



NextGen MURR ANSI/ANS-15.8 Quality Assurance Program Development

9-24-2026

**National Organization of Test, Research & Training Reactors
Annual Conference 2026**



NextGen MURR

University of Missouri

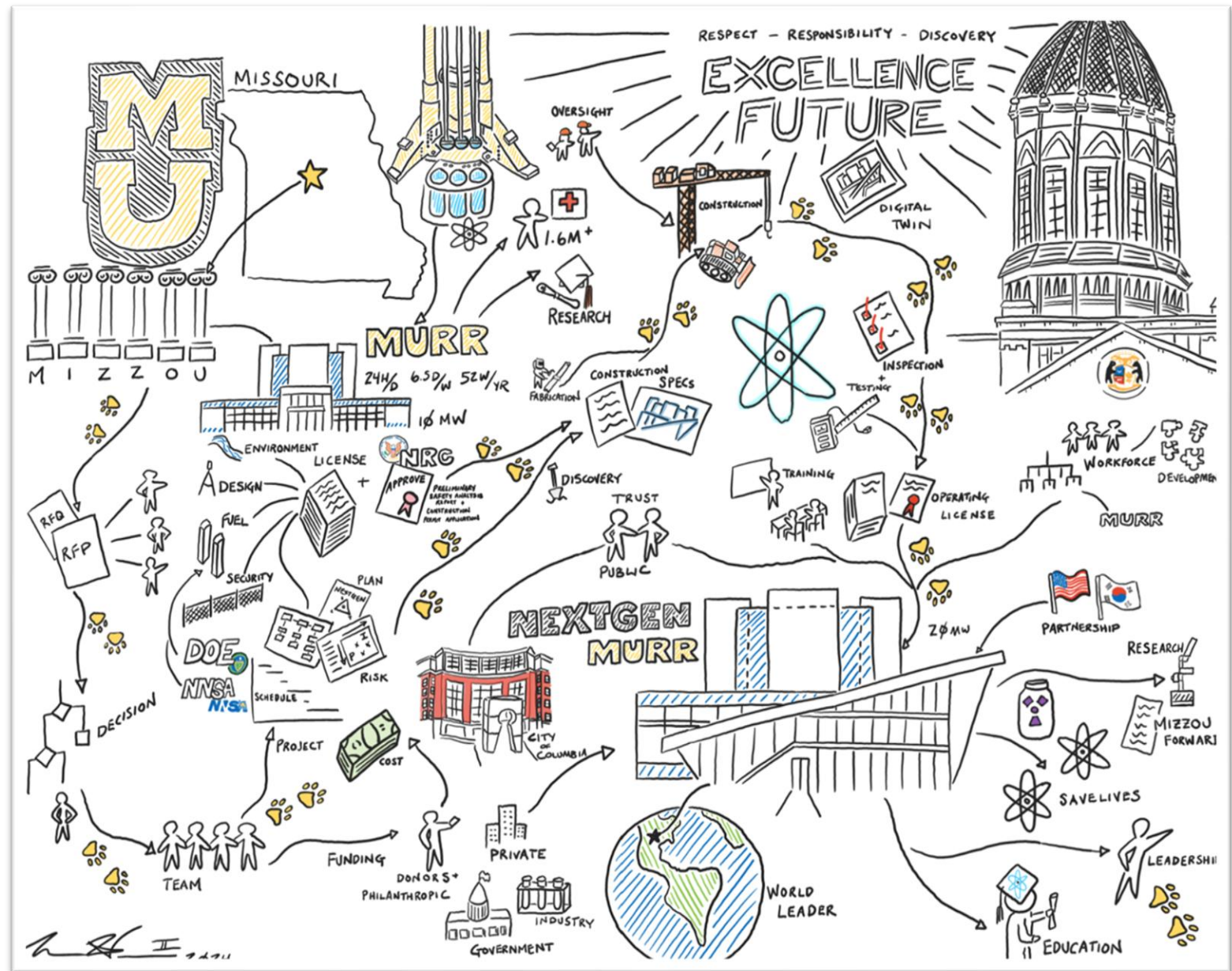
VISION:

The Nation's Center for Nuclear Excellence

Securing the world's most valued destination for nuclear science and technology opportunities and expanding the supply of critical materials for generations to come

MISSION:

