
Organization:	ORNL, LANL, DOE
Project Title:	SPI Readiness Review Program
Presenters:	M. J. Gouge (ORNL), S. Ashworth (LANL), P. Bakke (DOE-Golden)
FY 2005 Funding:	\$100K (ORNL), \$100K (LANL)

Project Purpose and FY 2005 Objectives:

The purpose of this HTS program initiative is to support the Superconducting Partnership with Industry (SPI) program to help ensure SPI demonstration projects go as planned via a series of phased readiness reviews. The focus is on collaboration with the SPI team to identify potential failure modes; issues involving cryogenic temperatures, vacuum and high voltage dielectrics are a major concern. Expertise is obtained as needed from national laboratories, universities, and consultants. M. J. Gouge (ORNL) and Jim Daley (DOE) provided an overview of the proposed SPI oversight program at the January 2003 DOE Wire Development Workshop and the program began in March 2003. The objective for 2005 is to provide at least one review of all active SPI projects. Following comments provided by peer reviewers in 2004, interim reviews were carried out on the three cable projects.

FY 2005 Performance and FY 2006 Plans:

All of the SPI projects completed at least one review cycle by August 2004. This phased readiness review program continued in 2005 as the SPI projects proceeded to final design, fabrication, assembly, and initial commissioning. We are encouraging all the SPI projects to develop risk identification and mitigation processes such as failure mode and effects analysis to manage risks including R&D and prototyping needed to enhance success at full-scale and design levels of voltage/current. Based on continuing issues with the design and performance of dielectric materials at cryogenic temperatures and at high voltage, more emphasis will be placed on R&D and risk mitigation in this area by the grid-based SPI projects. In late 2005 a web-site will be implemented (funding permitting) that will have lessons-learned from prior SPI projects, some general design guidance on high voltage, vacuum, etc. and a place where SPI participants can post comments or questions and get feedback. A High-Voltage Cryogenic Dielectric Workshop is being planned for October 16-17, 2005, just before the IEEE CEIDP in Nashville, TN. Participation by each SPI team facing high voltage component qualification is encouraged and the agenda will include some overview talks on liquid nitrogen dielectrics, solid dielectrics, HV design practices, etc. Reviews will continue in 2006 as the design enters the final phase for the GE HTS Generator Project, the Alpha MFCL single-phase prototype is commissioned and as the other projects begin site installation, assembly and commissioning.

FY 2005 Results:

The following project readiness reviews were conducted since the 2004 DOE HTS Peer Review:

- A readiness review of the Rockwell HTS motor R&D project was conducted on August 19, 2004. Reviewers were Paul Bakke (DOE-Golden), Mike Gouge and Bill Schwenterly (ORNL).
- A cable review team led by Steve Ashworth (LANL) conducted interim reviews of the LIPA and Albany cable projects during the Applied Superconductivity Conference in October 2004.
- On October 24, the cable review team conducted an interim review of the Ultera cable project via Webex.
- On November 11-12, a review (based on the final design) of the Albany cable project was conducted at the cryogenic partner (BOC) facility.

- M. J. Gouge and S. W. Schwenterly (ORNL) and Paul Bakke (DOE-Golden) participated in the Matrix Fault Current Limiter (MFCL) Technical Advisory Board Meeting with an embedded readiness review on November 17 at SuperPower, Inc. Emphasis was on results from the fault current testing at KEMA and the initial progress on high-voltage R&D.
- A SPI readiness review was conducted at General Electric–Corporate Research and Development on April 14, 2005. The scope included HTS field coil excitation, coil turn and layer insulation, and quench protection. Reviewers were Mike Gouge and Chris Rey (ORNL) and Charles Oberly (AFRL).
- A Readiness Review of completed 5/10 MVA HTS transformer project (lessons learned) was conducted at SuperPower on May 11, 2005. Reviewers were Mike Gouge and Isidor Sauers (ORNL), Bill Hassenzahl (AEA), and Paul Bakke (DOE-Golden). Most of the discussion focused on the high-voltage failure and dissection of the phase B coil.
- A readiness review of the Ultera HTS cable project was conducted at Southwire, Carrollton, GA, on June 8-9, 2005.
- M. J. Gouge and S. W. Schwenterly (ORNL), Bill Hassenzahl (LANL), and Paul Bakke (DOE-Golden) participated in the MFCL Technical Advisory Board Meeting with an embedded readiness review on June 28, 2005, at SuperPower, Inc.
- July 2005 LIPA cable project interim review by Steve Ashworth (ORNL).

Research Integration:

Since the reviews contain a large amount of proprietary material, the results and recommendations are typically shared only between the project being reviewed, the reviewers, and DOE. The reviewers, to the extent possible, highlight or flag potential problem areas that they have learned from other project reviews. M. J. Gouge presented a status report on the SPI readiness review program including an overview of 2004 DOE Peer Review comments at the January 19-20, 2005, DOE Wire Development Workshop. Actions taken in response to the comments of the peer reviewers were also covered. In November 2004, Ed Hahn (NYPA) was appointed to the cable review team to strengthen its expertise in utility-related matters. Participation in the U. S. Air Force quench and stability workshop on January 27, 2005, in Orlando was valuable in that the issues of reliable quench detection and protection in superconducting coils are common to DOD and DOE HTS applications. The web site and workshop mentioned above will be a way to share generic lessons-learned and design information.