Attachment A – Technical Research on Nuclear Fuel Transport, submitted by Marshal Hood

Submitted September 2, 2025

Radient Energy

Radient Energy is a start-up based on assumptions from the Biden presidency. These were:
1. Zero emissions by 2050
2. Diesel generators would be banned. Diesel prices would be very high if not banned
3. All coal fired generating capacity would be shut down
4. All new cars would be electric requiring many charging stations

The demand for their reactors is based on providing electricity where diesel generators would no longer be available and to power charging stations where electrical power lines are not available or overloaded.

There are a number of problems associated with the Radient design.

Production problems

1. Radient's reactor requires HALEU fuel. This is uranium enriched to 19+ % U-235
   The only commercial source of HALEU at the present time is Russia!
   The DOE is working on other sources. They have a pilot gaseous centrifuge operation that has produced 20 kg of HALEU and planning to produce 900 kg. Estimated demand is 32,000 kg by 2035
2. The encapsulated HALEU fuel is still in the pilot stage as well. One of the producers is protyping TRICO pellets using natural uranium. They have just announced a contract to build a plant to manufacture the pellets.

3. Timing to go into production. Radiernt's own handout materials say that their pilot unit will be tested at Idaho National Labs in 2026. They say on their website that they expect to deliver their first unit in 2028. A two year time frame to design and build a plant, hire and train a fabrication staff, and produce a unit that will pass all NRC inspections is unrealistically short. Twice as much time is probably not enough.

Deployment Problems

1. If reactors are built in Bar Nunn they will have to be transferred over the highways. The units are to weigh 70 tons which is an over 50% overload. This will require use of low boy units, limited travel times, and frequent stops at weigh stations. The Radient web site shows a convential 3 axle flatbed trailer carrying a mockup of their unit. Nothing is said about the overweight load.
2. Units will not be refuled on site (to get around Wyoming law forbidding storage of out of state nuclear waste.) They will be returned to Bar Nunn by the same slow process to be refuled. Nothing has been said so far on how power will be supplied while the units are removed for refueling.

Operational Problems

1. The unit requires a 48 hour cold start. Nothing has been said about a warm start after it is in operation
2. Their literature says the unit can be turned down to 30% of full load. This is 300kw. What happens if site demand drops below this? Are they assuming that the reactor will be connected to the power grid? If so why is there a need for the reactor in the first place?