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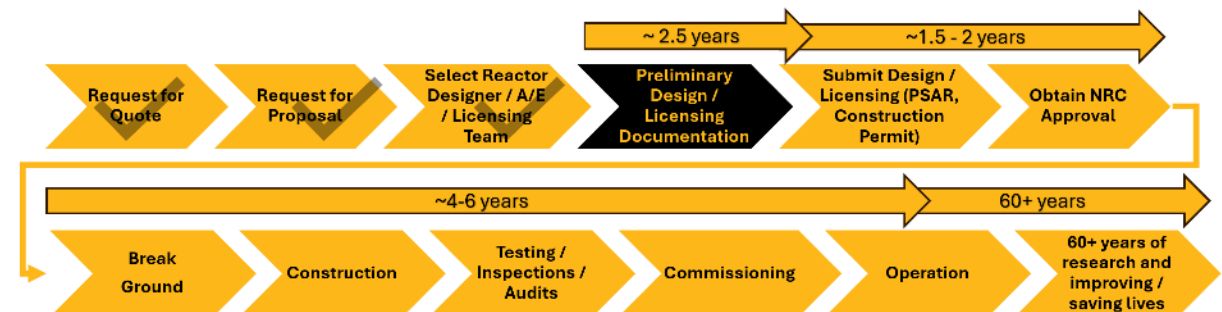


NextGen MURR

Vision – Initial Design Concepts

NextGen MURR – Pre-Conceptual Design

- 20 MW+ Research Reactor
 - Risk Informed 104(c) Licensing
- High Peak Thermal Flux
 - $>5 \times 10^{14}$ n/cm²/s
- At least 2x+ high flux capacity of MURR
- 52-week operation schedule
 - Short Outage Duration
- Neutron Guide Hall
 - 15-20 Neutron Beam Instruments
- Conservative design with HALEU fuel
 - Higher density Flat Plate U₃Si₂
- Integrated Nuclear Ecosystem
 - 220+ Acre Site Secured
 - Site Partner Opportunities





NextGen MURR Consortium

- Hyundai Engineering America (HEA)
- Korea Atomic Energy Research Institute (KAERI)
- Hyundai Engineering Co., Ltd. (HEC)
- MPR Associates Inc.



“The new reactor will be designed to meet the needs of the future...it’s a strategic national asset in the making.”



NextGen MURR Owner's Representative



“The new reactor will be designed to meet the needs of the future...it’s a strategic national asset in the making.”

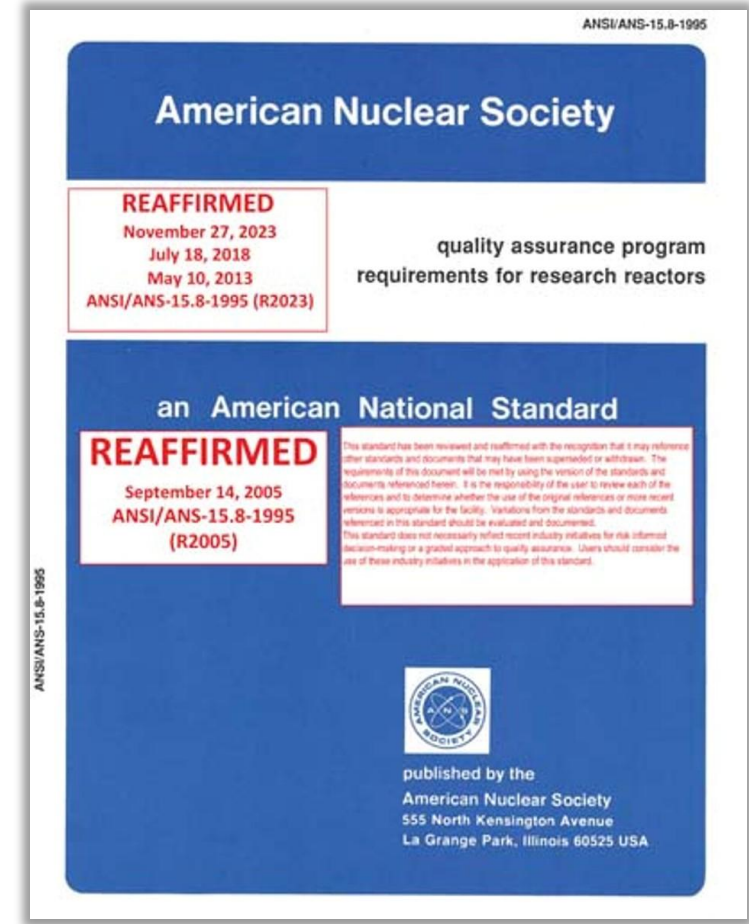
NextGen MURR Regulatory Plan

- Design Studies Phase completed rigorous review of NRC regulations
- Developed detailed plan to prepare Construction Permit Application
- Performed early site investigations at Discovery Ridge in Columbia, MO
- **Plan to submit Letter of Intent and Regulatory Engagement Plan during next agreement**

