

# Exploring Tomorrow's Nuclear Energy: New Approaches With Molten Salt Reactors

How Kairos Power is Leveraging a Rapid Iterative Approach and Vertical Integration to Accelerate Innovation and Achieve Cost Certainty

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Kairos Power LLC



**Kairos Power**

2023



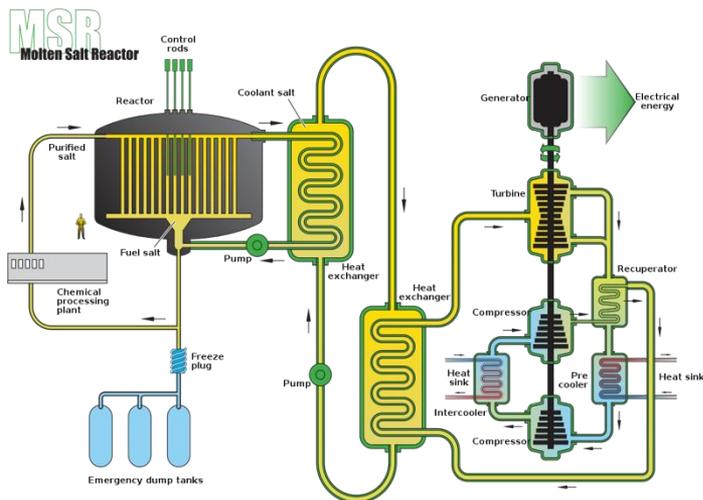
Kairos Power's mission is to enable the world's transition to clean energy, with the ultimate goal of dramatically improving people's quality of life while protecting the environment.

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In order to achieve this mission, we must prioritize our efforts to focus on a clean energy technology that is *affordable* and *safe*.

## Fluoride Salt-Cooled High Temperature Reactor

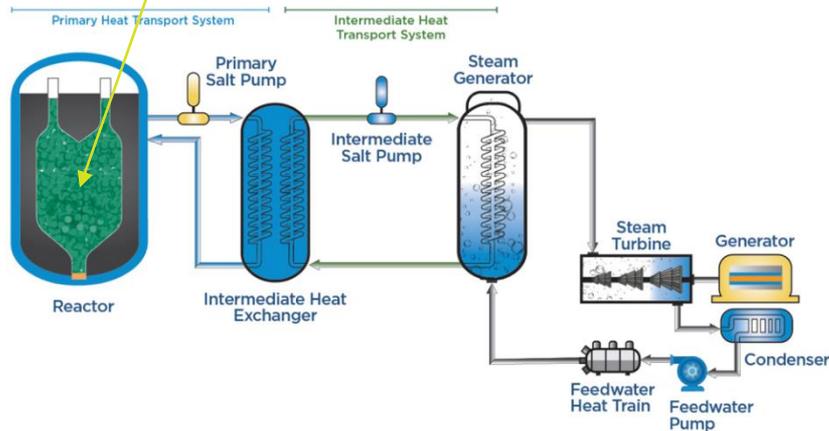
A novel molten salt technology



Generic MSR



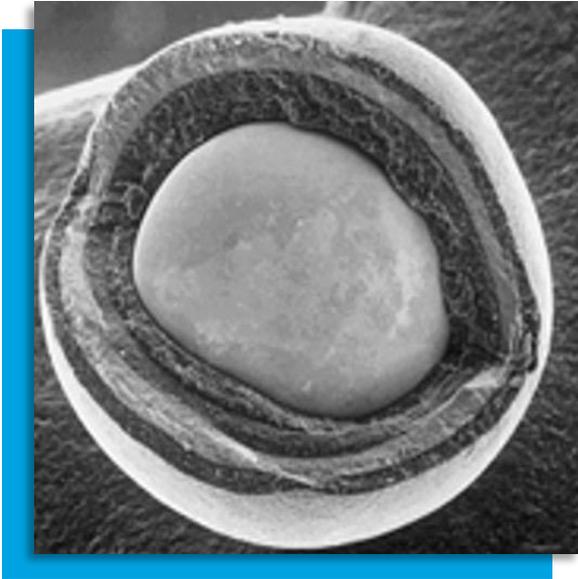
Coated particle fuel (TRISO)  
encased in graphite pebbles



