THERMAL HYDRAULICS DIVISION NEWSLETTER

Spring 2006

Message from the Chair

Last October at the NURETH-11 meeting, I had the privilege of providing a few thoughts at the closing ceremony. Quoting Voltaire, "*Aucun problem ne peut resister a la pensée - No problem can withstand sustained thinking"*, I challenged those in attendance to continue their efforts to make each and every gathering a success – whether as author, reviewer, session organizer, or meeting planner. Beyond that I hoped that my audience would take that quote to heart in their everyday technical and logistical challenges. Allow me to describe one example "problem" and a solution that we can all be a part of.

After many years of slow growth in our field, we are beginning to see new investment and interest in nuclear power. Our role as thermal-hydraulics specialists is being called on to address design, performance, safety, and licensing concerns. Everyone I meet seems to be very busy and there is a demand for more expertise in our discipline. With the average age of engineers serving the nuclear industry hovering around 48 or 49 years old, we face the added challenge of losing a significant amount of knowledge to retirements.

The latest reports from university nuclear engineering programs are that enrollments are rising. This is good news; but, as we have all learned from our own experiences, universities are limited in their ability to train the next generation. Beyond academia, new engineers must rely on training and mentoring by their more experienced peers in the workforce. In fact, this need is compounding the demands on our generation of engineers. Given everything else going on at our "8-5" jobs, it is tough to squeeze in the kind of mentoring and training that is needed by our younger coworkers.

One of my goals this year as Chair has been to look for ways in which the THD can help address this need. Our annual baseline support for students is typically in the form of financial aid for travel to conferences, for scholarships, and for awards. As a start, this year the THD Executive Committee voted to increase this financial support. Of course, real support comes when we have volunteers willing to "get their hands dirty". The first to step up was Gary Johnsen from the INL and Sandra Sloan from AREVA who answered our request for volunteers to lead a RELAP5 training seminar at the ANS Student Conference held at RPI in March. The success of that one-day seminar was reflected in the high attendance and the enthusiasm of the students participating. In fact, Gary told me that he enjoyed do the seminar so much that he'd like to do it again next year at the Student Conference at Oregon State! Our involvement with our younger members continues with a special "Young Members Competition" session at the upcoming Annual meeting in Reno, NV. Also in the works is a MELCOR training workshop scheduled for this year's Winter Meeting in Albuquerque. Look for announcements for that one as we get closer to November.

Certainly, as a technical division within a larger professional society, we have opportunities such as reaching out to students in forums like the ANS Student Conference or the National Conferences. However, the real strength of our division begins with our activities at our home institutions. As an example, a co-worker of mine started a biweekly "Brown Bag" technical forum for discussing our thermal-hydraulic analytical methods. He started over one year ago and has given or found volunteers for over 25 lectures. Inspired by his example, I have prepared several lectures, drawing from previous in-house, customer, and conference presentations, to contribute over the remainder of the 2006. This sort of program is really contagious and I encourage each of you look for opportunities to pass on your knowledge to these young people for whom this industry must rely on for sustaining the next wave of nuclear power plant construction and operation.

As for the THD as a whole, it is my pleasure to report that the division continues to be financially strong and opportunities for our membership to contribute are plentiful. If the health of the division is measured by the volunteerism of its members, then we are a very strong division, indeed! Thank you all for making my year as Chairman a wonderful experience!

Robert P. Martin, Robertp.Martin@areva.com
Chairperson (2005-2006)
Thermal-Hydraulics Division

Honors and Awards Committee Report

Thermal Hydraulics Division (THD) offers several awards each year; Distinguished Service Award, Best Paper Award, and Technical Achievement Award.

The Technical Achievement Award is the highest award given by the THD. It is normally presented annually to a member of the THD in recognition of outstanding past technical achievement. It is based on a major contribution to the state of the art, an important publication, a major technical achievement, or a sustained record of accomplishment and technical excellence in the art or science of Thermal Hydraulics. The THD H&A committee is currently soliciting nomination packages. Please submit your package to the

incoming H&A Committee Chair, Jong Kim, by July 2006, so that the H&A committee will be able to include it in the evaluation process.

One of the responsibilities of the THD Honors and Awards Committee is to propose candidates for various ANS awards. The THD has been very active during the last 5 years in efforts to increase the number of THD Fellow members. This year, another THD candidate was successful in being selected as an ANS Fellow. Please join us in congratulating Professor Soon Chang in his promotion to ANS Fellow!

