Environmental Impact Statement Scoping Process

Summary Report

Kairos Hermes Test Reactor Construction Permit Application Oak Ridge, TN

August 2022

U.S. Nuclear Regulatory Commission Rockville, Maryland

A. Objective

The purpose of this report[1] is to provide a concise summary of the determination of the scope of the NRC staff's environmental review of Kairos Power, LLC's construction permit application, incorporating stakeholder inputs. This report will briefly summarize the issues identified by the scoping process associated with the NRC staff's review of Kairos Power's construction permit application.

The remainder of this report is structured into five sections, as follows:

B. Introduction/Background
C. Scoping Process
D. Comments Received During the Scoping Period
E. Significant Issues Identified
F. Determinations and Conclusions

B. Introduction/Background

By letter dated September 29, 2021 (Agencywide Documents Access and Management System (ADAMS) Accession Package No. ML21272A375), Kairos Power, LLC (Kairos) submitted Part 1 of a two-part application to the United States Nuclear Regulatory Commission (NRC) for a construction permit (CP) pursuant to Title 10 of the *Code of Federal Regulations* Part 50 (10 CFR Part 50). The CP would allow construction of a non-power research and test reactor that Kairos has named Hermes on a 185 acre site in Oak Ridge, Tennessee. Section 104 of the Atomic Energy Act of 1954 (42 U.S.C. 2134) authorizes the NRC to issue CPs for testing facilities. To issue a CP, the NRC is required to consider the environmental impacts of the proposed action under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*, herein referred to as NEPA). The NRC's NEPA-implementing regulations in 10 CFR Part 51 identify several types of licensing actions that require the NRC to prepare an environmental impact statement (EIS). CPs and operating licenses (OLs) for test facilities are identified in 10 CFR 51.20 as actions that require an EIS.

Applicants for NRC licenses are required under 10 CFR 51.45 to submit an ER containing a description of the proposed project, a statement of its purposes, a description of the affected environment, and specific information needed for the staff to evaluate potential environmental impacts. After initially submitting Part 1 of the Kairos Hermes application (consisting of its Preliminary Safety Analysis Report (PSAR)), on October 31, 2021, Kairos submitted an Environmental Report (ER; ML21306A131) with information needed to assess potential environmental impacts from the CP licensing action. By letters dated February 10 (ML22042A095), February 18 (ML22049B555), and March 1 (ML22060A272), 2022, Kairos provided supplemental information regarding its CP application, including the ER.

As stated in the ER, the proposed site for the Kairos Hermes reactor is situated in the Heritage Center of the East Tennessee Technology Park (ETTP), an industrial park established by the City of Oak Ridge on land formerly owned by the U.S. Department of Energy (DOE) for the Oak Ridge Gaseous Diffusion Plant (ORGDP). The site was formerly occupied by DOE Buildings K-31 and K-33, which were both part of the ORGDP. DOE ceased operation of the ORGDP in

[1] The NRC's requirements for conducting the scoping process and for preparing a scoping summary report are found at 10 CFR 51.29, "Scoping-environmental impact statement and supplement to environmental impact statement."

1986. Both DOE buildings have since been razed, and the land has been remediated environmentally and released for industrial reuse.

The Kairos application and all other public documents relevant to the Hermes construction permit are available in the NRC's Web-based ADAMS, which is accessible at http://www.nrc.gov/reading-rm/adams.html. Persons who encounter problems in accessing documents in ADAMS should contact the NRC's Public Document Room (PDR) reference staff by telephone at 1-800-397-4209 or 301-415-4737, or by e-mail at pdr.resource@nrc.gov.

For additional information, the NRC staff has made available a Web site with specific information about the Kairos Hermes construction permit application at https://www.nrc.gov/reactors/non-power/hermes-kairos.html. This Web site includes application information, the licensing review schedule, opportunities for public involvement, project manager information, and other relevant information. In addition, important documents are available at the Federal rulemaking Web site, https://www.regulations.gov/, under Docket ID NRC-2021-0193.

C. Scoping process

The first step in developing an EIS is to conduct a public scoping process. On February 18, 2022, the NRC published a *Federal Register* notice of intent to prepare an EIS and conduct a scoping process (87 FR 9394). The notice invited stakeholders and members of the public to submit written comments by April 19, 2022. The scoping notice began the 60-day scoping period. The NRC staff also contacted potentially interested Federal, State, Tribal, regional, and local agencies to solicit comments.

On March 23, 2022, the NRC held a virtual joint public outreach and scoping meeting. Oral comments were recorded at the public meeting. All comments, both written and oral, were considered in the agency's scoping process.

The scoping process provided an opportunity for members of the public to propose environmental issues to be addressed in the EIS and to highlight public concerns and issues. In accordance with 10 CFR 51.29(b), this scoping summary report provides a concise summary of the determinations and conclusions reached as a result of the scoping process. The NRC's objectives of the scoping process were to:

- Define the proposed action, which is to be the subject of the EIS.
- Gather data on the scope of the EIS and identify the significant issues to be analyzed in depth.
- Identify and eliminate from detailed study those issues that are peripheral or are not significant.
- Identify any environmental assessments and other EISs that are being or will be prepared that are related to, but are not part of, the scope of the Kairos Hermes EIS.
- Identify other environmental review and consultation requirements related to the proposed action.
- Indicate the relationship between the timing of the preparation of the environmental analyses and the Commission's tentative planning and decision-making schedule.

- Identify any cooperating agencies and, as appropriate, allocate assignments for preparation and schedules for completing the EIS to the NRC and any cooperating agencies.
- Describe how the EIS will be prepared, including any contractor assistance to be used.

The NRC staff's determinations and conclusions regarding the above objectives are provided in Section F below.

D. Comments Received During the Scoping Period

The NRC received comment submissions from 39 individuals. Table D-1 provides a list of commenters who provided comment submissions (i.e., non-form letter submissions) identified by name, affiliation (if stated), the correspondence identification (ID) number, the comment source, and the ADAMS Accession Number of the source. The staff reviewed the scoping meeting transcript and all written material received to identify individual comments. Each comment was marked with a correspondence ID, a unique identifier consisting of the comment source and a comment number (specified in Table D-1). For example, Comment 3-1 would refer to the first comment from the third comment source. This unique identifier allows each comment to be traced back to the source where the comment was identified.

Table D-1. Individuals Providing Comments During the Scoping Comment Period

Commenter	Affiliation (if stated)	Correspondence ID	Comment Source	ADAMS Accession Number
Adler, David		17	Meeting Transcript	ML22091A000
Ahn, Alan	Third Way	14	Email	ML22109A022
Alexander, Steven	U.S. Fish and Wildlife Service	24	Email	ML22119A261
Anonymous, Anonymous	Nuclear Matters	22	Regulations.gov	ML22110A063
Austgen, Kati	Nuclear Energy Institute	16	Email	ML22110A068
Barton, Paul	Eastern Shawnee Tribe of Oklahoma	7	Email	ML22094A125
Campbell, Brian		17	Meeting Transcript	ML22091A000
Carlson, Philip		2	Email	ML22097A061
Colclasure, Doug		17	Meeting Transcript	ML22091A000
Emche, Danielle	Nuclear Innovation Alliance	21	Regulations.gov	ML22110A062
Frady, Teresa		19	Regulations.gov	ML22103A138
Franovich, Rani	Breakthrough Institute	17	Meeting Transcript	ML22091A000
Freed, Josh	Third Way	14	Email	ML22109A022
Haikey, Larry	Poarch Band of Creek Indians	10	Email	ML22095A224
Hastings, Peter	Kairos Power	3	Email	ML22097A062
Hayes, Alyssa		17	Meeting Transcript	ML22091A000

