

# HT<sup>3</sup>R

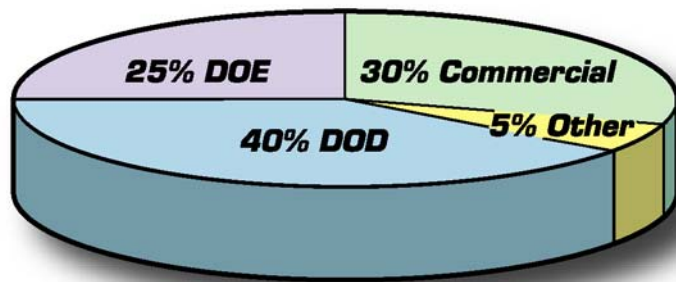
Building For The Future  
On 50 Years of Nuclear Experience

# GENERAL ATOMICS TECHNOLOGIES CORPORATION

- Founded 1955
- Privately Owned Since 1986
- Operations
  - US (CA, CO, DC, HI, MS, NJ, NM, OK, IA, TX, UT)
  - Germany (Saxony, Brandenburg, Saxony-Anhalt)
  - Australia (South Australia)
- Other Facilities
  - Japan, Thailand, Morocco



J. Neal Blue  
President & CEO



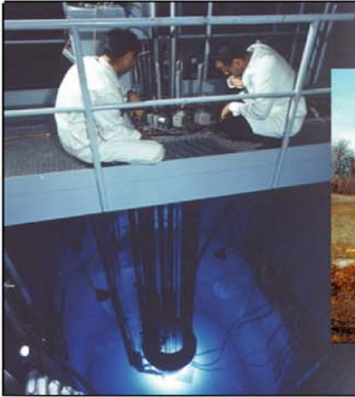
Revenue Sources  
GA & US Affiliates

GA works closely with:

- DARPA
- National Labs (e.g., INEEL, LANL, ORNL, SNL, LLNL)
- DoD Labs (e.g., AFRL, ARL, NRL)
- Universities (e.g., Auburn, Florida State, Mississippi, Mississippi State, Missouri, MIT, New Mexico, Princeton, Purdue, SDSU, South Carolina, Tennessee, Texas, UCSD)
- Major Companies (e.g., Boeing, Northrop Grumman, General Dynamics, Raytheon, Lockheed Martin, and Bechtel)
- International Programs (e.g., Japan, Germany, United Kingdom, Russia)
- DOE, operating the DIII-D tokamak as a national facility

