



### Message From the Chair By Charles Martin

Please read the newly revised Reactor Safety Position Statement #51 which appears elsewhere in this newsletter and (pending final editorial changes and a second ballot approval by the ANS Public Policy Committee) will soon be posted to the ANS web site. Herb Massie (Defense Nuclear Facilities Safety Board) has done an impressive job getting this position statement revised and approved, and he deserves our collective appreciation and commendation for his hard work.

I recently attended the ANS Student Conference at Oregon State University and was impressed by the numbers of new and enthusiastic students of nuclear engineering, but I was also sobered by the potential demand for these same students. With 24 new reactors planned in the U.S., several new overseas reactors on order from U.S. vendors, and site preparation already in progress on the ITER fusion reactor ("The Way" in Latin) at Cadarache, France, universities will be struggling to meet the demand. Moreover, new students will have less access to training reactors where they can receive direct experience with reactor control. In order to address the need to familiarize the new pool of talent with the rich body of safety lessons learned, NISD is sponsoring a professional development seminar. Bob Henry (Fauske Associates) is organizing the seminar and plans to cover the key phases in the TMI-2 accident as follows: RCS behavior prior to the core being uncovered, overheating and oxidation of intact fuel pins, debris relocation within the core boundaries, relocation of the molten debris to the water baffle and lower plenum regions, and overheating of the RPV and eventual cooling of the wall and the core debris. The seminar has been moved to the 2007 Winter Meeting in Washington, DC in order to expand it to a full 8 hours.

Members of NISD can boast that only 2 major accidents have occurred in more than 11,000 cumulative reactor years of commercial operation in over 30 countries; and, if one excludes Soviet, military, and experimental reactors, none have resulted in public harm or environmental damage. In the late 1970s, detailed analyses and large scale testing began to make clear that less radioactivity escapes from molten fuel than initially assumed, and that this radioactive material is not likely to escape the containment structure that surrounds all modern nuclear plants. In the event containment is breached, the laws of physics and the properties of materials will likely limit the effects of any core melt accident to the plant itself (about half of the core of TMI-2 was melted). Despite this sanguine assessment, there is a very robust program of safety related research which is designed to ensure that we continue to fully understand the safety of the existing power plants and the opportunities for improving the safety posture for future plants.

For example, the use of risk information is increasingly being used to support decision making for both operating reactors and for proposed new reactors. The state of the art for PRA models, methods, and tools is evolving to meet these new demands, and as a result, the NISD sponsored PRA topicals have been very successful both technically and financially for the Division.

Another topic of current interest is NRC Generic Safety Issue 191, which was initiated to address the potential for inadequate core cooling and/or containment spray after a LOCA because of debris induced clogging of containment sump strainers. NRC

has now completed research to help determine extent and significance of issues related to sump clogging, and in response, licensees are modifying sump strainer size and are performing tests to demonstrate that strainers can withstand post LOCA debris loading.

Fire research is another hot topic within the NRC's Office of Nuclear Regulatory Research, where two state of the art research programs were recently completed. There will be an interesting session at the ANS Annual Meeting in Boston devoted to these topics, and I encourage your participation.

Safety culture is also an area of current focus for both the NRC and the Department of Energy. Safety culture is defined as that assembly of characteristics and attitudes in organizations and individuals which establishes that, as an overriding priority, nuclear plant safety issues receive the attention warranted by their significance. Recently, the NRC's Reactor Oversight Process inspection and assessment program has incorporated changes related to the safety culture initiative deriving from reviews of the Davis Bessie vessel head incident and the Challenger Space Shuttle accident. This is an ongoing process, which has yet to see the full impact of the new protocols.

The design and reliability of digital instrumentation and control systems is yet another area of current interest. This technology has, at once, many potential benefits but presents daunting challenges given the many failure modes that must be addressed for any safety related applications. There is an ongoing dialogue between regulators and industry regarding methods to achieve defense in depth and diversity, cyber security, and advanced control room design.

