



ADVANCED REACTOR SAFEGUARDS

Preliminary University Advanced Reactor Assessment

PRESENTED BY

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10/31/2023

LA-UR-23-32262

Background

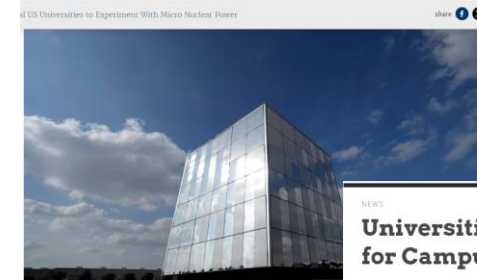


- Advanced reactor/microreactor technology is gaining interest for an increasing variety of applications.

- Local power
- Remote locations
- Isotope production

- Universities in the United States represent a growing user base exploring the feasibility of siting advanced/microreactors on college campuses.

Several US Universities to Experiment With Micro Nuclear Power



Universities Consider for Campus Power

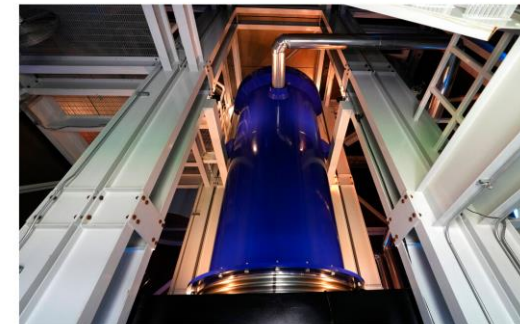
March 01, 2023 by Claire Turvill

A new generation of micro nuclear provide a decarbonized electricity a

Tiny nuclear reactors that produce one-hundredth the size of an energy alternative universities are interested in.

Micro-Nuclear Power On College Campuses

Thursday, February 9 2023 by JENNIFER McDERMOTT Associated Press
Share this story: f x



AP/David J. Phillip
A cross-section of a prototype reactor is shown inside Los Alamos National Laboratory's microreactor demonstration unit.

If your image of nuclear power is giant, cylindrical concrete cooling towers pouring out steam on a site that takes up hundreds of acres of land, soon there will be an alternative: tiny nuclear reactors that produce only one-hundredth the electricity and can even be delivered on a truck.

Small but meaningful amounts of electricity — nearly enough to run a small campus, a hospital or a military complex, for example — will pulse from a new generation of microreactors. Now, some universities are taking interest.



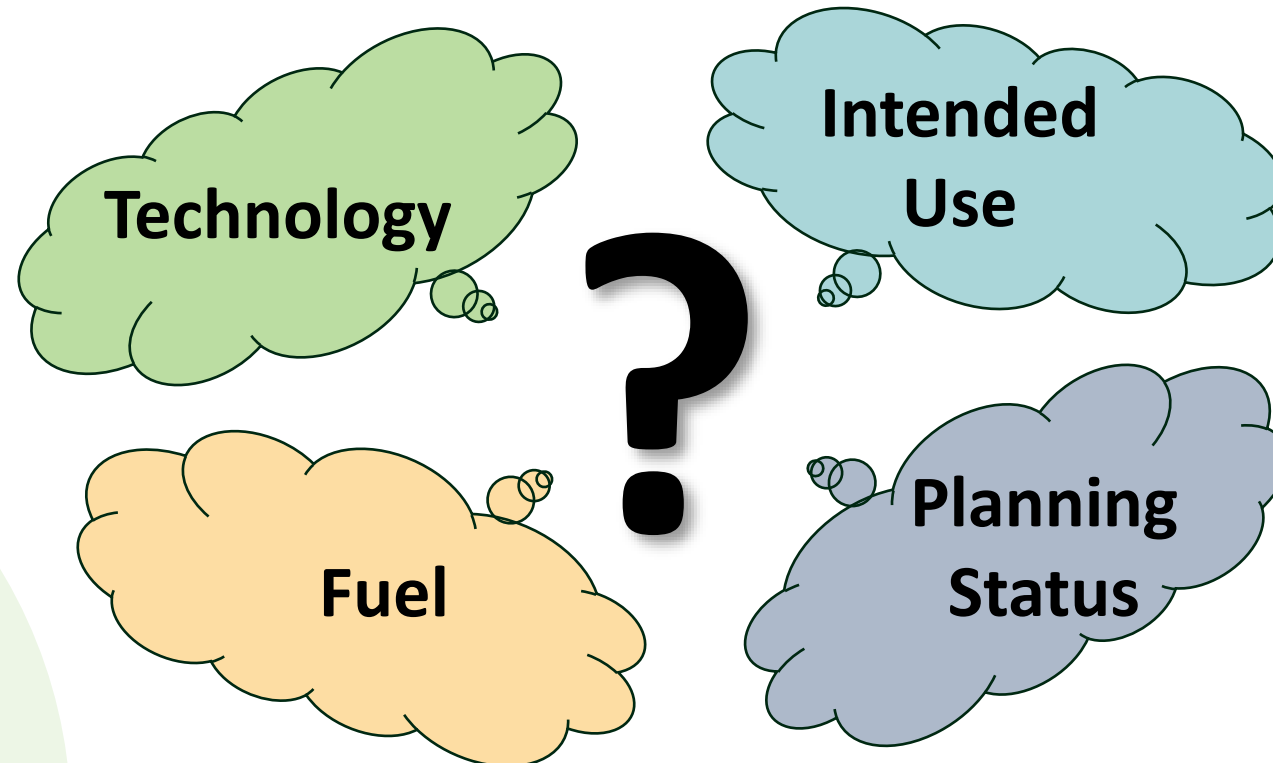
A nuclear power plant. Image used courtesy of Pixabay.