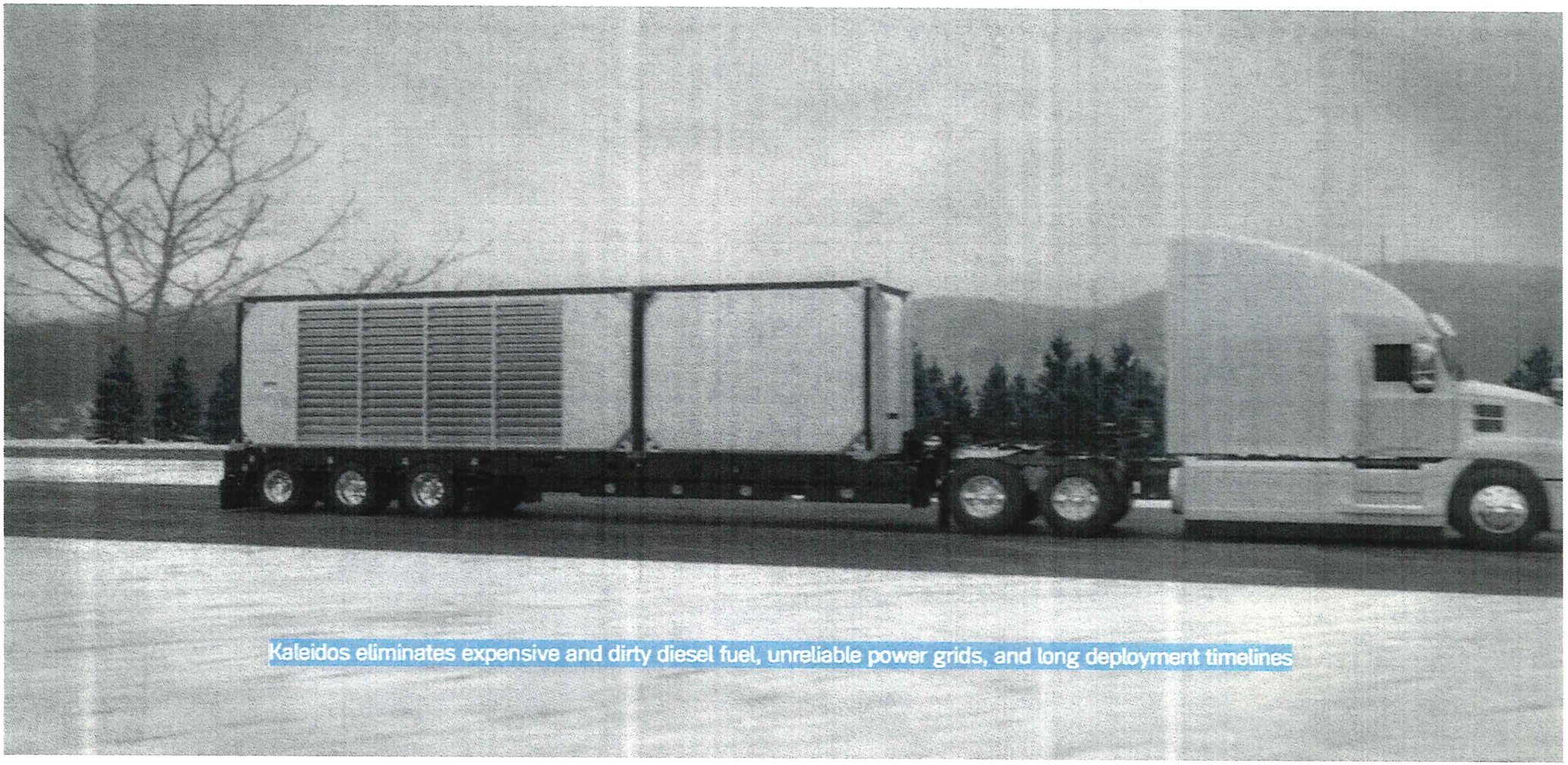
General Problem

It is obvious from the information presented on the Radient website that their business was planned during the Biden administration. They assume that "dirty" diesel generators will be banned. Their assumptions presuppose that fossil fueled power will not be available. They assume that coal fired power plants will be shut down.

They are assuming that small nuclear generators will have to be installed to make up for the lost fossil fuel generating capacity. That is not the situation at the present time.

They have placed no dollar cost on their micro reactors. However, the cost of security while the units are being moved and after they are in operation will be considerable.

Screenshot from Radient website
www.Radientnuclear.com



Kaleidos eliminates expensive and dirty diesel fuel, unreliable power grids, and long deployment timelines

Screen Shot from Radient website
www.radientnuclear.com

Neutron Bytes Blog
https://neutronbytes.com/2025/08/08/radiant-in-deal-to-deliver-its-microreactor-to-usaf/

About the Radiant Nuclear Reactor

Radiant's Kaleidos design is a transportable micro-reactor designed to generate 3MWth and approximately 1MWe. The Kaleidos micro-reactor is a high-temperature gas-cooled reactor (HTGR) using TRISO fuel, helium gas coolant, and prismatic graphite blocks. Each micro-reactor will be fully contained in a single shipping container.

The reactor is designed to weigh 70 tons (140,000 pounds) and to fit in an 11 x 11 x 35 container. Radiant says the reactor can set up to be producing power within 48 hours of delivery at a customer site. The reactor has a five-year fuel cycle and a 20-year service life. The refueling cycle is carried out at a remote maintenace facility with the reactor returned to service with fresh fuel.

Radiant Fuel Plans

HigAssay Low Enrichment Uranium 19.5% U-235

Radiant plans to use HALEU for its Kaleidos SMR. In 2022, Radiant launched a Request for Proposals for fuel fabricators to produce TRISO fuel, and in 2023 the company entered into an agreement with Centrus Energy to work towards a future supply of HALEU for up to 20 Kaleidos microreactors. In 2023, Radiant also received funding from the DOE to support activities related to qualification modelling for TRISO fuel.

NRC Interactions

Radiant Nuclear filed its Regulatory Engagement Plan (ML23286A328) in October 2023. Like other developers of advanced nuclear microreactors, Radiant has been submitting topical reports to the NRC are part of its pre-licensing work. For instance, in June it submitted its Radiant Factory Sitting Assessment. However, to protect proprietary information, this document and many like it are slated solely for internal use at the NRC.

According to documents filed with the NRC, as of April this year Radiant was asssessing both Part 50 and Part 52 licensing scenarios (ML25013A338). Chanson Yang, Head of Regulatory Engineering at Radiant, is the indicated point of contact in regulatory filings with the agency.
The National Reactor Innovation Center (NRIC), a US Department of Energy (DOE) program led by Idaho National Laboratory (INL), is supporting Radiant's regulatory engagement activities with the NRC and the DOE. In June 2024, the DOE announced that it had approved the Kaleidos safety design strategy, which is required before testing the Kaleidos SMR at the Demonstration Of Microreactor Experiments (DOME) facility at INL.

