U.S. DEPARTMENT OF ENERGY | Office of NUCLEAR ENERGY

Office of Reactor Fleet and Advanced Reactor Deployment

Joint ART Advanced Materials and Advanced Materials and Manufacturing Technologies (AMMT) Program Review

(Hybrid Meeting)

June 5 – 8, 2023

ART Advanced Materials, June 5-6, In-person Meeting
DOE Office Building, Auditorium
19901 Germantown Road, Germantown, MD 20874

Advanced Materials and Manufacturing Technologies (AMMT)
June 7-8, Virtual Meeting via Webex

AGENDA

Virtual Option:

Day 1 (ART): https://doe.webex.com/doe/j.php?MTID=md5d21768d0fe603064c3952453cb9af1

Meeting number (access code): 2762 242 9583, Meeting password: BzFi9RryP25

Day 2 (ART): https://doe.webex.com/doe/j.php?MTID=mddf5920ad19d89a010f20b3e8bd4cf13

Meeting number (access code): 2760 470 7751, Meeting password: 9sAynHPJ9S6

Day 3 (AMMT): https://doe.webex.com/doe/j.php?MTID=mccae9d984dd20675b12a03977bbfec5c

Meeting number (access code): 2763 594 1662, Meeting password: tKmPGpmM348

Day 4 (AMMT): https://doe.webex.com/doe/j.php?MTID=m11e205e6e4e58c2ba7a23e659b36dff3

Meeting number (access code): 2764 301 8280, Meeting password: gH3jFj5gMT3

Day 1, Monday, June 5, 2023

ART Advanced Materials

07:30 Check in at DOE Germantown

08:20 Logistical Announcement ..... Sue Lesica
DOE Office of Nuclear Energy

08:30 DOE Opening Remarks ..... Alison Hahn
DOE Office of Nuclear Energy

09:00 ART Advanced Materials Program Overview ..... Sam Sham
Idaho National Laboratory

10:00 Break

10:15 The Importance of Materials Research and Qualification for Licensing Advanced Reactors ..... Candace de Messieres
US Nuclear Regulatory Commission

10:45 GCR: Graphite R&D Overview ..... Will Windes
Idaho National Laboratory

11:30 GCR: Graphite Activities Related to Molten Salt Reactors ..... Nidia Gallego
Oak Ridge National Laboratory

12:00 No-Host Lunch

01:15 MSR: Surveillance Test Articles Development ..... Mike McMurtrey
Idaho National Laboratory
..... Mark Messner
Argonne National Laboratory

01:45 IRP: 22-27979, Advancing Diffusion Bonding for Compact Heat Exchangers: Development of Enabling Fabrication Technology for Compact Heat Exchangers for Advanced Reactors ..... Todd Allen
University of Michigan

02:15 NEUP: 18-15280, Advanced Alloy Innovations for Structural Components of Molten Salt Reactors ..... Kumar Sridharan
University of Wisconsin, Madison

02:45 NEUP: 18-14846, Development of Structural Materials Corrosion Resistant Coatings for Liquid Fueled Molten Salts Reactors Applications ..... Adrien Couet
University of Wisconsin, Madison

03:15 Break

03:30 NEUP: 19-17173, Ni-based ODS Alloys for Molten Salt Reactors ..... Djamel Kaoumi
North Carolina State University

04:00 NEUP: 20-19367, Investigation of Novel Nickel-Based Alloys for Molten Chloride Fast Reactor Structural Applications ..... Vijay Vasudevan
University of North Texas

04:30 NEUP: 21-24471, Technical Basis of Microstructure Criteria and Accelerated Testing for Qualifying Additively-manufactured 316H Stainless Steel for High-temperature Cyclic Service ..... Xiaoyuan Lou
Purdue University

05:00 Adjourn - Day 1

Day 2, Tuesday, June 6, 2023

ART Advanced Materials

07:00 Check in at DOE Germantown

08:00 MSR: Salt and Materials Interaction ..... Bruce Pint
Oak Ridge National Laboratory

08:30 MRP: Qualification of PM HIP Materials for Elevated Temperature Nuclear Construction ..... Tate Patterson
Idaho National Laboratory

08:50 MRP: Design Rules for Refractory Metals ..... Sam Sham
Idaho National Laboratory

09:10 FR: A709 Procurement and ASTM Specification Status ..... Richard Wright
Structural Alloys, LLC

09:30 FR: A709 Experimental Determination of Grain Coarsening Temperature and Continuous Cooling Precipitation Behavior: Moving Toward Bars, Pipes and Forgings ..... Grace Burke
Idaho National Laboratory

10:00 Break

10:15 FR: A709 Code Case Testing Status ..... Xuan Zhang
Argonne National Laboratory

10:45 FR: A709 Weldment Fabrication Status ..... Zhili Feng
Oak Ridge National Laboratory

11:15 FR: A709 Code Case Design Parameters ..... Sam Sham
Idaho National Laboratory

11:30 FR: A709 Sodium Compatibility ..... Yiren Chen
Argonne National Laboratory

12:00 No-Host Lunch

01:15 NEAMS: A709 Creep Rupture Extrapolation Aided by Modeling and Simulation ..... Mark Messner
Argonne National Laboratory

01:35 GCR: Innovative High Temperature Experiments for ASME Code Rule Development ..... Yanli Wang
Oak Ridge National Laboratory

02:20 GCR: Development of Improved A800H Weldment ..... Tate Patterson
Idaho National Laboratory

02:35 GCR: A617 Notch Effect and Crack Growth Testing Status ..... Mike McMurtrey
Idaho National Laboratory

