Central Savannah River Section Activities

May 22nd "Flow Simulation of Off-Gas and Other Utility Systems To Uncover Significant Savings Opportunities."- Todd Willman

You are cordially invited to a dinner meeting at the Aiken Brewing Company, 140 Laurens Street SW, Aiken, on Tuesday, May 22, at 6:30 pm. Todd J. Willman, Director of Development for EPCON International, will present a talk titled "Flow Simulation of Off-Gas and Other Utility Systems To Uncover Significant Savings Opportunities." We will order dinner off the menu. To make reservations, please email James Laurinat at james.laurinat@srnl.doe.gov.
Presentation summary: The use of flow simulation software has not yet become widely used in the chemical processing industries due to a lack of understanding of its application and benefits. Examples of off-gas, fuel gas, and other utility system models will be shown to demonstrate how significant an impact flow simulation can have on energy and water savings for any processing facility. Case studies to be shared will include one petrochemical site that modeled 16 utility systems using flow simulation software that identified $12MM/yr in energy and water savings and a $10MM one time capital cost avoidance from the proper application of flow simulation software. A comprehensive overview of flow simulation software technology will be provided with specific case study examples to encourage you to fully utilize this technology to further your career while improving your company's bottom line.

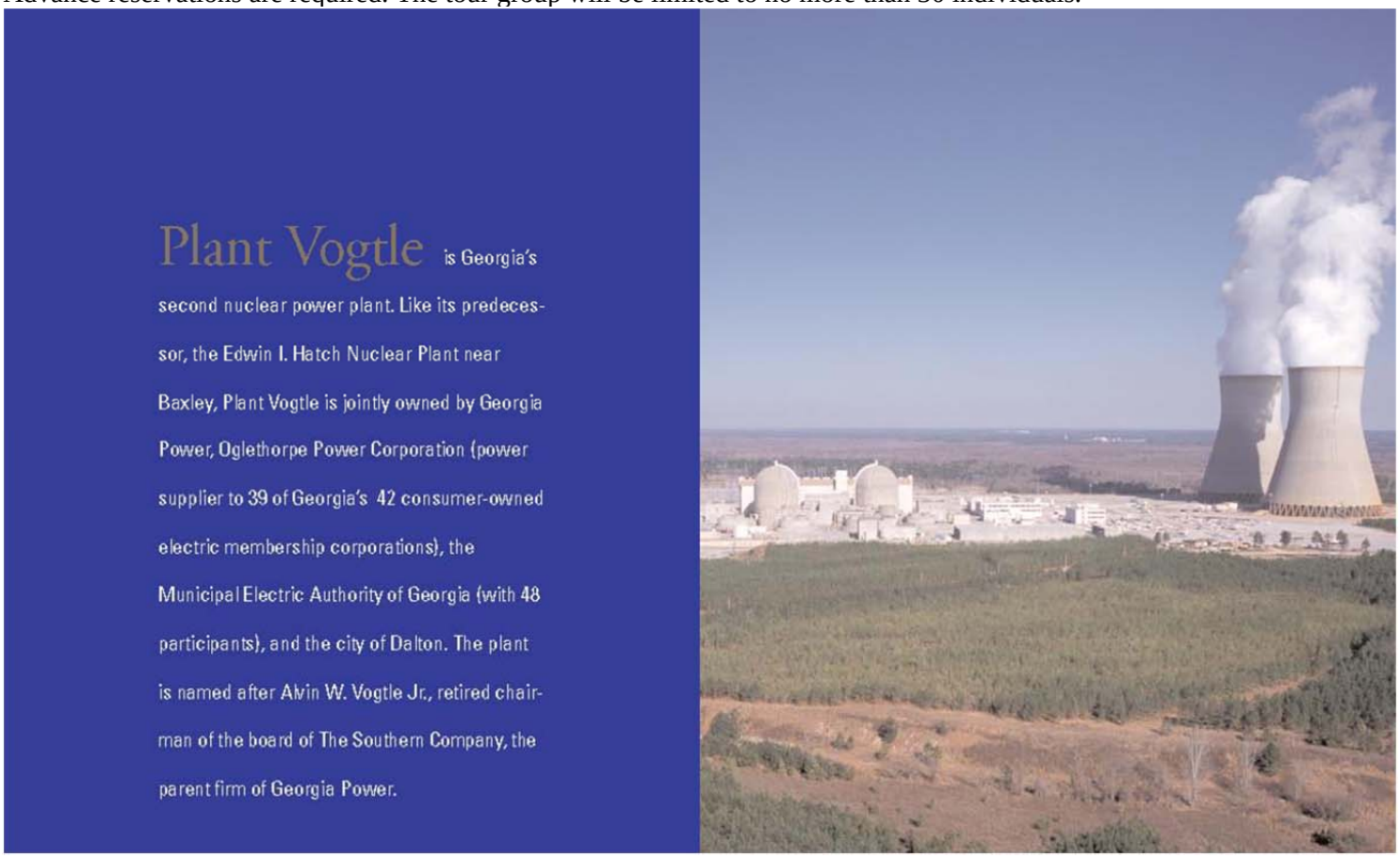
Speaker background: In addition to his position with the EPCON International computer simulation software company, Mr. Willman, pictured above, is Director of Engineering for EPI Engineering and Managing Director of the National Thermodynamic Laboratory. EPCON products include Engineer's Aide SiNet, the American Petroleum Institute Technical Data Book, and the Gas Producers' Association Databank. At EPI, engineering, Mr. Willman has overseen over 100 modeling and optimization studies at refineries and chemical plants with significant returns on investment. He has acquired six patents in the fields of thermodynamics, simulation software, and energy exploration.
Mr Willman is a Past Chair of the South Texas Local Section of the AIChE. In addition, he was instrumental in establishing the AIChE Regional Process Technology Conference.

