A HISTORY OF THE AMERICAN NUCLEAR SOCIETY, 1954–2004

ANS: 50 years of accomplishment

ANS started up, grew, and matured over the last 50 years, relying on the tireless dedication of its members to help develop the technology.

IT'S AMAZING TO think that only 50 years ago, the nuclear energy industry was in its infancy. In the writeup of ANS's 25th anniversary, published in 1979, it was noted that 25 years is "not a long period of time for an archaeologist, perhaps. But in the world of modern science and technology, that same 'small' time span can be big enough to encompass the development of an entire industry. . . ."

That development, now covering the 50 years from 1954 to 2004, has seen quite a range of growth and innovation and change. A new era of commercial activities has taken nuclear technologies out of the exclusive purview of the government and opened opportunities for business and industry. In the last 50 years, nuclear applications have found a home in the world's factories, food processing plants, health care facilities, and the reaches of deep space.

The industry's development has been paralleled by the establishment and growth of the American Nuclear Society. ANS has maintained an important presence through these years, enduring the ups and downs and providing a solid base of information and support to those involved in assuring nuclear's place in the energy mix of the United States, and in the rest of the world.

Back in 1954, there was great optimism about this new technology. Today, that optimism is still alive, as the industry and ANS look to the hope of a new generation of reactors to continue the industry's record of providing safe, clean, abundant electricity worldwide. And although the nuclear industry is still waiting for the next new U.S. nuclear power plant order, ANS has not been passive: Its many member volunteers have worked tirelessly and effectively to influence public and political opinion.

Now, let us set the time machine back to 1954 to take a look at the early days of ANS, and follow its growth into the 21st century.

The first 25 years

The 1950s: The beginnings

World War II, which had given birth to the atomic age, was less than a decade in the past. In a dramatic speech to the United Nations in 1953, President Dwight D. Eisenhower proposed the concept of "Atoms for Peace"—no less than an international sharing of technology for the development of civilian nuclear energy (*NN*, Nov. 2003, p. 38). The following year, the U.S. Congress enacted the Atomic Energy Act of 1954, which provided for private participation in this new field, and the age of nuclear energy had truly begun.

Nuclear energy, even at this early date, had shown that it transcended the boundaries of the traditional scientific disciplines, as interdisciplinary teams of physicists, chemists, and engineers had worked together on the wartime Manhattan Project. To make nuclear energy a commercial reality would require the continuation of this teamwork. What could be more natural than a new scientific organization to provide a professional "home" for the new nuclear pioneers?

A few people in the field had talked early in 1953 of establishing such an organization. By fall, the idea had jelled sufficiently for Jerome Luntz, editor of *Nucleonics* magazine, and Bendix Aviation Corporation's Urner Liddel to call a meeting of interested people for December in New York City, where an Interim Committee for the Formation of an Institute of Nuclear Science and Engineering was created.[1]

But before they went any farther with the organization, they needed to know more about the prospects for its success. A nuclear "institute" would serve several purposes—that they knew. It would provide a "unified oral forum" before which scientists and engineers would be able to present their ideas. It would be in a position to represent the needs of the "scientists and engineers who came from every conceivable discipline." And the existence of such a society or institute would "further stimulate the declassification of information" vital to the development of civilian nuclear power, information then being held by the U.S. Atomic Energy Commission (AEC) on a restricted basis. But was this the time for such a nuclear organization to be formed?

Nuclear divisions or groups already existed within a number of organizations, including the American Institute of Chemical Engineers (AIChE), the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the Institute of Radio Engineers. The AIChE had even opened its Nuclear Engineering Division to all categories of nuclear workers without requiring that they be chemical engineers. Although younger members of the nuclear community felt that their needs were not being met by the existing groups, some of their seniors felt that a new organization would confuse the situation and might not be nearly as effective as divisions of older societies.

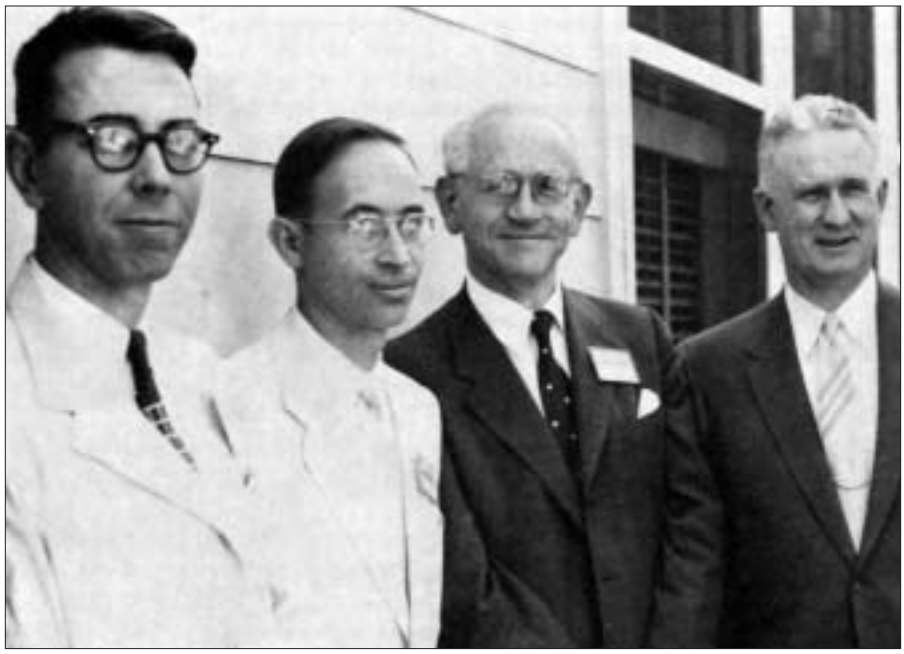
To resolve the dilemma, two questionnaires were sent out, one to several groups of people in the nuclear field, and another to 256 scientists and engineers at Oak Ridge National Laboratory. When

The first 25 years section of this ANS history—which has been updated—was originally prepared by Ellen Thro, a contributing editor to Nuclear News *in the 1970s, with the assistance of Jon Payne, who was* NN *Editor at that time (now retired). The second 25 years portion was written by Susan Gallier, a former* NN *Associate Editor. In addition, valuable help in collecting information was provided by several other people at ANS headquarters.*

[1] In addition to Luntz and Liddel, the Interim Committee members were Clifford Beck, of North Carolina State College; William Breazeale, Pennsylvania State College; John Landis, Babcock & Wilcox; James Lane, Oak Ridge National Laboratory; R. P. Petersen, U.S. Atomic Energy Commission; Stanley B. Roboff, Atomic Energy Division of Sylvania Electric Corp.; and Mortimer A. Schultz, Westinghouse Electric Corp.

John Landis (Babcock & Wilcox), Liddel, Luntz, and Mortimer A. Schultz (Westinghouse Electric) met in January 1954 in New York City to review the responses, the idea of a new and independent organization was clearly favored over several other choices offered, such as a new society under the joint sponsorship of existing societies, or no new society at that time.

The Interim Committee was overwhelmed by the positive response, but was startled to learn how much animosity the name "institute" aroused. So a variety of names came under discussion, including Society of Nuclear Engineering, American Society of Nuclear Technology, Institute of Nuclear Engineering, Association of Nuclear Engineers, Association of Nuclear Science and Technology, and Society of Nuclear Scientists and Engineers. The ultimate choice, American Nuclear Society, was made at the October 11, 1954, meeting of the committee that succeeded the Interim Committee.



ANS officers elected at the first annual meeting, June 1955 at Penn State, were (from left): J. G. Beckerley, editor; Karl Cohen, treasurer; Philip Sporn, vice president; and Walter Zinn, president. (Photo courtesy of Penn State)

Other questions were also being raised. Would members desert the professional organizations they already belonged to? (Piracy was to be avoided.) What would be the attitude toward military applications? Some of the committee members felt "extremely strongly" that military nuclear energy should have "no place in a professional society" like the one under discussion; rather, it should be restricted to "industrial uses of atomic energy including, of course, medical applications."

And how about publications? Two of the committee's advisers—questionnaire respondees who had volunteered to serve—had stated that "the success of the organization will depend in large part upon the quality of the publications" it would issue. A scientific journal in the nuclear field would not only affect other scientific publications, but might actually enhance industrial activity.

Last of all (or, perhaps, first), how would the new society be financed? Here, alas, the Interim Committee had "no practical suggestions" at all.

In March 1954, armed with the vote of confidence from the questionnaire, the Interim Committee met again, this time with the advisers, to transform themselves into the Organizing Committee for the Society of Nuclear Scientists and Engineers, with Jerome Luntz as chairman.[2] Established at this time were an Executive Committee and also subcommittees on constitution and bylaws, organizing and finance, membership standards and requirements, and publications and meetings.

By June 1954, the organization was well under way, with a resolution passed to form a society "devoted to the integration and advancement of nuclear science and technology primarily through the holding of meetings and the publication of papers."

The National Academy of Sciences in Washington, D.C., was the site of early meetings to organize the Society. In fact, the Academy provided space for holding the June 15 and October 11, 1954, meetings, but played no official role in the founding of ANS.

The idea of a new organization was attracting the approval even of some who had been lukewarm to the idea at first. One of these was Alvin Weinberg (of Oak Ridge National Laboratory, of which he became director in 1955). To a colleague, he wrote that it had been the "strong international implications of any unclassified nuclear energy conference" that had persuaded him that "a society capable of organizing and presenting a strongly effective conference is a necessity." The society, he believed, should include "engineers, physicists, metallurgists, chemists, mathematicians, perhaps even biologists." Its next order of business, Weinberg recommended, ought to be the organization of a second International Nuclear Energy Congress for 1956 (a first conference had already been held in 1954 before the advent of the American Nuclear Society).

The committee's actual next order of business was less lofty, but eminently practical: incorporating the society and obtaining 100 to 200 "distinguished members" of the nuclear field to serve as dues-paying charter members.

The first years

The beginning of 1955 saw the American Nuclear Society putting down roots in the nuclear community. The first meeting was already being planned for June at Pennsylvania State College (now University) to include five technical sessions: fast reactor technology, experimental nuclear techniques, radiation effects of biological and physical systems, sources and economics of reactor materials, and problems in reactor fuels. The names of 23 charter members were on the books and $6480 was in hand, most of it from the home companies of the members.

Newly incorporated in the state of New York, the first set of bylaws was adopted on January 17. The Society's formal objectives—eight in number—were set down as follows:

- To promote the advancement of science and engineering relating to the atomic nucleus, and of allied sciences and arts.
- To aid in the integration of the several disciplines constituting nuclear science and technology.
- To encourage research in nuclear science and technology, and in allied fields.
- To establish scholarships, grants, and awards such as may be useful in furthering the foregoing purposes.

Continued

[2] Other members of the Organizing Committee were: Beck; J. G. Beckerley, U.S. Atomic Energy Commission; R. A. Bowman, Bechtel; Breazeale; Karl Cohen, Walter Kidde Nuclear Laboratory; Richard Doan, Atomic Energy Div., Phillips Petroleum; Giocchina Failla, Department of Radiology, Columbia University; Walter Friend, Ebasco Services; L. A. Hyland, Bendix Aviation; K. H. Kingdon, General Electric Research Laboratory; W. E. Kingston, Sylvania Electric Products; Landis; Lane; Titus LeClair, Commonwealth Edison; Liddel; D. H. Loughridge, Northwestern University; Luntz; C. Rogers McCullough, Monsanto Chemical; J. R. Menke, Nuclear Development Associates; Petersen; W. G. Pollard, Oak Ridge Institute of Nuclear Studies; Roboff; Schultz; W. E. Shoupp, Westinghouse Industrial Atomic Power; Philip Sporn, American Gas & Electric; Chauncey Starr, North American Aviation; and Alvin Weinberg, Oak Ridge National Laboratory.

■ To hold meetings for the presentation and discussion of scientific papers.
■ To prepare and disseminate information related to nuclear science and technology, through journals, books, pamphlets, and reports.
■ To cooperate with government agencies, educational institutions, and other organizations having the same or similar purposes.
■ To engage in such other activities as may be appropriate for the fulfillment of the objectives of the Society.

Membership was to consist of fellows, members, associate members, affiliates, and student members. Elected officers were to be a president, vice president, treasurer, and editor, with an executive secretary to be appointed by the Society's managers, the 30-member Board of Directors. There was also a provision for the establishment of local sections, although what was expected to be a grass-roots movement had not yet emerged.

Officers named in early 1955 (to serve only until the June annual meeting) were Jerome Luntz, vice president; Karl Cohen, treasurer; and William Breazeale, secretary (and interim executive secretary). It was decided to defer election of a president until the first annual Society meeting, with a search to be conducted in the meantime by a nominating committee.