03:05 Break

03:20 GCR: Class B Code Case ..... Heramb Majahan
Idaho National Laboratory

03:50 GCR: Implementation of Inelastic Models in Division 5 ..... Mark Messner
Argonne National Laboratory

04:20 Directions, Reviews and Comments from DOE, NTDs, NRC, Industry and Others ..... Sue Lesica
DOE Office of Nuclear Energy

05:00 Adjourn - Day 2

06:00 No-Host Dinner, Mi Rancho Es Su Rancho (https://www.miranchomd.com), 19725 Germantown Rd A, Germantown, MD 20874, Tel: (301) 515-7480

Acronyms

ART	Advanced Reactor Technologies
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
DOE	Department of Energy
FR	Fast Reactor
GCR	Gas-Cooled Reactor
IRP	Integrated Research Project
MRP	Microreactor Program
MSR	Molten Salt Reactor
NEAMS	Nuclear Energy Advanced Modeling and Simulation
NEUP	Nuclear Energy University Program
NRC	Nuclear Regulatory Commission
NTD	National Technical Director
ODS	Oxide dispersion strengthened
PM HIP	Powder Metallurgy Hot Isostatic Pressed
R&D	Research and Development

Day 3, Wednesday, June 7, 2023, 10:00 am – 5:00 pm ET

Advanced Materials and Manufacturing Technologies (AMMT)

10:00 Welcome and Introduction ..... Dirk Cairns-Gallimore
DOE Office of Nuclear Energy

10:10 AMMT Overview ..... Meimei Li
Argonne National Laboratory

Session 1 – Advanced Materials and Manufacturing (Isabella Van Rooyen)

10:40 Advanced Materials and Manufacturing Overview ..... Isabella Van Rooyen
Pacific Northwest National Laboratory

11:00 Improvement and Optimization of Existing Reactor Materials Enabled by Advanced Manufacturing ..... Sebastien Dryepondt
Oak Ridge National Laboratory

11:30 Impact of Advanced Manufacturing on Development of ODS Materials ..... Mageshwari Komarasamy
Pacific Northwest National Laboratory

..... TS Byun
Oak Ridge National Laboratory

12:00 Lunch

Session 2 – Rapid Qualification (Ryan Dehoff)

01:20 Rapid Qualification Overview ..... Ryan Dehoff
Oak Ridge National Laboratory

01:40 Technical Basis for Qualification of LPBF 316H SS ..... Caleb Massey, Peeyush Nandwana
Oak Ridge National Laboratory

..... Xuan Zhang
Argonne National Laboratory

..... Robin Montoya
Los Alamos National Laboratory

02:20 Post-process NDE ..... Bill Chuirazzi
Idaho National Laboratory

..... Robert Montgomery
Pacific Northwest National Laboratory

02:40 Break

03:00 Multi-Dimensional Data Correlation (MDDC) Platform ..... Luke Scime
Oak Ridge National Laboratory

03:30 Process-Microstructure-Property Modeling for Advanced Manufacturing ..... Alex Plotkowski
Oak Ridge National Laboratory
..... Laurent Capolungo
Los Alamos National Laboratory

Session 3 – Technology Demonstration (Ryan Dehoff)

04:10 Technology Demonstration Overview ..... Ryan Dehoff
Oak Ridge National Laboratory

04:30 ASME Code Qualification Plan for LPBF 316 SS ..... Mark Messner
Argonne National Laboratory

05:00 Adjourn - Day 3

Day 4, Thursday, June 8, 2023, 10:00 am – 5:00 pm ET

Advanced Materials and Manufacturing Technologies (AMMT)

Session 4 – Material Performance Evaluation (Andrea Jokisaari)

10:00 Material Performance Evaluation Overview ..... Andrea Jokisaari
Idaho National Laboratory

10:20 HFIR Neutron Irradiation and PIE ..... Kory Linton & TS Byun
Oak Ridge National Laboratory

10:50 Qualification of AM Materials with Combined Neutron, Ion Irradiations and Computer Modeling
..... Stephen Taller
Oak Ridge National Laboratory
..... Weiying Chen
Argonne National Laboratory

Session 5 – Capability Development & Transformative Research (Andrea Jokisaari)

11:20 Capability Development & Transformative Research Overview ..... Andrea Jokisaari
Idaho National Laboratory

11:40 Automated, High-Throughput Materials Characterization Techniques ..... Amir Ziabari
Oak Ridge National Laboratory

12:10 Creep Testing Techniques ..... Mike McMurtrey
Idaho National Laboratory

12:40 Lunch

Session 6 – Collaborative R&D: NEUP and Industry Projects (David Andersson)

02:00 Collaborative R&D Overview ..... David Andersson
Los Alamos National Laboratory

02:20 Machine Learning on High-Throughput Databases of Irradiation Response and Corrosion Properties of Selected Compositionally Complex Alloys for Structural Nuclear Materials ..... Adrian Couet
University of Wisconsin

02:50 Fiber Sensor Fused Additive Manufacturing for Smart Component Fabrication for Nuclear Energy ..... Kevin Chen
University of Pittsburgh

03:20 Break

03:40 Irradiation Studies on Electron Beam Welded PM-HIP Pressure Vessel Steel ..... Janelle P. Wharry
Purdue University

04:10 SMR Reactor Pressure Vessel Manufacturing and Modular In-Chamber Electron Beam Welding ..... David Gandy
EPRI

04:40 Discussion and Feedback ..... All

05:00 Adjourn - Day 4