KP-FHR

## Fluoride Salt-Cooled High Temperature Reactor

Technology Basis

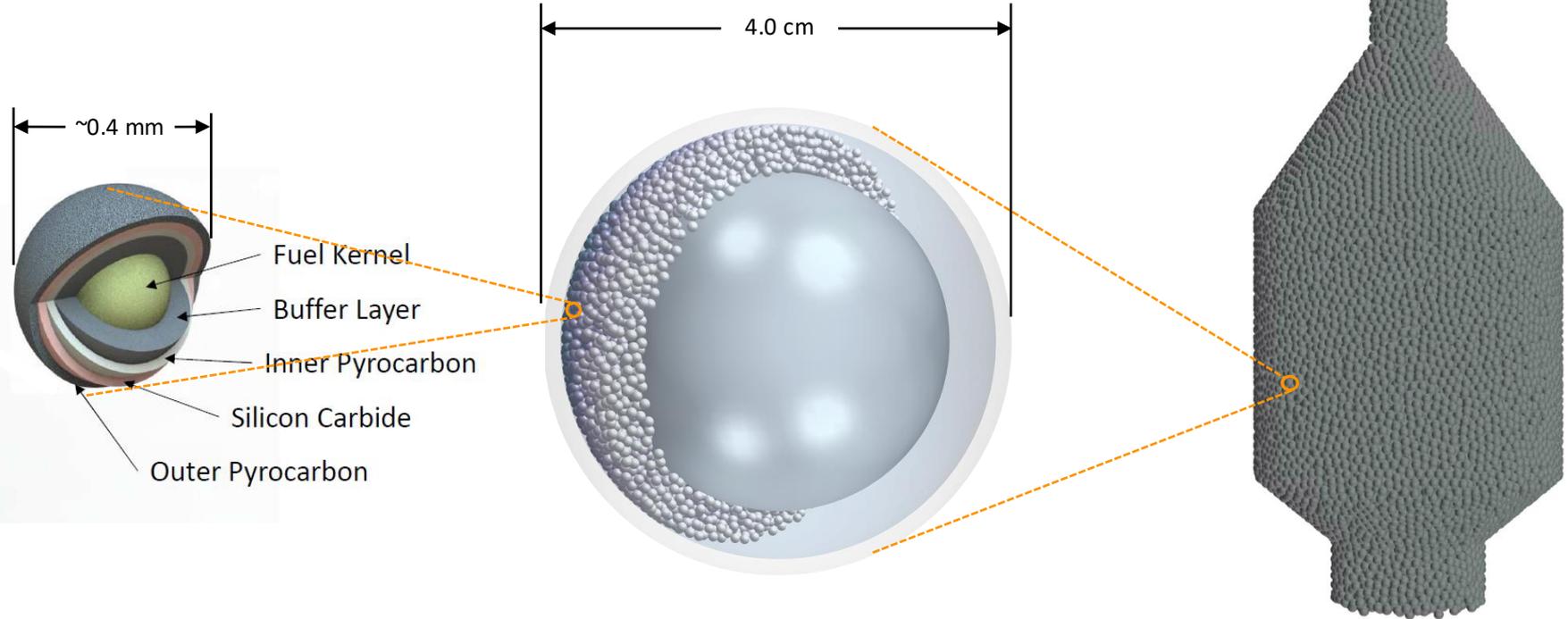


Coated Particle Fuel  
**TRISO**



Liquid Fluoride Salt Coolant  
**Flibe ( $2\text{LiF}-\text{BeF}_2$ )**

TRISO Fuel



TRISO Particle

Fuel Pebble

Pebble Bed Reactor Core

## Overview of Kairos Power

### Our mission-driven company

- Nuclear energy engineering, design, and manufacturing company *singularly focused* on the commercialization of the fluoride salt-cooled high-temperature reactor (FHR)
  - Founded in 2016
  - ~400 Employees
- Novel approach to nuclear development that includes iterative hardware demonstrations and in-house manufacturing to achieve disruptive cost reduction and provide true cost certainty
- Cost targets set to be competitive with natural gas in the US electricity market
- Schedule driven by US demonstration by 2030 (*or earlier*) and rapid deployment ramp in 2030s

