NEXT

Non-power and Advanced Reactors: Merging of Two Worlds

Dr. Rusty Towell

NEXT Lab Director, Abilene Christian University

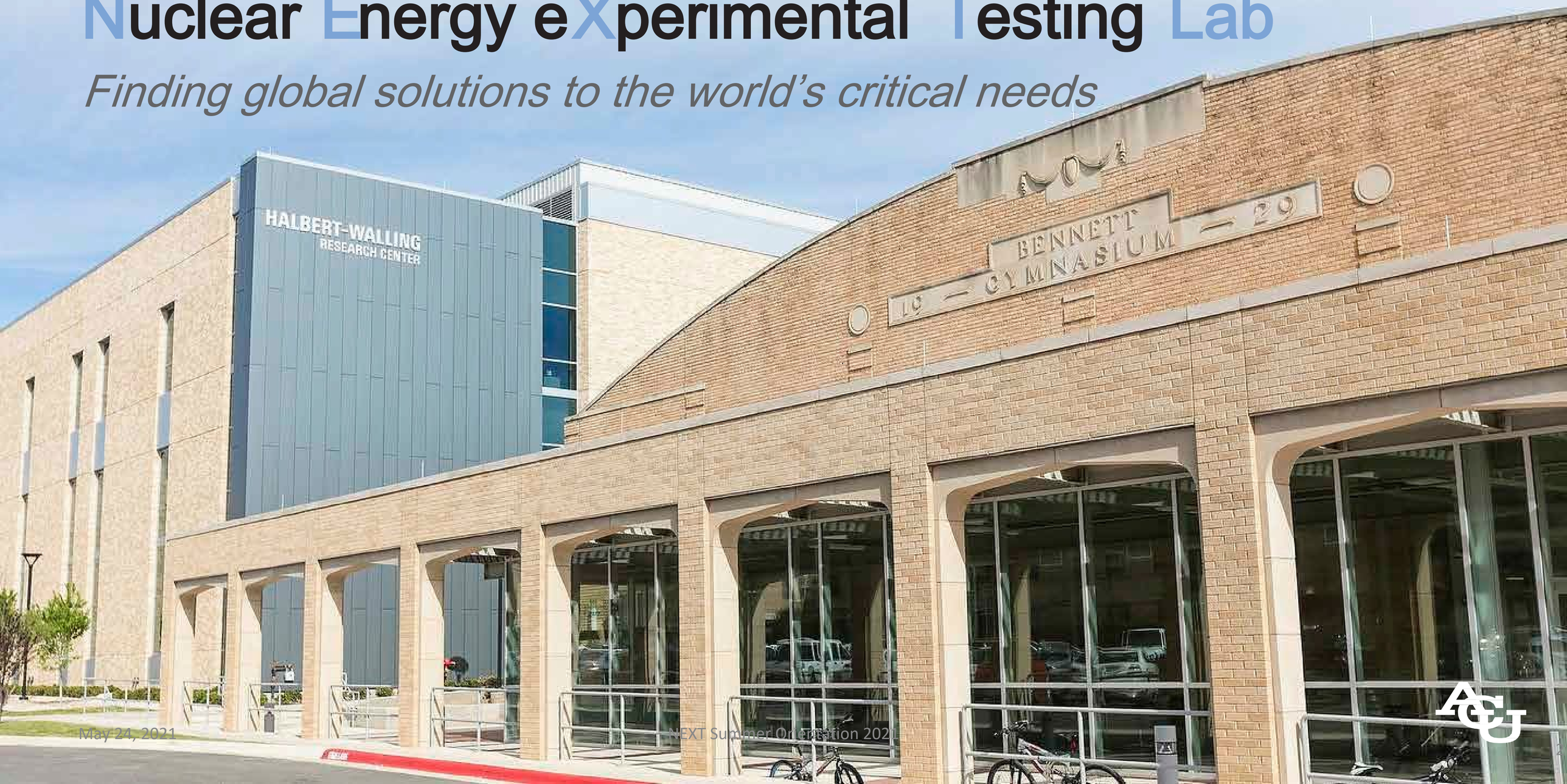
NRC Project Number 99902088 supporting pre-application licensing activities