Finally, no one can doubt the critical link between safety and quality assurance. There are several interesting safety related activities here: The ASME Nuclear Quality Assurance (NQA) Committee has been working closely with the NRC over the past several years to resolve issues which have prevented the NRC from endorsing the latest versions of NQA-1 through their Regulatory Guides. At the last meeting of the NQA Committee, they achieved agreement in principle on the remaining issues, and it appears that formal endorsement will soon follow. In addition, the International Atomic Energy Agency and the Organization for Economic Cooperation and Development's Nuclear Energy Agency are engaged in an effort to normalize international quality standards with the various individual national standards, including ASME's NQA-1.

I would like to express my thanks to the hard working members of the NISD Executive Committee, and to extend special thanks to Linda Hansen for extraordinary service to the Division as Secretary/Treasurer, to Gary Wilson for his marvelous service as Newsletter Editor and Web Site Coordinator, to Dana Powers for a wonderful job as Program Committee Chairman, to Jan van Erp as Honors and Awards Committee Chairman, and especially to Kevin O'Kula and Steve Schultz (again and again) as Topical Meeting and Special Session Chairs respectively. I have enjoyed my tenure as your Chairman and hope to see many of you in Boston.

### Message From the Vice-Chair By Allen Camp

On February 6, 2006, the Department of Energy announced the launching of a Global Nuclear Energy Partnership (GNEP) to



expand nuclear energy use worldwide and at the same time address issues associated with nuclear nonproliferation. Since that time a national debate has begun about the GNEP strategy around such issues as the political ramifications of reprocessing and the role of Yucca Mountain. These are healthy debates and I encourage all of you to participate. Whether or not GNEP survives in its current form, we must keep the momentum going with respect to the resurgence of nuclear energy and the nuclear fuel cycle.

But what is the role of the safety professional in these debates? It is the nature of the nuclear fuel cycle that it has many diverse parts, including mining, transportation, energy production, waste handling, etc. It is also the nature of our government, laboratory and corporate structures and budget processes that we tend to design and manage these diverse parts somewhat independently. While we have learned how to design safe nuclear systems in isolation from one another, we haven't learned how to optimize the safety of complete industries across a broad range of concerns.

Nuclear reactor safety, for example, is just one aspect of protecting the public and the environment from the hazards of the nuclear fuel cycle. Have you thought about how safety, security, and environmental tradeoffs should be made? And whether materials used to make a safe fuel design might lead to environmental damage elsewhere? Or whether there is increased mining or transportation risk? Perhaps when all of these issues are considered in a more integrated fashion, we would make different choices. Safety professionals should be concerned about all aspects of public and environmental risks, and we should begin to raise the debate to a higher level. These are complex problems, and no complete models exist to enable clear decisions. However, now is the time to take a broader look at these issues, while there is still time for analysis and thoughtful choices. Let's make sure that safety, in a broad context, has a place at the table during the ensuing debates and that we don't unwittingly shift risk to others or find out about problems when it's too late to make a difference.

Finally, I would like to thank Chip Martin for doing an excellent job as your Chair during the past year. He has been very engaged in looking out for the welfare of the Division and has positioned us well for the future.

### Honors & Awards Committee By Jan Van Erp

The 2007 meritorious awards of the Nuclear Installations Safety Division, namely the George C. Laurence Pioneering Award for Nuclear Safety and the Theos J. (Tommy) Thompson Award for Nuclear Safety, are to be presented to, respectively, David Okrent (University of California at Los Angeles) and Dana Powers (Sandia National Laboratories, Albuquerque, NM).

Both Dr. Okrent and Dr. Powers have made major contributions to nuclear safety, among others during their long service as members and chairmen of the US-NRC Advisory Committee on Reactor Safeguards. In recognition of this fact, the awards presentation ceremony will be conducted in Washington, DC during the ANS Winter Meeting in November 2007.

