



Management and Design Considerations for Irradiation Testing - A DRIFT Case Study

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Changing the World's Energy Future

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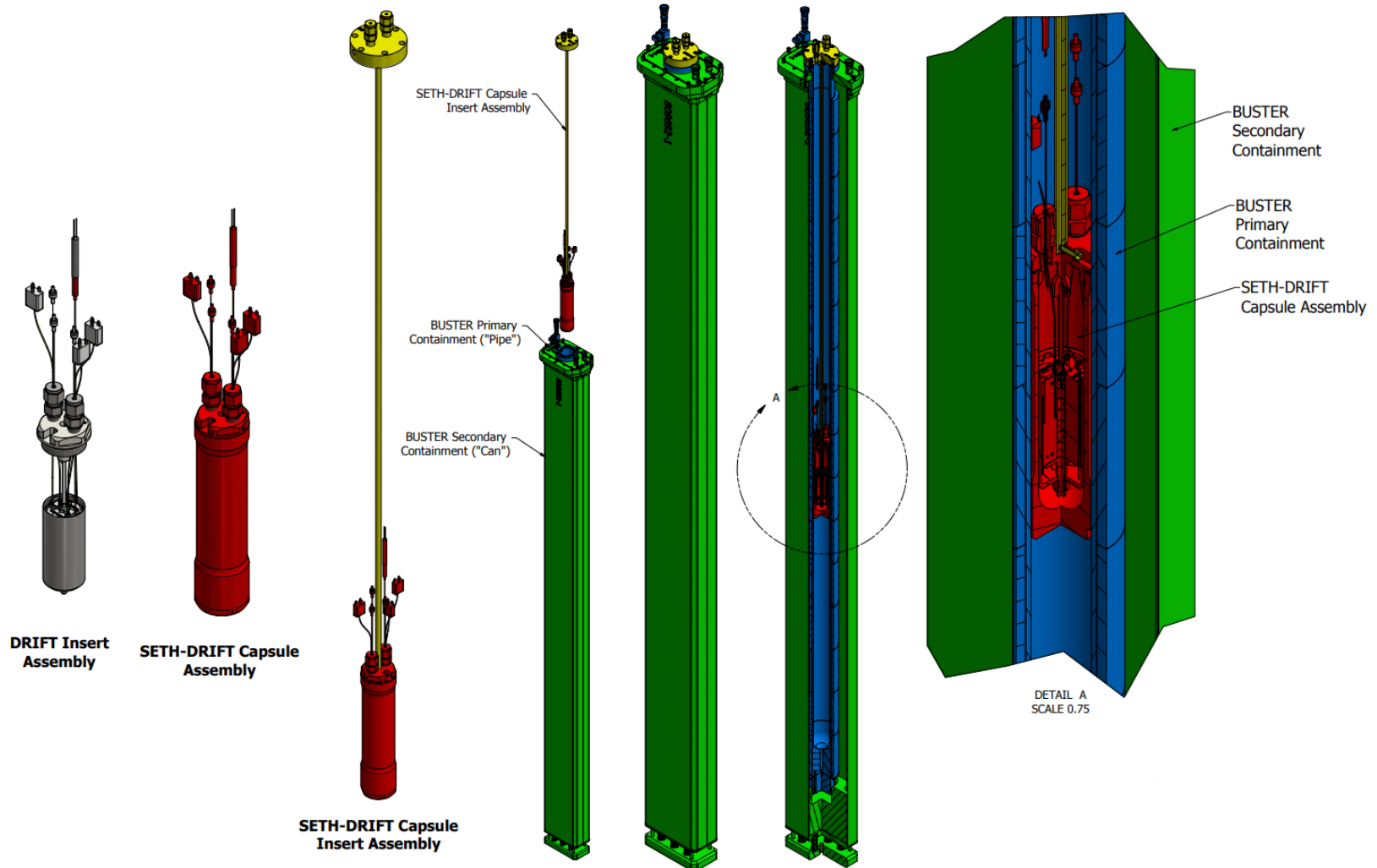
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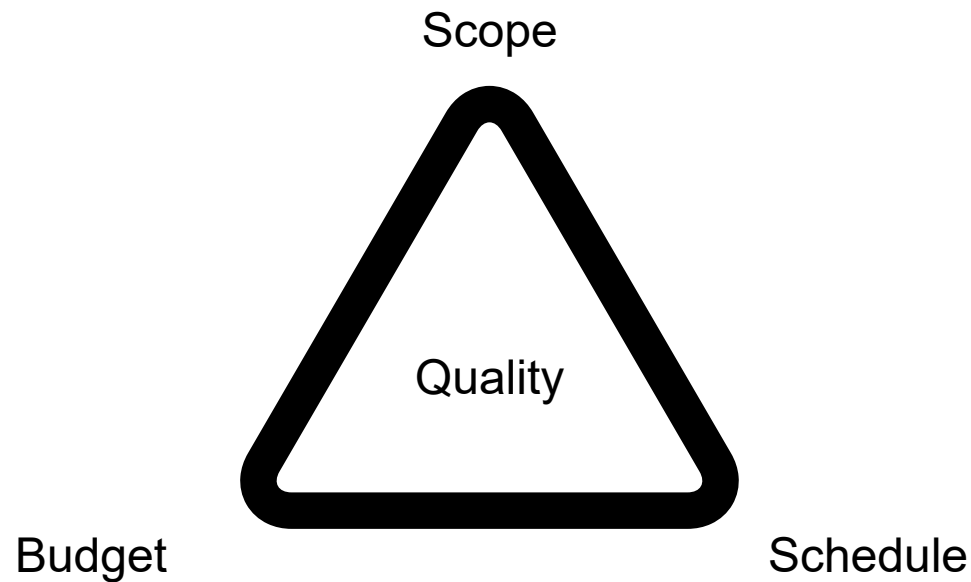


