~~Confidential information withheld from public disclosure under 10 CFR 2.390~~

BANR Licensing Activities
NRC Kick-Off Meeting
BANR-LTR-22-0498
Non-Proprietary Enclosure 2

BWX Technologies, Inc.

Steve Schilthelm
Erik Nygaard
Mike Haggerty

October 20, 2022

AGENDA

- BWXT Program Objectives
- Fuel Qualification Strategy
- Fuel Design & Analysis
- Fuel Development & Manufacturing
- Irradiation Testing
- REP Deliverables
- Next Steps, Actions, Questions

BWXT Program Objectives

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Fuel Qualification Strategy

- Goal: Accelerated fuel qualification of UN TRISO fuel architecture

- Basis of Approach: Fuel Qualification for Advanced Reactors, NUREG 2246
  - BANR will use a fuel design that is significantly different from commercial LWRs
  - BANR's operating environments is significantly different from commercial LWRs

- BWXT's Application of NUREG 2246

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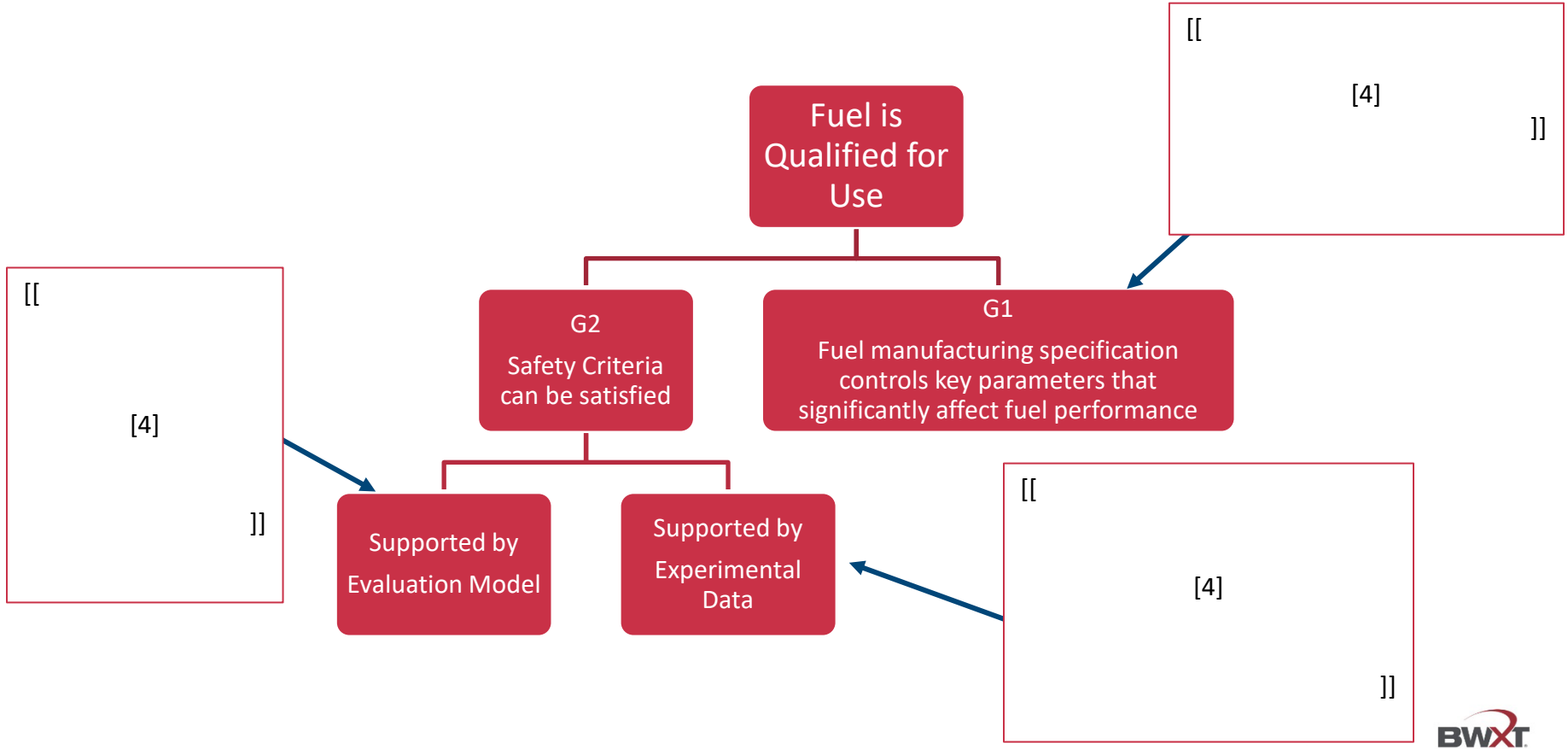
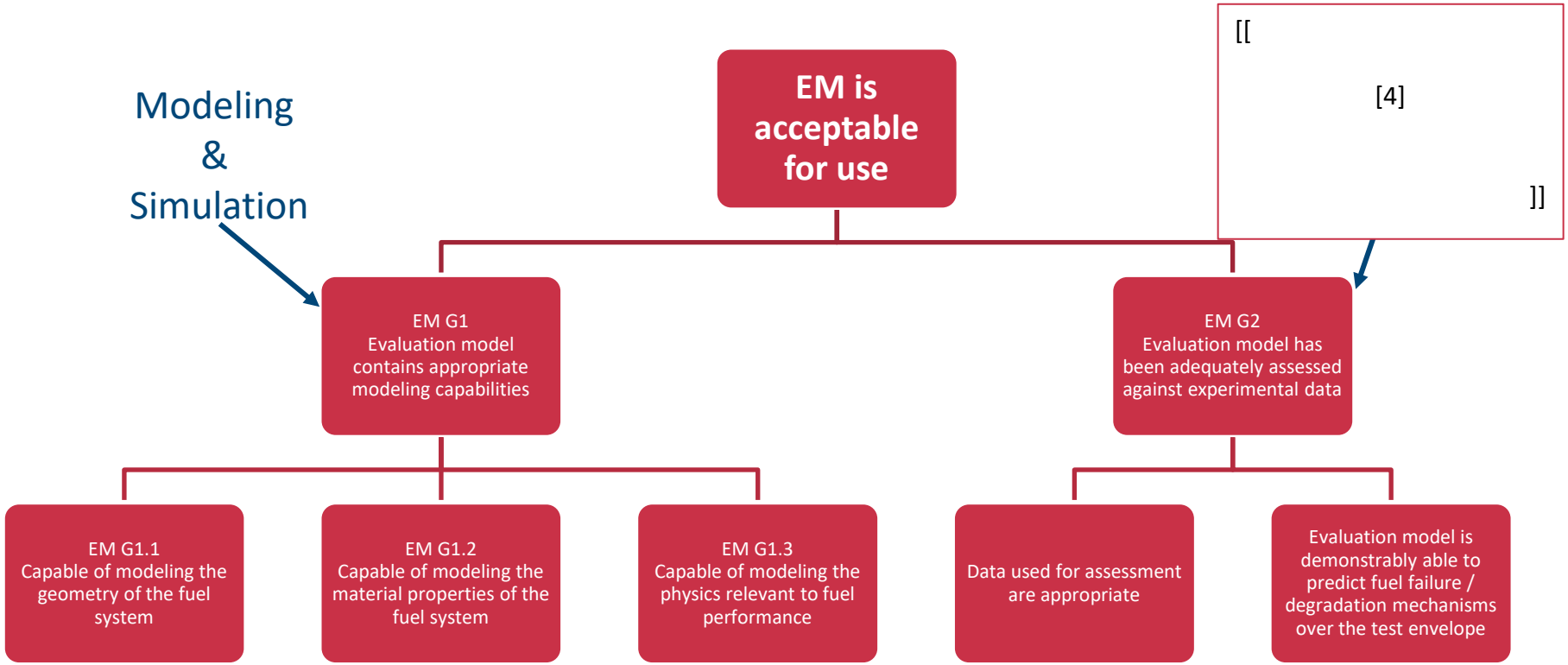
Fuel Qualification Strategy - Fuel Qualification Assessment Framework



