

KAIROS POWER LLC

DOCKET NO. 50-612

HERMES 2 TEST REACTOR FACILITY UNIT 2

CONSTRUCTION PERMIT

Construction Permit No. CPTR-8

1. The Nuclear Regulatory Commission (NRC or the Commission) has found that:
 - A. The application for a construction permit, as supplemented and revised (the application), filed by Kairos Power LLC (Kairos, the applicant), complies with the requirements of the Atomic Energy Act of 1954, as amended (the Act), and the rules and regulations of the Commission set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) Chapter I – Nuclear Regulatory Commission. There is reasonable assurance that the activities authorized by the permit will be conducted in compliance with the rules and regulations of the Commission, and all required notifications to other agencies or bodies have been duly made;
 - B. The applicant has described the proposed design of the facility, including, but not limited to, the principal architectural and engineering criteria for the design, and has identified the major features or components incorporated therein for the protection of the health and safety of the public;
 - C. Such further technical or design information as may be required to complete the safety analysis, and which can reasonably be left for later consideration, will be supplied in the final safety analysis report (FSAR);
 - D. Safety features or components that require research and development have been described by the applicant. The applicant has identified, and will conduct, a research and development program reasonably designed to resolve any safety questions associated with such features or components;
 - E. On the basis of the foregoing, there is reasonable assurance that: (i) such safety questions will be satisfactorily resolved at or before the latest date stated in the application for the completion of construction of the proposed facility, and (ii) taking into consideration the site criteria contained in 10 CFR Part 100, "Reactor Site Criteria," the proposed facility can be constructed and operated at the proposed location without undue risk to the health and safety of the public;
 - F. The processes to be performed provide reasonable assurance the applicant will comply with the regulations in 10 CFR Chapter I, including the regulations in 10 CFR Part 20, "Standards for Protection Against Radiation," and that the health and safety of the public will not be endangered;
 - G. Kairos is technically qualified to design and construct the facility in accordance with the Commission's regulations set forth in 10 CFR Chapter I;
 - H. Kairos is financially qualified to design and construct the facility in accordance with the Commission's regulations set forth in 10 CFR Chapter I;

- I. The issuance of a permit for the construction of the facility will not be inimical to the common defense and security or to the health and safety of the public; and
 - J. After weighing the environmental, economic, technical, and other benefits of the facility against environmental and other costs, and considering reasonable available alternatives, the issuance of this construction permit, subject to the conditions for protection of the environment set forth herein, is in accordance with Subpart A of 10 CFR Part 51, "Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions," of the Commission's regulations and all applicable requirements have been satisfied.
2. On the basis of the foregoing findings regarding this facility, construction permit No. CPTR-8 is hereby issued to Kairos pursuant to Sections 104c and 185a of the Act and 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," for a utilization facility, as defined in 10 CFR 50.2, "Definitions," useful in the conduct of research and development, as described in the application filed in this matter by the applicant and as more fully described in the evidence received at the public hearing upon that application. The utilization facility, known as Hermes 2, Unit 2, owned by Kairos, will be located at the site of the former Oak Ridge Gaseous Diffusion Plant, within the East Tennessee Technology Park in Oak Ridge, Tennessee, and is described in the application.
 3. This permit shall be deemed to contain and be subject to the conditions specified in 10 CFR 50.55, "Conditions of construction permits, early site permits, combined licenses, and manufacturing licenses"; is subject to all applicable provisions of the Act, and rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the conditions specified or incorporated below:
 - A. The earliest date for the completion of the construction of the facility is July 1, 2028, and the latest date for completion is December 31, 2028.
 - B. The facility shall be constructed and located at the site as described in the application, in the City of Oak Ridge, Roane County, Tennessee.
 - C. The construction permit authorizes the applicant to construct a non-power test reactor facility described in the application and the hearing record, in accordance with the principal architectural and engineering criteria and environmental protection commitments set forth therein.
 - D. Kairos shall perform detailed geologic mapping of excavations for safety related engineered structures; examine and evaluate geologic features discovered in those excavations, such as karst; and notify the Director of the Office of Nuclear Reactor Regulation, or the Director's designee, as specified in 10 CFR 50.4, "Written communications," once excavations for safety related structures are open for examination by the NRC.
 - E. Kairos shall implement the Quality Assurance (QA) program described, pursuant to 10 CFR 50.34(a)(7), in Chapter 12, Appendix B, of Revision 1 of the Hermes 2 Preliminary Safety Analysis Report (PSAR), including revisions to the QA program in accordance with the provisions below.