One Size Does Not Fit All

Based on the dimensions posted on Radiant's website, transportating the large 70 ton reactor, that is 11 ft high and 11 ft wide, in a single shipment is going to require some unique solutions.
A standard shipping container used globally in international commerce has measurements that do not exceed 40 feet long, 8'6" high, and 8.0' wide. A so-called 'high cube' is 9'6" in height. The Radiant reactor shipment dimensions are three feet higher and three feet wider and weighs about 40 tons more than the capacity of a standard truck shipping container.
The maximum gross weight for a standard 40ft international shipping container is 67,200 lbs. With an empty weight of 8,300 lbs, a 40ft container can accommodate up to 58,900 lbs of cargo or just under 30 tons.
The maximum values for a domestic US standard shipping container, delivered as part of an 18-wheeler truck, are about 10,500 pounds empty with a cargo capacity of 65,000 pounds. or about 33 tons.
These numbers could present challenges for the location of the

Radiant Nuclear factory and maintenance facilities near Casper, WY. Currently, local roads and bridges in Casper, WY, have a weight limit of 72,000 pounds for a five axle truck or half of the weight of a Radiant reactor shipment which is 70 tons (140,000 pounds).
For travel on I-25, which serves Casper, WY, with connections to Cheyenne, WY, and Denver, CO, the U.S. Department of Transportation federal highway weight limit is 80,000 pounds (40 tons) for a 5-axle truck which is 30 tons less than the weight of the Radiant microreactor.

Could Railroads Provide a Shipping Solution?
Casper, WY, is served by the BSNF, a Class 1 railroad which is only one of seven railroad companies in the US with this level of service. The railroad might be a an option for transporting the radiant reactor to and from the Wyoming facility.
A BSNF flatbed railcar can carry up to 233,000 pounds or 116 tons which is 46 tons more than the weight of the Radiant shipment. However, the width limit for a shipment on a BNSF flatbed rail car, which has to fit through mountain tunnels and bridges, is 10'6" which is an unforgiving 4 inches too short for the Radiant reactor.
BSNF ships large packages all the time such as Boeing jet airliner fuelages.
A dialog by Radiant with the railroad might yield useful results in terms of how it plans to ship its microreactors to customers from the Wyoming factory and to support the 5-year refueling cycle at the planned Wyoming maintenance facility.
Given the weight and size limits of available rail transportation infrastructure, Radiant's potential design options may be to either change the configuration of a single load to fit within rail car limits or ship the reactor in rail car in compliant sized pieces to be assembled on site or disassembled to be returned to the Wyoming site for refueling and maintenance.

Oak Ridge, Tenn., August 5, 2025 – X-energy Reactor Company, LLC ("X-energy" or the "Company"), and its wholly-owned subsidiary, TRISO-X LLC ("TRISO-X"), today announced the selection of Clark Construction Group to complete the building construction phase of its first-in-the-nation advanced nuclear fuel fabrication facility ("TX-1") in Oak Ridge, Tennessee. TX-1 is the first of two planned facilities at X-energy's site in Oak Ridge that will manufacture X-energy's proprietary tristructural-isotropic ("TRISO") fuel for X-energy's first commercial deployment of the Xe-100 in partnership with the Dow Chemical Company ("Dow") on the Texas Gulf Coast, as well as subsequent deployments.

