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small modular reactors
and their applications
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Regulatory Considerations for the **eVinci™** Microreactor

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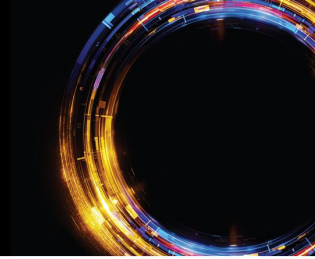
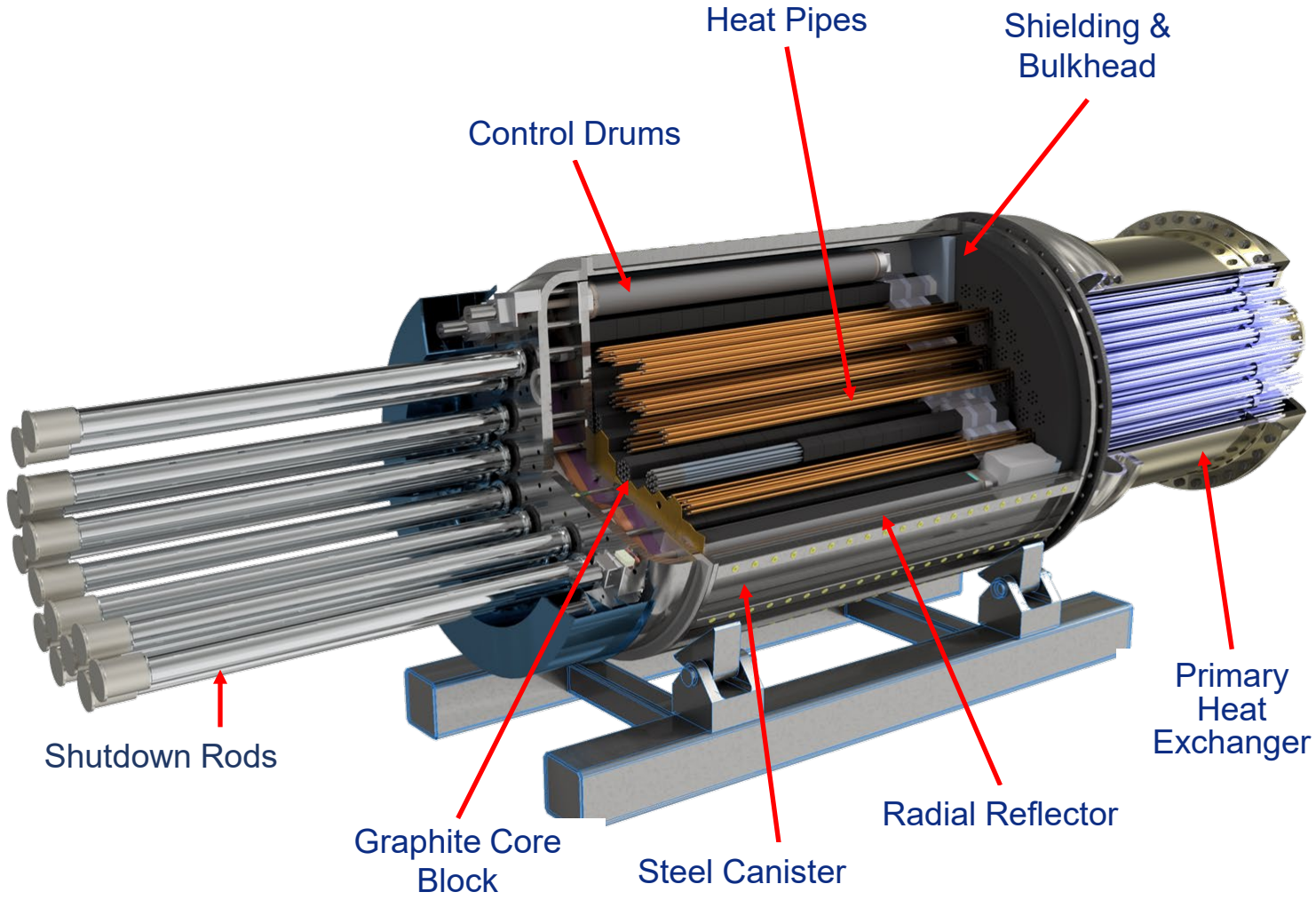