Members of ANS and in particular members of NISD are urged to attend this event which will honor two truly meritorious

colleagues. Details concerning the presentation ceremony will be published in the NISD Newsletter of autumn 2007.

### Program Committee By Dana Powers

Members of the Nuclear Installation Safety Division will have a lot to choose from at the meeting in Boston. There is, of course, the embedded topical meeting "Nuclear Safety and Technology of Hydrogen Production, Control and Management" sponsored by the Division. In addition, the Division is sponsoring six sessions at the Annual Meeting. Each of these sessions includes quite timely, interesting papers:

- 2i. Updating the NRC New Reactor Licensing Infrastructure
- 4h. Emerging Topics in Nuclear Installation Safety Technology includes papers on the molten salt reactor and safety culture
- 4i. Fire Protection in Nuclear Installation Safety continues our initiative to include fire safety in the Annual Meetings.
- 4k. Probabilistic Safety Applications
- 4o. Nuclear Installation Safety: Important Topics of Current Interest includes paper on air ingress during accidents, radionuclide release from process facilities and in-vessel retention of reactor core debris.
- 4p. Important Topics of Current Interest in Reactor Safety includes papers on cooling CANDU fuel assemblies and HEPA filters.

In addition, there is a panel session (2h) on Gas Reactor Safety and Licensing, with speakers from the USNRC, USDOE, PBMR (South Africa), General Atomic and AREVA.

Members of the Division should take every opportunity to attend sessions sponsored by the Division since attendance is a metric used in assuring good locations for sessions at future meetings.

The Program Committee plans interesting sessions for the Winter meeting to be held in Washington, D.C. A panel session on integration of the six ASME and ANS standards on PRA should be a highlight. There will also be paper sessions. It is not too early to consider submitting papers for the sessions:

- Modeling Safety Issues of Fuel Reprocessing
  - Control Room Habitability: Technical and Regulatory Lessons Learned
  - Safety in Waste Burning and Fast Reactors
  - 10 CFR Part 53 Technology Neutral Regulatory Framework
  - Early Site Permit Process: Safety issue Resolution
  - Achieving a Nuclear Safety Culture: Lessons Applied from Davis Besse
  - Long Term Spent Fuel Storage: Safety methods and Metrics
- Of course, the planned program welcomes pertinent papers that don't fit in these topical areas. Note especially the sessions:
- Innovations in Probabilistic Safety Assessment
  - Modern Analyses and Experiments in Nuclear Installation Safety
  - Current Issues in Reactor Safety
  - Emerging Issues in Nuclear Facility Safety
- Summaries are due by June 8, 2007. They should be submitted electronically via the ANS website.



The Program Committee will be planning sessions for the next Annual Meeting and welcomes suggestions from all concerning sessions that would be of interest and use to the membership.

## Probabilistic Safety Assessment 2008 (PSA '08)

The Nuclear Installation Safety Division will continue its series of topical meetings on probabilistic safety assessment with PSA'08 to be held in Knoxville, TN, September 7-11, 2008. Dr. Robert Budnitz will be the Honorary Chairman. George Flanagan is the general chairman for the topical meeting. David Johnson is the US Technical Program Committee (TPC) Chairman and is calling upon many of the members of the Division to help organize sessions. Overseas co-chairs for the TPC include Tadakuni Hakata and Pekka Pyy. The meeting will be held at the Knoxville Hilton Hotel in downtown Knoxville. The hotel is within walking distance of the newly renovated Market Square and the Old City. An exciting guest program is being planned and there will be tours of Oak Ridge National Laboratory. A web site for PSA'08 is being developed and will soon be available for viewing.

## Scheduled NISD Meetings

All NISD members are welcome to attend the following NISD committee meetings at the June 2007 Meeting in Boston:

- Executive Committee: Monday, 5:00 P.M. – 8:00 P.M.  
LOCATION: Salon G
- Program Committee: Sunday, 7:30 P.M. – 11:00 P.M.  
LOCATION: Simmons

The Executive and Program Committees invite NISD members to express their interest in serving on those committees, particularly by participation in one or both of the indicated meetings.

