



NEXXT

The Molten Salt Research Reactor at Abilene Christian University: The Natura Resources MSR-1

Dr. Kim Pamplin, NEXXT Lab Director of Chemistry, September 22, 2026

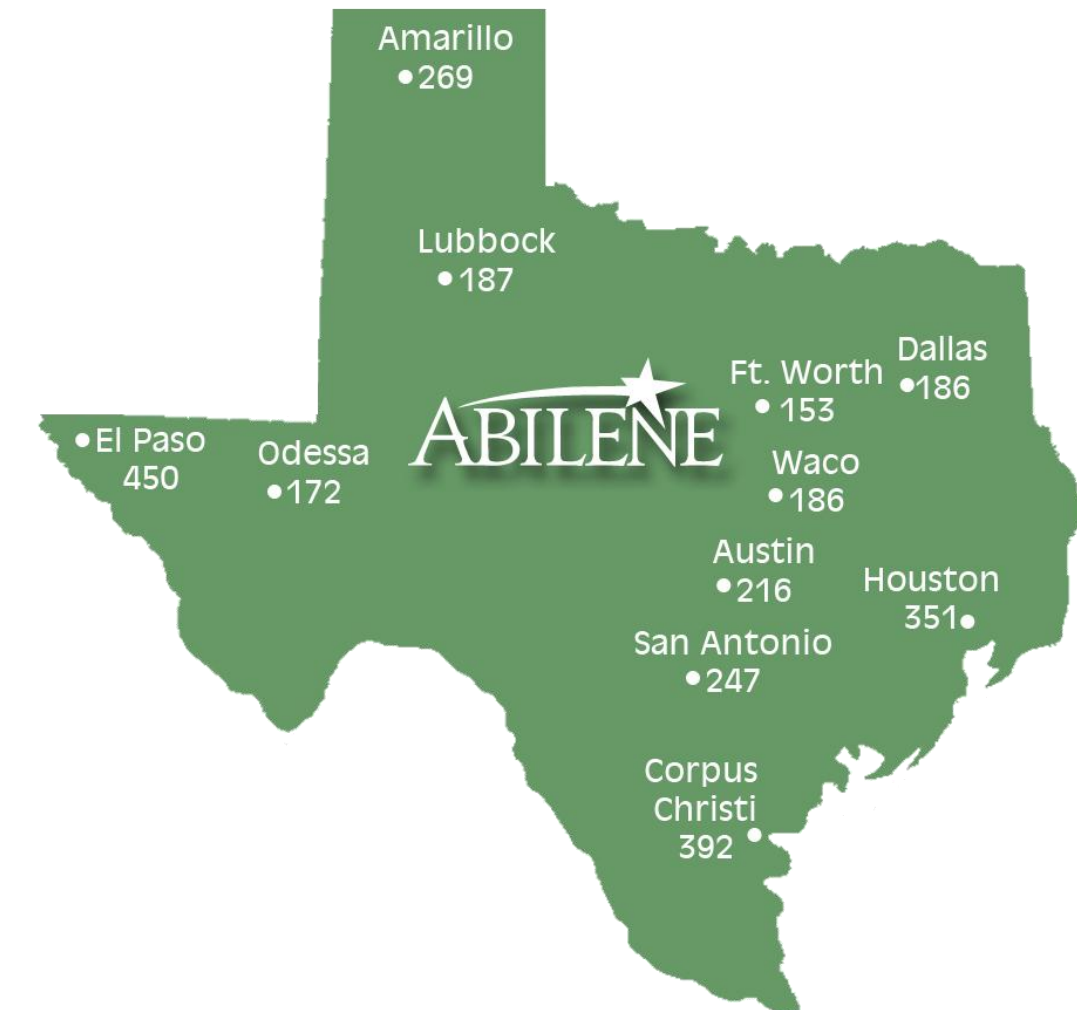


© 2026 Abilene Christian University

Abilene Christian University

NEXT

- ACU's mission is to educate students for Christian service and leadership throughout the world.
- Main Campus in Abilene, Texas population 130,000
- **2026-2027 marks the ninth consecutive year** for a record number of students enrolling at ACU: 7,877+



NEXT

POWERED BY



Natura Resources

Nuclear Energy eXperimental Testing Lab

Finding global solutions to the world's critical needs



NEWSLETTER

MEDICAL NEWS TODAY



LOG IN

'1 in 2 people will develop cancer in their lifetime'

By [Honor Whiteman](#) | Published Wednesday 4 February 2015

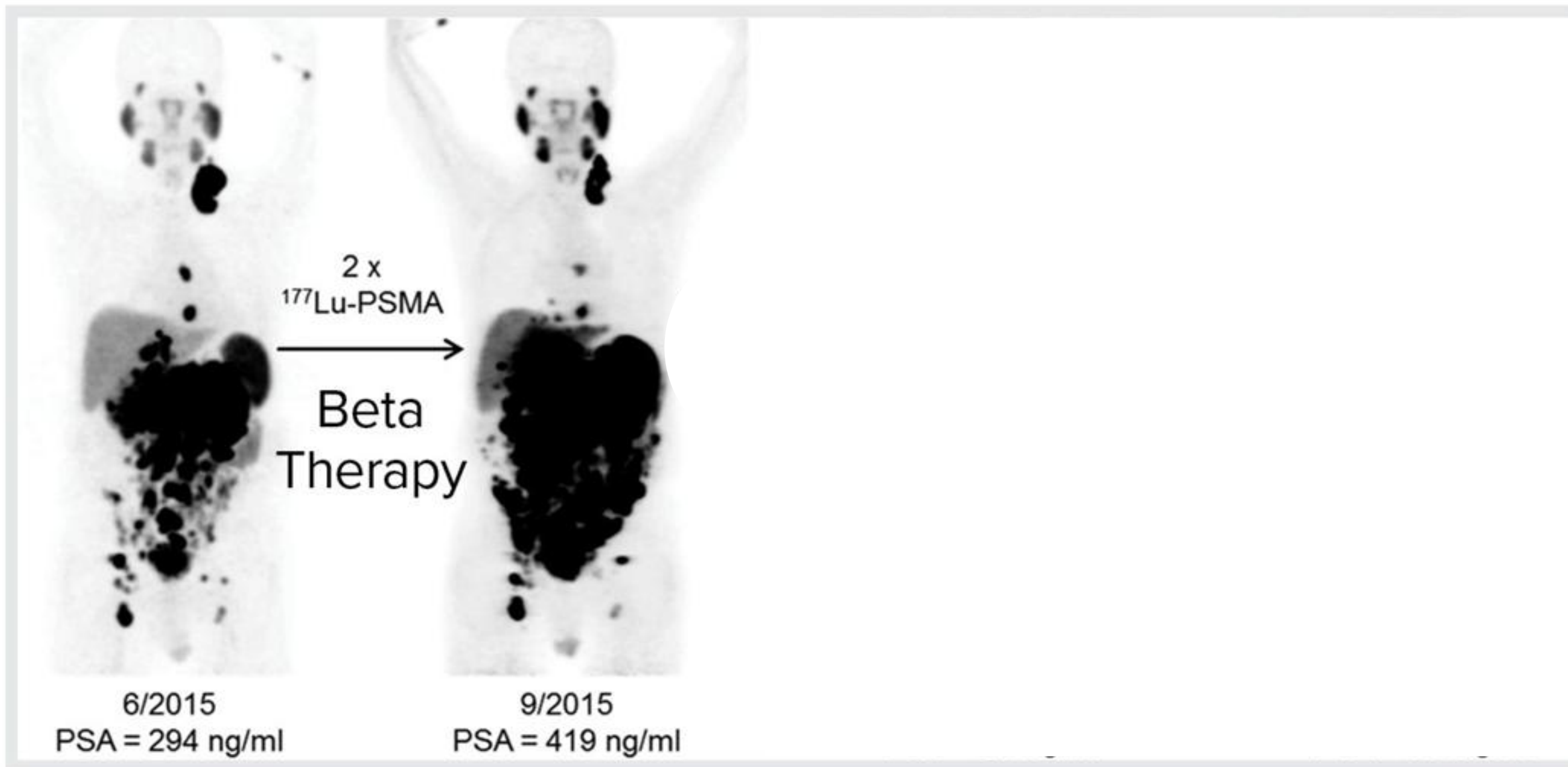
In the US, 1 in 2 women and 1 in 3 men will develop cancer in their lifetime. Now, a similar rate has been reported in the UK, with a new study published in the *British Journal of Cancer* claiming 1 in 2 men and women will be diagnosed with the disease at some point in their lives.

“From this, we can now forecast that a child born today has a 1 in 2 chance of developing cancer at some point in their lives.”

Solution:

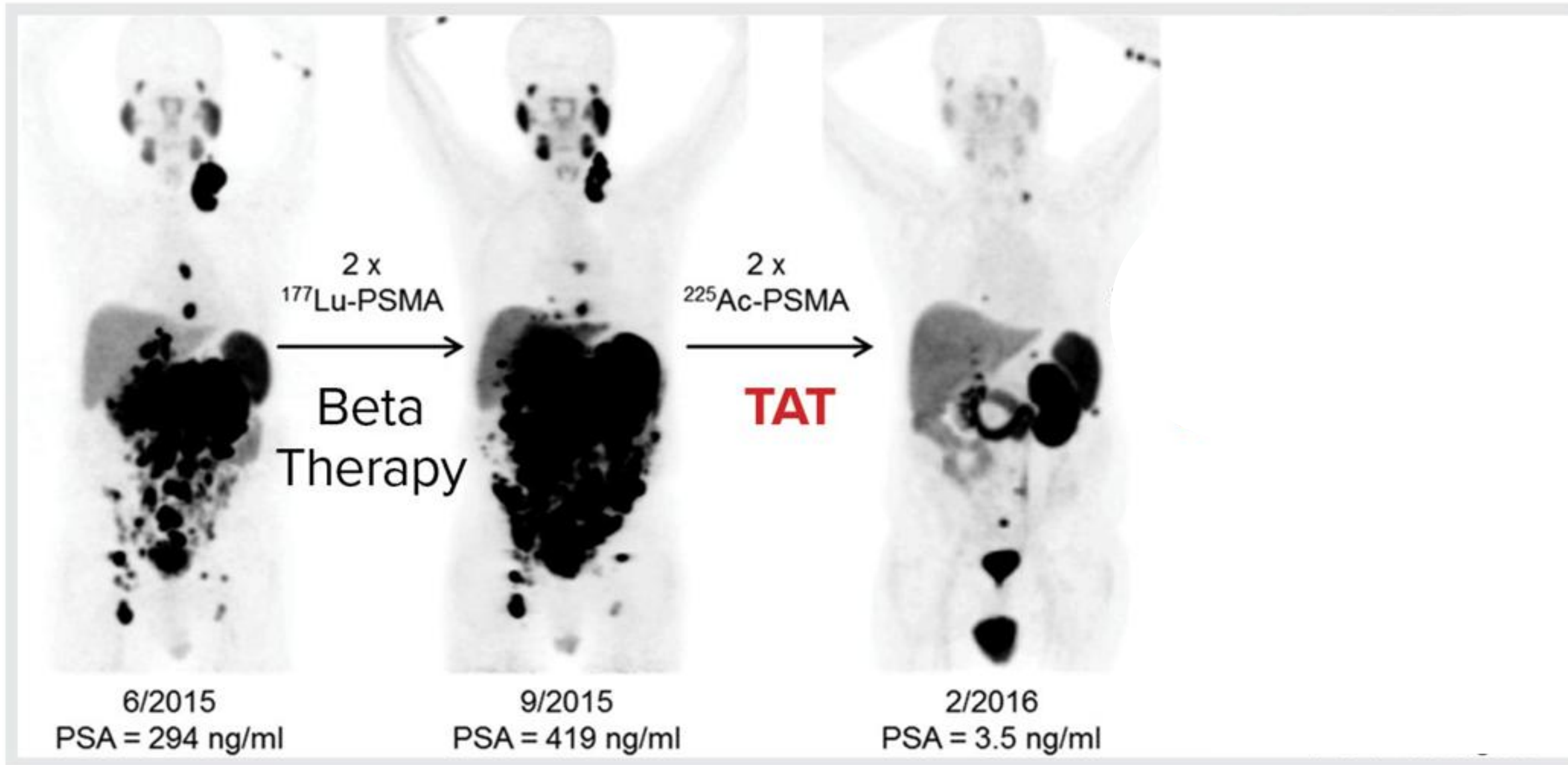
Targeted Alpha
(α)-particle
Therapy (TAT)

Cure for Cancer



68Ga-PSMA-11 PET/CT scans of patient B. In comparison to initial tumor spread (A), restaging after 2 cycles of β -emitting ^{177}Lu -PSMA-617 presented progression (B). Clemens Kratochwil et al. J Nucl Med 2016;57:1941-1944

Targeted Alpha Therapy

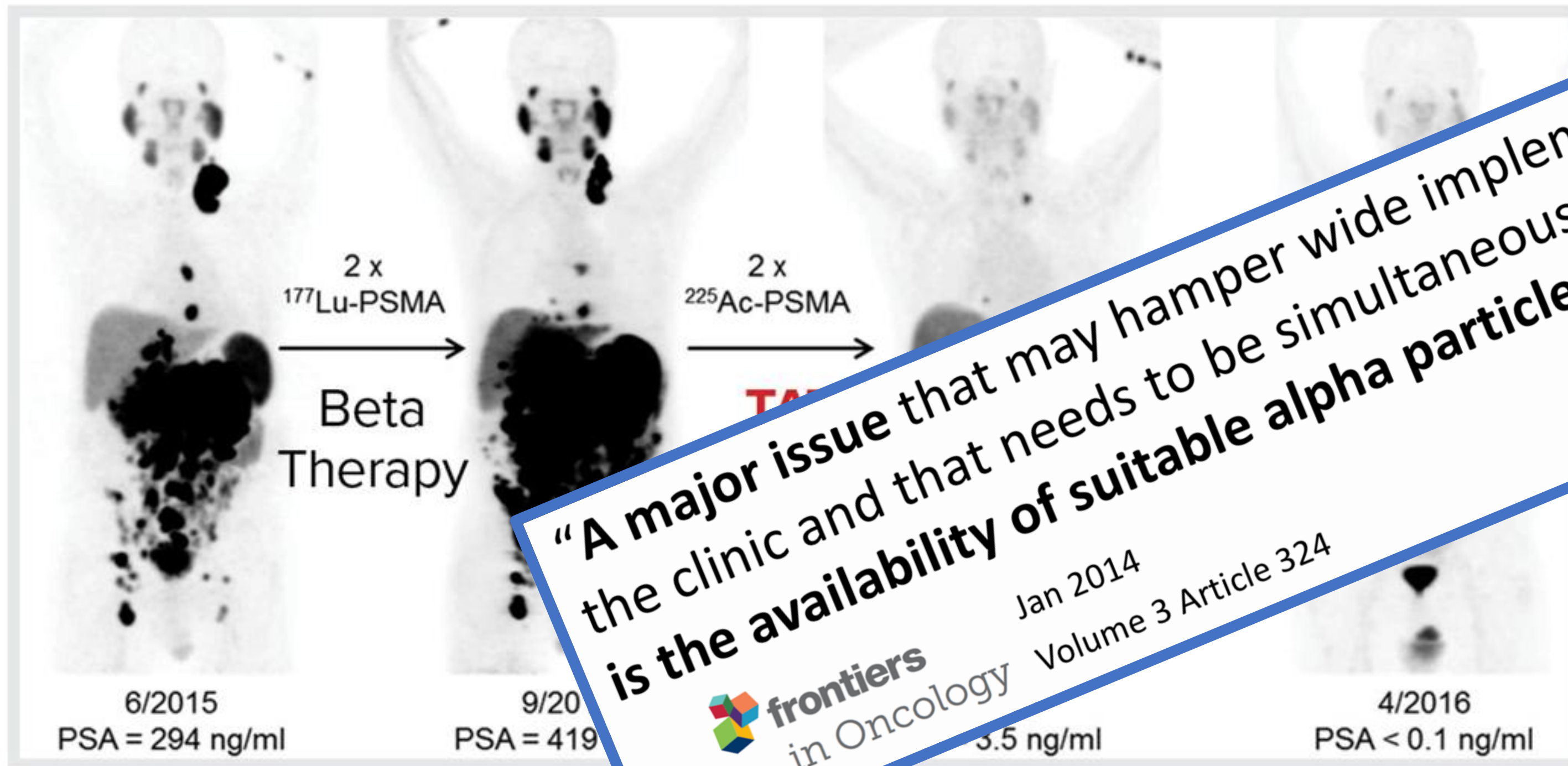


68Ga-PSMA-11 PET/CT scans of patient B. In comparison to initial tumor spread (A), restaging after 2 cycles of β -emitting ¹⁷⁷Lu-PSMA-617 presented progression (B). Clemens Kratochwil et al. J Nucl Med 2016;57:1941-1944

Targeted Alpha Therapy

NEXT

Nuclear Energy eXperimental Testing



“A major issue that may hamper wide implementation in the clinic and that needs to be simultaneously addressed is the availability of suitable alpha particle emitters”

frontiers
in Oncology

Jan 2014

Volume 3 Article 324

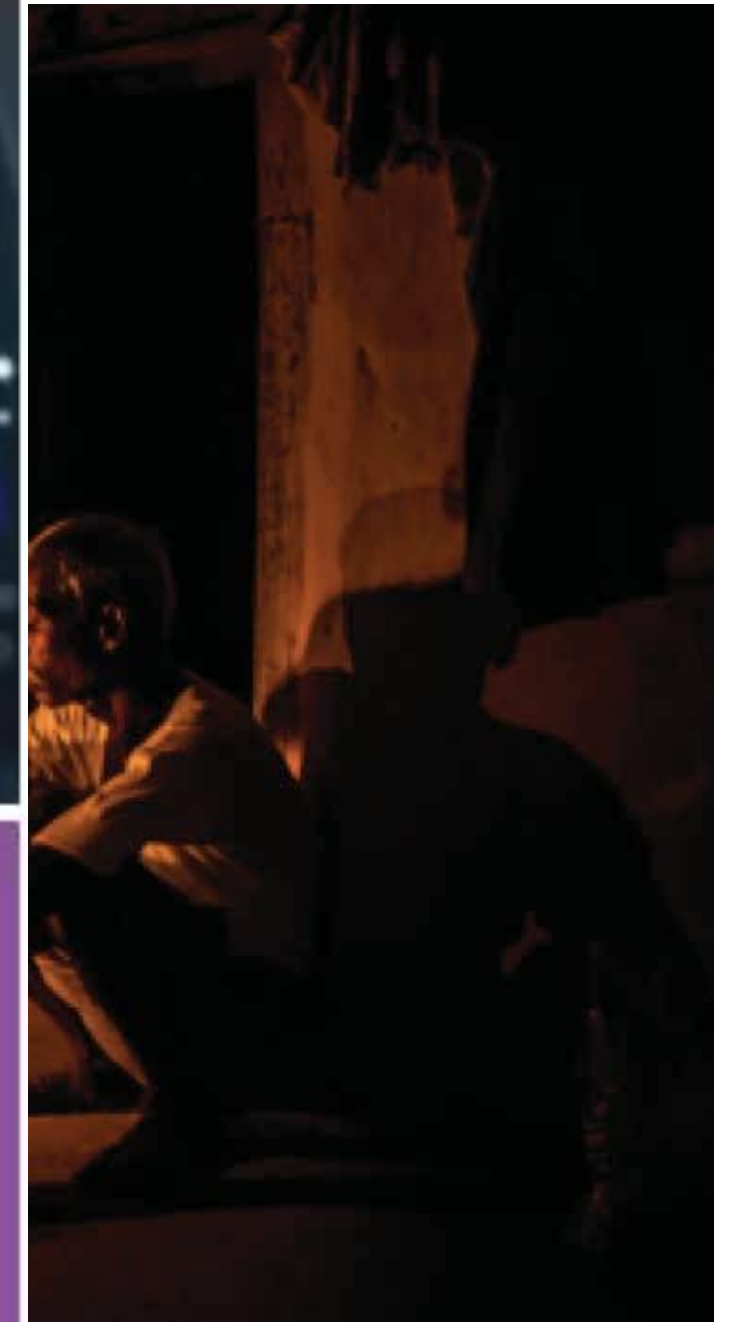
effective
specific
cells

Journal of
NUCLEAR MEDICINE

68Ga-PSMA-11 PET/CT scans of patient B. In comparison to initial tumor spread (A), restaging after 2 cycles of β -emitting ^{177}Lu -PSMA-617 presented progression (B). Clemens Kratochwil et al. J Nucl Med 2016;57:1941-1944

