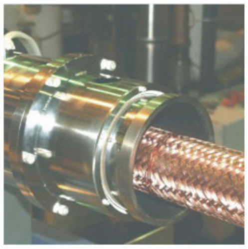
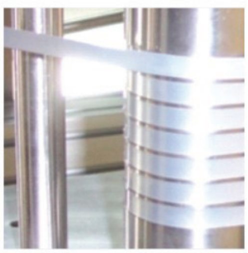
U.S. DEPARTMENT OF
ENERGY
Electricity Delivery
and Energy Reliability

SUPERCONDUCTIVITY
FOR ELECTRIC SYSTEMS

2008 Annual Peer Review

Final Report

July 29-31, 2008

Crystal Gateway Marriott
Arlington, VA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HIGH TEMPERATURE SUPERCONDUCTIVITY FOR ELECTRIC SYSTEMS PROGRAM OVERVIEW

The Office of Electricity Delivery and Energy Reliability's High Temperature Superconductivity (HTS) for Electric Systems Program's specific mission is to work in partnership with industry to develop HTS wire and perform other research and development activities leading to the commercialization of HTS-based electric power applications by U.S. companies. This technology contributes to several key performance improvements of the grid. It enhances reliability by increasing capacity, which relieves congestion and helps prevent outages. Efficiency is improved as a result of the reduction of loss during operation which both conserves energy and reduces supply-side pollutants. Finally, the environmental impact is reduced through oil-free operation and the decreased demand for rights of way.

The DOE HTS Program has three focus areas; grid applications, strategic research and second-generation wire development. The applications area is focused on developing HTS-based electric power equipment such as transmission and distribution cables and fault current limiters (FCLs). It is also installing this equipment in the grid and demonstrating proof of concept designs. These demonstration projects include cable projects in Columbus, OH, Albany, NY, Long Island, NY and New Orleans, LA as well as three FCL projects in California and Ohio.

Some of the benefits for high-temperature superconducting cables include:

- Delivering three to five times more current than conventional power lines of the same diameter, which alleviates congestion by transmitting more electricity with greater energy efficiency.
- Enables grid reconfiguration capabilities to allow flexibility in substation/transformer placement and network connections.
- Reducing right-of-way requirements since HTS cables have a smaller footprint compared to conventional cables while carrying more power.
- Because HTS cables can carry more current at lower voltages, large power transformers can be located farther away from urban centers, allowing urban planners to free up valuable real estate for development or green space.

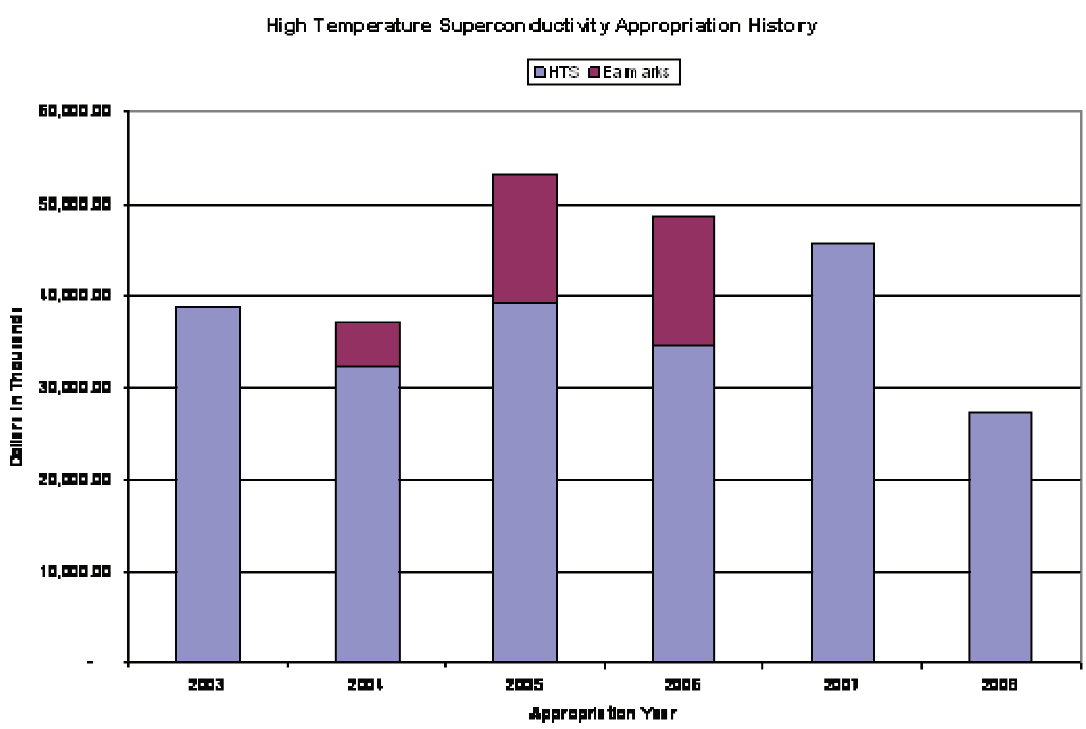
Fault current limiters are devices which, in the occurrence of a fault, limit the current in a crucial branch of the circuit so that no component in the system becomes overloaded. Some of the benefits of FCLS include:

- Enhanced stability, safety, reliability, and efficiency of power-delivery systems.
- Reduced or eliminated wide-area blackouts, reduced localized disruptions, and increased recovery time when disruptions do occur.
- Protected T&D equipment and eliminated or reduced replacement of T&D equipment, such as circuit breakers.

The strategic research area supports fundamental research activities to better understand relationships between the microstructure of HTS materials and their ability to carry large electric currents over long lengths. New projects are planned to investigate the various technical aspects of this key issue. The benefits will be higher-performance wires and potentially lower manufacturing costs. Also, work on enabling technologies such as joining HTS conductors to normal conductors will be supported, as well as additional research to minimize electrical losses due to alternating currents. In addition, strategic research includes exploratory activities on innovative processes and systems. Successes in these activities will help improve current capacity and lower processing costs of wires and applications through optimization and new discoveries. These activities are mainly carried out by the national labs and feed into second-generation wire development projects.

The wire development component of the DOE HTS program builds on the strategic research efforts to resolve fundamental barriers that limit the manufacture and applications of these materials. It focuses on the development of high-performance, low-cost, and long length second generation wire. Application of these scientific results should enable increased rates of wire fabrication, along with improved properties that lower the wire and device costs for industrial partners. The purpose is to foster the partnership between industry and the national labs to work on improving current wire technology. In partnership with the Department of Defense under the Title III program, DOE is co-sponsoring efforts to help assure commercially viable domestic suppliers of 2G wire.

The last five years of budget history for the program are shown below.



THE PEER REVIEW

A peer review is a documented, critical evaluation performed by technical experts who are independent of the work being reviewed. The peer review process is an important tool for assessing the U.S. Department of Energy's portfolio of projects by evaluating its goals, objectives, strategy, productivity, and leadership. In addition, it affords an opportunity for industry, national laboratories, and the academic community to network, share best practices, and seek areas of synergy.

The peer review provides program managers with high-quality technical input that can be used to make decisions, set priorities, and allocate resources. It also improves project management and productivity. The peer review process provides:

- The project team with an expert, unbiased assessment of strengths, weaknesses, and specific changes that would improve the project
- Public accountability for use of public funds
- A forum for interested parties to learn about the program's status and plans
- A forum for program participants to learn aspects of other participants' work that is not otherwise available
- A basis for identifying the most outstanding projects for potential recognition
- A basis for identifying the weakest projects so they can be improved or ended before the completion of the R&D cycle

Agendas and presentations are available from previous superconductivity for electric systems peer reviews are available.[1]

The 2008 HTS Peer Review was structured so that the projects were broken into the three focus areas, each with their own expert panel of reviewers. The three sessions were held concurrently over a period of three days, July 29-31, 2008. The agenda can be found in Appendix A.

[1] http://www.oe.energy.gov/information_center/peerreviews.htm

The Peer Reviewers were chosen from a list of stakeholder-nominated candidates. Particular attention was given to maintaining diversity on the panels by balancing representatives from industry, government and academia. Additionally, each panel maintained at least two peer reviewers from the previous year to maintain continuity and to serve as resources for historical information on the projects for new reviewers. Since high temperature superconductivity is an international field, each panel also had a representative from outside the United States. The peer reviewers for each of the three peer panels are listed below.

