

# SC TRANSPORTABLE NUCLEAR BRIEFING

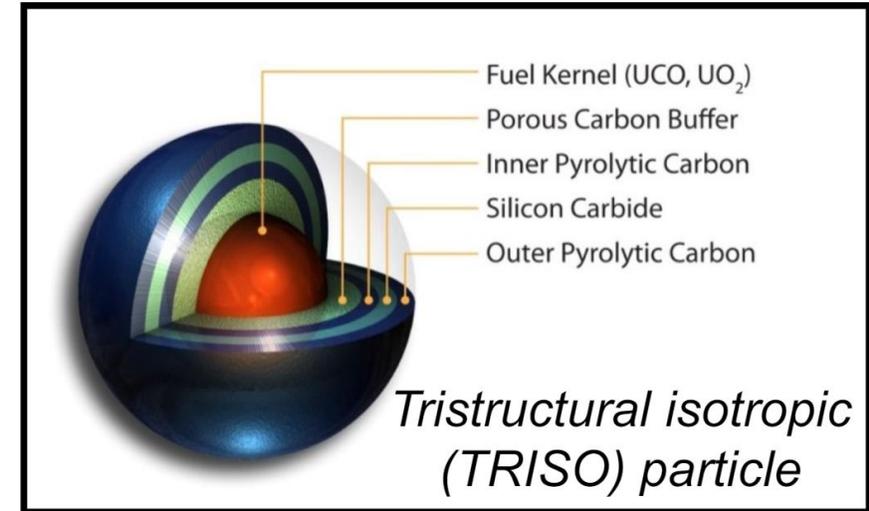
6 MAY 2024

# DISCLAIMER

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# PROJECT PELE

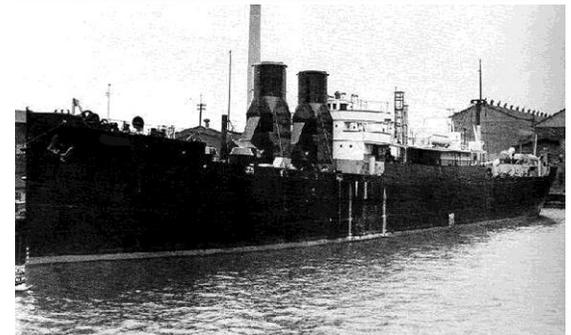
- DoD microreactor program led by Strategic Capabilities Office
- 1-5 MWe, 4 shipping containers, TRISO HTGR
- Program design competition began March 2020
- Prototype is being built and will be at INL by year end
- Reactor will be tested for the length of 2025



ML-1 US Army reactor, 1958, Arco, Idaho

# HISTORIC PRECEDENCE

- WW2: US deployed ~320+ MWe of floating power plants (~7+ GWe today)
- Assets were used in WW2, Korea, and Vietnam to power major cities and ports
- Assets were used to respond to civil authorities in times of emergency and to power remote civil grids
- US Navy has deployed over 525 reactors with over 7,500 reactor years of operation with no accidents
- In 1963 the Army build the USS Sturgis, a 10 MWe nuclear power barge, which operated for over 10 years in the Panama Canal zone



# WHAT WORKS FOR NUCLEAR

- Over 525 Transportable US Reactors have been built
- Transportable SMRs are ~70% of all US reactors
- Perfect Safety Record
- Proven serial shipyard construction

US Reactors Since 1993	US Commercial	US Navy
Built	4	50
Under Construction	1	15
On Order	2	11

Reactors Completed Since 1993	World Total	G7+S. Korea	Sino-Russo	USA	Russia	China	All Others
Commercial	153	47	67	4	12	55	39
Land	104	67	35	50	23	12	2
Floating	238	114	102	54	35	67	41
% Floating Reactor	44%	59%	34%	93%	66%	18%	5%

\*Only includes Commercial Power Plants and Naval Reactors, does not include research reactors, the 2 commercial Russian reactors on the barge Akademik Lomonosov are listed as naval, built means became operational