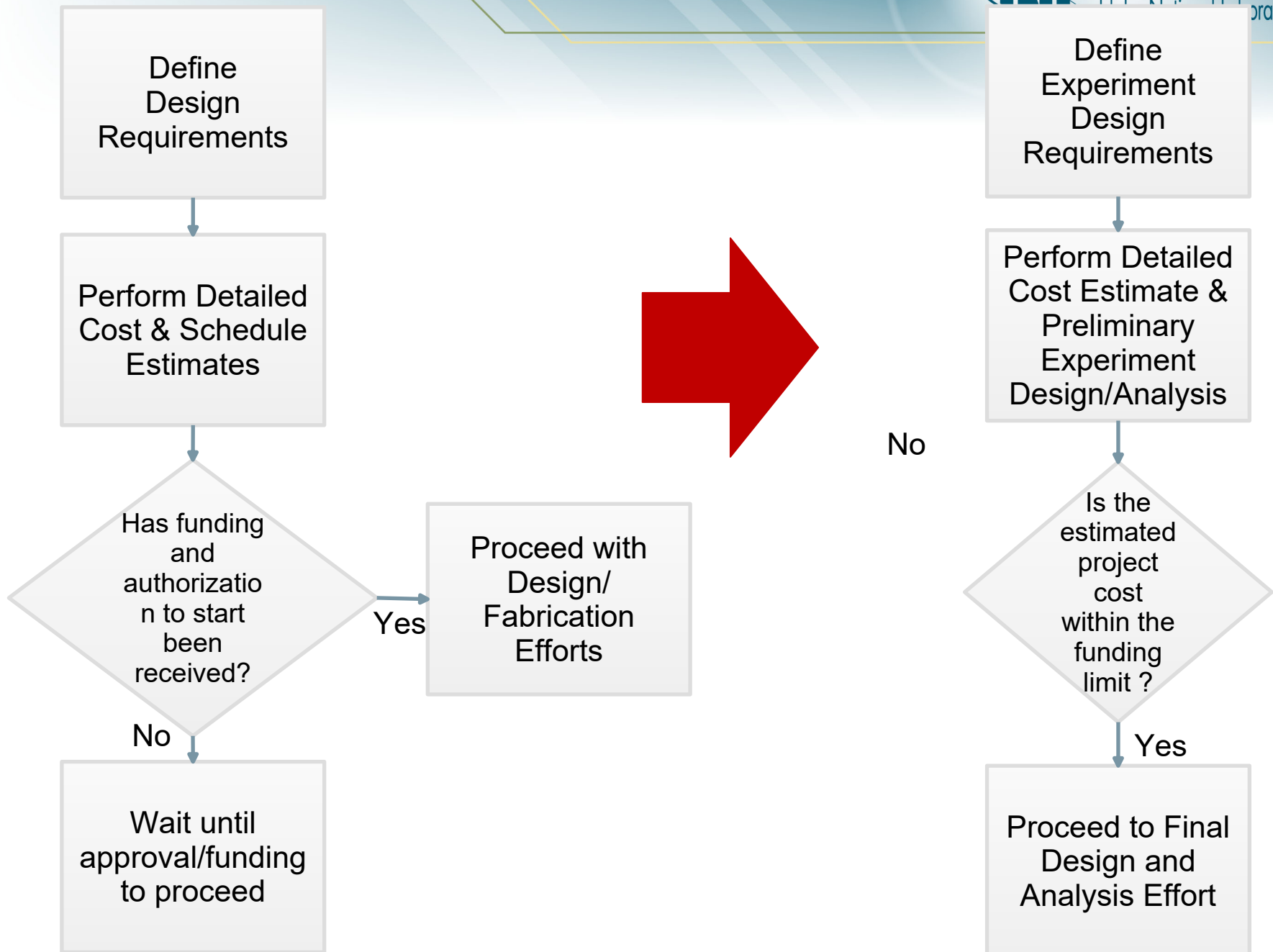
Project Objectives

- Develop fracture propagation data consistent with the behavior of UO_2 in Light Water Reactors (LWRs)
- Validate and improve modelling in MOOSE-BISON-Marmot (MBM) framework