2ND GENERATION WIRE

Don Gubser	Naval Research Laboratory
Bill McCallum	Iowa State University
Chan Park	Seoul National University
Michael Sumption	Ohio State University
Harold Weinstock	Air Force Office of Scientific Research

STRATEGIC RESEARCH

Paul Barnes	Air Force Research Laboratory
Paul Grant	W2AGZ
James Horwitz	Department of Energy, Office of Science
Brian Maple	University of California San Diego
Xavier Obradors	Institut de Ciència de Materials de Barcelona
Yutaka Yamada	SRL-ISTEC

APPLICATIONS

Julian Cave	Hydro-Quebec
Swapan Dey	NSTAR Electric and Gas Corporation
Luciano Martini	Cesi Ricera S.pA.
Nathan Mitchell	American Public Power Association
Richard O'Callaghan	First Energy
Lynn Petersen	Office of Naval Research

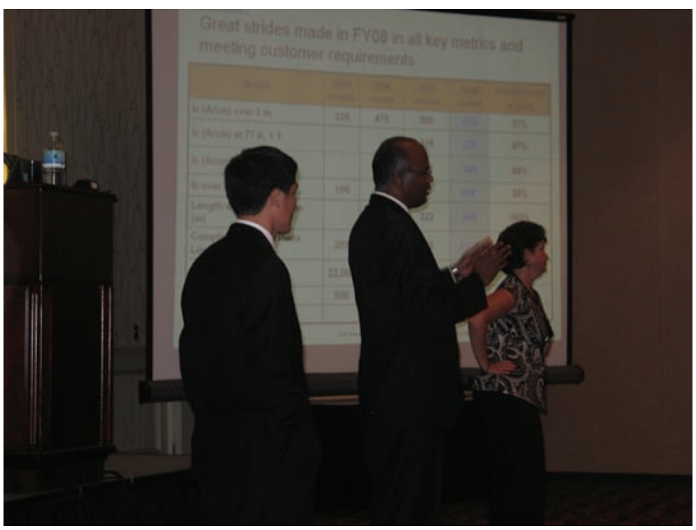
Review Criteria

Each project was evaluated quantitatively and qualitatively by the peer reviewers. The peer reviewer evaluation form can be found in Appendix B. A summary of the criteria are listed below along with the percentage weighting:

1. Relevance to the OE mission – 5%
2. Approach and Project Management – 25%
3. Technical Accomplishments, Quality and Productivity – 50%
4. Technology Transfer, Collaborations and Partnerships – 20%
5. Overall Impressions: strengths, weaknesses and recommendations (reviewers provided written comments on this question and were not asked for a numerical score.)

The reviewers were asked to rate the projects on the following scale:

Outstanding/Excellent: 9-10
Very Good/Few Areas to Improve: 7-8
Good/Modest/Some Areas to Improve: 5-6
Fair/Significant Weaknesses: 3-4
Poor/Not Adequate: 1-2



Guidelines

Each Principal Investigator was given a time limit for their presentations with a period at the end of the presentation for the Reviewers to ask clarifying questions. If there was time remaining, the floor was opened to the audience to ask questions about the project.

COMMENTS AND SUGGESTIONS ON THE OVERALL HTS PROGRAM

In addition to providing an evaluation for each project in their session the peer reviewers also provided comments on the overall HTS program. The evaluation formed asked for comments on the effectiveness of the program strategy, structure and management as well as implementation. The overall program evaluation asked the reviewers what other areas of R&D the program should be investing, and what are the strengths and weaknesses of the program. The following is a summary of the comments and suggestions that were given by the reviewers for each section of the overall program evaluation.

1. PROGRAM STRATEGY

The reviewers overwhelmingly agreed that the mission, goals and priorities of the HTS program are clearly stated and well aligned with the Office of Electricity Delivery and Energy Reliability (OE). They mentioned that the needs of the industrial partners were considered, but there was also a comment that more financial support for the program would help U.S. industry secure a more technologically dominant position internationally.

> ***"The mission, goals and priorities of the program appropriately support the OE and properly reflect the needs of industry and utility to design, develop, and demonstrate HTS components for the T&D electric system."***

A suggestion was made that OE should require the project team to extend the in-grid demonstration phase in order to gain more information and knowledge about the behavior of the cable and fault current limiter devices under operating conditions, allowing the growth of a general consensus about the real potential of HTS technology.

It was recommended that OE conduct research on competing technologies, learning about their benefits and challenges, which will help focus research, industry and marketing efforts. Another reviewer suggested that OE needs to set the goals of system installed cost by a certain date and be the advocate for those who will meet that goal. The reviewers stressed that emphasis on cables and fault current limiters in-grid demonstrations at voltages up to 138 kV address real grid challenges and encourages utility participation. Continued R&D, coupled with these grid technology demonstrations, should result in a major improvement in U.S. electricity reliability.

2. Program Structure and Management

Comments on the program structure and management mentioned that the program activities are well focused and are carried out systematically. The majority of the peer reviewers concurred that industry was doing en excellent job of improving wire performance and demonstrating highly successful in-grid projects. One reviewer stated that there should be additional emphasis on the applications projects and advocacy and outreach to key stakeholders. Another comment mentioned that the program goals should address how critical power applications of superconductivity really are to the nation's energy technology mix.

One suggestion was that more resources should shift from coated conductor development to project demonstration with a ratio of at least 2/3 demonstration and 1/3 conductor development.

> ***"The program structure does an excellent job of addressing overall program goals. It contains a balance of research necessary to improve and enhance materials properties and processing and manufacturing R&D."***

The Cooperative Research and Development Agreements (CRADAs) were deemed to be a crucial element of the program because the value added by the DOE labs working under CRADAs is "enormous".

Finally, in terms of the program milestones, one of the reviewers suggested that they are aggressive, and they challenge the participants, and noted that they "were met this year and, although extremely challenging, will likely be met next year."

3. Implementation

In terms of leveraging resources, the reviewers had mixed reactions. Several thought that the leveraging with other agencies was quite good, and one called the collaboration with the labs and universities working in conjunction with industry "excellent". However, there were also a few reviewers who thought that more support from other federal agencies, such as the Department of Defense and the Department of Homeland Security, and more support from states would shorten the timeframe of commercialization for HTS devices, and speed up the process of realizing the OE goals more quickly.

Regarding technology transfer, a comment was made that the technology needs to come out of the lab, and the information "needs to be distilled down to an industry language and delivered in a way that a utility can evaluate an HTS solution compared to a current, trusted method."

> ***"The accomplishments have been and continue to be truly impressive. This program is, I think, a model for how to transfer difficult and intensely technological developments to industry. The results are worth the investment being made."***

In terms of the productivity of the program, one of the specific areas that reviewers mentioned is the AC loss projects. The reviewer mentioned that AC loss programs "are critical to the overall need and absolutely must be done"

4. Areas of RD&D in Which the Program Should be Investing

While some of the reviewers said that more support to all of the areas presently under development is needed, others mentioned specific projects that would benefit the program overall with more support. Several reviewers mentioned focusing efforts on in-grid demonstrations and one suggested that "network simulation studies utilizing the same software as the utility engineers and planners with integrated and tested models of HTS applications" would help gain acceptance of these new types of equipment.

Another suggestion in terms of investment is that cost benefit analyses should be conducted for each of the projects, and that information should be available to industry.

Finally, one reviewer advised that the program should focus on the near term rather than looking far into the future and making sure that adequate research is being conducted to meet those needs.

5. Strengths of the Program

The general consensus about the main strength of the HTS program is the collaboration between the national labs, universities and industry. Other strengths that were mentioned include the "expertise, efforts, and passion of the researchers of the participating institutes", "the technological and program management (including the HTS Peer Review process)", "the ability to attract and involve important international manufacturers", "the multidisciplinary approach to multidisciplinary challenges", and "the decision to focus on selected HTS applications and to allow different design and technical solutions to increase the chance of success."

6. Weaknesses of the program

The reviewers identified several different weaknesses of the program, but the one that was most prevalent was the unstable funding situation. Some reviewers mentioned that the program is under funded, while others noted that the funding is unpredictable. Other issues that were mentioned include the fact that the program relies heavily on the health of two companies, and that there needs to be buy-in from utilities for this technology before it will be successful. To that end, it was mentioned that "there has not been a good comparison of the HTS installations to current cable technology" and that a cost-benefit analysis should be conducted and shared with industry so that they can make informed decisions about the equipment they deploy.

Another issue that came up was coordination. It was suggested that more could be done with Department of Defense and Department of Homeland Security. It was also mentioned that "many of the collaborations with others are listed simply to check a box. It is not clear how they are truly a significant and integral part of the effort." To combat this issue, it was suggested that when collaborations are listed, the partners, actions and significance to the overall effort should be outlined.

Some technical weaknesses that were brought up include a concern about the process of electrodeposition, and how although it may be a cost-effective processing technology that could reduce some of the current production costs, that it does not seem to be as important as some of the projects aimed at meeting the materials performance milestones for the next two years. Another technical comment was that "refrigeration reliability is a weak link in this process." Finally, one reviewer expressed concern about the near term relevance of the program to the nation's energy problems.