April 19th Plant Vogel Tour

You are invited to participate in the AIChE Central Savannah River Section tour of Plant Vogtle, 7821 River Road, Waynesboro, GA, on Thursday, April 19. Don't miss this opportunity to visit the site of the only new commercial nuclear reactor built in this country in the last 20 years!

There will be a presentation in the Visitor Center, followed by a driving tour through the construction site for the new reactors (Units 3 and 4). The tour will last from approximately 3 to 5 pm, but please plan to arrive between 2:30 and 2:45. Clothing appropriate for a construction site is required (long pants and closed toe, flat-soled shoes). Plant Vogtle will provide hard hats and safety glasses. Bring your driver's license or other form of government identification (such as a passport) with you.

Please make reservations by emailing James Laurinat at james.laurinat@srnl.doe.gov by 3:30 pm Friday, April 13. Advance reservations are required. The tour group will be limited to no more than 30 individuals.



March 15th Medical Initiatives from the Nuclear Community….. Applications of Innovative "Multi-Use" Technologies – George Wicks

For approximately 50 years, the Savannah River Site in Aiken SC has provided state of the art research, and critical products and services, primarily for national and defense needs. In 2004, the laboratory was designated the 12th National Laboratory in the Department of Energy (DOE) complex and later that year, an important Memorandum of Understanding was signed between the leadership of the Savannah River National Laboratory (SRNL) and the then Medical College of Georgia (MCG). The MOU was updated in 2011 with SRNL and the GA Health Sciences University (GHSU) with the overall goal to "… foster collaboration… in areas of life sciences, engineering and related technologies….. leverage resources and expertise from the two organizations… and explore opportunities that benefit both organizations".

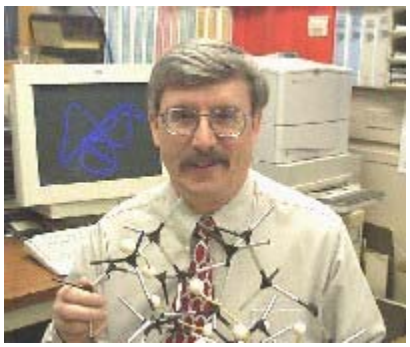
The talk will provide an overview of some of the exciting collaborations that have occurred between these two important CSRA organizations. At the cornerstone of these efforts are "multi-use technologies", i.e., those that have been born, breed and developed in the nuclear complex and over many years, applied to a multitude of uses within the DOE complex, which also represent technologies that could be tailored for other uses in other fields. These multi-use technologies are now being examined by teams of scientists and engineers from SRNL, collaborating with medical researchers and clinicians from GHSU, to examine their potential for providing improved tools, and in some cases brand new tools, for doctors to improve patient care, in diagnostics, repair and replacement, and treatment and therapy techniques. Examples of these collaborations will be discussed in specific areas of digital radiography, microbiology, sensors/ robotics, advanced materials, and ceramics/ glass science.

