

# A Risk Informed Environmental Process for Microreactors

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**RADIANT**

# RADIANT | A CLEAN ALTERNATIVE TO DIESEL


- Resilience is a challenge amid trends in decarbonization and diesel is the most common backup source:
  - Requires logistics planning for fuel supply and storage
  - Emits carcinogens & CO2
- Radiant aims to displace diesel for critical and remote infrastructure
  - 110 times energy density of diesel
  - 5-year energy, equal to 5,500 tons of diesel fuel per core
  - Cost competitive to diesel in energy challenged regions



MEP-810: deployable diesel power generation.

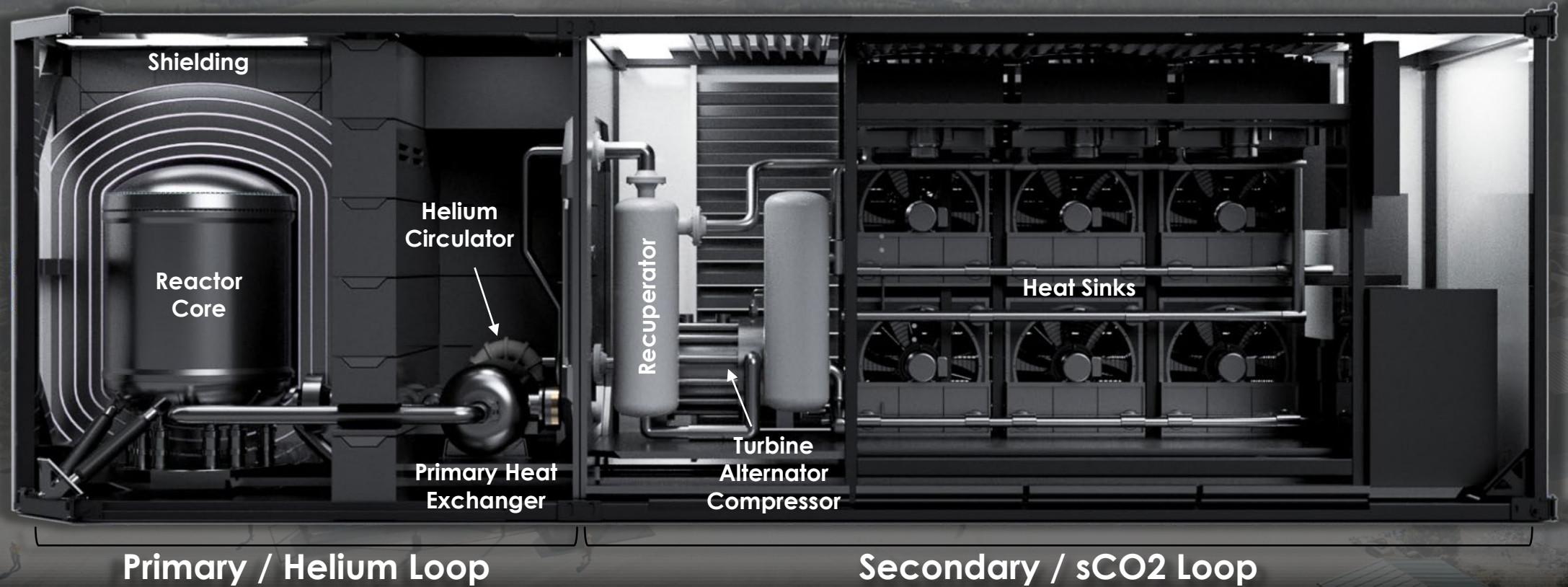


Kaleidos: portable nuclear power.

Specification	MEP-810	Kaleidos 
Mass (t)	25	72
Gallons/day fuel (75% load)	1,080	0
Tons/day fuel	3.78	0
Time between refueling	2 hours	4-6 years
Power rating (kWE, 4160V)	840	1050
Move after shutdown	24 hours	168 hours



# KALEIDOS | PORTABLE, SAFE, RESILIENT & CLEAN POWER



## Power Output

- 1 MWe - Electricity output
- 480V 3-Phase standard
- Power Range: 30% - 100%, 3s recovery

## Heat Output

- 1.9 MWt - Heat
- Hot water (80° C)
- Desalination

## Key Features

- 60-ton shipping container (10' x 10' x 35')
- Remote automation and monitoring
- Power down to shippable: 30 days max