7. Other Comments and Recommendations

Additional comments and recommendations from the reviewers were varied in scope. Several of them had to do with the process of the review, and the manner in which the projects were reviewed. One reviewer suggested that the characterization technique talks should come just after the combined session, followed by the characterization on AMSC and Superpower and that CRADA talks should be grouped by topic, not by company. Another suggested that "it would be easier to review laboratory based projects as a whole or in the same session so that the components of the project that are connected can be seen and understood." It was also mentioned that it would be helpful to get an overview talk on the program at the start of the review. This would help the reviewers "understand the program as a whole and be able to see the balance between research that is targeted at solving immediate problems and those that are addressing long-range issues." Along similar lines, another reviewer suggested that it would be useful to expose each of the reviewer groups to a summary of the other sections to enhance their understanding of the program as a whole.

A couple of comments were made in reference to the evaluation criteria. One reviewer suggested an adjustment in the categories and weighting of the criteria, cutting the current categories down from Relevance (5%), Approach and Project Management (25%), Technical Accomplishments, Quality and Productivity (50%) and Technology Transfer, Collaborations and Partnerships (25%) to only two: Technical Accomplishments, Quality and Productivity (60%), and Prospects for Near-Term and Future Deployment (40%). Another reviewer mentioned that the change in evaluation criteria from previous years was an improvement.

> *"Overall, the review process keeps the players on their toes and is a valuable exercise."*

Another reviewer mentioned that more focused funding should be considered stating that "it is unfortunate that the overall funding seems to go down. More funding for this program now will help shorten the time to get to the position where no more government funding is needed. The wire manufacturers and device developers need more consistent support until the cost goes down sufficiently and a real market opens."

The types of projects that the review covered were also mentioned by the reviewers. A reviewer suggested that DOE should support cable manufacturers that are willing to start producing medium voltage cables that can use insulation products that are relatively low risk and already proven as a result of DOE HTS program. Another suggestion was that "DOE should promote projects that will use HTS cables to support… "Green initiatives." Finally, one of the reviewers stated that "OE has handled this program very systematically and efficiently, and this was critical for the success of the whole superconductivity program."

"This program has been excellent in the R&D which is leading to the practical application of high temperature superconducting materials and, at the same time, is paying a very critical role in Oe's effort to pursue strategic Critical Objectives."

SCORES

The scores for the project evaluations were compiled and graphed into the three sections of the peer review, Strategic Research, Second Generation Wire and Applications. Within each category, there are four graphs illustrating the criteria evaluated by the reviewers. These criteria are Relevance, Approach and Project Management, Technical Accomplishments, Quality and Productivity and Technology Transfer, Collaborations and Partnerships. The following graphs illustrate how the presenters from each section measured in each of the criteria.

STRATEGIC RESEARCH

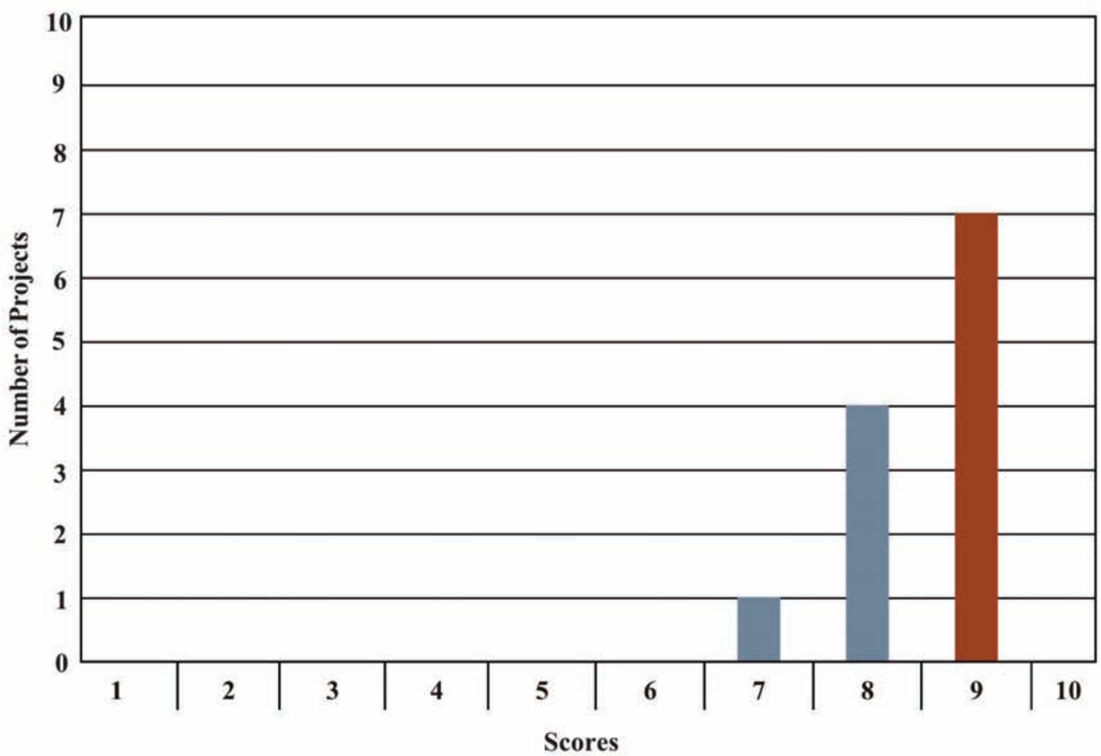
SCORES

Criteria 1- "Relevance"

The average for all projects -- **8.82**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	7 projects (58%)
Good (6-8):	5 projects (42%)
Marginal (3-5):	none
Unsatisfactory (0-2):	none



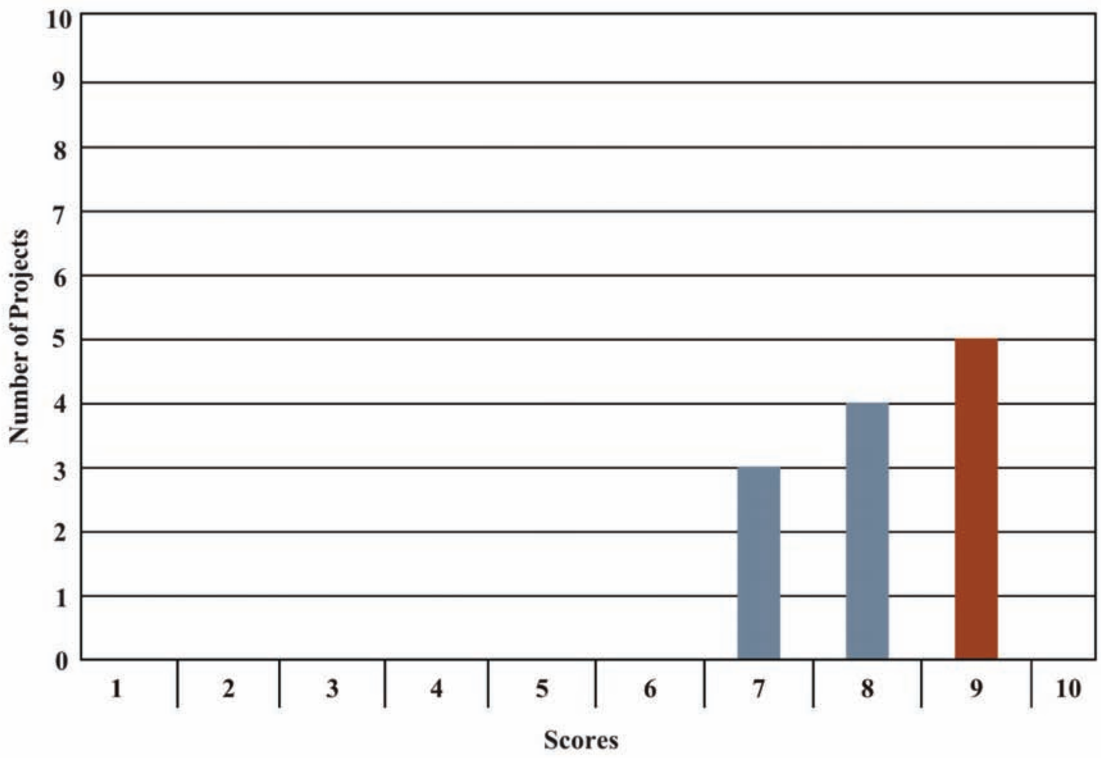
SCORES

Criteria 2- "Approach and Project Management"

The average for all projects -- **8.51**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	5 projects (42%)
Good (6-8):	7 projects (58%)
Marginal (3-5):	none
Unsatisfactory (0-2):	none