Commenter	Affiliation (if stated)	Correspondence ID	Comment Source	ADAMS Accession Number
Hayes, Rose		1	Email	ML22083A085
Hoff, Heather	Mothers for Nuclear	17	Meeting Transcript	ML22091A000
Houghtalen, Natalie	ClearPath	18	Regulations.gov	ML22103A137
John, Lisa	The Chickasaw Nation	11	Email	ML22090A055
John, Lisa	The Chickasaw Nation	12	Email	ML22090A056
Kahanak, Gary		17	Meeting Transcript	ML22091A000
Kirby, Kris	National Park Service	13	Email	ML22105A022
Klemski, John		8	Email	ML22095A220
Mayor and Members of Oak Ridge City Council		4	Email	ML22103A108
Medsker, Alan		17	Meeting Transcript	ML22091A000
Norman, Ryan	Third Way	14	Email	ML22109A022
Nunez-Mujica, Guido		17	Meeting Transcript	ML22091A000
O'Neill, Martin	Nuclear Energy Institute	17	Meeting Transcript	ML22091A000
Parish, Brad	Advanced Technologies and Laboratories International, Inc.	5	Email	ML22088A148
Payne, Joshua		17	Meeting Transcript	ML22091A000
Pickering, Ryan		17	Meeting Transcript	ML22091A000
Reid, Kelley	Tennessee State Historic Preservation Office	6	Email	ML22088A153
Reid, Kelley	Tennessee State Historic Preservation Office	6	Email	ML22088A294
Rushton, James		20	Regulations.gov	ML22103A139
Safer, Don		23	Regulations.gov	ML22110A102
Smith, Ellen	Oak Ridge City Council	17	Meeting Transcript	ML22091A000
Thompson-Pade, Erin	Delaware Nation	9	Email	ML22095A221
Watson, Mark	City of Oak Ridge, TN	4	Email	ML22103A108
Watson, Mark	City of Oak Ridge, TN	17	Meeting Transcript	ML22091A000
Woody, Ron	Roane County, TN	4	Email	ML22103A108
Woody, Ron	Roane County, TN	17	Meeting Transcript	ML22091A000
Yahola, Ben	The Great Seminole Nation of Oklahoma	15	Email	ML22109A188

A total of 78 individual comments were received during the scoping period. Comments were consolidated and categorized according to a resource area or topic. Table D-2 identifies the distribution of comments received by resource area or topic.

Table D-2. Distribution of Comments by Resource Area or Topic

Resource Area or Topic	Comments
Accidents	3
Air Quality	1
Alternatives	3
Cost-Benefit Considerations	1
Ecological Resources	1
Fuel Cycle and Radiological Waste Management	4
Historic and Cultural Resources	8
Human Health - Radiological	1
Land Use	3
Purpose and Need	2
Site and Technical Overview	1
Socioeconomics	4
Water Resources	1
Process - Construction Permit	1
Process - NEPA	18
Support for Project or Nuclear Power	21
Outside of Scope	5

A summary of the comments received is provided below. Comments were grouped based on being in scope or out of scope, and comments with similar themes were further sub-grouped to capture the resources concerned. Each comment submittal was uniquely identified and when a submittal addressed multiple issues, the submittal was further divided into separate comments with tracking identifiers.

D.1 Comments on the Resource Areas

D.1.1 Comments Concerning Accidents [0015R - DRAFT]

Comment Summary: *The NRC received several comments related to the risk posed by advanced reactor technologies relative to more traditional large light-water technologies. One commenter asked for comparison to other energy technologies, while another suggested that the robustness of TRISO fuel made accident risk very low and therefore presented a potential advantage.*

Comment: These novel advanced reactor technologies possess inherent attributes that make their energy systems more resilient to hypothetical accidents and external hazards than ever before. (**14-3** [Ahn, Alan] [Freed, Josh] [Norman, Ryan])

Comment: And I want to, I guess, stress the importance of a level playing field for nuclear when comparing to other technologies. When we're talking about environmental impacts of this facility compared to another non-nuclear facility, do we consider the impacts of accidents? If we do, are

they appropriately weighted? Do we have any kind of probabilistic risk assessment that says any potential outcomes are so unlikely that they're not as important? How does that work, you know, when compared to other facilities? And do other EIRs for other facilities also consider accidents, like oil spills and fires, and stuff like that? (**17-8-2** [Hoff, Heather])

Comment: I really appreciate all the transparency for public comment on the Kairos project. But I would ask that, as the NRC goes through this process, that they try to consider relative risk assessment. My understanding of TRISO fuel is that it's very robust, resistant to high temperature, probably minimal probability of release of any radioactive materials. The source term is quite small. So, the potential risk there is quite small, and I would ask that you all compare that to the potential gain from what this technology could provide. (**17-9-1** [Kahanak, Gary])

D.1.2 Comments Concerning Air Quality [0002R - DRAFT]

Comment Summary: *One commenter stated that the previous facility on the site, Oak Ridge Gaseous Diffusion Plant, released more thermal energy to the environment than the Hermes reactor would release and had no significant thermal impact to air or adjoining waterways.*

Comment: The Hermes is being sited at the former location of the Oak Ridge Gaseous Diffusion Plant that had the capability to consume over 2000 MW(e) largely for powering compressors in the gaseous diffusion process. Heat of compression was eventually discharged to the environment, primarily through evaporative cooling towers. The discharge of 35 MW of thermal energy by the Hermes Reactor to the atmosphere is, by comparison, a trivial impact. The original ORGDP heat discharge did not have a significant thermal impact on the air or adjoining waterways. (20-3 [Rushton, James])

D.1.3 Comments Concerning Alternatives [0009R - DRAFT]

Comment Summary: *Commenters raised several issues regarding alternatives, including (a) the need to address the adverse impacts of the no-action alternative on U.S. energy policy and climate goals; (b) the safety, economic, and environmental benefits of the Kairos reactor compared to earlier reactors; and (c) the need to address the environmental impacts of energy alternatives.*

Comment: Finally, the staff also should consider the adverse impacts of the no-action alternative. Hermes is an enabling project that will facilitate broader deployment of clean, resilient energy. Not moving forward with Hermes would make that deployment more difficult and less likely, thereby reducing the likelihood of achievement of climate goals and U.S. energy policy, and impacting Kairos Power's ability to support those goals as a US Department of Energy Advanced Reactor Demonstration Program awardee. (3-2 [Hastings, Peter])

Comment: Innovative advanced reactor designs, such as the scaled Hermes reactor, benefit from a legacy of technological breakthroughs and adaptations centered around safety and efficiency. The Kairos Power demonstration represents a new generation of nuclear reactors that are safer, more economical, and have even lower adverse environmental impact than their predecessors (which already have overwhelmingly positive environmental impact). (14-2 [Ahn, Alan] [Freed, Josh] [Norman, Ryan])

Comment: The same principles apply to environmental reviews. The scope and detail should be considered relative to the environmental impacts of alternative forms of energy production. (17-12-2 [Franovich, Rani])

D.1.4 Comments Concerning Cost-Benefit Considerations [0016R - DRAFT]

Comment Summary: *A commenter stated that the Kairos technology presents an opportunity for timely replacement of coal plants that will soon go offline. The commenter also indicated that fast deployment of the technology will be beneficial and save lives.*

Comment: We know that we have a massive fleet of coal plants that will be going offline as soon as we can find a replacement. And the Kairos technology, with its higher output temperature, is most probably a very likely candidate for plug-and-play to repower these existing coal plants.

And keep in mind that coal plants worldwide are killing 6 to 8 million people per year. That is where the risk is. And so, what's important is time. So, anything that the NRC can do to see this process along, time is of the essence. No one is asking for an unsafe, dangerous reactor to be made. I don't think that would happen. But that's my main point, is: time is of the essence. Speed this along because many people will benefit and many lives will be saved. (17-9-2 [Kahanak, Gary])

D.1.5 Comments Concerning Ecological Resources [0003R - DRAFT]

Comment Summary: *The commenter lists several federally listed endangered or threatened bat species that exist adjacent to and in the general project area, and notes the site's proximity to a conservation easement. They recommend preparing a Biological Evaluation (with site infrastructure requirements) and including it within the draft Environmental Impact Statement.*

Comment: The U.S. Fish and Wildlife Service (Service) has reviewed your correspondence, dated March 4, 2022, regarding the proposed construction of a nuclear reactor at the Heritage Center Site in Roane County. Undeveloped areas adjacent to this proposed project area provide significant summer roosting habitats for the federally endangered Indiana bat and threatened Northern long-eared bat. The general project area has significant karst features which support the federally endangered Gray bat and the Heritage Center is adjacent to the Black Oak Ridge Conservation Easement.