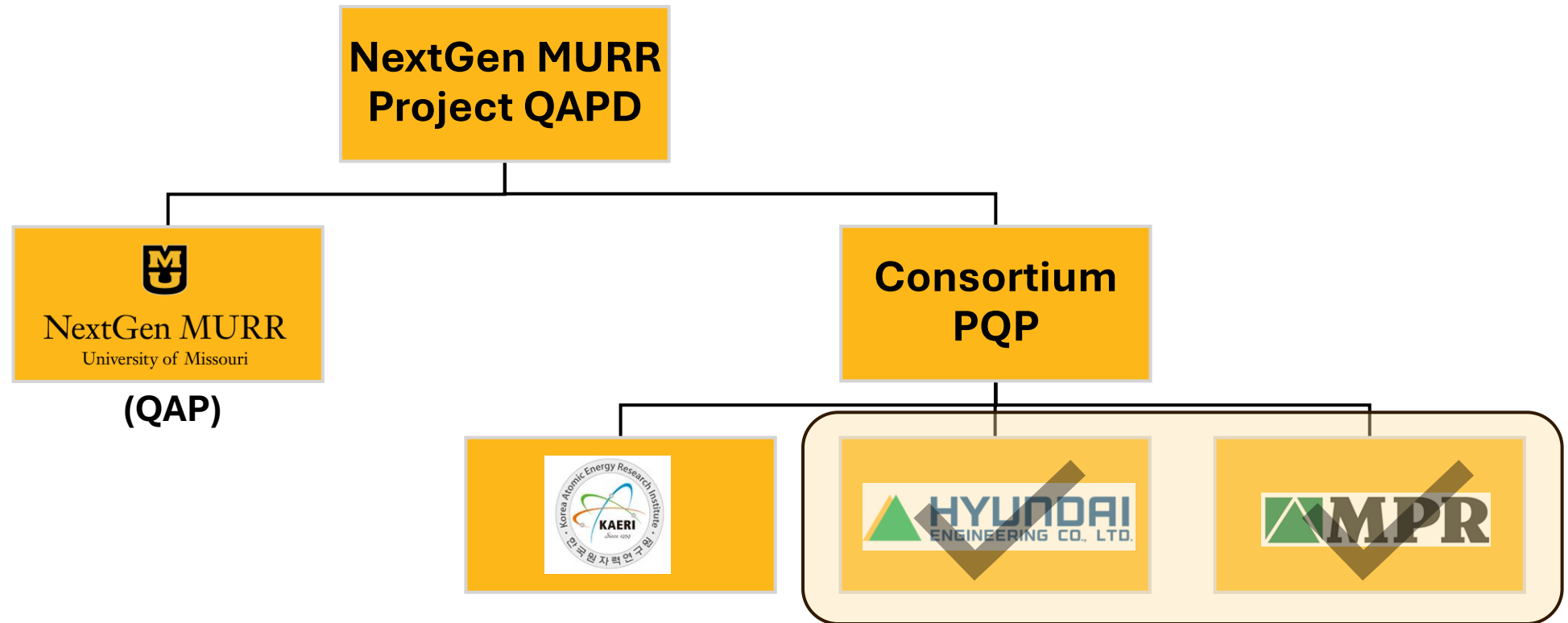


Licensing, Regulatory, and QA

- Chapter 10 of the Code of Federal Regulations (10 CFR) Part 50.21
 - Class 104(c) Licensing
- 10 CFR Part 50.34
 - Regulatory Guide 2.5: Quality Assurance Program Requirements for Research and Test Reactors
 - ANSI/ANS-15.8: Quality Assurance Program Requirements for Research Reactors
- NUREG-1537: Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors



Quality Assurance Program Hierarchy

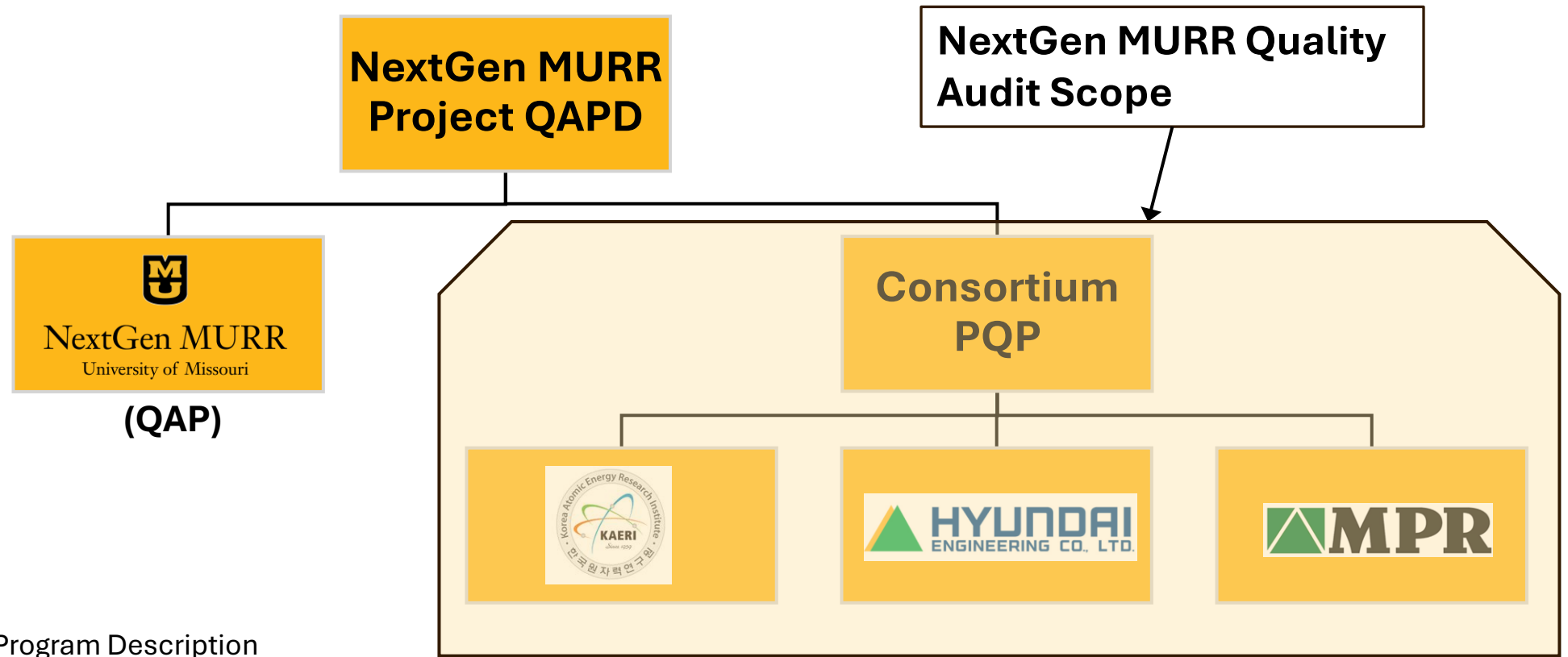


QAPD – Quality Assurance Program Description

QAP – Quality Assurance Program

PQP – Project Quality Plan

Quality Assurance Program Hierarchy



QAPD – Quality Assurance Program Description
QAP – Quality Assurance Program
PQP – Project Quality Plan

NextGen MURR QAP

- Specific QA procedures must be developed prior to performing work relevant to procedure's scope
- During inspections, NRC will verify that procedure approval dates pre-date work activities they govern
- Do not need full QA Program developed during initial project phases



Minimum Procedures to Support Initial Phases

Procedure Title	Procedure Required Effective Date
Design Control (including design of Experimental Equipment)	Effective prior to owner's acceptance review of design documentation that will support NGM's final licensing basis in the OLA . Roughly estimated to be ~6 months after Phase 1 and 2 Kickoff to support review of the safety classification report and initial design requirement documentation for safety-related SSCs.
Document Control	
Procurement Document Control	Effective prior to starting official review of consortium's Project Quality Plan and relevant consortium member QA programs . These QA reviews should be completed prior to final acceptance of any design documentation that will support NGM's final licensing basis in the OLA. Note that aspects of these procedures that relate to procurement of items don't need to be developed during Phase 1 and 2.
Control of Purchased Items and Services	
Control of Nonconforming Items and Services	
Corrective Actions	Effective prior to use of any other procedure .
Quality Record	
Assessments	