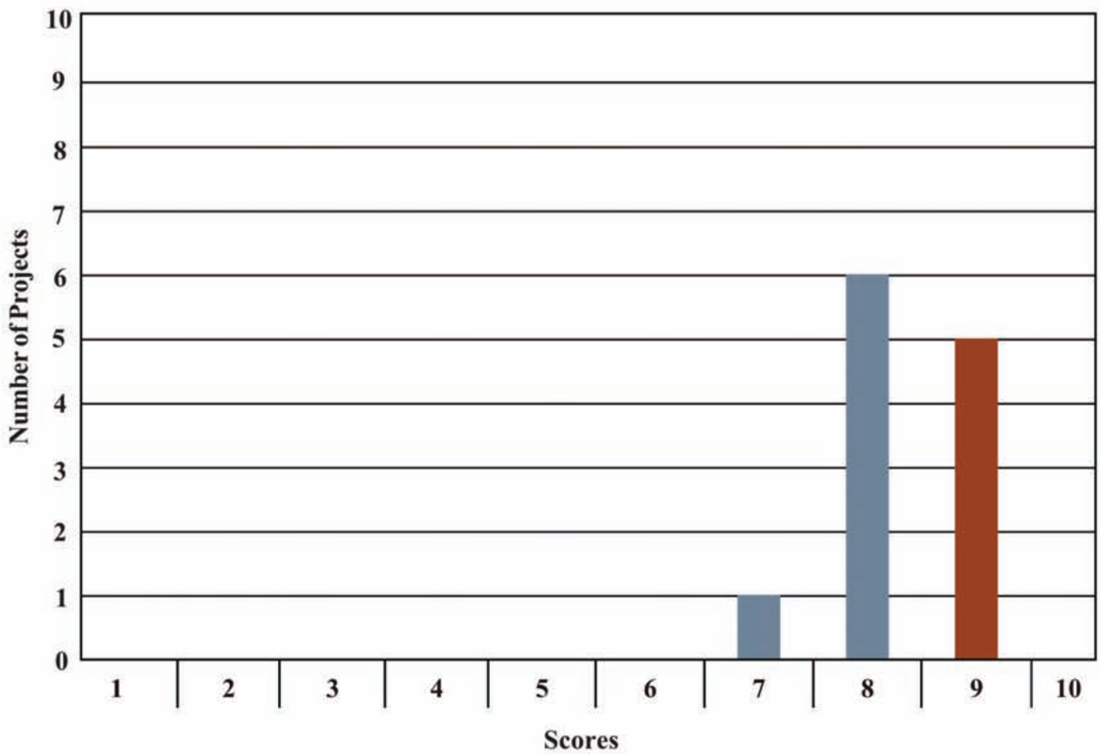
SCORES

Criteria 3- "Technical Accomplishments, Quality, and Productivity"

The average for all projects -- **8.66**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	5 projects (42%)
Good (6-8):	7 projects (58%)
Marginal (3-5):	none
Unsatisfactory (0-2):	none



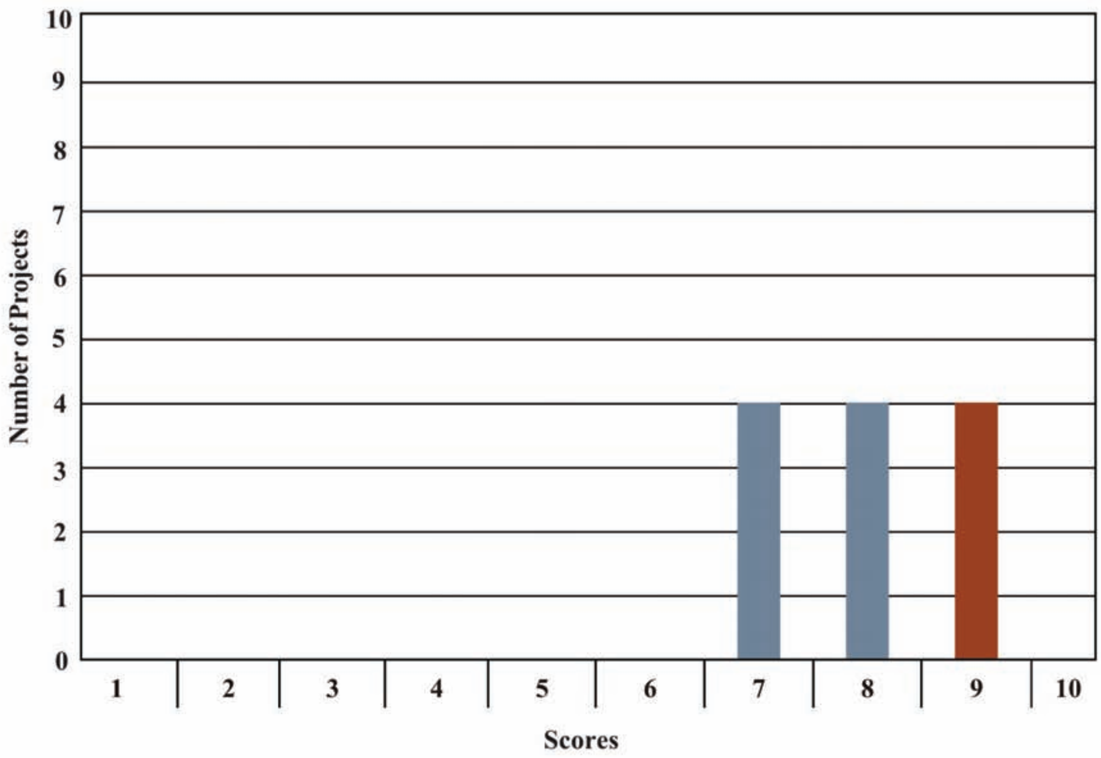
SCORES

Criteria 4- "Technology Transfer, Collaborations, and Partnerships"

The average for all projects -- **8.53**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	4 projects (33%)
Good (6-8):	8 projects (67%)
Marginal (3-5):	none
Unsatisfactory (0-2):	none



SECOND GENERATION WIRE DEVELOPMENT

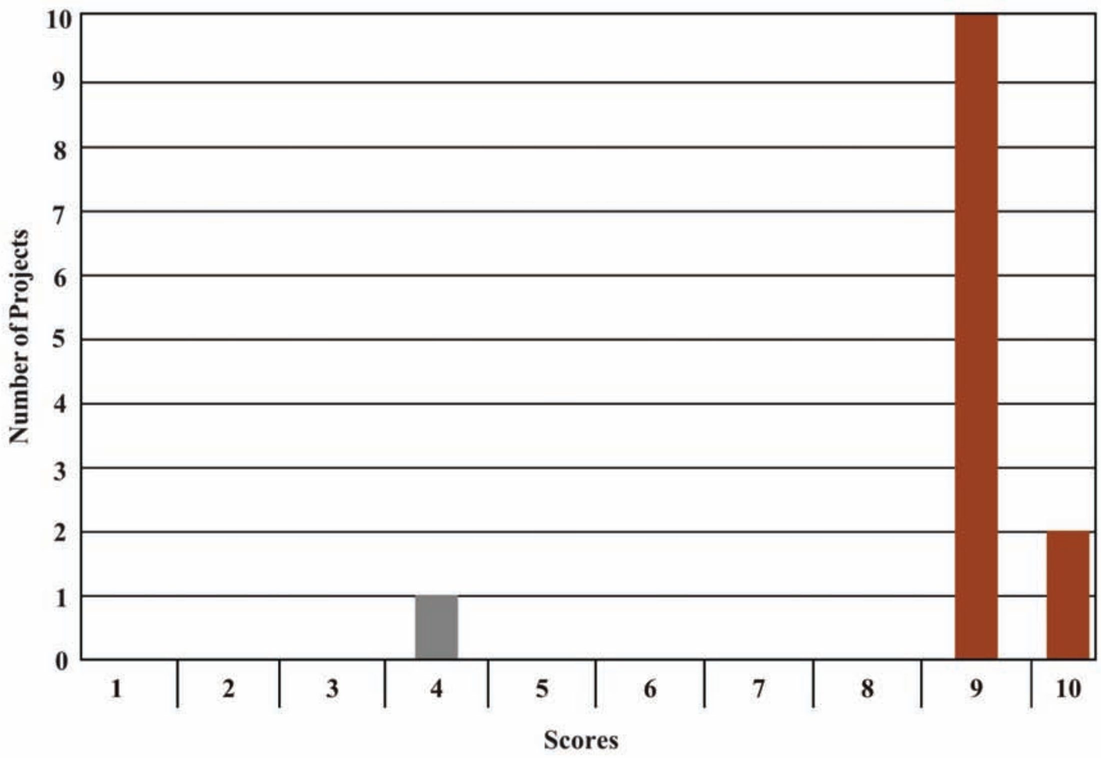
SCORES

Criteria 1- "Relevance"

The average for all projects -- **9.23**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	12 projects (92%)
Good (6-8):	none
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



