Project Title:	**Readiness Reviews of SPE Projects**
Organization:	ORNL / LANL
Presenters:	Steve Ashworth (LANL) and Mike Gouge (ORNL)
FY 2010 Funding:	$125 K (ORNL)

Overall Project Purpose and Objectives:

The purpose of this HTS program initiative is to support the Superconducting Power Equipment (SPE) project teams to ensure that the demonstration projects go as planned via a series of phased readiness reviews. The focus is on collaboration with the SPE teams 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, utilities and consultants. M. J. Gouge (ORNL) and Jim Daley (DOE) provided an overview of this proposed oversight program at the January 2003 DOE Wire Development Workshop, and the program began in March 2003. The objective for 2010 is to continue focused reviews as SPI projects remain operational on the electric grid, and the new SPE projects proceed to final design, fabrication and testing, off and on the grid. We are encouraging all the SPE projects to develop risk identification and mitigation processes and to leverage R&D and prototyping to enhance success at full-scale and design levels of voltage/current. The importance of prototypes has been demonstrated on both of the active FCL projects where technical issues with the electric conductor (both superconductor and stabilizer), turn insulation and coil configuration have been identified based on scaled model tests. Based on continuing issues with the design and performance of dielectric materials at cryogenic temperatures and at high voltage, more emphasis has been placed on R&D and risk mitigation in this area by the grid-based projects. A web-site was started in 2007 with lessons-learned and general design guidance.

FY 2010 Approach and Results:

Most of the activity was focused on readiness reviews of the SPE Fault Current Limiter (FCL) projects. Preparations were made for a 3rd readiness review of AMSC/Siemens FCL project, and the review was conducted via a web-seminar on December 18, 2009 with the entire FCL team represented. A draft report was issued to AMSC and comments provided and resolved; the final report was issued in March 2010. The next readiness review is scheduled in Washington, DC on June 28, 2010 just before the 2010 DOE Peer Review. A 3rd readiness review of the Zenergy FCL project was conducted on January 26-27, 2010 in San Francisco with a final report to DOE issued in March 2010. This met a DOE milestone to complete a third round of readiness reviews of the SPE fault current limiter projects by the end of April 2010. A special review of the Zenergy FCL was conducted via web-seminar on May 24th to address issues in model (prototype) coil testing. Reviewers for the FCL projects were Dr. Mike Gouge (ORNL), Dr. Bill Hassenzahl (AEA) and Dr. Mischa Steurer, FSU/CAPS.

Two of the three superconducting cable projects (AMSC/LIPA and Columbus/AEP HTS cables) continued in operation on the electric grid in FY 2010. Review support is being provided to the DHS “Hydra” cable project by Steve Ashworth, LANL. We aim to ensure that lessons learned in the individual DOE and DHS projects are, as far as possible, communicated across agencies.

FY 2011 Plans and Expectations:

It is planned to hold a fourth round of readiness reviews of the two active FCL projects as they complete detailed design and fabrication and begin testing both off-grid and in-grid. We will review the technical baseline and associated risk assessments and identify those areas potentially likely to repeat past problems or lead to new ones. Conceptual/preliminary design reviews for the two cable SPE projects are under discussion. Reviews are planned for the two operational superconducting cable projects as they conclude their demonstration phase to quantify "lessons-learned" during operations on the grid. A Smart Grid Regional Demonstrations Project was awarded to a Waukesha Electric Systems (WES)-led team earlier this fiscal year. The projects plans to demonstrate a Smart Grid-compatible, fault current limiting, superconducting transformer in a Southern California Edison Substation near Irvine, CA with a nominal rating of 28 MVA. It is planned to conduct an initial readiness review of this new project in the summer or fall of 2010.

Technology Transfer, Collaboration, Partnerships:

Since the in-depth technical reviews can 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. The intent of the web site is to highlight generic lessons-learned and provide general design guidance that will be useful to all the SPE teams.

Since early 2009 the IEEE Switchgear Administrative Subcommittee (ADSCOM) is sponsoring a Task Force on Fault Current Limiter (FCL) Testing. The aim of this project is to develop guidelines for utilities, potential FCL developers, and testing labs on how to properly test emerging FCL technologies. Dr. Mischa Steurer at Florida State University, who also serves on the FCL readiness review team (under an ORNL subcontract), chairs this Task Force. He also contributes to the CIGRE Working Group A3.23 on FCLs which focuses on FCL characteristics, specifications, applications, and economics.