Press Release for IAPWS Annual Meeting at Witney, Oxfordshire, UK September 3-8, 2006

Sixty scientists and engineers from thirteen countries attended the annual meetings of the International Association for the Properties of Water and Steam (IAPWS), September 3-8, 2006 in Witney, Oxfordshire, United Kingdom. IAPWS provides standards for steam and water properties and serves as a forum where engineers from the power industry and academic scientists can communicate problems and solutions to each other. IAPWS has traditionally concentrated on the science underlying the thermodynamics and chemistry in steam power plants, but is broadening into other aspects of power generation and high-temperature aqueous systems as well as seawater and ice. Discussions range from puzzling power plant chemistry results to reports on solutions to such problems to practical implications of fundamental theory and molecular modeling of thermodynamic and transport properties.

The IAPWS delegates were joined by an additional 36 people from England and Ireland for a symposium on power-cycle chemistry. New methods of power generation and current issues in power cycle chemistry, such as the use of amines for pH control were featured. In a separate session, issues in nuclear power plant chemistry, particularly those related to flow assisted corrosion, were featured.

A highlight of the 2006 meeting was the workshop on seawater properties and standard seawater. Representatives from the International Association for the Physical Sciences of the Ocean (IAPSO) explained the difficulties in the IAPSO standards. IAPSO and IAPWS will cooperate in developing new seawater standards. This cooperation will require examining the applicability of the IAPWS-95 formulation to subcooled water, since seawater freezes below the current lower limit of the triple point of water.

A new IAPWS Release "Equation of State for H_2O Ice Ih" was approved and is now on the IAPWS website. Work continues on new documents which will describe the viscosity of water and the ionization of constant of water.

IAWPS produces Certified Research Needs (ICRN) as guidance for funding agencies and as an aid to people doing research in defining important research. This year several ICRN's were approved in principle at the meeting and will appear on the IAPWS website as they are made final. The ICRN's approved this year concerned thermophysical properties associated with ultra-supercritical coal-fired steam generators; mechanism of decomposition of ion-exchange resin; development and application of ambient and high temperature sensors; and improved analysis of low concentration of metals.

Equations for thermophysical properties of water and aqueous systems have long been and continue to be an interest of IAPWS. The IAPWS Helmholtz Award lecture this year, "Corresponding States: A General Theory Including Aqueous States," by Hong Wei Xiang of the Chinese Academy of Sciences, provided additional insights in this field. The IAPWS Helmholtz award is given to a young scientist who is working in a field of interest to IAPWS. It includes a trip to the IAPWS meeting to present a lecture.

A plan to understand the corrosion and catalysis at metal surfaces related to ultrasupercritical power plants continues. It includes a symposium on "Interfacial Electrochemistry and Chemistry in High Temperature Media" to be conducted at the Joint Electrochemical Society (ECS)-IAPWS Symposium (Washington, D.C., 2007). The aim of the symposium is to provide deeper insight into chemical and electrochemical processes at all kinds of interfaces and to elucidate the significant effects of the interfacial processes on the properties and behavior of materials in high temperature aqueous environments. Of particular interest are the high temperature interfacial processes related to water cycles in current and next-generation fossil fuel and nuclear power plants, fuel cells and batteries, hydrogen production and storage, photovoltaics, hydrothermal/electrochemical synthesis of materials, corrosion and passivation of high-performance alloys, etc. (Links will appear on the IAPWS website when the symposium is organized.)

IAPWS is preparing a Databook, with seven chapters: Phase equilibria, pVTX, Calorimetry, Potentiometry, Electrical conductivity, Thermal conductivity, Viscosity. This book evaluates various high-temperature techniques and collects and summarizes all of the relevant experimental data

available in the literature with emphasis on results obtained above 200°C. The book is expected to be completed by the end of 2006.

In response to advanced energy cycles identified by industrial members, a revision to IAPWS-IF97 (Industrial Formulation) will increase the upper pressure limit of Region 5, which covers the high-temperature range of steam from 800 to 2000°C, from 10 MPa to 50 MPa. It is anticipated that this will be adopted by IAPWS at next year's annual meeting.

An international collaboration project on "Predictive Scheme for Standard Thermodynamic Properties of Aqueous Substitutes Benzenes over a Wide Range of Temperatures and Pressures" will be carried out by Jana Ehlerova, a Czech Republic student, from the Technical University of Liberec at the University of Guelph (Canada). A second international collaboration on improvements in power plant sampling techniques will send Piti Srisukvatananan from the University of New Brunswick to Alstom in Switzerland and Elsam Power in Denmark

The next IAPWS meeting will be in Switzerland, near the start of September, 2007. Details of the meeting will be available through links from the IAPWS website at www.iapws.org. Minutes of the 2006 meeting will appear on the website shortly. The meetings are open to anybody interested in the general topics of IAPWS (see website for registration details). The proceedings from the 14th International Conference on Properties of Water and Steam, *Water, Steam, and Aqueous Solutions for Electric Power*, are available (see link on Website). The 15th International Conference on Properties of Water and Steam is planned for Berlin, Germany in September 2008.

People interested in IAPWS documents and activities should contact the chairman of their IAPWS National Committee (see website) or the IAPWS Executive Secretary, Dr. Barry Dooley, EPRI, 1300 West W.T. Harris Blvd., Charlotte, North Carolina 28262, USA (bdooley@epri.com).