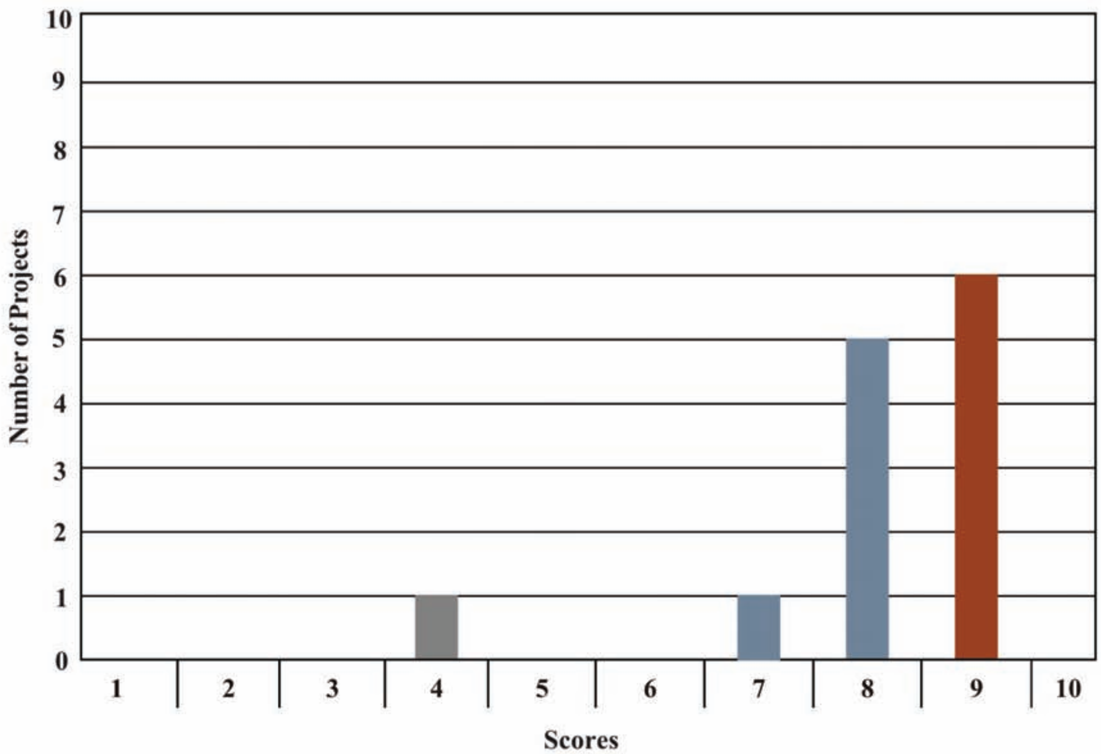
SCORES

Criteria 2- "Approach and Project Management"

The average for all projects -- **8.45**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	6 projects (46%)
Good (6-8):	6 projects (46%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



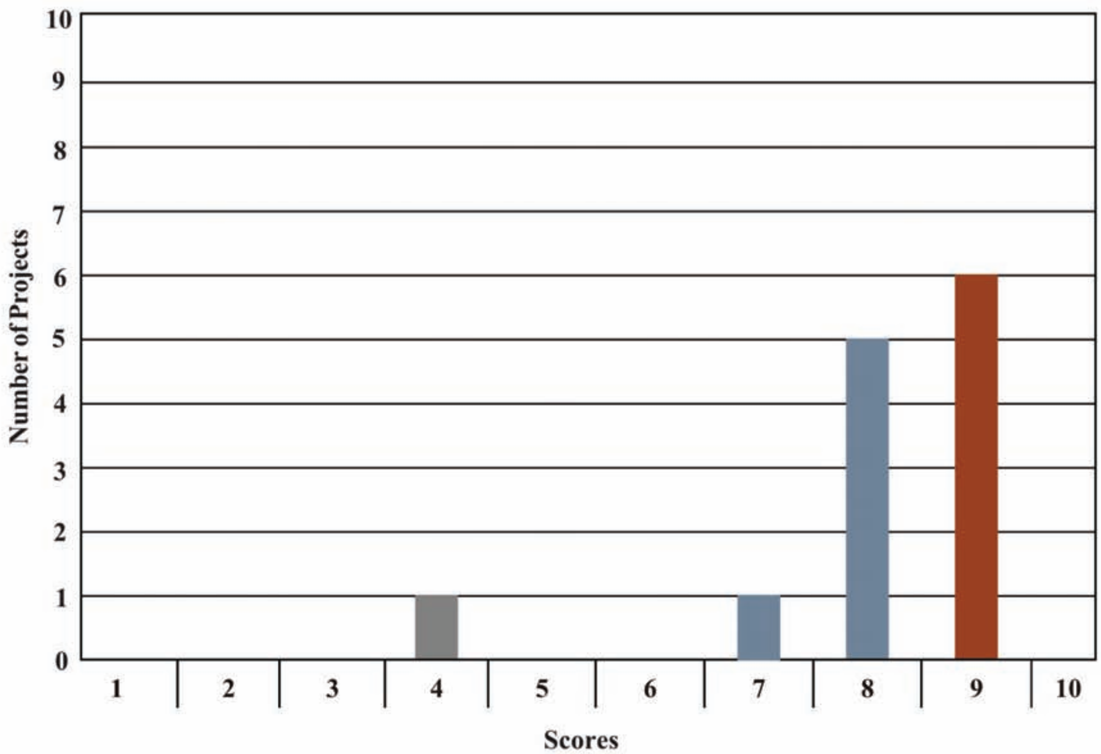
SCORES

Criteria 3- "Technical Accomplishments, Quality, and Productivity"

The average for all projects -- **8.50**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	6 projects (46%)
Good (6-8):	6 projects (46%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



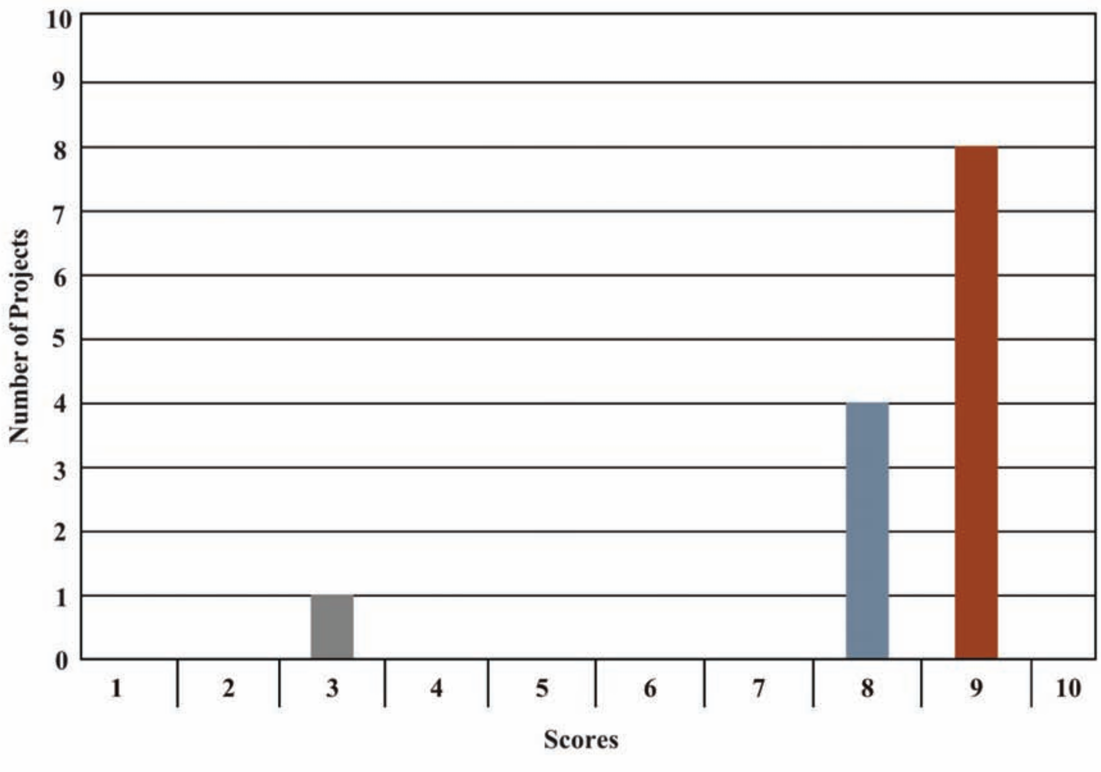
SCORES

Criteria 4- "Technology Transfer, Collaborations, and Partnerships"

The average for all projects -- **7.53**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	8 projects (61%)
Good (6-8):	4 projects (31%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