Dr. George G. Wicks- Biosketch

Consulting Scientist

Savannah River National Laboratory (SRNL)

Aiken, South Carolina



Educational Background:

1974 PhD; MIT, Cambridge, Mass., Metallurgy & Mat'ls. Sci.,
Thesis: Structural Studies of Amorphous Materials
1971 MS; Harvard Univ., Cambridge, Mass., Appl. Physics & Eng.
1969 SM; Fla. State Univ., Tallahassee, Fla., Materials Science
1967 BS; Fla. State Univ., Tallahassee, Fla., Engineering Science

Work History:

Dr. George Wicks is a Consulting Scientist at the Savannah River National Laboratory, in Aiken, SC. He has been involved for more than 35 years in many areas of materials science, including vitrification and management of high level radioactive wastes, environmental remediation, sensor development, corrosion of materials, hydrogen storage systems, alternative and renewable energy, nuclear disarmament activities, C&B agents, and a variety of new medical initiatives. He has worked extensively in many areas of ceramics and glass science, and studied the properties and structure of glasses for a variety of applications at both Harvard and MIT, where he received his advanced degrees. Dr. Wicks developed the first *'Slurry Feeding System'* for vitrification of the 34 million gallons of high-level waste at SRS in the more than billion dollar Defense Waste Processing Facility (DWPF), now in production. He has also been involved in leaching studies of nuclear glasses and in assessing the chemical durability of waste products and systems. He is co-author of the *SRL Kinetic Leachability Model* [Wallace-Wicks Model] describing leaching behavior of the complex 40-component SRS waste glass system and also, he designed, developed and coordinated, the *first major international in-situ testing program in the US,* involving burial of

simulated nuclear waste systems. This involved burial and subsequent analyses of almost 2000 glass, metal and geologic samples, supplied from many different countries, in the WIPP salt site at Carlsbad, New Mexico. The 5-year effort involved samples and analyses provided by laboratories in 8 countries, including the U.S., Germany, France, Canada, Belgium, Japan, Sweden and the United Kingdom. These tests supplement his other international in-situ efforts, including the burial of over 100 SRS waste glass samples in granite in Sweden, the burial of SRS samples in clay in Mol Belgium, and the burial of both SRS waste glasses and natural glass analogs in limestone in the U.K.

Dr. Wicks is also co-inventor of *Sol-Gel Indicators*, a new class of composite materials that can be fabricated into special sensors, and integrated into important fiber optic, analytical monitoring devices for environmental measurements and other uses, including medical applications. He is co-inventor of *Sol-Gel Metal Hydrides* and *Porous-Walled Hollow Glass Microspheres*, composites which have the ability to store unusually large amounts of hydrogen, both reversible and very effectively and for the glass microspheres, also providing the potential of being a unique drug delivery tool. He is co-inventor of a new *Hybrid Microwave Technology*, with the ability to remediate hazardous components and reclaim reusable metals. He has also published a considerable amount of work in these various areas, which includes more than **200 publications and 16 patents issued, to date.** He also authored or co-authored **6 books and 8 invited chapters in texts and encyclopedias**, and served as co-chairman for more than dozen international meetings, most on nuclear waste management and energy, in France, Belgium, Germany as well as the U.S.

Dr. Wicks has been past Chairman of the Nuclear and Environmental Technology Division of the American Ceramic Society and past President of the National Institute of Ceramic Engineers. He has also served on the U.S. Materials Review Board and been Adjunct Professor to Clemson University and the University of Florida, and served on Advisory Boards to Clemson Univ., Univ. of SC, USC-Aiken and VA Tech. He has also served as a member of the DuPont Corporate Ceramics Board and testified on technical aspects of waste management and weapons dismantlement activities for various committees, including those of the National Academy of Sciences, and served on a NATO team that traveled to St. Petersburg, Russia to discuss "Disposal of Weapons Plutonium". He is currently Chairman of the SRS Creativity Committee, serves on a Science & Technical Advisory Council and is Chair of the SRNL Mentoring Committee. Dr. Wicks also currently serves on two International Scientific Advisory Boards involving radioactive waste management activities in France (CEA) and also the European Communities (EC). He is also the technical lead working with the medical community on a new series of initiatives involving technologies developed within the nuclear field, which are now being tailored and evaluated for potential applications in diagnostics, repair/ replacement, and therapy/ treatment of a variety of medical conditions.

Among the many awards and honors of Dr. Wicks, include the following:

2012-2011

In **2012**, Dr. Wicks currently serves as the **President of the American Ceramic Society** (8-10,000 members from more than 80 countries). In **2012**, he is also co-organizer of a unique inter-society conference on "**Materials Challenges in Alternative and Renewable Energy (MCARE-2012)**" involving participants from more than 30 countries. This conf. is sponsored by all 3 major materials disciplines and societies, including ACerS (ceramics/ glasses), ASM, Int'l and TMS (metals/ composites), and also SPE (plastics/ polymers), as well as other Societies including MRS, SAMPE, etc.