### Kairos Power Headquarters

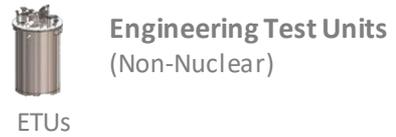
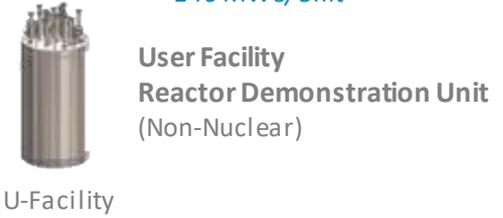


### Kairos Power Team



## Kairos Power Path to Commercialization

Successive Large-Scale Integrated Demonstrations

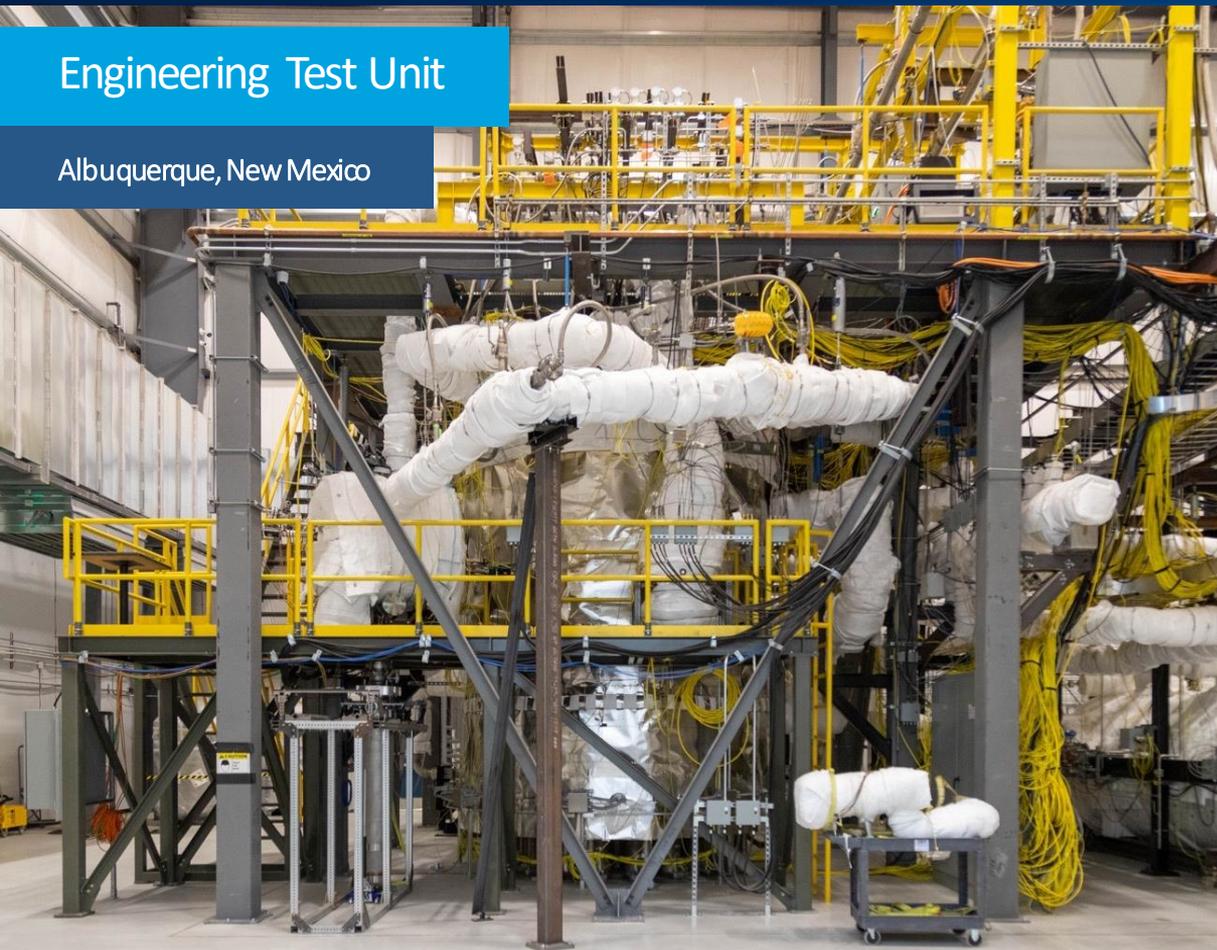


Nuclear

Produces electricity and connected to grid

Engineering Test Unit

Albuquerque, New Mexico



Graphite Reflector Installation



Entrant Training



Control Room



## Flibe & Fuel Production

Vertical Integration

Molten Salt Purification Plant  
*Elmore, Ohio*



First batch of Flibe arrives at KP Southwest  
*April 2023*



Pebble Development Lab  
*Albuquerque, New Mexico*

Manufacturing

Vertical Integration



KP Southwest Manufacturing Floor  
Albuquerque, New Mexico

