

(18) Preventing Solidification Defects in Large Superalloy Castings Used in Advance Electric power Systems

This two-year effort will study macrosegregation in superalloy remelting processes. Weaknesses in existing models, particularly the inability to accurately predict partition coefficients of key elements under real operating conditions, will be addressed. Compositional effects of individual alloying elements in different alloys will be characterized so that a comprehensive database will be available in a useable format. A predictive methodology incorporating advanced computation technologies will be developed. Alloy index of freckle and center segregation formation can be determined for complex alloy compositions with efficient computational and laboratory analysis. The ultimate goal is to develop a predictive technology that can be applied commercially to prevent solidification defects for large superalloy castings used in advance electric power systems.

Total project cost: \$526,332

Funding request: \$375,473

Project Lead: West Virginia Research Corp. on behalf of West Virginia University

Project Participants: GE Energy; Special metals Corp.; Pennsylvania State University

Start Date: August 30, 2005

End Date: August 30, 2007

Presentations/Publications

None.

Patents

None.

Progress in Past Quarter and Current Status

Task 1: Solidification Modeling