1 in 2 Need Energy

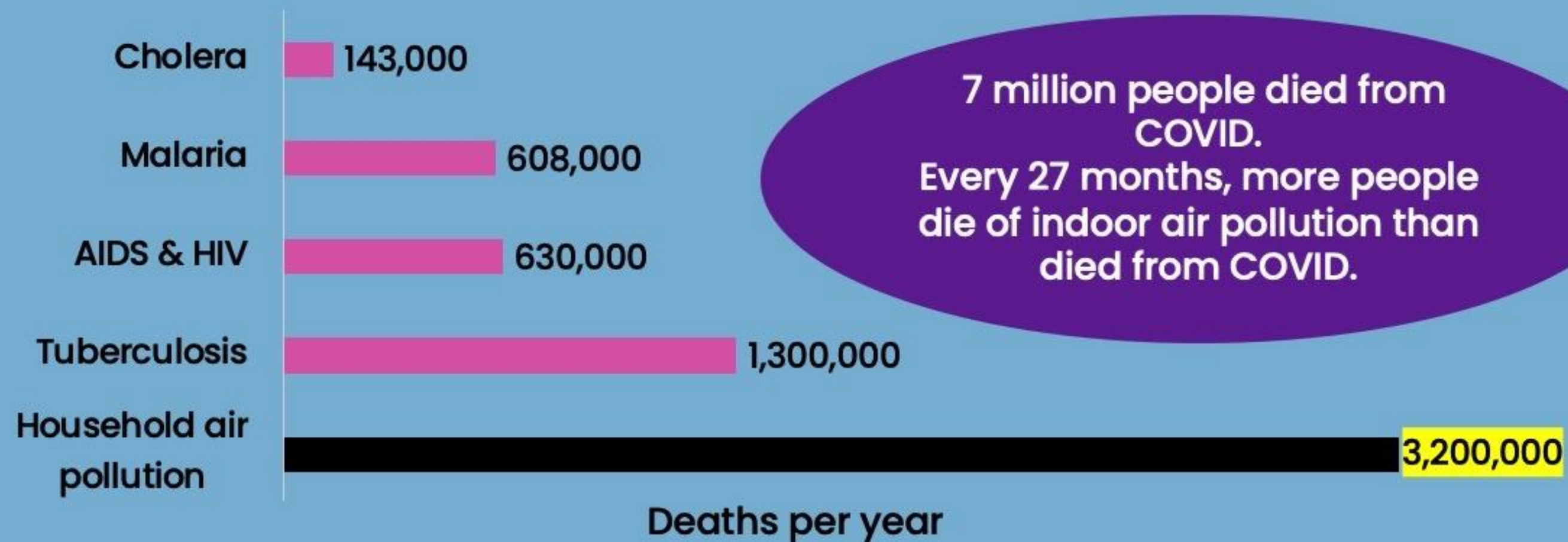
NEXT



1 in 2 Need Energy

NEXT

Indoor Air Pollution From Cooking With Biomass Kills More People Than AIDS/HIV, Cholera, Malaria, & Tuberculosis Combined!



Sources: World Health Organization, <https://www.who.int/news-room/fact-sheets>, <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>, <https://ourworldindata.org/grapher/cumulative-covid-deaths-region>

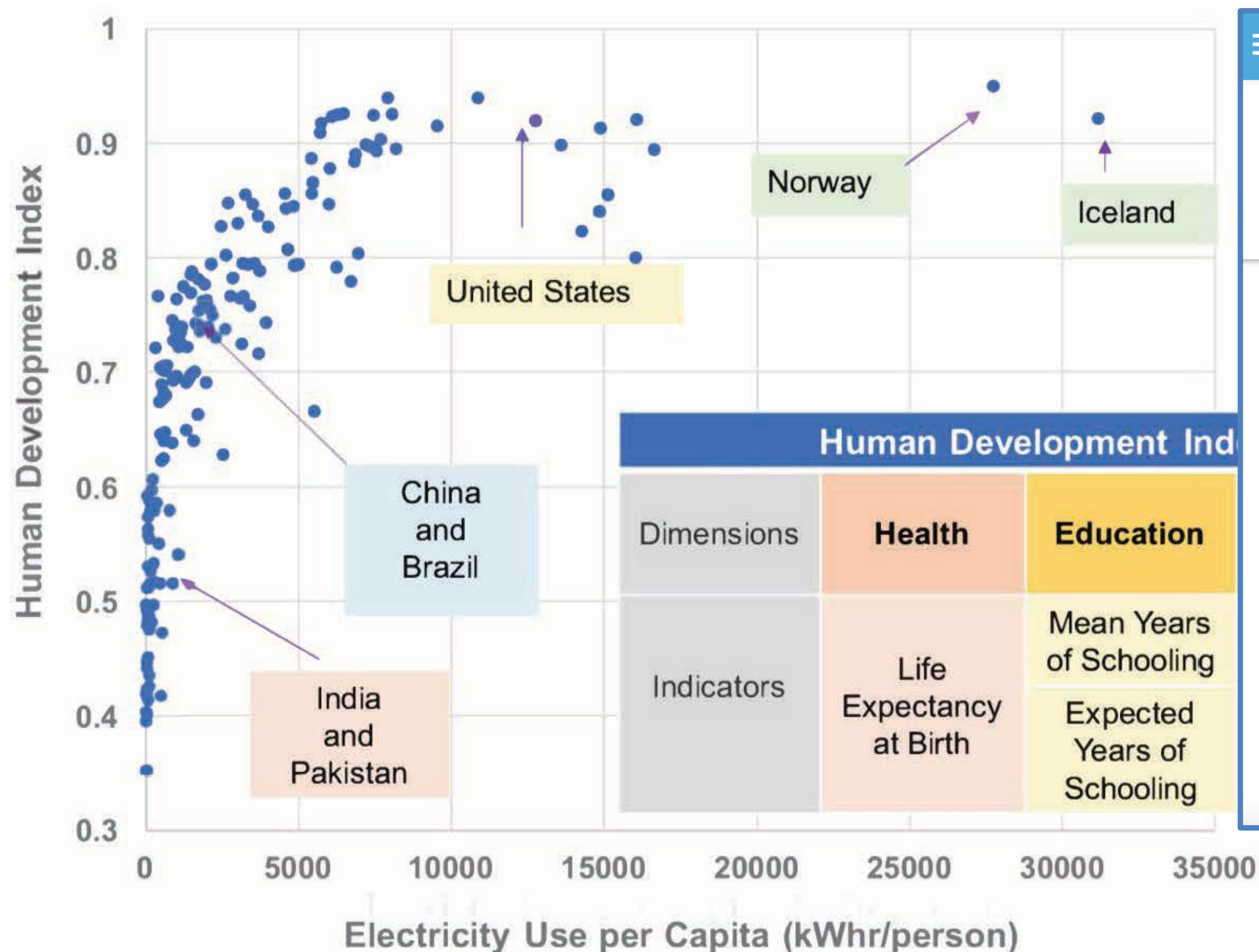
© Robert Bryce



Solution: Inexpensive, Clean, Safe, Available Electricity

Energy Usage and Standard of Living

NEXT



unicef | for every child

DONATE

UNICEF: Collecting water is often a colossal waste of time for women and girls

29 August 2016

Available in: English [Français](#) [Español](#)

UNICEF/UN017117/Shrestha

NEW YORK/STOCKHOLM, 29 August 2016 – UNICEF said the 200 million hours women and girls spend every day collecting water is a

1 in 3 Need Water

NEXT



Global Critical Needs

NEXT

Nuclear Energy eXperimental Testing

1 in 2 do not have access to the **energy** needed to lift them out of poverty



1 in 2 will develop **cancer** and need **medical isotopes**



1 in 3 do not have access to clean **water**



"Nuclear energy is indispensable for achieving global sustainable development and has a crucial role in decarbonizing the energy sector, as well as *eliminating poverty, ending hunger, providing clean water, affordable energy, economic growth, and industry innovation.*" - United Nations Economic Commission for Europe (UNECE) Expert Group on Resource Management (EGRM)