# General Atomics: Technologically Versatile

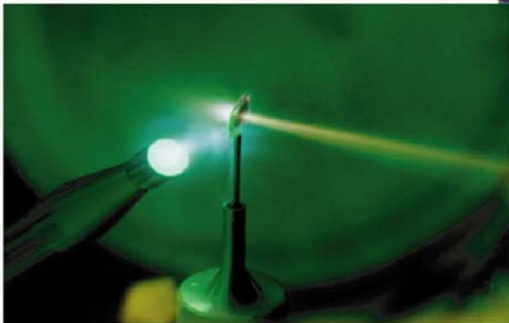
Nuclear Energy



Fusion Research



Hazardous Materials



Predator Unmanned Aircraft



Remote Sensors

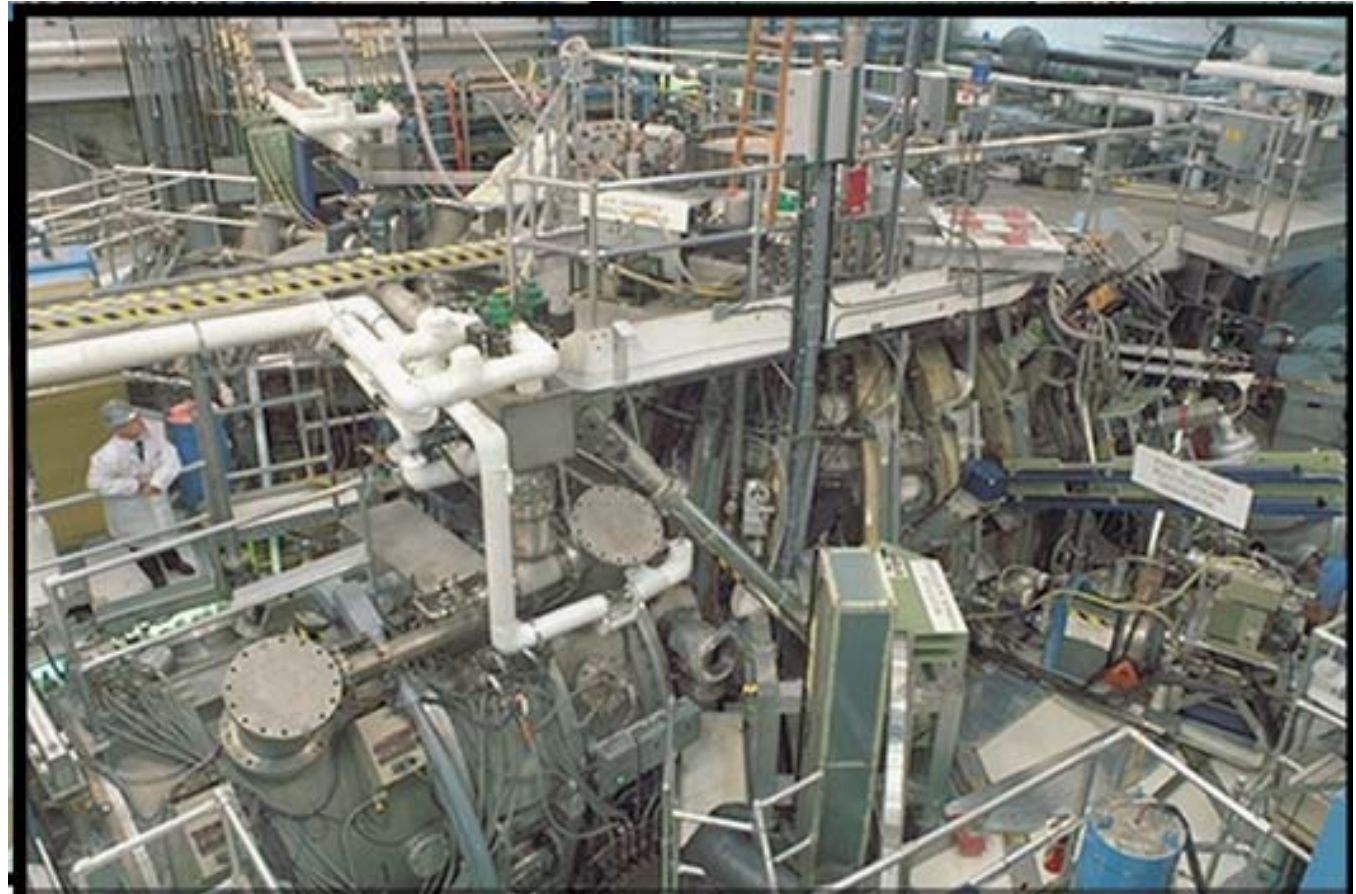
# *GA Built and Operates the DIII-D National Fusion User Facility*