Natura Resources
SUSTAINABLE ENERGY

ACU
ABILENE CHRISTIAN UNIVERSITY

Nuclear Energy eXperimental Testing Lab

Finding global solutions to the world's critical needs



World's Critical Needs

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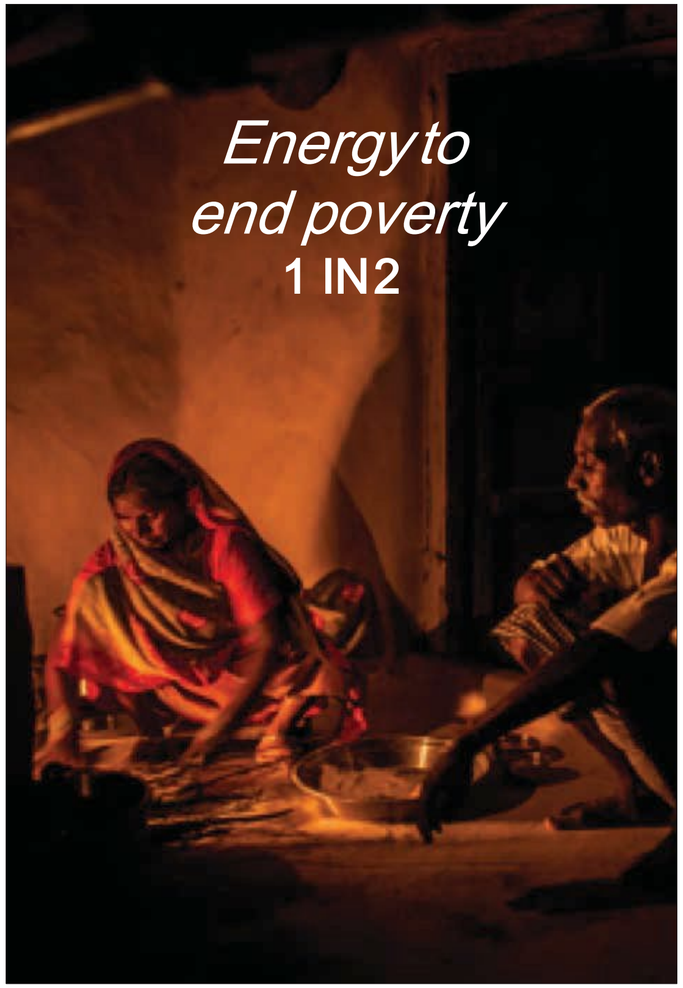
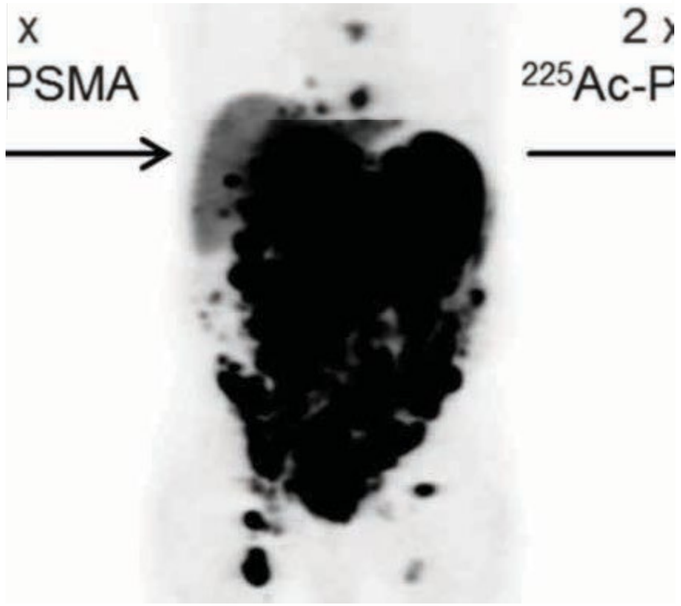
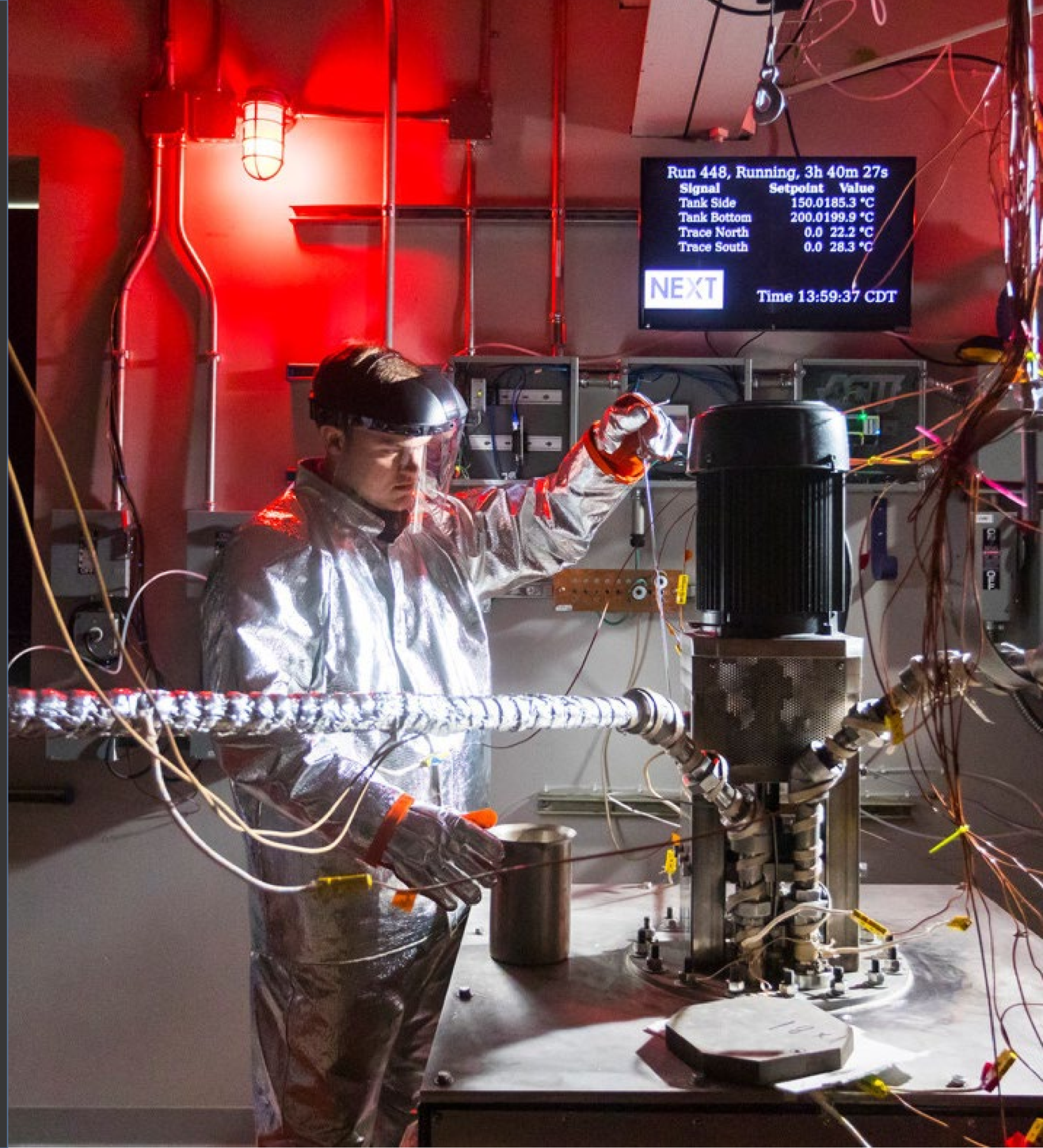


