially unchanged.¹² When promulgating those rules, the Commission considered, among other things, the broad diversity of size, design, and location of the nuclear reactors licensed by the Commission over the years,¹³ and addressed a "major" concern that actions perceived as having a significant impact might not be accorded adequate review.¹⁴ The Commission stated its intent that, to the extent practicable, the Commission's responsibilities under other environmental laws will be coordinated with its NEPA procedures.¹⁵ In the 1984 rulemaking, the Commission discussed its responsibilities, saying:

At the outset, the Commission wishes to make clear that it fully accepts its responsibilities under NEPA for the preparation and issuance of environmental impact statements on all major Commission actions which significantly affect the quality of the human environment. The Commission also recognizes that it has a continuing obligation to conduct its licensing and related regulatory functions in an environmentally responsible manner. In preparing these revised regulations, the Commission has tried to structure its NEPA process to assure that these responsibilities will be effectively carried out.¹⁶

The Commission described how its regulatory scheme used EAs when it is unclear at the outset whether preparation of an EIS for the action in question is justified, whereas for other items the regulations required an EIS without first requiring an EA.¹⁷

As explained below, for the specific facts of Hermes 2, the staff has concluded that it is unclear at the outset whether the preparation of an EIS is justified in light of the recently prepared EIS for Hermes 1. Accordingly, the staff is exploring whether the Commission's NEPA responsibilities can be effectively carried out if the staff is not required to prepare an EIS but instead uses the two-step process of starting with an EA. To implement this approach, the staff would need

⁷ "Proposed Rule, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments," 45 FR 13739 (March 3, 1980).

⁸ 45 FR 13752 (proposing 10 CFR 51.20(b)(1)).

⁹ 45 FR 13752 (proposing 10 CFR 51.21(a) and (b)(1)).

¹⁰ 45 FR 13741.

¹¹ "Final Rule, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions and Related Conforming Amendments," 49 FR 9352, 9384 (March 12, 1984) (issuing 10 CFR 51.20, "Criteria for and identification of licensing and regulatory actions requiring environmental impact statements" and 10 CFR 51.21, "Criteria for and identification of licensing and regulatory actions requiring environmental assessments").

¹² Compare 10 CFR 51.20(b)(1) (1984) and 10 CFR 51.21 (1984) with 10 CFR 51.20(b)(1) (2023) and 10 CFR 51.21 (2023).

¹³ 49 FR 9357-8.

¹⁴ 49 FR 9361.

¹⁵ 49 FR 9359.

¹⁶ 49 FR 9362.

¹⁷ 49 FR 9362.

certain exemptions from 10 CFR Part 51; specifically, under 10 CFR 51.6, “Specific exemptions,” the Commission may, upon application of any interested person or upon its own initiative, grant exemptions from the requirements of the regulations in 10 CFR Part 51 if such exemptions are determined to be authorized by law and are otherwise in the public interest.¹⁸

On December 31, 2020, in response to many internal and external drivers, the staff issued SECY-21-0001, “Rulemaking Plan – Transforming the NRC’s Environmental Review Process” ([ML20212L389](#)). This paper recommended the initiation of rulemaking to revise and update 10 CFR Part 51. The intent of the proposed rulemaking was to streamline the staff’s environmental review process, focus reviews on relevant environmental issues, maintain openness with the public, and reduce burden on applicants and the NRC. However, in the staff requirements memorandum (SRM) for SECY-21-0001, dated April 19, 2022 ([ML22109A171](#)), the Commission did not approve the staff’s recommendation and stated the following:

If, after completing several environmental reviews for advanced reactors, the staff wants to further explore the idea of preparing environmental assessments to meet NEPA requirements for some categories and subcategories of license applications presently falling within the scope of 10 C.F.R. § 51.20(b), the staff should present options to the Commission.

Notwithstanding the above direction, the staff believes that its recent experience with the Hermes 1 CP environmental review, as discussed below, makes this an opportune time to exercise the EA process in support of the Hermes 2 CP environmental review.¹⁹ The staff recently completed the environmental review of the Kairos Hermes 1 CP application²⁰ and issued NUREG-2263, “Environmental Impact Statement for the Construction Permit for the Kairos Hermes Test Reactor,” in August 2023 ([ML23214A269](#)), concluding that the action would result in SMALL impacts for all resource areas.

DISCUSSION:

The Hermes 2 test facility would consist of two fluoride salt-cooled test reactor units at the East Tennessee Technology Park in Oak Ridge, TN, Hermes 2 would be located immediately adjacent to the proposed Hermes 1 facility on the same previously disturbed, former nuclear industrial site that was evaluated in the Hermes 1 EIS.