**-Today's Capitol  
Investment for  
DIII-D:**

**~\$500M-\$750M**

**-Operating  
Program**

**~\$55M/yr**

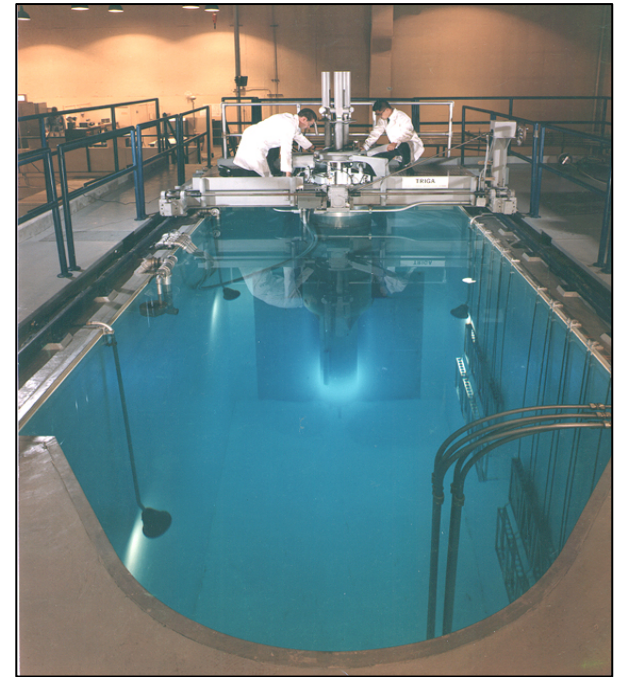
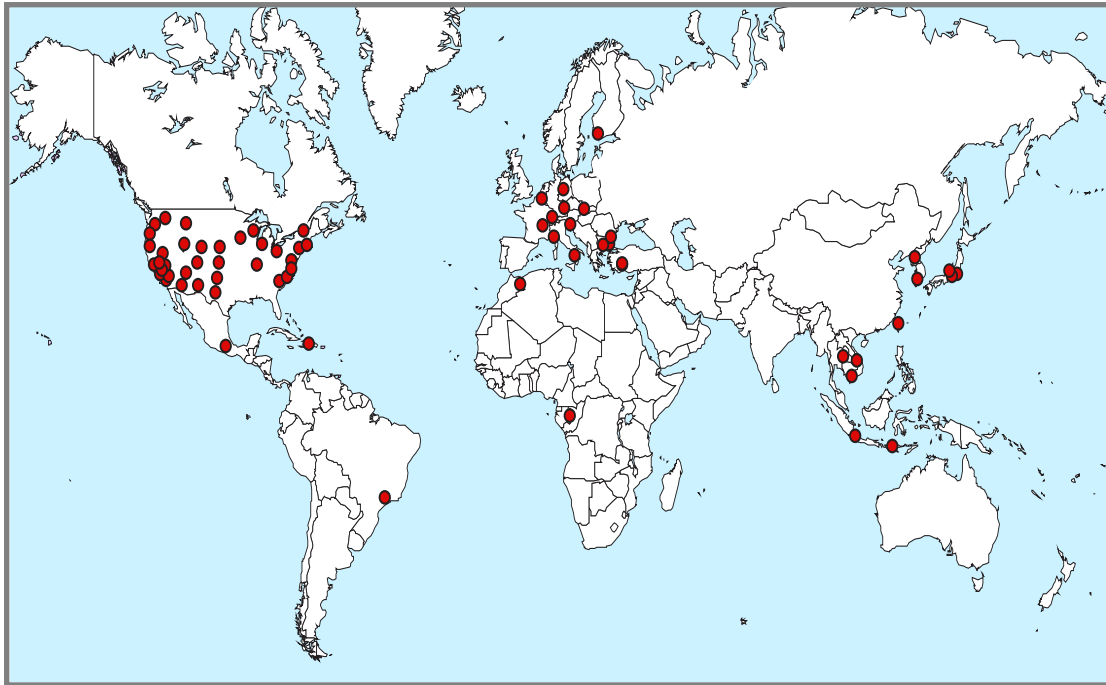


***~500 collaborators (national, international) conduct research on DIII-D***



**General Atomics Has Built More  
Research and Test Reactors Than  
Any Other Company In the World**

# 65 TRIGA RESEARCH REACTORS IN 23 COUNTRIES



***TRIGA Reactors: Perfect Safety Record  
for 50 years***



Spent Fuel Tank



Cooling Systems



Core Structure



Morocco 2 MW TRIGA Reactor Building



Reactor Shield

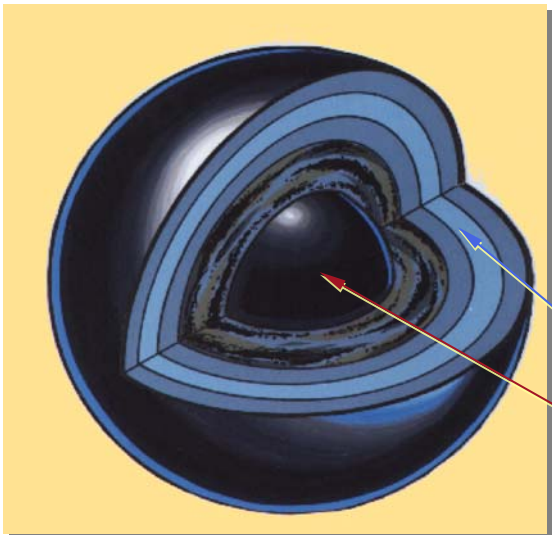


Fuel Elements



Reactor Hall

# Building Block of a Gas Reactor: It starts with the Fuel



## TRISO Coated Fuel Particles:

- *Lots of cladding - extremely strong*
- *Little fuel - fully encapsulated*

Each fuel particle forms a separate pressure containment vessel for the kernel (to 1000 atm)

