



DOME Reactor Testing User Guide

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Changing the World's Energy Future

Marvin W Fielding



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NRIC

National Reactor
Innovation Center

DOME* Reactor Testing User Guide

*Demonstration of Microreactor Experiments

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4/23/2024



Agenda

- DOME User Guide History
- DOME User Guide Introduction
- User Engagement Lifecycle for DOME
- Phase 1 – Front End Engineering and Experiment Design (FEEED)
- Phase 2 – Detailed Design & Long Lead Procurement
- Phase 3 – Fabrication, Training, & Delivery
- Phase 4 – Installation & Testing
- Phase 5 – Removal & Disposal
- Next steps



DOME User Guide History

Feb '23

- 2022 completed the “Concept of Operations (ConOps)” for MFC and DOE review
- Name changed from “ConOps” to “User Guide”
- Draft User Guide to U.S. Department of Energy (DOE) for comment
- Received DOE comments Aug '23

Sep '23

- PICS* milestone Complete DOME User Guide based on final design
- Received DOE comments Dec '23
 - Scheduling
 - Non-technical topics subject to change
- Received input from developers

Jan '24

- Decision to pivot to a technical guide
- Document FEEED lessons learned
- Mature and document design, testing, and removal phases

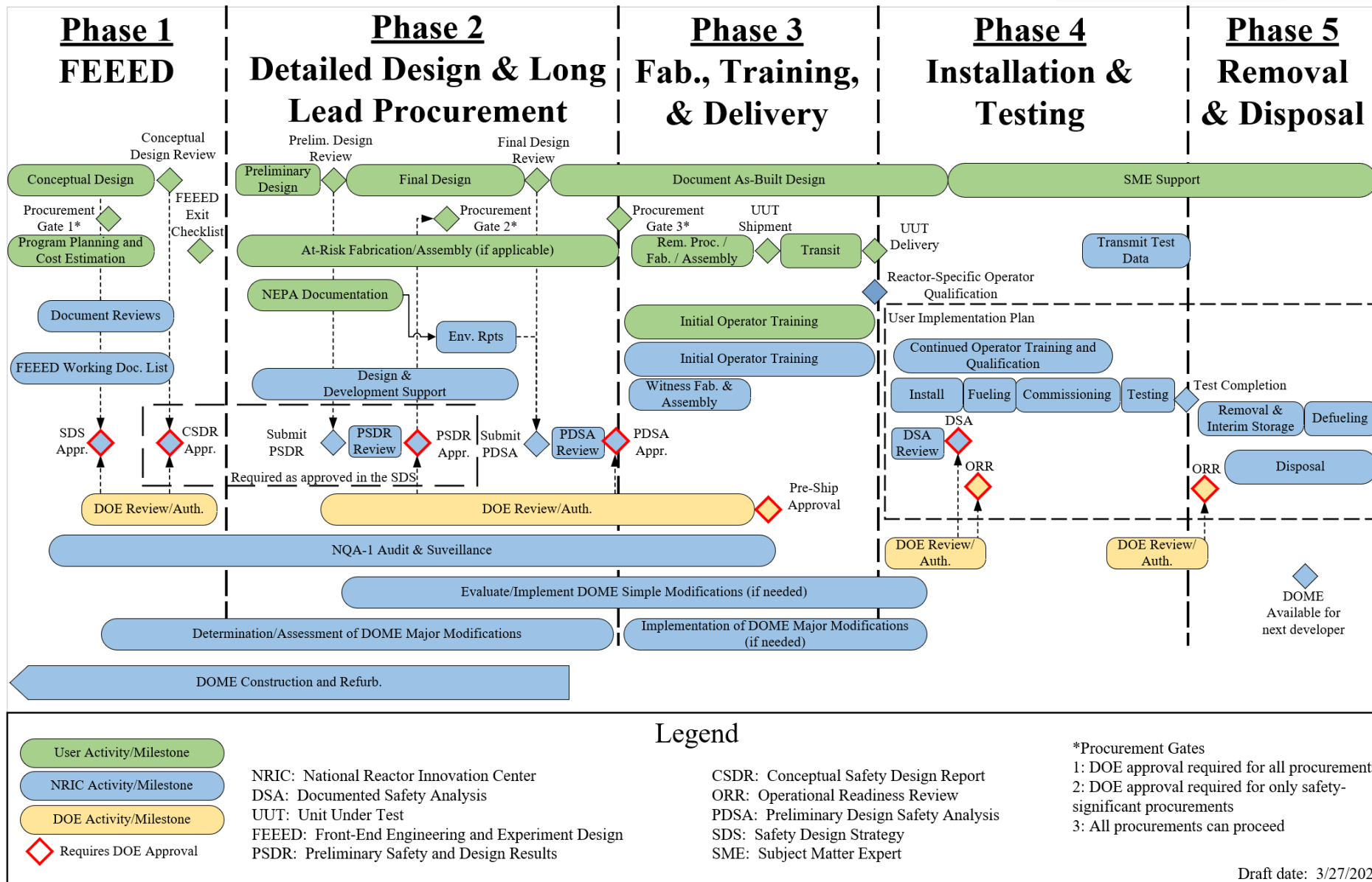
*Program Information Collection System:Nuclear Energy (PICS:NE)