The Hermes 2 test reactors would be similar in design to the Hermes 1 test reactor, employing fluoride salt-cooled, high-temperature reactor technology with inherent safety features that the staff found in the Hermes 1 EIS to have SMALL environmental impacts. Like the Hermes 1 design, the Hermes 2 test reactors would operate at a low power level (35 megawatts thermal) but would include an intermediate salt loop to exchange heat from the primary coolant loops to a common power generation system to produce electricity. The Hermes 2 facility would also include a small building footprint, limited interfaces with environmental resources, and increased reliance on passive systems and inherent characteristics used to prevent radioactive releases.

¹⁸ The staff has not yet made a determination about the exemption factors. The staff is evaluating these factors in parallel with its environmental review and its evaluation of other exemptions that may be necessary for the staff to prepare an EA and FONSI for the Hermes 2 CP.

¹⁹ Regarding the Commission’s direction in SRM-SECY-21-0001, the staff will use the experience gained from this EA process to inform any future rulemaking on using EAs to meet NEPA requirements for advanced reactors.

²⁰ The Kairos Hermes 1 CP application is available at [ML21272A375](#) and [ML21306A131](#).

Based on the staff's initial reading of the ER submitted by Kairos with the Hermes 2 CP application, along with the knowledge and information gained through the development of the Hermes 1 EIS, the staff has concluded that it is "unclear at the outset" whether preparation of an EIS for the action in question is justified, notwithstanding the default requirement to prepare an EIS for a CP for a testing facility. The staff therefore is exploring the use of exemptions from 10 CFR Part 51 which would have the practical initial effect of requiring the staff to prepare an EA in accordance with 10 CFR 51.21. The EA will evaluate the potential environmental impacts of Hermes 2, consistent with LIC-203, "Procedural Guidance for Preparing Categorical Exclusions, Environmental Assessments, and Considering Environmental Issues" ([ML12234A708](#)). Consistent with the Commission's stated intention that its responsibilities under other environmental laws be coordinated with its NEPA procedures,²¹ an EA would also include completing consultation with other Federal agencies as required under the Endangered Species Act and National Historic Preservation Act. Then, pursuant to 10 CFR 51.31(a), upon completion of an EA the appropriate NRC staff director will determine whether to prepare an EIS or FONSI²² on the proposed action. This strategy would ensure the most efficient use of staff and applicant resources while maintaining a high level of technical rigor in the review.

There are significant schedule and resource advantages to the staff initiating the environmental review for the Hermes 2 CP application with the development of an EA. First, based on the knowledge obtained from the Hermes 1 CP environmental review and the initial reading of the Hermes 2 CP ER, it is uncertain that an EIS would be necessary for the Hermes 2 CP application. Second, this approach would provide the staff with a unique opportunity to implement an innovative, risk-informed approach for the environmental review that is commensurate with the risks posed by this advanced reactor technology. Because of the need for an EA to determine that environmental impacts are not significant to support a FONSI, an EA for Hermes 2 would contain substantially the same impact assessment analytical data as would an EIS.

Third, an EA would not require as much administrative work as preparing an EIS and could be completed on a shorter timeline that would not include scoping but, if the EA results in a FONSI and an EIS is not necessary, would include publication of the draft FONSI including the EA or a summary thereof, for a 30-day public comment period.²³ Finally, an optimized environmental review schedule is expected to correspond more closely with the estimated schedule to complete the safety review of the Hermes 2 CP application.²⁴

Should the staff identify one or more potentially significant environmental impacts while preparing the EA, the staff would immediately pivot to developing an EIS for the Hermes 2 CP application. This pivot could extend the overall schedule for completing the environmental review due to the requirement in 10 CFR 51.27, "Notice of intent," to publish in the *Federal Register* a notice of intent and conduct a scoping process for an EIS, which are not required for an EA.

²¹ 49 FR 9359.

²² As provided in 10 CFR 51.33, a determination to prepare a draft FONSI, which could be published for public comment, may be made. If a FONSI determination can be made for the Hermes 2 CP, the staff plans to issue the draft FONSI for a 30-day public comment period.

²³ The regulation in 10 CFR 51.33, "Draft finding of no significant impact; distribution," provides for a for a 30-day public comment period.

²⁴ The staff is still in the process of developing the comprehensive schedule and resource estimate for the review. In the coming weeks it will be publicly provided to the applicant by letter.