Molten Salt Reactors (MSRs) provide answers to critical global needs

NEXT

Nuclear Energy eXperimental Testing

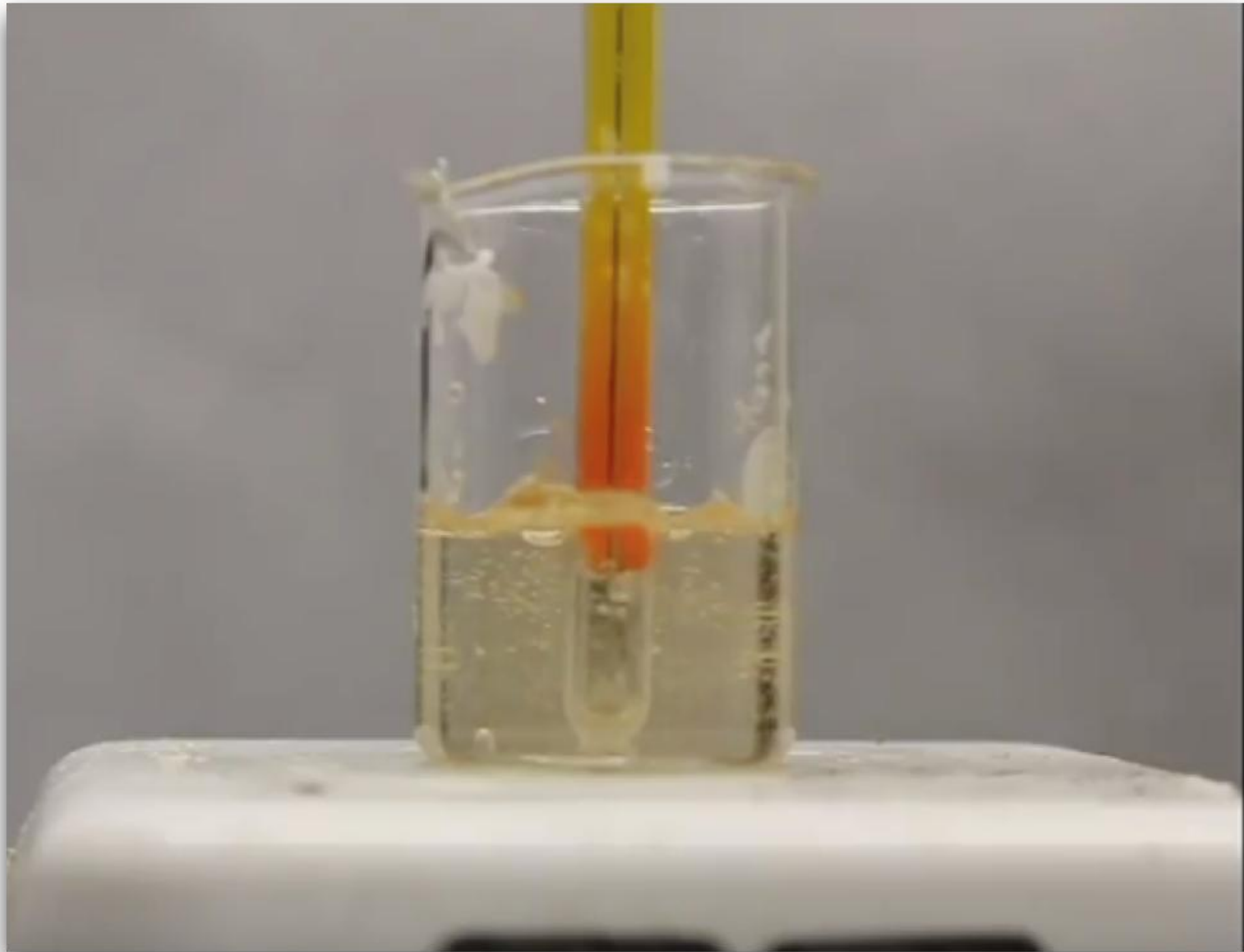
OUR MISSION

The mission of ACU's NEXT Lab is to provide global solutions to the world's need for energy, water and medical isotopes by advancing the technology of molten salt reactors while educating future leaders in nuclear science and engineering.



Key Requirement 1: Molten Salt Coolant

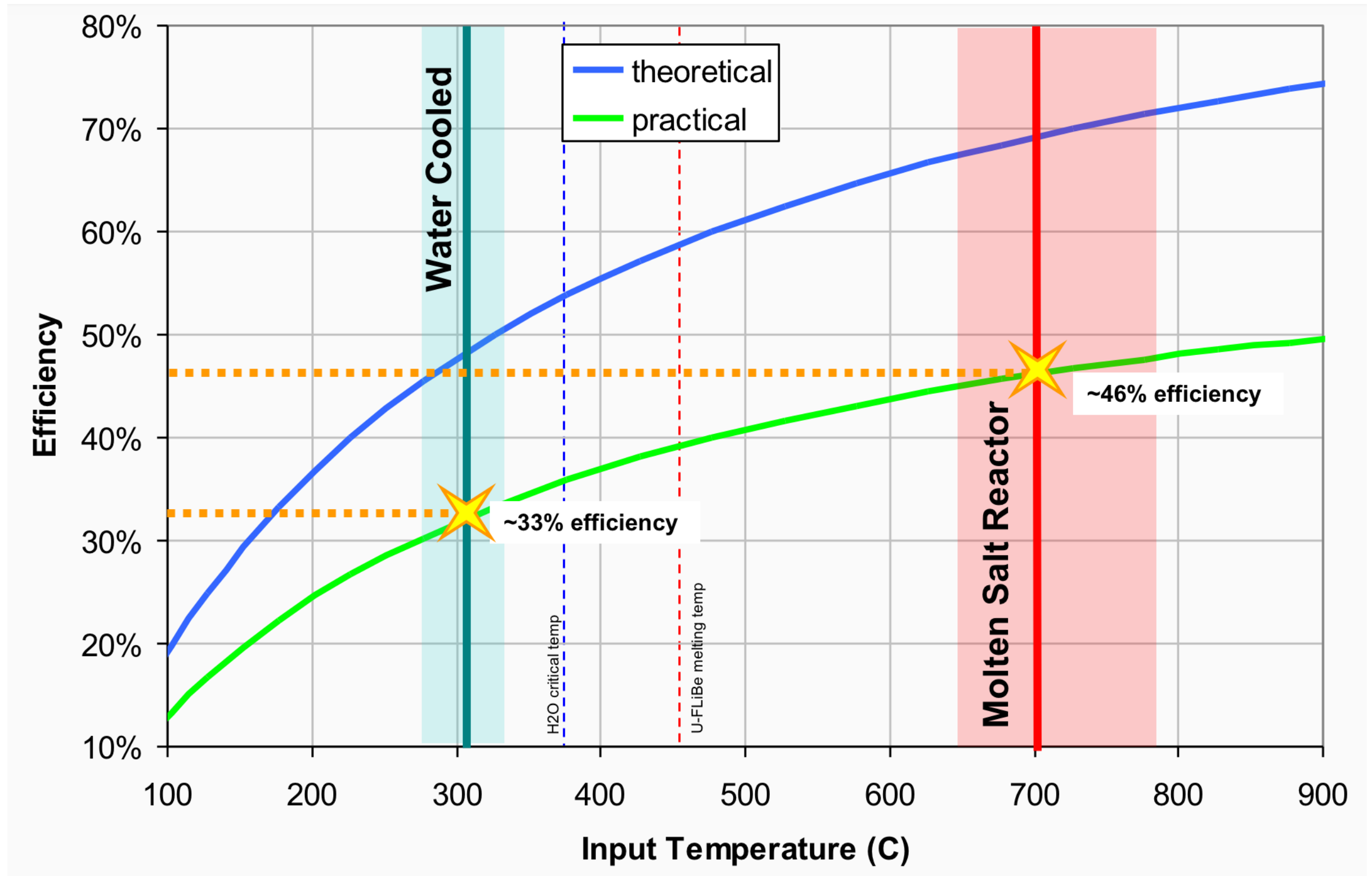
NEXT



Key Requirement 1: Molten Salt Coolant

NEXT

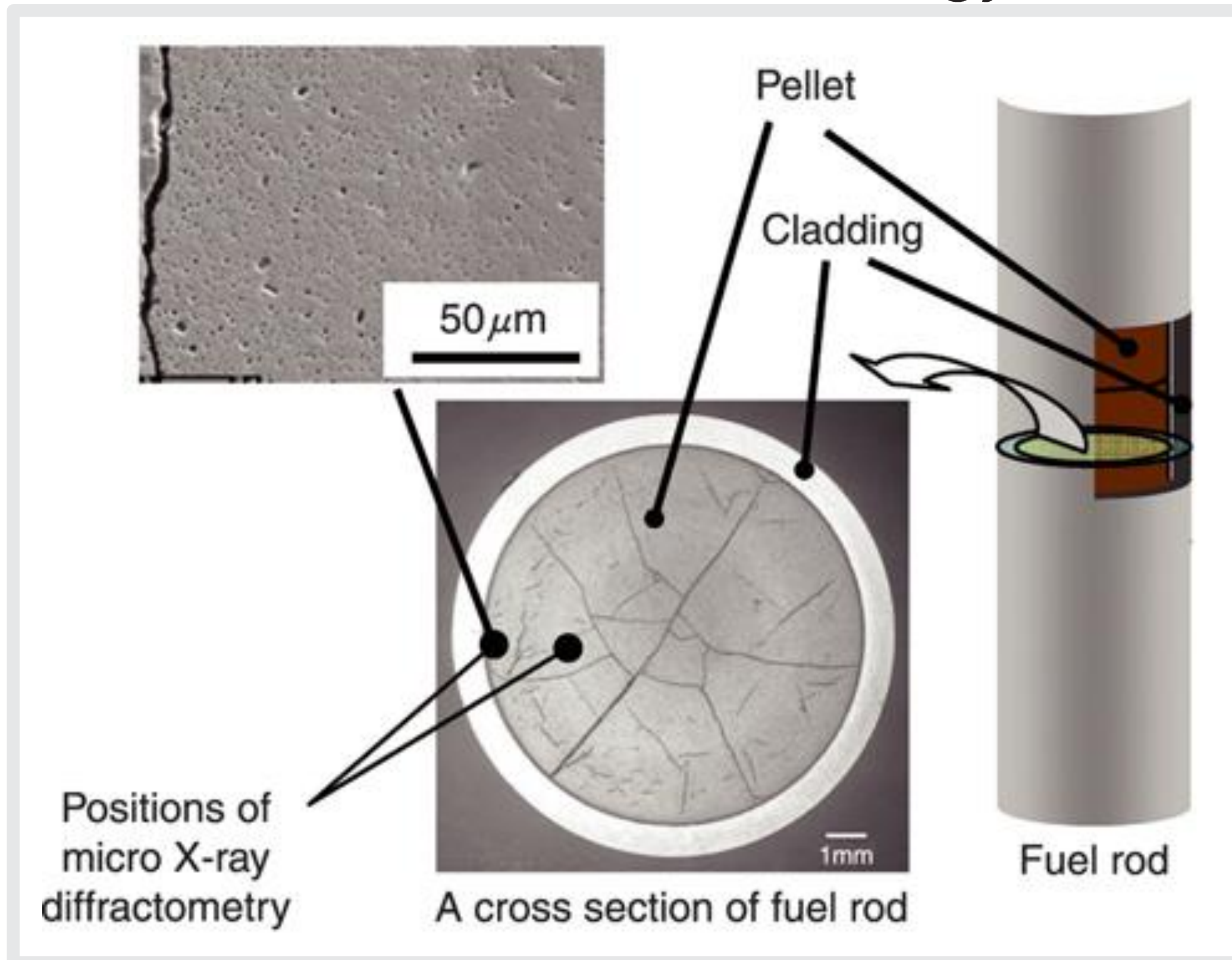
- High Temperature:
 - Improved efficiency
 - Industrial heat
- Safe – Low Pressure
 - No phase transition to a vapor
 - Walk-away-safe
- Enables ...