There have been numerous protected species surveys on this site. You should prepare a Biological Evaluation (BE) for the proposed project and include it in the draft Environmental Impact Statement (DEIS). We will provide a thorough review of the DEIS and BE when completed. This information should include all necessary site infrastructure requirements including source(s) of electricity and water needed to facilitate its construction and operation. Please forward further project information to the Service to my attention. (24-1 [Alexander, Steven])

D.1.6 Comments Concerning Fuel Cycle and Radiological Waste Management

D.1.6.1 Fuel Source [0020R - DRAFT]

Comment Summary: *A commenter inquired about the source of TRISO fuel for the demonstration and whether there is an NRC-licensed TRISO fabrication facility in the U.S.*

Comment: But what is the source of the TRISO fuel for this demonstration reactor? And is there an NRC-licensed TRISO fuel lab facility in the U.S.? (17-6-1 [Colclasure, Doug])

D.1.6.2 Reactor Life Cycle [0017R - DRAFT]

Comment Summary: *The NRC received two comments related to reactor life cycle. One was specific to emissions during the reactor life cycle and environmental impact of those emissions while the other focused on reactor operating life and potential actions to be taken beyond its current licensing period (decommissioning, expansion, or license renewal).*

Comment: One question that people have had that I think the EIS should help answer for us is the question of the operating life of the test reactor and the potential follow-ons to the operation of that reactor, whether it be decommissioning or expansion or continuation in a different form. (17-5-1 [Smith, Ellen])

Comment: I was just wondering if, in the preparation of these Environmental Impact Statements, the NRC is considering the latest report from the United Nations Economic Commission for Europe on the "Life Cycle Assessment of Electricity Generation Options," and, you know, the life cycle emissions relative environmental impacts, and those things. (17-15-1 [Payne, Joshua])

D.1.6.3 Used Nuclear Fuel Disposition [0018R - DRAFT]

Comment Summary: *A commenter requested that the EIS include planning for off-site permanent safe storage of waste.*

Comment: The environmental evaluation should include planning for moving the waste off site for permanent safe storage. (1-1 [Hayes, Rose])

D.1.7 Comments Concerning Historic and Cultural Resources [0001R - DRAFT]

Comment Summary: *The NRC received comments related to historic and cultural resources from multiple consulting parties in response to the NRC's letter initiating National Historic Preservation Act (NHPA) Section 106 consultation and its environmental scoping. The Eastern Shawnee Tribe of Oklahoma indicated that there are no historic properties of historical or cultural significance to the Tribe that will be impacted by the project. The Tribe did request that all ground disturbing activities stop and that they be immediately contacted if archaeological sites or objects are inadvertently discovered. The Delaware Nation, Poarch Band of Creek Indians and the Chickasaw Nation indicated that the project area is outside of its geographic area of interest. The Chickasaw Nation further indicated that it has no objection to the undertaking but would defer to the federally recognized tribe that identifies as having a connection to the project area.*

The Tennessee Historic Preservation Office (SHPO) indicated that the project area contains a cultural resource eligible for listing in the National Register of Historic Places (NRHP), but that the project as currently proposed will not adversely affect the resource: Manhattan Project National Historical Park (MPNHP). The National Park Service (NPS) provided comments regarding considerations for minimizing impacts to the NRHP-eligible MPNHP including the recommendation that the NPS collaborate with Kairos and/or NRC on the development of interpretation material that illustrates the history of nuclear science and technology and demonstrates linkages to the work done at K-25 during World War II for display at or near the

Kairos facility. Similar partnerships are being undertaken to develop interpretation and recreation programs with Roane County, Tennessee based at and near the waterways near the K-25 site (which is part of the MPNHP). The NPS is also in the process of planning for public access to the K-25 site but is monitoring potential access restrictions based on uncertainties related to proximity of potential public access points to the planned Kairos facility and to the planned nearby Oak Ridge airport.

Comment: Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we find that the project area contains a cultural resource eligible for listing in the National Register of Historic Places. We further find that the project as currently proposed will not adversely affect the Manhattan Project National Historical Park. This office has no objection to the implementation of this project as currently planned. (**6-1** [Reid, Kelley])

Comment: As described in your correspondence, after further research and review of our records, we find that **No Known Properties** of Historical and/or Cultural significance to the Tribe will be impacted by this project. Please continue Project as planned. However, should this project inadvertently discover an archeological site or object(s) we request that you immediately contact the Eastern Shawnee Tribe, as well as the appropriate state agencies (within 24 hours). We also ask that all ground disturbing activity stop until the Tribe and State agencies are consulted. (**7-1** [Barton, Paul])

Comment: Thank you for contacting Delaware Nation. However, Tennessee is outside of our area of interest. (**9-1** [Thompson-Pade, Erin])

Comment: Thank you for the notification on this project. The location of the project appears to be outside the Poarch Band of Creek Indians area of interest. We respectfully defer NHPA consultation to those Tribes with a stronger connection to the project's location. (**10-1** [Haikey, Larry])

Comment: The proposed project is outside of our area; therefore, we do not request government-to-government consultation with the United States Nuclear Regulatory Commission. While the Chickasaw Nation has no objection to the undertaking, we respectfully defer to the federally-recognized First American tribe(s) who have identified a connection to the project area. (**11-1** [John, Lisa])

Comment: The proposed project is outside of our area; therefore, we do not request government-to-government consultation with the United States Nuclear Regulatory Commission. While the Chickasaw Nation has no objection to the undertaking, we respectfully defer to the federally-recognized First American tribe(s) who have identified a connection to the project area. (**12-1** [John, Lisa])

Comment: There may be some opportunities to include interpretation material at or in proximity to the proposed Kairos facility that illustrates the history of nuclear science and technology and

demonstrates linkages to the work done at K-25 during World War II. The NPS would be interested in collaborating with Kairos and/or the NRC on these efforts. The NPS is also currently working with Roane County, Tennessee to develop interpretation and recreation programs based at and near the waterways near the K-25 site.

DOE is still in the process of developing plans in the area, and public access locations to the K-25 NPS site have not yet been determined. At this point, it is uncertain how close the public will be able to get to the Kairos facility. Adding to the uncertainty is the planned nearby Oak Ridge airport, which has the possibility of impacting public access to the NPS site and other planned developments. We are monitoring these developments and will take them into consideration in relationship to the Kairos project when planning for public access at the K-25 site. (**13-2** [Kirby, Kris])

Comment: Based on the information provided we accept the invation to participate in the environmental scoping process. (**15-1** [Yahola, Ben])

D.1.8 Comments Concerning Human Health - Radiological [0004R - DRAFT]

Comment Summary: *One commenter expressed that the risks of observable health effects from radiation exposure associated with nuclear reactor operations should be compared with risks of observable health effects associated with alternative energy technologies, including fossil energy.*

Comment: Regulation of risks associated with nuclear reactor operations should be limited to levels of exposure to radiation that would result in observable health effects in a large exposed population over a reasonable period of time. I agree with Gary Kanahak that those risks should be considered and weighed against the more significant health effects associated with alternative energy technologies that might supplant nuclear energy generation, primarily fossil sources that emit carbon dioxide. (17-12-1 [Franovich, Rani])

D.1.9 Comments Concerning Land Use [0013R - DRAFT]

Comment Summary: *Commenters expressed support for constructing the Kairos facility on an existing site with developed land but stated that the NRC EIS should address the relationship between construction of the facility on the ETTP site and construction and operation of a proposed airport in the K-25 area of the ETTP site.*

Comment: Another question that I anticipate you hearing from the community has to do with construction. As you may or may not be aware, there's an airport planned in the K-25 site area in the East Tennessee Technology Park. And understanding the relationship between the construction of this project and the construction and operation of that airport is of great concern to our residents, and it's something that I hope you will address in the EIS. (17-5-2 [Smith, Ellen])

Comment: I love that it's on an existing site, using all this pre-used land. I think that's awesome. (17-8-1 [Hoff, Heather])

Comment: I agree with Heather Hoff's comment that the siting of this demonstration reactor at an existing DOE location is sensible and minimizes environmental impact relative to, say, a greenfield site. (17-12-3 [Franovich, Rani])

D.1.10 Comments Concerning Purpose and Need [0012R - DRAFT]

Comment Summary: *Commenters noted that in defining the purpose and need for the Kairos facility in the NEPA review, the NRC should acknowledge the national and legislative policy considerations underlying the project. In particular, commenters stated that the NRC should acknowledge the Department of Energy's objective under the Advanced Reactor Demonstration Program to assist U.S. private industries in demonstrating advanced reactors, with the goal of designing and developing safe and affordable reactor technologies that can be licensed and deployed over the next 10 to 14 years.*

Comment: Moreover, in defining the purpose and need for the proposed facility for purposes of its NEPA review, the NRC should acknowledge the significant national and legislative policy considerations undergirding this project. As discussed in Section 1.3 of Kairos' Environmental Report, the Hermes project was selected for an award under the Department of Energy's (DOE) new Advanced Reactor Demonstration Program (ARDP) associated with Risk Reduction for Future Demonstration projects. Therefore, "the need for the project is also tied directly to the DOE's objective under ARDP to assist private industries in the United States to demonstrate advanced nuclear reactors, with a goal of designing and developing safe and affordable reactor technologies that can be licensed and deployed over the next 10 to 14 years." Section 9005 of the Energy Act of 2020 formally authorized the ARDP, the primary purpose of which is to demonstrate a variety of advanced nuclear reactor technologies, including those that could be used to produce safer, emissions-free power at a competitive cost of electricity compared to other new energy generation technologies; heat for community heating, industrial purposes, heat storage, or synthetic fuel production; remote or off-grid energy supply; or backup or mission-critical power supplies. (16-2 [Austgen, Kati])

Comment: And like many of the folks who have said they were very excited about this project, we think it's critical on the part of the industry's mission.