Ceramic Coatings

Fuel Kernel (U, Pu, Th, TRU)



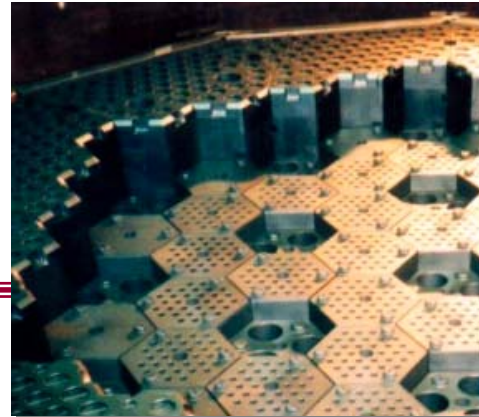
PARTICLES



COMPACTS



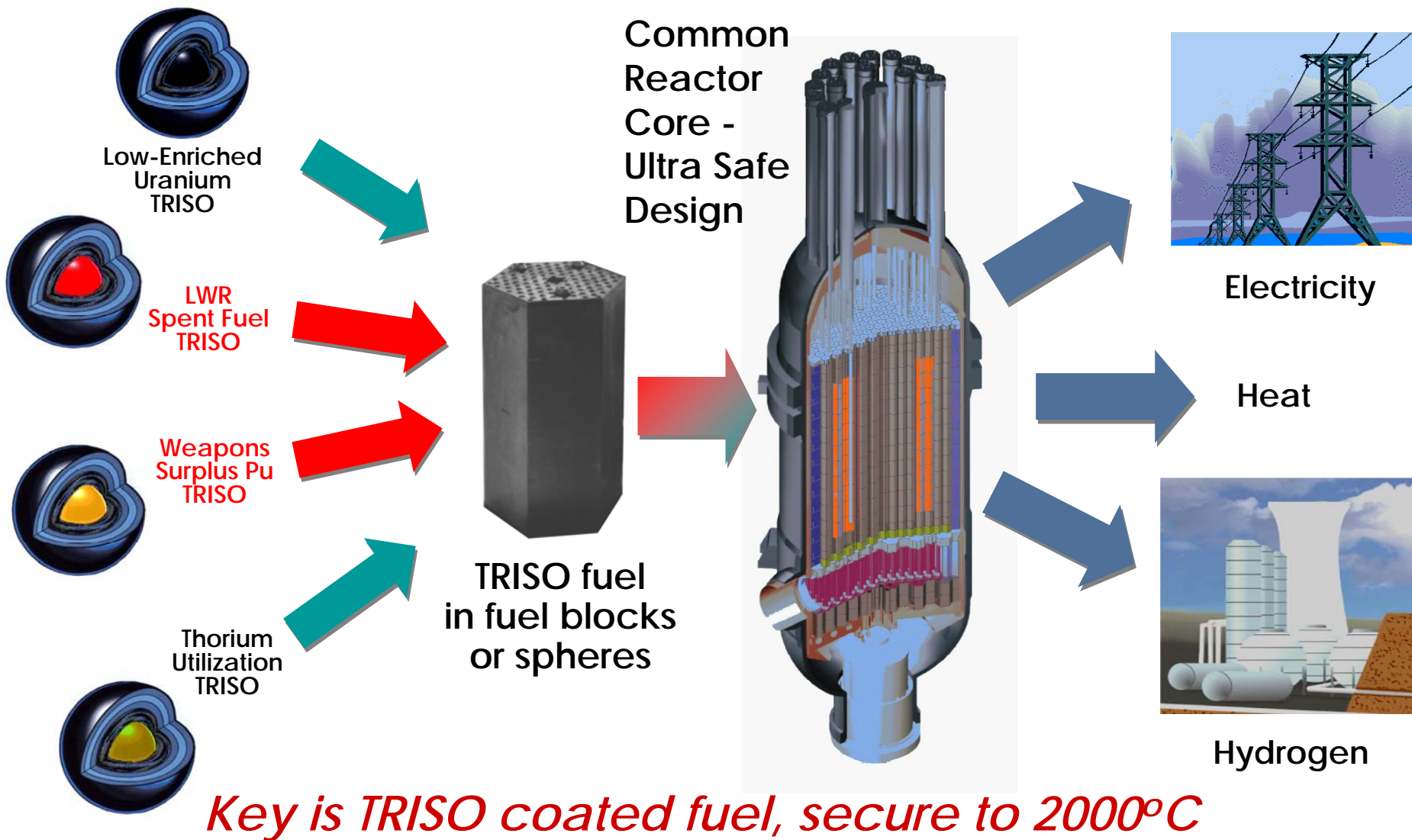
FUEL BLOCK



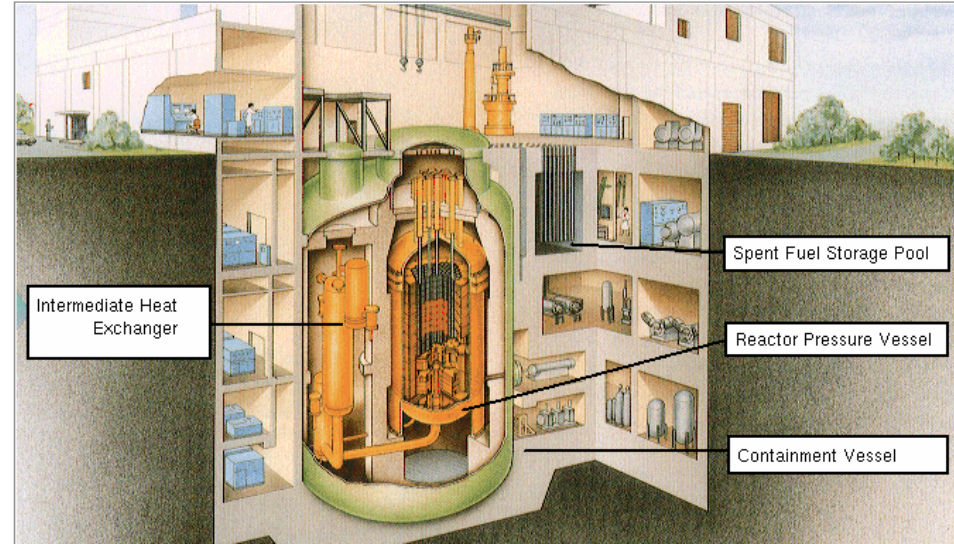
MHR CORE