The Triple Constraint





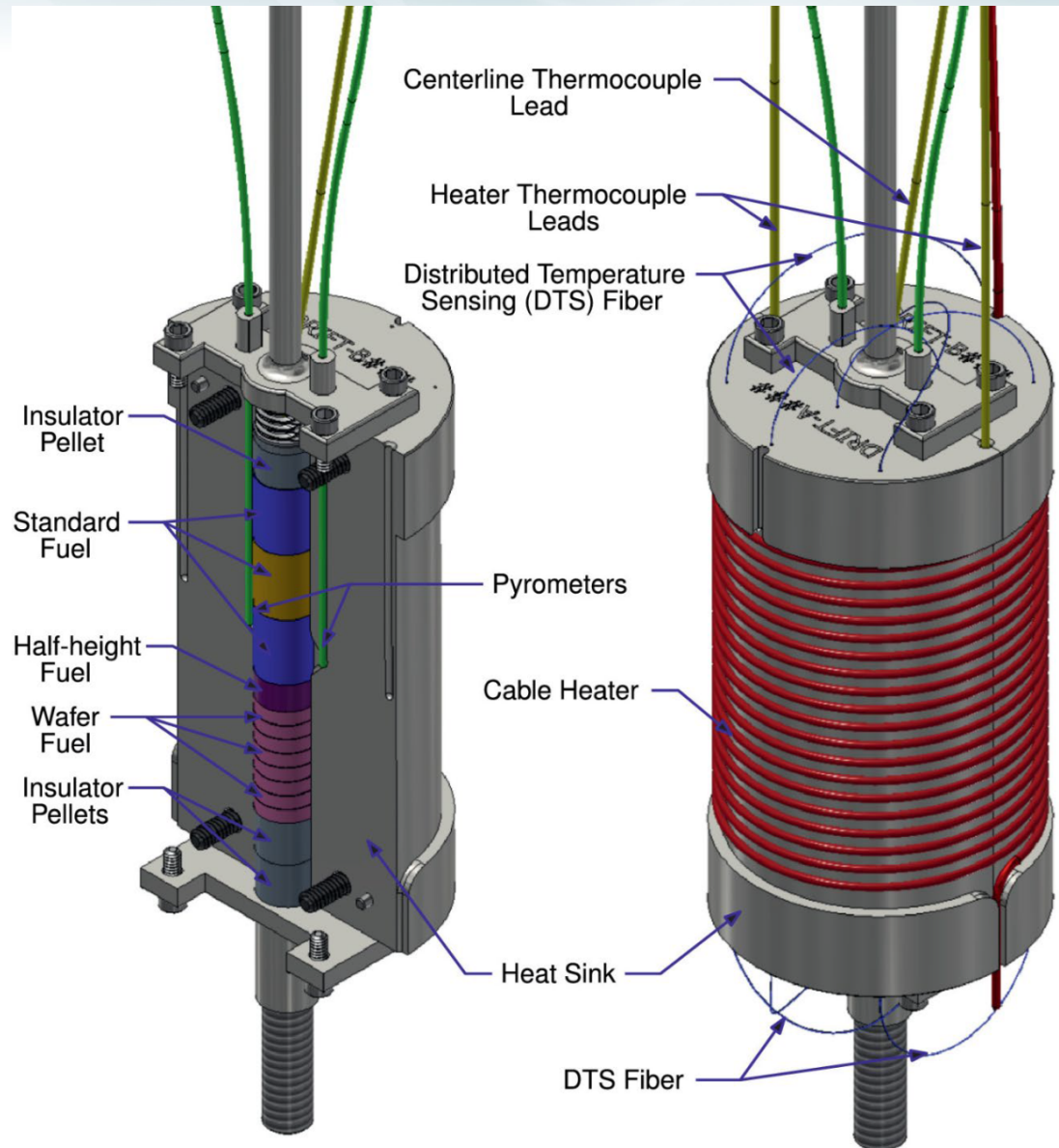
Design Requirements

- A few examples

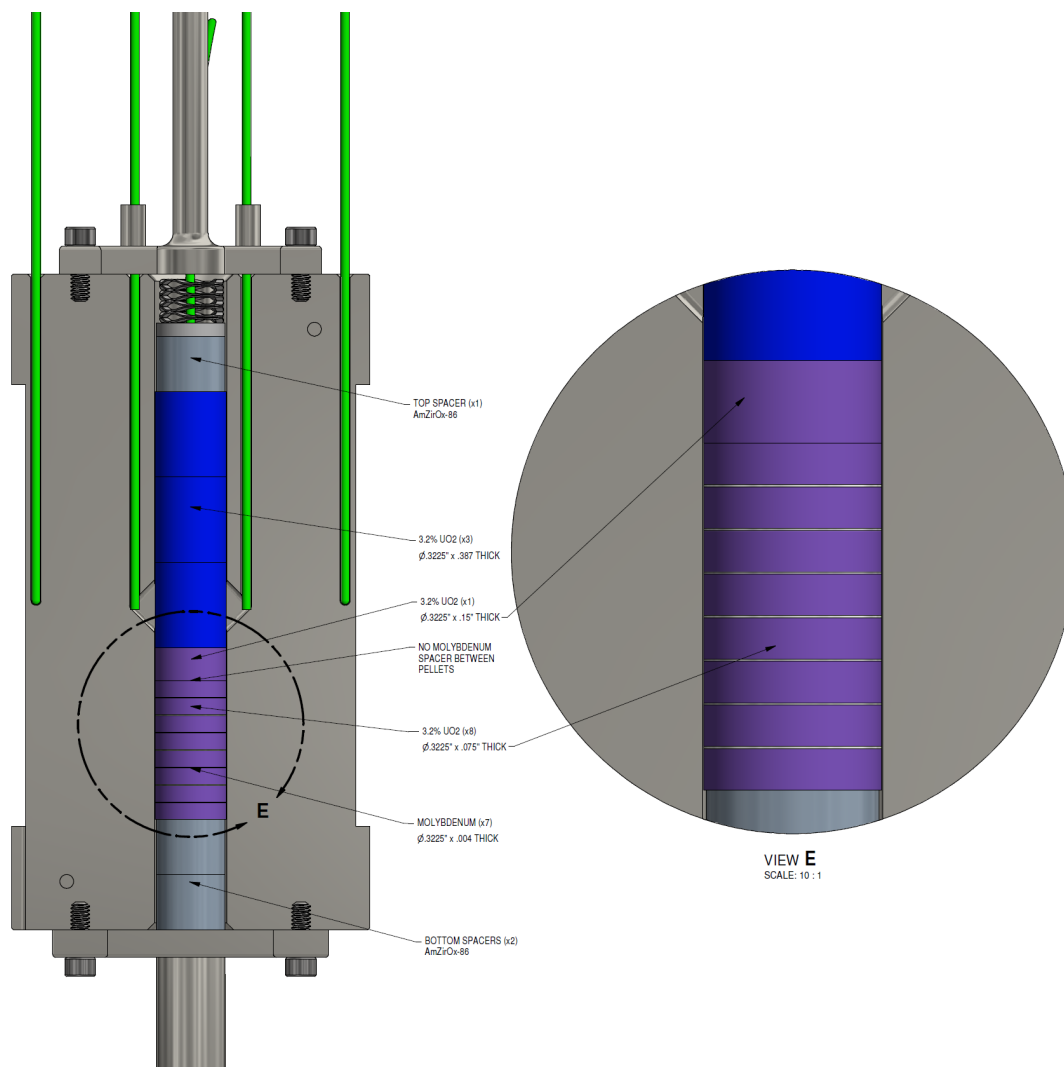
Requirement Description	Basis	Verification Method
The experiment shall be able to accommodate a pellet stack height equivalent to at least five pellets (~5 cm). Each pellet shall have radial dimensions typical of pressurized water reactor (PWR) UO_2 pellets enriched at 3.20% $^{235}\text{U}/\text{U}$.	Programmatic Requirement	Drawings
The design of the experiment shall enable the temperature of the heat sink and fuel specimens to be measured in a way that minimally perturbs the specimens' temperature response.	Programmatic Requirement	Drawings
The experiment shall meet the applicable nuclear safety requirements per TREAT's safety basis.	Nuclear safety requirement	Drawings; Neutronics, Thermal, & Structural ECARs
All experiment components, which are separable during TREAT operations, shall have a unique identifier or other means for item traceability.	Reactor operational requirement.	Drawings

Prototype Testing

- Reduces uncertainty in final design/assembly efforts
- Only of value if done early (cost v. value)
- Lessons Learned:
 - Drilling direction
 - Rounded edges
 - Utilizing tie-wire to hold the heater
 - Estimated Labor Hours



A New Investor



The Moral of the Story

- Involve experienced project managers early for reasonable cost and schedule estimates
- R&D requires creative solutions
- Prototyping is a great risk mitigation method
- Utilizing existing designs can result in significant cost savings
- Be reasonable.

Experiments can be Complicated

- [Video](#)