And one point I just want to emphasize today is the need for and purpose of the project. Kairos did address that in its Environmental Report, Section 1.3. And as indicated in the Environmental Report, certainly, Kairos is a commercial entity with some commercial objectives, but I think it's important to understand that this project is also undergirded by important national policy considerations that relate to energy security and independence, as well as climate mitigation initiatives.

And Kairos, as noted in the Environmental Report, was awarded funding under DOE's Office of Nuclear Energy's Advanced Reactor Demonstration Program. And as the ER indicates, the need for this project, therefore, is tied, in part, directly to DOE's objective under the ARDP to assist private industries in the United States to demonstrate advanced reactors, with a goal of designing and developing the safe and affordable reactor technologies that could be licensed and deployed over the next 10 to 14 years.

So, again, I just want to underscore that fact, as the NRC considers the need for the project, which also informs the consideration of alternatives, that the Agency bear in mind these are very important considerations.

And I guess, on that point, I did want to note that, last week, Members of Congress, the Committee on Science, Space, and Technology, sent a letter to Chairman Hanson and Energy Secretary Jennifer Granholm talking, in part, about the need for a very efficient licensing process. But that letter did underscore how there is significant bipartisan support for advanced

nuclear research and development, and that it's critical to the strengthening of the U.S. energy independence, to retain leadership in energy innovation, and addressing global climate change. (17-13-1 [O'Neill, Martin])

D.1.11 Comments Concerning Site and Technical Overview [0019R - DRAFT]

Comment Summary: *A commenter requested that information be provided regarding the plant's infrastructure needs, including electric power, during both the construction and operation phases.*

Comment: Third, it is the City's understanding that the 35MW demand test reactor will not produce electricity. However, it is important that the City understand the electric power and other infrastructure requirements needed for the project's construction and operation such as redundancy needs. (4-4 [Mayor and Members of Oak Ridge City Council, .] [Watson, Mark] [Woody, Ron])

D.1.12 Comments Concerning Socioeconomics [0005R - DRAFT]

Comment Summary: *Three commenters express expectations of positive socioeconomic impact to their communities from the proposed project. One commenter suggests including an analysis of the cumulative socioeconomic impact from this and other nuclear-related projects being considered in the Oak Ridge area.*

Comment: Oak Ridge Councilmember Ellen Smith and I both stated the community's support for the proposed project; we applauded the opportunity to create new jobs and advance new, innovative technology in our town.

The Industrial Development Board of the City of Oak Ridge has been engaged with Kairos Power LLC for more than a year and has finalized a lease and Payment in Lieu of Tax (PILOT) agreement to facilitate the acquisition of property for the construction of Kairos's Hermes test reactor project. As City Manager, I spent many hours reviewing the company's plans and gave a favorable review in February 2021 of the PILOT request submitted by Kairos. (4-1 [Mayor and Members of Oak Ridge City Council, .] [Watson, Mark] [Woody, Ron])

Comment: Second, the socioeconomic analyses should include the cumulative impact of several nuclear-related projects under consideration and review in Oak Ridge, including the Tennessee Valley Authority's Clinch River Nuclear Site. (4-3 [Mayor and Members of Oak Ridge City Council, .] [Watson, Mark] [Woody, Ron])

Comment: The scoping of this environmental review also should include recognition of the positive economic impact of bringing innovative technology research facilities to a community and the exemplary safety record of nuclear energy. (16-3 [Austgen, Kati])

Comment: But a couple of things that I would mention is that we are very proud and have gone through long deliberations on reviewing the Kairos project. We think we've done a very adequate analysis on our part to assess what those potential impacts will be. Of course, there are the localized impacts on housing and schools, and different aspects, when we look at a couple of hundred people that will be new employees.

We are completely in agreement in the investment, and I would point out that many of the jobs that are located here will be residents from the region. And as we look at that, we would like to

be able to see that our agreements -- you know, we are funding the tax pilot programs, the payment in lieu of taxes. And we've come to some very good agreements with that. It's not a 100-percent abatement, but the 30,000 people are investing in this project. So, we want to make sure that that is done well and right. (17-1-2 [Watson, Mark])

D.1.13 Comments Concerning Water Resources [0010R - DRAFT]

Comment Summary: *A commenter expressed concern about potential impacts to surface water bodies downstream of the Kairos facility, particularly the Clinch River and the Tennessee River.*

Comment: Because I do also spend a lot of time in the Tennessee River, in the Clinch River, in the surface water bodies downstream from this facility, obviously, I care about that a lot. So, I'd like the analysis to carefully look at that. (17-11-2 [Adler, David])

D.2 Non-Technical and Comments Outside the Scope of the Environmental Review

D.2.1 Comments Concerning Process - Construction Permit [0011R - DRAFT]

Comment Summary: *One commenter expressed concern about the speed of advanced nuclear reactor licensing in the United States compared with other countries.*

Comment: I'm a pro nuclear advocate and I'm an eco-modernist.

I would like to just go back to the NRC mission statement: "promote the common defense and security."

If you're not aware, since the Ukrainian invasion, to me, we are in a new cold war since the USSR, Russia, or whatever you want to call it, is now aligned with China. And the NRC should definitely take that into a factor, when it approves -- I hope -- this Hermes reactor project, because the United States needs to do as much as possible in nuclear in this new foreign situation that is facing us, and facing the security of this country.

I am very disappointed that the NRC disapproved Oklo's application. To me, it just throws a bunch of uncertainty into people that are trying to build advanced nuclear reactors, like this Hermes project.

And one of my pro-nuclear people who I follow is Robert Brice. And he wrote in Forbes that, "The NRC's rejection of the Oklo application shows the U.S. is miles behind China in advanced nuclear reactors."

And right now, they have a nice, 5,000-page agreement with Russia, and I just see them as taking total control of this technology worldwide, unless the NRC wakes up and starts approving advanced nuclear reactors. And China is beating the pants off of the United States in the race to deploy next-generation nuclear reactors.

Wait. That's not quite true. To have a race, the competitors have to be assembled at the starting line. The hard truth, the U.S. sector is in a bureaucratic inertia and is preventing it from even approaching the starting line. And the proof is the Oklo rejection for sure.

And if we're going to build these small modular reactors and these advanced fourth-generation reactors -- China already has one, a nice one. And their gas reactor is already providing power to the grid.

So, I would like the NRC to seriously consider: "promote the common defense and security." Because I don't think it's doing it right now. (17-3-1 [Campbell, Brian])

D.2.2 Comments Concerning Process - NEPA

D.2.2.1 Efficiency of Analysis [0021R - DRAFT]

Comment Summary: *The NRC received several comments regarding the efficiency of the staff's environmental review. Several commenters mentioned taking advantage of existing analyses to the extent possible, including the yet-to-be-published ANR GEIS, to help streamline the review.*

Comment: In completing its Environmental Impact Statement (EIS), the NRC staff's level of analysis should be commensurate with the severity of anticipated impacts, and the staff's conclusions should take advantage of existing information to the maximum extent practical :

First, may impacts are already demonstrated to be small under very conservative assumptions in the Preliminary Safety Analysis Report (PSAR) that comprises the balance of the CPA.

Second, the staff should be able to conclude that, where applicable, impacts to human health and the environment are small by virtue of compliance with applicable federal and state licenses and permits. Under the best-estimate models appropriate for NEPA, it is not reasonable to analyze conditions that would be likely to occur only during protracted periods of noncompliance that would be detected and corrected through routine monitoring, surveillance, and permit enforcement.

