



Preliminary Reactor Fueling Support Equipment Recommendation

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CONTENTS

ACKNOWLEDGEMENTS	ii
ACRONYMS	iv
BACKGROUND	1
PURPOSE	1
DISCUSSION.....	1

TABLES

Table 1. Recommended Fueling Equipment List.....	1
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ACRONYMS

DOE	U.S. Department of Energy
DOME	Demonstration of Microreactor Experiments
EBR	Experimental Breeder Reactor
INL	Idaho National Laboratory
MFC	Materials and Fuels Complex
NEICA	Nuclear Energy Innovation Capabilities Act
NRIC	National Reactor Innovation Center
RHS	Reactor Handling System

BACKGROUND

The National Reactor Innovation Center (NRIC) is a national program that was established as part of the Nuclear Energy Innovation Capabilities Act (NEICA). NRIC's mission is to accelerate the demonstration and deployment of advanced nuclear energy through its mission to inspire stakeholders and the public, empower innovators, and deliver successful outcomes through efficient coordination of partners and resources. NRIC is designed to bridge the gap between research, development, and the marketplace to help convert some of the nation's most promising advanced nuclear reactors into commercial applications.

The NRIC Demonstration of Microreactor Experiments (DOME) facility, formerly known as Experimental Breeder Reactor II (EBR II), located at the Materials and Fuels Complex (MFC) at the Idaho National Laboratory (INL) is intended to allow industrial and other partners the opportunity to test Advanced Microreactors up to 20MW thermal power.

In addition to providing the DOME test bed, NRIC is developing the equipment and infrastructure to assist with each operation to be performed at INL. This report will document the preliminary fueling equipment recommendation that will be provided to support the fueling operations.

PURPOSE

The purpose of this report is to document the preliminary fueling equipment list recommendation.

DISCUSSION

In 2024, NRIC contracted with MPR to assist with developing the Concept of Operations and a list of equipment that will be provided to the advanced microreactor developers to assist with each operation. MPR submitted Concept of Operations draft B 4-29-24 and Equipment List Draft A 4-29-24.

The concept of fueling includes work performed to receive fuel at the fueling location, prepare the facility, install fuel, and assemble the reactor. Some reactors may be fueled in DOME and others may be fueled in TREAT. The preliminary recommended equipment to be provided by NRIC for fueling is listed in Table 1. Additional equipment required for fueling specific reactors will be provided by developers.

As the concept of operations matures, the support equipment that will be provided by NRIC will be finalized and approved.

Table 1. Recommended Fueling Equipment List

List Number	Category	Equipment	Potential Purpose(s)
1	Moving	1 Ton Forklift	Unloading and moving fuel storage/shipping containers
2	Fueling	Polar Crane / TREAT Bridge Crane	Moving fuel from the preparation tent into the reactor

Preliminary Reactor Fueling Support Equipment Recommendation

List Number	Category	Equipment	Potential Purpose(s)
3	Fueling	Removable Work Platforms / Scaffolding	Provide personnel access to the reactor for fueling
4	Fueling	Cleanliness Tent	Provide physical separation between fuel preparation area and reactor and the rest of the fueling facility
5	Fueling	Fuel Storage Locker	Intermediate storage of fuel elements after inspection and before fueling
6	Fueling	Fuel Inspection Stand	Provide location to inspect fuel element after removal from storage/shipping container
7	Assembly	Welding Equipment	Seal welding the reactor closed after fueling
8	Decontamination	Decontamination Equipment	Decontamination of equipment and tooling
9	RHS	Intra INL Transport Truck and Trailer / Modular Platform Trailer	Transporting reactor skids and components
10	RHS	RHS Lifting Equipment	Lifting reactor skid off trailer, loading dock, in fueling facility, etc.
11	RHS	RHS Translating Equipment incl. Dunnage	Moving reactor into position at fueling facility