DOMÉ User Guide Introduction

- Provide end-to-end technical requirements for testing in DOMÉ
- Identify DOMÉ facilities, equipment, and capabilities
- Identify applicable standards and documents



User Engagement Lifecycle for DOME



Phase 1 – FEEED

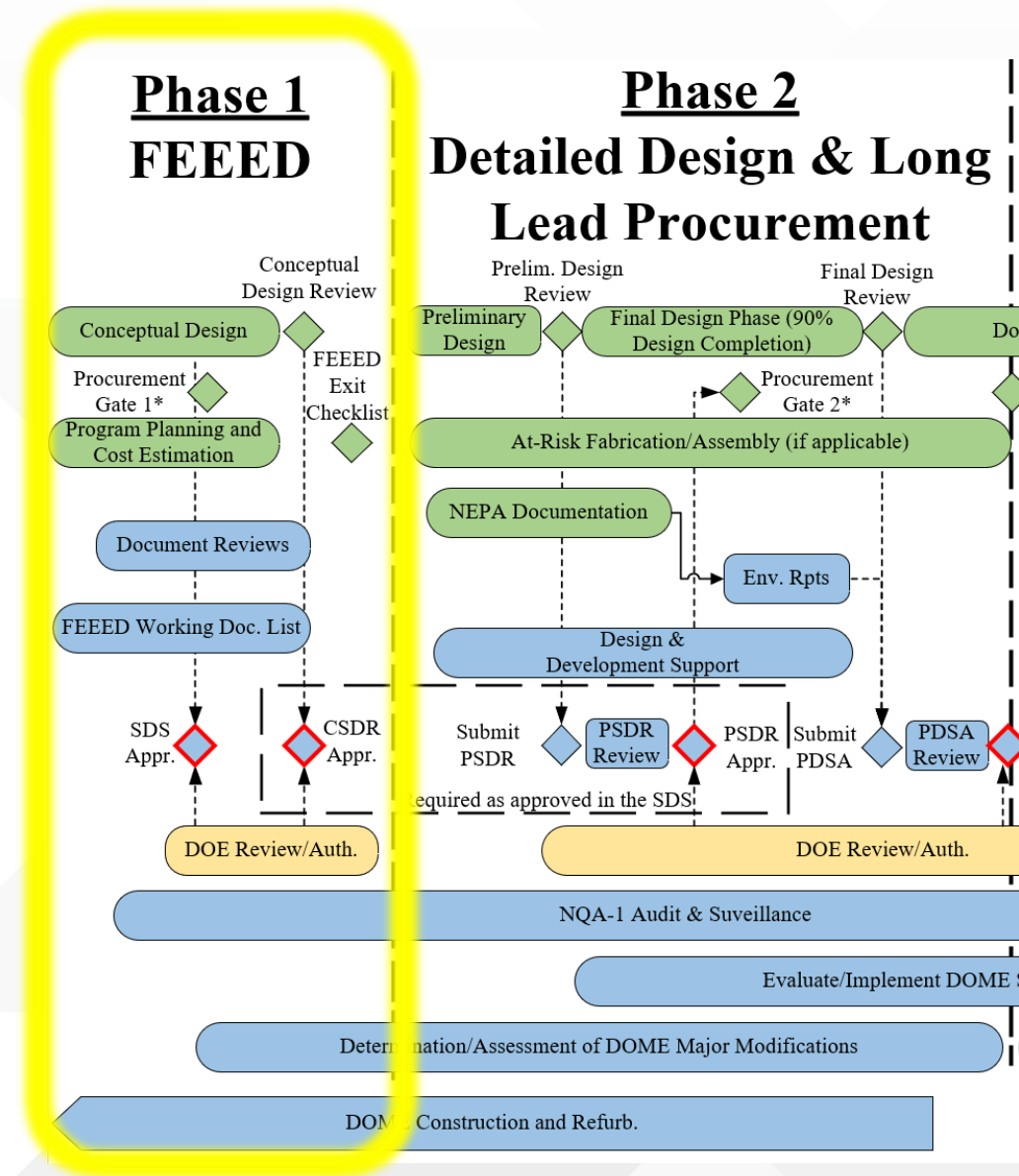
Front-End Engineering and Experiment Design