Key Requirement 2: Liquid Fuel

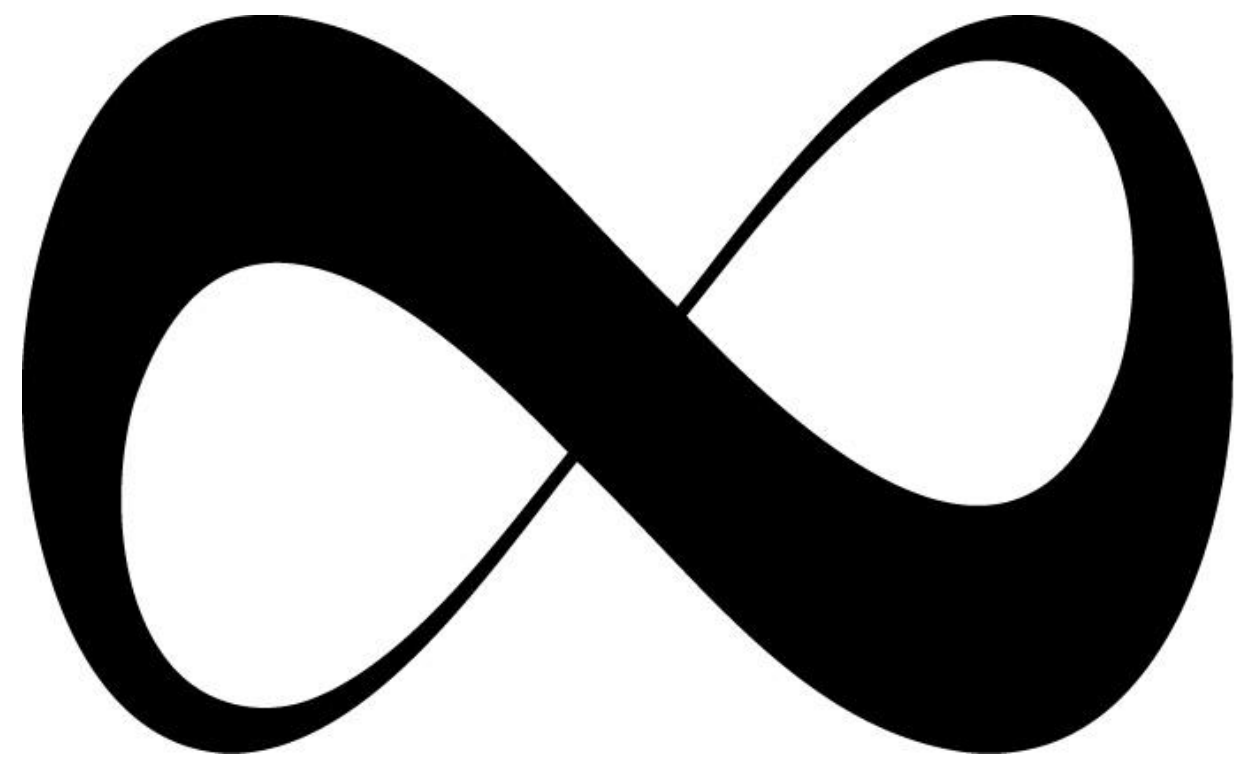
NEXT

Old Solid Fuel Technology



Advantages of Liquid Fuel

- Increased fuel utilization
- Decreased waste
- Access to medical isotopes
- Can not melt down
- Efficient use of many fuel forms



Natura Resources

Natura Resources, LLC is committed to answering the world's increased demand for **reliable energy**, **medical isotopes**, and **clean water**, by developing **commercially deployable** molten salt reactors (MSRs)

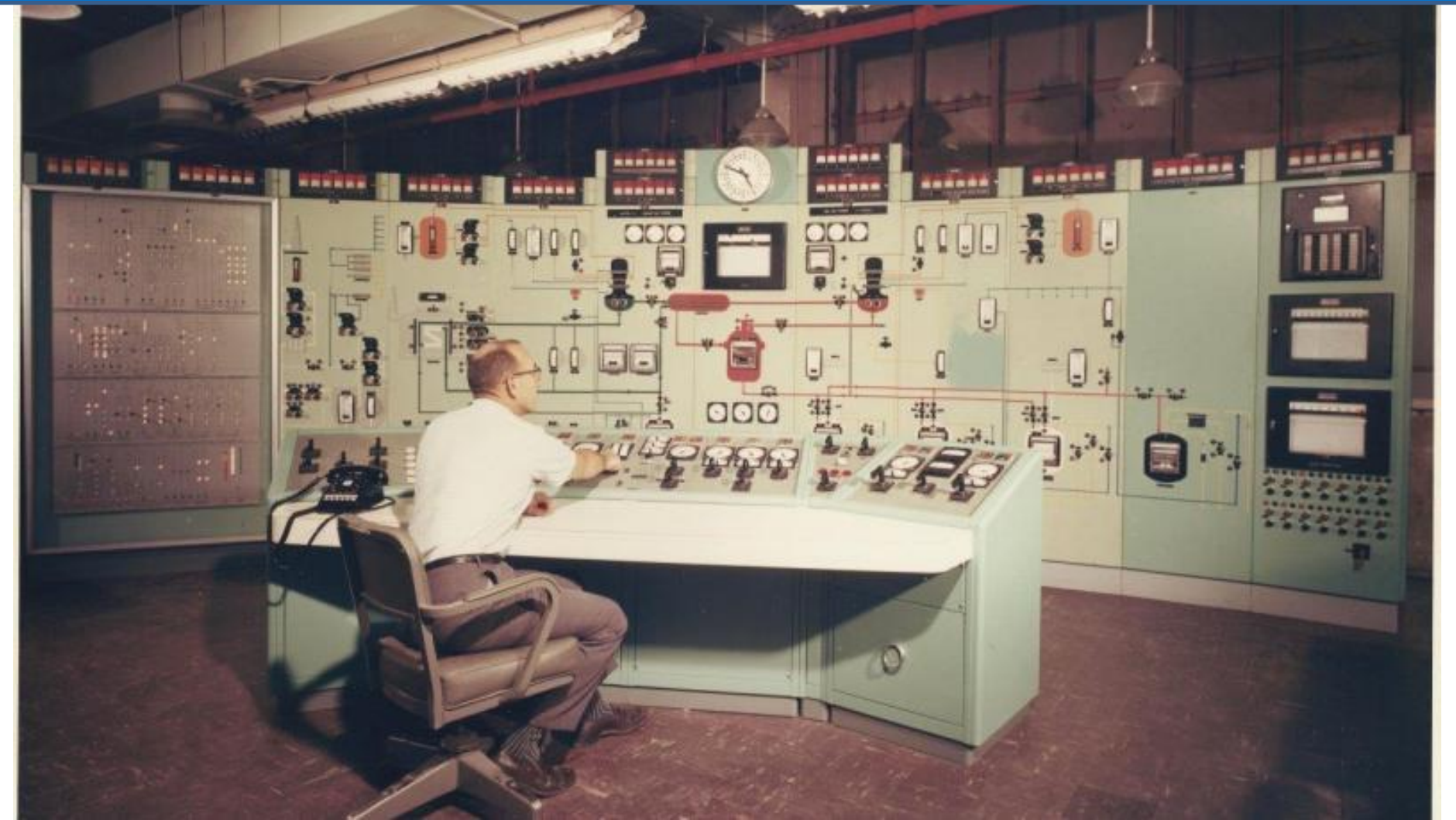
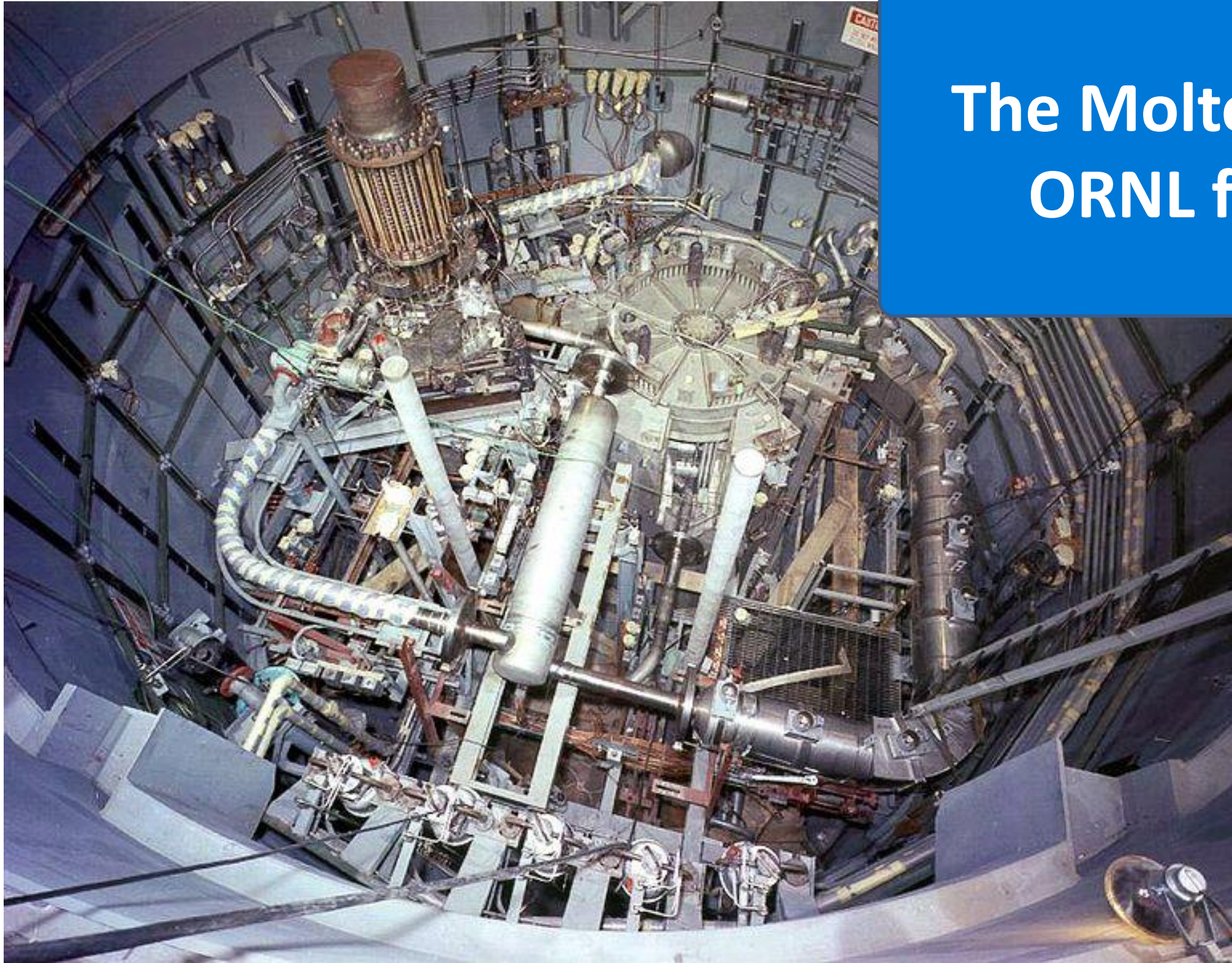
Natura Resources
Research Alliance