A screenshot of a World Nuclear News article. The main headline is 'US university plans to build microreactor' dated 29 June 2021. The article text states: 'The University of Illinois at Urbana-Champaign (UIUC) has informed the US Nuclear Regulatory Commission (NRC) that it intends to construct an Ultra-Safe Nuclear Corporation (USNC) Micro Modular Reactor on its campus. The university said the submission of the letter of intent is the first step in the NRC's two-step process to license the new research and test reactor facility.' Below the text is an image of a microreactor unit with the USNC logo. A sidebar on the right lists 'Most read' articles and includes a 'World Nuclear Association' logo.

Project Overview



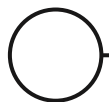
- The goal of the proposed effort is to perform a preliminary scoping study of domestic universities' advanced/microreactor activities.



Project Overview



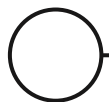
- Project Status
 - Started September 2023
- Tasks
 - University Engagement
 - Preliminary assessment
 - Questions/topics for engagement
 - Outreach
 - Regulation Overview
 - Review regulations
 - Future Planning
 - Identify potential future activities
 - Reports; Focused workshops; Individual engagements; etc.



University Overview



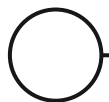
- University nuclear department and program overview (visual example only!)



University Overview



- University nuclear department and program overview (visual example only!)



University Overview – Advanced/Micro Reactors

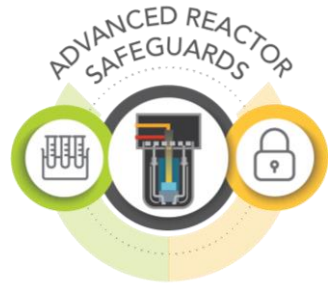


- Universities interested in advanced reactors are not limited to those with nuclear programs