Medical Isotopes for cancer
1 IN2



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

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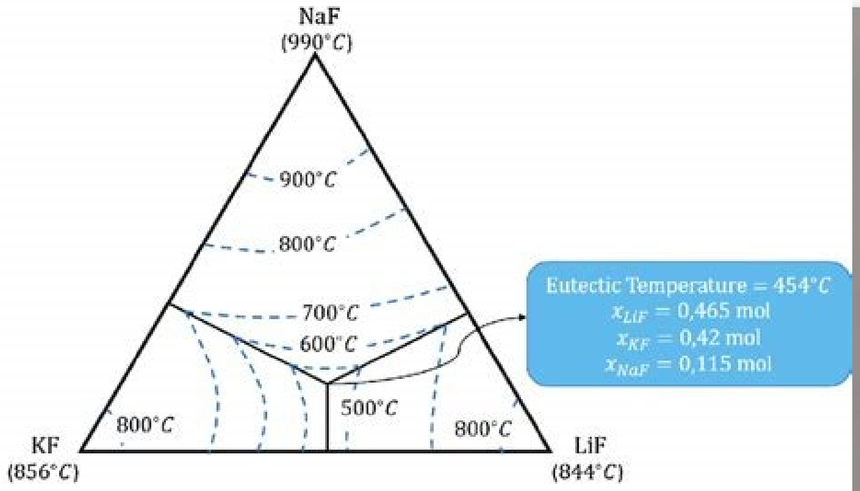