Molten Salt Research Reactor is Simplified MSRE

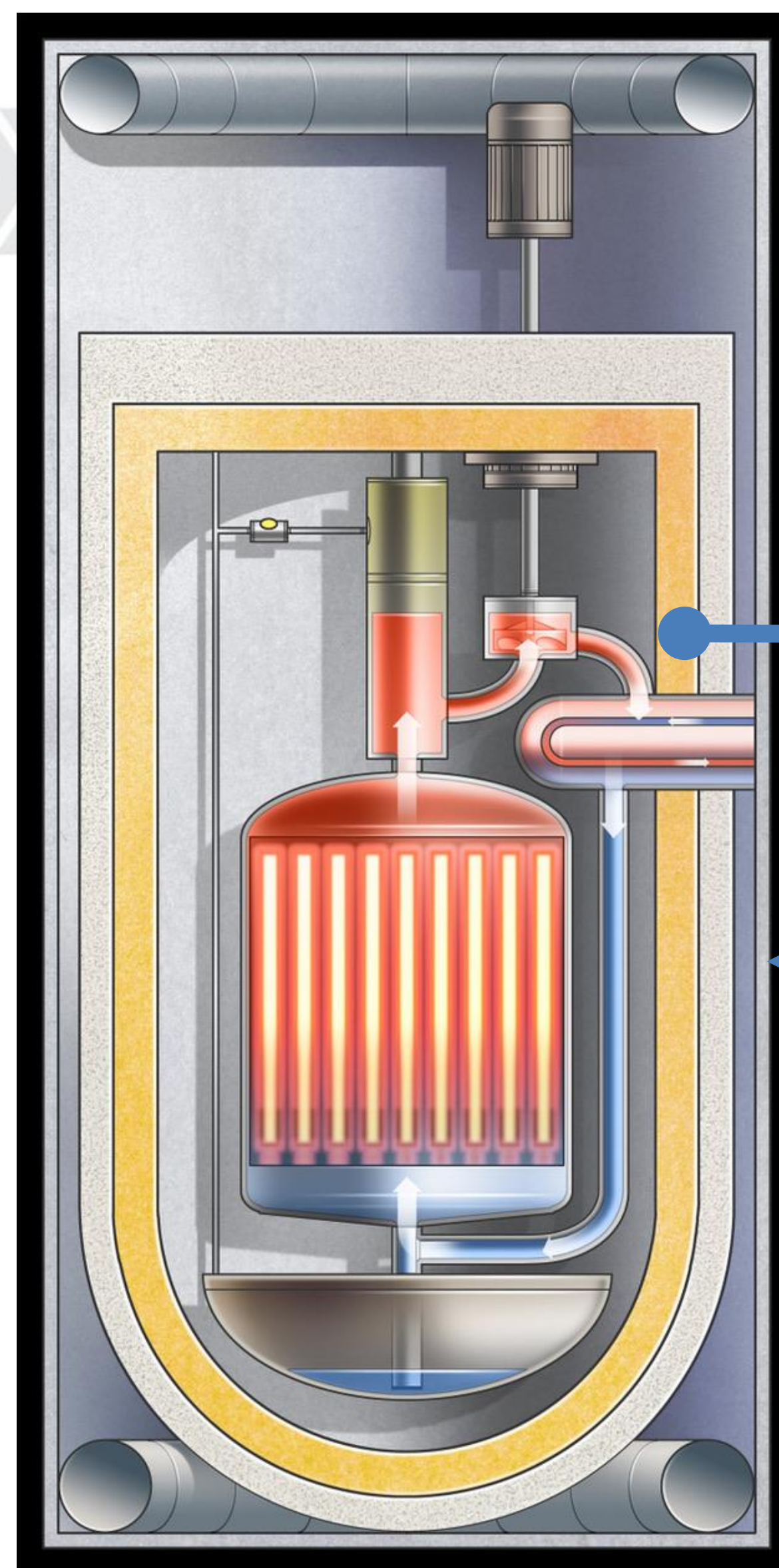
NEXT

The Molten Salt Reactor Experiment operated at ORNL from 1965-1969 on U-235 and U-233.



MSRR safety features

- Layered enclosures:
 - Salt
 - Primary fueled salt loop
 - Reactor Thermal Management System (RTMS)
 - Reactor Enclosure
 - Reactor Cell
- Low pressure system
- Shutdown via core drain
- Passive heat removal during shutdown



