

William Burchill: A man with a plan

The new president of the American Nuclear Society has been a member since 1970, and his goal while in office is to help all constituencies of ANS in “getting the word out” about nuclear.

BY RICK MICHAL

WILLIAM BURCHILL, THE 54th president of the American Nuclear Society, was born on December 1, 1942, in a hospital on the South Side of Chicago, six blocks from the University of Chicago’s old Stagg Field, where one day later Enrico Fermi and his team of scientists demonstrated nuclear fission for the first time in the Chicago Pile-1 experimental reactor. “After that,” Burchill muses, “it was destiny that I would go into nuclear work of some kind.”

Youthful and energetic, Burchill can be keenly focused while moving toward an objective. His standard operating procedure has been to set a goal, plan how to reach it, and then adjust along the way as circumstances required. He even married a woman who thinks the same way. He climbed his way up the career ladder working for a reactor vendor, was a senior manager at two nuclear utilities, and then became a professor and head of the nuclear engineering department at a large university. At every stage of his adult life, he has been connected to ANS, beginning as a student member.

While enjoying retirement in North Carolina, Burchill has represented ANS extensively during his term as vice president/president-elect, visiting local and student sections and speaking at conferences and seminars, including the 2008 ANS Student Conference, and he aims to continue to be actively engaged in ANS business as president. And, as those who attended the 2008

ANS Annual Meeting already know, he plans to continue “Getting the Word Out!” about nuclear, a phrase used on the lapel buttons he handed out at the meeting.

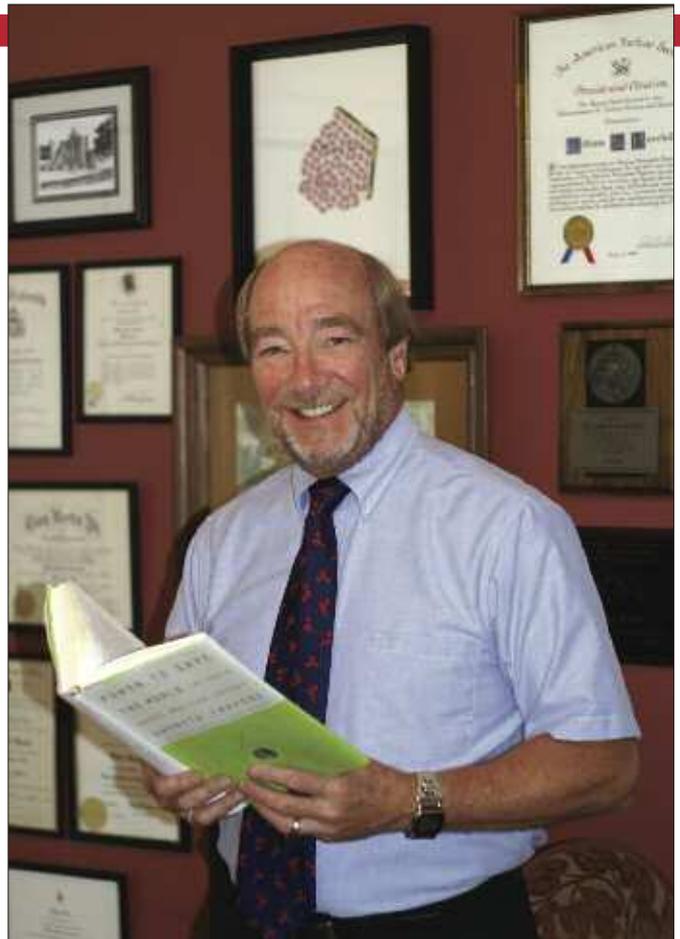
First steps

The Burchill family lived in Chicago until Bill, an only child, was 10 years old. His life in the big city was wonderful, he said. Weekends and after-school hours were

spent at the famous Museum of Science and Industry, which was near his home, or bike riding along the Lake Michigan shoreline, with its views of the city’s downtown skyline.

In the early 1950s, Bill’s father took a job downstate, and the family moved to Taylorville, a small town in central Illinois.

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William Burchill, 2008–2009 ANS President



Bill Burchill, at 6 months, striking a presidential pose.