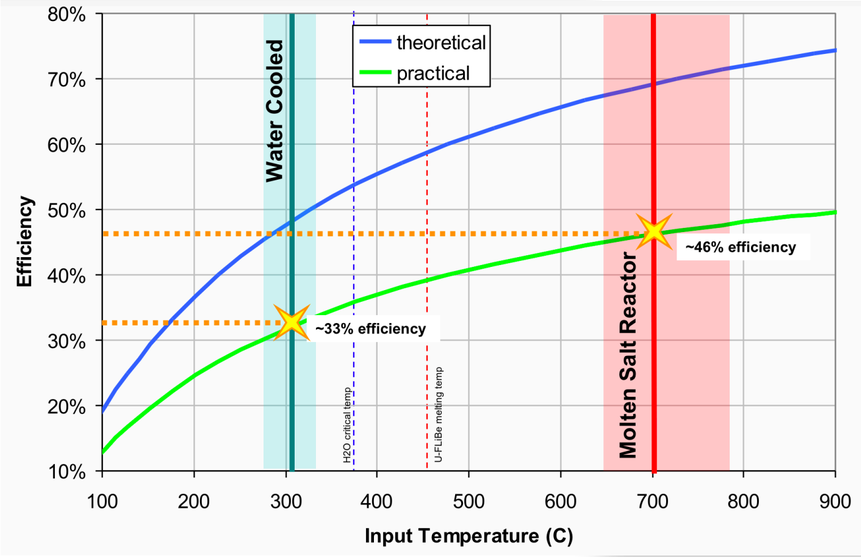

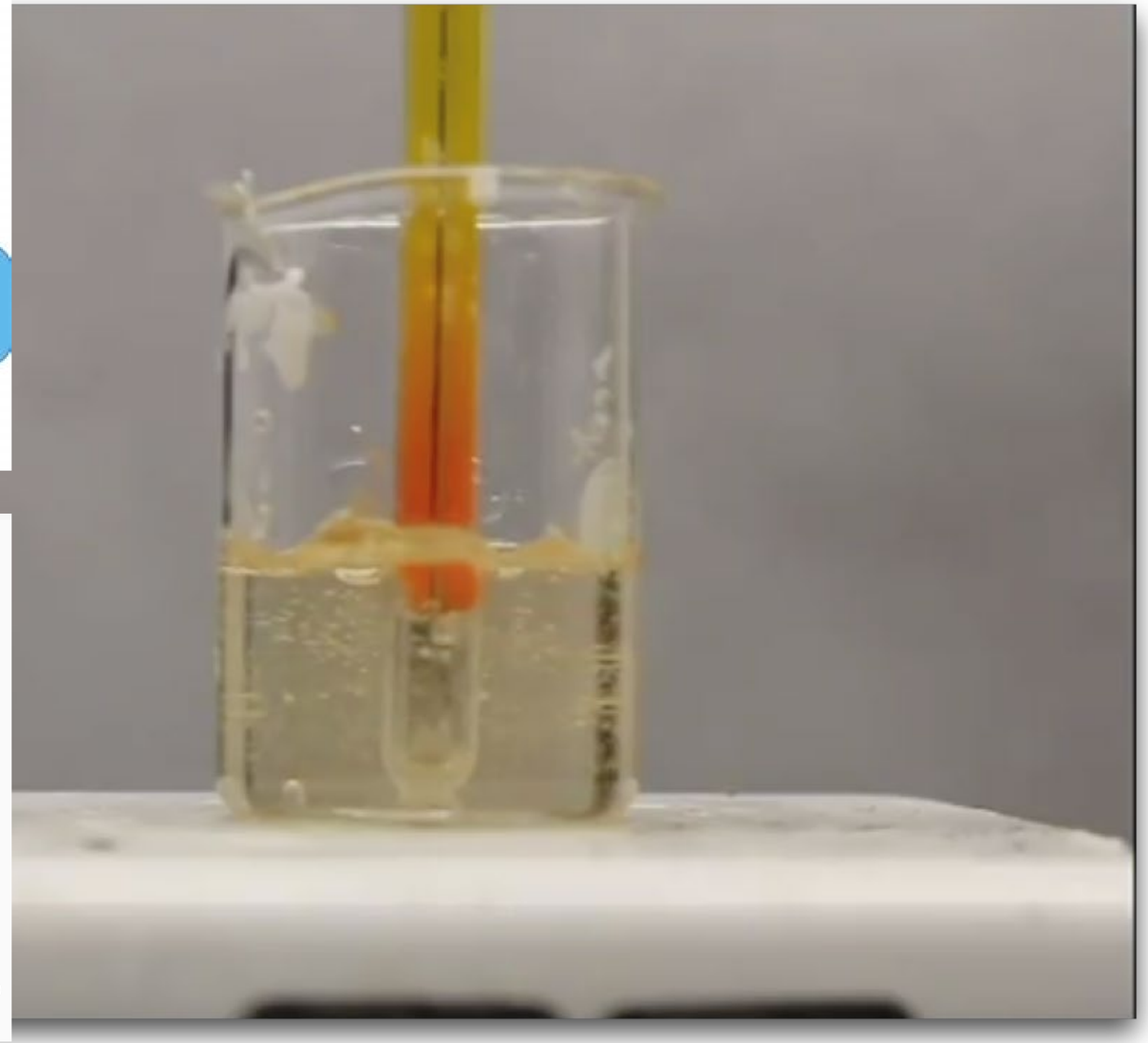

Key Requirement 2: Liquid Fuel

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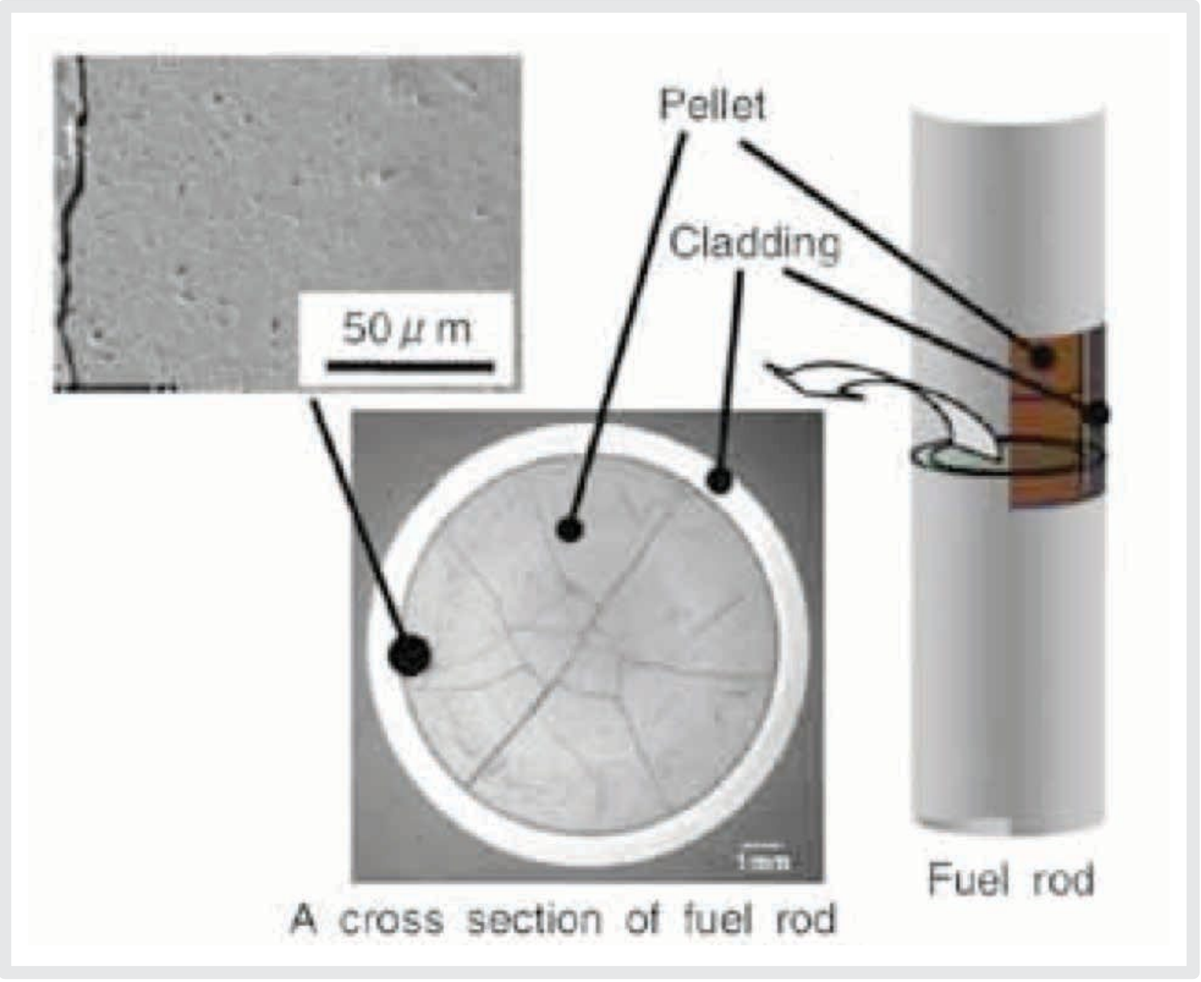
Old Solid Fuel Technology



