Utility Working Conference: Managing business

Utility executives mix with plant managers and staffers to talk about the issues that really affect nuclear power plants.

NUCLEAR PLANT OFFICIALS looking to hire management employees who are used to the daily wars of competition should head for the place where they buy their frozen pizzas: the food store. After all, reasoned Edward Tirello, Jr., managing director for Deutsche Banc Alex Brown, where better to find people who operate on thin margins and compete every hour for business than a supermarket? "You have to have that mentality," said Tirello. "If you don't have good management, you might as well hang it up."

As the nuclear industry deals with the issue of a dwindling supply of prospective employees, Tirello was offering advice on where the next wave of employees might come. Food employees fall into one of two categories, Tirello continued. The first category contains the supermarket people, who are in a business where they make one penny on the dollar before net profit. "Every day is a war, every day they fight the competition and fight to sell whatever they have to whoever comes in the door," said Tirello, a utility analyst for 31 years.

Tirello

The second category contains the Coke or Pepsi salesmen. In the morning the Coke man comes in and shoves the Pepsi products to the side, giving Coke products more frontage on the store shelves. In the afternoon, the Pepsi man comes in and shoves his products the other way into Coke territory. "In the end, it balances out," Tirello remarked, "but it is a constant war"—thin margins, vicious competition, and always being on the prowl looking to sell products. "It's the same as in the power business," he said. "So, [nuclear plant employees] have to have that same mentality that food people have."

Tirello spoke during the opening plenary of this year's ANS Utility Working Conference, held August 6–10 at Amelia Island, Fla. The title of the conference was "Managing the business of nuclear power," appropriate in an era of industry consolidation, restructuring, and a shrinking labor pool.

Tirello stressed that if nuclear plants were run strictly as businesses, they would be the nation's cheapest power generators and the most profitable part of a company that also had coal- and gas-powered units in its stable. Further, a company formed solely to operate nuclear power plants would be attractive to investors, Tirello predicted. "It will be perceived as a higher risk company, but that's fine," he said, "because then people who invest in it will fully know that it should afford a higher return." Once that happens, a new era for the industry will be triggered, Tirello concluded, "and I don't think it's that far off. I think it's just around the corner."

The industry's future

Ray Necci, vice president of nuclear technical services at the Millstone nuclear power plant, served as conference general chairman in place of Leon Olivier, chief nuclear officer of Northeast Utilities, who was kept away by business concerns. "The nuclear industry is more in the news today than it has been since 1990," Necci noted during the opening plenary. Since 1990, "nuclear output has increased to the equivalent of bringing nineteen 1000-MWe plants on line," he said, with more than 800 MWe in uprates already announced for the future. More good news, Necci added, is the capacity factors of U.S. plants that have not yet peaked, even as the Energy Department has predicted that the combined output for nuclear plants this year will be 735 billion kWh, a 1 percent increase over 1999's record output level.

The successes of the industry, however, should never lead to a laxness of responsibilities, warned Jeffrey Merrifield, a commissioner of the Nuclear Regulatory Commission. "The nuclear industry and the NRC must learn from history so that we do not fall victim to the unexpected," he said. "As the industry reaps the benefits associated with improved performance, and as the NRC and the industry pursue greater efficiencies and regulatory reform, we must learn from the lessons of the past and be careful not to roll back the safety improvements made over the last 20 years."

Merrifield reminded the listeners that the industry's performance and safety improvements "came at a very high price," and that lessons learned must not be "budgeted out" of nuclear plant programs in the years ahead.

Looking at the future was Jerry Yelverton, president and chief executive officer of Entergy Nuclear, Inc. Yelverton began his talk by noting the increased levels of performance of U.S. nuclear power plants over the past 20 years (57 percent capacity factor in 1980, more than an 86 percent capacity factor in 1999) and the shrinking of outage durations in the past 10 years, from 100-day outages in 1990 to 41.5 days in 1999.

Yelverton

Yelverton predicted that consolidation will stabilize the industry, optimum performance levels will be reached, and, when compared with gas-fired generation, nuclear will be less sensitive to fuel pricing volatility and won't be affected by escalating clean air requirements. "I think the biggest driver beyond the economics is probably going to be the environment," he said.

But Yelverton felt this area was where nuclear had fallen short. "As an industry we've done a poor job of trying to go out and sell to the American public what we really bring," he said. He called the industry's clean-air power the issue that will provide nuclear the ability to grow, because it "does distinguish us from our competitors."