Quickdraw Bill at age 7

Taylorville was nothing like Chicago, of course, but Burchill adapted quickly to country life. Living in central Illinois was “absolutely marvelous,” he said. Taylorville, with a population of about 10 000, was a coal-mining town, surrounded by farms and forestland. This environment suited Burchill just fine. He had enjoyed spending earlier adventure-filled summers at his grandmother’s house in rural Lake of the Ozarks, in Missouri.

The Burchill home in Taylorville was large, with a big backyard. “Although our house was in town, I could easily get out of town,” he said. “I developed friends very quickly. We used to ride our bikes everywhere. We covered the whole town and surrounding area with our bikes. I got into Scouting and went hiking and camping and learned to play the clarinet.”

Burchill was introduced to physics in high school, but an earlier brush with nuclear technology has stayed with him since childhood. The memory involves the 1950s TV show *Watch Mr. Wizard*. In one episode, “Mr. Wizard” described a nuclear chain reaction. “One of the things I distinctly remember was his using ping-pong balls on a table to explain nuclear fission,” he said. “I remember being very intrigued by that. I was under 10 years old at the time. It was probably my first exposure to the possibility that I would be interested in that kind of thing.”

Because he excelled in math and science

in high school, it became clearer to Burchill that his future would be in a technical field. His father, a plumbing-and-heating salesman, and his mother, a secretary, supported his academic goals.

After graduating from high school in 1960, Burchill enrolled at the Missouri School of Mines and Metallurgy, in Rolla, Mo., where he studied metallurgical engineering with a nuclear option. (There were no undergraduate nuclear engineering programs at the time.)

During his freshman year, he met his future wife, Sue, who was a year younger than Burchill and was still a high school senior. Their first meeting took place at Burchill’s fraternity house following a blind date Sue had with one of his frat brothers. Burchill noticed her sit-

ting alone on a couch in an activities room and decided she was “really neat,” he said. He offered her a bowl of popcorn, which she declined. “I don’t think she’s ever turned down popcorn since,” he added with a wink. Afterward, during the summer, he continued to pursue her, and by the fall, “we decided we were going to stay together for a long time,” he said.

Sue graduated from high school in 1961. Although she was a year behind Burchill, the plan was that they would attend their respective colleges and graduate at the same time. This meant that Sue would accelerate her course work at Missouri Valley College and take summer classes in order to graduate in three years instead of four.

During his college days, Burchill was known as a go-getter

and an organizer, traits that he has carried with him throughout his life. He spent the summer after his freshman year recruiting new pledges for his fraternity, Acacia. “I had my own car, and I traveled all over Missouri and southern Illinois,” he said. He welcomed this task as a great adventure, in part because his travels took him through St. Louis, where Sue lived.

Burchill was so successful that the fraternity had to rent a second house on campus to accommodate all the new pledges. His skill as a salesman was due to his being “a pretty good talker,” he said, and also to his sales techniques, which included throwing parties and—separately, of course—meeting with prospects’ parents. “I remember particularly relating to the mothers,” he said. “A mother would be enthralled by having someone sitting in her living room, telling how her son was going to be living once he got on campus—how many pairs of socks he would need, how many towels—questions I could answer from direct, firsthand experience.”

During the summers following Burchill’s sophomore and junior years, he worked at Argonne National Laboratory in Illinois. One of his professors, Daniel Eppelsheimer, had been involved in World War II’s Manhattan Project and had strong ties to the lab. “He was the one who referred me and helped me make the connections,” Burchill said.



Sue and Bill Burchill on their wedding day, June 13, 1964



Burchill as a student aide at Argonne National Laboratory in summer 1962

Burchill was assigned as a student aide to Argonne's Fuels Technology Division in the Ceramic Fuels Group. "That was the real solidification of my interest in nuclear power," he said. At that time, in the early 1960s, existing reactors mostly used metal fuels or oxide fuels. Burchill's work focused on options for future fuel forms, such as nitrides, carbides, and sulphides, which were being analyzed for such things as their thermo-mechanical properties.

Holding to the plan they had made soon after meeting, Burchill and Sue graduated from college at the same time, in the summer of 1964, and two weeks later they were married. Before starting graduate school at the University of Illinois, Burchill took a summer job with Monsanto Research Corporation at what was then called the Mound Laboratory, in Miamisburg, Ohio, where he worked on the development of the plutonium/platinum phase diagram for ultra-high-

temperature fuels.