All members are invited to participate in the ANS Fellow nomination process. If you know of someone deserving of this distinction, please review the nomination process and candidate qualifications documents available on the ANS website (http://www.ans.org/honors/va-fellow). The THD H&A committee would like to be made aware of such sponsorships. As a courtesy, please inform the incoming H&A chair, Jong Kim (jkim@epriww.com), of any nomination plans.

The THD distributed a call-for-papers for the "Young Professionals Competition". This competition is scheduled for the Reno summer meeting. Several THD members will be at the meeting to represent the division in selecting the winner along with new Executive Committee member, Donald Todd. The winner will be invited to the winter meeting to receive their award at the ANS THD award ceremony during the ANS Winter Meeting.

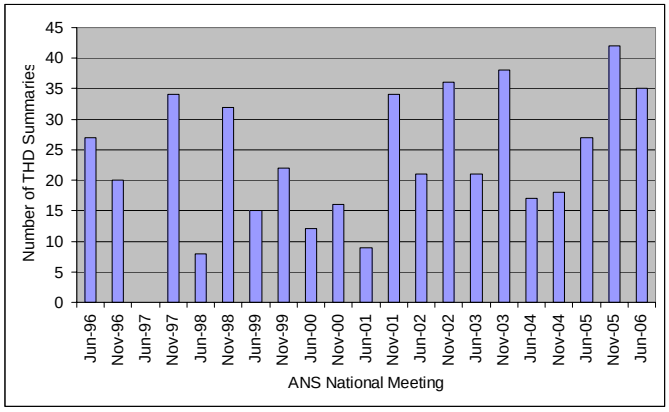
Wolfgang Wulff, one of the founders of the THD, recently indicated to me that there was a large-scale ANS solicitation for nominations of candidates for all ANS awards. A considerable number of these awards, described at length, were awards of ANS divisions, but the Thermal Hydraulics Divisions' awards were not mentioned. He has observed the exclusion by ANS HQ of the THD awards for several years. While all other ANS award recipients are regularly publicized in ANS publications, THD award winners are not. As a consequence, National Laboratory and university bulletins who depend on ANS publications have omitted to recognize their award-winning employees. This issue will be discussed at the upcoming EC meeting during the ANS Annual Meeting in Reno, NV. If you have an opinion on this, please forward your comments to any EC member.

Finally, everyone is invited to suggest candidates for our awards and, of course, your comments and suggestions are always welcome.

Cetin Unal, cu@lanl.gov
Honors & Awards Chair

Program Committee Report

Our strong contribution to the ANS Annual and Winter Meetings continues as the number of THD summaries marks a record high for a June meeting for the last 12 years. At the Reno meeting we are having 35 presentations in 6 sessions.



The ANS 2006 Winter Meeting will be held in Albuquerque, New Mexico. We are organizing 6 sessions in the meeting:

Computational Thermal Hydraulics,
General Two-Phase Flow,
General Thermal Hydraulics,
Severe Accident Phenomena and Engineered Features,
Thermal Hydraulics of Advanced Systems,
Thermal-Hydraulic Limits for Generation IV Reactors.

The sessions for the 2007 Annual Meeting at Boston will be planned at the Reno PC meeting. Individuals interested in organizing a session should either make their proposals at the PC meeting (June 4, 2-4pm, check meeting program for place) or provide suggestions to me by e-mail (muftuoak@westinghouse.com) in advance of the meeting.

We always depend on contributions of individuals to the peer-review process. Volunteers interested in helping with the review of the submitted summaries should contact me or any of the THD EC members.

The topical meeting preparations for NURETH-12 are underway. The meeting dates are September 30 through October 4, 2007. The meeting will be held at Sheraton Station Square in Pittsburgh, Pennsylvania. The main topics of the meeting include:

Two-phase flow and heat transfer
Experimental methods and instrumentation
Boiling and condensation heat transfer
Subchannel thermal hydraulics
Computational methods and code development
Large-scale tests and databases
Severe accident thermal hydraulics
Operating water reactor T/H and safety
Advanced water reactor systems and T/H
Generation-IV reactor T/H
High-temperature gas-cooled reactor systems
T/H of hydrogen systems
Space nuclear

A special session on OECD/NRC Benchmark based on NUPEC BWR Full-Size Fine-Mesh Bundle Tests (BFBT) is supported by Professors Ivanov and Hochreiter of Penn State.

