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DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE CONSTRUCTION PERMIT FOR THE KAIROS HERMES TEST REACTOR

Wednesday, November 16, 2022

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Nuclear Regulatory Commission

- The NRC is an Independent Federal Agency
- Over 40 years of experience regulating all civilian use of nuclear materials, including power and non-power reactors
- Mission: To protect public health and safety, promote common defense and security, and protect the environment

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Purposes of this Meeting

- Describe the NRC review process
- Share with you the NRC staff's preliminary findings and recommendation from the environmental review.
- Describe how you can provide comments during the comment period
- **Listen to and gather your comments**

Proposed Hermes Site

185-acre site in East Tennessee Technology Park in the city of Oak Ridge

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Proposed Hermes Site

(Source: Kairos Jan 21,2021 ML21021A364)

Utilizes land formerly occupied by Oak Ridge Gaseous Diffusion Plant Buildings K-33 and K-31

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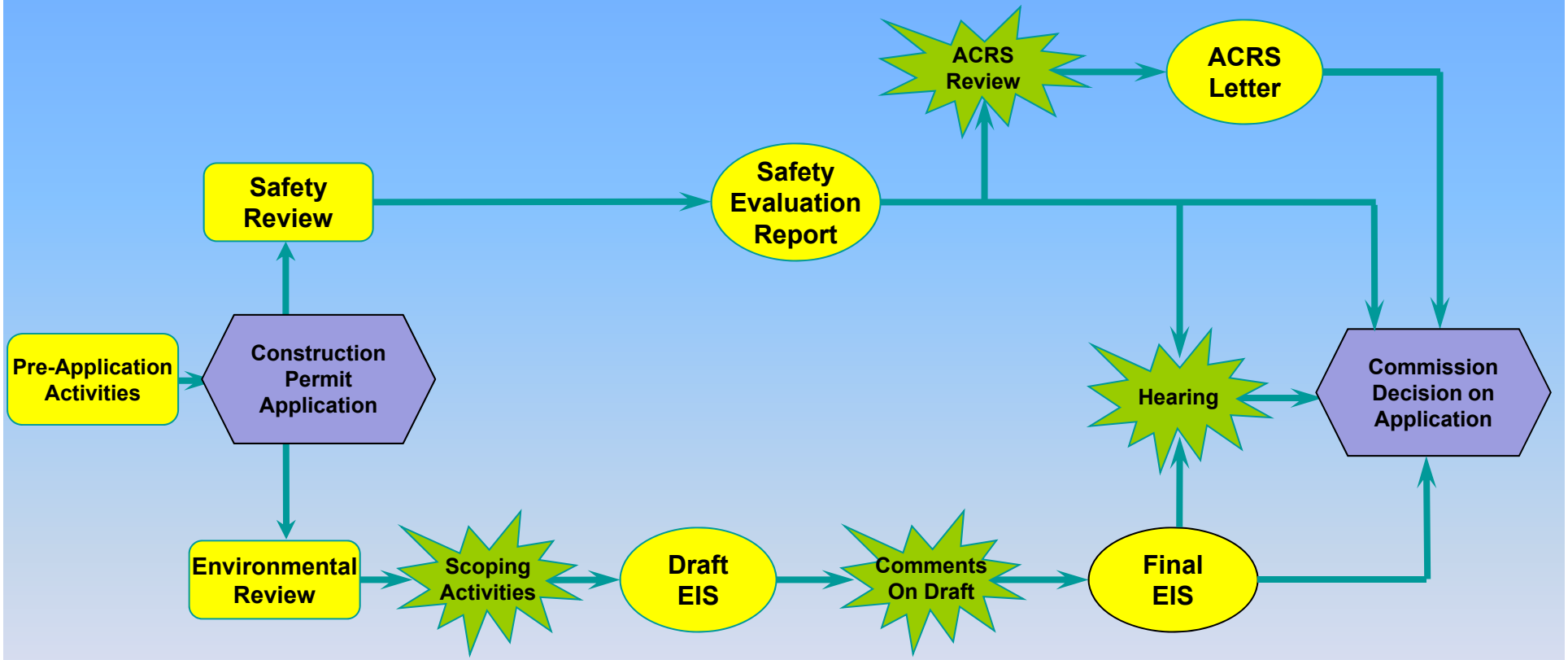
Construction Permit

- NRC authorization for an applicant to proceed with construction of a nuclear facility
- An additional application and NRC review of a final design is needed for an Operating License that approves operation of the facility
- There are two aspects of the NRC's review of the Kairos Hermes Non-Power Test Reactor application – safety and environmental