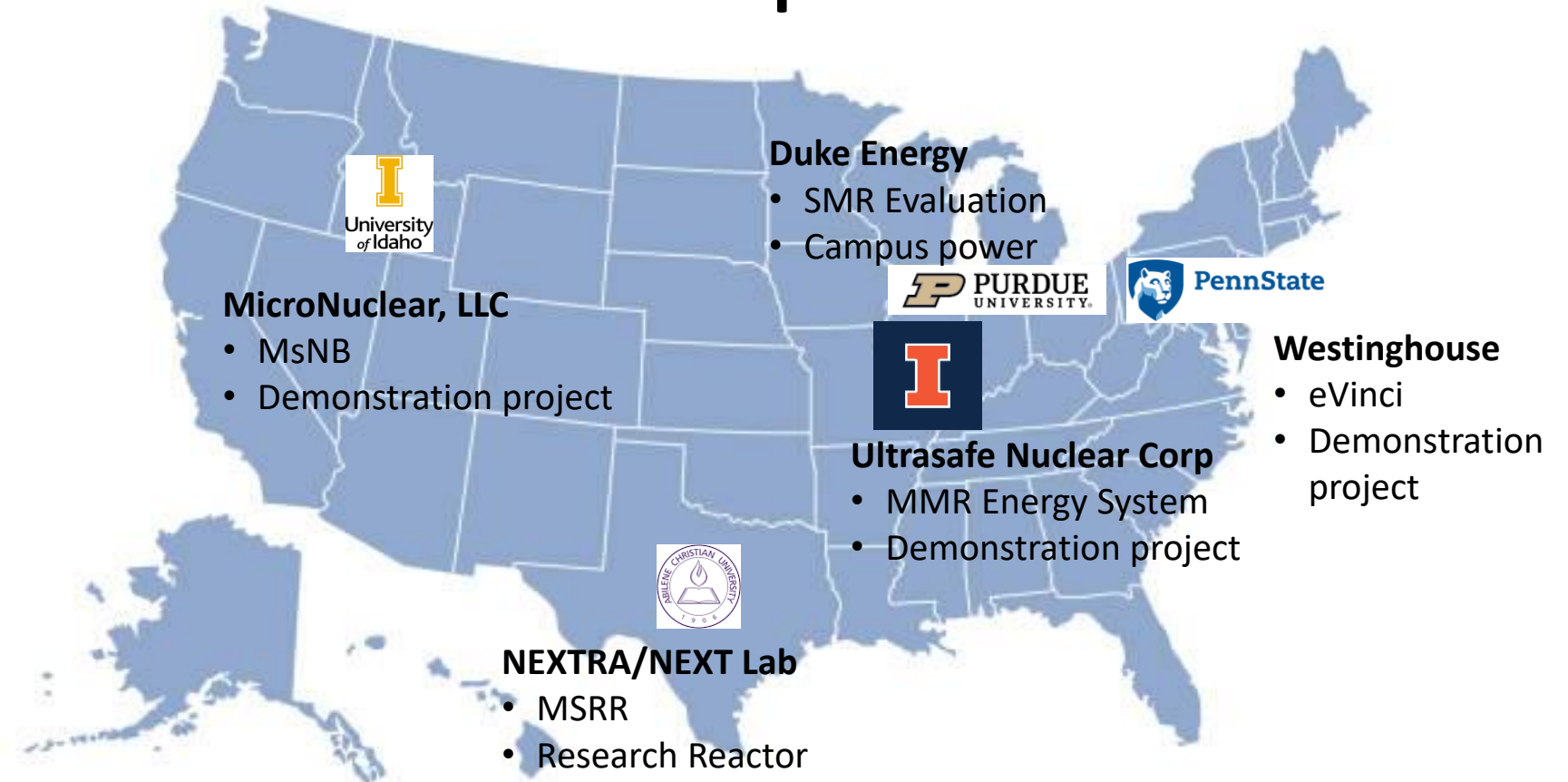
Example



University Overview – Advanced/Micro Reactors



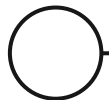
Example



University Overview



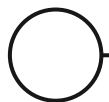
- Activities are at different stages of planning
 - Assessment
 - Memorandum of Understanding
 - Preparing for license application
 - Current application
- Different technologies
- Different use cases
 - Demonstration
 - Research reactor
 - Power



University Assessment and Engagement



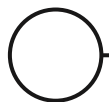
- Preparing topics and questions for preliminary engagement
 - Examples:
 - Existing research reactor
 - Planning an advanced/microreactor deployment on campus
 - Involved with a consortium
 - Advanced/microreactor technology that is being pursued
 - Fuel type/source
 - Proposed use
 - Current stage of planning



Regulatory Overview



- Review of existing regulations
 - 10 CFR 73
 - Graded approach for research reactors
 - 10 CFR 20
 - 10 CFR 50
 - 10 CFR 51
 - 10 CFR 52
 - Regulatory Guide 1.233
 - NUREGs
 - The list goes on...



Regulatory Overview



- Updates for advanced reactors
 - 10 CFR 53
 - SECY-22-0072
 - SECY-23-0021
 - Regulatory Guide 1.233
 - This list also goes on...