Third, the staff should, to the maximum practical extent, avail itself of the evaluations conducted in support of the in-process advanced nuclear reactor generic EIS (ANR GEIS). While Kairos Power recognizes the ANR GEIS will not be finalized in time to be used as a direct input to the Hermes review, the supporting evaluations should be used as input to the Hermes EIS wherever applicable. (3-1 [Hastings, Peter])

Comment: Therefore, we urge the NRC to implement a comprehensive view of nuclear energy's environmental implications in developing its environmental assessment process by taking into account nuclear energy's contribution to reducing climate and non-climate emissions. Further, we advise that the NRC apply this perspective in its review of the environmental impact statement for Kairos Power's Hermes demonstration reactor, as well as keeping its environmental review as efficient as possible by keeping the scope of the review focused. (14-5 [Ahn, Alan] [Freed, Josh] [Norman, Ryan])

Comment: We further encourage the NRC to consider the efficiency of the environmental review during this scoping process. Council on Environmental Quality (CEQ) guidelines recommend federal agency staff use the applicant's environmental report (ER) as the basis for the draft environmental assessment (EA) or environmental impact statement (EIS), and further allow that the federal agency may use the applicant's ER as the draft EA or EIS. NRC should maximize the use of existing evaluations and the inherent attributes of the Kairos Hermes design, and the NRC's own regulatory process, to avoid duplication of effort in the

environmental review process. Identifying how NRC will achieve such efficiencies during the scoping process will provide regulatory clarity for all stakeholders, many of whom have voiced strong support for this project. (16-5 [Austgen, Kati])

Comment: Finally, we recognize the NRC staff's ongoing efforts to develop the advanced nuclear reactor generic environmental impact statement (ANR GEIS). While the rulemaking for the ANR GEIS is still in progress, the NRC staff should leverage the supporting technical analyses already completed in that effort (see, e.g., draft NUREG-2249) to address those areas of the Kairos Hermes application that are bounded. This will create substantial efficiencies in addressing at least 80% of the scope of the environmental review.

In summary, the scoping of the environmental review pertaining to Kairos Power's construction permit application for the Hermes test reactor to be built in Oak Ridge, Tennessee offers the opportunity for NRC staff to implement tangible improvements to the efficiency and timeliness of NRC environmental reviews for new reactor applications. (16-6 [Austgen, Kati])

Comment: And I hope that the NRC will work going forward to make sure the process is as smooth as possible for getting the salt technologies out and commercially, you know, after this research facility. (17-8-4 [Hoff, Heather])

Comment: And finally, I did want to commend the NRC on the efforts it's been making in recent years to kind of innovate and improve and streamline its environmental review process. I think the Environmental Center of Expertise has done a good job in that regard. And we would encourage the NRC to continue to look for ways to streamline the environmental review process, and, in particular, leverage existing analyses of the Advanced Nuclear Reactor GEIS that's under development that made it possible to incorporate portions of that by reference, as well as other EISes. (17-13-2 [O'Neill, Martin])

Comment: We would like to encourage the NRC to keep the scope of the environmental review as targeted as reasonably achievable while still obtaining reasonable assurance of adequate protection for the health and safety of the public and to protect the environment. In order to realize a reliable, multi-sectoral clean-energy future, advanced reactors will need to be constructed both *safely* and *expeditiously*.

The scoping process for the Hermes EIS is important because, although Hermes is a test reactor, elements of the Hermes' EIS process can likely also be used for full-scale, Kairos reactor deployments. Furthermore, as the Hermes test reactor will be one of the first advanced reactor designs to undergo an environmental review by the NRC, applying lessons learned will be useful as the NRC prepares to license multiple advanced reactor designs in the near future. (18-2 [Houghtalen, Natalie])

Comment: Nuclear Matters applauds the significant effort by the industry to streamline environmental reviews for first-of-a kind advanced nuclear demonstration projects and encourages the NRC to consider the efficiency and timeliness of the environmental review during the scoping process for new reactor applications. (22-1 [Anonymous, Anonymous])

D.2.2.2 Environmental Review Process [0024R - DRAFT]

Comment Summary: *A commenter asked whether a similar environmental review process is used in other industries.*

Comment: But I was just wondering, for other facilities that have EIRs, is there a similar process where they have an environmental review that's prepared or conducted by their own regulator? (17-18-1 [Hoff, Heather])

D.2.2.3 Issues Out of Scope [0022R - DRAFT]

Comment Summary: *The NRC received several comments regarding scope of review. The commenters recommended that the NRC not analyze in detail those items out of scope or those without significant impact.*

Comment: Conversely, issues outside the scope of this specific regulatory decision should not be considered. The applicant has taken the time to analyze available sites and resources; thus, the scope of the NRC environmental review should consider what is realistic and within the agency's jurisdiction. As both the Commission and the federal courts have held, when the proposed action subject to NEPA review is triggered by a proposal or application from a private party, the agency should give "substantial weight" to the goals and objectives of that private entity. Thus, in such cases, for a project alternative to be "reasonable," it should meet the goals of the private applicant. (16-4 [Austgen, Kati])

Comment: The Proposed Kairos Power, LLC Test Reactor is an essential element of a highly attractive pathway to reduce carbon emissions from electric generation and high-temperature thermal processes. The Hermes Test Reactor is a key step in the process of demonstrating the operation, maintenance, performance, and affordability of the novel technology. Given the numerous reports by the Intergovernmental Panel on Climate Change showing the urgency of addressing carbon emissions, the NRC should accelerate and complete the licensing reviews of the Hermes Test Reactor so as to enable its potential global environmental, safety and affordability benefits to be evaluated and realized as soon as possible. Although the NRC has published a review schedule, the NRC should implement concrete efforts to accelerate the publishing of the draft EIS and safety reviews to facilitate the construction. In support of this, I strongly endorse the full application of item c. "identify and eliminate from study those issues that are peripheral or are not significant or have been covered by prior environmental reviews." Significantly streamlining by the NRC in the preparation of the EIS should be feasible because the site was previously extensively developed for a now decommissioned federal facility, the K-33 Building at the Oak Ridge Gaseous Diffusion Plant. The characterization of the site following decommissioning and demolition of the K-33Building met the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations of the EPA. The site was released for private development by the Department of Energy. (20-1 [Rushton, James])

Comment: During the Hermes' environmental scoping, NIA recommends utilizing performance-based principles so the scope of the review is commensurate with the reasonably conceivable hazards, environmental impacts, and source term. NIA encourages NRC staff to limit the scope of its review to topics relevant to the Hermes' licensing decision and to scale the review as necessary, based on the documented findings. In NRC's assessment of risks, there should also be an emphasis on the positive environmental impact of nuclear energy and the role of the Hermes test reactor in enabling future advanced nuclear reactors. (21-2 [Emche, Danielle])

D.2.2.4 Review Timeline [0023R - DRAFT]

Comment Summary: *The NRC received several comments regarding the review timeline. While most of those commenters urged the NRC to provide a timely and expedient*

review, one commenter suggested a longer comment period to accommodate City Council resolution timelines.

Comment: One thing I would suggest -- and we find this happens when a calendar of events are established and communications -- we like to have that adopted by our City Council with a resolution or a statement in time, and that takes Council actions. And sometimes that doesn't match up.