With ANS officially in business, the first major task was the establishment of the nuclear journal on which some of the Society's prestige was thought to rest. An interim editor had already been selected—J. G. Beckerley, who was then with the Schlumberger Well Surveying Corp. Beckerley was already making plans to solicit papers for the first few bimonthly issues, expected early in 1956. In September, after considering several companies, the Society contracted with Academic Press for publication of *Nuclear Science and Engineering*, the journal name that had been chosen.

By March, a nominating committee had found a suitable candidate for president—Walter Zinn, director of Argonne National Laboratory. Zinn knew that being, in effect, the George Washington of the new Society would not be easy. But, as he wrote to Luntz, "I have great hopes that the American Nuclear Society will be the most important professional society for people in atomic energy, . . . [and] I would exert myself to the limit to bring this about."

The first annual meeting

The first annual meeting, held in June 1955 at Penn State, produced evidence of a strong and growing organization. The five sessions scheduled for the three-day meeting indicated the state of the art and the concerns of the nuclear community. Walter Zinn and the other officers already serving were duly elected to one-year terms, and the some 400 members and others present heard papers on such topics as the design and fabrication of electromagnetic pumps for liquid metal application, an estimation of the Doppler effect in fast neutron reactors, pyrometallurgical processing of reactor fuels, critical assemblies at Los Alamos, dosimetry

ANS Local Sections and Year Formed (Year Dissolved)

Alabama
Birmingham 1977
Huntsville 1964

Arizona
Arizona 1971

Arkansas
Arkansas 1973

California
Los Angeles 1956
Northern California. 1956
San Diego 1960

Colorado
Colorado 1962

District of Columbia
District of Columbia 1958

Florida
Florida. 1968
Southeast Florida 1990

Georgia
Atlanta. 1971

Idaho
Eastern Idaho 1957
Idaho

Illinois
Central Illinois 1982
Chicago 1957

Indiana
Southern Indiana. 1984 (1986)

Iowa
Iowa 1987
Iowa-Nebraska 1977 (1987)

Kansas
Mid-Kansas. 1982
Witchita. 1971

Louisiana
Louisiana. 1975

Massachusetts
Northeastern 1960

Michigan
Southeastern 1959

Minnesota
Upper Midwest 1972

Mississippi
Mississippi 1975

Missouri
Central/Eastern 1982
Missouri-Kansas 1967

Nebraska
Nebraska 1987

Nevada
Nevada 1963

New Jersey
Northern New Jersey 1979

New Mexico
Carlsbad 1990
Trinity 1961

New York
Long Island 1978
Metropolitan 1956
Niagara-Finger Lakes 1962
Northeastern N.Y. 1957

North Carolina
Eastern Carolinas 1975
Piedmont Carolinas. 1973

Ohio
Northern Ohio. 1962 (2002)
Ohio Section 2002
Southwest 1958 (2000)

Oklahoma
Oklahoma 1973

Oregon
Oregon 1969

Pennsylvania
Central Pennsylvania 1982
Delaware Valley 1958
Northern Pennsylvania . . . 1984
Pittsburgh 1956

South Carolina
Columbia. 1978
Savannah River. 1978

Tennessee
Chattanooga 1973
Oak Ridge 1957

Texas
North Texas. 1960
South Texas. 1973

Virginia
Virginia 1956

Washington
Eastern Washington 1983
Puget Sound 1977
Richland 1958

Wisconsin
Wisconsin 1977

Asia
Japan 1973
Korea. 1982
Taiwan 1979

Europe
Austria. 1969
Belgium. 1970
Central. 1970
France 1970
Italy 1971
Swiss 1985

Latin America
Latin American 1975

in radiation protection, radiation effects in metals, recent developments in the technology of ceramic materials for nuclear applications, the mechanism of dimensional instability in uranium, the impact of waste disposal on chemical processing, and the relative biological hazards associated with nuclear reactors.

And the Society was starting its first full year of operation with just over $11 000 in the bank, having spent a grand total of $546.16 since the previous October, most of it on travel, stationery, and printing, plus an additional $795 spent during the month of June in connection with the meeting itself. Also, by then, a total of 796 members were enrolled.

In his speech to those present, newly elected President Zinn noted that there were then five power reactors scheduled to be built in the United States—two pressurized water reactors (Indian Point-1 and Yankee Rowe); a boiling water reactor (Dresden-1); a graphite-moderated, sodium-cooled reactor (Hallam); and a sodium-cooled fast reactor (Fermi-1).

Zinn thought this diversity was good in contrast to the situation in Britain, where a number of plants with the same design were being planned. Which design was best? He believed this might not be known for a very long time, and that management was more important than reactor type. The members of ANS, Zinn said, would be able to play an important role in determining this, since the details of management, design, and operation were going to be in their hands, and would lead to a flourishing technology.

The annual meeting had been a success, but it was already in the past as the fledgling group made plans that summer for other professional gatherings. First on the agenda was joint sponsorship, with the newly formed Atomic Industrial Forum, of a Washington meeting in September on international developments in atomic energy. Immediately following with sole ANS sponsorship was the Fourth Hot Laboratory Meeting, also in Washington.

In the meantime, another international landmark was about to take place: the first United Nations International Conference on the Peaceful Uses of Atomic Energy. Like their counterparts around the world, the leaders of the American nuclear community began, in the words of one ANS officer, their "rapid evaporation" toward Geneva, Switzerland—to such an extent that the August 1955 meeting of the ANS Board of Directors was held there at the Palais des Nations' European headquarters of the UN, rather than in the United States.

The first Geneva conference provided a world platform for the presentation of ideas for the commercialization of nuclear power. As one physicist ANS member wrote to Walter Zinn, commenting on the presentation of details of the boiling water reactor (the 20-MWt, 5-MWe Experimental Boiling Water Reactor to be built at Argonne) and the NaK-cooled fast reactor, which became EBR-I: "Declassification makes an enormous difference in the completeness of the picture one can get, even though one had access to the material earlier."

That summer also, ANS leaders found that people other than nuclear veterans were interested in their new organization. In July, Zinn had received a letter from Jerome Shapiro, a doctoral student in nuclear engineering at the University of Michigan. His request: Would it be possible for him and a group of fellow students to form a student branch of the American Nuclear Society? An enthusiastic "yes" was the reply, and by the end of the year, the first ANS student branch was in operation.

About this same time, the first steps were being taken in another endeavor that was to be of increasing importance to the Society—the development of nuclear standards. ANS and other organizations were already discussing several possible areas for standards, including safety, disposal of wastes, specification of reactor components and fuels, chemistry, metallurgy, metallography, and fabrication of reprocessed fuels.

But Walter Zinn was cautious about plunging into the field. Noting that an ANS standards committee had not yet been set up, he said, "It is my personal opinion that great care should be taken that an early announcement of standards should not prejudice the future," since there was so little experience in the field. "Too little is known at the present time about the performance of power reactors to begin to set standards." In addition, the AEC's legal responsibilities were resulting in the development of ideas about acceptable standards. "Other ideas cannot be assessed for compatibility with industry until there is experience." Because of this, Zinn believed, "it might be acceptable to start the standards work with some fairly simple matters such as neutron instrumentation but to go very slowly on such matters as the standards for pressure vessels." But there was little doubt even then that the matter of nuclear standards would grow in importance, and that the Society's involvement in this area would increase.

Another topic just beginning to attract organized interest was radiological protection. Health physicists were beginning to organize their own professional society, and there was even talk of affiliating with ANS. Among the activities of ANS, some founders, including Giocchina Failla, of the Department of Radiology at Columbia University, and C. Rogers McCullough, of Monsanto Chemical (who was to become chairman of the AEC's Advisory Committee on Reactor Safeguards and also the second president of ANS), believed there should be an examination of the costs of radiological protection. As McCullough said, the costs of protection were probably "not insignificant," but should be verified. It was possible, however, that "the difference in cost between one level of radiological protection and a much greater level is insignificant, especially if this is planned for in the beginning."

By the end of 1955, there had emerged the grass-roots movement that had been anticipated to start the local sections, and dur-

This was the entire American Nuclear Society staff in 1957. The photo, which appeared in *The Oak Ridger* newspaper on January 17, 1957, shows (at upper right) W. W. "Greg" Grigorieff, serving as part-time ANS executive secretary. At center rear is Lilian Grigorieff, who worked with her husband as part of the original ANS staff. At lower left is Rosa Klotz, a part-time employee, and at lower right is Catherine Coppersmith, a full-time office worker.

ing the ANS's first year, the society had received requests from members in Wichita, Los Angeles, Washington (D.C.), New York, and Pittsburgh to form local groups. The second annual meeting, held in 1956 in Chicago, found ANS with a membership of about 1400, with strong representation from the national laboratories, equipment manufacturers, utilities, and other industries. Among the members were a large number of engineers, some of whom felt they were not sufficiently represented in the ranks of Society officers, which were dominated by physicists. This increasing importance of engineers, in contrast to the physicists who had played the major nuclear role in the early days, was a sign of the rapid development of the industry of civilian nuclear power.

And so the new Society was well launched, as was the industry. ANS headquarters were located in Oak Ridge, with a part-time executive secretary in the person of W. W. "Greg" Grigorieff, of the Oak Ridge Institute of Nuclear Studies (now Oak Ridge Associated Universities), assisted by his wife, Lilian, constituting the complete secretariat staff. By 1957, the staff had two additional office workers, one full-time and one part-time. But early in 1958, Grigorieff decided to take a position abroad with the International Atomic Energy Agency. The ANS Board at this point decided that a full-time executive was needed, and at a more central location.

The reason for these decisions was the rapid growth of the organization. By June 1958, ANS membership had climbed to over 2800, including 128 students and 148 members in more than 30 countries other than the United States and Canada. The membership represented approximately 500 organizations, educational institutions, and government agencies, and the treasury sported a surplus of $28 000. A complement of ANS committees was already in operation, several divisions were well along in their efforts to organize, and nine local sections and five student branches were functioning, with more in the offing.

To handle an activity of this size, the Board rented space in downtown Chicago at 86 E. Randolph St., then the site of the John Crerar Library and already the home of several technical organizations. But who was going to take over the work?

Several candidates were interviewed, but one seemed to stand out. He was a chemical engineer with a degree in business administration as well, and he was working in the Chemical Engineering Division of Argonne National Laboratory. His name: Octave Du Temple. In April 1958, the Board of Directors offered him the position of executive secretary, and by mid-May he was on the job. He retired from ANS at the end of 1989.

The Society was now looking into a future of what seemed to be an almost unlimited expansion of the use of nuclear energy, both in the United States and abroad. In the years ahead, the increasingly international character of the nuclear community and its transformation from a small group of physicists to a diverse body of physicists, engineers, and other specialties were to be major factors in the growth of nuclear power. And the American Nuclear Society was to be intimately involved in it all.

The 1960s: Growth and maturity

What was the state of the nuclear world in 1960? A look at the topics in that year's December issue of *Nuclear News*, which began publication in 1959, provides an idea. It had articles about a direct conversion system for heat-to-electricity to power a space vehicle; a reactor for rocket propulsion (Project ROVER); a molten-salt reactor experiment planned for Oak Ridge National Laboratory; a neutron cross-section evaluation center established at Brookhaven National Laboratory; the Soviet nuclear-powered icebreaker *Lenin*, which was reported to be working in the Arctic, and the United States' NS (nuclear ship) *Savannah*, a cargo and passenger ship, which would soon be in operation; Pacific Gas &

Standards: A long-term commitment

Development of nuclear standards has been a Society concern almost from the time ANS was founded. The Standards Committee itself was formed early—in November 1956—and by April 1957, there were already seven defined areas for which standards were seen to be needed: reactor classification, reactor environment, reactor operator qualifications, reactor operation, methods of estimating energy and fission product release, reactor dynamic system design, and reactor components.

Today, the scope of the Standards Committee includes, but is not limited to, the following specific subjects:

1. Nuclear criticality safety.
2. Definitions of technical terminology used in the nuclear field.
3. Facilities for using radioactive isotopes and remote handling of radioactive materials.
4. Research reactors and critical facilities.
5. Reactor physics and radiation shielding.
6. Utilization of computer programs in the nuclear field.
7. Siting requirements for nuclear facilities.
8. Nuclear power plant design, including safety requirements and plant system criteria.
9. Reactor operation and operator training and selection.
10. Fuel design, handling, and storage.
11. Radioactive waste management.
12. Fission product behavior.

In 1958, ANS became cosponsor with ASME of N6, Reactor Safety, one of the first seven American National Standards Committees, under the direction of ASA, the American Standards Association (now the American National Standards Institute [ANSI]) through its Nuclear Standards Board.

ANS standards—which are intended to be applied on a voluntary basis—are documents that set forth requirements for the design, manufacture, or operation of a piece of equipment. They can also address computer firmware and software. A standard can address the necessary physical and functional features of equipment, its safe application, or some combination of these.

