A Risk Informed Environmental Process for Microreactors

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RADIANT
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

### Specification Comparison

<table>
<thead>
<tr>
<th>Specification</th>
<th>MEP-810</th>
<th>Kaleidos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass (t)</td>
<td>25</td>
<td>72</td>
</tr>
<tr>
<td>Gallons/day fuel (75% load)</td>
<td>1,080</td>
<td>0</td>
</tr>
<tr>
<td>Tons/day fuel</td>
<td>3.78</td>
<td>0</td>
</tr>
<tr>
<td>Time between refueling</td>
<td>2 hours</td>
<td>4-6 years</td>
</tr>
<tr>
<td>Power rating (kWE, 4160V)</td>
<td>840</td>
<td>1050</td>
</tr>
<tr>
<td>Move after shutdown</td>
<td>24 hours</td>
<td>168 hours</td>
</tr>
</tbody>
</table>
KALEIDOS | PORTABLE, SAFE, RESILIENT & CLEAN POWER

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

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

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

**Diagram**
- Primary / Helium Loop
  - Reactor Core
  - Helium Circulator
  - Primary Heat Exchanger
- Secondary / sCO2 Loop
  - Recuperator
  - Turbine Alternator Compressor
  - Heat Sinks
  - Primary Heat Exchanger
  - Helium Circulator
REACTOR DELIVERY TIMELINE

Order Placed

Production Scheduling

Kaleidos unit completed

Factory Checkouts

Location Identified

Land Preparation

Verify site conforms with Kaleidos Enviro. Envelope

Deliver Shielding

Factory Operations

Site Operations

Delivery and Operation

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6
The quickest an EIS can be approved is **20 months** from initial application; this does not account for the hearing process.
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