Advantages of Liquid Fuel

- Increased fuel utilization
- Decreased waste
- Access to medical isotopes
- Can not melt down

NEXTRA

Nuclear Energy eXperimental Testing Research Alliance

NEXT

Nuclear Energy eXperimental Testing

TEXAS

The University of Texas at Austin

TEXAS A&M UNIVERSITY

ABILENE CHRISTIAN UNIVERSITY

Georgia Tech

Natura Resources
SUSTAINABLE ENERGY


TEXAS
A&M
GEORGIA TECH
GT

NEXT Lab Research Projects

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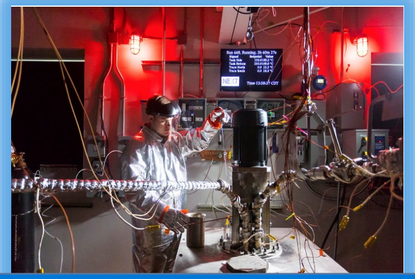
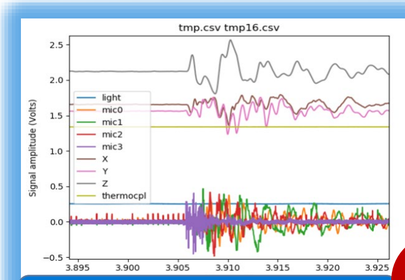
Nuclear Energy eXperimental Testing