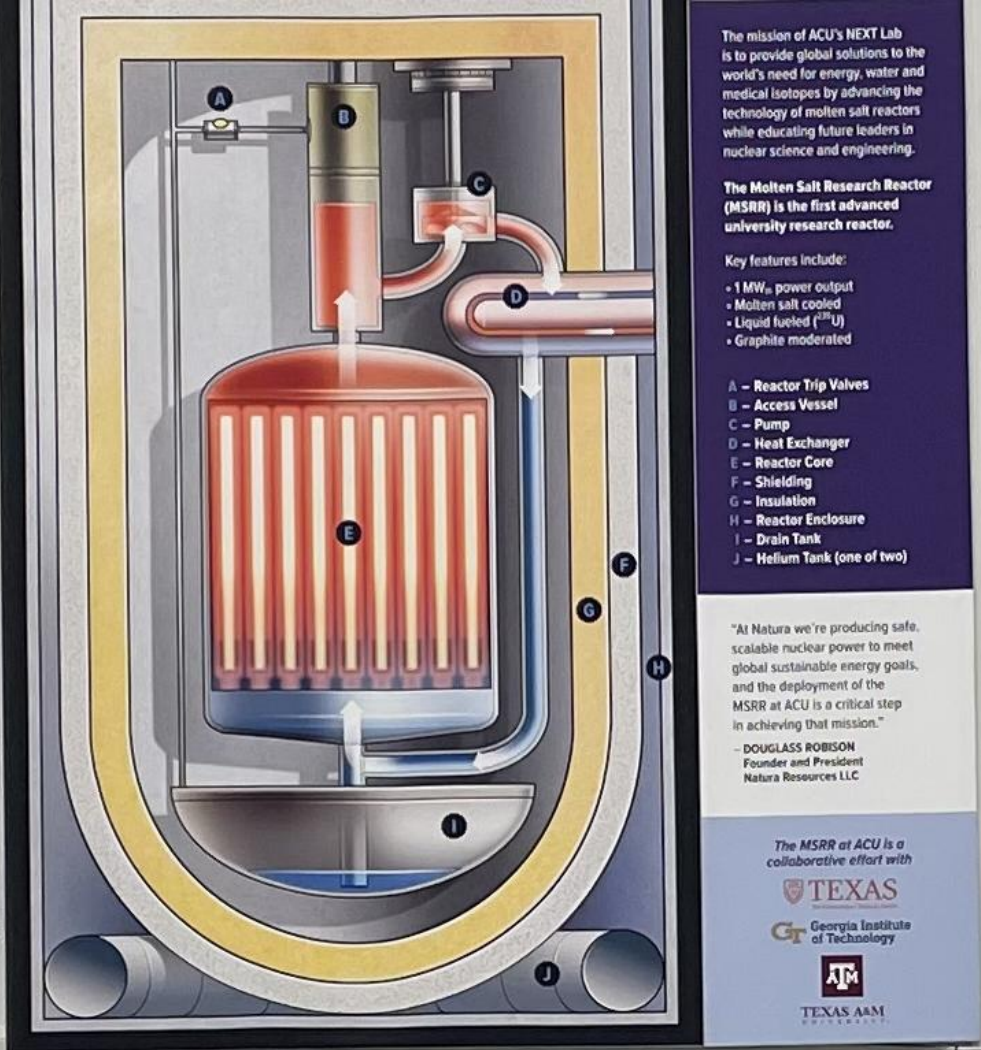
RTMS

Reactor
Enclosure

Historic NRC Construction Permit Approval Sept 16, 2024

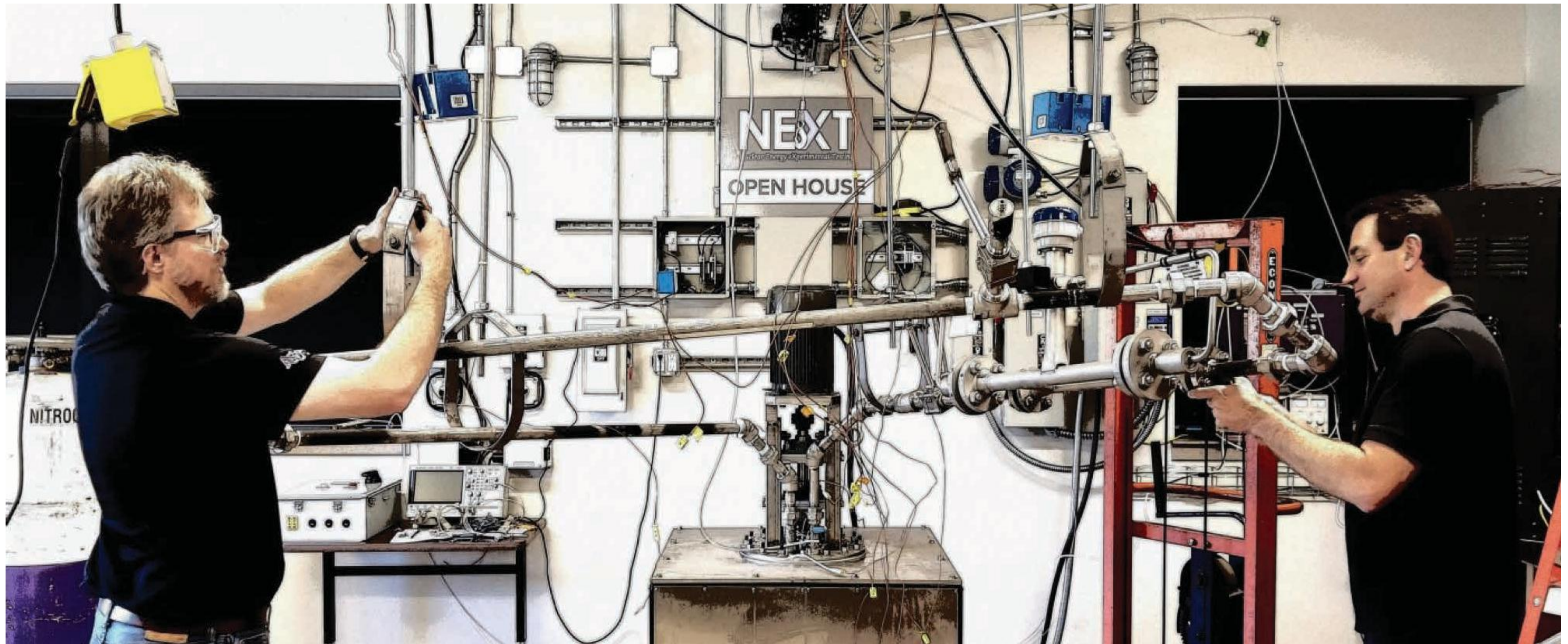


NEXT Lab Team



Molten Salt Test Loop (2018)