Key Activities

- Conceptual design and Conceptual Design Review
- Develop working documents
- Conceptual experiment design

Key Deliverables

- User Program Plan
- Class 4 Cost Estimate
- Conceptual Test Plan
- Safety Design Strategy (SDS)
- Conceptual Safety Design Report (CSDR)



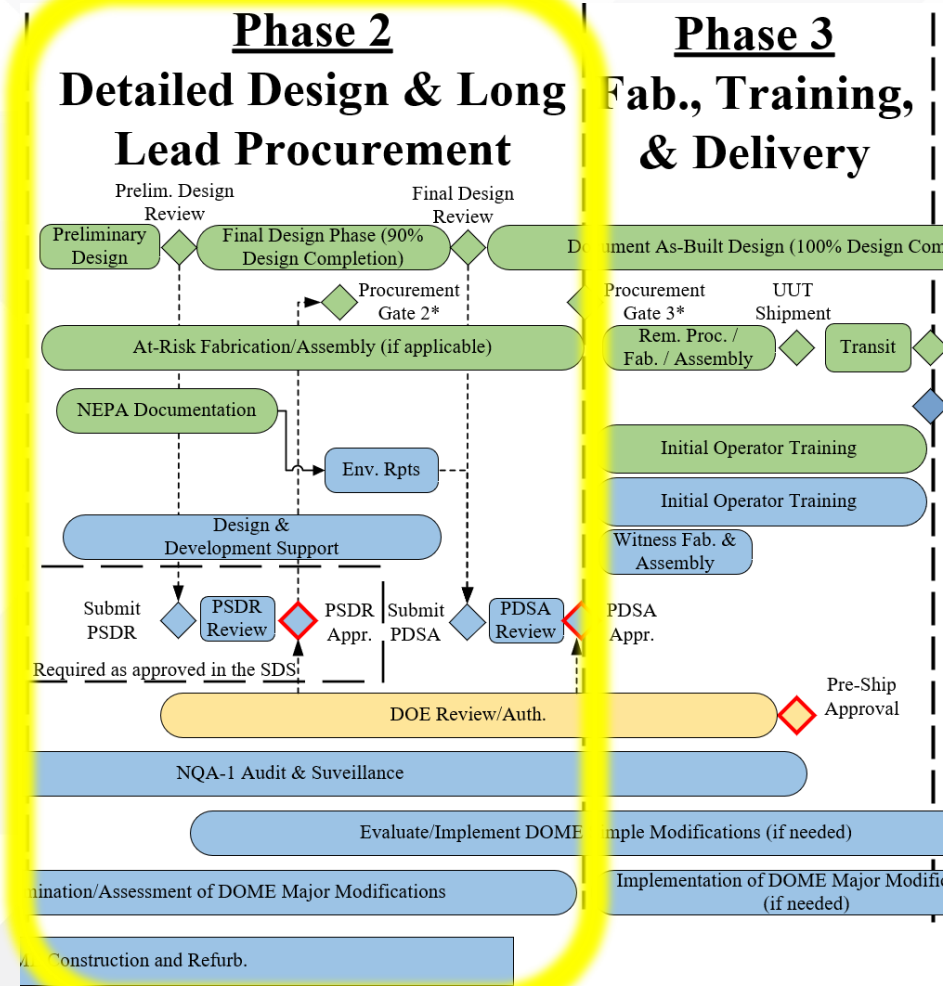
Phase 2 - Detailed Design & Long Lead Procurement