And so, we would like permission that, if, for instance, April 19th is a hard-and-fast date, or we're looking to the November date, going into Christmas and 45 days' comments, it's a little difficult for the local officials to take particular actions. So, we would ask for flexibility in those timeframes, when they come about, to make the comments and have them formally adopted by the City Council. (17-1-1 [Watson, Mark])

Comment: But I, like other commenters, would like to see us approach this with some sense of urgency. I think there is an important need to not drive the process out; of course, not to cut any corners on safety analysis, but to move forward with purpose and some sense of urgency. (17-11-3 [Adler, David])

Comment: On behalf of the Breakthrough Institute, I urge the NRC to prepare its Environmental Impact Statement, in light of these considerations. Additionally, and consistent with Mr. Kahanak's comments, I further urge the NRC to conduct a timely review and provide clear communication with the Applicant and the public. (17-12-4 [Franovich, Rani])

Comment: A process question: it was discussed earlier about the contested environmental review, if it's going to happen. Do you know the approximate -- like if there's a contesting, like what's the timeline for that, and how would that affect the Hermes project? (17-17-1 [Campbell, Brian])

Comment: Several of the commenters have pointed out the timeliness, expediency. I know you have several hard dates, the EIS, the 45-day comment, the final. What would be your projected start of construction? Can you make that projection at this point? (17-19-1 [Colclasure, Doug])

Comment: The NRC licensing process (and most particularly the Environmental Impact Statement) should reflect that implementing the Hermes Reactor is an urgent action for the benefit of the environment and we who live within it. (20-5 [Rushton, James])

D.2.3 Comments Concerning Support for Project or Nuclear Power [0014R - DRAFT]

Comment Summary: *Several commenters expressed general support for nuclear power and specific support for the Kairos facility. The commenters expressed support for nuclear power because it (a) reduces carbon emissions and climate impacts and helps meet national and global carbon-reduction goals, (b) reduces fossil fuel emissions and associated health impacts, (c) is safe, (d) promotes national energy security, and (e) is cost-effective. The commenters expressed support for the Kairos facility because it (a) is key to developing next generation reactor technology, (b) represents clean, reliable energy innovation, (c) would have a smaller footprint than alternative energy sources and thereby reduce land-use impacts and other impacts to vulnerable communities, and (d) would create jobs in the local community.*

Comment: I want to express my strong support for the Kairos Hermes Nuclear Test Reactor being proposed for Oak Ridge TN. We absolutely need robust test facilities in order to support

our generation 4 reactor technology, which is the future of energy in the US and the world. We need this capability as soon as possible and I support expedient approval of this project. (2-1 [Carlson, Philip])

Comment: As such, I am writing to express my support of the NRC permitting process for Kairos Power's construction and licensing permit application for the Hermes demonstration reactor they plan to build in Oak Ridge, Tennessee. It's my opinion the local community also welcomes the opportunity to continue our long tradition of supporting energy innovation as I do. This property has a history of supporting the nation's energy and safeguards, and I'm very pleased Kairos Power is investing in our local community and the nation's future. (5-1 [Parish, Brad])

Comment: The potential for nuclear power to supply a great percentage of our power needs has always existed but fear and media coverage (Three Mile Island) and no one even mentions nuclear power and many European Nations are abandoning nuclear completely, and they have access to fewer power source options than the US.

The ability to show and prove to the public that nuclear reactor power generation is possible in a safe, cost effective, and least effect on climate issues is long overdue and is something that has long been overlooked for too many decades.

I fully support the building and operation of this proposed facility and hope to see the knowledge gained from this project be put to use in the hopefully near future. (8-1 [Klemski, John])

Comment: Consistent with the views of a growing number of prominent experts within the climate science community and the current executive administration, we believe that nuclear energy will play an essential role in meeting global climate objectives - given the vast amounts of low-carbon energy sources that will need to be deployed in order to meaningfully reduce greenhouse gas emissions within a very short timeframe. In particular, we believe advanced reactor technologies, such as Kairos Power's fluoride salt-cooled high temperature reactor, have the potential to be rapidly deployed at scale and provide the abundant safe, clean, and reliable energy needed to combat climate change - not just power, but also industrial heat, desalination, etc. (14-1 [Ahn, Alan] [Freed, Josh] [Norman, Ryan])

Comment: The reality is that the United States simply won't meet its climate commitments without an expansion of nuclear generation capacity. Furthermore, in the opposite scenario of contraction in nuclear capacity, authoritative analyses have shown that the output is overwhelmingly replaced by fossil fuel generation which contravenes efforts to reach climate commitments and adds to harsh climate impacts. While no energy generation is completely free of environmental impacts, nuclear power deployment has significant environmental benefits. Nuclear power generation is free of carbon and other greenhouse gas emissions that drive climate change and curbs the overall growth of these hazardous fossil fuel emissions that present direct health risks for local communities. (14-4 [Ahn, Alan] [Freed, Josh] [Norman, Ryan])

Comment: With regard to the scoping of this environmental review, we urge the NRC to consider the widely recognized environmental benefits of nuclear energy. In addition to not producing carbon emissions, nuclear power plants do not emit other harmful air pollutants that contribute to heart disease, neurological disease, lung cancer and respiratory diseases. Due to nuclear power's high energy density, reactors have relatively small geographic footprints that lessen land use impacts. For these reasons, nuclear power avoids adverse climate change, air

quality, and other environmental impacts that have been shown to disproportionately affect vulnerable communities. We recognize that the Hermes non-power test reactor will not supply electricity to the grid. However, the construction and operation of the proposed test facility is necessary to demonstrate the key technologies of the Kairos Power Fluoride Salt-Cooled, High Temperature Reactor (KP-FHR) for future commercial deployment. (16-1 [Austgen, Kati])

Comment: So, I just wanted to, basically, kind of lend the support from the government of Roane County, as we collaboratively work together with the city of Oak Ridge and Kairos Power and the NRC. (17-2-1 [Woody, Ron])

Comment: And I just want to commend everyone on this call for this tremendous effort of bringing this incredible technology to the United States.

And I appreciate the earlier caller highlighting the tremendous importance of this technology.

And I want to thank all the veterans on the call for delivering such a safe industry for these new technologies to robustly grow in the United States.

So, I just want to share a lot of gratitude for everyone on the call. And as a member of the public, we're cheering everyone on. (17-7-1 [Pickering, Ryan])

Comment: So, it's important to me that we have more clean electricity and more clean energy now, and I think nuclear is great at doing that. (17-8-3 [Hoff, Heather])

Comment: First of all, I'm very excited about this project and about the technology being developed and commercialized in ways that will serve all of us well. Energy is a key component of all of our lives, and we need a lot more of it. And we especially need a lot more clean energy, and this will help us get there.

The encouragement that I would offer is that assessments that are made regarding safety for holistic include not only assessment of risk of this technology and the reactor and follow-on projects that are resulting from that, but also the negative effects that it will have on the proliferation of fossil fuels.

Again, as Mr. Kahanak stated, the thing that we need to worry about is the impacts of climate change and pollution from burning things, and nuclear energy doesn't do either of those things. So, this technology, as well as other designs that are being worked on, will be key to us reducing that fossil fuel, we'll call it a load on the planet that, again, kills millions of people every year and exacerbates the global warming problem that we have.

So, the assessment really needs to be holistic, and I know it's just the Nuclear Regulatory Commission, but the effects, the follow-on effects, of delayed processes really does have a real effect. And we need to keep that in mind. (17-10-1 [Medsker, Alan])

Comment: I'm also very excited about this project. I think that we need to move with some urgency away from the current processes we use to produce electricity and move towards clean electricity sources that do not contribute to the climate change problem.
(17-11-1 [Adler, David])

Comment: And I just, also, wanted to refer to the NRC's mission statement on environmental protection, protecting the environment. To me, nuclear power does that. Because every time

you build a nuclear power plant, you're not emitting. And anytime that a nuclear plant is either decommissioned prematurely or not built, it's filled in by something. And it's not renewable energy for the most part. It's going to be something that's going to emit fossil fuel. (17-14-1 [Campbell, Brian])

Comment: And so, I have a very short comment, because I will be living in this area for a while. And I just want to say that I am supportive of this endeavor, as a local resident. I've been to that site and seen, basically, the same empty fields that were shown in the images. And I think that this is going to help expand this part of eastern Tennessee technologically in terms of jobs.

And I really hope that this comes to fruition, and I am excited for these economic and technological developments. I'm a nuclear engineering student as well, and I hope that this brings additional job opportunities for future nuclear engineers in my department here at UT, more opportunities for them to see advanced nuclear research that they, themselves, could get their hands on in the future.

So, yes, I look forward to seeing this project come to fruition. Thank you. (17-16-1 [Hayes, Alyssa])

Comment: I would like to make a comment supporting the project. As a resident of the San Francisco Bay area who works in tech, I am often very worried that there's a single sector that's the remaining part of the economy here. And I don't think that we have a lot of very capable people that are able to do our things, but they really don't have the opportunity.

So, I think that this is a step in the right direction to diversify the economy of the area in California and to give more opportunities to people who, even if they have the skills to work in traditional software technology, maybe they want to do something that feels more meaningful, more purposeful, and this is a way to contribute to fighting global warming. (17-20-1 [Nunez-Mujica, Guido])

Comment: But I must say, I am so impressed by the level of integrity and thoughtfulness of American nuclear energy. And with what we have built, we must inspire a young generation to take this tremendous responsibility on.