The standards developed by the ANS Standards Committee are intended to be American National Standards and to meet the acceptance requirements of ANSI. Industry standards are often started to establish safe practices. Once a standard is written and approved, it may influence regulatory guidance. When adopted by a state or federal agency, a standard then becomes part of the agency's mandatory code. Further, standards developed under voluntary consensus procedures, like those of ANS, often receive wide acceptance in their industry due to the broad representation of experts who worked to create the standard.

The ANS Standards Committee is responsible for determining the need for new and revised standards and for the development and maintenance of standards that address the design, analysis, and operation of components, systems, and facilities involved in or using nuclear technology. The committee—which does not address standards for the application of radiation for medical purposes—is headed up by the Standards Board (SB), currently chaired by James F. Mallay. The SB also has a vice-chair, up to five members-at-large, and each Consensus Committee chair as an ex-officio member (with voting privileges).

ANS currently supports four Consensus Committees. A Consensus Committee is the balanced body that conducts the consensus ballot on proposed standards in order for them to become official, approved standards. Each Consensus Com-

Electric Company, which had just received a construction permit for a power reactor at Humboldt Bay; and the technology of the pressurized water reactor being developed at the Shippingport and Yankee plants and elsewhere.

By then, the annual meetings in June and the winter meetings six months later, first instituted in 1956, were drawing more than 1000 attendees to hear between 200 and 300 papers. But communication among ANS members was proceeding in other ways, too. By 1962, there were 20 local sections, and the need to maintain contact between them and the Board was growing. To achieve this, each local section was assigned a Board member to serve as liaison.

The year 1964 was the time of the Third UN Conference on the Peaceful Uses of Atomic Energy (the second had been in 1958). By this time, some of the early euphoria about the various types of power reactors, as economic commercialization appeared to be on its way, had given way to reality. In the United States, the choice narrowed to the pressurized water reactor and the boiling water reactor; the Soviet Union was opting for the PWR and the graphite reactor; France and the United Kingdom were concentrating on the gas-cooled reactor (France subsequently switched to emphasis on the PWR); and all were looking at the liquid-metal fast breeder reactor for the future. Canada was developing the heavy-water reactor.

The U.S. nuclear program was furthered by legislation allowing private ownership of nuclear fuel, and moving a step closer to making the uranium fuel cycle like the commercial market for conventional fuels.

The commercial orientation and growth were reflected in ANS, which was expanding in size and commitment—both an advantage and the source of growing pains. Up to this point, ANS had been small enough to operate as a unit. Now there were signs, at least to some members, that new divisions were increasing their memberships at the expense of older ones, and that the diverse needs of the specialized divisions were lacking close integration with the Society as a whole.

By the mid-1960s, divisions existed for aerospace, isotopes and radiation, materials science and technology, remote systems technology, mathematics and computation, reactor operations, shielding, education, reactor physics, and power. Although most of these divisions developed organically within the ANS structure, one of them, remote systems technology, actually antedated ANS, having existed since 1947 under various names, including the Hot Laboratory Committee, as an interchange among the various national laboratories. That group affiliated with ANS in 1958.

To prepare the Society for the years ahead, a number of steps were taken in mid-decade to improve direction and leadership. The Board of Directors would devote its attention to policy rather than operational questions, delegating "suitable authority" to the Executive Committee to handle operations. Only those matters involving policy would be referred back to the Board.

While operations were to be handled centrally, the divisions, on the other hand, were to take a greater hand in determining the content of the national meetings. This step was designed to assure that the contents of the programs closely reflected the needs of the professions and also to distribute the work load such meetings entailed among a larger number of willing hands.

Increasing its work beyond the nuclear community, ANS established a Public Information Committee in 1964 to increase the Society's role in educating the public to the value of nuclear energy. Although a rather broad public information program exists today, the idea was not without its critics 40 years ago, as former President Norman Hilberry (1965–1966) once recalled. He observed that some members feared this activity was dangerously close to hucksterism, not only ill-becoming the Society, but—more practically—a possible endangerment to the Society's status as a not-for-profit

mittee has a defined scope of activities. The four ANS Consensus Committees are as follows: N16, Nuclear Criticality Safety; N17, Research Reactors, Reactor Physics, Radiation Shielding, and Computational Methods; Nuclear Facilities Standards Committee (NFSC); and Risk Informed Standards Committee (RISC).

An ANS Working Group is the writing committee for each standard. These small groups of about a dozen people each create the text of ANS standards. They also make decisions about a standard's maintenance and respond to requests for clarification or interpretation. Many working groups take advantage of the two ANS national meetings held each year (June and November) and meet at those times. Others conduct much of their work via telephone, e-mail, and fax.

Currently, standards work is supported by two ANS staffers—one full-time (Pat Schroeder, Standards Administrator) and one part-time (Susan Peccatiello, Standards Assistant).

Since its start, ANS has written and approved more than 100 different standards, and numerous versions of many of those. At present, ANS has 90 standards that are current American National Standards and many others that are considered historical standards. These technical documents are written, reviewed, and approved by the army of talented volunteers who support the program. ANS has more than 1000 volunteers who provide their experience and expertise to the various levels of standards committees to see that these important documents are written for the industry's needs.

ANS standards pioneers included U. M. Staebler, Norman Hilberry, Marvin Mann, M. C. Edlund, M. M. Shapiro, Ralph Chalker, Miles Leverett (first Standards Committee chair), J. R. Crittenden, A. Dixon Callihan, and C. Rogers McCullough.

Other standards milestones have included the following:

■ 1961—Ann Savolainen became editor for ANS standards, and later, the first administrative secretary to the Standards Committee.

■ 1965—ANS became a member of ASA.

■ 1967—The first ANS standard was completed: ANS-1, *A Code of Good Practices for the Performance of Critical Experiments.*

■ 1970—Publication of the newsletter *Nuclear Standards News,* and the startup of the Information Center on Nuclear Standards (ICONS), which provides various services and publications related to standards.

■ 1972—Members of the ANS Executive Committee met with AEC Commissioners to discuss, among other matters, governmental and organizational roles in development of environmental standards. Also in that year, ANS held its first major conference on problems and progress in nuclear standards.

■ 1986—ANS published the *Glossary of Terms in Nuclear Science and Technology.* Compiled by the ANS Standards Subcommittee on Nuclear Terminology and Units, this recognized reference publication covers all areas of the field.

■ 1998—Marilyn Weber, ANS staffer and Standards Administrator, retired after 25 years of service to ANS and the standards effort.

■ 1999—Public Law 104-113 required federal agencies to use voluntary consensus standards, and ANS increased its standards effort to provide such standards development support.

■ 2000—ANS formally addressed its voluntary consensus standards development process, and with Board endorsement, formally committed to continuing its role in developing standards. ANS also committed to developing two new standards, in the areas of risk-informed analysis for shutdown operations and of external hazards, and received grant support from the U.S. Nuclear Regulatory Commission to do so.

■ 2003—ANS published ANS/ANS-58.21–2003, *External-Events PRA Methodology.*

organization. Because of this, the Society was determined to take only that public information role that would maintain its integrity and fulfill its basic role as a scientific and educational organization.

At the same time, the Society was increasing its concern with, and service to, the educational community. This was intended to complement its work with industry, because the rapidly expanding industry needed the trained people produced by the schools, while the schools needed (for the benefit of both the faculty and students) up-to-date information on trends and equipment that only industry could provide. The role of ANS in all this was designed to provide a forum for the exchange of ideas, stimulation to what were delicately described as "less forward-looking companies" to adopt proven methods of advancing the education of engineers, and a people exchange between industry and the universities. It was perhaps no coincidence that ANS President Hilberry at this time was primarily an educator, both in his role as a professor of nuclear engineering at the University of Arizona, and, prior to his retirement in 1964, director of Argonne National Laboratory.

Professional Divisions: A history in themselves

The establishment and growth of ANS's Professional Divisions is both a barometer of and an instrument in the changes that have taken place in and around the Society over the past 50 years. As such, a history of the Society's divisions is something of a history of nuclear technology. The following is a brief description of the divisions, past and present, listed alphabetically.

Accelerator Applications

The division was organized to promote the advancement of knowledge of the use of particle accelerator technologies for nuclear and other applications. It focuses on production of neutrons and other particles and utilization of these particles for scientific or industrial purposes, such as the production or destruction of radionuclides significant to energy, medicine, defense, or other endeavors, as well as imaging and diagnostics.

Formed as a technical group in 1996; achieved division status in 1999. Current membership: about 340.

Biology & Medicine

Members focus on the application and development of nuclear technology for the life sciences, as well as the impact of such technology on society. Areas of interest include neutron, photon, and charged-particle applications, dosimetry, radiographic and radioisotope imaging, radionuclide tracers, instrumentation, radiopharmaceutical synthesis and radionuclide production, bone and tissue dosimetry, effects of radiation exposure, and other related subjects.

Formed as a technical group in 1980; achieved division status in 1987. Current membership: about 450.

Decommissioning, Decontamination, & Reutilization

The mission of the DD&R Division is to promote the development and use of those skills and technologies associated with the optimal management of decommissioning, decontamination, reutilization, and long-term surveillance and maintenance of nuclear and former nuclear installations, materials, facilities, and sites for the betterment of society. The target audience for this effort is the membership of the division, the Society, and the public at large.

Formed as a technical group in spring 1994; achieved division status in fall of the same year. Current membership: about 1300.

Education & Training

Through the exchange of views and information on matters related to education and training in nuclear science, engineering, and technology, this division links the academic, industrial, and governmental communities. Education and training professionals and interested students work together through Society-sponsored meetings and publications, to enrich their professional development, educate the general public, and advance nuclear science and engineering.

Formed as the Education Technical Group in 1964; achieved division status in 1966. Added "Training" to the name in 1987. Current membership: about 970.

Environmental Sciences

Information on the relationship of nuclear power to the environment, the ecological influence of nuclear processes, and the tradeoffs of nuclear technology in relation to other sciences are studied and disseminated by division members. Through education programs, scientific meetings, and publication of findings, this division encourages awareness and stimulates interest among the public, government agencies, and international organizations.

Formed as a technical group in 1970; achieved division status in 1973. Current membership: about 940.

Fuel Cycle & Waste Management

Devoted to all aspects of the nuclear fuel cycle, including waste management, worldwide. Division-specific areas of interest and involvement include uranium conversion and enrichment; fuel fabrication, management (in-core and ex-core), and recycle; transportation; safeguards; high-level, low-level, and mixed waste management and disposal; public policy and program management; decontamination and decommissioning environmental restoration; and excess weapons materials disposition.

Originally the Fuel Cycle Technical Group formed in 1969; division status achieved in 1970. "Waste Management" was added to the name in 1980. Current membership: about 2430.

Fusion Energy

This division promotes the development and timely introduction of fusion energy as a sustainable energy source with favorable economic, environmental, and safety attributes. The division cooperates with other organizations on common issues of multidisciplinary fusion science and technology, conducts professional meetings, and disseminates technical information in support of these goals. Members focus on the assessment and resolution of critical developmental issues for practical fusion energy applications.

Formed as the Controlled Nuclear Fusion Technical Group in 1970; achieved division status in 1974. Current name was adopted in 1980. Current membership: about 750.

Human Factors

Improving task performance, system reliability, system and personnel safety, efficiency, and effectiveness are the division's main objectives. Its major areas of interest include task design, procedures, training, instrument and control layout and placement, stress control, anthropometrics, psychological input, and motivation.

Formed as a technical group in 1979; division status achieved in 1985. Current membership: about 590.

Isotopes & Radiation

Members are devoted to applying nuclear science and engineering technologies involving isotopes, radiation applications, and assorted equipment in scientific research, development, and industrial processes. Their interests lie primarily in education, industrial uses, biology, medicine, and health physics. Division committees include Analytical Applications of Isotopes and Radiation, Biology and Medicine, Radiation Applications, Radiation Sources and Detection, and Thermal Power Sources.

Formed in 1959. In 1975, it incorporated the Aerospace and Hydrospace Division. The Aerospace and Hydrospace Division was formed as an interim Technical Group on Nuclear Space Systems in 1961, became the Aerospace Division in 1962, and changed its name to Aerospace and Hydrospace Division in 1973 before the merger. Current membership: about 830.

Materials Science & Technology

The objectives of MSTD are: promote the advancement of materials science in nuclear technology applications and support the multiple disciplines that constitute it; encourage research by providing a forum for the presentation, exchange, and documentation of rele-

Before the decade was over, the Society had helped define the discipline of nuclear engineering, linking it not only to specific technologies such as fission, fusion, radioisotope power sources, and particle accelerators, but also to physics, chemistry, and to other branches of engineering. In addition, the general and specific characteristics of the nuclear engineering curriculum were spelled out, to qualify the undergraduate student for either a professional position or for graduate school.