APPLICATIONS

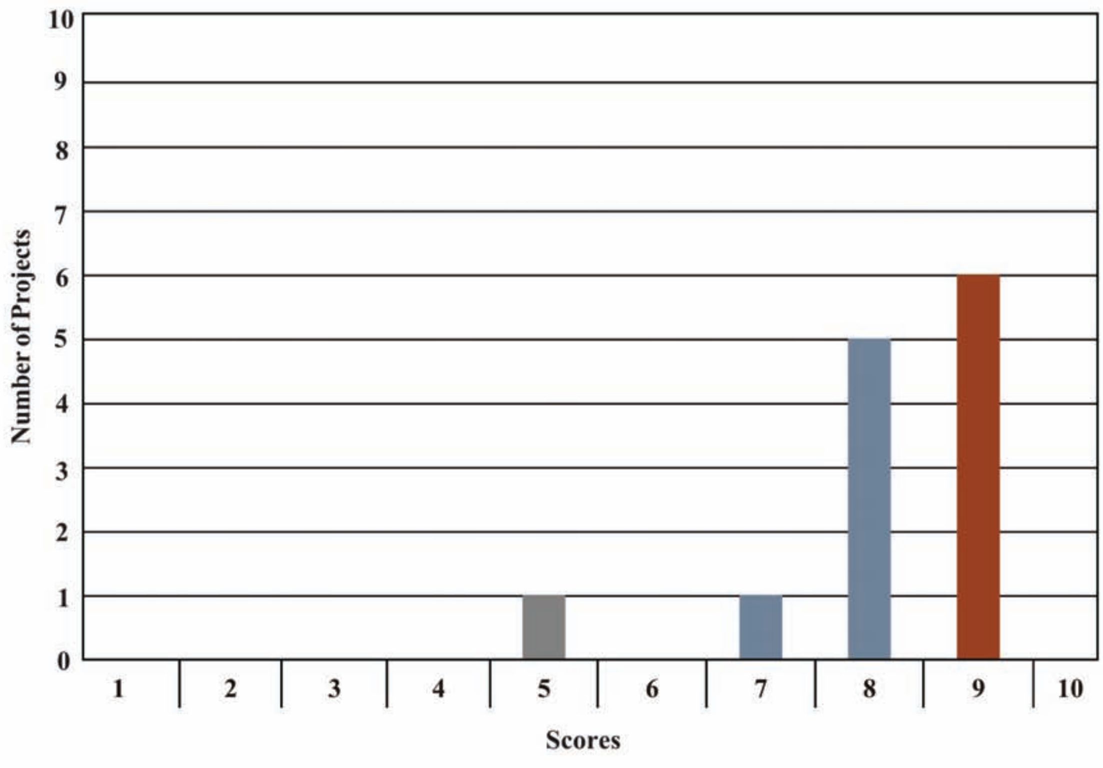
SCORES

Criteria 1- "Relevance"

The average for all projects -- **8.52**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	6 projects (46%)
Good (6-8):	6 projects (46%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



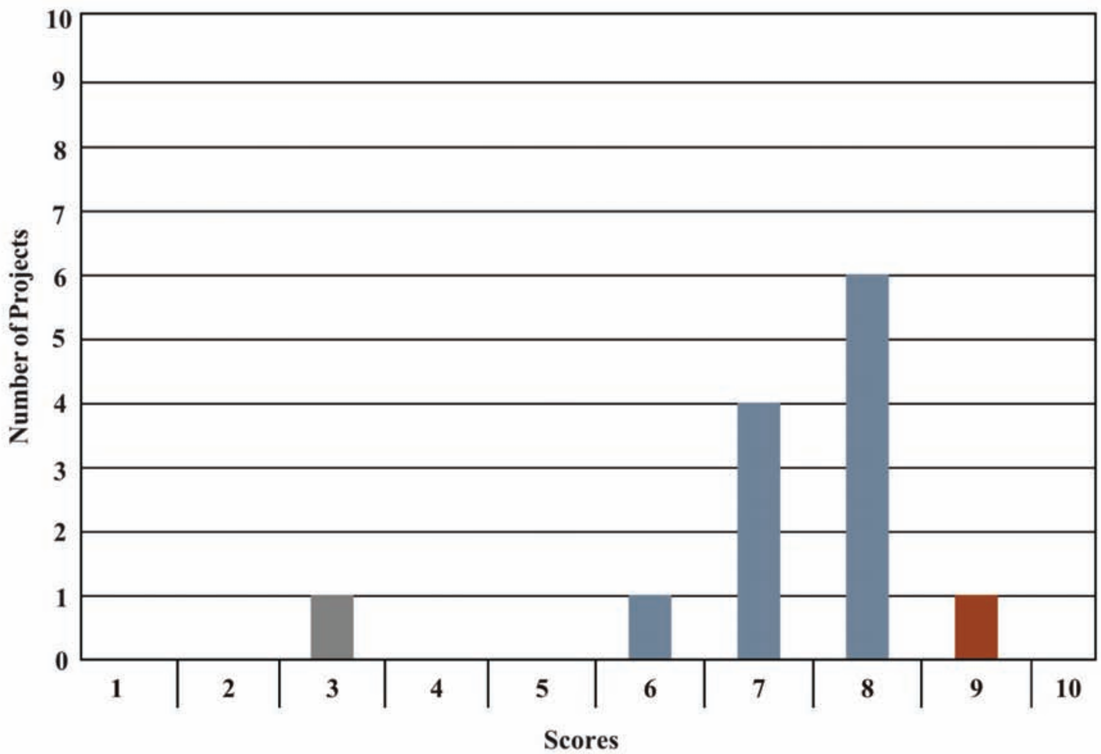
SCORES

Criteria 2- "Approach and Project Management"

The average for all projects -- **7.66**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	1 project (8%)
Good (6-8):	11 projects (84%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



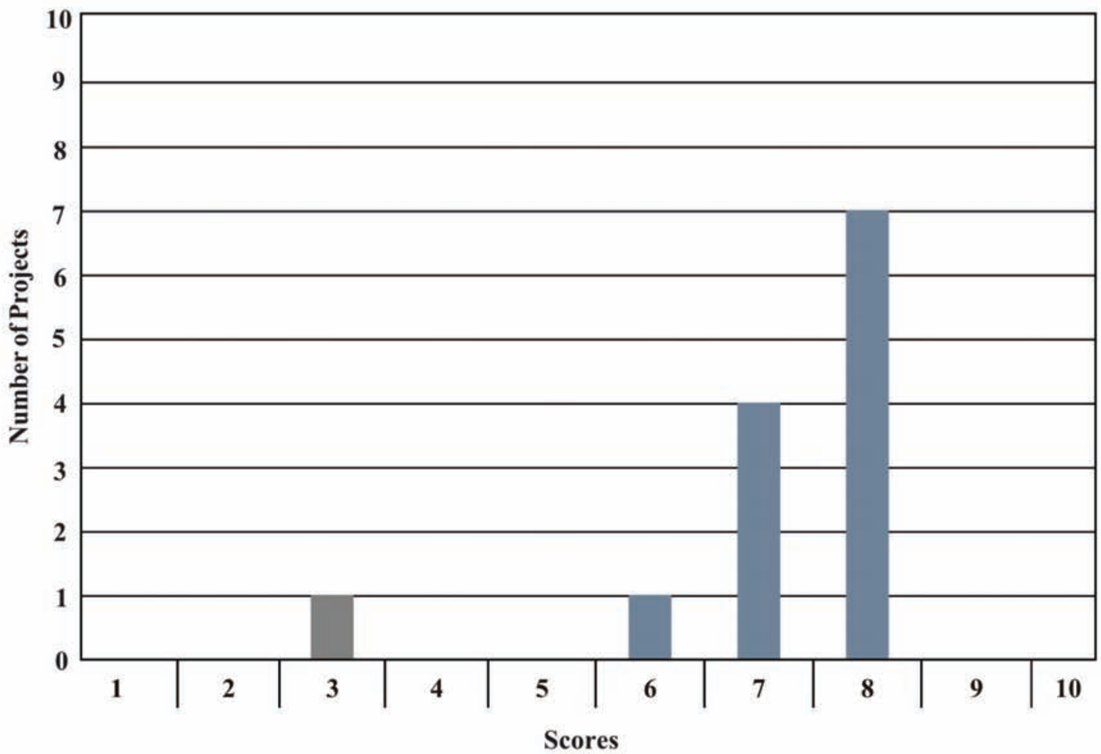
SCORES

Criteria 3- "Technical Accomplishments, Quality, and Productivity"

The average for all projects -- **7.65**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	none
Good (6-8):	12 project (92%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