Regulatory Evaluation

The National Environmental Policy Act requires Federal agencies to assess the environmental effects of their proposed actions prior to deciding whether to approve or disapprove the proposed action. The range of actions covered by NEPA is broad and includes, among other things, making decisions on permit applications, adopting federal land management actions, and constructing highways and other publicly owned facilities. Using the NEPA process, agencies evaluate the environmental and related social and economic effects of their proposed actions. Agencies also provide opportunities for public review and comment on those evaluations.

Because the Commission has determined generically through 10 CFR 51.20(b)(1) that a CP for a testing facility is a major federal action for which an EIS is required, the staff's proposal to begin its environmental review with the preparation of an EA for Kairos' requested licensing action would require exemption(s) from NRC regulations. The regulations in 10 CFR 51.6 provide the mechanics for this exemption as part of the NRC's normal processes and prescribe that such exemptions must be authorized by law and otherwise in the public interest. The Commission has delegated the authority to issue such exemptions to the Director of the Office of Nuclear Reactor Regulation.²⁵ The staff is continuing to evaluate the full scope of potential regulations from which exemption would be necessary; however, it is clear that an exemption from 10 CFR 51.20(b)(1) would be required.

Several ancillary regulations build off the 10 CFR 51.20(b)(1) requirement for the staff to prepare an EIS for testing facility CPs. The staff has not made a final determination as to whether exemptions related to such regulations are necessary or if a single exemption to 10 CFR 51.20(b)(1) is sufficient. These regulations include the following:

- 10 CFR 2.101(a)(3)(ii), which requires, in part, that with respect to a tendered application and/or ER or part thereof, the applicant will be requested to serve, among other things, a notification to the chief executive of a municipality or county where the facility will be located that a draft EIS will be issued by the Commission and made available upon request;
- 10 CFR 2.337(g)(1), which requires, in part, that the NRC staff shall offer into evidence any EIS prepared under 10 CFR Part 51, Subpart A, for a CP application hearing; and
- 10 CFR 51.75(a), which requires preparation of a draft EIS relating to issuance of a CP for a production or utilization facility.

Furthermore, the staff has identified several regulations related to the application and issuance of an operating license (OL) under 10 CFR Part 50 that would need to be addressed if Kairos were to apply for an OL for Hermes 2 following staff preparation of an EA and FONSI for the Hermes 2 CP application, if such a finding was justified and found to satisfy the NRC's NEPA obligations. The staff has not made a final determination whether exemptions would be required for these regulations but will continue to evaluate their potential impact. These regulations include the following:

²⁵ Pursuant to Management Directive 9.27, "O/F, Office of Nuclear Reactor Regulation" ([ML18073A256](#)).

- 10 CFR 51.53(b), which requires, in part, an OL applicant to submit an updated ER with its application for an OL to the extent that there is different or new information in addition to that discussed in the final EIS for the CP;
- 10 CFR 51.95(b), which requires, in connection with the issuance of an OL, that the NRC staff will prepare a supplement to the final EIS on the CP for that facility, which will update the prior environmental review; and
- 10 CFR 51.95(d), which sets forth environmental review requirements in connection with the amendment of an operating license authorizing decommissioning activities at a facility covered by 10 CFR 51.20 (i.e., covered by the regulation that is the subject of an exemption being considered by the staff).

This list is preliminary and may be revised, as needed, upon completion of the staff's research and regulatory evaluation. The staff will inform the Commission of the outcome of this exercise. If a determination is made at any point that one or more exemptions would not be authorized by law or would not otherwise be in the public interest, the staff will shift from preparing an EA to preparing an EIS for the Hermes 2 CP review. The staff would work to minimize any impacts to the schedule resulting from this shift.

Applicant Interaction

As part of developing its approach for performing the Hermes 2 CP environmental review, the staff has engaged in preliminary discussions with Kairos on the staff's desire to initiate development of an EA. The staff also has informed Kairos of the potential downstream regulatory impacts at the OL stage and the potential impacts to the schedule should a FONSI not be supportable or any of the necessary exemptions not be authorized by law or otherwise in the public interest. Kairos has expressed strong support for the staff's approach and is aware of the potential risks to the project schedule if the EA results in the need for an EIS. As previously discussed, the applicant included an ER with their application which provides the necessary information for the NRC staff to prepare an EIS, if necessary.