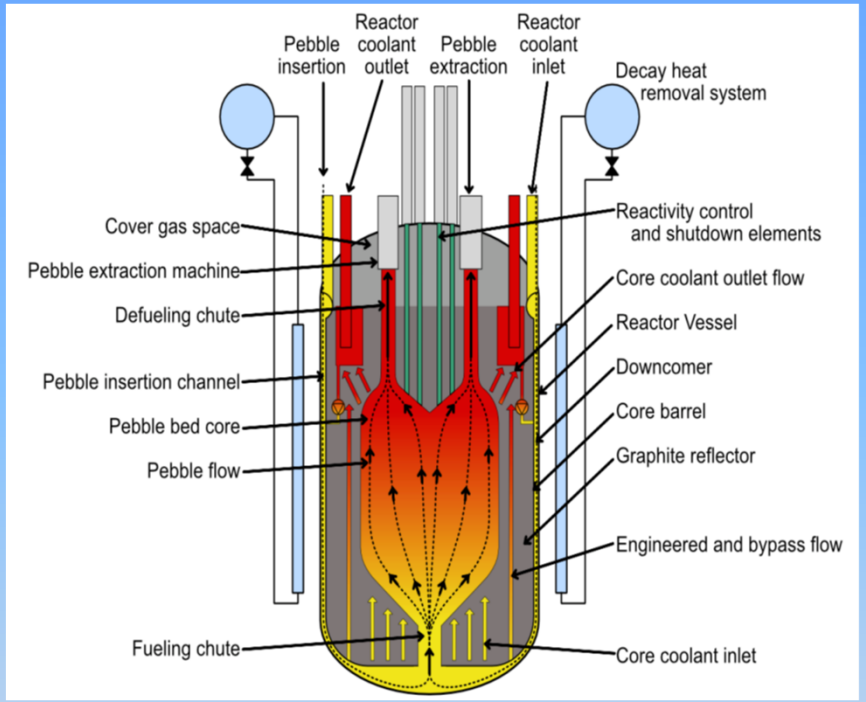
Test Reactor Construction Permit NRC Review Process



ACRS: Advisory Committee on Reactor Safeguards
EIS: Environmental Impact Statement

The Kairos Hermes Facility

(Source: Kairos Power)



(Source: Kairos Public Meeting Presentation, January 2021)

- Non-power test reactor (35 megawatts-thermal) demonstrating key technologies of Kairos Power Fluoride Salt-Cooled, High Temperature Reactor for future commercial deployment
- Reactor fuel: high assay low-enriched uranium (HALEU) in tri-structural isotropic (TRISO) particles embedded in a graphite pebble
- Reactor coolant: molten salt of lithium fluoride and beryllium fluoride (Flibe)
- Reactor moderator and reflector: graphite
- Reactor is compact in size (~10 ft diameter, ~16 ft height)
- Low pressure, large thermal inertia, slow transient response, TRISO and Flibe retention of radionuclides, and other features to ensure safety

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NRC Safety Review Process

- The NRC staff performs test and research reactor (i.e., non-power reactor) safety reviews in accordance with guidance in NUREG-1537, “Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors.”
- Areas of review for a Construction Permit Application include (partial list):
  - Facility site characteristics
  - Preliminary facility design
  - Preliminary analyses of facility operation and possible accidents
  - Quality assurance
- Kairos submitted its Hermes Construction Permit Application in September and October 2021 (2 parts); NRC accepted the application for review and began its detailed review of the application in November 2021.
- To clearly document its safety findings, and support an open and transparent process, the NRC staff safety review is summarized in a Safety Evaluation Report.
- The NRC staff currently expects to complete its Safety Evaluation Report in summer of 2023.