The Society's interest in education was reflected in the educational level of its members. A 1964 survey of professions and educational level, in 41 technical societies, by the Engineers Joint Council showed that ANS had the highest average years of formal education among the groups surveyed. Of the ANS members in the sample, 28 percent held doctorates, 30 percent had master's degrees, and only 3 percent were below the bachelor's level. (The survey showed that chemical and mechanical engineers accounted for 26 and 23 percent, respectively, of the ANS membership, with 16 percent nuclear engineers, 10 percent electrical engineers, and about 9 percent with

vant information; promote interaction and communication among its members; and recognize and reward its members for significant contributions to the field of materials science in nuclear technology.

Formed as an interim Technical Group on Materials Technology in 1962; achieved division status in 1963. Current membership: about 930.

Mathematics & Computation

Division members promote the advancement of mathematical and computational methods for solving problems arising in all disciplines encompassed by the Society. They place particular emphasis on numerical techniques for efficient computer applications to aid in the dissemination, integration, and proper use of computer codes, including preparation of computational benchmarks and development of standards for computing practices, and to encourage the development of new computer codes and broaden their use.

Originally the Reactor Mathematics and Computations Division; formed in 1959. Current membership: about 920.

Nuclear Criticality Safety

NCSD provides communication among nuclear criticality safety professionals through the development of standards, evolution of training methods and materials, presentation of technical data and procedures, and creation of specialty publications. In these ways, the division furthers the exchange of technical information on nuclear criticality safety with the ultimate goal of promoting the safe handling of fissionable materials outside reactors.

Originally a technical group formed in 1968; achieved division status in 1969. Current membership: about 750.

Nuclear Installations Safety

Devoted specifically to the safety of nuclear installations and the health and safety of the public, this division seeks a better understanding of the role of safety in the design, construction, and operation of nuclear installation facilities. The division also promotes engineering and scientific technology advancement associated with the safety of such facilities.

Formed as the Nuclear Reactor Safety Technical Group, 1971; division status achieved in 1974; current name adopted in 1996. Current membership: about 1650.

Operations & Power

Members focus on the dissemination of knowledge and information in the area of power reactors, with particular application to the production of electric power and process heat. The division sponsors meetings on the coverage of applied nuclear science and engineering as related to power plants, nonpower reactors, and other nuclear facilities. It encourages and assists with the dissemination of knowledge pertinent to the safe and efficient operation of nuclear facilities through professional staff development, information exchange, and supporting the generation of viable solutions to current issues.

Formed in 1999 from the merger of two divisions: the Reactor Operations Division, created in 1961, and the Power Division, originally a technical group formed in 1964 that achieved division status in 1966.

In 1988, the Power Division incorporated the Alternative Energy Technologies and Systems Division. This division was established in 1978 from a technical group formed in 1975. In 1976, as a technical group, it incorporated the Civil Explosion Application Division. The Civil Explosion Application Division was formed in 1967 as the Technical Group for Nuclear Explosives Engineering and achieved division status in 1971. Current membership of the Operations and Power Division: about 4210.

Radiation Protection & Shielding

The division promotes the interchange of technology related to the transport of particulate and electromagnetic radiation in materials and biological systems; techniques and instrumentation to measure and calculate radiation fields; and the quantification of radiation effects and nuclear heat deposition within materials. Radiation protection management, ALARA, operation health physics, and radiation shield design and evaluation are key subject areas.

Formed in 1960 under the name Shielding Division, it became the Shielding and Dosimetry Division in 1968. It acquired its present name in 1976. Current membership: about 1460.

Reactor Physics

The division's objectives are to promote the advancement of knowledge and understanding of the fundamental physical phenomena characterizing nuclear reactors and other nuclear systems. The division encourages research and disseminates information through meetings and publications. Areas of technical interest include nuclear data, particle interactions and transport, reactor and nuclear systems analysis, methods, design, validation and operating experience, and standards. The division's Wigner Award heads the awards program.

Formed as a technical group in 1965; achieved division status in 1966. Current membership: about 1340.

Robotics & Remote Systems

Division members are interested in the advancement of science and engineering related to remotely operated systems, facilities, equipment, and devices for nuclear energy and other related applications.

It was ANS's first division, stemming from a separate group that became part of ANS in December 1958 as the Hot Laboratory Division. In 1963, the name was changed to Remote Systems Technology Division. In 1993, it acquired its present name. Current membership: about 370.

Thermal Hydraulics

The division provides a forum for focused technical dialogue on thermal hydraulic technology in the nuclear industry. Specifically, this includes heat transfer and fluid mechanics involved in the utilization of nuclear energy. It is intended to attract the highest quality of theoretical and experimental work to ANS, including research on basic phenomena and application to nuclear system design.

Established in 1978; achieved division status in 1981. Current membership: about 870.

Aerospace Nuclear Science & Technology (Technical Group)

This group was organized to promote the advancement of knowledge in the use of nuclear science and technology in aerospace applications. Specialized nuclear-based technologies and applications are needed to advance the state of the art in aerospace design, engineering, and operations to explore planetary bodies in our solar system and beyond, plus enhance the safety of air travel, especially high-speed air travel. Areas of interest include, but are not limited to, the creation of nuclear-based power and propulsion systems; multifunctional materials to protect humans and electronic components from atmospheric, space, and nuclear power system radiation; and human factor strategies for the safety and reliable operation of nuclear power and propulsion plants by nonspecialized personnel.

Formed in 2000. Current membership: about 390.

other engineering degrees. Physicists, the only nonengineering category, made up 16 percent of the membership. Of the 862 members surveyed, only three were women. About one-third of the members were in management or administration, another 15 percent in research, 17 percent in design, and 6 percent in teaching.)

A follow-up survey three years later showed that nondegreed professionals had increased in number in the Society as they increased their professional experience (for those without degrees, eight years of related experience were required for membership). But in three years' time, the members whose work was supported by government funds declined significantly.

As the decade ended, the growth of ANS was emulating that of the nuclear industry as a whole. Membership topped 8000, growing at an average clip of 540 a year between 1955 and 1970. The Power Division alone grew from its origin in 1966 to a total of 2369 in 1969. This mirrored, in the same period, the rapid increase in the number of nuclear power reactors in the works or on line.

To reinforce the rapid growth of the nuclear industry, ANS began in 1965 the publication of a second journal, *Nuclear Applications* (now *Nuclear Technology*). Further strengthening its ties with industry, the Society in 1969 established the category of Organization Member, open to companies, government agencies, and educational and medical institutions.

But it was not only the Society's activities and membership that had been on the march during the decade. ANS had moved physically, too. By the early 1960s, it was outgrowing its increasingly inconvenient quarters in Chicago's Loop, and the Crerar Library itself was planning to move, because the Randolph Street building was being sold. An offer to come to Pittsburgh was turned down because Chicago was more of a national converging point, and because it also had several nuclear-related facilities. In 1964, the headquarters were moved to leased facilities in Hinsdale, a western suburb of Chicago, where it was to remain for the next 13 years.

The 1960s were years of nuclear expansion amid a climate of strong popular approval. The year 1967 alone saw several landmark events, including the centennial of the birth of Marie Curie and the 25th anniversary of the first self-sustaining nuclear chain reaction. New orders that year for U.S. nuclear power reactors totaled 28, the highest of any year until the early 1970s. It was the year of Project Gasbuggy—for the stimulation of low-productivity gas reservoirs—the United States' first peaceful nuclear explosion in which private industry was a participant. Less fortuitously for optimists, it was the year the NERVA rocket program was cut back by the government. But a reactor, SNAP-10A, had gone into space during the decade. The submarine reactor was a laudable success in both usefulness and safety. Radioisotopes had become increasingly useful and even commonplace in medicine and industry.

Also, nuclear power was increasing steadily in public acceptance, it appeared, in light of its safety record and its lack of obvious pollution.

The 1970s: Involvement, internationalism

For the American Nuclear Society, the beginning of the 1970s might have been called the "era of internationalism." The international character of the nuclear community had been evident from the days of the World War II Manhattan Project. The reac-

Publications: A major enterprise

As with most societies, publications are a major element of the American Nuclear Society's activities. When the Society was founded, publication of a scholarly journal was a priority item. Today, ANS publishes three journals, a news-oriented magazine, a specialist magazine on radioactive waste management, a membership newsletter, *Transactions* and proceedings, monographs and other books, a newsletter on standards development, an informational periodical for teachers, and other special publications.

From the Commercial Publications Department

■ *Nuclear News* began in 1959 as a four-page mimeographed newsletter. It first appeared in a magazine format in 1961, and has grown to encompass news and information about all aspects of the uses of nuclear energy and radioactive materials in the United States and abroad. The monthly schedule was augmented with the creation of the *Buyers Guide* issue in 1969. The magazine is received by each member, and is also available to subscribers outside the membership. Its current editor and publisher is Gregg Taylor, who is being succeeded in June by Betsy Tompkins.

■ *ANS News*, devoted specifically to membership activities, grew out of a long-standing section of *Nuclear News* to become a separate monthly publication in 1983. As part of a cost-cutting effort, *ANS News* was rolled back into *Nuclear News* in 1996, but brought out separately again in 1999. It is provided to each Society member. Its current editor is Phyllis Ruzicka.

■ *Radwaste Magazine*, begun in 1994, took ANS into a new realm: the specialist publication. Composed mainly of feature articles, this magazine (now titled *Radwaste Solutions*) provides technical and state-of-the-art detail from real-world experience, without the peer review process of the journals. *Radwaste Solutions* is a bimonthly publication (originally a quarterly), and is distributed to paying subscribers. Its current editor is Nancy Zacha.

■ The *Nuclear News* staffers also found other ways to gather information and make it available. The first edition of the *World Directory of Nuclear Utility Management* (subsequently also available on CD-ROM) was dated 1988. This reference book was received so well that it has settled in as an annual publication; the 16th edition was published in 2004. From 1992 to 1994, the staff also produced three editions of a similar book, the *World Directory of Radwaste Managers*. Also, the data on nuclear power plants worldwide, published as part of the March issue of *Nuclear News*, are available every other year on wall maps.

From the Scientific Publications Department

■ *Nuclear Science and Engineering (NS&E)*, started in 1956, was the Society's first major publishing effort. It is in the tradition of journals of other societies, with its emphasis on previously unreported research. The original schedule was six issues per year, with J. G. Beckerley as the editor and Academic Press Inc. doing the actual publishing. E. P. Blizzard became the editor in 1959, and that same year, the frequency became 12 issues per year. In 1964, ANS took over publication of *NS&E*, and in 1965, Dixon Callihan was named editor. Currently published nine times a year, *NS&E* is led technically by Dan G. Cacuci, who has served as editor since 1986.

■ *Nuclear Technology* was first published in 1965 (its name then was *Nuclear Applications*), and its purpose was the publication of papers that were more applications-oriented than *Nuclear Science and Engineering*. The first editor was Louis Stang and the schedule was six issues per year. In 1967, the publishing schedule became 12 issues per year, and the journal produced the first of its "proceedings" issues, containing the papers from a conference. Roy Post was named editor in 1969, the same year that the publication was renamed *Nuclear Applications and Technology*. The name was changed to *Nuclear Technology* in 1971, and in 1977, the publication schedule be-

tor technology that grew during that period was shared by the United States, Britain, Canada, and France, and had soon spread to, or been developed separately by, the Soviet Union, Japan, and other countries. The United Nations had already sponsored three conferences in Geneva on the peaceful uses of atomic energy—in 1955 and 1958, during the period of extensive declassification of government-held information, and a third in 1964.

As early as 1956, ANS founding members C. Rogers McCullough and Jerome Luntz had discussed a joint meeting of the Society with nuclear counterparts in Europe, even though no comparable society existed there at that time. Internationalism had long been a priority with Octave Du Temple and Society leaders. During the 1960s, a number of international conferences had in fact been held, in both North America and Europe. But professional affiliations were a different matter. In 1964, at the time of the Geneva conference, ANS Board members held informal discussions with members of the British Nuclear Energy Society about the possibility of a closer relationship, but the idea was dismissed as premature. The British renewed the discussion four years later. By 1968, however, ANS had more than 100 members in France and about 50 each in West Germany, Italy, and the United Kingdom, all countries with their own nuclear programs and organizations.

The ANS President at the time, Karl Cohen, of General Electric, believed that any closer relationship with Britain should be accompanied by similar links in other European countries. More than international goodwill was involved, he thought; the late 1960s was a period of intense competition among the various nuclear countries, and Britain, more so than others in Europe, was reluctant to open its nuclear economy to competition from the United States.

In 1970, however, the time was ripe for closer Europe-ANS ties, and that year, three ANS local sections were started in Europe, with another starting up the following year. In 1974, an ANS overseas office was opened in Paris. In addition, ANS has cooperated with the European Nuclear Society (ENS) in meetings and also in other activities; in 1978, ENS purchased a one-half interest in *Nuclear Technology* (sole ownership of *NT* returned to ANS in 1987).

The first Asian local section was formed in Japan in 1973. That same year, after a trip through Asia's nuclear nations, Octave Du Temple foresaw a Pacific Basin nuclear conference in a few years' time, an idea also urged by U.S. West Coast local sections. The first such conference was held in Hawaii in 1976.