Kairos may make changes to its previously accepted QA program description without prior Commission approval, provided the changes do not reduce the commitments in the QA program description as accepted by the Commission. Changes to the QA program description that do not reduce the commitments must be submitted to the Commission within 90 days.

Changes to the QA program description that do reduce the commitments must be submitted to the Commission and receive Commission approval prior to implementation, as follows:

- (a) Changes must be submitted as specified in 10 CFR 50.4.
- (b) The submittal of changes to the QA program description must include all pages affected by the changes and must be accompanied by a forwarding letter identifying the changes, the reason for the changes, and the basis for concluding that the revised program incorporating the changes continues to satisfy the PSAR Revision 1 QA program description commitments previously accepted by the NRC (the letter need not provide the basis for changes that correct spelling, punctuation, or editorial items).
- (c) A copy of the forwarding letter identifying the changes must be maintained as a record by Kairos for three years.
- (d) Changes to the QA program description shall be regarded as accepted by the NRC upon Kairos's receipt of a letter to this effect from the appropriate reviewing office of the NRC or 60 days after Kairos's submittal to the NRC, whichever occurs first.

F. The Environmental Protection Plan described in Appendix A of this permit is hereby incorporated into this permit.

- 4. This permit is subject to the limitation that a license authorizing operation of the facility will not be issued by the Commission unless: (a) the applicant submits to the Commission the complete FSAR, portions of which may be submitted and evaluated from time to time; (b) the Commission finds that the final design provides reasonable assurance that the health and safety of the public will not be endangered by the operation of the facility in accordance with procedures approved by it in connection with the issuance of said license; (c) the Commission finds that operation of the facility will be in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements were satisfied; and (d) the applicant submits proof of financial protection and executes an indemnity agreement as required by Section 170 of the Act.

5. This permit is effective as of its date of issuance and shall expire on the latest completion date indicated in paragraph 3.A. above.

FOR THE NUCLEAR REGULATORY COMMISSION

Andrea Veil, Director
Office of Nuclear Reactor Regulation

Appendix:

Appendix A – Environmental Protection Plan

Date of Issuance: November 21, 2024

APPENDIX A
TO FACILITY CONSTRUCTION PERMIT NO. CPTR-8
KAIROS POWER, LLC
HERMES 2 TEST REACTOR FACILITY UNIT 2
DOCKET NO. 50-612
ENVIRONMENTAL PROTECTION PLAN
(NONRADIOLOGICAL)
November 21, 2024

TABLE OF CONTENTS

- 1.0 Objective of the Environmental Protection Plan
- 2.0 Environmental Protection Issues
 - 2.1 Aquatic Resources Issues
 - 2.2 Terrestrial Resources Issues
 - 2.3 Endangered Species Act of 1973
 - 2.4 National Historic Preservation Act of 1966
- 3.0 Consistency Requirements
- 4.0 Administrative Procedures
 - 4.1 Plant Reporting Requirements: Non-routine Reports
 - 4.2 Review and Audit
 - 4.3 Records Retention
 - 4.4 Changes in Environmental Protection Plan

1.0 Objective of the Environmental Protection Plan

The Environmental Protection Plan (EPP) objective is to ensure compliance with the Endangered Species Act of 1973, as amended (ESA), and to ensure that the Commission is kept informed of other environmental matters. The EPP is intended to be consistent with Federal, state, and local requirements for environmental protection.

2.0 Environmental Protection Issues

In the final environmental assessment (EA) and finding of no significant impact dated August 30, 2024, the U.S. Nuclear Regulatory Commission (NRC) staff considered the environmental impacts associated with the issuance of construction permits, including consideration of the impacts of construction of two new nuclear test reactors at the Hermes 2 site. This EPP applies to the permit holder's actions affecting the environmental resources evaluated in the EA and the permit holder's actions that may affect any newly discovered environmental resources.

2.1 Aquatic Resources Issues

Federal agencies other than the NRC, such as the U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (USACE), have jurisdiction to regulate aquatic resources under the Federal Water Pollution Control Act (Clean Water Act or CWA) and the Rivers and Harbors Appropriation Act of 1899 (RHA). Nothing within this EPP shall be construed to place additional requirements on the regulation of aquatic resources except the imposition of requirements in a Biological Opinion under the ESA (see Section 2.3).