When the summer ended, the Burchills moved to Urbana, Ill., where Burchill was enrolled in graduate school at the U of I and Sue had a job as a fourth-grade teacher. Burchill earned a master's degree in nuclear engineering in 1965 and became an active student member of the American Nuclear Society. In 1966, he was the publicity chairman for the fourth ANS Student Conference, which was the largest such meeting to that point.

While Burchill pursued his doctorate in nuclear engineering at the U of I, Sue remained the couple's full-time breadwinner as an elementary school teacher. Their first child, a daughter named Cheryl, was born in March 1969. Burchill had already accepted a job with Combustion Engineering (C-E), although he was still several months away from finishing graduate school.

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Burchill doing research for his Ph.D. dissertation in 1969



Burchill (left) received Combustion Engineering's Outstanding Employee Award in 1979 for his work investigating the TMI accident. Presenting the award are Frank Bevilacqua (center), vice president of engineering, and John West, president of the Nuclear Power Division.

Hello, Windsor

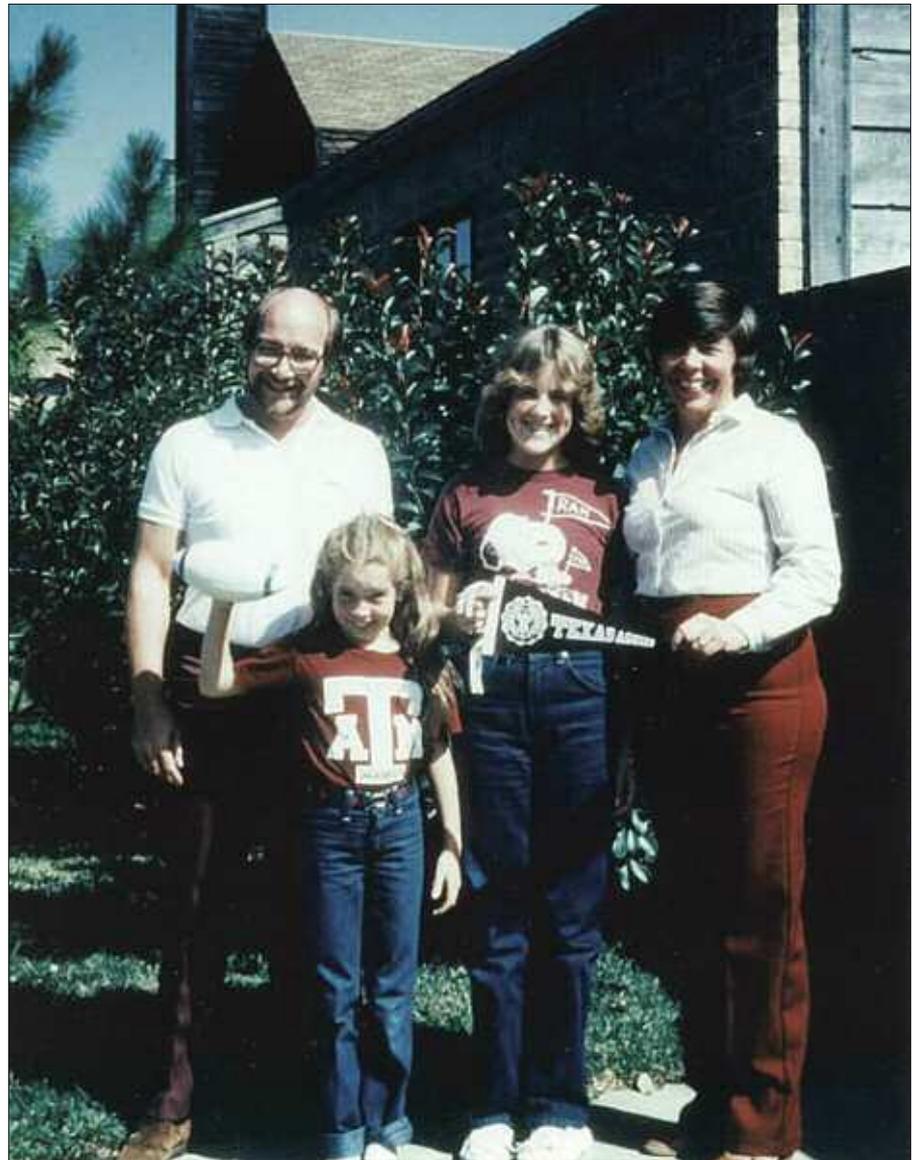
Burchill completed his dissertation—on detailed turbulence properties in flow of water through a heated pipe that involved the construction and operation of a large experimental thermal hydraulic facility—and was awarded his Ph.D. in January 1970. The Burchills packed up and moved to Windsor, Conn., where C-E was headquartered. C-E was one of four reactor vendors in the United States, along with Westinghouse, General Electric, and Babcock & Wilcox (B&W). In the early 1970s, reactor orders were pouring in. Burchill recalls that at one point, C-E had 19 orders for the new System 80 reactor, the company's most advanced design. Over time, all of these orders were canceled, except for the three units built in the 1980s at the Palo Verde site, in Wintersburg, Ariz. Later, in the 1990s, several System 80 units were built in South Korea.