# ADVANTAGES OF TRANSPORTABLE NUCLEAR

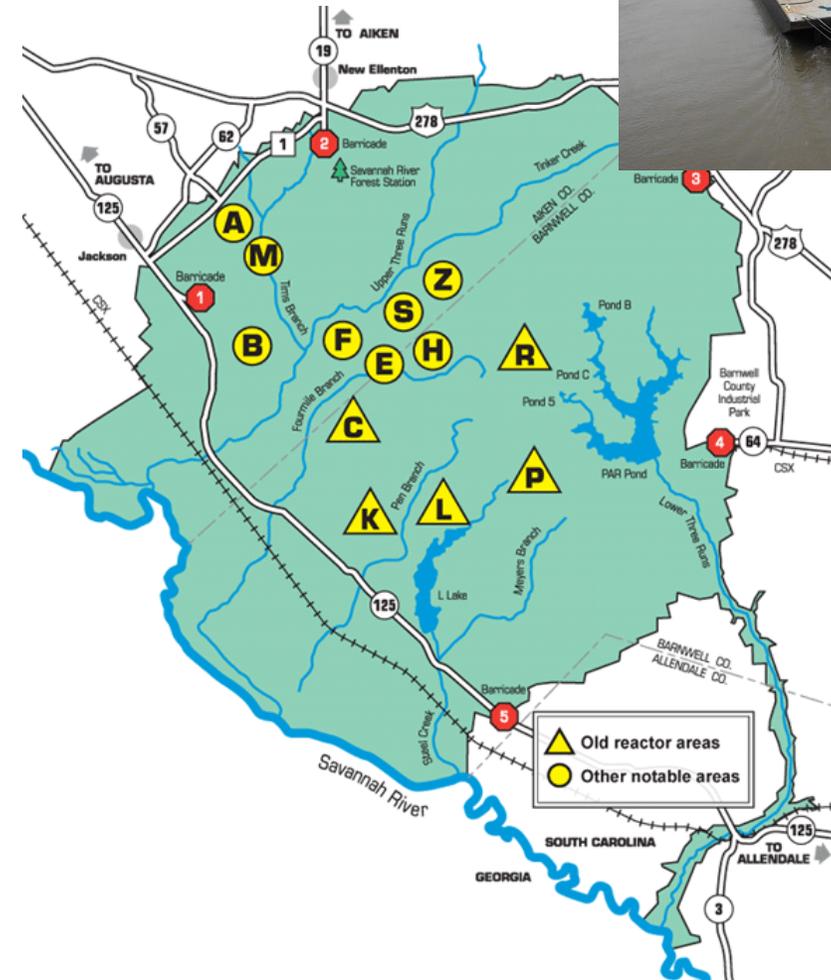
- Dual commercial and National Security
- Non fixed asset carries less risk, short term PPAs
- Capitol allocation advantages, shallow J-Curve
- Shipyard/Factory mass construction efficiency
- Workforce consolidation
- Product based licensing
- Proven scalability
- Ideal for mass export through a leasing structure
- Closer placement to industrial nodes or offshore platforms

# ADVANTAGES FOR SOUTH CAROLINA

- Prove reactors can be built relatively on time and on cost: start small and lower cost
- Risk is deferred between consortium of commercial interests, the state, and the federal government
- Reward for successful deployments (several thousand GWe)
  - Capture a portion of the manufacturing process
  - Large scale workforce development
  - License fee for reactors developed with the state