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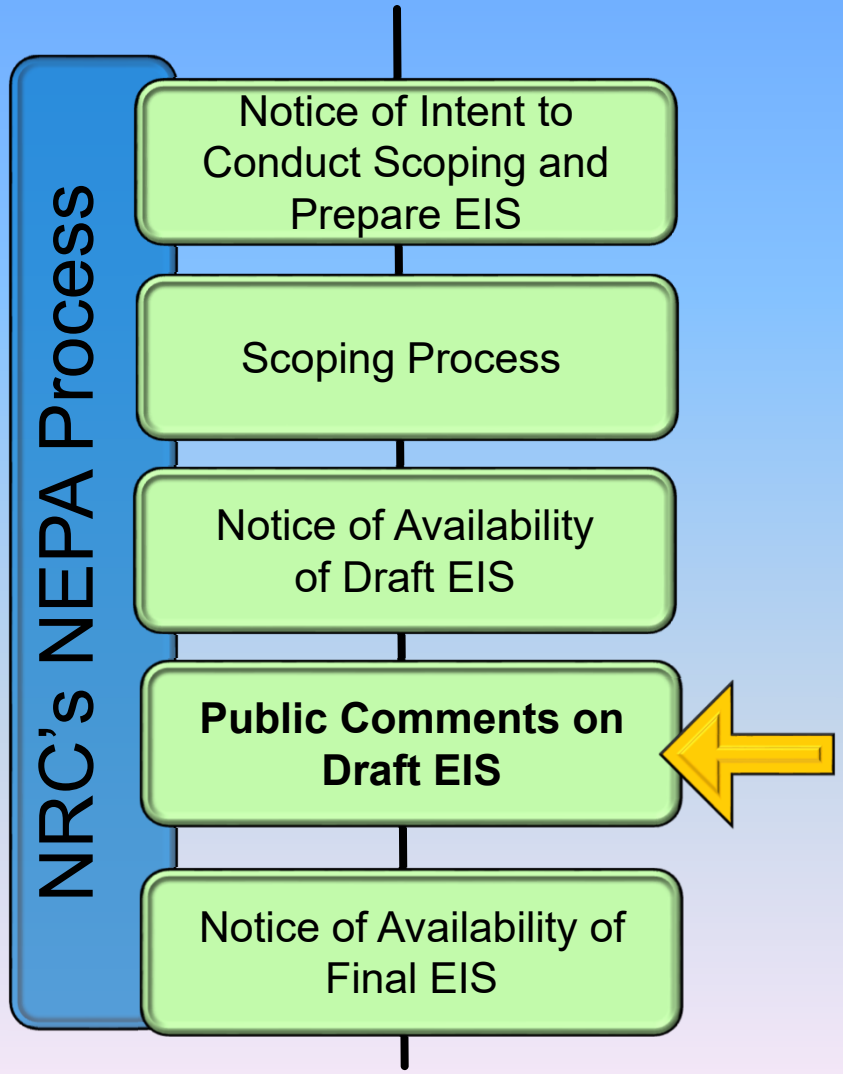
Environmental Review

- NRC systematic approach per National Environmental Policy Act (NEPA)
  - Regulations (10 CFR Part 51)
- Test reactor requires the preparation of an Environmental Impact Statement (EIS)
- Evaluates environmental impacts of construction, operation and decommissioning of a proposed nuclear facility

Environmental Review Schedule



- Published *Federal Register* notice on February 18, 2022
- Scoping period from February 18 to April 19, 2022
- EPA Issued Notice of Availability on October 7, 2022
- **Comment period on the Draft EIS from October 7 to December 6, 2022 (60 days)**
- Final EIS expected to be published in summer 2023

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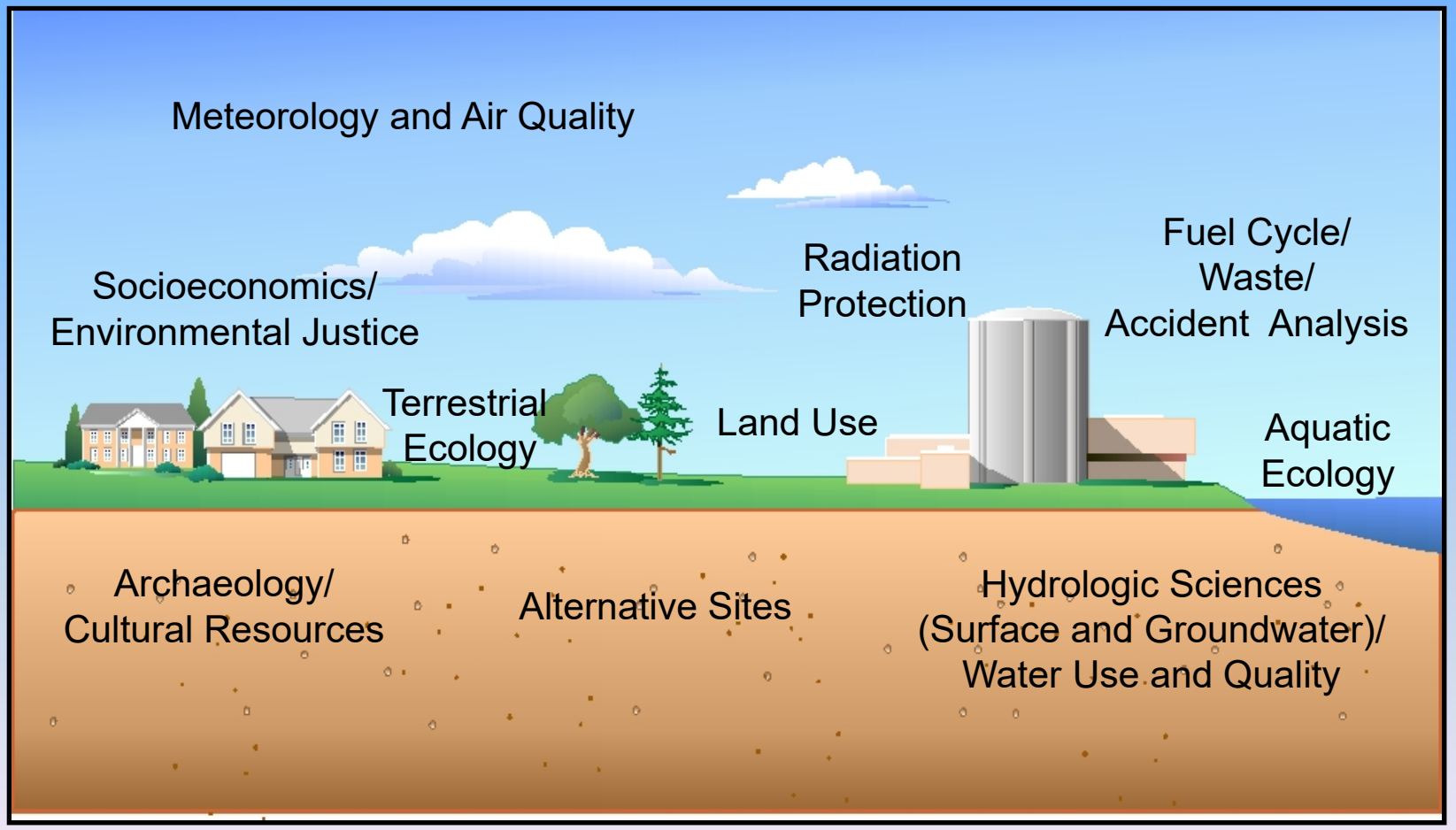
Resource Areas