Fuel Qualification Strategy - Evaluation Model Assessment Framework



Modeling & Simulation supports the Evaluation Model Framework

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- Leveraging established tools and methods for:
  - Particle Design Analysis
  - Modeling of Test Specimens
  - Fuel Elements
  - Core Performance

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EM G1: Appropriate modeling capabilities

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Fuel Design & Analysis

EM G1:
Appropriate modeling capabilities

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Assessing Existing Data

EM G2:
EM assessed against data

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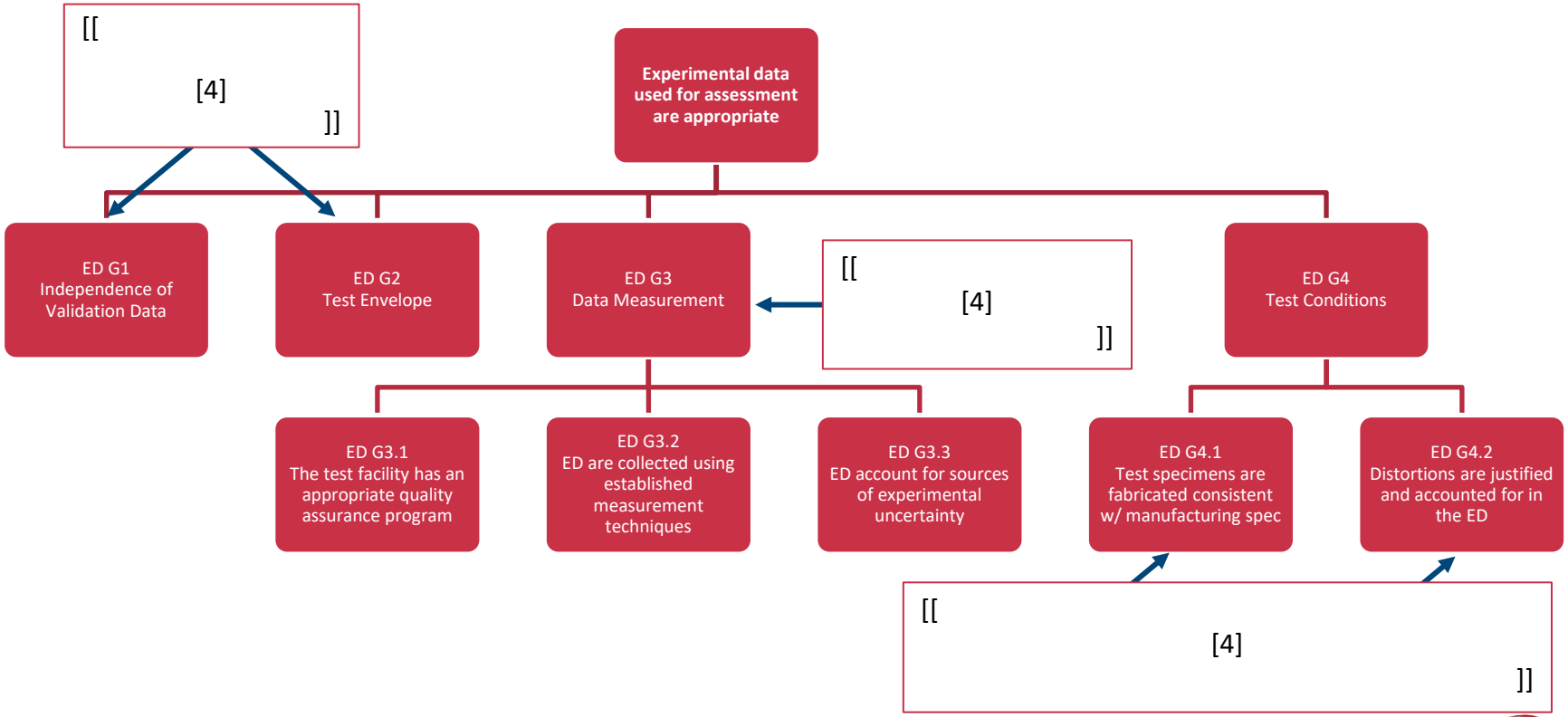
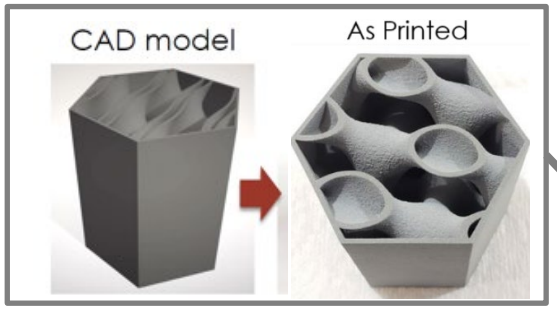
Fuel Qualification Strategy – Experimental Data Assessment Framework