eVinci Microreactor Design

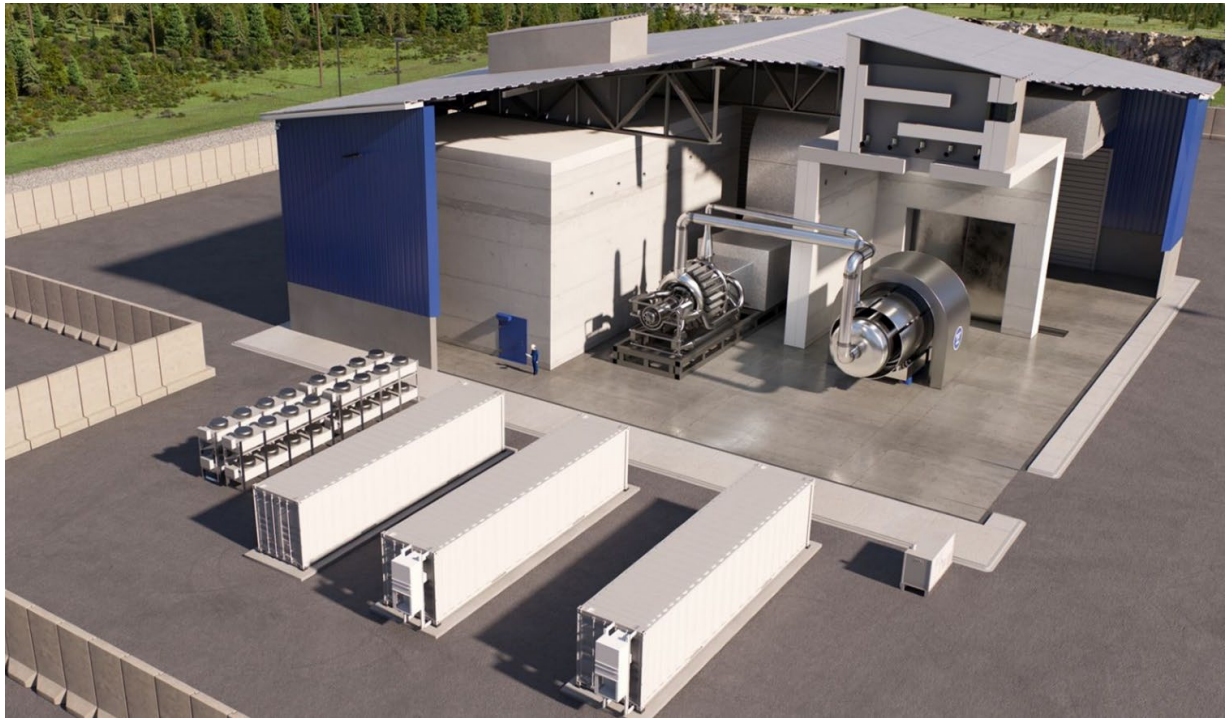
Parameter	eVinci Microreactor
Power	15 MWt
Fuel Cycle	8 years
Fuel (Enrichment)	Tri-structural Isotropic (TRISO) (19.75%)
Coolant	Heat Pipes
Reactor Pressure	~1 atm
Moderator	Graphite
Power Conversion	Open-Air Brayton
Efficiency	34%
Decay Heat Removal	Radial Conduction