2.2 Terrestrial Resources Issues

Several statutes govern the regulation of terrestrial resources. For example, the U.S. Fish and Wildlife Service (FWS) regulate matters involving migratory birds and their nests in accordance with the Migratory Bird Treaty Act. Activities affecting migratory birds, or their nests may require permits under the Migratory Bird Treaty Act. The FWS also regulates matters involving the protection and taking of bald and golden eagles in accordance with the Bald and Golden Eagle Protection Acts. Nothing within this EPP shall be construed to place additional requirements on the regulation of terrestrial resources except the imposition of requirements in a Biological Opinion under the ESA (see Section 2.3).

2.3 Endangered Species Act of 1973

The NRC may be required to protect some aquatic resources and terrestrial resources in accordance with the ESA. If a Biological Opinion is issued to the NRC in accordance with ESA Section 7 prior to the issuance of an operating license or other NRC license or approval over the life cycle of the Hermes 2, Unit 2, project, the permit holder shall comply with the Terms and Conditions set forth in the Incidental Take Statement of such a Biological Opinion.

If any Federally listed species or critical habitat occurs in an area affected by construction that was not previously identified as occurring in such areas, including species and critical habitat that were not previously Federally listed, the permit holder shall inform the NRC within four hours of discovery. Similarly, the permit holder shall inform the NRC within four hours of discovery of any take, as defined in the ESA, of a Federally listed species or destruction or adverse modification of critical habitat. These notifications shall be made to the NRC Operations Center via the

Emergency Notification System. The permit holder shall provide any necessary information to the NRC if the NRC initiates consultation under the ESA.

Unusual ESA-Related Event - The permit holder shall inform the NRC of any onsite mortality, injury, or unusual occurrence of any species protected by the ESA within four hours of discovery, followed by a written report in accordance with Section 4.1. Such incidents shall be reported regardless of causal relation to construction.

2.4 National Historic Preservation Act of 1966

In accordance with Section 106 of the National Historic Preservation Act, Kairos shall implement its Archaeological Resource Monitoring and Unanticipated Discovery Plan.

3.0 Consistency Requirements

The permit holder shall notify the NRC of proposed changes to permits or certifications concerning aquatic or terrestrial resources by providing the NRC with a copy of the proposed change at the same time it is submitted to the permitting agency. The permit holder shall provide the NRC with a copy of the application for renewal of permits or certifications at the same time the application is submitted to the permitting agency.

Changes to or renewals of these permits or certifications shall be reported to the NRC within 30 days following the later of the date the change or renewal is approved or the date the change becomes effective. If a permit or certification, in part or in its entirety, is appealed and stayed, the NRC shall be notified within 30 days following the date the stay is granted.

4.0 Administrative Procedures

4.1 Plant Reporting Requirements: Non-routine Reports

A written report shall be submitted to the NRC within 30 days of occurrence of any unusual ESA-related event described in Section 2.3 of this EPP. The report shall (a) describe, analyze, and evaluate the event, including extent and magnitude of the impact and plant operating characteristics at the time of the event; (b) describe the probable cause of the event; (c) indicate the action taken to correct the reported event; (d) indicate the corrective action taken to preclude repetition of the event and to prevent similar occurrences involving similar components or systems; and (e) indicate the agencies notified and their preliminary responses.

Events reportable under this subsection, which also require reports to other Federal, State, or local agencies, shall be reported in accordance with those reporting requirements, in lieu of the requirements of this subsection. The NRC shall be provided a copy of such report at the same time it is submitted to the other agency.

4.2 Review and Audit

The permit holder shall provide for review and audit of compliance with Section 2.3 of the EPP. The audits shall be conducted independently of the individual or groups responsible for performing the specific activity. A description of the organizational structure utilized to achieve the

independent review and audit function and results of the audit activities shall be maintained and made available for inspection.

4.3 Records Retention

Records required by this EPP shall be made and retained in a manner convenient for review and inspection. These records shall be made available to the NRC on request. The records, data, and logs relating to this EPP shall be retained for five years or, where applicable, in accordance with the requirements of other agencies.

4.4 Changes in Environmental Protection Plan

A request for a change in the EPP shall include an assessment of the environmental impact of the proposed change and a supporting justification. Implementation of such changes in the EPP shall not commence prior to NRC approval of the proposed changes in the form of a license amendment incorporating the appropriate revision to the EPP.