POLICY ISSUE (Information)

March 1, 2023

SECY-23-0022

FOR:

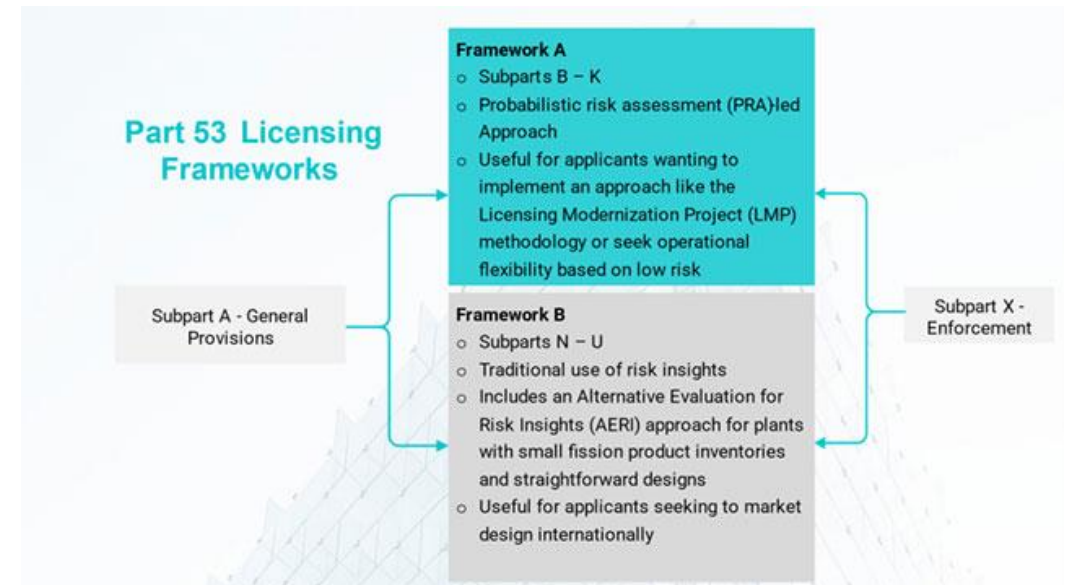
The Commissioners

FROM:

Andrea D. Veil, Director
Office of Nuclear Reactor Regulation

SUBJECT:

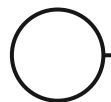
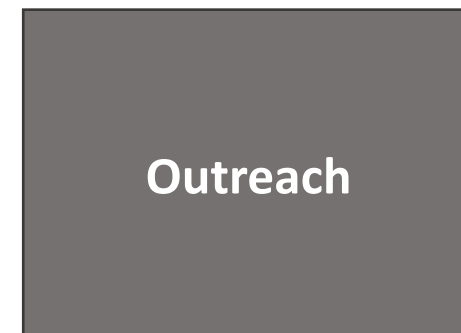
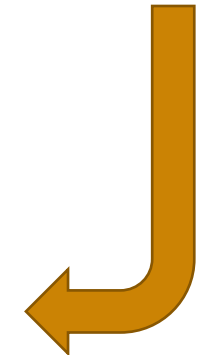
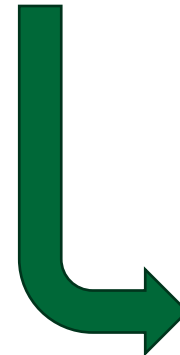
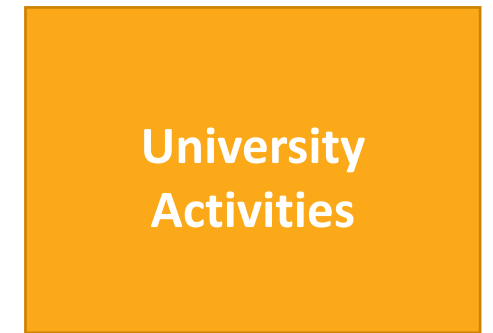
ADVANCED REACTOR PROGRAM STATUS



Next Steps



- University overview
 - Develop and refine questions
 - Coordinate outreach
- Regulations
 - Continue review
- Outreach avenues
 - Direct engagement
 - Consortia meetings
 - NEDHO
 - TRTR Annual Meeting
 - Conferences





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