And it's clear that nuclear energy is a nonpartisan issue. And that's important because energy is life, and what we do is important.

So, I know it's been hard times for nuclear energy. You know, I, myself, was an antinuclear advocate in the past, and I've changed my mind because of all the hard work that everyone has done, so that we are empirically a good response to modernity.

So, thank you again. I'm happy to read this into federal commentary and the federal record because there's a lot of great people who have come before us to bring us to these moments where both American business and the American government can work together to bring cheap, clean energy for the United States and, also, the world.

And that is how the world wants us to lead, is pro-energy, and that is the promise that working with America provides. And we must regain that cultural leadership.

And I commend everyone for their bravery in these times because I know there's a lot of opposition to this technology, and we must be patient, but also resilient. (17-21-1 [Pickering, Ryan])

Comment: ClearPath is grateful for the opportunity to express our support for the construction of the Kairos' test reactor, Hermes, at the East Tennessee Technology Park Heritage Center site in Oak Ridge. The Hermes test reactor will support the development and licensing of a larger, commercial nuclear power plant.

The rapid scaling of innovative technologies is necessary to mitigate climate change, and nuclear energy is essential for a reliable and robust clean-energy system. Advanced nuclear reactors have a variety of attributes that allow them to tackle power sector decarbonization at grid-scale and microgrid-scale as well as industrial and district heating. While environmental reviews are typically associated with the potential for negative environmental impacts, the positive environmental impact of advanced nuclear reactors extends further than the fenceline. While every new power facility of any type will have direct land-use impacts, advanced nuclear energy has a meager impact; especially when considering avoided emissions and avoided land use of alternative energy sources. (18-1 [Houghtalen, Natalie])

Comment: I am writing to express my support of the NRC permitting process for Kairos Power's construction and licensing permit application for the Hermes demonstration reactor they plan to build at Heritage Center (ETTP) in Oak Ridge, Tennessee. In my opinion, the local community, of which I am a life-long resident, has welcomed the opportunity to continue its long-standing tradition of supporting energy innovation as well. The former K-25 site has a significant history of supporting the nation's energy and safeguards, and I'm very pleased Kairos Power is investing in our local community and the nation's future. (19-1 [Frady, Teresa])

Comment: As a resident of Oak Ridge, whose residence in approximately 4 miles from the Kairos Power Hermes site, I am totally supportive of the construction and operation of this vital facility. My residence is also 5-6miles from the High Flux Isotope Reactor at ORNL, which started operation in the 1960's and now operates at a thermal power of 85MW, more than double the Hermes Reactor thermal power. The safety regulations of the DOE have ensured that HFIR has operated with no significant environmental effect and, in fact, is viewed as a major asset by the community. I have confidence that the regulations of the NRC will, likewise, ensure that the Hermes Reactor is operated to high standards under the NRC's practiced and experienced regulatory process. Moreover, the inherent safety features of the Hermes Reactor minimize the potential for any environmental impact. (20-2 [Rushton, James])

Comment: Global climate change is real. (See Comment No. 1) The Hermes Reactor is an enabler of one of the family of solutions that the planet will require to address the climate challenge to humanity without denying billions the right to economic development and prosperity. The leverage of Hermes is immense in this quest for sustainable energy. (20-4 [Rushton, James])

Comment: The Nuclear Innovation Alliance (NIA) appreciates the opportunity to comment on the environmental scoping for the Kairos' test reactor, Hermes, and to express our support for the reactor's construction at the East Tennessee Technology Park Heritage Center site in Oak Ridge, TN. (21-1 [Emche, Danielle])

Comment: The secure deployment of advanced reactors is crucial to meeting our carbon reduction goals and strengthening our national energy security, as well as solidifying the U.S.'s

global leadership on advanced nuclear technology. In addition, the advancement of new reactor technologies provides a career pathway for the next generation of nuclear industry professionals. Nuclear Matters encourages the environmental review scoping to fully recognize these positive environmental and economic impacts, plus the long safety record of the commercial nuclear power sector.

Nuclear Matters appreciates the opportunity to provide comments on the scoping of the environmental review. Our advocates are enthusiastic about and supportive of the next generation of nuclear technology, including advanced reactor types. Improving the efficiency and timeliness of the environmental review during the scoping process will help sustain and advance the progress made with these innovations that will play a key role in securing America's clean energy future. (22-2 [Anonymous, Anonymous])

D.2.4 Comments Concerning Outside of Scope

D.2.4.1 Local Government Engagement [0006R - DRAFT]

Comment Summary: *Two comments focused on local government's request for sufficient time to review NRC documents and its request to maintain regular communication with NRC officials during the permitting processes.*

Comment: First, as the NRC prepares an EIS to evaluate the environmental impacts for a construction permit (CP), please allow sufficient time for our city officials to review the document and to prepare comments for transmittal. Our City Council typically holds one business meeting monthly (2nd Monday), so receiving lengthy and technical documents at least 45-60 days prior to the deadline is necessary. (4-2 [Mayor and Members of Oak Ridge City Council] [Watson, Mark] [Woody, Ron])

Comment: Finally, it is the City's understanding that the Construction Permit, if issued, is the first step in the NRC process, to be followed by a second Operations Permit application process. We urge regular and effective communication with local officials that would complete the process in a timely manner, including planning for the NRC's in person meeting in Oak Ridge under consideration for later this year. (4-5 [Mayor and Members of Oak Ridge City Council, .] [Watson, Mark] [Woody, Ron])

D.2.4.2 Public Safety [0007R - DRAFT]

Comment Summary: *Two comments raise awareness about the impact and preparedness of local public safety and emergency resources to respond to the site's needs.*

Comment: *The K-25 site is scheduled to be open to the public within the next 5 years. This will allow open access to the area 24 hours a day, 7 days a week, and will not be staffed most of the time. We request this be taken into consideration when planning security and public safety for the project. (13-1 [Kirby, Kris])

Comment: Just a couple of final thoughts. We are a full-service city with lots of aspects, including the utilities that are in our area. And I know one of the debates or discussions that have come on is the aspect of public safety, public response by firemen, policemen, those sorts of individuals. And we particularly want to look at the public safety aspect of that and how we respond.

In today's federal world, for instance, the clearance permits to get onto various sites have challenged us with public safety services. And as we look at this, I know it's a private sector facility, but we have some of the best firemen that are around. They have to be trained in very sophisticated matters. And so, we would like to ensure that that public safety element is able to be responding to and questions raised in that regard. (17-1-3 [Watson, Mark])

D.2.4.3 Reactor Safety [0008R - DRAFT]

Comment Summary: *One commenter raised concerns about safety with regards to the reactor design.*

Comment: The Environmental Report (ER) and Preliminary Safety Analysis Report (PSAR) for the proposed Kairos Hermes reactor project in Oak Ridge, Tennessee fail miserably to accomplish the Nuclear Regulatory Commission's (NRC) mission and stated purpose of protecting the public and the environment from potential harm caused by nuclear energy projects.

The reports blindly and prematurely validate safety claims being made by Kairos about the inherent safety of the design. The use of the term "postulated events" instead of "accidents" (Section 3.1.1) is suspect as an attempted semantic neutralization of perceived risks. In fact, the Hermes reactor is a one quarter size experimental test reactor being built solely to validate many theoretical claims.

The reliance of "functional containment" instead of robust, leak-resistant physical containment is a major concern and should be rejected by the NRC. The proposed functional containment relies on the fuel balls themselves to contain the radiation created by fission. Stretching the point, further containment credit is given to the liquid fluoride coolant while the fuel is covered with it in the reactor vessel.

The PSAR is riddled with unchallenged and unproven assumptions like this one in Section 3.1.1: "failure of the reactor vessel is a beyond design basis event as the vessel is designed against such failure." And: "The TRISO fuel layers of fuel in the reactor core and the Flibe are credited with the radionuclide retention properties described in Reference 1. For the Flibe to maintain the retention properties described in Reference 1, the integrity of the portion of the reactor vessel that ensures the pebbles in the reactor core remain covered by Flibe is credited with maintaining integrity under MHA conditions." (13.1.1.2)

The PSAR and the ER do not address the possibility of failure of the reactor vessel which would likely result in release of dangerous amounts of radiation. The "functional containment" would disappear in the blink of an eye and all the radiation within the TRISO fuel would be released if their maximum temperature of 1600 degrees Celsius is exceeded. Since the irradiated fuel is set to be stored in the reactor building a serious fire might compromise the integrity of that storage, each canister is set to have 2100 fuel balls. Storage capacity is 192 canisters. Burnup levels will be quite high so there will be an enormous amount of radiation stored and possibly at risk. This would likely cause the release of much other radiation in the reactor area.

