DOE-NE Microreactor Program
Winter Review Meeting
March 8 - 9, 2023

U.S. DEPARTMENT OF ENERGY

Meeting Objectives

This Program Review will be focused on ongoing progress for each Technical Focus Area and discussion of path forward for the remainder of FY23. Discussions will highlight:

- Accomplishments to date and progress on key efforts
- Issues/concerns related to meeting FY23 goals and M2 milestones
- Potential collaboration with other NE programs
- Initial thoughts on priorities for FY24 and beyond
- Review participant questions

Program Vision

Through cross-cutting research and development and technology demonstration support, by 2025 the Microreactor Program will:

- Achieve technological breakthroughs for key features of microreactors
- Empower initial demonstration of the next advanced reactor in the US
- Enable successful demonstrations of multiple domestic commercial microreactors

Program Objectives

1. Meet critical R&D needs of existing developers that require national lab or university expertise or capabilities
2. Develop R&D infrastructure to support design, demonstration, regulatory, and safety-related tests and to collect data to validate M&S tools.
3. Develop advanced technologies and concepts for next-generation microreactor applications and systems
4. Enable future microreactor applications (e.g., district heat, hydrogen production, and defense applications).

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Agenda

Wednesday, March 8th , 2023

(note: all times are EST)

10:00 **Welcome and introduction to MRP Winter Meeting..... Diana Li**

10:10 **Purpose, expectations, and program overview ..... John Jackson**

10:25 **System Integration and Analysis Overview. ..... Alex Huning**

10:40 – 11:10 Emerging markets for microreactors..... **David Shropshire**

11:10 – 11:30 Development of a CRAB/MELCORE framework ..... **Jason Christensen**

11:30 – 11:50 (NEUP Project 20-19042) Flexible Siting Criteria .. **Jacopo Buongiornio**

11:50 – 12:10 (NEUP Project 20-19693) Well-characterized micro-grid... **Caleb Brooks**

12:10 – 12:25 Emergency Planning for transportation..... **Steve Maheras**

12:25 – 12:30 Wrap Up ..... **Alex Huning**

12:40 **Break ..... ALL**

1:00 **Technology Maturation Overview .....Holly Trellue**

1:15 – 2:00 High Temperature Moderators..... **Adi Shivprasad/Nedim Cinbiz/Sumit Bhattacharya**

2:10 – 2:45 Instrumentation and Sensors – Microreactor Automatic Control System (MACS) and Acoustics .....**Chris Petrie/TJ Ulrich**

2:45 – 3:15 37 Heat Pipe Test Article (Heat Transfer)..... **Bob Reid**

3:15 – 3:35 (NEUP Project 19-16980) Effects of Neutron Irradiation on the Structural Integrity of Additively Manufactured Heat Exchangers .....**Scott Thompson**

3:35 – 4:05 Structural Materials - PM-HIP code case and refractory metals .....**Tate Patterson/John Carpenter**

4:05 – 4:25 (NEUP Project 19-17416) Experiments and computations to address the safety case of heat pipe failures in Special Purpose Reactors .....**Victor Petrov**

4:25 – 4:45 (NEUP Project 21-24226) Cost Reduction of Advanced Integration Heat Exchanger Technology for Micro-Reactors .....**Gregory Nellis**

4:45 – 4:55 (NEUP Project 22-27123) Development of Hydrogen Transport Models for High Temperature Metal Hydride Moderators.....**Jeff King**

4:55 – 5:00 Wrap Up .....**Holly Trellue**

5:15 **Day 1 Wrap up..... John Jackson**

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Thursday, March 9th, 2023

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10:00 **Welcome to day 2** ..... **John Jackson**

10:05 **Demonstration Capabilities Overview.** ..... **Piyush Sabharwall**

10:15 – 10:35 High Pressure He Loop Facility .. **Zach Sellers and Piyush Sabharwall**

10:35 – 11:00 SPHERE ..... **Jeremy Hartvigsen**

11:00 – 11:25 MAGNET ..... **TJ Morton**

11:25 – 11:45 (NEUP Project 20-19735) Experiments for Modeling and Validation of Liquid-Metal Heat Pipe Simulation Tools for Micro-Reactor ..... **Yassin Hassan**

11:45 – 12:05 (NEUP Project 21-24152) Direct heating of chemical catalysts for hydrogen and fertilizer production using Microreactors ..... **Hitesh Bindra**

12:05 – 12:25 Wrap Up ..... **Piyush Sabharwall**

12:25 **Break** ..... **ALL**

1:00 **Microreactor Application Overview** ..... **Yasir Arafat**

1:10 – 1:30 MARVEL Final Design ..... **Yasir Arafat**

1:30 – 1:45 MARVEL PCAT ..... **Derek Sommer, Scott Reed**

1:45 – 2:00 MARVEL Fuel Fabrication ..... **MW Patterson**

2:00 – 2:15 MARVEL Construction Assembly Plan……..…….. **Tarrin Funderberg**

2:15 – 2:30 MARVEL ASME Calculations…… **Kyle Francis, Cody Hale**

2:30 – 2:45 Microreactor Factory Fabrication…… **Abdalla Abu- Jaode**

2:45 – 3:00 (NEUP Project 19-16802) Evaluation of Semi-Autonomous Passive Control Systems for HTGR Type Special Purpose Reactors..... **Brendan Kochunas**

3:00 – 3:15 (NEUP Project 19-17185) Demonstrating Reactor Autonomous Control Framework Using Graphite Exponential Pile ..... **Bren Phillips**

3:15 – 3:30 (NEUP Project 22-26910) Demonstrating Autonomous Control, Remote Operation, and Human Factors for Microreactors..... **Stylianos Chatzidakis**

3:30 – 3:50 Next Steps & Wrap Up..... **Yasir Arafat**

3:50 **Highlight actions and next steps** ..... **John Jackson**

4:15 **Adjourn**..... **ALL**