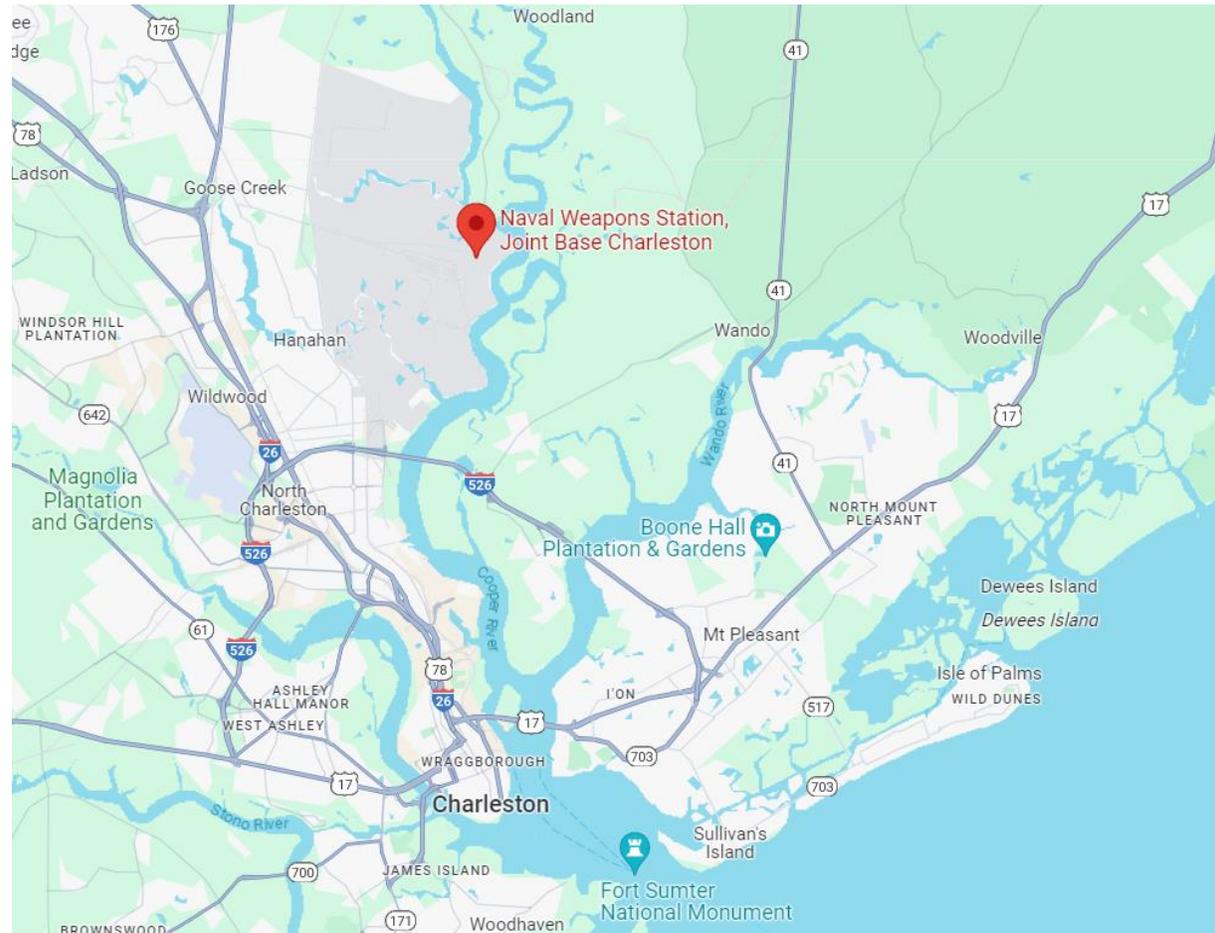
# SAVANNAH RIVER SITE

- Aiken , SC, 310 Sq Miles, Borders the Savannah River
- Designated by Secretary of Energy Granholm in July 2023 in the “Through the Cleanup to Clean Energy Initiative” as a ideal site for clean energy projects to include nuclear
- 5 Previous production reactors on site, and opposite Vogtle
- Nearby Use Cases
  - SC National Guard Cyber Battalion
  - Fort Eisenhower
  - NSA facilities



# NAVAL WEAPON STATION CHARLESTON

- Charleston, SC
- 32.6 Sq Miles
- Borders the Cooper River
- 2 Navy training reactors
- River Outlet is the Port of Charleston
- Navy Information Warfare Center Atlantic HQ



# GENERAL PROPOSED PATHWAY FORWARD

Prototype  
(Government Led)

First Generation  
(Hybrid)

Mass Production  
(Commercially Led)

- DoD/DOE led development program (Pele)
- Establish commercial order book & funding
- Begin build up of workforce/supply chain

- Deploy first reactors within DoD, DoE or at national security sites with commercial partners
- Establish full production line
- Refine prototypes for mass production

- NRC License secured
- Begin mass manufacture of reactors
- Deploy domestically, and internationally
- Technology becomes COTS for USG use

# TYPES OF REACTORS

## LWR

- Mainstay of both the commercial fleet and the US Navy
- Certified fuels
- Existing supply chains

## TRISO HTGR's

- Project Pele will provide hard data in 2025
- High temperatures lend themselves to process steam use cases
- Initial supply chain established
- Potential Safety Benefits

## Others

- Will require more research prior to deployment
- Will require new supply chains
- Include: Molten salt, Fast, and Thorium reactors

# LICENSURE PATHWAYS

## NRC

- Commercial License: required for large scale deployment
- Research Reactor License

## DoE

- Requires DoE involvement
- Must be located on DoE land
- Can leverage existing environmental assessments

## DoD

- Requires DoD involvement
- Initial license process likely through DOE
- Potential use at National Security Site (data center, industrial node)
- Existing Efforts: Project Pele, AF Elision effort, Army Installation Energy Office

# RUSSIAN/CHINESE EFFORTS

- Akademik Lomonosov, keel laid in 2007, with both reactors fully online in 2019; can provide 70 MWe or 150 MWt; currently in use at Pevek Russia providing electricity and thermal energy.
- 4 Follow on units being built in shanghai and were to be transferred to St. Peterburg at the end of 2023 for reactor install.
- 20 Dec 2023, CEO of Rosatom announces leasing program of floating reactors to third party countries.
- Chinese officials and media have stated that at least 20 such reactors will be built for use in the south china sea.