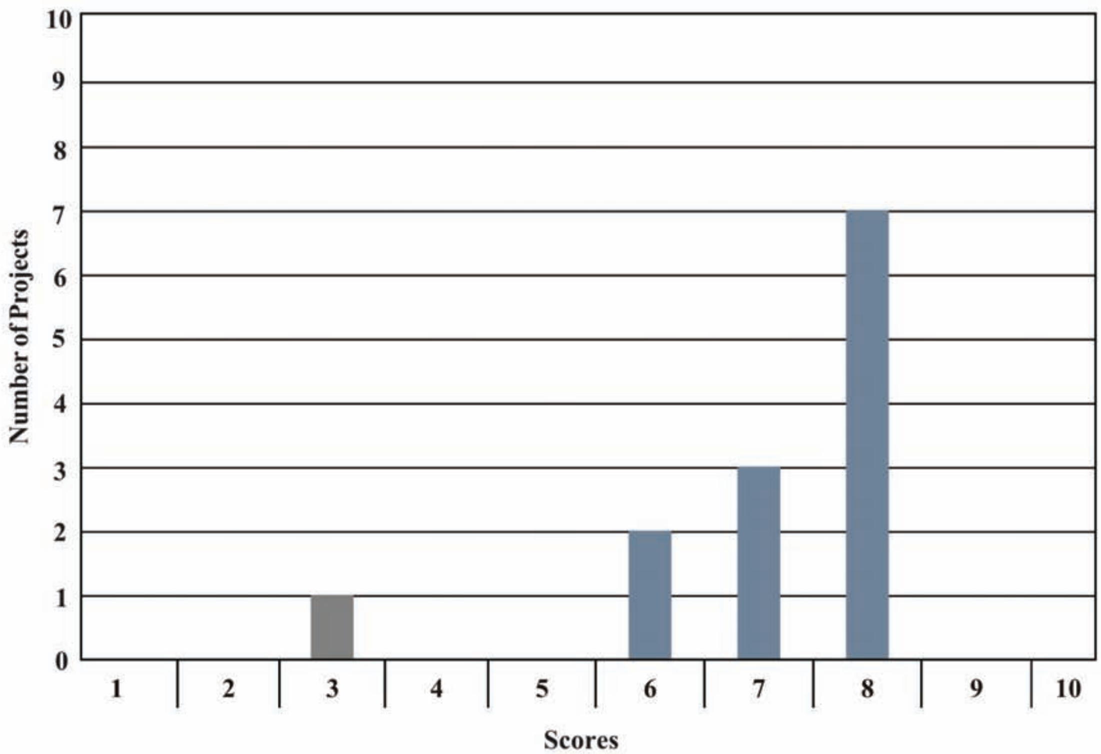
SCORES

Criteria 4- "Technology Transfer, Collaborations, and Partnerships"

The average for all projects -- **7.53**

The number of projects and relevant percentage by rating category are:

Excellent (9-10):	none
Good (6-8):	12 projects (92%)
Marginal (3-5):	1 project (8%)
Unsatisfactory (0-2):	none



APPENDIX A: AGENDA

2008 Annual Superconductivity for Electric Systems Peer Review

July 29-31, 2008
Marriott Crystal Gateway, Arlington, VA

TUESDAY, July 29th – DAY ONE

7:30 am – 8:30 am **Registration/Continental Breakfast**

8:30 am – 8:40 am **Welcome – Program Overview and Purpose of Peer Review**
Debbie Haught, U.S. DOE Program Manager, Superconductivity for Electric Systems

8:40 am – 9:00 am **Opening Remarks**
Kevin Kolevar, Assistant Secretary, U.S. DOE Office of Electricity Delivery and Energy Reliability

9:00 am – 9:30 am **DOD Perspectives**
Lynn Petersen, Office of Naval Research

9:30 am – 10:00 am **Utility Value Propositions for HTS Cables and Fault Current Limiters**
Steven Tobias, Navigant Consulting

10:00 am – 10:30 am **Break**

10:30 am – 11:30 am **Global Progress in HTS**
- China Update, *Dean Peterson, LANL*
- Japan Update, *Yutaka Yamada, SRL-ISTEC*
- European Update, *Xavier Obradors, ICMAB*

11:30 am – 12:00 pm **Testing of T&D Power Equipment**
Brian Marchionini, Energetics Incorporated

12:00 pm – 1:30 pm **Luncheon**

JOINT 2nd GENERATION WIRE and STRATEGIC RESEARCH SESSION *(Held in Salon IV)*	
Session Moderator : Debbie Haught, U.S. DOE	
1:30 pm – 3:00 pm **Progress in Scale-up of 2G HTS Wire at SuperPower** (60+30) *Venkat Selvamanickam (SuperPower), Y. Xie (SuperPower)*	
3:00 pm – 3:30 pm	**Break**
3:30 pm – 5:00 pm **Scale-up of 2G HTS Wire Manufacturing at American Superconductor** (60+30) *Alex Malozemoff, Martin Rupich, Angelo Santamaria (AMSC)*	
5:00 pm	**Adjourn for the Day**
5:15 pm – 6:45 pm	**Poster Session** – with cash bar and light appetizers

WEDNESDAY, July 30th – DAY TWO

7:00 am – 8:00 am **Continental Breakfast**

2nd GENERATION WIRE SESSION *(Held in Salon IV)*	STRATEGIC RESEARCH SESSION *(Held in Salon V)*	SUPERCONDUCTIVITY APPLICATIONS SESSION *(Held in Salon VI)*
Session Moderator: Donald Geiling, U.S. DOE-NETL	*Session Moderator: Mario Sciulli, U.S. DOE-NETL*	*Session Moderator: Paul Bakke, U.S. DOE-Golden*
8:00 am – 9:00 am **LANL/AMSC CRADA** (45+15) *Terry Holesinger, Yates Coulter (LANL) and Marty Rupich (AMSC)* 9:00 am – 10:00 am **ANL/AMSC CRADA: Characterization of 2G Conductors** (45+15) *Dean Miller and Victor Maroni (ANL), Marty Rupich (AMSC)*	8:00 am – 9:00 am **Strategic Substrate Development for Coated Conductors** (45+15) *Amit Goyal and Parans Paranthaman (ORNL)* 9:00 am -10:00 am **Coated Conductor Template Research** (45+15) *Vlad Matias and Quanxi Jia (LANL)*	8:00 am – 8:30 am **Readiness Review (20+10)** *Mike Gouge (ORNL), Steve Ashworth (LANL) and Paul Bakke (DOE-Golden)* 8:30 am – 9:30 am **Strategic Dielectric R&D for HTS and other OE applications** (45+15) *Isidor Sauers and Enis Tuncer (ORNL)* 9:30 am – 10:00 am **HTS Transformer Technology** (20+10) *Bill Schwenterly (ORNL) and Ed Pleva (Waukesha)*
10:00 am – 10:15 am **Break**	10:00 am – 10:30 am **Break**	10:00 am – 10:15 am **Break**
10:15 am – 11:30 am **ORNL/AMSC CRADA: Development of RABiTS-based 2G Wire** (55+20) *Amit Goyal and Parans Paranthaman (ORNL), Marty Rupich (AMSC)* 11:30 am – 12:00 pm **Long Length Characterization** (20+10) *Yates Coulter and Jeff Willis*	10:30 am – 11:30 am **HTS Coated Conductor Characterization and Analysis** (45+15) *David Christen (ORNL)* 11:30 am – 12:00 pm **AC Loss Measurements on HTS Materials** (20+10) *Sastry Pamidi (FSU-CAPS)*	10:15 am – 10:45 am **SBIR Phase 2 Project - Large Capacity Cryocooler for High Temperature Superconductor Applications** (20+10) *Songgang Qiu (Infinia Corporation)* 10:45 am – 11:15 am **SBIR Phase 2 Project on Acoustic-Stirling Cryocooler** (20+10) *John Corey (CFIC-Qdrive)*