Subsequent linkages with Asia were the reciprocal visits in 1978 and 1979 between ANS and the People's Republic of China. In 1978, a contingent of ANS members made a two-week trip to China, visiting research institutes, universities, and industrial facilities. In 1979, the Society was host to a high-level scientific delegation from China that spent about a month in the United States, and then two weeks in Canada, visiting national laboratories, universities, companies, and other nuclear-related facilities. The visits are credited with strengthening ties between the countries at a time when China was opening its economy to the introduction of Western and other technologies.

The 1970s also saw a rise in importance of nuclear developments in the Middle East. In 1976, a liaison agreement was signed between the ANS and its counterpart in Israel. The international

came 15 issues per year. By 1986, the frequency was scaled back to 12 issues per year, and has been held at that frequency ever since. Post retired as editor of *NT* in 1990, and was followed by William (Bill) Vogelsang, (University of Wisconsin) from 1990 to 1996. Nicholas Tsoulfanidis, of the University of Missouri–Rolla, has served as the editor since August 1996.

It was also in the late 1980s that ANS elected to move the *Nuclear Technology* journal editorial office from its remote location in Tucson, Ariz., where the technical editor was based, to ANS headquarters. And after a period of years, all three journals are now administered from ANS headquarters. With the advancement of electronic access, location no longer played a major role in the peer review of journal manuscripts.

■ *Fusion Science and Technology* (formerly *Fusion Technology*) was first published in 1981 as part of *Nuclear Technology/Fusion* and was led by then associate editor, George Miley, of the University of Illinois. Miley's efforts moved the journal quickly to a freestanding journal, and in 1984, *Fusion Technology* was published four times a year with its own masthead. In 2000, Miley retired as editor, and Nermin Uckan, of Oak Ridge National Laboratory, led the way in expanding the journal's scope, as well as increasing its frequency to eight times a year, double what it was originally.

■ Monographs and books constitute another important category of publishing by ANS, and over the years, the Society has increased its capabilities in this area.

In 1961, ANS, the (then) Atomic Energy Commission, and a private publisher agreed on a plan for publishing 15 technical monographs. For the first monographs, completed in 1963, the Society provided editorial direction, the AEC funded the manuscript preparation, and Brown & Littlefield did the printing and marketing. From that comparatively limited role, the Society's work on the monographs grew so that by 1970 it was doing the editing, printing, and marketing, with the AEC funding the manuscript preparation. In 1974, the first ANS-published book not supported by a federal agency was printed.

Today, the ANS book publishing effort is focused on the revision and/or new publication of textbooks needed for nuclear engineering graduate and undergraduate programs. ANS has been very successful in developing this niche by sustaining titles that are still used in the classroom, but are no longer published by the commercial publishers. In addition, ANS still publishes select monographs and special interest titles submitted for consideration. Some of these titles are published solely by ANS, but ANS continues to work cooperatively with the Nuclear Regulatory Commission and the Department of Energy in select topical areas.

■ *Transactions* and proceedings have long been a part of the Society's publishing activities. *Transactions*, containing 450- to 900-word summaries of the papers for both the Society's Annual and Winter Meetings, have been published starting in 1958. In June 2001, ANS entered the electronic publishing arena with the introduction of an electronic submission and review system for ANS Annual and Winter Meetings. Since then, ANS has logged and processed well over 3500 summaries for publication in CD-ROM format, and the review system is now being used by topical meeting organizers for paper reviews for embedded and stand-alone topical meeting proceedings.

Proceedings, which usually contain complete papers, are now published for some topical and special meetings in CD-ROM format as well. In special cases, the term "transactions" is used for meetings publications that carry complete papers or summaries longer than indicated above—e.g., the Transactions Supplements for certain international meetings.

■ *Nuclear Standards News* was first published in 1970, and is still received by numerous readers who are interested in key events and issues in the nuclear standards field.

From the Outreach Department

■ *ReActions* is an informational newsletter distributed free of charge to 18 000 teachers in elementary and high schools. Launched in 1985, *ReActions* is currently published two to three times a year.

meeting in Iran in 1977, cosponsored by ANS, was a particularly notable and successful event.

The Society was expanding rapidly in the United States, too, at the start of the decade. In 1968, the ANS Planning Committee had estimated that membership would reach 8000 by 1970. The Committee was wrong: By 1970, the figure was a whopping 8995, exceeding the projection by almost 1000. The members were enrolled in 11 divisions and four technical groups, 29 local sections, and 48 student branches, and there were 120 Organization Members.

By this time in its life, ANS was conducting numerous activities to fulfill its original objectives, or had plans to do so:

■ Meetings included the two national meetings each year, plus international, topical, local, and student conferences.

■ Publications included the two journals and *Nuclear News*, monographs and books, *Transactions*, and proceedings of meetings, with newsletters to begin later.

■ To promote and advance science, the Society was well into development of nuclear standards, and its public information activities were growing.

■ Integration of disciplines was being assisted by the professional divisions, career guidance films, and a manpower survey.

■ Research was being encouraged through Society members' advising the government on power, radioisotopes, the environment, and education.

■ Scholarship was advanced by student conferences, subsidies to student publications, fellowship programs, and special awards.

Many changes to come

It was good that the Society was beginning the decade in a position of strength, as a number of changes were coming to the country and to the nuclear industry that would not have been anticipated just a few years earlier.

One such change was the militancy of some environmental groups. Organized in the unrest of the late 1960s, they took at least part of their creed from a reaction against technology and another part from a skepticism of the power and authority of the government. A skepticism about—and then opposition to—nuclear power became a particularly strong element of the environmental movement.

Some of the highly visible opposition to nuclear energy came from groups such as the Union of Concerned Scientists and the Natural Resources Defense Council. The industry faced many dramatic changes from former practices: militance at licensing hearings, the enactment of the National Environmental Policy Act, major legal cases (i.e., those involving Calvert Cliffs and Midland-Vermont Yankee, and the U.S. Supreme Court ruling that the Price-Anderson Act is constitutional), the demise of the Congressional Joint Committee on Atomic Energy, and the transformation of the Atomic Energy Commission

Over the years, ANS Executive Director Octave Du Temple (now Executive Director Emeritus) represented the Society at many events. This occasion was a March 6, 1975, briefing and reception at the White House for the American Society of Association Executives. Du Temple (front row, center, in top photo; speaking in lower photo) and other association executives met with then President Gerald Ford and his aides for discussions on energy and the economy.

into separate developmental and regulatory bodies. Their current incarnations are the Department of Energy and the Nuclear Regulatory Commission.

ANS responded by accelerating its own program to reach the public. ANS President John Landis (1971–72), then of Gulf General Atomic, urged members to "spread the word" to counteract the negative view of nuclear energy often appearing in the media. This, Landis said, should be done "with solid facts, realistic appraisal, and balanced confidence. We can't root out misinformation and prejudice with dramatic overreaction," he said, "but only with patient and understanding repetition of the truth as we see it."

The Society provided information to industry ("Nuclear Energy and the Environment FactsFile") and to the general public ("Nuclear Energy: Questions and Answers," which had first been developed by the San Diego Section). A full-time public information staff person was hired in 1974. A speakers' bureau was organized, with experts available to the press and the public around the country.

Pictured at a late March 1979 reception in Washington, D.C., for a Chinese delegation of scientists that was in the United States for a month-long visit are (from left to right): C. Pierre Zaleski, of Electricité de France, then ANS Vice President/President-elect Edward Hennelly, former Congressman Craig Hosmer, and Wang Ganchang, head of the Chinese delegation.

In this kind of climate, where was the Society headed, in its members' views? President Landis polled a group of key members to find out. The results: There should be more international growth; continuation of the existing policy of establishing technical divisions and groups; close cooperation with the American National Standards Institute for formation of standards; cooperation with the government in the event of a national emergency by providing names of specialists in various disciplines throughout the country; a continuation of the existing services to members, especially in public information and publications; a "yes" to retaining ANS headquarters in the Chicago area; and a "no" to a proposal that the Society broaden its scope to include non-nuclear technologies.

The Society was not immune to the social change that was so much a part of the 1960s and 1970s. The NEED Committee (Nuclear Engineering Education for the Disadvantaged), which was formed in 1969, has created and administered a program of scholarship aid and career workshops for Black, Hispanic, American Indian, and other young people from economically disadvantaged groups.

The Society's most obvious shift during the decade was the move into a different headquarters building. The idea of owning its "home" became a goal in 1971, with the first idea being to construct a new facility. Several suburban Chicago sites were considered, but by 1975, the best choice appeared to be a vacant 47-year-old elementary school building in west suburban La Grange Park. The size, location, and price all seemed acceptable, and after extensive interior remodeling, in 1977 ANS moved into its fourth home—and for the first time, one that it owned.

If there was a salient characteristic of the energy situation in the late 1970s, it was perhaps uncertainty. For nuclear energy in particular, uncertainty was a major factor for some time, and was exacerbated by the 1979 accident at Three Mile Island-2.

The next 25 years

The 1980s: To the grindstone

As the American Nuclear Society neared the end of its first 25 years, waste management and other back-end of the fuel cycle issues constituted the top nuclear industry challenge. Then came the TMI-2 accident in 1979 and the resulting plunge of political and public support for all things nuclear. The Society's second quarter-century thus did not begin auspiciously. However, the way that the Society rose to the challenge of TMI and the industry slowdown that followed would set a pattern for the vigorous efforts ANS would make in the next 25 years.

With no new plant orders, mounting cancellations, and new regulatory hurdles in front of plants seeking operating licenses, the industry focus started to shift from construction to operations during the 1980s. Important advancements were made in safety and performance as plants worked to meet NRC requirements and to lower costs.

ANS and the industry also continued to focus their attention on radioactive waste management. The federal government enacted major legislation relating to both low- and high-level wastes in the early 1980s: In 1981, President Ronald Reagan's administration lifted President Jimmy Carter's deferral of reprocessing of spent commercial nuclear fuel and began a policy that looked ahead to a high-level waste repository. In January 1983, President Reagan signed the Nuclear Waste Policy Act of 1982 (amended in 1987) to govern the storage, transport, and disposal of spent nuclear fuel and other high-level radioactive waste.

Although apprehensive about what lay ahead, and burdened with mounting costs, nuclear utilities worked to enact many post-TMI safety regulations while ANS swung into action. By 1983, then President L. Manning Muntzing was able to proclaim: "As a Society, we are larger, stronger, and more outspoken. At the same time, we have maintained our great attribute, credibility, which is based upon solid professional, scientific, technical knowledge."

Concerned that the U.S. nuclear industry might permanently fall behind international suppliers and utilities that were still constructing new plants at a brisk pace, ANS worked to influence political and public opinion in the marketplace of ideas. A strong economic case could be made: The low cost of nuclear power still stood its ground against any realistic competitors, despite the large up-front financial commitment for plant construction and the regulatory slowdowns that added to plant costs. But a formidable obstacle stood in the way: reduced public support.

Informing the public

ANS sharply increased its public information activities and budget during the early 1980s to try to regain the public's trust in nuclear. PI activities were numerous and vigorous. An expanded list of members who could serve as expert sources—*The Communicators*—was published for the media, and a 45-rpm record with nine public service radio spots was released, as was a public service announcement prepared for television. Books and pamphlets

written for the public and addressing TMI were published, traveling museum exhibits were constructed, and *The Atom–A Closer Look*, an animated film produced with Walt Disney Educational Media Company, was offered for sale.

The Society also recognized the importance of one-on-one communication to change opinions. Local sections and student branches increased their visibility in communities across the country in countless ways, including booth displays at malls and fairs, public debates, "coffee sessions," and local "media blitzes." In both 1982 and 1984, ANS presented an exhibit at the World's Fairs in Knoxville, Tenn., and New Orleans, La., respectively. The displays engaged visitors with interactive computer programs and an assortment of everyday radioactive items.

All this work cost money, and PEP (the Public Education Program), the fund-raising program of the Society's Public Information Committee, initiated in 1980, "was not receiving the external support that it previously enjoyed," said John Graham, Society treasurer in 1983 (and later an ANS president). In that year, the Executive Committee decided that PI efforts should be more sharply focused with the help of a cost/benefit analysis. In 1984, the Society discontinued its contract with an outside firm and added a media relations manager to the existing public communications staff.

In the late 1980s, PI efforts became more focused. The Society had always recognized the importance of reaching educators and students, but now that focus intensified. A newsletter, *re-actions* (now *ReActions*), was launched in 1985 and was well received by the approximately 6000 teachers to whom it was sent three times a year. Intensive one-day teacher workshops offered a professional approach, continuing education credit, and often plant tours. The PI committee chair in 1988, Christina Burtchaell, explained that "By reaching one teacher, who will undoubtedly reach thousands of students in his or her lifetime, we multiply our efforts." In that year, 70 percent of PI activity was directed toward teachers and students.