Yelverton predicted the next new nuclear plant in the U.S. would be built after another decade passes, when someone takes "that bold step" and starts construction on a new plant. Once that happens, then other new nuclear plants will break ground because "this whole nuclear industry has been follow the leader."

Lucian Conway, who has built a reputation in the industry by working the crowds as part of his animated presentations, i.e., jokes, stories, and a good-natured disdain for the Clemson University football team, followed with a look at the finances of nuclear power. In the old days before restructuring, there existed "the monopoly world, where the king was reliability," said Conway, president of Conway Consulting, of Colleyville, Tex. Revenue was equal to as much money as a plant could spend on O&M plus 10 percent times the investment in the plant. The strategy of the monopoly world, Conway said, was that engineers could spend as much as they wanted to make the plant reliable, and would build more into the plant to increase the investment in it.

But what is happening today is that the monopoly world (regulation) is crumbling as restructuring and competition (deregulation) moves in. This has led to what Conway called "future world," where reliability has been replaced by profit as king. When revenues go up and expenses go down, the new king—profit—is healthy in the future world, he noted.

There is also a "between world," Conway continued, where many nuclear plants exist today—that is, in a monopoly but headed toward competition. For nuclear plants stuck in this between world, "[utility executives] want you in a nuclear plant to pretend you're in a com-

petitive world," Conway announced. Those executives, he continued, are taking money out of the regulated side of the business, where rate of return tops out at 12 percent, and moving it to the unregulated side where they can earn 15 to 20 percent or more. Pointing to Jerry Yelverton, Conway boomed to the crowd, "They don't just give him money anymore. They expect a [handsome] return!"

Conway was credited by David Christian with helping to make Dominion Generation more competitive. Christian, senior vice president–nuclear for Dominion, saluted Conway for teaching business-training classes at Dominion (then Virginia Power) as far back as 1993. "By focusing on safe, reliable operations [as a partial result of those training classes], we saw profitability improve," Christian said.

Christian noted that when Dominion's nuclear plants (North Anna-1 and -2 and Surry-1 and -2) are operating well, the expense of inefficiency falls out. "I would suggest that a management approach that overfocuses on expenses and costs . . . will at best not produce maximum results," he said. "At worst, such an approach will touch off a death spiral in performance, where cost cutting results in poor performance, which is followed by more cost cutting."

Christian closed by noting that nuclear's place in the nation's energy mix is secured by the need for stability of the U.S. economy, which "is inextricably tied to the security of energy and competitively priced electricity."

This was the seventh consecutive year the Utility Working Conference had been held since its inaugural run in 1994. Daily sessions during the conference were on topics covering regulatory relations, engineering, business, information technology, maintenance, supply chain issues, and operations.

Work talent retention

Through restructuring, mergers, acquisitions, alliances, and license renewal, nuclear plants still need people to staff and support them. A panel of industry professionals was assembled to discuss ways that organizations can retain their talent, replenish the talent lost to retirement and other attractions, and renew the talent needed for the change-rich future.

Tom Sydnor, general supervisor of plant engineering at the Calvert Cliffs plant, came straight to the point of how to keep people at a nuclear power plant: Money. "Compensation *is* important," he said. "People say money isn't everything. Well, it's right up there. It's 1A." Sydnor added that when his employees get job inquiries from other companies offering more money, "they very seriously consider leaving, and a lot of times they do."

Sydnor exhorted that money has to be part of the equation for keeping employees at the nuclear plant. "We can't continue to pretend it's not important," he said. "My equipment is useless if I don't keep my best people around. I can buy a better pump but I can't replace my 20-year-experienced system manager. I can replace an engineer, but I can't replace his knowledge."

Sydnor stressed that investing in people is as important as putting money into a new piece of equipment. He ventured that no one bats an eye when hundreds of millions of dollars are spent on a steam generator replacement project, but "give a guy a $7000 raise and it takes months [to get it approved by utility management]."

G. Neil Midkiff, principal of Tim D. Martin & Associates, in Herndon, Va., revealed that in the past eight years about 26 000 people have left the nuclear power industry through retirements and staff reductions. Further, he said, the industry isn't attracting new workers because no plants are being built in the United States that would provide new jobs. "And those plants that do exist have not been actively recruiting," he said, "while apprentice programs have disappeared, losing another way for new workers to become trained."

Midkiff

At some plants, Midkiff continued, the retirement issue is becoming a huge problem, as up to one-third of their engineering staffs will be eligible for retirement within the next three years. A solution to retaining and attracting workers will be making the workplace more "people friendly," Midkiff advised. Four-day work weeks will have to be implemented, flexible work schedules offered, educational opportunities made available, and profit sharing and stock options given.

