2021 Crosscutting Research and Advanced Energy Systems Project Review Meeting

June 3, 8, 10, 15, 2021 All times designated in Eastern Daylight Time (EDT)

HIGH PERFORMANCE MATERIALS PROGRAM AGENDA

Thursday, June 3, 2021	
10:00	Welcome and High Performance Materials Overview Briggs White, National Energy Technology Laboratory
Advanced Structural Materials **Moderator: Vito Cedro**	
10:20	Advanced Ultra-Supercritical Component Testing (FE0025064) Robert Purgert, Energy Industries of Ohio, Inc.
10:40	Development of Corrosion- and Erosion-Resistant Coatings for Advanced Ultra-Supercritical Materials (FE0031820) Ying Zhang, Tennessee Technological University
11:00	Advanced Alloy Development (FWP-1022406) TBD, National Energy Technology Laboratory
11:20	Welding of Haynes 282 to Steels to Enable Modular Rotors for Advanced Ultra Super-Critical Steam Turbines (FE0031824) Sudhir Rajagopalan, Siemens Corporation
11:40	Probabilistic Life Assessment and Aged Materials Testing for Service Feedback of Gas Turbine Components (FWP-FEAA137) Sebastien N. Dryepondt, Oak Ridge National Laboratory
12:00	BREAK
Advanced Structural Materials **Moderator: Michael Fasouletos**	
13:00	Effect of Impurities on Supercritical Carbon Dioxide Compatibility (FWP-FEAA144) Bruce A. Pint, Oak Ridge National Laboratory
13:20	Low Cost High Performance Austenitic Stainless Steels for A-USC (FWP-FEAA133) Xiang Chen, Oak Ridge National Laboratory
13:40	Steamside Oxidation Issues in Current Coal-Fired Boilers (FWP-FEAA150) Bruce A. Pint, Oak Ridge National Laboratory
14:00	Evaluating Ni-Based Alloys for A-USC Component Manufacturing and Use (FWP-FEAA152) Xiang Chen, Oak Ridge National Laboratory
14:20	Weldability of Creep Resistant Alloys for Advanced Power Plants (FWP-FEAA118) Zhili Feng, Oak Ridge National Laboratory

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Tuesday, June 8, 2021	
Computational Materials Design **Moderator: Anthony Zinn**	
10:00	Opening Remarks Anthony Zinn, National Energy Technology Laboratory
10:10	Large-Scale, Graphics Processing Unit (GPU)-Enhanced Density Functional Tight Binding (DFTB) Approaches for Probing Multi-Component Alloys (FE0030582) Bryan Wong, University of California - Riverside *Project sponsored by Simulation-Based Engineering (SBE) Program*
10:30	ICME for Advanced Manufacturing of Nickel Superalloy Heat Exchangers with High Temperature CREEP Plus Oxidation Resistance for Supercritical CO2 (FE0031631) Brett Tossey, Det Norske Veritas (NDV) GL USA, Inc.
10:50	Digital Twin Model for Advanced Manufacture of a Rotating Detonation Engine Injector (FE0031644) Shane Coogan, Southwest Research Institute (SwRI)
11:10	eXtremeMAT - Accelerated Design and Manufacture of Next Generation Extreme Environment Materials (FWP-1022433) Jeffrey Hawk, National Energy Technology Laboratory
11:30	Predictive Design of Novel Ni-based Alloys (FWP-AL-19-510-097) Mathew Kramer, Ames National Laboratory
11:50	Integrated Computational Materials and Mechanical Modeling for Additive Manufacturing of Alloys with Graded Structure used in Fossil Fuel Power Plants (FE0031637) Wei Xiong, University of Pittsburgh
12:10	BREAK
Computational Materials Design **Moderator: Rick Dunst**	
13:00	High Throughput Computational Framework of Materials Properties for Extreme Environments (FE0031553) Zi-Kui Liu, Pennsylvania State University
13:20	Multi-modal Approach to Modeling Creep Deformation in Ni-Base Superalloys (FE0031554) Ridwan Sakidja, Missouri State University
13:40	Alloy for Enhancement of Operational Flexibility of Power Plants (FE0031747) Ahmed Megri, North Carolina Agricultural and Technical State University
14:00	Development of Novel Combustion Codes for Supercritical CO2 Combustion (HPC4Materials) TBD, 8 Rivers Capital
14:20	Pseudo-Spectral Method for Conjugate Heat Transfer Prediction of Impinging Flows over Rough Surfaces (P.100.1028) (HPC4Materials) TBD, United Technologies Research Center
14:40	Accelerating High Temperature Operation Development of High Entropy Alloys via High Performance Computation (P.E00.0401) (HPC4Materials) TBD, United Technologies Research Center