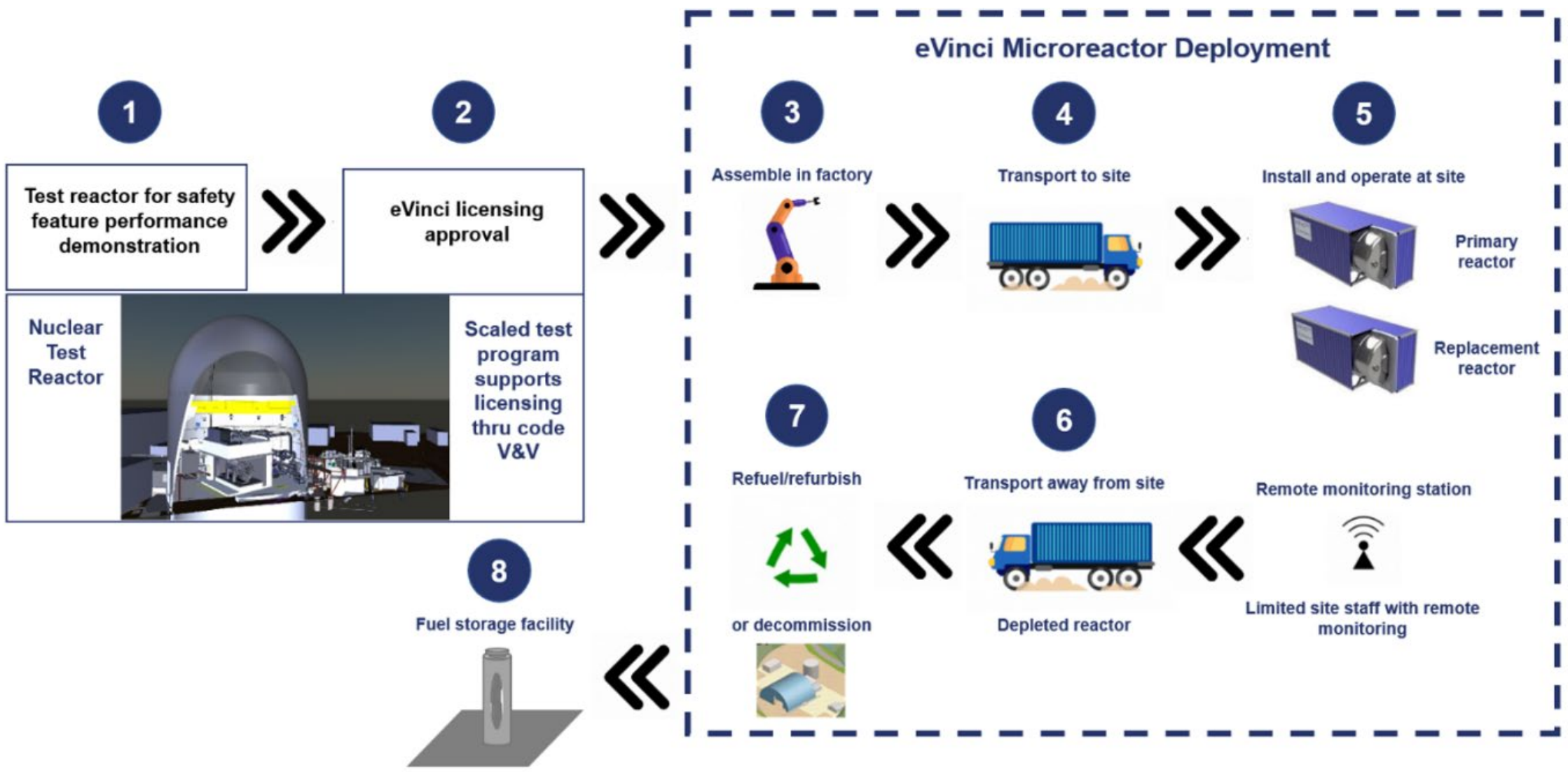
eVinci Microreactor Site Layout

Site and facility shown for single unit

- All buildings and systems: **above ground**
- Reactor site footprint: **< 3 acres**
- Building footprint: <**0.5 acres**



eVinci Microreactor Deployment Model



U.S. NRC Pre-application Engagement

#	Topic	Submittal Wave	#	Topic	Submittal Wave	#	Topic	Submittal Wave
1	Facility Level Design Description	Submitted - 1	13	Advanced Logic System®(ALS) v2	Submitted - 3	25	Inservice Inspection Program/Inservice Testing Program	Submitted – 5
2	Principal Design Criteria	Submitted - 1	14	Component Qualification	Submitted- 3	26	Post-Accident Monitoring System	Submitted – 5
3	Safety and Accident Analysis Methodologies	Submitted - 1	15	Emergency Plan Zone Sizing Methodology	Submitted - 3	27	Equipment Qualification	Submitted – 5
4	Licensing Modernization Project Implementation	Submitted - 1	16	Physical Security	Submitted - 3	28	Probabilistic Risk Assessment and Transportation Risk Assessment	Submitted – 5
5	Regulatory Analysis	Submitted - 2	17	Heat Pipe Design, Qualification, and Testing	Submitted - 3	29	Fire Protection	Submitted – 5
6	Deployment Model	Submitted - 2	18	Nuclear Design	Submitted - 3	30	Cyber Security	Submitted – 5
7	Safeguards Information Plan	Submitted - 2	19	U.S Transportation Strategy	Submitted - 3	31	Radiation Protection and Contamination Methodology	Submitted – 6
8	Test and Analysis Process	Submitted - 2	20	Phenomena Identification and Ranking Table (PIRT)	Submitted - 4			
9	Functional Containment and Mechanistic Source Term	Submitted - 2	21	Integral Effects and Transient Testing	Submitted - 4			
10	Composite Material Qualification and Testing	Submitted - 2	22	Refueling and Decommissioning	Submitted - 4			
11	Fuel Qualification and Testing	Submitted - 3	23	Seismic Methodology	Submitted - 4			
12	Code Qualification	Submitted - 3	24	Operations and Remote Monitoring	Submitted - 4			

Current Status:
https://www.nrc.gov/reactors/new-reactors/advanced/licensing-activities/pre-application-activities/evinci.html

Regulatory Considerations

- Fuel Load in Manufacturing Facility
  - Seeking near-term resolution via NRC Commission vote on SECY-24-0008[1]
- Licensing of Replacement Reactor Modules
- Right-sizing staffing levels (including operations and security) commensurate with the size, simplicity, and reduced risk associated with microreactors
- Storage of Spent Fuel
  - 10 CFR Part 72 definition of spent fuel: "*fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies.*"

[1]SECY-24-0008, "Micro-Reactor Licensing and Deployment Considerations: Fuel Loading and Operational Testing at a Factory" (https://www.nrc.gov/docs/ML2320/ML23207A252.html)