# REGULATORY | DOE AND NRC ACTIVITIES



**DOE AUTHORIZATION**

Regulatory Gap Analysis

Preliminary Design Review  
Draft PDSA

Draft Safety Analysis Report

Final Design Review

Final Safety Analysis Report

Operational Readiness Review  
Final PDSA

Factory Environmental Assessment

**NRC AUTHORIZATION**

Manufacturing License

Factory Operating License

## COMPLETED

Added to Qualified Supplier List for Design

Pre-Application with NRC

Completed Conceptual Design Review

Safety Design Strategy approved

Long Lead Procurement Requests



# REACTOR DELIVERY TIMELINE

## Factory Operations

\$  
Order Placed



Production Scheduling



Kaleidos unit completed



Factory Checkouts

Week 1

Week 2

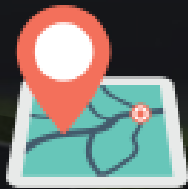
Week 3

Week 4

Week 5

Week 6

Location Identified



Verify site conforms with Kaleidos Enviro. Envelope

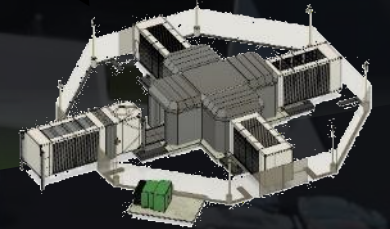
Land Preparation



Deliver Shielding



Delivery and Operation

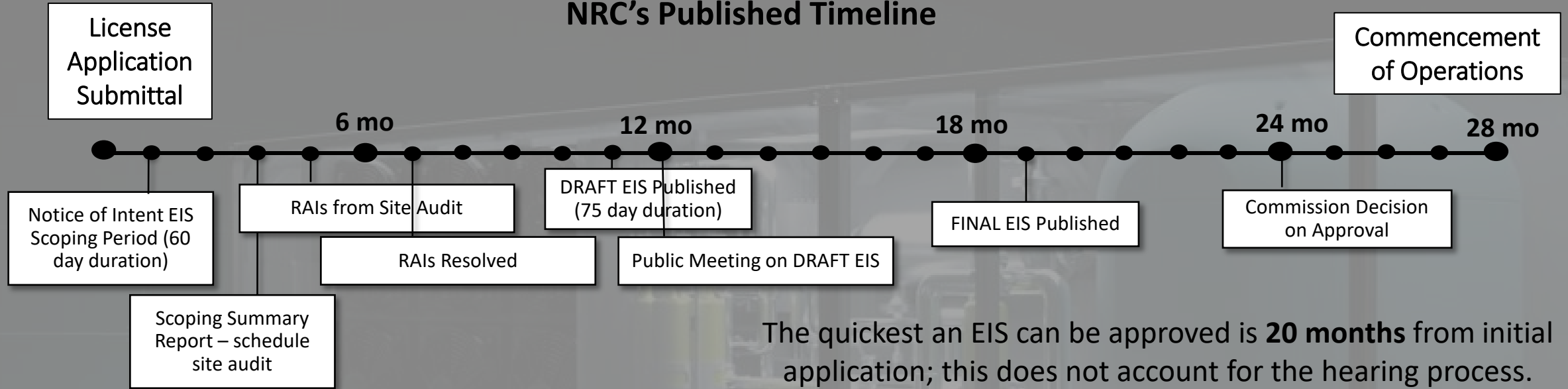


## Site Operations



# NRC'S PUBLISHED REVIEW TIMELINE

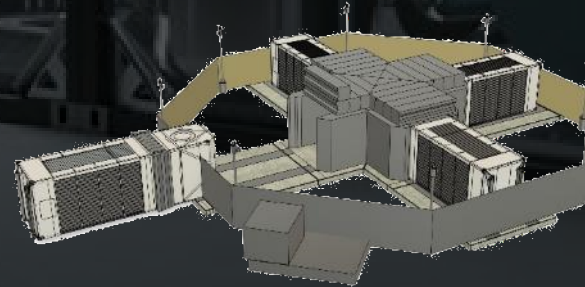
## NRC's Published Timeline



Manufacturing 1 reactor/week



Delivery 2-3 days



Setup/Operational <48hrs