*Prismatic concept illustrated - Pebble Bed variant also possible*

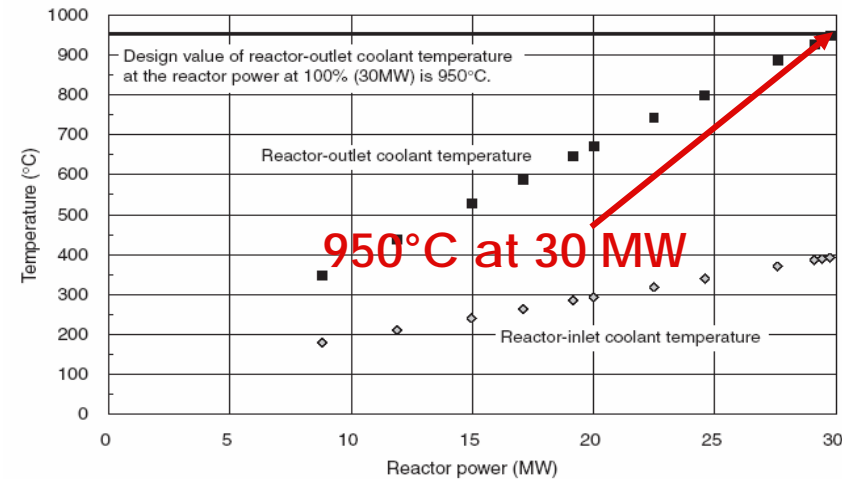
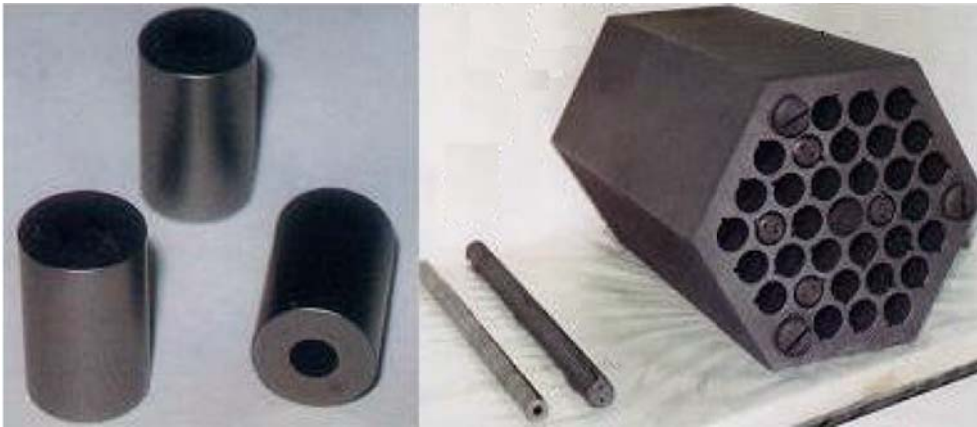
# Features of MHR : TRISO Fuel, Graphite Moderators, Helium coolant