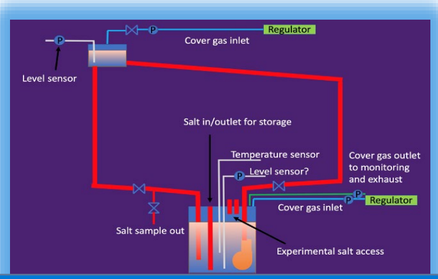
Molten Salt Test Loop

Isotope Extraction & Purification



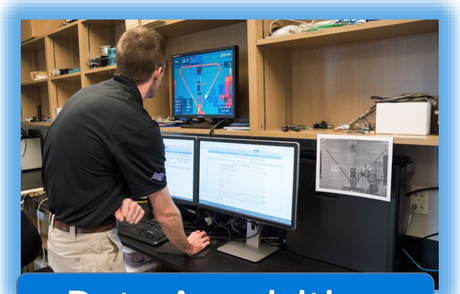
Instrumentation

Component Test System

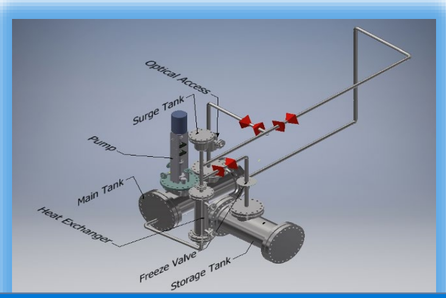


Fluoride Molten Salt Test Loop

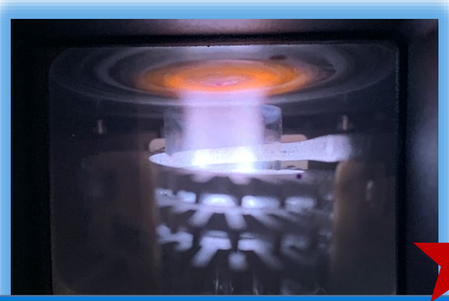
Salt Purification System



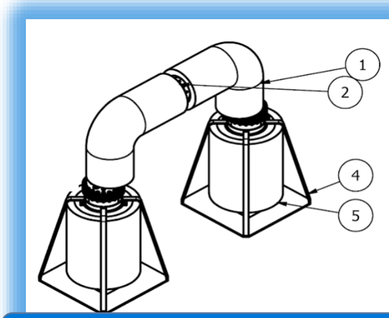
Data Acquisition



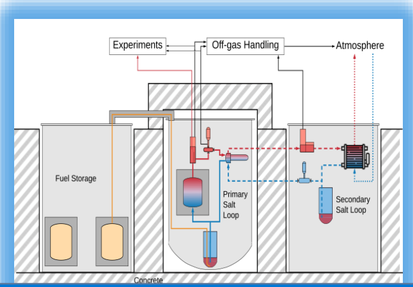
Molten Salt Test System



Chemical Analysis System



Molten Salt Filters



Molten Salt Research Reactor

✪Patented Technology

✭Patent Pending

MSRR is Simplified MSRE

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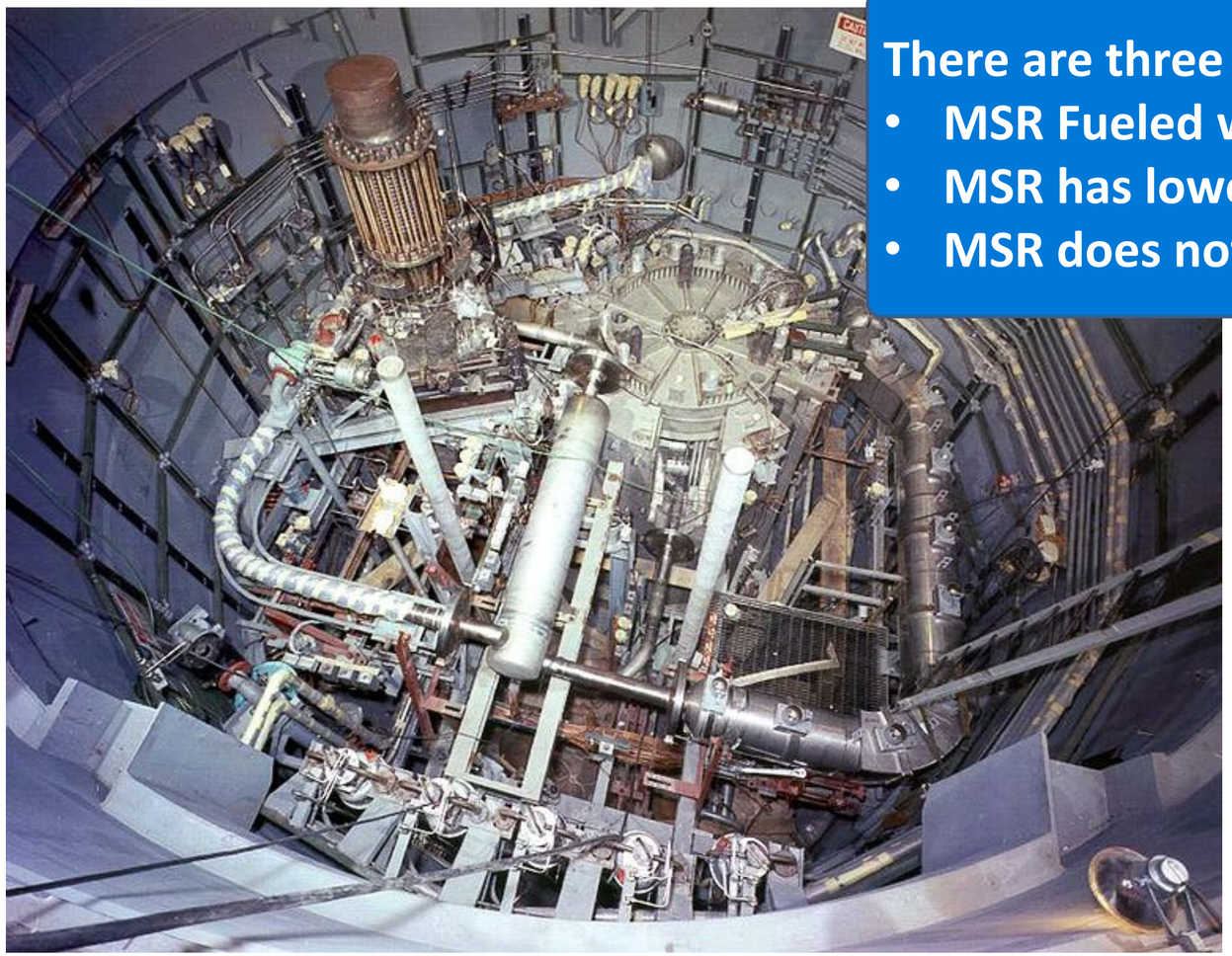
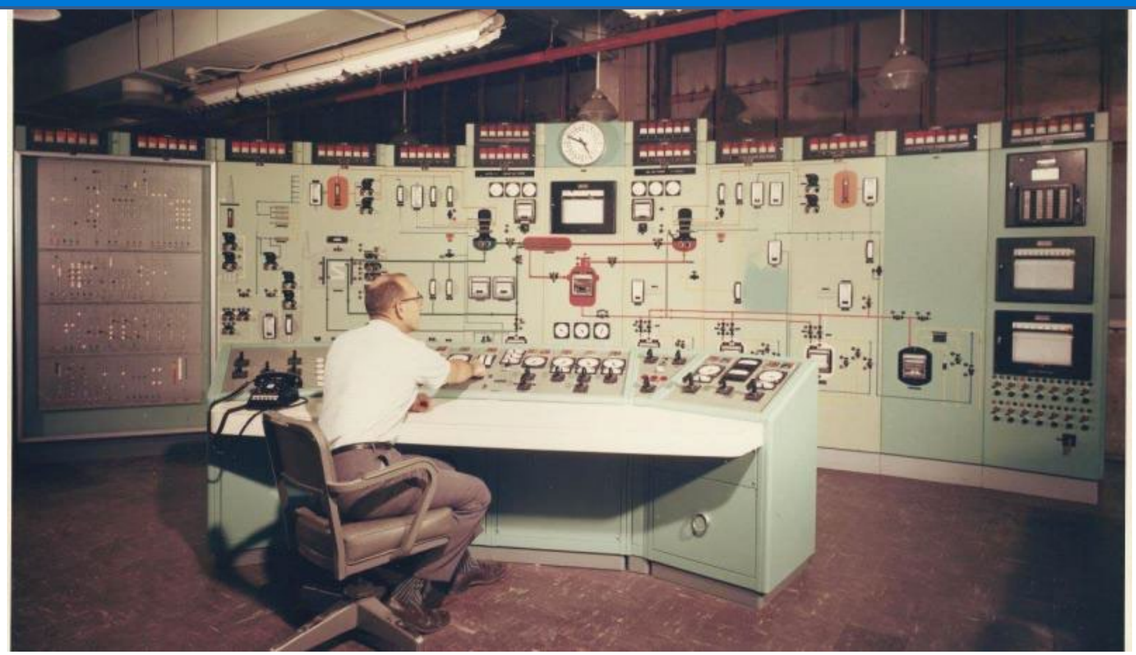
Nuclear Energy eXperimental Testing



There are three major differences between the MSRE and the MSRR

- **MSR Fueled with HALEU instead of HEU**
- **MSR has lower power and power density**
- **MSR does not require external cooling water**