Selected papers from the conference will be published in special issues of Nuclear Engineering and Design and Nuclear Technology journals.

Among the social activities, a dinner cruise on the Gateway Clipper will be the featured event. There will also be an awards luncheon in recognition of THD award winners. The call-for-papers will be issued in June.

Kurshad Muftuoglu, muftuoak@westinghouse.com
Program Committee Chair

Introducing the New THD Website!!!

The Executive Committee has approved an updated division website and this was implemented in March 2006. The update had three primary goals: a) more graphical consistency with the ANS parent website, b) enhanced and "self apparent" user features, and c) addition/deletion of data to that currently appropriate. The increased graphical consistency is illustrated in Figure 1 which is the first screen to be displayed when the website is accessed via the internet. This same graphical format (i.e., the banner at the top of Figure 1 and the "first level" user navigation options shown at the left and below the banner) is used on nearly all subsequent screens that may be addressed. Several (but not all) of the first level user options have sub-options that are displayed when the cursor is positioned over the first level option. A typical example of first and second level options is shown in Figure 2. A left mouse click on an option results in display of a screen containing the information appropriate that action. These subsequent screens often contain further navigational paths to additional information screens accessed by single or double left mouse clicks.

THD members are urged to try out the new website via the normal, several step, access procedure through the parent ANS website (http://www.ans.org), or by direct access at http://thd.ans.org. As can be noted at the bottom of Figure 1, division members are welcome to provide feedback to the Webmaster, or to an Executive Committee member via the "Executive Committee" option.

The THD would like to thank Gary Wilson for his efforts to develop this improved website for the THD.

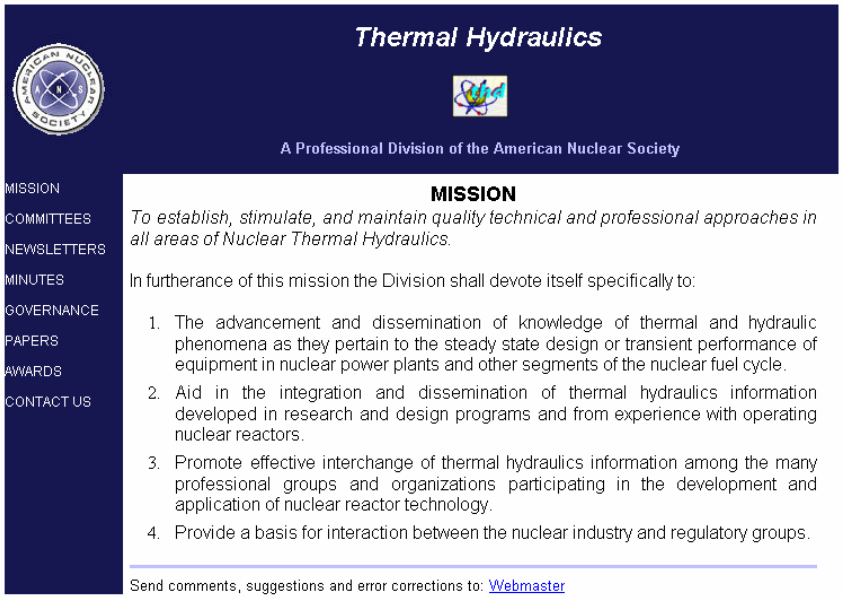


Figure 1. The New THD Website Frontpage

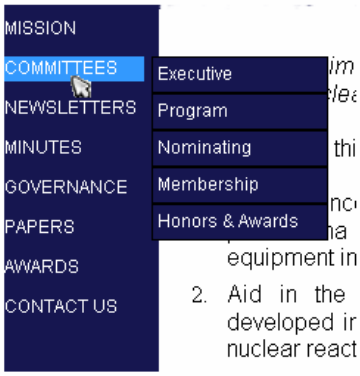


Figure 2. Dropdown Menus

Research Briefs:

International Nuclear Engineering Research Initiative Project at INL, ANL, and KAERI

C.H. Oh, C. Davis, S. Sherman at INL, R. Vilim at ANL, and Y. Lee, W. Lee at KAERI
Phone: (208) 526-7716 Email: Chang.Oh@inl.gov

As part of I-NERI program, two US laboratories, INL and ANL, and one laboratory, KAERI, are involved in development of HyPEP, a hydrogen production plant efficiency calculation computer code.