Key Activities

- Preliminary Design and Preliminary Design Review
- Final design and Final Design Review (90% design Completion, req'd for Preliminary Documented Safety Analysis (PDSA))
- Finalize supplemental National Environmental Policy Act (NEPA) information and DOME Environmental Analysis (EA) comparison
- Progress Nuclear Safety documentation for PDSA
- Initial confirmatory reactor analysis
- Begin long lead procurement and manufacturing

Key Deliverables

- Confirmation of reactor design complying with DOME EA Plant Parameter Envelope (PPE)
- PDSA submittal



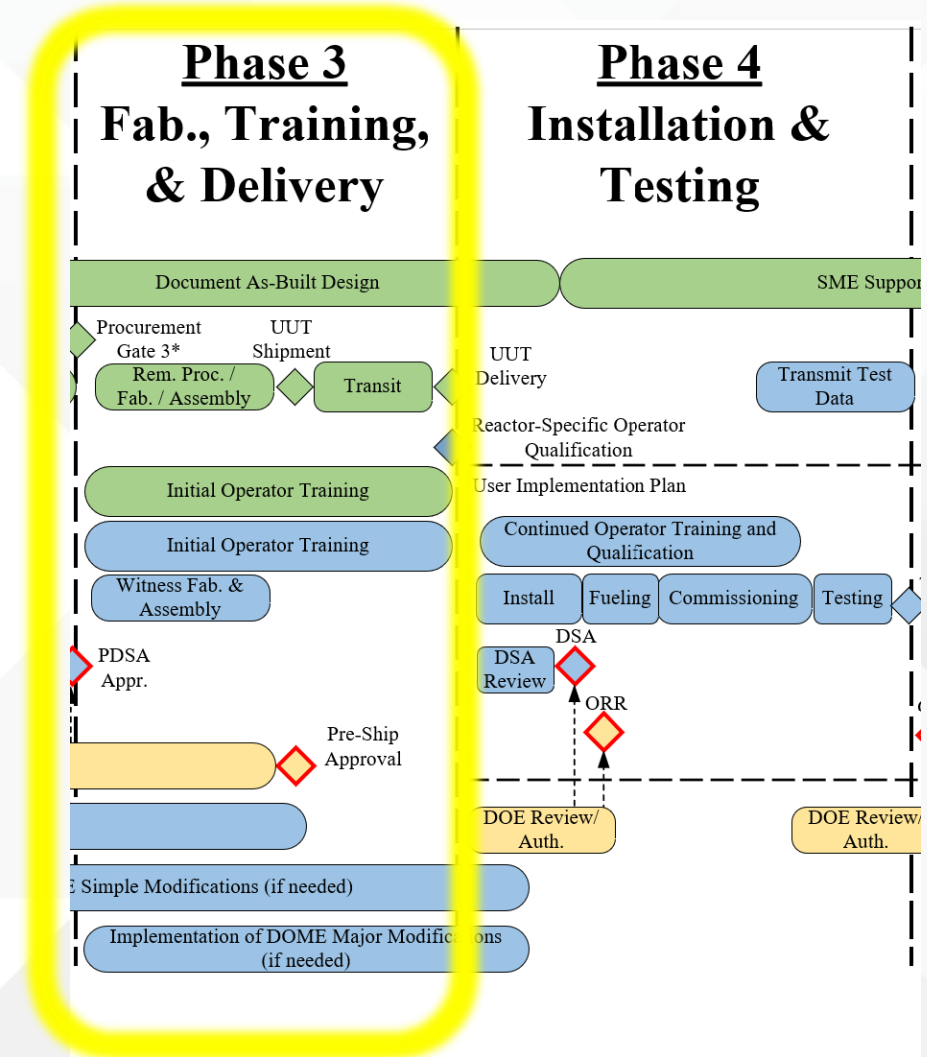
Phase 3 – Fabrication, Training, & Delivery