At C-E, Burchill continued his involvement with ANS. "The first thing I did was to get very active in the local section, and I wound up going up through the ranks," he said. As the Connecticut Section's program chairman, he brought in as many as 350 people for meetings and dinners. "It's just how you choose your speakers—you bring in the really hot topics," he said. In 1975–1976, he served as the chairman of the section.

Burchill said he became involved with ANS on a national basis through Joe Die-

trich, a preeminent engineer and one of the early contributors to nuclear safety philosophy and implementation. Dietrich, who was C-E's chief scientist, served as ANS president in 1977–1978. During Dietrich's two-year term—first as vice president/president-elect and then as president—Burchill was his executive assistant. Independent of that, Burchill was asked to join ANS's Reactor Safety Division program committee in 1976. "So, two pathways into national involvement occurred simultaneously," he said.

Meanwhile, the years at C-E went flying by, something he hadn't counted on. "I always had a plan about where I was headed," he said. "My plan—and anyone who would be within earshot would hear it—was that I would be at Combustion for five years at the most, because I thought that changing companies was the only way to advance my career." It turned out that he didn't have to do that, because there were plenty of challenging job opportunities at C-E, "so I was there for nearly 25 years."



The Burchills—Bill, Michelle, Cheryl, and Sue—show off their Texas A&M pride in 1982.

His first assignment after graduating from the U of I was two years in the fast breeder reactor development department on work sponsored by the Atomic Energy Commission (AEC). From there he moved to C-E's emergency core cooling system (ECCS) development group, working on an AEC-sponsored steam/water mixing project, which experimentally and analytically modeled the interaction of ECCS cooling water with steam venting during the blow-down and reflood phases of a large-break loss-of-coolant accident (LOCA) in a pressurized water reactor.

Although he was the principal investigator on that project, he had no employees working under him. His goal, however, was to move into management and supervisory roles, and so he made a request to expand his responsibilities. His bosses listened, and he was assigned to work for two years as supervisor of a small-break LOCA code development group. "I had a small but very intellectual group of really talented people," he said. The group came up with some new codes that were instrumental in the licensing of several C-E reactors.

After that, Burchill for two years supervised a group that worked on issues related to anticipated transients without scram (ATWS). This was followed by two years as manager of a section that was responsible for all LOCA analysis methods development. Then he was assigned to report to C-E Senior Vice President Fred Stern to coordinate the resolution of all technical and contractual issues related to ATWS in response to a new Nuclear Regulatory Commission rule. "By then I was really established and seemed to be constantly getting assigned to the hot topic of the day," he said.



An avid hiker, Bill (right) trekked New Hampshire's White Mountains in 1991 with daughter Cheryl (left) and friends.

TMI: An intense time

Then came March 28, 1979—the day of the accident at Three Mile Island-2, a B&W PWR. "I was really mesmerized, as everyone was, by what was going on," Burchill said. The industry was asking itself how such an accident could happen. C-E, like a lot of entities in the industry, was asked by the NRC to study the accident and determine whether a similar event could happen at other plants, including at boiling water reactors. Within days, C-E sent 30 employees to TMI, in Pennsylvania, but Burchill was not among them; he was off to Chicago on ANS committee business.

Before leaving, however, he emptied C-E's library of everything he could find on B&W reactors to take with him to Chicago.