Initial Deployment

- Quality Assurance Program Description (QAPD)
- Quality Manual
- Procedures
 - Assessments
 - Control of Nonconforming Items and Services
 - Control of Purchased Items and Services
 - Corrective Actions
 - Design Control
 - Document Control
 - Procurement Document Control
 - Quality Record

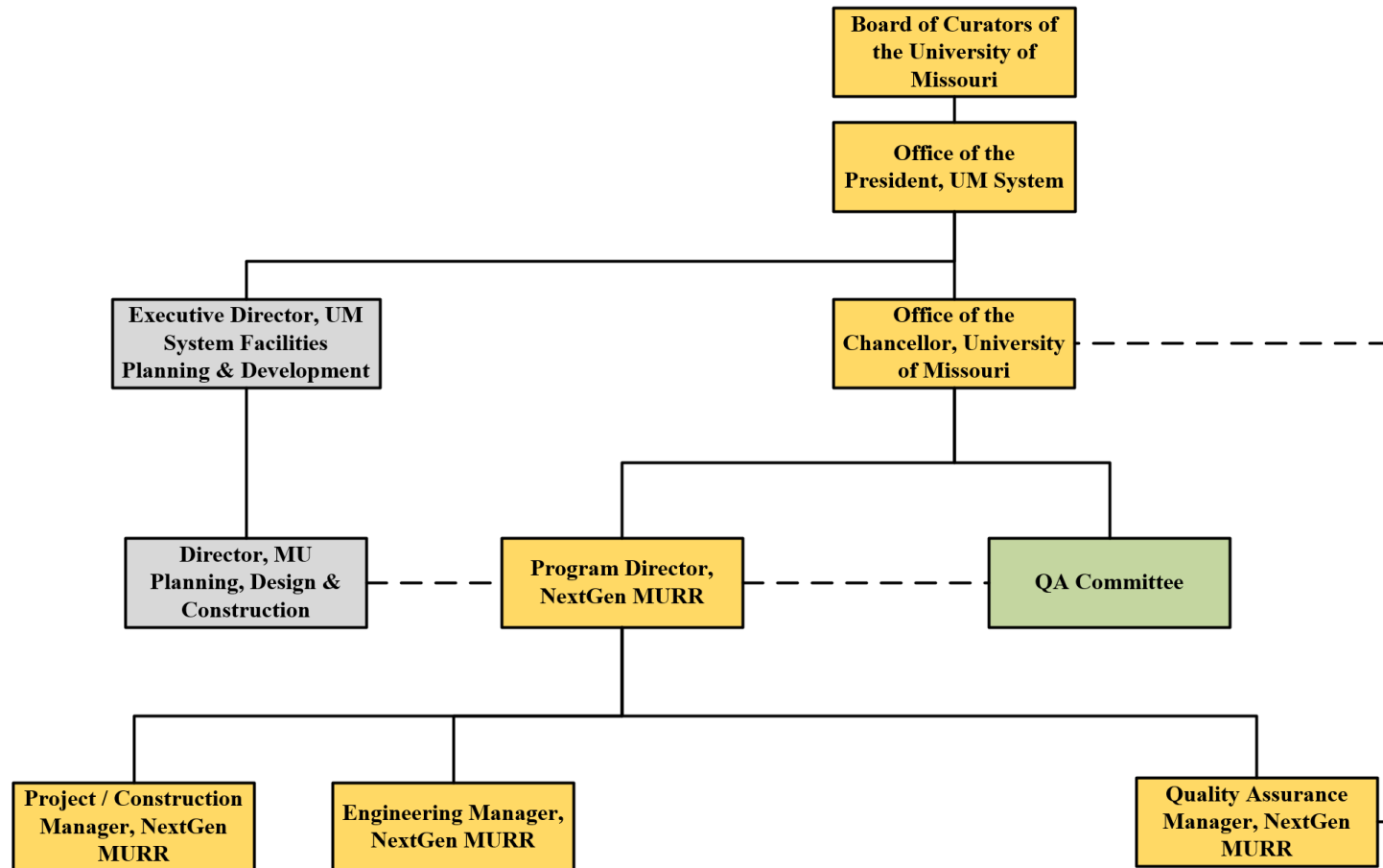


Benchmarking

- **MURR**
 - POL-35: MURR Quality Assurance Program Correlation
 - Current procedures
- Abilene Christian University (ACU) Molten Salt Research Reactor (**MSRR**)
 - NRC-approved QAPD
- University of Illinois Urbana-Champaign (UIUC) Illinois Microreactor Demonstration Project (**IMDP**)
 - NRC-approved QAPD
- The Ohio State University Research Reactor (**OSURR**)
 - Procedure formatting
 - Procedure change process