Key Activities

- Procurement
- Unit fabrication and assembly
- Document as-built design
- Initial Operator Training
- Idaho National Laboratory (INL) witness fabrication and assembly

Key Deliverables

- Unit delivery
- Operator qualification



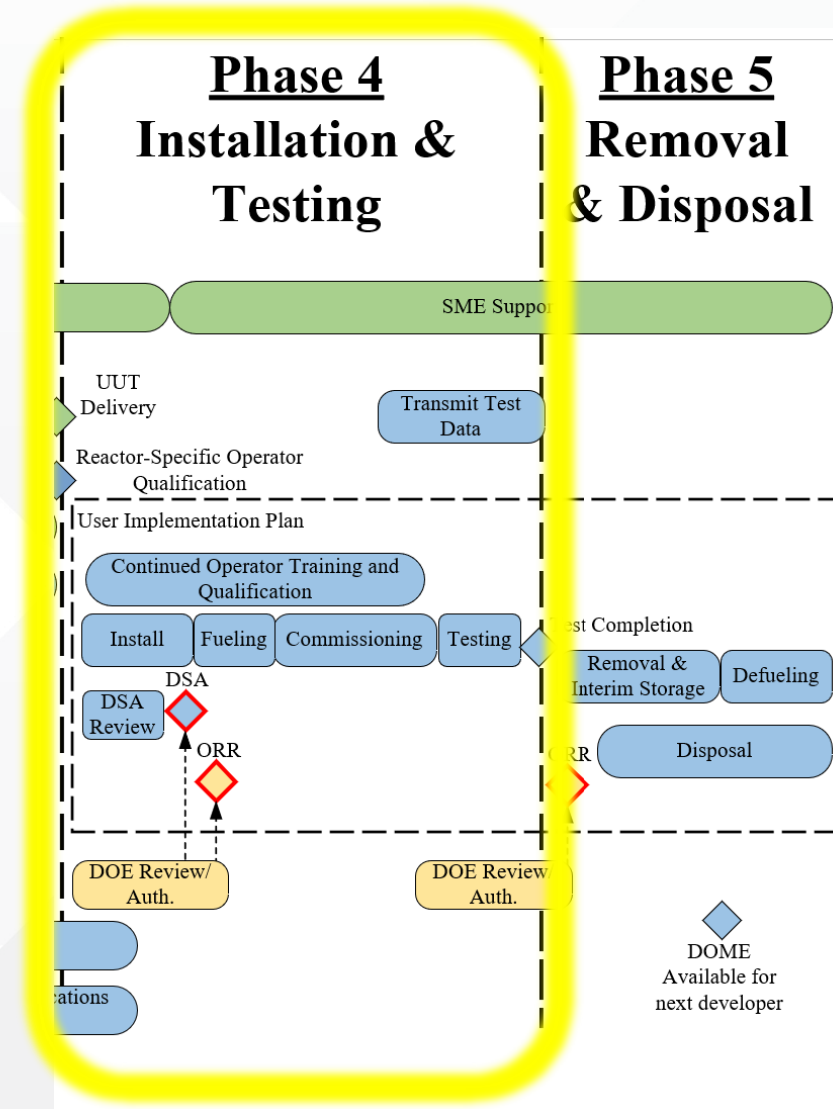
Phase 4 – Installation & Testing

Key Activities

- Unit Under Test Delivery (UUT)
- Unit installation
- Operational Readiness Reviews (ORR)
- Test campaign/Data collection