In every spare moment, on the airplane and elsewhere, he pored over the material, and by the time his ANS visit had ended, he had an idea of what had caused the accident. His background in the AEC's steam/water mixing research program had taught him about some thermal hydraulic phenomena, particularly what is called "flooding," in which an updraft of steam can suspend a down flow of water, he said.

His suspicions held true. An updraft of steam had occurred in the surge line of TMI-2's pressurizer, which kept a water column from dropping and gave a false monitoring reading. The false reading misled TMI's operators and caused them to turn off the ECCS, which was the key to the accident.

With information in hand, Burchill flew back to Windsor and went to C-E's vice president of engineering, Frank Bevilacqua, to explain his findings. "I don't think I got out of Frank's office and the company's conference rooms for the next 24 hours," he said. Within days, a complete scenario was developed, including pictorial illustrations that are the foundation for the analysis in Appendix TH of the Nuclear Safety Analysis Center's NSAC-1 report, *Analysis of Three Mile Island Unit 2 Accident*.

Burchill's work springboarded him to higher-level involvement regarding TMI. He gave presentations on the accident to large groups of C-E employees, to all C-E plant owners, and to peer organizations within the industry. He also was instrumental in forming the C-E Owners Group (CEOG) and became its first manager. Similar owners groups were established by the other plant vendors and owners—for Westinghouse, GE, and B&W plants—to solve problems that arose from TMI and to respond to regulatory issues.

It was an intense period of Burchill's life, with all of the TMI regulatory issues and



Burchill accepts a retirement plaque from Texas A&M Provost Bill Perry in January 2007.

with lots of traveling for C-E to CEOG meetings and to give presentations to the NRC and the NRC's Advisory Committee on Reactor Safeguards. He was away on business almost more than he was at home, and he credits his wife, Sue, with holding together the family, which by then included a second daughter, Michelle, born in September 1973. "We thought that the ideal family size was four—two children," he said. "That was always the plan."

During this period, he attended the 1981 ANS Annual Meeting in Miami Beach, Fla., where he ran into Carl Erdman, a cohort from his graduate school days. Erdman had just transferred from the University of Virginia to Texas A&M University, where he was head of the Nuclear Engineering Department. Erdman said that a faculty member was going on sabbatical from 1982 to 1983, and he asked Burchill to come down to fill in for him. Burchill had done some training for various nuclear organizations in the past, and he thought the opportunity to teach at a university would offer him a chance to recover from the exhaustion of TMI-related efforts.

The question was, however, would Burchill have to leave C-E's employment? It turned out that he wouldn't. An arrangement was set up so that he was contracted out from C-E to Texas A&M, and so he didn't have to leave the company's payroll. In August 1982, the Burchills packed up a trailer, rented out their house in Connecticut, and drove to Texas. His introduction to college teaching lasted for two semesters, during which he put together a new nuclear safety course that is still one of the required courses at the Ph.D. level, and he revised a master's-level reactor design course. "I don't know who worked harder on my homework, the students or me in getting it done before they did," he recalled fondly.

Expanding to management

Burchill's term at Texas A&M ended in May 1983. The family packed up again and took an extended trip on the way back to Connecticut. For six weeks they meandered through the Southwest—New Mexico, Arizona, California, Nevada, Utah, and Colorado, living in a pop-up trailer—before returning home. "My favorite memory of the trip is hiking to the bottom of the Grand Canyon and back to the top—19 miles—in one day," he said.

Burchill had kept in touch with C-E senior executives while he was at the university, telling them that his plan was to get into business management when he returned and asking for an opportunity to do so. His C-E career so far had been heavy in technical activities, such as methods development, experimental work, and regulatory support. Now, with his background as an educator, he wanted an expanded horizon. C-E agreed and made him director of its



The Burchills at Christmas 2007: Bill, daughter Michelle, Sue, granddaughter Aster, and Cheryl.

Nuclear Training Department, which sold training services to nuclear utilities in the days before reactor simulators at plant sites were common. The department had an annual revenue of about \$4 million, and Burchill as director had achieved his goal of becoming a business manager. "So now I had to make a profit," he said. "I had to price our services properly and hire people and pay per diems at a level that was affordable. It was a whole new ball game."