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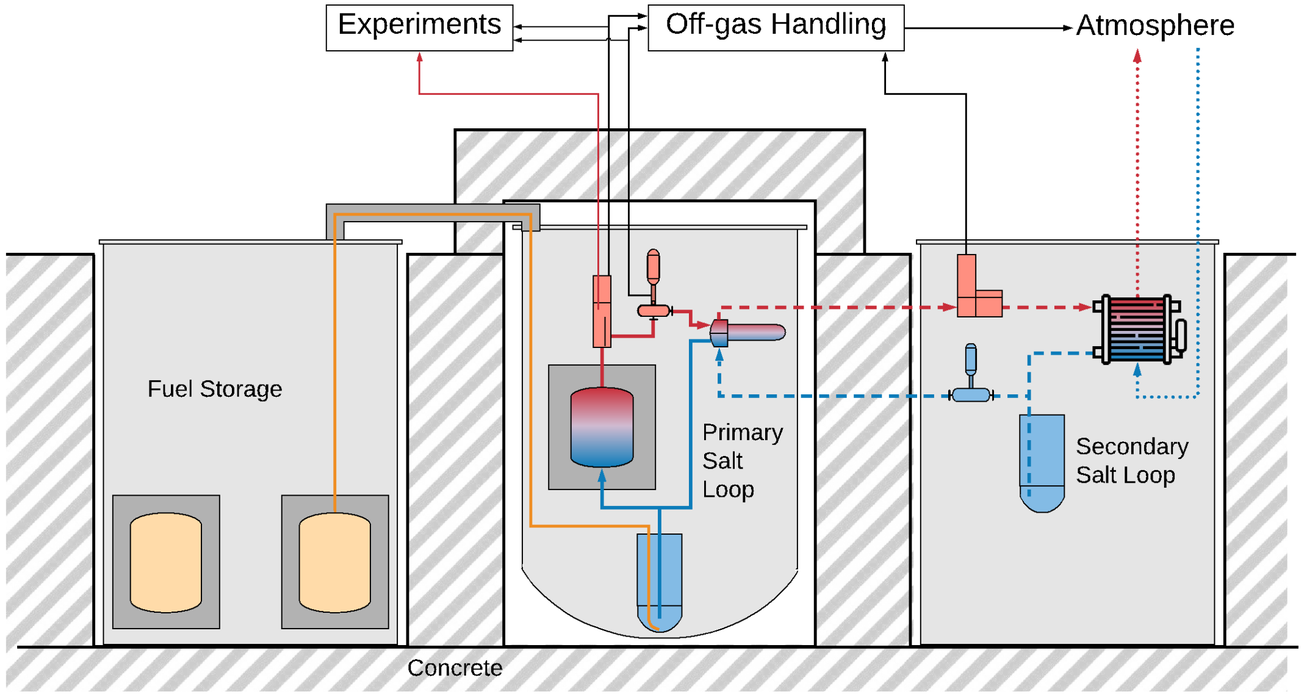
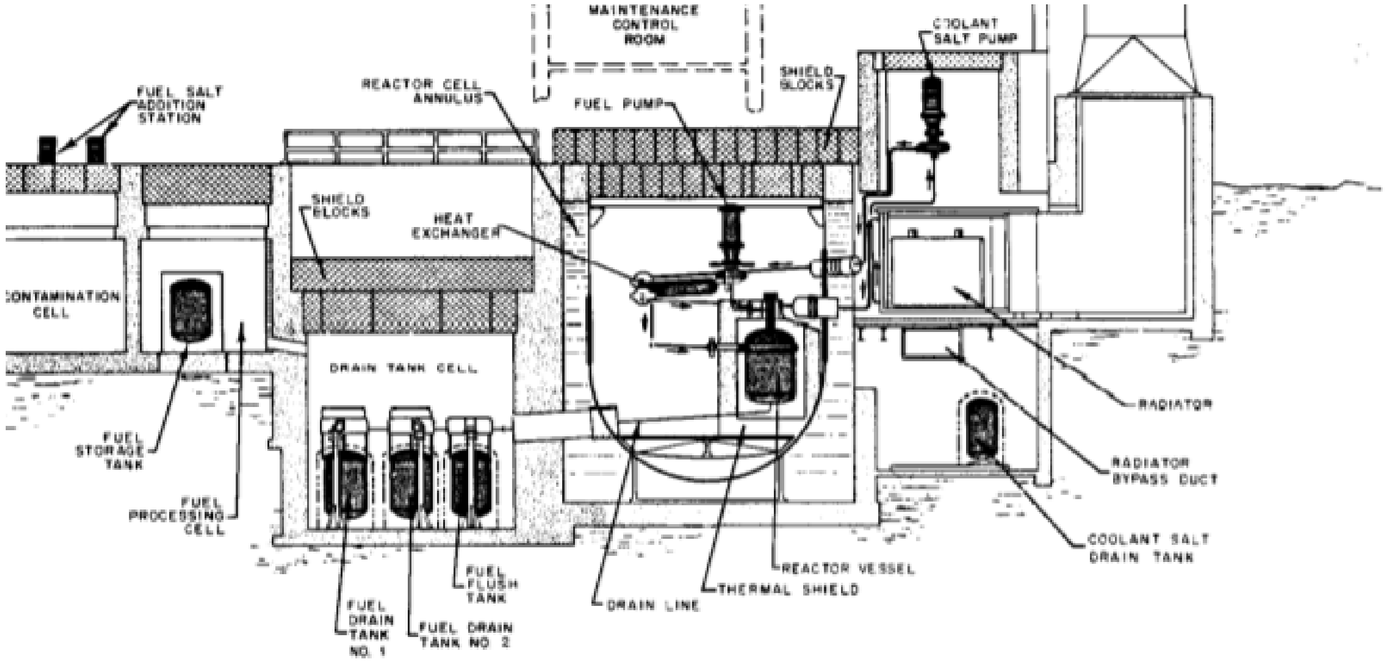
MSRR



MSRE



MSRR to be Licensed as a University Research Reactor

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Nuclear Energy eXperimental Testing

- ACU is seeking a license under AEA Section 104c pursuant to 10 CFR 50.21(c) for a University Research Reactor facility with a maximum licensed power level of 1 MW_{th}.