In **2011-2012,** he also served on many committees and in many activities, including being on the Steering Committee for the 4th International Congress on Ceramics (ICC4) (to be held in **2012**), and was Scientific Editor of the SRNL magazine "Science at Work", as well as a 2011-12 Associate Editor of a new journal called "The International Journal of Applied Glass Science (IJAGS). He also currently serves on **Advisory Boards** to various universities including **VA Tech**, is an **Adjunct Professor at the GA Health Sciences University**, and also has been a member of the **Board of Directors of the Ronald McDonald House** of Augusta and a **Board Member to the CSRA Wounded Warriors Care Project.**

On Oct. of **2011**, Dr. Wicks and his team received the **2011 R&D 100 Award** ……. signifying their development of Porous Wall Hollow Glass Microspheres as "…one of the 100 most technical significant products introduced into the marketplace over the year".

2010-2009

In **2010**, Dr. Wicks was chosen to receive the prestigious **2010 South Carolina Governor's Award for Excellence in Scientific Research**, sponsored by the Governor's Office and the SC Academy of Science. In his letter, Gov. Mark Sanford stated, "Your contributions…. have had a far reaching impact, not only on the state but also the nation and the world". In **October of 2010**, he was also the recipient of an international award named the **Greaves Walker Award** for his contributions to the field of ceramics,

In **2009**, Dr. Wicks received the **Alpha Sigma Mu International Honorary Society "Distinguished Life Member" Award**, which is the highest honor in the Society which is awarded to "those select few whose technical attainment and contributions in the field of materials

science and engineering have resulted in significant benefits to mankind" and late in the year, also was the recipient of the **D.T. Rankin Award** for his contributions to the nuclear field. In **2009**, Dr. Wicks also served on a National Inter-society Materials Board to help define materials needs in the U.S. in alternative and renewable energy, which produced a report that went to Congress.

Earlier Work

Dr. Wicks has been the recipient of a variety of honors and awards including the **George Westinghouse Gold Corporate Award** as well as two **Westinghouse Signature Awards** for technical excellence, as well as the **Westinghouse Innovators Award**.

In **2008**, he was a Co-organizer of a new Symposium on "**Materials Innovations in an Emerging Hydrogen Economy**". In late **2007**, he also received a **Clinical/ Adjunct Faculty appointment at the Medical College of GA** in the Department of Oral Biology and Maxillofacial Pathology where he still serves. In **2007** was selected as the recipient of the **SRS Career Achievement Award**, established "to honor individuals for their accomplishments and success"….. and "presented to individuals who have repeatedly demonstrated, over a period of years, significant contributions".

In **2005-2006**, he was also named "**Distinguished Scientist of the Year**", an award given by Citizens for Nuclear Technology Awareness, and in **2005**, was presented the prestigious **Joan Hodges Queaneau Palladium Medal**, a national award given jointly by the American Association of Engineering Societies (AAES) and the National Audubon Society, to recognized individuals who encourage cooperation between engineering professionals and environmentalists to provide "innovative solutions to environmental problems". In **2003** he received the **Arthur L. Friedberg Memorial Lecturer and award recipient**, an honor given to individuals who have "made outstanding contributions to the ceramic engineering profession". Dr. Wicks is also a **Fellow of the American Ceramic Society** (ACerS), a **Fellow of the National Institute of Ceramic Engineers** (NICE), a member of the **Order of Engineers**.

February 16 Solvay Advanced Polymers plant tour

January 15th : Are you smarter than an iPhone? – Dave Olson

You are invited to attend the January meeting of the Central Savannah River Local Section of the American Institute of Chemical Engineers. We will meet at the Bridgestone Tire Company in Graniteville, SC, on Thursday, January 19, at 6 pm. A catered dinner will be served starting at 6:30, to be followed by our featured speaker.

Savannah River Remediation President and Project Manager Dave Olson will be the featured speaker. Mr. Olson will ask attendees an important question: Are you smarter than an iPhone? Today's smart phones seem to have all the answers, but it's always the people who resolve issues. Mr. Olson plans to interact with audience members to give them a chance at solving some pressing issues in the radioactive liquid waste arena at the Savannah River Site. In addition, he will explain the progress SRR is making in treating and dispositioning the waste, along with answering questions from the group. Mr. Olson, who has 30-years experience at SRS, leads the liquid waste contract for SRR.