Two years later, in 1985, C-E's Nuclear Division reorganized, and Burchill became head of Nuclear Training and Operations Services (NTOPS), which included nuclear training, safety analyses, procedures and Tech Spec support, and nuclear training simulator upgrade services. The new unit had about 100 employees and an annual

revenue of about \$10 million. Eventually, however, the training business dwindled as utilities became self-sufficient by installing their own simulators and hiring staff. To offset the business loss, NTOPS in 1987 began providing a variety of services at the DOE's Savannah River Site (SRS), in South Carolina.

Soon after, C-E assigned Burchill responsibility for all of its SRS contracts, including oversight of about 150 on-site employees. Burchill's business unit now had annual revenues of about \$25 million, with about \$19 million of it from SRS. For the next two years, Burchill traveled from his C-E office in Connecticut to SRS several days each month. In 1989, C-E was acquired by foreign-owned ABB, and the new owner, Burchill said, paid little attention to

C-E's Nuclear Services unit, of which NTOPS was a part.

But things changed in 1990 when the new owner received a letter from the Department of Energy, declaring that there was a problem with having a foreign company manage a program at a U.S. national lab. In response, Burchill spent a year forming a U.S. subsidiary for ABB that would serve the SRS. Later, with the DOE matter settled, he had to decide whether he would stay with C-E, which still existed under ABB, or become president of the new subsidiary he had helped create. He opted to stick with C-E, and he was made director of Nuclear Operations and of Field Engineering Services. The latter unit involved several offices at nuclear power plant sites and had annual revenues about equal to the lost SRS revenue.

One thing that Burchill didn't plan on was what happened starting in mid-1993. At that time, nuclear utilities suddenly began doing more work in-house, which meant less aftermarket work for vendors such as C-E. In business terms, aftermarket work involves jobs that have a very high turnover, short duration, and contracts that are offered on short notice. In just a few months, Burchill's unit—and all of ABB/C-E's nuclear services—saw its revenue drop by half. "All of a sudden, the utilities started doing their own thing," he said.

The freefall couldn't be stopped, and ABB decided to shut down the field offices of Burchill's Field Engineering Services unit. By the end of 1993, Burchill's position as unit director was eliminated. He was assigned to another role, but within six months he knew that his C-E days were coming to a close. In June 1994, he left the company after nearly 25 years.

Many hats of utility work

Although Burchill had long associations with nuclear utilities, he had never worked for one. "My plan was that I needed to go somewhere where I could learn the utility business very quickly," he said. "It turned out that Pennsylvania Power and Light was an ideal opportunity."

PP&L operates one nuclear plant with two units, Susquehanna-1 and -2, in Berwick, Pa. With the children grown by this time, Burchill moved with Sue from Connecticut to Pennsylvania in January 1995. His new job found him wearing many hats, and his duties included being in charge of quality assurance, quality control, operating experience evaluations, the corrective action program, the employee concerns program, and the Independent Safety Evaluation Group, which was a post-TMI requirement.

"It was fun," he said. "I was at the top of a utility organization, reporting to the chief nuclear officer. Because of my position, I could walk into anybody's office and learn what they were doing and how they planned

to improve things. I learned the utility business from that perspective for a couple of years, and it was just a great experience."

After less than three years at PP&L, Burchill accepted an offer to move to the nation's largest nuclear utility, Commonwealth Edison, in Illinois, as deputy to the vice president of engineering for the company's nuclear units. The Burchills relocated to Chicago in January 1998. The ComEd fleet was on shaky legs at the time, with five of 10 units under NRC shutdown orders. Oliver Kingsley, who had improved nuclear performance for other utilities, had been hired just prior to Burchill's arrival. Kingsley was the chief nuclear officer, and his philosophy was simple: "The only way to go is up," according to Burchill. "I came in and it was just an unbelievable experience," he said. "The work intensity level was similar to post-TMI."

Within a year, the five units under shutdown orders were brought back on line. ComEd's refueling outages were reduced to less than 20 days, which was unheard of at the time, and standardized work procedures and practices were implemented. The ComEd nuclear fleet now led the industry in capacity factor.

Burchill was put in charge of risk management activities for ComEd's nuclear units. "Risk-informed regulation was being implemented by the NRC during this period of time, and I was very much involved," he said. He worked on two Nuclear Energy Institute task forces preparing guidelines for applying probabilistic risk assessment techniques to all the commercial reactors in the United States.