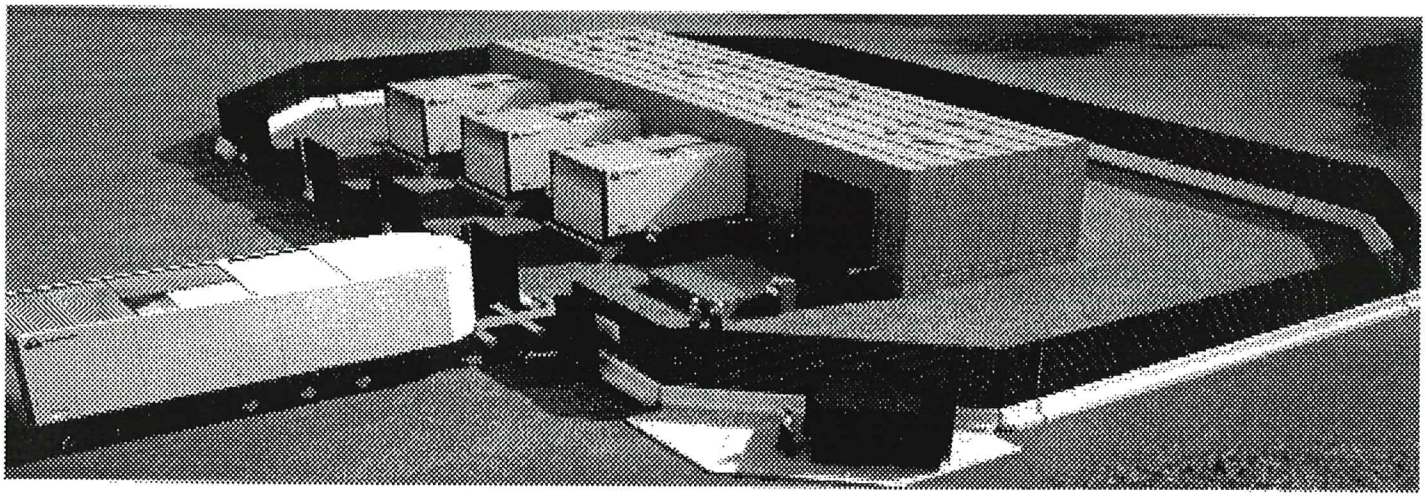
The $48.2 million award is part of X-energy's participation in the U.S. Department of Energy's Advanced Reactor Demonstration Program ("ARDP), and encompasses the Phase 2A of the facility construction, including the completion of the core and shell of the 214,812 square foot facility. Construction on this next phase is expected to begin in September following the completion of site preparation work. In parallel, X-energy has also received approval from the Department of Energy to authorize an additional approximately $30 million for early procurement of critical long-lead equipment and materials to support the successful delivery of subsequent construction phases, and ensure adherence to the overall project schedule.

"This milestone marks another step forward in ensuring a secure, domestic supply of fuel for the next generation of nuclear reactors," said Joel Duling, President of TRISO-X. "TX-1 will be the first facility of its kind in the nation, addressing a critical gap in the current U.S. nuclear fuel cycle, and bolstering U.S. energy independence with American technology and innovation."

Radient Handout

NUCLEAR, BUILT IN NATRONA COUNTY

RADIANT



REACTOR SPECIFICATIONS

Electric Power: 1MW, 480V 3P
Heat: 1.9 MW
Transport: Land, Air, or Sea
Size: 70 ton 11' x 11' x 35' container
Startup Time: 48 hours to full power
Life: 20 years, 5 years per core

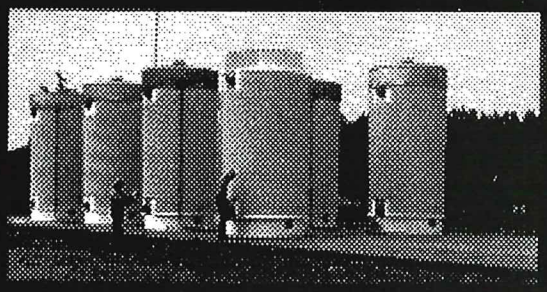
CUSTOMERS

Defense
Data Centers
Oil and Gas
Mining
Remote Communities
EV Charging

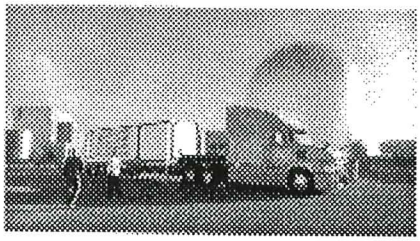
Radiant has raised **$225MM in funding** and already has **25+ reactors** committed for production.

REACTOR TRANSPORT & FUEL STORAGE

- Radiant has an inherently safe reactor design that is significantly smaller than most other reactors
- Radiant will temporarily store spent fuel in dry casks (built to withstand water immersion, fires, high impact crashes, 30' drops, etc.) until the DOE finalizes a permanent national storage site.
- Zero injuries in over 25,000 shipments of spent nuclear fuel worldwide since the '60s.

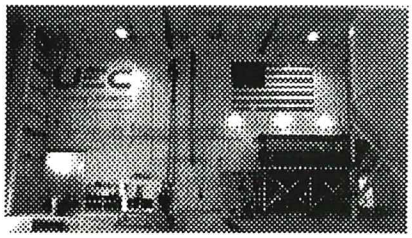


A single dry cask can hold 20% of a 1 GW reactor core, or many Radiant reactor cores.



The President's Department of Energy has selected Radiant to be the first to test its prototype reactor at Idaho National Laboratory in 2026. This will be the **first fueled operation of a new reactor design in over 50 years.**

Radiant has signed a contract to ensure our reactors are being fueled with **uranium mined right here in Wyoming.**



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www.radiantnuclear.com

Where is the electrical generator?