The political fray

ANS and its members, eager to reclaim the dramatic growth of the 1970s, began to explore how best to do that. A Long-Range Planning Committee in 1980 summarized the Society's top priorities as "participation in public education, assistance in the transfer of nuclear technology, and provision for the continued professional growth of members." It also acknowledged the need to respond to "the current de facto moratorium on nuclear power," and started to consider the "role of ANS as a purely scientific and research-oriented society and its possible role as an engineering and construction-type society."

Dramatic headlines punctuated the industry (and national) news during the decade: Funding for the Clinch River Breeder Reactor was dropped on October 28, 1983 (and ANS stepped up with job placement assistance for affected members); TMI-1 was restarted in 1985 after a dramatic public meeting; the Chernobyl-4 accident occurred in 1986, further shaking the public's confidence in the safety of nuclear power; and the Price-Anderson Act, in jeopardy for months, was amended and renewed in 1988.

The Society's response to the political and regulatory climate affecting nuclear was immediate and reached the highest levels of government. ANS members represented the Society at public forums and participated directly in conversations with the NRC, the DOE, and presidential administrations. John Graham (not the ANS past president)—who became *Nuclear News* Washington Editor in 1977, and then ANS Washington Representative in 1978—and later the firm Durante Associates (hired to serve as the ANS Washington Office in 1989), observed the political scene and sought to inform policymakers about nuclear issues. ANS participated in a 1983 Nuclear Power Assembly, which created a resolution—"Nuclear Power: Agenda for the '80s"—that then President L. Manning Muntzing presented, with others, to President Reagan.

ANS made a particularly dedicated effort to work with the NRC to reform a licensing and regulatory process that almost all interested parties agreed was in need of change. Post-TMI research indicated that the current regulatory-defined source terms (the amount of radioactivity that would enter the environment after a severe reactor accident in which any release occurs), based on the Reactor Safety Study (WASH-1400), might have been grossly out of proportion.

The ANS Special Committee on Source Terms was formed, and in its report released in 1984 declared that "reductions in the source term from estimates reported in the 1975 pioneering Reactor Safety Study (WASH-1400) could range from more than a factor of 10 to several factors of 10 for the critical fission products in most of the accident scenarios that have been recently considered. This finding is based on considerable technical progress since 1975 in both fundamental knowledge and analytical techniques." One committee member summed up the group's work with the words "We are trying to rewrite 25 years of bad conclusions." The report was presented to the NRC commissioners by an ANS delegation during the 1984 Winter Meeting, in Washington, D.C. Another Special Committee got to work in the latter half of the decade formulating recommendations for NUREG-1150 (the NRC's Reactor Risk Reference Study), and issued a report in 1990.

Members spoke out individually and as a Society after Chernobyl, as they did after TMI. The Society released for the public "The Chernobyl Disaster: A Statement by the American Nuclear Society," expressing sympathy to the Soviets and explaining that Chernobyl would not have met U.S. safety standards, and that all technologies (including replacement power sources) have risks.

ANS also increased its visibility by issuing public policy statements (now called position statements), starting in 1979, on the most pressing industry issues, from safety and waste management to emerging technologies and decommissioning. An Energy Policy Statement was formulated by an ad hoc committee appointed by then President Gail de Planque in 1988, and released in April 1989. The statement, which was sent to all members of Congress and was designed for use in public information programs, urged the advancement of nuclear for the country's well-being.

Finances demand attention

The dedicated work of ANS and its members did not weaken, but the added task of addressing financial issues emerged. In 1982, the ANS Planning Committee issued a "Planning Document for the American Nuclear Society" that predicted more lean years ahead: "This is a long-term trend that possesses the possibility of no reversal and conceivably could lead to the restructuring of the electric power industry." ANS budgeting should allow for a leveling off or decline in membership, the committee advised, while still working for increased membership and financial strength.

Society finances moved into the spotlight in the early 1980s and for some time thereafter. Large PI expenditures in the early 1980s made yearly accounting a bit tougher, but ANS members and leaders were committed to a comprehensive PI campaign. The Society continued to operate in the black, as investment income was used to make up operational deficits in some years. The Finance Committee recognized that financial pressures would likely continue because the major revenue-producing elements of the Society—advertising pages sold, library subscriptions, and meeting registration fees—were showing a downward trend.

Cutting services or raising prices and fees were both unpopular solutions, although they had their advocates. By the end of the decade, the Finance Committee was reporting that the Society needed to "launch a new way of doing business, be more entrepreneurial in its business planning and learn to let the budgetary 'sacred cows' fall when and where they may in the path of these new measures," in the words of Ramon Ashley, committee chair in 1988.

Services expand

The Society continued to offer new and expanded services throughout the decade. Short courses were offered for the first time in 1982, held the day before the Winter Meeting in Washington,

Meetings: Since the beginning, playing an important role

Planning and organizing successful meetings is an important tradition within the American Nuclear Society. Anchoring the Society's meeting schedule are the Annual and Winter Meetings, a sampling of which is shown in the accompanying table.

In addition, however, the Society serves as the major sponsor–or in some cases, a cosponsor—of many international conferences, topical meetings, executive conferences, and local section and student section meetings. An active ANS National Program Committee has played a leading part in guiding the development of this impressive array of meetings.

ANS National Meetings—A Sampling, 1955–2003

Meeting	Place	Sessions	Papers	Attendance
June 1955–First Annual Meeting	Penn State	5	28	400
November 1955	(No meeting held)			
June 1956	Chicago, Ill.	(not known)	190	1000
November 1956–First Winter Meeting	Washington, D.C.	22	188	1075
1960 Annual	Chicago, Ill.	27	207	1010
1960 Winter	San Francisco, Calif.	42	326	1093
1965 Annual	Gatlinburg, Tenn.	50	355	1123
1965 Winter	Washington, D.C.	62	406	1340
1970 Annual	Los Angeles, Calif.	78	497	1300
1970 Winter	Washington, D.C.	83	521	1492
1975 Annual	New Orleans, La.	96	600+	1361
1975 Winter	San Francisco, Calif.	130	800+	2387
1980 Annual	Las Vegas, Nev.	113	682	1841
1980 Winter	Washington, D.C.	79	482	1632
1985 Annual	Boston, Mass.	71	375	1191
1985 Winter	San Francisco, Calif.	94	520	1498
1990 Annual	Nashville, Tenn.	76	375	1242
1990 Winter	Washington, D.C.	114	532	1421
1995 Annual	Philadelphia, Pa.	94	337	887
1995 Winter	San Francisco, Calif.	91	411	1035
2000 Annual	San Diego, Calif.	87	261	815
2000 Winter	Washington, D.C.	149	359	1342
2003 Annual	San Diego, Calif.	96	255	1055
2003 Winter	New Orleans, La.	149	367	1454

D.C. The first embedded topical meeting (the Seventh ANS Topical Meeting on the Technology of Fusion Energy) was held during the 1986 Annual Meeting in Reno, Nev. This "experiment," which planners thought could encourage interaction between members at large and topical attendees, was such a success that embedded topical meetings became a national meeting fixture.

An e-mail and information service, ANSIRS (ANS Information Resource Service), was launched in 1986, offering members, for a fee, the promise that "one can save time and eliminate 'telephone tag' by contacting others via electronic mail or TELEX." ANSIRS was ultimately discontinued, as it was superseded by advances in Internet technology.

Nuclear News, rated by members in a 1982 survey as one of the most important benefits of Society membership, continued to cover the news of the day, and the staff of *Nuclear News* in 1987 launched the annual *World Directory of Nuclear Utility Management.* The directory has been a very successful ANS/*NN* product since its inception; since 2001, a CD-ROM version has been offered along with the print copy. *ANS News* broke away from *Nuclear News* into a separate tabloid newspaper in January 1983. The intent of the new format was to provide wider and deeper coverage of the Society, reduce costs, and consolidate information that up until then had been published and mailed in other, separate, newsletters.

The Society launched a new journal on fusion, first published in January 1981 as *Nuclear Technology/Fusion*, a quarterly supplement to *Nuclear Technology*. At the 1983 Winter Meeting in San Francisco, having proven its viability, the journal earned its own name—*Fusion Technology* (now *Fusion Science and Technology*)—and independence from *Nuclear Technology*.

The Society's Honors and Awards Committee created several new awards during the decade as it continued to honor innovation in nuclear science and technology and dedication to career and ANS. Among those awards launched during the 1980s were the Seaborg Medal (named in honor of Glenn Seaborg in 1983 to recognize "outstanding scientific or engineering research achievements associated with the development of peaceful uses of nuclear energy") and the Nuclear Historical Landmark Designation Award. Divisions also continued to offer their own prestigious awards.

Change from within

ANS felt some growing pains as it worked to reconcile its historical emphasis on research and development with the industry's new focus on plant operations. Some in the Society felt that an increasing focus on power plant operations and maintenance did a disservice to some members, who were still largely in R&D. That R&D continued to foster an improved quality of life for the country, as applications such as food irradiation, medical imaging, and even space nuclear power matured and gained visibility.

Grass-roots efforts by some groups of members effected subtle changes in the governance of the Society. A new Board statement in 1985 altered the traditional officer election practice: The Nominating Committee was now encouraged to nominate two candidates each for the positions of vice president/president-elect and treasurer, instead of one as had been traditional. Also, a member Code of Ethics (adapted from the Engineers' Council for Professional Development Code of Ethics for Engineers) was endorsed by the Board in 1985.

Seeking to meet the needs of all Society constituent groups, the Board of Directors authorized a survey of ANS membership that asked members to rank 15 goals of the Society. The results, published in the March 1987 issue of *ANS News*, reported that the primary goal chosen by survey respondents was to "stimulate the exchange of technical information in nuclear science, engineering,

ANS STUDENT SECTIONS AND YEAR FORMED (INACTIVE) [DISSOLVED]

Arizona
Arizona State University 1974 (1995)
University of Arizona 1960 (1999)

Arkansas
University of Arkansas . . . . . 1983 (No year available)

California
University of California–Santa Barbara 1971 (1995)
University of California–Los Angeles . . . . . 1962 (1984) [1995]
University of California–Berkeley . . 1959

Connecticut
Three Rivers Community Technical College 1988

District of Columbia
The Catholic University of America . . 1965 (1983) [1995]
Howard University 1974 (1993)

Florida
Central Florida Community College 1986 (1997)
University of Florida 1960

Georgia
Georgia Institute of Technology 1965

Idaho
Idaho State University 1969

Illinois
University of Illinois 1961
Northwestern University . . . . . 1967 [1995]

Indiana
Purdue University 1959

Iowa
Iowa State University 1957

Kansas
Kansas State University 1958

Louisiana
Louisiana State University 1990

Maryland
United States Naval Academy 1971
University of Maryland 1965

Massachusetts
Massachusetts Institute of Technology 1961
Worcester Polytechnic Institute 1979
University of Massachusetts–Lowell 1967

Michigan
Michigan Technological University . 1967 (1995)
University of Michigan 1955

Mississippi
Mississippi State University 1962 (1995)

Missouri
University of Missouri–Rolla 1967
University of Missouri–Columbia . . 1968

Nevada
University of Nevada, Las Vegas . . . 2003

New Jersey
Newark College of Engineering . . . . 1975 (1983) [1995]
New Jersey Institute of Technology . . 1975 (No year available)

New Mexico
University of New Mexico 1967

New York
Rensselaer Polytechnic Institute 1964
State University of New York–Buffalo . . . . . 1967 (1984) [1995]
State University of New York–Maritime College 1968 (1993)
Polytechnic Institute of New York . . 1974 (1984) [1995]
Columbia University . . . . . 1961 [1995]
Manhattan College 1968 (1997)
U.S. Military Academy at West Point 2004

North Carolina
North Carolina State University 1958

Ohio
Air Force Institute of Technology . . 1956
The Ohio State University 1967
Youngstown State University 1977 (1996)
University of Cincinnati 1968

Oklahoma
Oklahoma State University . . . . . 1975 (1983) [1995]
University of Oklahoma . . . . . 1961 [1995]

Oregon
Oregon State University 1970

Pennsylvania
Pennsylvania State University 1959
Penn State–Beaver Campus 1988 (1993)
Carnegie-Mellon University . . . . . 1970 (1984) [1995]

South Carolina
South Carolina State University 2002
Clemson University 1980 (1991)

Tennessee
University of Tennessee 1959
Tennessee Technological University 1973 (1995)

Texas
University of Texas at Austin 1961
Texas A&M University 1961

Utah
University of Utah 1977

Virginia
Virginia Polytechnic Institute & State University . . . . . 1958 (No year available)
University of Virginia . . . . . 1958 (No year available)

Washington
University of Washington 1964 (1993)

Wisconsin
Lakeshore Technical Institute 1985
University of Wisconsin–Madison . . 1961

Canada
University of Toronto 1973
University of New Brunswick 1988
Ecole Polytechnique/Montreal . . . . . 1975 (1983) [1995]

Mexico
Instituto Politechnico Nacional . . . . . 1967 (No year available)

and technology among members." Supporting goals chosen were to encourage nuclear science and technology research; to encourage nuclear science and engineering education; to increase member awareness of technical and policy issues; to promote public understanding; and to continue to support the standards program. Other goals were worthy, the committee recognized, and would continue to be pursued, but concentrated effort would support these top-rated functions.