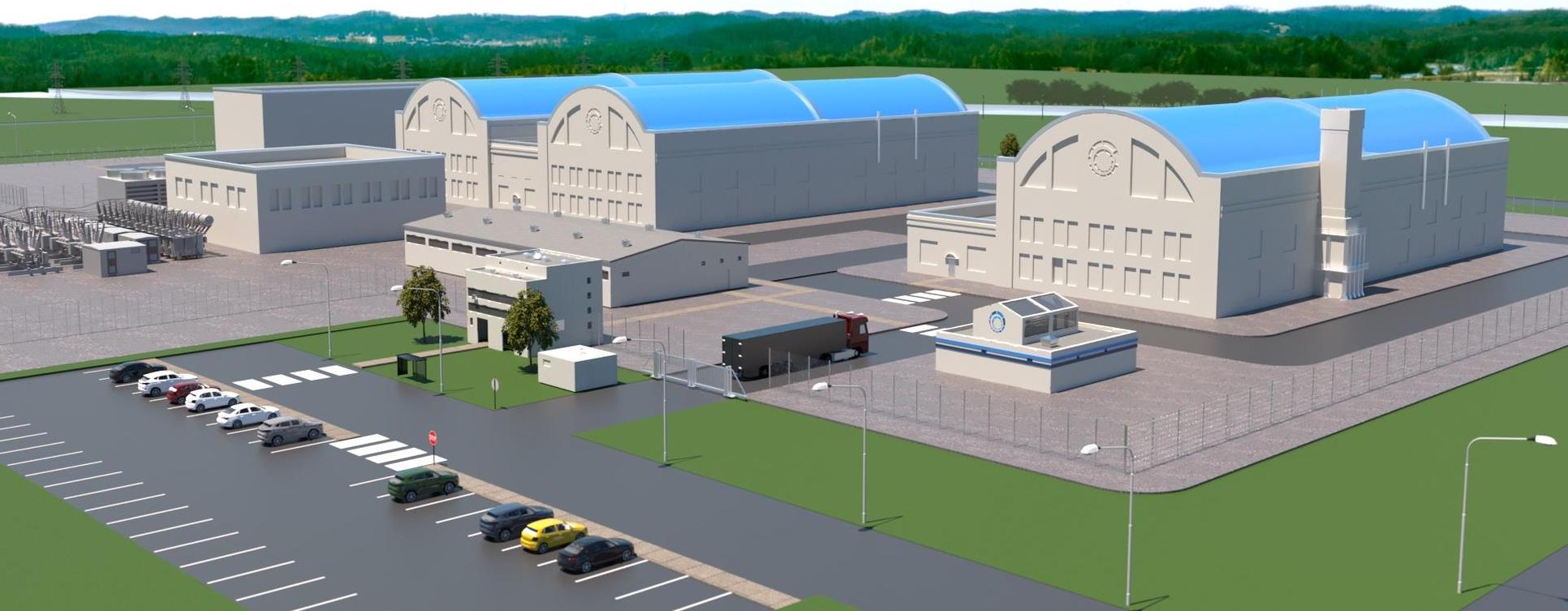


First U-Stamped Vessel  
December 2022



## Hermes Demonstration Reactor Series

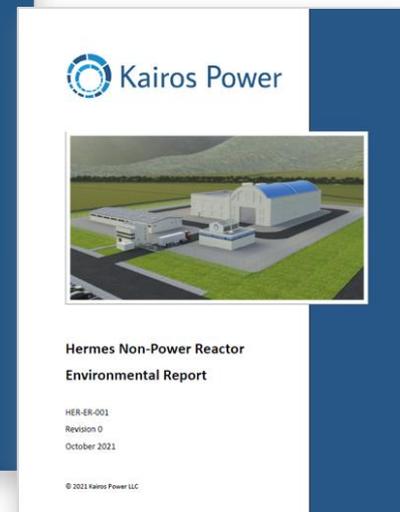
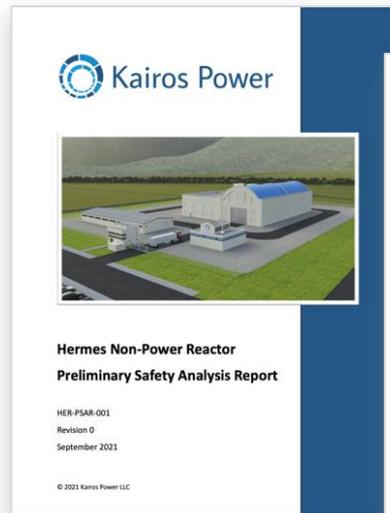
Heritage Center K-33 Site / Oak Ridge, Tennessee



## Hermes Construction Permit Application

Leading the Way in Advanced Reactor Licensing

- The U.S. Nuclear Regulatory Commission accepted the Hermes CPA for review in November 2021 following robust pre-application engagement with 11 topical reports and several technical reports supporting the CPA.
- Kairos Power is the first and only developer of a non-light-water reactor to have a firm NRC review schedule for our CPA at a projected 21 months.
- **CPA review progressing ahead of schedule:**
  - ✓ **ACRS Safety Evaluation Review Completed**
  - ✓ **Final Safety Evaluation Report Issued**
  - ✓ **Final Environmental Impact Statement Issued**
  - ✓ **On track to receive CP in Fall 2023**



**Hermes Project Status Dashboard:**  
[nrc.gov/reactors/non-power/hermes-kairos/dashboard.html](https://www.nrc.gov/reactors/non-power/hermes-kairos/dashboard.html)

## KP-OMADA Advanced Nuclear Alliance

The Kairos Power Operations, Manufacturing and Development Alliance brings together leading North American utilities and generating companies to collaborate on the advancement of KP-FHR technology.

**BrucePower**

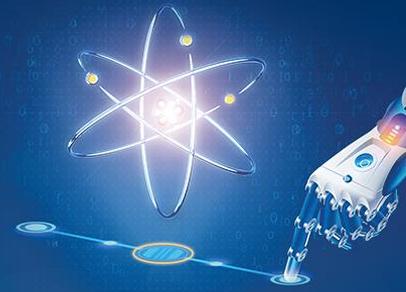
 **Constellation**

 **Kairos Power**



**TVA** **TENNESSEE  
VALLEY  
AUTHORITY**





Thank You

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2023