In September 1999, ComEd announced its intention to merge with Philadelphia Electric Company to form Exelon, with 17 nuclear units at 10 sites. Over the next year, Burchill spent about equal time in Illinois and Pennsylvania standardizing risk management practices across the fleet under a Kingsley-led standardization effort. The merger was completed in October 2000, and Burchill continued spending about equal time in Exelon's two main hubs over the next two years. Since then, thanks in part to extensive risk management, Exelon's plants have had some of the highest capacity factors in the industry. In 2007, for example, the industry had a composite capacity factor of 92 percent—its highest ever—and Exelon's was 94 percent.

After being with ComEd/Exelon for five years, Burchill at age 59 announced his retirement in late 2002. It wasn't really retirement, however. His decision had been stimulated by an opportunity that would let him realize another part of his career plan. "I wanted to spend a few years at a university at the end of my career, teaching and passing to the next generation the experience that I had gained," he said.

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Back again at A&M

Burchill never thought he would return to Texas A&M 20 years after he had left in 1983, but that's exactly what he did. Alan Waltar, a former ANS president (1994–1995), was retiring as head of the university's Nuclear Engineering Department, and a replacement was needed. An offer of a four-year term as department head was made to Burchill, and he accepted it.

The Burchills' transition from Illinois to Texas happened in January 2003. Over the next four years, his work with the students at the university was "an absolutely heady experience," he said. "The students have such enthusiasm, based on their recognition of the tremendous benefits of nuclear technology, ranging from nuclear power to medical applications, including nuclear power's favorable environmental attributes." Under a university-wide "faculty investment program," Burchill hired seven of the 21 tenured/tenure-track faculty currently in the department. "That was a fantastic opportunity," he recalled.

At the end of four years, however, he held to his plan and declined an offer of another four-year appointment. Sue had been retired as a teacher and later as a veterinary clinic office manager since 1995, and so in January 2007, Burchill went into retirement, again—although he spent the next six months as a part-time consultant to the DOE's Idaho Operations Office.

These days, Burchill and his wife live in Hendersonville, N.C., where he spends some of his time with his old friend, the bicycle, riding up to 40 miles at a clip, several times a week. In early May of this year, he and two friends bicycled the Natchez Trace—445 miles from Natchez, Miss., to Nashville, Tenn.—in five and a half days. Hiking is another of his hobbies. When he lived in Connecticut while working for C-E, he did a lot of backpacking in New England as a member of the Appalachian Mountain Club. He also notes proudly that he is a member of the 4000-Footer Club, having climbed all 48 peaks in New Hampshire's White Mountains that are above 4000 feet. Now in retirement, he plans to hike parts of the Appalachian Trail, which passes through 14 states, including North Carolina. Moving to North Carolina, he said, "was a logical extension of the many happy camping trips with Sue, the girls, and our dog when the girls were growing up."

Living in North Carolina also puts him in proximity to his daughters. Cheryl and her husband, Will, reside in Providence, R.I., where she is coordinator of children's programs for the city's library system. Cheryl and Will have a daughter, Aster, now three, who brings "pure joy into our lives," he said. The Burchills' other daughter, Michelle, lives with her husband, Toph, in New York City, where she is director of manufacturing

for Nanette Lepore, a high-end fashion house.

Burchill is eager to serve his term as ANS president. Months before his retirement from Texas A&M, the ANS Nominating Committee had called him and asked if he wanted to run for that office. He had been an active ANS member for his entire career, and the timing was compatible with retirement, allowing him to devote considerable time to the office. So, he said yes.