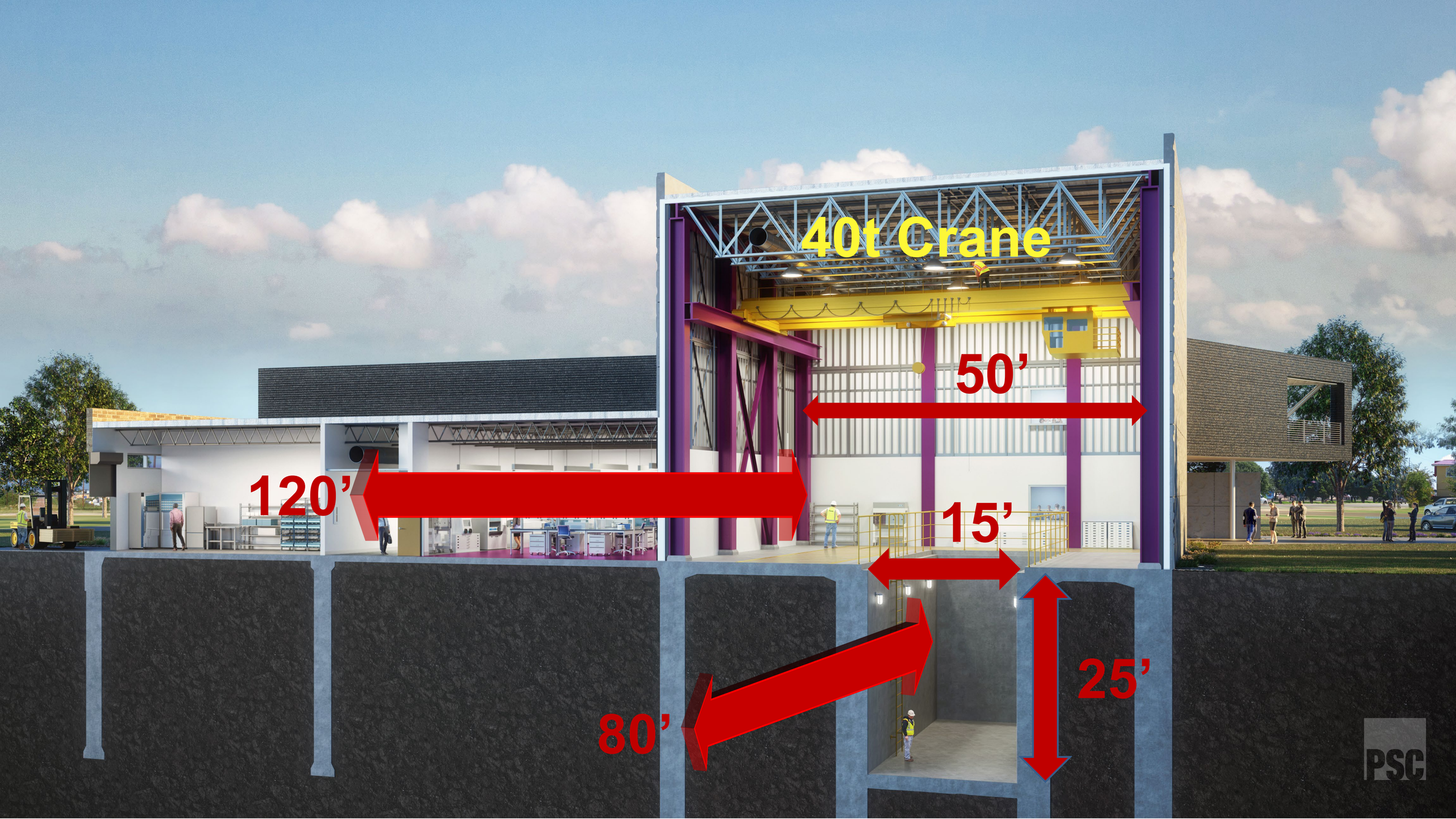
- The ACU MSRR will be a non-power utilization facility as described in 10 CFR 50.21(c) - “useful in the conduct of research and development activities of the types specified in Section 31 of the Atomic Energy Act (AEA).”

- The MSRR will not be a commercial or industrial facility as specified in paragraph (b) of 10 CFR 50.21 or in 10 CFR 50.22 and MSRR activities will be consistent with licensing under Section 104c of the AEA as amended by NEIMA.

ACU

Science and Engineering Research Center

- 28,000 ft^2 facility
  - 6, 000 ft^2 Research Bay
  - Specialty Research Labs
  - Offices
- Design completed by Parkhill
- Linbeck construction company
- Allowed in 10 CFR 50.10(a)(2)(x)
- Design Completed: 2021
- Begin Construction: 2022
- Completed: 2023


40t Crane
50’
120’
15’
25’
80’
PSC

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THANK YOU

acunextlab.org

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Development Corporation of Abilene

U.S. DEPARTMENT OF ENERGY

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