The Department of Energy envisions the next generation very high-temperature gas-cooled reactor (VHTR) as a single-purpose or dual-purpose facility that produces hydrogen and electricity. The Ministry of Science and Technology (MOST) of the Republic of Korea also selected VHTR for the Nuclear Hydrogen Development and Demonstration (NHDD) Project. This collaborative work will address the evaluation of hydrogen and electricity production cycle efficiencies for such systems as the VHTR and NHDD, and the optimization of system configurations.

This project will select a reference design that deals with the primary coolant system, the secondary coolant system, the intermediate heat transfer loop, the hydrogen production plant and all requirements. Calculations are based on methods defined for the plant efficiency, HyPEP overall numerical schemes, partial load and operating constraints. Both thermochemical and HTE processes will be included in the complex system.

Optimization of such complex systems as the VHTR and NHDD will require a large number of calculations involving a large number of operating parameter variations and many different system configurations. The research will produce (a) the HyPEP which is specifically designed to be an easy-to-use and fast running tool for the hydrogen and electricity production evaluation with flexible system layout, (b) thermal hydraulic calculations using reference design, (c) verification and validation of numerical tools used in this study, (d) transient analyses during start-up operation and off-normal operation. This project will also produce preliminary cost estimates of the major components.

In order to optimize the designs of such plant systems such as the VHTR (Figure 1) and NHDD (Figure 2), it is necessary to be able to evaluate the operating parameters and production efficiencies of various design layouts. This project was funded for three-year and as a final product, we will produce HyPEP computer code along with steady-state and transient analyses on NHDD.

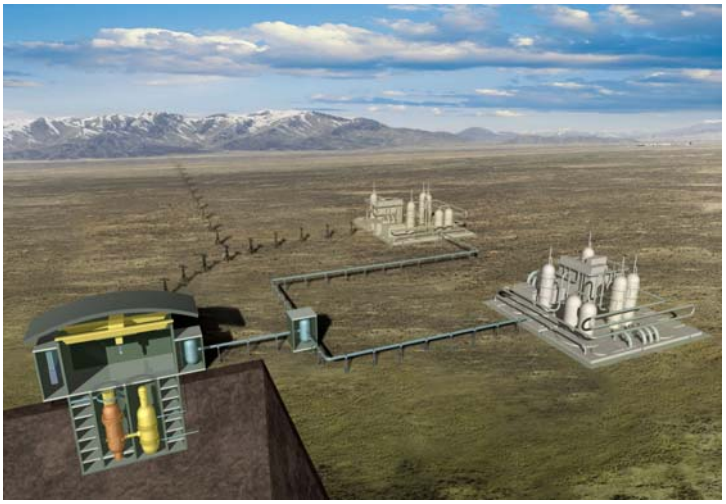


Figure 1. Potential Layout of VHTR for Hydrogen Production.

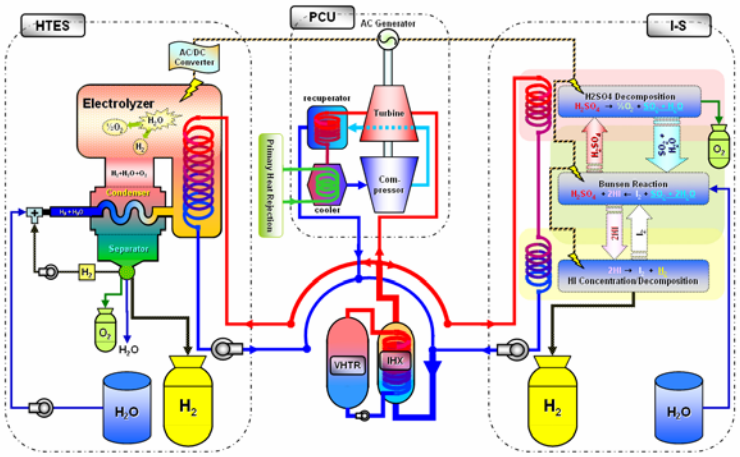


Figure 2. Potential Layout of Proposed NHDD Plant.