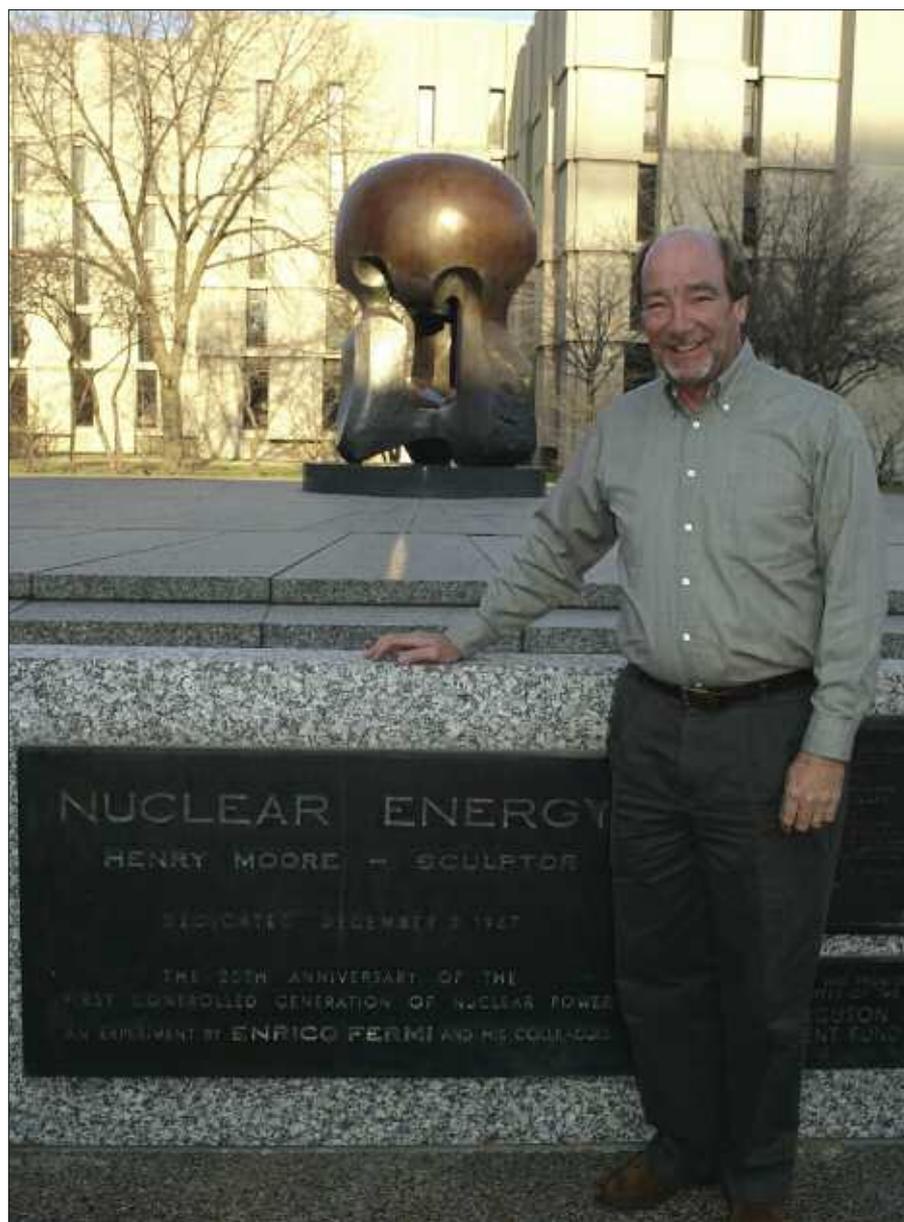
Burchill's ANS career includes having chaired two professional divisions—one of them twice—and the Finance, Local Sections, Special Projects, Risk Informed Standards, and Professional Divisions committees. Other roles included membership on the ANS Board of Directors, Executive Committee, Planning Committee, Standards Board, Business Practices Committee, Nominating Committee, and many topical meeting program committees.

During his term as ANS president,

Burchill's primary goal is to support all ANS constituencies in "getting the word out" about nuclear by engaging the public and educating policymakers. At the 2008 ANS Annual Meeting in Anaheim, Calif., in June, he outlined his plans for his term in office at the ANS President's Special Session, titled "Getting the Word Out."

Although he affirms that electric power generation is a key application of nuclear technology, he emphasizes that ANS is "definitely much broader than the 'American Nuclear Power Society,'" and he notes that the Society's professional divisions address a variety of technical activities, such as Biology and Medicine, Robotics, Human Factors, and Environmental Sciences.

"I would like to see each ANS constituency, including individual members, rise to its potential in promoting a better understanding of its focus to the public and to policymakers." That is his plan, and now he will work it. ■



Burchill recently at the Henry Moore sculpture "Nuclear Energy" at the University of Chicago