Fuel Development and Manufacturing Work Flow

ED G4.1
Fuel manufacturing specification

Fuel Shell Manufacture



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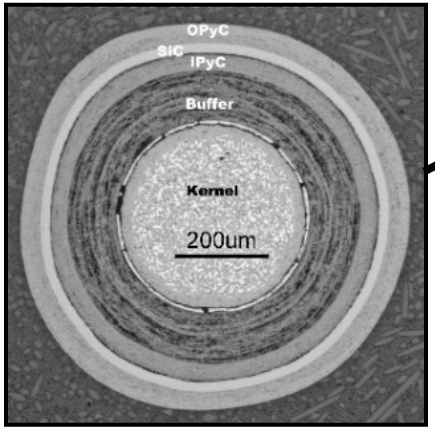
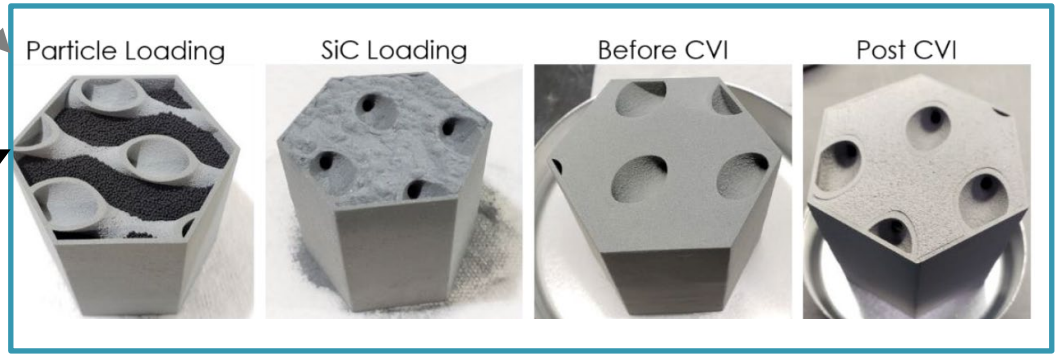
Fuel Particle Manufacture



Fuel Specimen Manufacture



TCR Fuel Elements – Photo from ORNL

Fuel Particle Development & Manufacturing

ED G4.1
Fuel manufacturing specification

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- Began natural uranium kernel production

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- Natural uranium kernel particle production feeds coating development scope

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Fuel Element Development & Manufacturing, cont

ED G4.1

Fuel manufacturing specification

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Irradiation Testing and PIE supports the Experimental Data Framework

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Irradiation Testing, cont

ED G3

Data measurement

- ATR irradiation cornerstone of fuel qualification effort
- Recently completed conceptual design review of test train with INL
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Irradiation Testing, cont

ED G3

Data measurement

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Irradiation Testing, cont

ED G3

Data measurement

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Irradiation Testing, cont

ED G3

Data measurement

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BANR Licensing Activities – Questions and Proprietary Discussion

- Regulatory Engagement Plan
- QA Topical Report
- Fuel technical report
  - Goal: early feedback to reduce risk on fuel technical report
  - Confirm timing
  - Subject of continued meetings
- Topical report
- AM report

BANR Licensing Activities – Regulatory Engagement

- Next Steps
  - Timing of technical update meetings
  - Topics of most interest to NRC
- Importance / Value