Source U.S. NRC

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How Impacts Are Expressed

- Environmental impacts assessed in each relevant resource area
- NRC has established three levels of impact:
  - ***SMALL***: Effect is not detectable, or so minor it will neither destabilize nor noticeably alter any important attribute of the resource.
  - ***MODERATE***: Effect is sufficient to alter noticeably, but not destabilize, important attributes of the resource.
  - ***LARGE***: Effect is clearly noticeable and sufficient to destabilize important attributes of the resource.

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Environmental Impacts of the Hermes Test Reactor Project

- EIS considers Direct, Indirect, and Cumulative Impacts.
- All environmental impacts determined to be SMALL.
- Small project with low resource usage.
- Existing industrial park served by existing roads and utilities.
- No surface water withdrawals or discharges.
- Confined to previously disturbed industrial lands lacking sensitive ecological or cultural resources.
- BMPs for erosion control, stormwater, fugitive dust.
- Compliance with all health and safety regulations.
- Low waste generation.
- Meets NRC requirements for postulated accidents.

Alternatives Analysis

- Systematic Process used to identify Range of Reasonable Alternatives meeting the Purpose & Need: to demonstrate Kairos Power Fluoride Salt-Cooled High Temperature Reactor technology
- **No-action Alternative**: evaluated in detail
- Fuel and Technology Alternatives: Test Reactor for a specific technology – no such alternatives meet Purpose & Need
- Site alternatives: Two identified for detailed evaluation
    - **Proposed Action** (Oak Ridge, TN)
    - **Eagle Rock Alternative Site** (Idaho Falls, ID)
- No sensitive resources disturbed – no need to consider alternative layouts

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Alternatives Analysis

Resource	No Action	Proposed Action (Oak Ridge Site)	Alternative Action (Eagle Rock Site)
Land Use and Visual Resources	SMALL	SMALL	**MODERATE**
Air Quality and Noise	SMALL	SMALL	SMALL
Geological Environmental and Water Resources	SMALL	SMALL	SMALL
Ecological Resources	SMALL	SMALL	**MODERATE**
Historic and Cultural Resources	SMALL	SMALL	**MODERATE**
Socioeconomics	SMALL	SMALL	SMALL
Environmental Justice	SMALL	SMALL	SMALL
Human Health	SMALL	SMALL	SMALL
Nonradiological Waste	SMALL	SMALL	SMALL
Fuel Cycle and Radiological Waste Management	SMALL	SMALL	SMALL
Transportation	SMALL	SMALL	SMALL
Accidents	SMALL	SMALL	SMALL

No Environmentally Preferrable Sites
No Obviously Superior Sites

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Preliminary Recommendation

The NRC staff's preliminary recommendation to the Commission from the environmental review is that the Construction Permit be issued. This recommendation is based on:

- information in Kairos' CP application;
- communications with Federal, State, Tribal, and Local agency officials;
- the staff's independent review;
- public scoping comments; and
- assessments summarized in the draft EIS
- The staff's determination that there are no environmentally preferrable sites to the proposed site.

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Access to the Draft EIS or Additional Information

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https://www.nrc.gov/reactors/non-power/kairos-hermes.html

Oak Ridge Public Library
1401 Oak Ridge Turnpike
Oak Ridge, TN 37830

Submitting Comments

Speaking today at this meeting

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COMMENTS ARE DUE BY **December 6, 2022**