A multifaceted Society

The international ties of ANS grew stronger and more numerous in the 1980s. The Chinese Nuclear Society (CNS), in particular, became an active partner with ANS, and an agreement of cooperation was signed. Members of each society visited the other on several occasions throughout the decade, and ANS brought an exhibit of industry suppliers to China, which was, in 1981, reported "to be embarking on an ambitious nuclear power program." ANS and CNS both agreed to send one staff member to the other society to work for a year, and in 1984 Guangyu Sun, a nuclear engineer and director of CNS's technical exchange program, started a year of work at ANS headquarters (ANS, however, never did send a reciprocal staff member to China). ANS also strengthened its ties with the Canadian Nuclear Society and the European Nuclear Society through formal agreements. In the late 1980s, after the 1986 Chernobyl accident, communication with the USSR increased, and an ANS delegation visited the Soviet Union and the Chernobyl site July 9–21, 1989.

The late Guangyu Sun, a nuclear engineer and director of the Chinese Nuclear Society's technical exchange program, spent a year in 1984–1985 working at ANS under an agreement between the two societies.

ANS remained active on the nation's campuses. A new nuclear honor society, Alpha Nu Sigma, was approved by the Society's Education Division and the Board of Directors in 1981, and was launched with chapters at eight universities. Student membership fluctuated during the decade, however, while enrollments declined even as Society governance and the engineering community at large recognized a looming manpower shortage. Through its existing scholarship programs and a special program launched in 1981 called CURE (College Undergraduate Recruitment Effort), which gave grants ranging from $1000 to $6500 to 11 universities, ANS sought to reverse the trends.

Professional divisions took strength from the national Society and thrived, to the point of provoking concern that their strength sapped resources from the Society as a whole. In particular, ANS national meeting attendance lagged as that of topical meetings picked up. An Ad Hoc Committee to Study the Financial Aspects of ANS-Sponsored Meetings advised the Society to preserve and strengthen the two national meetings per year. Local sections continued to serve their constituencies and to grow: They numbered 53 by 1990. In 1988, the first plant branch was formed at the Diablo Canyon nuclear power plant.

The Society, which since 1969 had offered scholarships to disadvantaged students (primarily minorities and women) through the work of the NEED (Nuclear Engineering Education for the Disadvantaged) Committee, began to benefit even more from the commitment of its female members. A Standing Committee on Women Professionals in ANS was established in 1982, to work toward increasing the visibility of women in the Society, and increasing the interest of girls and women in engineering and the sciences. In 1987, ANS elected its first female vice president/president-elect, Gail de Planque.

The Society's rate of membership growth started to decline in the mid-1970s from a 1972–1973 high of 10.5 percent to an average yearly rate of less than 4 percent for the years since 1974. This rate of growth was steady through the early 1980s, a fact that the Membership Committee, in a 1985 report, found significant: "The Society has continued to grow steadily at a 3 to 5 percent annual rate over the past several years, despite the many negative factors influencing the nuclear industry." As part of efforts to increase membership further still, the Society tried to reach out to local section members who did not belong to the national organization, and to plant operations personnel, but did not find much success. Instead, the Society realized, retention of current members, particularly students and retirees, was going to be key to boosting membership.

Just how to do that was the question. Special promotions and the frequent publication of the membership application in *Nuclear News* helped, but in 1987, for the first time in 16 years, Society membership experienced a decline of approximately 1 percent. Society governance recognized that the drop was "probably due to the general slowing of growth in the nuclear industry in the United States."

Moving on

After 30 years of service as ANS Executive Director, Octave Du Temple announced in 1988 his desire to retire, and by October 1989, a successor had been found: Joseph C. Braun, an ANS member with Combustion Engineering. Braun took over the duties of Executive Director in January 1990, leading a staff of more than 70 at ANS headquarters.

There was new hope in the industry as the decade came to a close: The administration of George H. W. Bush seemed much more likely to support the industry than President Reagan had, and debate about the risk of global warming caused by greenhouse gases filled headlines after the hot summer of 1988, leading even some in the media to reconsider nuclear power. The Society was gearing up to meet the next set of challenges with a new vigor. In a summary of her term of office, President Gail de Planque in 1989 said, "We're beginning to see a cautious but unprecedented enthusiasm and hope for a new generation of power plants that may win greater public acceptance in this changing atmosphere."

The 1990s: Action, contraction

As the 1990s began, ANS boasted more than 16 000 members, 59 local sections, 3 section/plant branches, 54 student branches, and 17 professional divisions. The U.S. nuclear power industry entered the decade with an excellent record: The median capacity factor at U.S. plants had risen by about 10 percentage points over the past decade, while there was a decrease in unplanned scrams, occupational radiation exposure, and volumes of both high-level and low-level radioactive waste.

The Society was looking forward to the next new plant order, and it seemed to be right around the corner. The nuclear industry "will remain a multi-billion dollar business as long as the lights are on in the U.S.," said a report from the ANS Special Initiatives Committee in 1994. "Many see license renewals and foreign reactor orders just around the corner. And when the U.S. economy picks up, demand for new plants will follow—yes, even nuclear." But ANS leaders knew new plant orders would not come without help; and where there was hope, there was action.

On the national scene

In this new decade, anything could happen, and ANS pushed for change. Members were exhorted by each new president to contact

The 1992 ANS/ENS (European Nuclear Society) International Meeting, held in Chicago in commemoration of the 50th anniversary of the first controlled nuclear chain reaction at the University of Chicago, included a session on "Reflections of the Pioneers." The session brought together a stellar collection of nuclear pioneers, pictured above (left to right, across both pages): Harold Agnew, Manson Benedict, Edward Creutz, Sigvard Eklund, John Foster, André Giraud, Bertrand Goldschmidt, Sir John Hill, Alvin Weinberg, Edward Teller, John Kuranz, Sir Rudolf Peierls, Alfred Nier, Chauncey Starr, Glenn Seaborg, John Wheeler, and Rosalyn Yalow. (Photo by Jean Krettler)

their representatives in Washington. An industry that was, after all, providing more than 22 percent of U.S. utility-generated electric power from 109 plants by 1997 had every right to speak up. In the words of Ted Quinn, President in 1999, "We need to deliver the message—in an increasingly strong voice—that our nuclear science infrastructure is a national treasure, and that it *must* be maintained for the thousands of ways in which nuclear science benefits our world." Food irradiation offered great potential for improving the safety of the nation's food supply (the first U.S. commercial food irradiation plant opened in Florida in 1991), and medical applications of nuclear technology were widely used. In the June 1997 issue of *ANS News*, it was reported that 35 percent of all patients who enter a hospital benefit from applications of nuclear technology.

In June 1990, the ANS Power Division formed the Committee for New Construction (CNC), later named a Special Committee of the Society, to "support the resolution of all outstanding roadblocks to the next order, license issue and construction of a commercial nuclear unit in the United States." In November 1990, the Nuclear Power Oversight Committee, an industry group, made public a "Strategic Plan for Building New Nuclear Power Plants," setting the mid-1990s as a target for the next plant order.

A Special Panel on the Protection and Management of Plutonium was chartered by the Board of Directors in November 1994. The blue-ribbon group of about 20 renowned nuclear experts from the United States and other countries had as honorary chair and working member Glenn T. Seaborg, co-discoverer of plutonium. The panel was formed to evaluate options for the immediate and long-term protection and management of plutonium from all sources within the United States. In August 1995, the panel gave its recommendations in a report that called for surplus weapons plutonium to be converted to the spent fuel standard to protect it from theft or seizure, and for the possible use of surplus plutonium as fuel in commercial power reactors. A longer-term discussion of separated reactor-grade plutonium and plutonium remaining in spent fuel included the options of permanent disposal, retrievable storage pending final disposition, and reprocessing and recycling. The panel supported the use of breeder reactors, but only after extensive development and demonstration. Also, the panel stated, it was vital that all plutonium worldwide be under reliable safeguards.

The new environmental consciousness of the 1990s opened an opportunity for the nuclear power industry to reframe its message to the public. The threat of global warming and the resulting political push toward "sustainable development" allowed the industry and the Society to emphasize how nuclear power can get the job done without emissions. As Edward D. Fuller, then ANS President, stated in 1993, "We are actively embracing the concept of sustainable development as the best characterization of nuclear technology."

A new "economic imperative" was recognized—that of designing a nuclear plant that could provide the lowest cost for producing electricity in a deregulated market. Unless a shortage of gas occurred, the combined-cycle gas turbine, which enjoyed the support of the first Bush administration, would lock nuclear out of the market. Industry and Society members knew that large-scale manufacturing techniques, shorter construction times, and modular component design would all be necessary. By the end of the decade, "Generation IV" became the operative term for this group of advanced reactor designs that could compete with natural gas.

Taking the initiative

The Society worked for change not only at the level of national policy, but also within its own programs. "ANS is on the brink of a metamorphosis, unlike any in its 39-year history, which will prepare it for the launching of the next 50 years of the nuclear enterprise. . . . It will prove to be a period of discontinuities, surprises, rapid changes, and great opportunities," wrote Jim Toscas, who was ANS Executive Director in 1993.

Throughout the decade, Society governance initiated several special programs intended to expand and improve the Society and its services. A Strategic and Operational Plan was approved at the Winter Meeting in 1991, with five key strategic initiatives: Advance Science and Technology, Develop Standards, Educate the Public, Energize Membership, and Ensure Financial Stability. In 1993 the plan was reviewed, which resulted in a reduction of initiatives from five to four, with a focus on the role of publications, meetings, and the professional welfare of ANS members. A Special Initiative Program (SIP), launched in 1994, formed "I teams," small research teams to report to the board on progress in various Society initiatives. Each of these efforts put the hard work of ANS members and staff to good use and helped promote the goals of the Society.

As part of SIP, ANS completed its largest, most professional survey of members in fall 1994. Surveys were sent to two groups: a random sampling of members, and those members in the executive committees of the divisions who were not selected for the general membership survey. Among the survey's major findings were that outreach efforts were considered very important, and that many members thought the Society was serving effectively in its role as a vehicle for receiving and exchanging information. *Nuclear News* remained the single most important ANS product or service, in the opinion of members. Interestingly, the survey found that the responses of general members and those of the di-

vision executive committee members were in agreement in some areas, but significantly different in many others, such as the assessment of Society benefits and the structure of ANS. These responses were to provide critical guidance in the implementation of SIP and would prove useful for the coming years.

ANS President John Graham in January 1996 spoke of an "exciting" time. "Today, members across the country understand that the Society is evolving. What has, in the past, been a piecemeal effort to reengineer our activities, has suddenly become coherent." In 1998, Society governance worked with a professional consultant to develop an ANS Strategic Plan, unanimously approved by the Board of Directors on November 19, 1998. This five-year plan included several goals, milestones for measuring progress toward the goals, and numerous strategies for achieving each goal. The Strategic Plan also included a new mission statement, which stands today: "The American Nuclear Society serves its members in their efforts to develop and safely apply nuclear science and technology for public benefit through knowledge exchange, professional development, and enhanced public understanding."

A thriving Society

The 50th anniversary of the first controlled nuclear chain reaction was celebrated in 1992, and was a focus of that year's Winter Meeting, appropriately held in Chicago, which set a record with the most participants of any ANS meeting. The celebration was well deserved—both for the achievements of the nuclear pioneers and for the growth of ANS over nearly 40 years.

Every branch and service of the Society contributed to that growth in the 1990s. The Society's divisions took the lead in their areas of expertise. The Professional Divisions Committee worked to increase the exchange of knowledge by working on position statements, increasing paper submissions for journals, and holding technical meetings. A new Technical Group for Decommissioning, Decontamination & Reutilization (DD&R) was approved by the Board in spring 1994, and only months later at the Winter Meeting was formed into a division because of its rapid growth.

ANS continued to draw a lot of strength from its international membership: About 10 percent of all members lived overseas in 1990. Cooperative agreements with nuclear organizations in other countries were initiated and strengthened, and ANS provided assistance to nuclear organizations in China and Russia, and to the Pacific Nuclear Council. Local sections continued to be key to the Society's public education program, and the number of active plant branches increased during the 1990s: 13 branches were formed between 1991 and 1994 alone.

Membership levels were strong when the decade opened, reaching a high of 16 777 in 1992, but began to decrease significantly in 1995 as consolidation in the nuclear power industry continued, resulting in a membership of 10 947 in 2000. Several new techniques were used to help promote membership in the Society. One-time discounts were offered; a lifetime membership, initially available for 10 times the regular dues, was offered for the first time in June 1991; and the ANS Sponsor Club rewarded members who sponsored new members.