Treasurers Report

For FY 2005 the opportunities for income for the divisions came from two sources, member allocation and 2005 national meeting participation. THD expenses were from awards and various student support. Actual expenses increased in 2005 as a result of a unique occurrence with regard to Honors and Awards. For FY 2005 two persons were given technical achievement awards. In addition, actual expense related to the best paper award for 2004 appear in the 2005 actuals as result of a late filing of the transaction. THD increased its sponsorship of students to $2,500 to support Scholarships, travel and the ANS Student Conference. The reserve at the EOY 2005 was $20,340, following total expenses of $6,462. The allotted budget for FY 2006 is shown below. Again for FY 2006, the THD has taken the initiative to invest more on student supports. A total of $3,000 was allotted for FY and this amount has already been disbursed.

Revenue and Expenses Projected for FY 2006

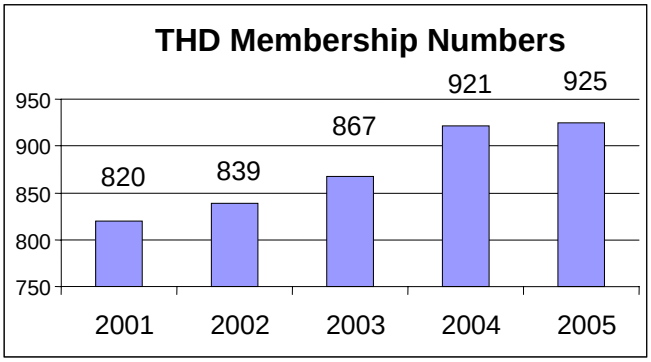
Revenue		
Type	**Discussion**	
Member Allocation	$1/THD Member	921
2005 National Meeting		0
TOTAL REVENUE		**921**
Expenses		
Type	Discussion	Allotted
Newsletters	Within Page Limit	0
Awards, Plaques	THD Technical Awards	2,500
National Meetings		0
Division Officer Expenses	None	0
Student Support	Student ANS Conference and Travel	2,000*
Student Travel	ANS meetings	500*
Scholarship/ NEED		500*
Other Expenses	None	0
TOTAL EXPENSES		**5,500**
Projected 12/31/06 Balance		**15,761**

* Disbursed as of 5/01/2006

Shripad T. Revankar, shripad@purdue.com
THD Treasurer, 2005-2006

Membership Committee Report

Our current membership stands at 925, based on EOY 2005. Thanks to two successful topical meetings in the last two years, NUTHOS-6 and NUREH-11, we have enjoyed a significant membership boast. The chart below demonstrates our excellent growth trends.



While the trend for the past year shows a leveling off, we are optimistic that our growth trends will continue to mirror the society as a whole.

Robert Martin
Membership Committee Chair

Nominating Committee Report

The results of the recent ANS elections are in. We have the following new Division Officers and Executive Committee members.

Division Chair: Joy Rempe
Email: Joy.Rempe@inl.gov

Vice Chair/Chair Elect: Shripad T. Revankar
Email: shripad@ecn.purdue.edu

Treasurer: Chang Oh
Email: Chang.Oh@inl.gov

Secretary: Karen Vierow
Email:vierow@ecn.purdue.edu

Executive Committee (3 year term):

Fan-Bill Cheung, PSU (2009)
Whee Choe, TXU (2009)
Yassin Hassan, TAMU (2009)
Hishashi Ninokata, TIT (2009)
Donald Todd, AREVA (2009)

Current Year THD Officers:

Division Chair: Robert Martin, Robertp.Martin@areva.com
Vice Chair: Joy Rempe, Joy.Rempe@inl.gov
Secretary: Chang Oh, Chang.Oh@inl.gov
Treasurer: Shripad Revankar, shripad@purdue.com

Executive Committee Members:

David Bessette (2006)
Martin Bertodano (2006)
Cetin Unal (2006)
Karen M. Vierow (2007)
Chang H. Oh (2007)
Jong Kim (2008)

The Nominating Committee is responsible for the nomination of THD members to leadership positions on both the Program and Executive Committees. The THD would like to encourage members interested in getting more involved to contact one of the officers listed above. In particular, the division is always in need of volunteers as technical meeting session organizers and paper reviewers.

Yassin Hassin, y-hassan@tamu.edu
Nominating Committee Chair

Newsletter Edited by Chang Oh, 2005-6 THD Secretary, Chang.Oh@inl.gov