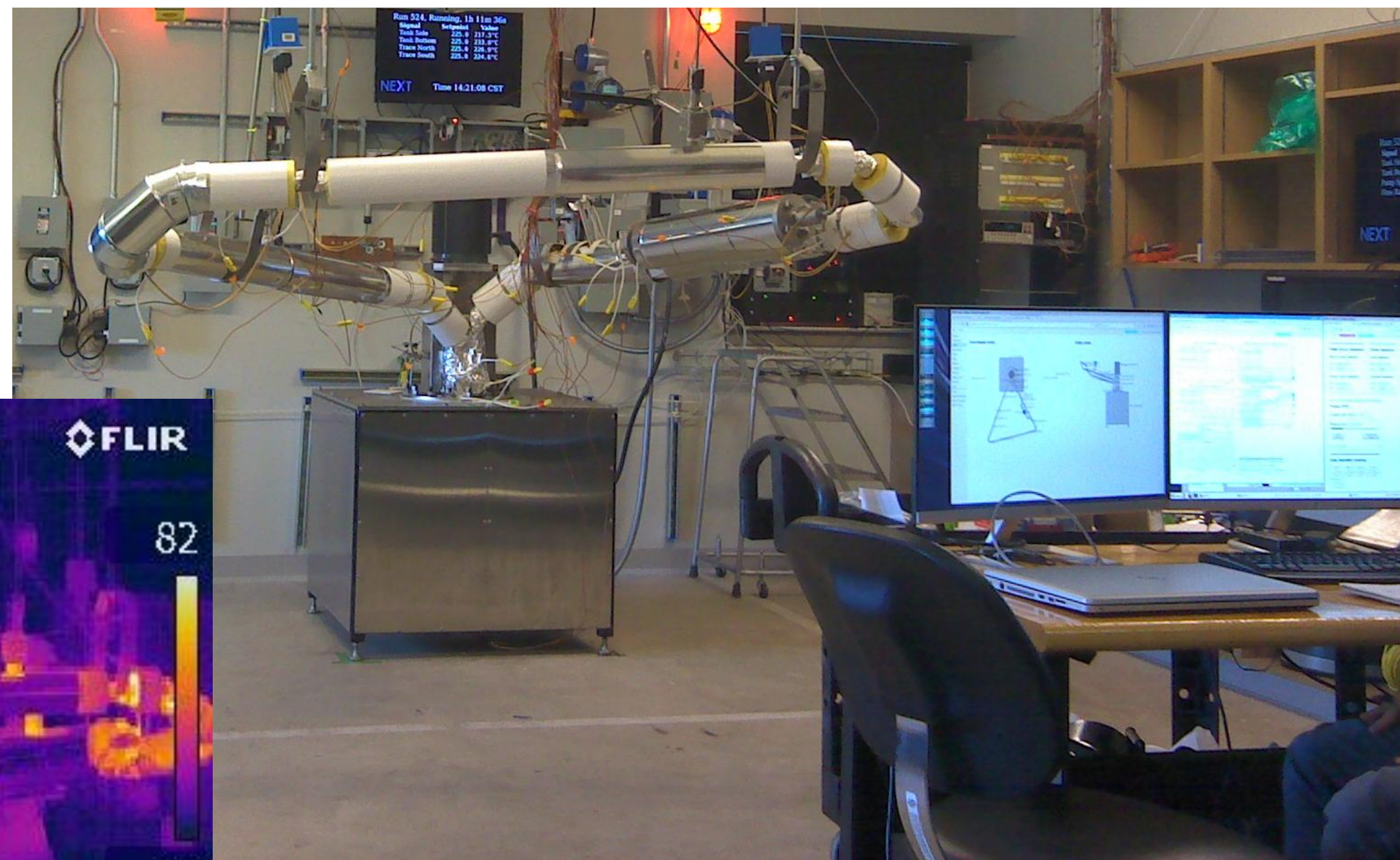
NEXT

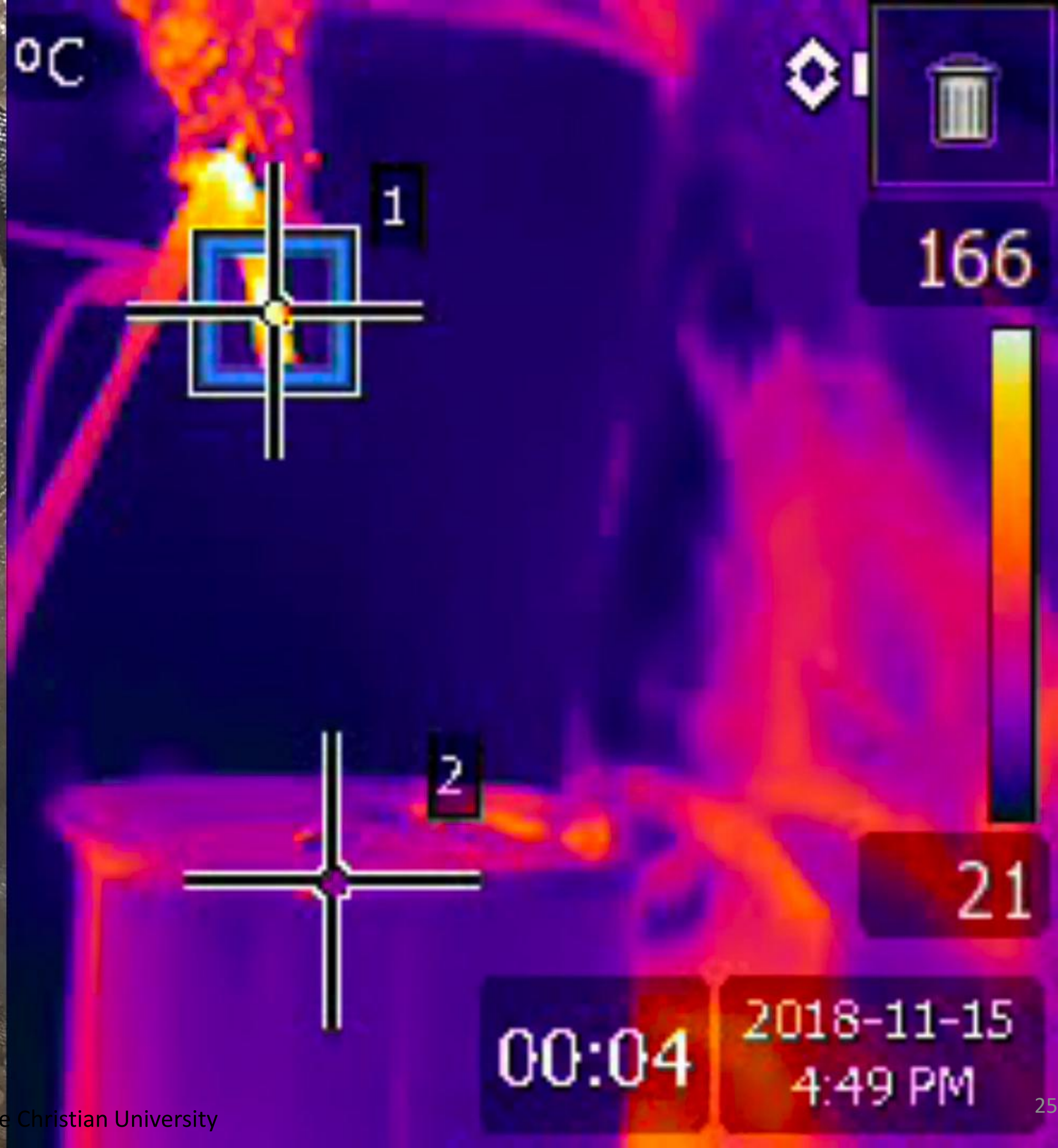


Molten Salt Test Loop

NEXT

Nuclear Energy eXperimental Testing

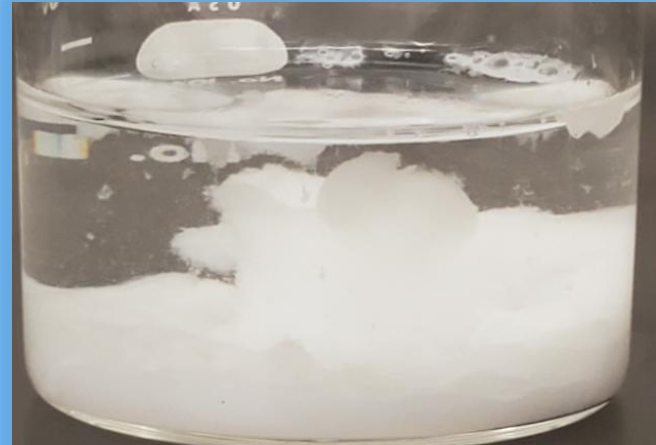




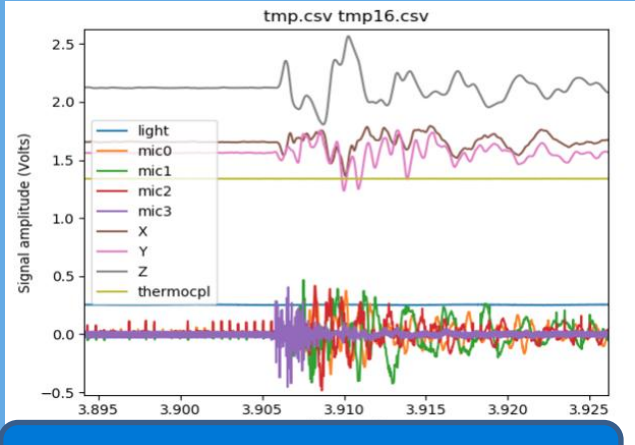
NEXT Lab Research Projects



Molten Salt Test Loop



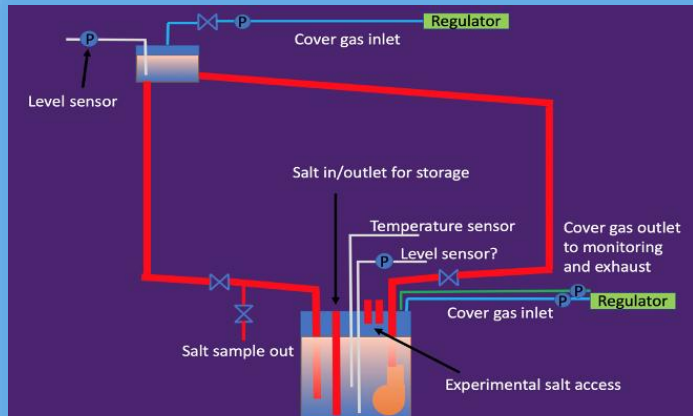
Isotope Extraction & Purification



Instrumentation



Component Test System



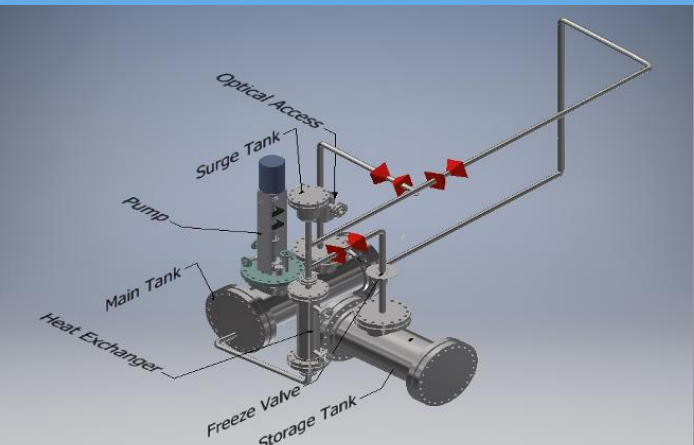
Fluoride Molten Salt Test Loop



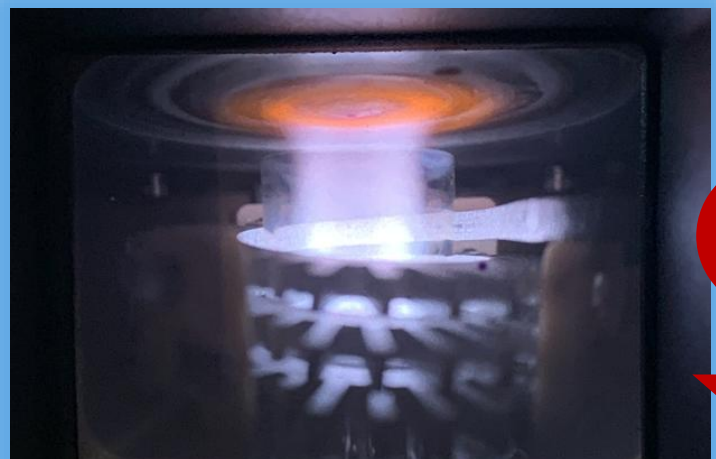
Salt Purification System



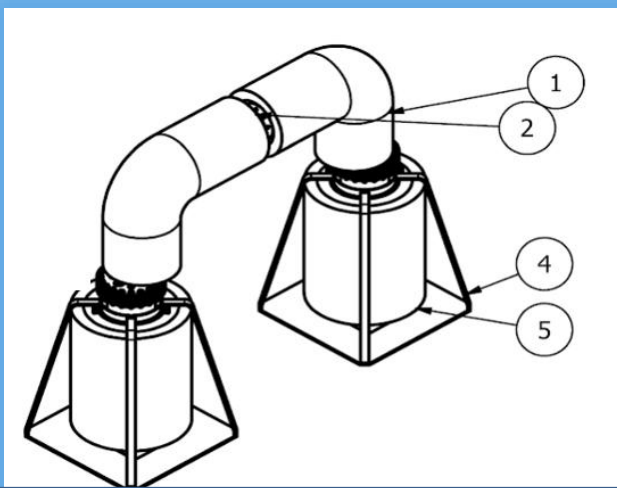
Data Acquisition



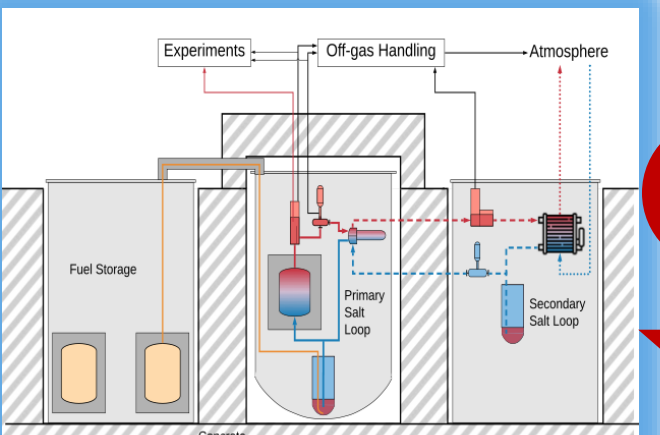
Molten Salt Test System



Chemical Analysis System



Molten Salt Filters



Molten Salt Research Reactor



★ Patented Technology

★ Patent Pending

https://doi.org/10.1016/j.anucene.2023.109772

NEXT Research & Development Labs at ACU

NEXT



Science & Engineering Research Center (SERC)

Advanced Reactor Demonstration Facility

Molten Salt Research Reactor (MSRR) Site

Chemistry Labs

Beryllium Lab

Instrumentation Labs



Bennett Research Labs

Molten Salt Test Loop (MSTL)

Fluoride Molten Salt Test Loop (FMSTL)

Molten Salt Filters

Salt Purification System (SPS)

Instrumentation Labs



Advanced Research Center (ARC)

Molten Salt Test System (MSTS)

Fluoride Salt Purification System (FSP)

Chemistry Lab

Now leased by Natura



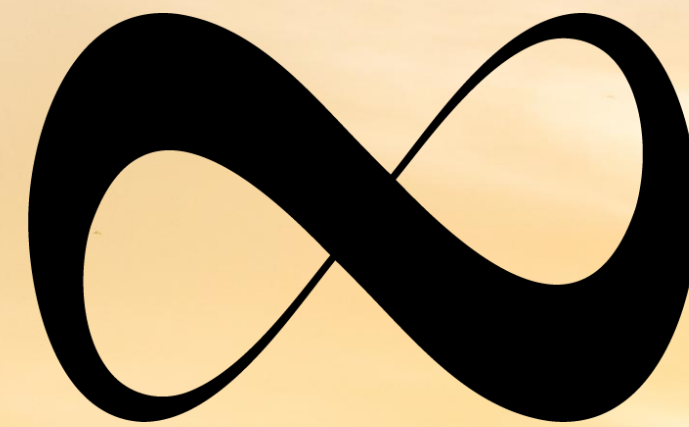


ABILENE CHRISTIAN
UNIVERSITY

NEXT

Nuclear Energy eXperimental Testing

Powered by



Natura Resources



The first advanced reactor test facility in the US

NEXT



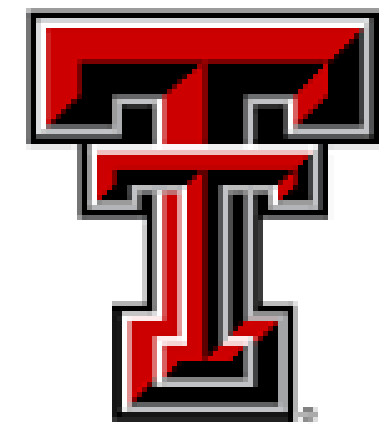


U.S. DEPARTMENT *of* ENERGY

- Allocated 500 kg of HALEU fuel to Natura/ACU for MSRR.
- Picked this project to be part of the DOE Pilot Reactor Program to support Executive Order 14301.
- Awarded the Molten Salt Reactor Experiment Secondary Side Coolant Salt to Natura/ACU.



- Texas committed \$120M to this project in collaboration with Natura Resources including \$8M for desalination at Texas Tech University.
- Texas announced an additional \$350 million for nuclear energy to be managed by the new Texas Advanced Nuclear Energy Office (TANEO).



TEXAS TECH
UNIVERSITY.



The Natura Resources Research Alliance is leading the way in SMR and MSR development and deployment.

- ACU received a construction permit for the first advanced university research reactor with the NRC.
- ACU completed the SERC to house the MSRR.
- Natura/ACU are on a path to be the first operating advanced reactor in the USA.
- Natura is positioned to be one of the first commercial reactor vendors capable of deployment.



THANK YOU

naturaresources.com

acu.edu/next