# HTR (Japan): a Helium Cooled Test Reactor dedicated to make Hydrogen at High Temperatures



*950 °C Helium outlet temp. successfully tested*



Based on extensive earlier experience in Germany, UK & US

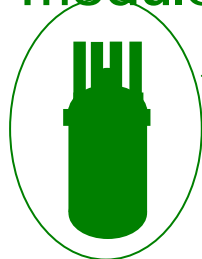


# HT<sup>3</sup>R Proposed to Have Same Physical & Operating Characteristics as GT-MHR But 1/20th Size

GT-MHR  
reactor  
module

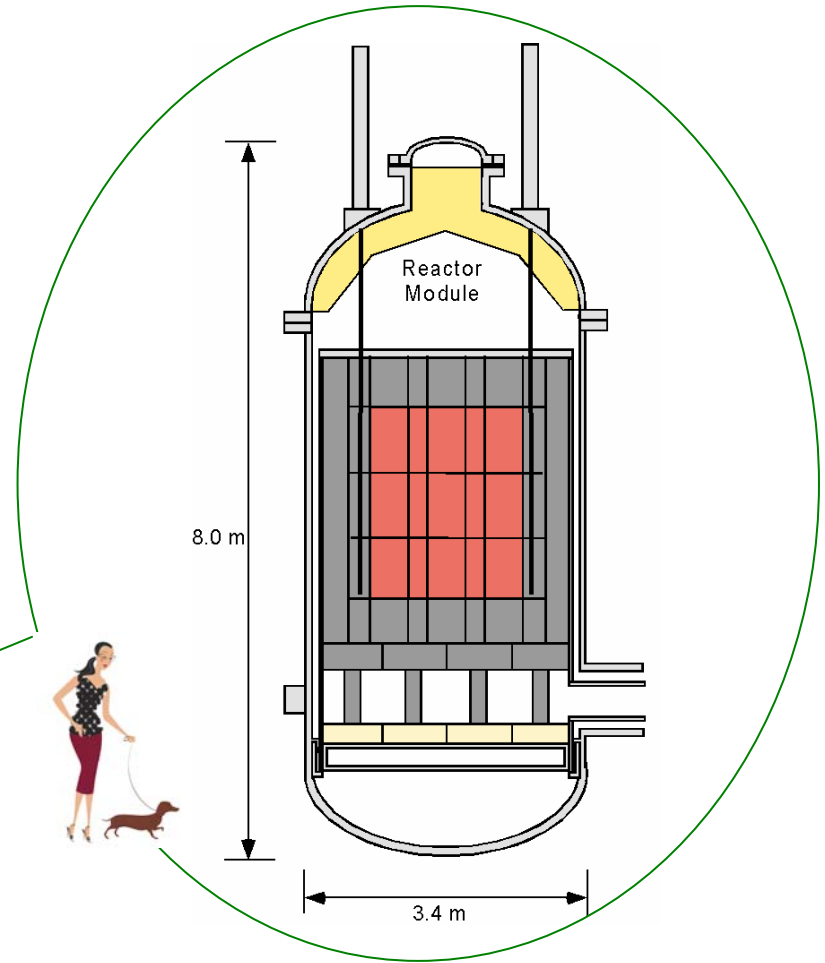


UR-MHR  
reactor  
module

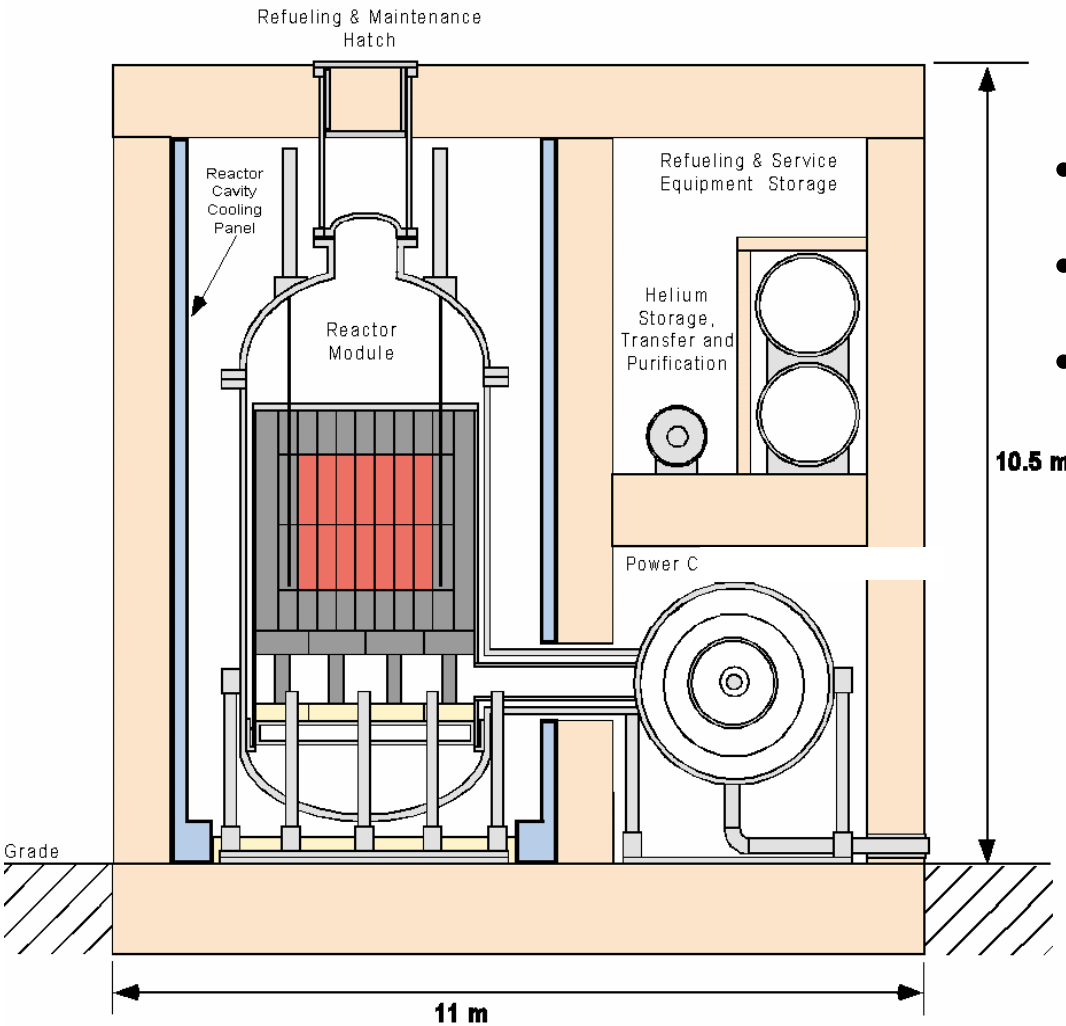


GT-MHR vs HT<sup>3</sup>R

UR-MHR Reactor Vessel



# One possible deployment: Reactor Placed in Protective Confinement That Enables Access for Maintenance



- High density concrete shielding
- Passive safety reactor cooling
- Refueling from top-port

**Most likely the design will have the reactor underground**

# HT<sup>3</sup>R Mission Serves Multiple Purposes

- Education and training of scientists and engineers
- Support for Idaho Next Generation Nuclear Plant
- R&D of high temperature reactor materials, systems and components
- Development of US nuclear manufacturing infrastructure
- Technology development for small reactor plant applications (military & civilian)
  - Remote islands
  - Military installations
  - Locations at high latitudes

**We're Excited About This Project  
and the partnership with UTPB  
and the Permian Basin!**