NextGen MURR QA Organization Structure





Owner's Rep QA Workshop

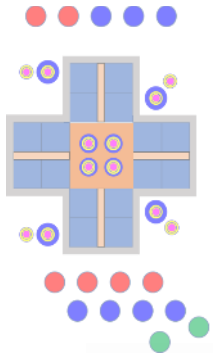
- Developed QA program development timeline
- Determined resources needed to support QA program development
- Gathered input on procedure and form templates, and numbering systems
 - Consistent procedure formatting for ease of use and revision



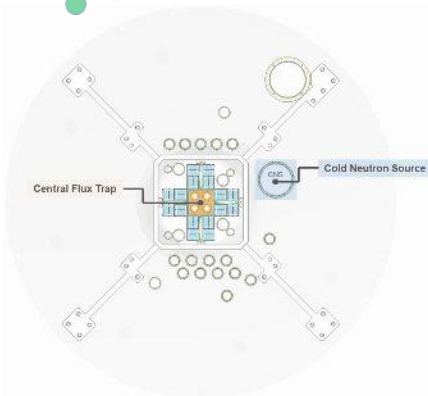
NextGen MURR: Integrated Nuclear Ecosystem



HALEU Fuel
($5.3 \text{ g/cm}^3 \text{ U}_3\text{Si}_2$)



Reactor Position Optimization:
Radioisotope + NTD
Silicon Production +
Nuclear Science



High Thermal Flux Volumes
(>MURR)



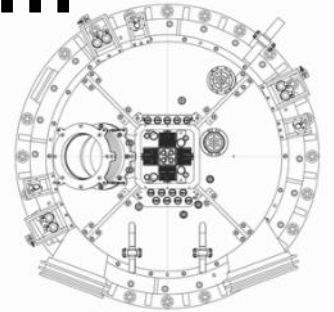
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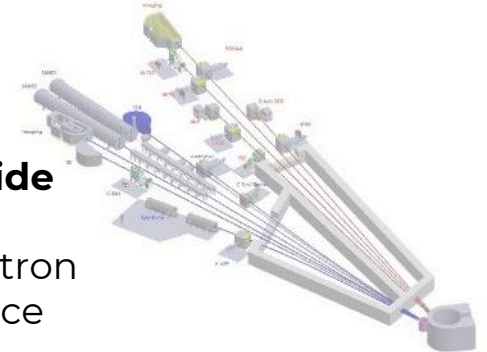
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**20+ MWth
104(c) License
8-10 Year Timeline**

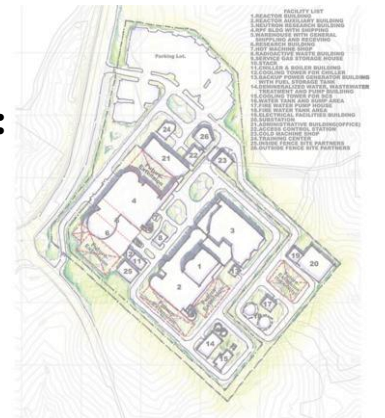
Cold and Thermal Guides



Neutron Guide Hall:
National Neutron Beam Science Facility



Optimized Site Layout:
Research, Guide Hall,
Radioisotope Processing,
Workforce Development



NextGen MURR will serve as an asset of national strategic significance in both radioisotope supply and research excellence.



The University of Missouri's vision is to build upon the 60 years of safe, reliable, and innovative operation of the University of Missouri Research Reactor (MURR), to pursue a new, state-of-the-art, research reactor, NextGen MURR.

NextGen MURR will serve as an asset of national strategic significance in both radioisotope supply and research excellence.

NextGen MURR will secure the nations radioisotope supply, ensuring life-improving treatments are provided to U.S. patients, and will secure excellence within the nations research portfolio, leading the technological and medical advancements of the future.



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