A disaster like the devastating accidents at Three Mile Island, Chernobyl and Fukushima is not considered by the ER and PSAR. It is a fundamental failure to continue to ignore true worst-case scenarios when licensing new nuclear reactors. The bureaucratic slight of hand that manages to avoid having to consider the worst possible effects on the public and the environment puts Tennesseans at unacceptable risk.

The Hermes design is a new combination of HALEU (high assay low enriched uranium) TRISO fuel pellets enriched to almost 20 percent with liquid fluoride salt cooling (Flibe). There will be around 36,000 fuel balls floating in the cooling liquid. Operating temperatures are designed to be quite high, 600 to 700 degrees centigrade at the coolant outlet. The Flibe coolant contains poisonous beryllium and will present many engineering challenges at those temperatures. This novel design creates many issues, known and unknown. The PSAR (Section 1.3.9) list of areas of research for this design include: fuel pebble behavior, high temperature testing on reactor vessel and internals, graphite oxidation, develop and validate computer codes for core design, develop reactor coolant chemical monitoring instrumentation.

There are also concerns about maintaining the Flibe coolant's liquidity during shutdown or in a scram since it will freeze at 450 degrees C.

The Nuclear Regulatory Commission needs to verify any assumptions of "inherent safety" very carefully and require robust containment surrounding this experimental reactor. (23-1 [Safer, Don])

E. Significant issues identified

After the NRC staff considered and grouped comments according to resource area/topic, the NRC staff identified the significant issues raised during the scoping period that bear on the proposed action or its impacts, in accordance with 10 CFR 51.29. A summary of the significant issues, including each commenter’s unique identifier, are provided below.

Ecological Resources

- Concerns were expressed regarding several federally-listed endangered or threatened bat species that exist adjacent to and in the general project area, as well as the site’s proximity to a conservation easement. As such, the commenter requested the preparation of a Biological Evaluation (with site infrastructure requirements) and including as part of the draft Environmental Impact Statement.

Comment: (24-1)

Historic and Cultural Resources

- Concerns were expressed regarding the presence of a cultural resource eligible for listing in the National Register of Historic Places.
- Commenters requested that Kairos and/or the NRC collaborate with the National Park Service on development of materials illustrating the history of nuclear science and technology at the K-25 site. Additionally, commenters requested that all ground disturbing activities stop and the appropriate Tribe contacted if archaeological sites or objects are inadvertently discovered.

Comments: (6-1), (7-1), (9-1), (10-1), (11-1), (12-1), (13-2), (15-1)

Water Resources

- Concerns were expressed regarding potential impacts to surface water bodies downstream of the Kairos facility, particularly the Clinch River and the Tennessee River.

- The commenter requested that analysis performed as part of the EIS look carefully at those potential impacts.

Comments: (17-11-2)

F. Determinations and Conclusions

Issues to be Analyzed in the EIS

The NRC staff will consider the significant issues identified in Section E in the development of the EIS. The NRC staff will identify and describe the ecological resources, historic and cultural resources, and water resources that may be impacted by issuance of a construction permit in Chapter 3 of the EIS.

The EIS will discuss the ecological habitats present within the Kairos Hermes site boundary. Furthermore, the NRC staff is consulting with the U.S. Fish and Wildlife Service (FWS) under Section 7 of the Endangered Species Act of 1973 (ESA) to evaluate the potential impacts of the construction of the Kairos Hermes reactor on endangered and threatened species and their critical habitat. The NRC staff will also review the FWS National Wetlands Inventory Mapper to determine if wetlands are on or adjacent to the site. The NRC will describe its FWS consultation for the Kairos Hermes construction permit in Chapter 3 of the EIS. The EIS will include a description of potential effects on federally and state-listed protected species in Chapter 3 of the EIS.

The NRC is conducting Section 106 of the National Historic Preservation Act of 1966 (NHPA) consultation through NEPA in accordance with 36 CFR 800.8(c). The regulations in 36 CFR Part 800, “Protection of historic properties,” establish the requirements for the NRC to consult with the State Historical Preservation Officer and any American Indian Tribe that attaches religious and cultural significance to historic properties that may be affected by a proposed action/undertaking. The NRC will describe its ongoing Section 106 consultation for the Kairos Hermes construction permit in Chapter 3 of the EIS. The EIS will also include a description of the historic and cultural resources as well as historic properties identified within the area of potential effects in Chapter 3, together with the staff’s evaluation of the effects of the proposed action on the identified historic and cultural resources and historic properties.

For water resources, the DOE continues to monitor surface and groundwater quality at various locations around the site and, in cooperation with the DOE, Kairos will institute an environmental monitoring plan of its own in addition to its obligation to meet all requirements for water use and wastewater service and stormwater permitting requirements. The EIS will include a description of all affected groundwater and surface water features that could be affected by Kairos Hermes construction activities in Chapter 3 of the EIS.

In addition, the NRC staff received a number of comments that were either general in nature or otherwise beyond the scope of the construction permit environmental review. These included comments from organizations and individuals in support of the Kairos Hermes plant. The NRC staff will describe in Chapter 3 of the EIS the following topics generally mentioned in these comments: the impact of thermal energy release to the environment and the impact to air or adjoining waterways, radiation exposure levels, and the socioeconomic impacts as a result of constructing the Kairos Hermes plant. Comments related to the environmental review process also expressed concerns regarding the timeline of review, with some indicating a desire for an accelerated process while others requested more time for comment. However, the NRC will not

consider or evaluate any issues in the EIS which do not pertain to the staff's environmental evaluation or are beyond the scope of the construction permit environmental review. The current schedule for the issuance of the draft EIS may be found on the project website at https://www.nrc.gov/reactors/non-power/hermes-kairos.html.

Define the Proposed Action

The NRC's proposed action is to issue a CP to Kairos authorizing construction of the Hermes reactor. The issuance of a construction permit is a separate licensing action from the issuance of an operating license (OL). If the NRC issues a CP, then Kairos would need to submit a separate application for an OL and obtain NRC approval before operation of the Hermes test facility.

Other Environmental Review and Consultation Requirements

Concurrent with its NEPA review, the NRC staff is informally consulting with the FWS under Section 7 of the ESA to evaluate the potential impacts of the construction of the Kairos Hermes reactor on endangered and threatened species and their critical habitat. If the FWS concurs with the NRC staff's conclusions of "may affect, but not likely to adversely affect" for the Hermes project, then formal Section 7 consultation will not be necessary. Consistent with 36 CFR 800.8(c), the staff is also consulting with affected Indian Tribes and the Tennessee State Historic Preservation Office to fulfill its Section 106 obligations under the National Historic Preservation Act of 1966.

Timing of Agency Action and How the EIS Will Be Prepared

Upon completion of the scoping process and site audits, completion of its review of Kairos's ER and related documents, and completion of its independent evaluations, the NRC staff will compile its findings into a draft EIS. The staff will make the draft EIS available for public comment. Based on the information gathered during the public comment period, the staff will amend the draft EIS findings, as necessary, and then will publish the final EIS. In accordance with 10 CFR 51.102 and 10 CFR 51.103 requirements, the NRC will prepare and provide a Record of Decision. Concurrent with but separate from this environmental review, the staff will document its safety review in a safety evaluation report (SER). The findings in the EIS and the SER will be considerations in the NRC's decision to issue or deny the construction permit.

The NRC staff is currently scheduled to finalize the final EIS, SER, and related activities by September 2023. The draft and final EIS will be prepared by the NRC staff with contractor support for historic and cultural resources, document editing, and for managing the processing of public comments. The date for decision on the issuance of a construction permit is yet to be determined.

Future Opportunities for Public Participation

The NRC staff plans to issue a draft EIS (DEIS) for public comment in October or November 2022. The DEIS comment period will offer an opportunity for participants, such as the applicant; interested Federal, State, and local government agencies; Tribal governments; local organizations; and members of the public to provide further input to the agency's environmental review process. The DEIS comments will be considered in the preparation of the final EIS (FEIS). Together, the FEIS and the SER will identify the information considered and the

evaluations that the staff performed, and they will provide the basis for the NRC's decision on Kairos's application for a construction permit for the Hermes plant.