Financially, the Society's struggles increased during the 1990s. In 1990, Society governance approved the use of a professional investment manager for ANS's reserves. In that year, the Society had a net loss from operations, necessitating a withdrawal from reserves. With no significant gain in revenues, the trend continued. In the middle of the decade, President Alan Waltar chartered a Business Advisory Committee and a Revenue Committee to evaluate the Society's business activities and to boost revenue with new products and services.

In 1993, amid concerns about the Society's financial health, the headquarters staff was downsized, a move that did stabilize the budget in the near term. When preparing the 1997 operating budget, however, the Board of Directors opted to allow earnings on reserves to supplement a planned budget shortfall, as had been done in the early 1980s. Their stated goal was to "maintain the core services of the Society and thereby maintain the value of Society membership." Don Miller, President at the time, encouraged the Society to "Invest in ANS," saying that while balancing budgets had been "good for the Society in the short term, if continued, it could lead to a loss of optimism and a lack of risk-taking." Through the end of the decade, the financial markets were kind to the Society's investments, and new Strategic Initiatives were launched, including, in 1998, a federal affairs office and a centralized marketing function at headquarters.

After 30-plus years of service by one Executive Director, the 1990s saw some changes in that position. Joe Braun left after two years, to be succeeded by James G. (Jim) Toscas, another ANS member, who was selected for the job in June 1992. When Toscas resigned in late 1996, a search committee launched a nine-month search, during which time Brian Hajek (an Ohio State University research scientist and associate chair of the OSU Nuclear Engineering program, and an ANS member as well) served as interim Executive Director. Harry Bradley, who had 19 years of association management experience, was hired and has served ably since December 1, 1997.

Services respond to needs

A great number of products and services continued to meet the needs of members. ANS adopted technology as an active partner in its new and expanding programs during the 1990s. A paper review meeting was first conducted over the Internet in 1996, at a significant cost savings. In 1996, the Society launched its Web site—"The ANSWER," which allowed online membership application, conference registration, and ordering of publications, and provided tables of contents for magazines and journals. Then, as now, with today's improved site, the goal of ANS's numerous electronic efforts was to allow the Society to work more effectively, more inexpensively, or more quickly—whether that work is communicating, mar-

keting and selling, or presenting products and services in a new manner.

ANS was committed to a strong public education program, and although the program of the 1990s may not have had the funding of the early 1980s, it was nonetheless effective. Teacher outreach remained a central focus of PI efforts. ANS local sections and plant and student branches were vital to these programs, sponsoring workshops across the country. ANS also began to offer multi-day summer programs for middle and high school teachers, funded in part by a matching funds grant from the DOE. The *ReActions* newsletter reached about 21 500 teachers in 1996. A campaign to save thousands of Geiger counters headed for landfills resulted in ANS's distributing more than 9500 of the devices and educating teachers about how to use them. Clearly, "K–12 education [had] become the cornerstone of the ANS [outreach] program," as reported in the November 1993 issue of *ANS News*.

Harry Bradley, current executive director of ANS, came on board to lead Society operations in 1997.

In 1994, the headquarters Public Communications Department was renamed the Outreach Department, and three new outreach programs were started: Eagle Alliance, an organization of the leadership of the entire nuclear community, led by ANS; Indy Car Outreach, which sent an Indy show car with nuclear graphics across the country; and FANS!, a new program for Friends of Applied Nuclear Science. Despite these new programs, the trend in the 1990s was to decreased PI funding. The two headquarters Outreach staff members had a new mode of operation: "The remaining ANS [Outreach] staff have switched from being 'doers' to becoming 'organizers and coordinators of volunteers,'" said a 1996 report from Public Information Committee members and staff.

In early 1993, the journal *Nuclear Technology* published a special issue with multiple papers on waste management. Responding to a need for a publication devoted to this large area of industry activity, *Radwaste Magazine* (now *Radwaste Solutions)* was launched in January 1994 as a quarterly, and later became a bimonthly. A new *World Directory of Radwaste Managers* was published for the first time by the *Nuclear News* staff in 1992 (the third and last edition was published in 1994). *ANS News*, published as part of *Nuclear News* for the years 1996–1998, moved back to tabloid form in 1999.

In 1992, ANS had 102 American National Standards on offer. More that 900 volunteers were actively engaged in the maintenance of these standards and in the creation of new standards projects. Nearly two dozen ANS standards were at that point endorsed in NRC regulatory guides.

The young generation

Workforce issues became a focus of ANS outreach activities during the 1990s, and the Society worked on increasing the supply of qualified people for the nuclear field by encouraging math and science education. Nuclear engineering programs were being phased out at some universities, and the root cause of the lack of new students was recognized to be the perception that nuclear had an uncertain future. But student branches remained an important part of the Society. In 1998, the Board of Directors approved changing student branches to student sections, which meant that the Student Sections Committee could now report directly to the Board of Directors. Students could also now elect a member to the Board and vote in national committees.

A number of young members of ANS, observing the success of a four-year-old "Young Generation Network" (YGN) affiliated with the European Nuclear Society, decided to launch a parallel American group to contribute to the long-term viability of the nuclear industry. North American–Young Generation in Nuclear (NA-YGN) was launched with an organizing meeting held during the ANS Annual Meeting in 1999, and the ANS Board of Directors agreed to provide some financial support to the new group.

Political action

The nuclear industry rode a roller coaster of politics during the 1990s. Nuclear energy cuts were made in the DOE budget under President George H. W. Bush, despite his generally favorable attitude toward nuclear. When Bill Clinton took office, however, he dismayed industry observers by saying, during a budget speech, "We're eliminating programs that are no longer needed, such as nuclear power research and development." In recognition of the challenges the new administration could bring, Patrick W. Murphy was hired in 1993 as ANS Director of Federal Affairs, where he was tasked not only with reporting on Washington matters, but also with actively providing information to policymakers.

In the 1990s, amid consolidation in the nuclear industry, ANS increased its visibility in Washington, D.C. "There is no question as we enter the second 50 years of nuclear technology that we are entering a new era where citizen involvement in the political process is becoming more and more a necessity to preserve worthwhile programs in our nuclear community," said then President Edward D. Fuller in August 1993. The Board of Directors approved in 1999 the sponsorship of a Congressional Science Fellow to work in the office of a congressperson or on the staff of a congressional committee. For every year since, a different candidate has been chosen by ANS for the role. The voice of ANS was heard during the decade as waste management issues were discussed, while Nevada tussled with federal agencies over studies to take place at Yucca Mountain. Deregulation was also a critical topic for the nuclear industry, which was concerned about continuing the recovery of unrecovered capital costs and unfunded decommissioning obligations as deregulation rapidly proceeded. ANS members testified many times throughout the decade before congressional committees and spoke before other Washington bodies. Public policy and position statements were a primary means of communicating the Society's collective opinion.

The ANS Washington Office was cut back from full to part time in 1995, but was later upgraded when a new Washington Office, staffed by Doug Wasitis and David Zook, of Sagamore Associates, was started May 1, 1998. Late in the decade, President Clinton's President's Committee of Advisors on Science and Technology (PCAST) recommended restoring some nuclear funding, and in fiscal year 1999, the DOE initiated the Nuclear Energy Research Initiative (NERI) and the Nuclear Energy Plant Optimization (NEPO) programs.

The 2000s: A new millennium

Stepping into the new millennium was a lean and able nuclear industry, one that had learned to lower costs by dramatically reducing the length of outages. The American Nuclear Society, too, was seeing revived balance sheets from the market growth of the late 1990s. The times were good—a new president in the White House, George W. Bush, again sparked hopes for a nuclear power resurgence. ANS President Jim Lake, in a letter to members published in the May/June 2001 *ANS News*, wrote that the Society was facing "the best opportunity in our history to reenergize and revitalize nuclear energy in America."

The defining moment of the early 2000s for the United States would also be a defining moment for the nuclear industry. "For nuclear

power, the ramifications of September 11 will certainly reverberate for a long time," wrote Gail Marcus, ANS President at the time. General security issues and concerns about specific plants were being raised—and addressed.

Rising natural gas prices led many to believe that a new nuclear plant order was finally in sight. "The exceptional economic and safety performance of nuclear energy in the United States for more than a decade laid a solid foundation for nuclear energy to respond to America's awakening to the energy cost and supply crisis in our country," wrote Lake in 2001.

Teacher workshops are a successful feature of ANS's Outreach efforts. Pictured at this day-long workshop, held in conjunction with the June 2002 ANS Annual Meeting in Hollywood, Fla., is Tim DeVries (at right), a retired high school science teacher from Illinois and a veteran workshop presenter, instructing teachers on using Geiger counters to detect radiation.

The 21st-century Society

Society governance took forward-thinking steps to secure the position of ANS amid a new optimism. The Board of Directors in 2000 passed a Generation IV resolution "in support of the design, construction, and operation—in the near term—of a Generation IV nuclear energy plant." A review and revision of the Society's Strategic Plan was initiated the same year, and a new plan was approved in 2001.

Membership levels held relatively steady in the early 2000s, even increasing by a net of 69 in 2003, to a total of 10 773. A major survey of ANS membership reported in the January/February 2002 *ANS News* revealed that 94 percent of responders were either "very satisfied" or "somewhat satisfied" with ANS membership overall. Policymakers should be considered the most important target of Society outreach efforts, survey responders indicated, followed by outreach to the media, K–12 teachers, the general public, and K–12 students.

Financially, the Society reviewed the wisdom of relying on investment funds for operating expenses, as had been done since the late 1990s. Despite the market downturn, which reduced overall reserves by approximately 30 percent, the Society's total reserves remained higher than those of comparable societies—a fact attributed to prudent investment decisions and to the wise practice of saving budget surpluses from the Society's earlier years. Society governance and headquarters staff agreed in late 2003 to prioritize and review all ANS programs, and to fund new programs only if an equivalent budget offset was found. Currently, the Finance Committee and the Board of Directors are working to produce a five-year financial strategy that will maintain services without compromising the long-term integrity of the reserve fund.

A political and economic climate that fostered hopes for a near-term nuclear resurgence was accompanied by some growth in nuclear engineering enrollments. ANS awarded 73 scholarships for the 2003–2004 academic year, and the NEED committee provided more than $40 000 in 2000 for scholarships, grants, and awards.

Applications of nuclear technology grabbed some of the spotlight in the new millennium, particularly space applications. Interested members proposed creating a technical group for aerospace nuclear technology and submitted their petition at the 2000 Annual Meeting. The proposal was approved later that year. Food irradiation took some steps forward in public acceptance: In 2003 the USDA approved the use of irradiated beef in the National School Lunch program.

Outreach work remained important to the Society. Particularly noteworthy efforts during the early 2000s were an upgraded Speakers Bureau to meet media requests for expert opinion. The ANS Web site (<www.ans.org>) was relaunched after major reworking and improvements in early 2000, and shortly thereafter new broadcast e-mail services were on offer: a "Washington Update" and "Late News" from *Nuclear News*.

In 2002, a $385 000 grant was received from the DOE Office of Nuclear Energy, Science and Technology to help support the ANS teacher workshop program and other Outreach activities in 2002. In June 2002, ANS launched a new Web site developed by the Public Information Committee, <aboutnuclear.org>, offering 120 pages of public-friendly information about nuclear technology benefits.

ANS voice is heard

During the early 2000s, Society representatives worked to keep nuclear power on the minds of policymakers. Society representatives traveled to United Nations conferences on climate change and sustainable development to promote nuclear power's role in reducing greenhouse gas emissions. A Nuclear Engineering Student Delegation to Washington became an annual event. Board members, joined by others, established an annual members' day on Capitol Hill in conjunction with the March meeting of the Board of Directors, when it was held in Washington, D.C. ANS continued to make its opinion known through formal testimony and through position statements.

And Washington responded. Doug Wasitis, ANS Washington representative, was able to report in 2001 that "Not since the Atoms for Peace program nearly 50 years ago has Congress exhibited such support for nuclear programs." The Price-Anderson Act was renewed, funds for nuclear R&D increased, and utilities began to talk about siting new nuclear plants.

Today, and the future

ANS has made, and continues to make, important contributions to the use of nuclear science and technology, and consequently to the larger society beyond ANS. Today, as the Society celebrates its 50th anniversary, it remains a professional organization of scientists, engineers, and others devoted to the peaceful applications of nuclear science and technology. Its approximately 10 500 members representing 1600-plus corporations, educational institutions, and government agencies come from diverse technical disciplines and from across the full spectrum of national and international enterprise.

Today, ANS looks to the future with optimism. The Society will continue to play an important role in the field it has served and helped shape from the early years. In the next 50 years and beyond, ANS members envision the dramatic and continued expansion of nuclear technology. Successes and challenges will be encountered on the way to a new nuclear future—and ANS is ready. NN