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Thursday, June 10, 2021	
Advanced Manufacturing **Moderator: Vito Cedro**	
10:00	Opening Remarks Vito Cedro, National Energy Technology Laboratory
10:10	Low-Cost Hip Fabrication of Advanced Power Cycle Components and PM/Wrought in740h Weld Development (FE0031818) Shenyan Huang, General Electric (GE) Company
10:30	Low Cost Fabrication of ODS Materials (FWP-60098) Glenn Grant, Pacific Northwest National Laboratory
10:50	Solid State Joining of Creep Enhanced Ferritic Steels (FWP-66059) Glenn Grant, Pacific Northwest National Laboratory
11:10	Integrated Process Improvement using Laser and Friction Stir Processing for Nickel Alloys used in Fossil Energy Power Plant Applications (FWP-71843) Glenn Grant, Pacific Northwest National Laboratory
11:30	Components Fabricated by Additive Manufacturing (FWP-FEAA128) Sebastien N. Dryepondt, Oak Ridge National Laboratory
11:50	Development of Functionally Graded Transition Joints to Enable Dissimilar Metal Welds (FWP-FEAA151) Peeyush Nandwana, Oak Ridge National Laboratory
12:10	BREAK
Advanced Manufacturing **Moderator: Michael Fasouletos**	
13:00	Novel Transition Joint for Dissimilar Metal Welds by Solid-State Manufacturing Processes for New Installation and Replacement (FWP-FEAA372) Zhili Feng, Oak Ridge National Laboratory
13:20	Multi-Pass Hybrid Laser ARC Welding of Alloy 740H (FWP-B100-19010) Thomas M. Lillo, Idaho National Laboratory
13:40	Additively Manufactured Graded Composite Transition Joints for Dissimilar Metal Weldments in Ultra-Supercritical Power Plant (FE0031819) Xingbo Liu, West Virginia University
14:00	Optimization of Wire Arc Additive Manufacturing (WAAM) Process to Produce Advanced Ultra-Supercritical Components (AUSC) Components with Increased Service Life (FE0031821) Alexander Staroselsk, United Technologies Research Center
14:20	Computation Tools for Additive Manufacture of Tailored Microstructure and Properties (FE0031642) John A. Sharon, United Technologies Research Center
14:40	Robust Dissimilar Metal Friction Welded Spool for Enhanced Capability for Steam Power Components (FE0031907) Erica Sampson, General Electric (GE) Company

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HIGH PERFORMANCE MATERIALS PROGRAM AGENDA

Tuesday, June 15, 2021	
Materials Characterization, Modeling, Existing Fleet, and Alloy Development **Moderator: Omer Bakshi**	
10:00	Opening Remarks Omer Bakshi, National Energy Technology Laboratory
10:10	Characterization of Long-Term Service Coal Combustion Power Plant Extreme Environment Materials (EEMs) (FE0031562) Steven C. Kung, Electric Power Research Institute
10:30	Environmental Validation of Materials and Design Concepts to Enable Operational Flexibility of Existing Coal Power Plants (FE0031749) Anand Kulkarni, Siemens Corporation
10:50	Elimination of Steam Side Scaling on Grade 91 Steel: Improving Efficiency, Reliability, & Flexibility of Existing Fossil Fired Power Plants (FE0031769) Jeff Henry, Applied Thermal Coatings, Inc.
11:10	Life Modeling of Critical Steam Cycle Components in Coal-Fueled Power Plants (FE0031811) Mark Patterson, Southern Research Institute *Project sponsored by Simulation-Based Engineering (SBE) Program*
11:30	Damage Accumulations Predictions for Boiler Components Via Macrostructurally Informed Material Models (FE0031823) Monica Soare, National Energy Technology Laboratory *Project sponsored by Simulation-Based Engineering (SBE) Program*
11:50	Advanced Coating Compositions and Microstructures to Improve Uptime and Operational Flexibility in Cyclic, Low-Load Fossil Plants (FE0031911) Anteneh Kebbede, General Electric (GE) Company
12:10	BREAK
Materials Characterization, Modeling, Existing Fleet, and Alloy Development **Moderator: Robie Lewis**	
13:00	Standardized Test Method and Calculation Protocol for Determining and Reporting Annual Heat Rate for Coal-Fueled Electricity Generating Units (FE0031933) Dan Andrei, ASME Standards Technology, LLC
13:20	In-Situ Thermomechanical Studies of Ni-Based Alloys (FWP-31961.2) Jonathan Almer, Argonne National Laboratory
13:40	Corrosion Issues in Advanced Coal Fired Boilers (FWP-FEAA116) Bruce A. Pint, Oak Ridge National Laboratory
14:00	Reducing the Cost of Ingots Utilized in Large Steam Cycle Components by Heat Flux Manipulation during VAR Processing to Control Solidification (SC0020980) Paul King, KW Associates, LLC
14:20	Advanced Alloy Development (FWP-1022406 Task X) TBD, National Energy Technology Laboratory
14:40	Advanced Alloy Development (FWP-1022406 Task Y) TBD, National Energy Technology Laboratory