Key Deliverables

- Documented Safety Analysis (DSA)/Safety Analysis Report (SAR)
- Test Data



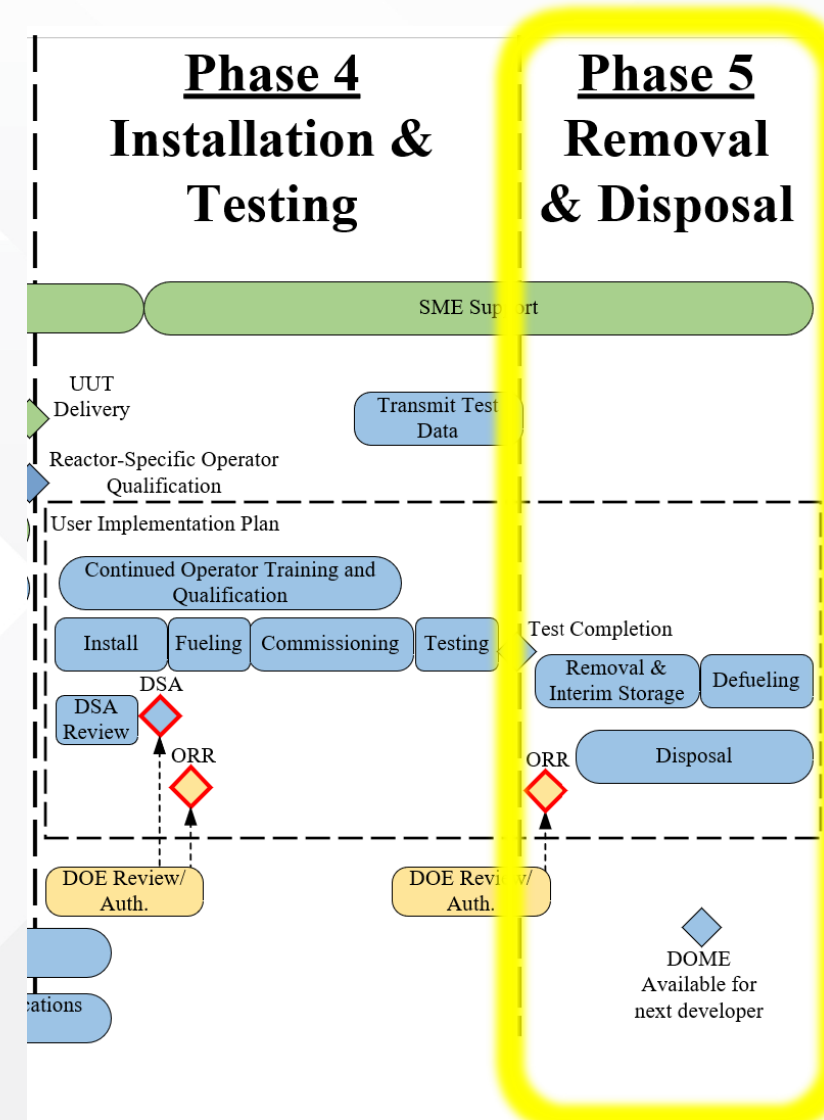
Phase 5 Removal & Disposal

Key Activities

- Shutdown and cooling
- Reactor removal
- Transport
- Interim Storage
- Defueling
- Disposal

Key Deliverables

- DOME ready for next test



DOME User Guide Next Steps

May '24

- NRIC review of revised User Guide
- NRIC National Technical Director review of revised User Guide

Jun '24

- Address and Incorporate review comments

Aug '24

- INL reviews of User Guide revision
- PICS Milestone 9/15/24



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