Members may also wish to attend the Honors & Award Luncheon on Tuesday June 26, 11:30am-1:00pm in Salon E of the Boston Marriott Cople Place Hotel. Tickets can be purchased in advance or on-site at the ANS Registration Desk for \$55.

## REACTOR SAFETY - Position Statement, April 2007 (subject to 2<sup>nd</sup> ballot approval by the PPC)

The American Nuclear Society affirms that power reactors have been and can continue to be built and operated safely, with no undue risk to public health and safety, provided the established elements of power reactor safety are honored.

After more than fifty years and more than 11,000 reactor-years of operating experience, the international community of nuclear reactor experts has reached a consensus that the essential attributes of power reactor safety are:

- A solid foundation of scientific and technological knowledge,
- A robust design that uses established codes and standards and embodies margins, qualified materials, and redundant and diverse safety systems,
- Construction and testing in accordance with the applicable design specifications and safety analyses,
- A comprehensive organizational safety culture,

- Qualified operational and maintenance personnel, that have a profound respect for the reactor core and radioactive materials, and any supporting systems,
- Technical specifications that define and control the safety operating envelope,
- A strong engineering function that provides support to operations and maintenance,
- Adherence to a defense-in-depth safety philosophy to maintain multiple barriers, both physical and procedural, to protect people,
- Risk insights derived from analysis and experience,
- Effective Quality Assurance, Self-Assessment and Corrective Action programs,
- Emergency plans protecting both on-site workers and off-site populations,
- Access to a continuing program of nuclear safety research,
- A strong management and fiscal organization,
- A safety regulatory authority that is responsible for independently assuring operational safety, and
- Newer reactor designs continue to incorporate enhanced safety features.

See background report at: <http://www.ans.org/pi/ps/docs/ps51-bi.pdf>

The American Nuclear Society, founded in 1954, is a not-for-profit scientific and educational society of over 11,000 scientists, engineers, and educators from universities, government and private laboratories, and industry.

Position Statements are the considered opinions and judgments of the Society in matters related to nuclear science and technology. They are intended to provide an objective basis for weighing the facts in reaching decisions on important national issues.

## Invitation to contribute to NISD Memorial Scholarships

The NISD has been instrumental in developing two Memorial Scholarships, namely:

**Saul Levine Memorial Scholarship** to be used to support the graduate education of worthy nuclear engineering students. Award of this scholarship is pending further donations with the desire to become fully endowed within the next four years.

**Ray DiSalvo Memorial Scholarship** to be used to support the undergraduate education of worthy nuclear engineering students. This scholarship has been awarded in both 2004 and 2005, but needs additional funding to become fully endowed.

ANS members are urged to contribute to these worthy scholarships. Any size of contribution is most welcome (\$10, \$15, \$25, \$50, \$100; \$250; \$500; \$1000). Contributions of \$100 or more will receive a letter of acknowledgement.

Tax-deductible donations to these funds may be made by personal check (made out to American Nuclear Society) or by credit card (see below). Please, mark on the check: "for the Saul Levine (or Ray DiSalvo) Memorial Scholarship Fund". Send to:

American Nuclear Society  
Attention: Sharon Kerrick  
555 North Kensington Avenue  
LaGrange Park, IL 60526 USA

If paying by credit card, please complete, cut and send the following:



**For:** (Saul Levine Memorial Scholarship, or Ray DiSalvo Memorial Scholarship)

**Type Card:** (Visa; Master Card; AmEX; Other)

**Card number:**

**Expiration date:**

**Amount:**

**Signature:**

### NISD Website

The NISD Website may be accessed directly at <http://nisd.ans.org> or indirectly at <http://www.ans.org>.

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