Public Engagement

The staff engaged in significant stakeholder interaction during the Hermes 1 CP environmental review²⁶ which considered the same site and similar facility design as Hermes 2. Examples include media advertisements and letters to State, Federal, and local agencies and federally recognized Tribes to raise awareness and solicit comments on the proposed action, which was limited to the Hermes 1 test reactor. For Hermes 1, the NRC staff also supported public meetings for environmental scoping and to discuss the draft EIS to obtain stakeholder input and held government-to-government meetings with local officials on the environmental impacts of the proposed project. The staff addressed stakeholder feedback in Appendix G, "Draft Environmental Impact Statement Comments and Responses," to the Hermes 1 CP EIS.²⁷ The staff did not receive any feedback that altered the findings in the draft EIS that impacts to all resource areas were SMALL.

²⁶ As documented in Section 1.3, "The NRC Application Review," of the Hermes 1 CP EIS.

²⁷ The staff notes that neither the draft EIS nor the final EIS for the Hermes 1 CP review included information to alert the public that two additional reactor test facilities might be constructed and operated at the site.

In accordance with 10 CFR 51.33(b), if the Hermes 2 CP environmental review supports a FONSI, the staff may publish the draft FONSI for a 30-day public comment period. This will invite public engagement during the Hermes 2 environmental review process. If the staff determines that an EIS is needed, in accordance with 10 CFR 51.26, a notice of intent will be prepared and will be published in the Federal Register, and an appropriate scoping process will be conducted.

Future Commission Engagement

While this paper is specifically focused on the development of an EA for the Hermes 2 CP environmental review to determine whether a FONSI is justified or an EIS is necessary, the staff recognizes that there will likely be future engagements with the Commission on this and other related matters. In accordance with Commission direction provided in SRM-SECY-21-0001, the staff plans to evaluate lessons-learned from the Hermes 2 CP environmental review and determine whether any modifications to the NRC's processes or regulations are appropriate to enhance the timeliness and efficiency of future advanced reactor environmental reviews. A paper will be developed to provide such insights along with any staff recommendations to the Commission for deliberation.

COMMITMENT:

The staff has committed to the following actions in this paper:

- The staff plans to proceed with preparation of an EA, as described in 10 CFR 51.30, "Environmental assessment," for the Hermes 2 CP application to determine whether a FONSI is justified or an EIS is necessary.
- To proceed with this approach, one or more exemptions from NRC regulations will be necessary.²⁸ The staff will inform the Commission if exemptions, in addition to those considered above, are identified as a result of the staff's continued research and regulatory evaluation.
- Consistent with 10 CFR 51.31(a), upon completion of the EA for Hermes 2, the staff will determine whether to prepare a FONSI or an EIS.
- In accordance with 10 CFR 51.33(b), if the Hermes 2 CP environmental review supports a FONSI, the staff will publish the draft FONSI for a 30-day public comment period.
- The staff will evaluate lessons-learned from the Hermes 2 CP environmental review, along with other expected near-term applications, and determine whether any modifications to the NRC's processes or regulations are appropriate to enhance the timeliness and efficiency of future advanced reactor reviews. The staff will provide any such recommendations in a Commission paper.

²⁸ The staff is continuing to evaluate the basis for such exemption(s) to determine whether justified by law and otherwise in the public interest.

CONCLUSION:

The staff plans to initiate the Hermes 2 CP application environmental review with the preparation of an EA. Upon completion of the EA, the staff will determine whether to prepare a FONSI or an EIS on the proposed action. If a FONSI is reached, the staff will prepare any appropriate exemptions related to the requirement of the staff developing an EIS for 10 CFR Part 50 testing facility CPs. The Commission has delegated authority for issuing such exemptions to the Director of the Office of Nuclear Reactor Regulation.

RESOURCES:

No currently planned work will be affected by the commitments above. The enclosure includes an estimate of resources for the Hermes 2 CP environmental review.

COORDINATION:

The Office of the General Counsel has reviewed this paper and has no legal objection.

The Office of the Chief Financial Officer reviewed this paper and determined that it has no financial impact.

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Daniel H. Dorman
Executive Director for Operations

Enclosure:
Estimated Resources

SUBJECT: ENVIRONMENTAL REVIEW APPROACH FOR THE KAIROS POWER, LLC,
 HERMES 2 CONSTRUCTION PERMIT APPLICATION DATED:
 SEPTEMBER 13, 2023

**ADAMS Accession Nos: Pkg ML23214A164; Paper ML23214A165; Enclosure (non-public)
 ML23240A320 SECY-0012**

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OFFICE	NRR/DANU/UAL1:BC	NMSS/REFS	NRR/DANU	QTE
NAME	WJessup	JMoses	MShams	JDougherty
DATE	8/24/23	8/24/23	8/25/23	8/18/23
OFFICE	OCFO	OGC	NRR	NMSS
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