2^nd GENERATION WIRE SESSION *(Held in Salon IV)*	**STRATEGIC RESEARCH SESSION** *(Held in Salon V)*	**SUPERCONDUCTIVITY APPLICATIONS SESSION** *(Held in Salon VI)*
(LANL)		11:15 am – 12:00 pm **LANL Advanced Cable Research** (30+15) *Steve Ashworth (LANL)*
12:00 pm – 1:00 pm **Luncheon**		
Session Moderator: Mario Sciulli, U.S. DOE-NETL	*Session Moderator: Debbie Haught, U.S. DOE*	*Session Moderator: Donald Geiling, U.S. DOE-NETL*
1:00 pm – 2:15 pm **ORNL/SuperPower CRADA: Development of MOCVD-based, IBAD-2G wire** (55+20) *Parans Paranthaman, Tolga Aytug and Amit Goyal (ORNL) and Venkat Selvamanickam (SuperPower)* 2:15 pm – 3:15 pm **ANL/SuperPower CRADA: Characterization of 2G Conductors** (45+15) *Dean Miller and Victor Maroni (ANL) and Venkat Selvamanickam (SuperPower)*	1:00 pm – 2:15 pm **Progress in Understanding Vortex Pinning for Enhanced Coated Conductor Performance** (55+20) *Leonardo Civale, Matthew Feldmann and Boris Maiorov, (LANL)* 2:15 pm – 3:15 pm **Engineered Columner Defects for Coated Conductors** (45+15) *Amit Goyal (ORNL)*	1:00 pm –1:45 pm **Status Update for the Albany HTS Cable Project** (30+15) *Chuck Weber (SuperPower), Hiroyasu Yumura (SEI)* 1:45 pm – 3:00 pm **High-Temperature Superconducting Power Cable** (55+20) *David Knoll (Southwire Co./Ultera), Jonathan Demko (ORNL), Isidor Sauers (ORNL) , Greg Henzler (Praxair)*
3:15 pm – 3:30 pm **Break**	3:15 pm – 3:40 pm **Break**	3:00 pm – 3:15 pm **Break**
Session Moderator: Donald Geiling, U.S. DOE-NETL	*Session Moderator: Debbie Haught, U.S. DOE*	*Session Moderator: Mario Sciulli, U.S. DOE-NETL*
3:30 pm – 4:30 pm **LANL/SuperPower CRADA** (45+15) *Leonardo Civale (LANL) and Venkat Selvamanickam (SuperPower)* 4:30 pm – 5:00 pm **Characterization of Dielectric Materials Under Cryogenic Conditions** (20+10) *Horatio Rodrigo (FSU-CAPS)*	3:40 pm – 4:15 pm **Raising Performance of 2G Wires Through Improved Nucleation of YBCO on Technical Oxide Buffers** (25+10) *Slowa Solovyov (BNL)* 4:15 pm – 5:00 pm **Progress in Reactive Co-Evaporation on IBAD** (30+15) *Vladimir Matias (LANL)*	3:15 pm – 4:15 pm **LIPA I** (45+15) *Jim Maguire (AMSC), Frank Schmidt (Nexans), Tom Welsh (LIPA), Shawn Bratt (Air Liquide)* 4:15 pm – 5:00 pm **LIPA II** (30+15) *Jim Maguire (AMSC), Frank Schmidt (Nexans), Tom Welsh (LIPA), Shawn Bratt (Air Liquide)*
5:00 pm **2^nd Generation Wire Session Adjourns for the Day**	5:00 pm **Strategic Research Session Adjourns for Day**	5:00 pm **Applications Session Adjourns for Day**

THURSDAY, July 31st – DAY THREE

7:00 am – 8:00 am **Continental Breakfast**

2nd GENERATION WIRE SESSION *(Held in Salon IV)*	STRATEGIC RESEARCH SESSION *(Held in Salon V)*	SUPERCONDUCTIVITY APPLICATIONS SESSION *(Held in Salon VI)*
Session Moderator: Debbie Haught, U.S. DOE	*Session Moderator: Donald Geiling, U.S. DOE-NETL*	*Session Moderator: Mario Sciulli, U.S. DOE-NETL*
8:00 am – 9:15 am **Conductor Design for HTS Applications** (55+20) *Robert Duckworth (ORNL)* 9:15 am – 10:00 am **Scale-up of All-Solution Deposited Coated Conductors** (30+15) *Paul Clem (SNL)*	8:00 am – 8:45 am **A.C. Losses of HTS** (30+15) *Steve Ashworth (LANL)* 8:45 am – 9:25 am **Optimization of RBCO Nucleation in Fluoride-Precursor ex situ Processing** *(30+10)* *Ron Feenstra (ORNL), Dean Miller (ANL)* 9:25 am – 10:05 am **Non-Vacuum Deposition of Buffer Layers and SuperPower CRADA** (30 + 10) *Raghu Bhattacharya (NREL)*	8:00 am – 9:00 am **Transmission Level High Temperature Superconducting Fault Current Limiter** (45+15) *Drew Hazelton (SuperPower), Juan Carlos Llambes (SuperPower), and Isidor Sauers (ORNL)* 9:00 am – 10:00 am **Development and In-Grid Demonstration of a Transmission Voltage SuperLimiter™ Fault Current Limiter** (45+15) *Bruce Gamble (AMSC), Syed Ahmed (SCE), Heinz-Werner Neumüller (Siemans), Frank Schmidt (Nexans)*
10:00 am – 10:20 am **Break**	10:05 am – 10:25 am **Break**	10:00 am – 10:20 am **Break**
Session Moderator: Paul Bakke, U.S. DOE-Golden	*Session Moderator: John Yankeelov, U.S. DOE-Idaho*	*Session Moderator: Donald Geiling, U.S. DOE-NETL*
10:20 am – 11:20 am **Electromechanical Studies for Superconductor Development** (40+15) *Danko van der Laan and Najib Cheggour (NIST-Boulder)*	10:25 am – 11:20 am **Current Limiting Mechanism Studies of Coated Conductors** (40+15) *David Larbalestier, Dmytro Abraimov and Eric Hellstrom (FSU)*	10:20 am – 11:20 am **Zenergy's Fault Current Limiter** (45+15) *Frank Darmann, Robert Lambaerde (Zenergy)*
2G Wire Session Adjourns	**Strategic Research Session Adjourns**	**Applications Session Adjourns**

11:25 am – 11:45 am *(The Strategic Research and Applications sessions will reconvene in the 2G Wire room)*

Highlight Summary – ORNL/LANL

- **FY2008 ORNL HTS Program Highlights**
  Dominic Lee (ORNL)
- **Highlights of 2008 DOE Annual HTS Peer Review**
  Ken Marken (LANL)

Adjourn HTS Peer Review

11:45 am – 1:00 pm **Lunch on your own**

1:00 pm – 5:30 pm **DOE/EPRI Fault Current Limiter Testing Roundtable and EPRI Superconductivity Program Meeting**

APPENDIX B: SAMPLE EVALUATION FORM

HTS PEER REVIEW 2008
PROJECT EVALUATION FORM

Reviewer Name:	
Project Title:	
Principal Investigator(s):	

Using the following criteria, rate the work presented in the context of program objectives and provide specific, concise comments in support of your score. Use whole numbers for the score.

9-10	7-8	5-6	3-4	1-2
Outstanding/ Excellent	Very Good/Few areas to improve	Good/Modest/ Some areas to improve	Fair/Significant weaknesses	Poor/Not Adequate

1. Relevance

Relevance to the OE mission and the HTS program goals to develop technologies to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions to energy supply. Degree to which the project addresses a specific and existing problem, interest, or need.

Rating: [ ] 5%

Comments:

2. Approach and Project Management

Quality of project management, including research plan, program execution, and research team. The degree to which technical or market barriers are, or have been, addressed, the quality of the project design, and technical feasibility. Degree to which the project approach is free of major flaws that would limit the project's effectiveness or efficiency. If this project is continuing, the degree to which the project has effectively planned its future, defined milestones, identified risks, considered contingencies to mitigate/manage risks, built in optional paths, etc.

Rating: [ ] 25%

Comments:

3. Technical Accomplishments, Quality, and Productivity

Degree to which technical accomplishments are being achieved and progress is being made toward overall project goals and milestones. The degree to which progress compares to performance indicators in terms of effectiveness, efficiency, cost, and benefits.

Rating: [ ] 50%

Comments:

4. Technology Transfer, Collaborations, and Partnerships

The degree to which collaboration with the electricity industry, universities, government laboratories, states, and/or end-users is being, or has been, accomplished. The effectiveness of technology transfer or dissemination of results. The degree to which the project has successfully leveraged other resources or opportunities.

Rating: [ ] 20%

Comments:

5. Overall Impressions

Comments on overall strengths and weaknesses, aspects of the project that could be expanded or deleted, new areas or directions that could be added, and changes that may have occurred in research context (markets, policy, competing technologies, etc.) that might alter planned targets or goals.

Strengths:

Weaknesses:

Recommendations:

APPENDIX C: POSTER SESSION TOPICS

Title	Organization	Type of Project
High Rate Deposition of Epitaxial Films for Use in Superconducting Coated Conductors	Directed Vapor Technologies International, Inc.	FY07 SBIR Phase I (DOE)
Acoustic-Stirling Cyrocooler *(display)*	CFIC-Qdrive	FY07 SBIR Phase II (DOE)
AC Loss Reduction in Coated Conductors	UES	FY08 SBIR Phase I (DOE)
Flexible Aerogel as a Superior Thermal Insulation for Superconductor Technology	Aero Gel	FY08 SBIR Phase I (DOE)
LANL MetOx CRADA	LANL	National Laboratory Funded
ORNL-MetOx CRADA: Characterizing All-MOCVD 2G Wires	ORNL	National Laboratory Funded
AC Losses	École Polytechnique de Montréal	National Laboratory Funded
Development of Virtual Filaments for AC Applications	ORNL	National Laboratory
Technology Development for an HTS Ship Degaussing System	Creare	SBIR (DOD)
Shock and Vibration Tolerant High Temperature Superconducting Shipboard Degaussing Cable	AMSC	SBIR (DOD)
HTS degaussing for Navy ships	Tai-Yang Research Company	SBIR (DOD)

SBIR = Small Business Innovation Research

Appendix D: Registration List

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