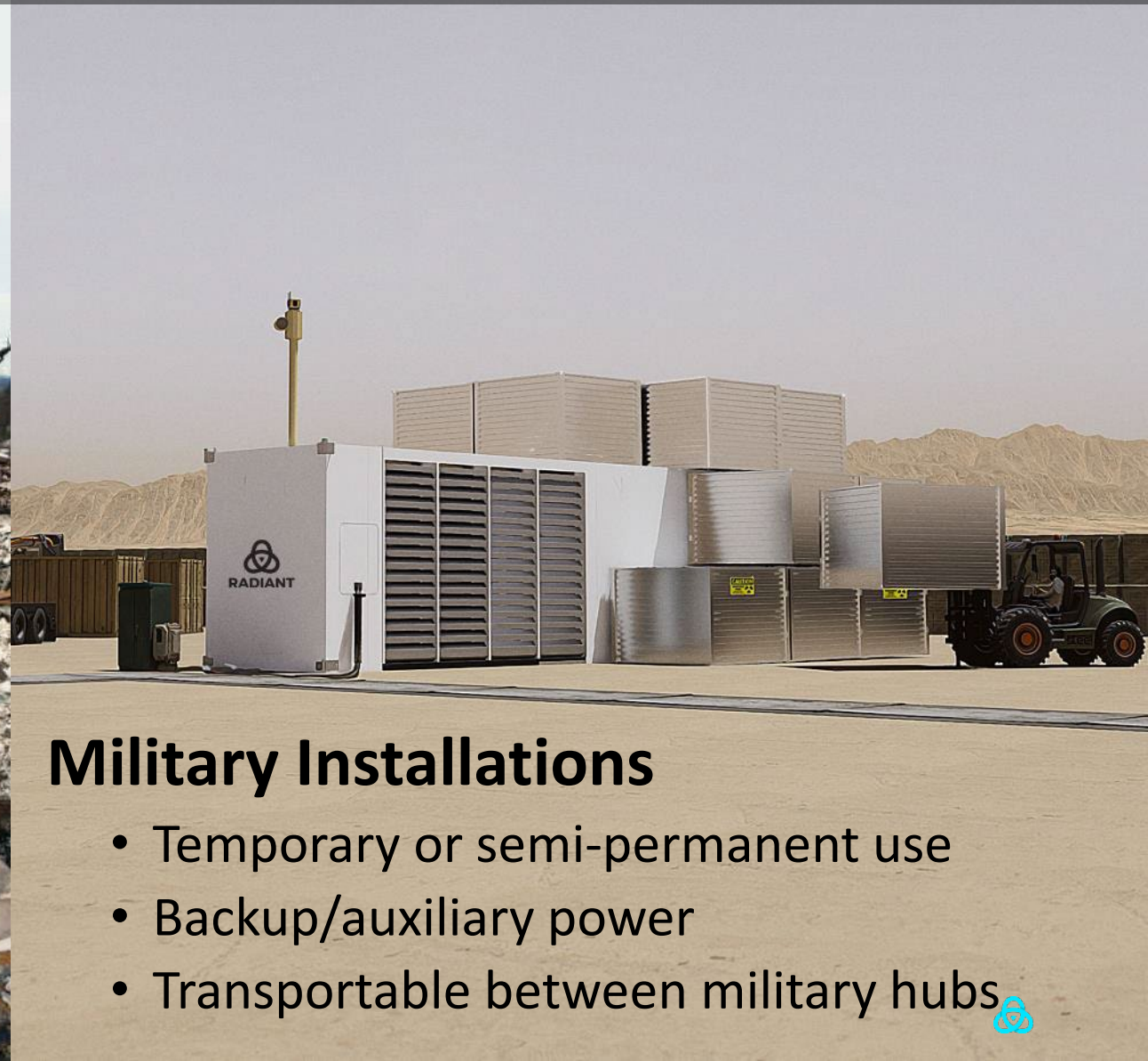
Operational for 5 years

# MICROREACTORS AS ALTERNATIVES TO DIESEL GENERATORS



## Natural Disasters

- Long duration power loss
- Units can be deployed & operational in <72 hrs



## Military Installations

- Temporary or semi-permanent use
- Backup/auxiliary power
- Transportable between military hubs



# WHY PRESCRIPTIVE REQUIREMENTS FALL SHORT



## Natural Disasters

- Timeliness is critical in restoring power
- Impacts of construction are immaterial
- No action alternatives are more dire



## Military Installations

- Resilient power is mission critical
- Priorities are inherently different than civilian applications





# A PRESCRIPTIVE VS RISK INFORMED APPROACH

## PRESCRIPTIVE:

- EIS requirement for each reactor unit/location
- Public Comment period (OL/COL)
- Requirement for mandatory hearings

## RISK INFORMED:

- Comparative analysis of newly proposed site vs previously approved site
- Comment period commensurate with the needs of the site, expedited when appropriate
- Recognizing that construction activities for microreactors are significantly different from grid-scale reactors



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