New hires will not come from traditional sources, Midkiff predicted. "They will be workers from related industries such as chemical and petrochemical, fossil plant staffers, engineers and others from other countries, and retired workers who come back to do outage jobs," he said.

According to Gary Close, a senior engineer at Diablo Canyon, the staffing plan at his plant is to hire 10 new engineers every two years starting now. "The new-hire engineers will stay in a development program for two years, in hopes that this will aid in the socialization of the group," he noted. The staffing plan will include a two-week orientation, three five-month job rotations, three outage jobs, a 12-week plant orientation course (in nuclear fundamentals, systems, and simulator training), and a mentor program. All 10 new engineers will start at the plant on the same day.

Close

Recruiters at Diablo Canyon targeted six West Coast universities for campus interviews, Close said, conducting 51 interviews in all. From those interviews, 35 prospective employees were offered follow-up interviews, and of those, 19 were offered positions at the plant. From the 19, job offers were accepted by 10 people, with many noting that the two-year development program was a major attraction. Close said 70 personnel from Pacific Gas & Electric Company, operator of Diablo Canyon, were involved in the recruiting.

Vicki Bier, associate professor of industrial engineering and engineering physics at the University of Wisconsin–Madison, spoke on the effects of electricity deregulation on current and prospective employees. Bier presented results of three case studies of industries that had gone through restructuring. They are the U.S. aviation and rail industries and the United Kingdom electricity industry. The air and rail industries were deregulated more than 20 years ago and the U.K. electric industry more recently, but all three are still "undergoing significant changes in response to deregulation," she said.

Bier

The air and rail industries in the U.S. had generally better safety records after deregulation than before, Bier reported, but major challenges did result to their safety cultures. For example, corporate culture adversely affected safety after mergers and acquisitions. Following the Union Pacific/Southern Pacific railroad merger, three fatal accidents and another seven fatalities occurred within seven months and critics claimed that Union Pacific's culture clashed with Southern Pacific's. Bier also found that safety problems tended to go unreported after deregulation in the rail industry. The same held true for the airline industry, where new airlines such as "People Express and ValueJet" were "substantially more risky" than established airlines, Bier noted.

Also, companies in two of the three case studies undertook major downsizing. "In the U.S. rail industry, employment was cut in half after deregulation," Bier said. The U.K. nuclear power industry experienced a similar downsizing after restructuring, coupled with increased use of contractors.

"Such changes are not necessarily adverse to safety," Bier observed, "but can cause safety problems if undertaken with inadequate planning, or if excessive cuts are made in safety-related areas." In the airline industry, rapid growth in air travel after deregulation adversely affected experience levels among both pilots and ground crews. The result was that rapid turnover—more than 100 percent per year for some small airlines—exacerbated this problem.

Significant concerns were raised about downsizing and fatigue in the rail and U.K. nuclear power industries, Bier said. Federal investigations of major railroad accidents have identified inadequate staffing and fatigue as contributing factors, especially after mergers. Safety regulators in both industries also raised concerns about increased use of overtime.

The lesson learned from studying other restructured industries, Bier declared, was that

"deregulation is not incompatible with maintaining or even improving safety, but that it takes total commitment, special know-how, a highly disciplined work force, and exemplary skill by management" to make it work.

Marilyn Kray, vice president of AmerGen Acquisitions, gave the PECO Energy perspective of recruiting and retraining talent. PECO, which is half owner of AmerGen Energy Company, had "gotten out of practice" in recruiting new employees as the nuclear power industry shrunk in the past decade. One thing the company realized was that "the game had changed while we were downsizing," she said, and it now entails being much more proactive. It no longer is solely the job of the human relations department to recruit people, Kray added, but involves department managers from PECO's Limerick and Peach Bottom plants.

PECO has also reestablished relationships with universities. "There is an onsite presence, and not just on recruiting day," she said. "That means we provide a lot of examples for senior design projects that come from real-life issues at Peach Bottom or Limerick. This allows the students to see what the issues are at nuclear plants and have them work through them. We don't expect them to figure out answers for us, because the issues come from past experiences, but it allows them to deal with the types of problems they could run into at a plant."

Lawrence Durham, president of Sterling Learning Services, Inc., of Birmingham, Ala., bluntly assessed the staffing problems of nuclear plants: "If you think it's bad now. . . ." With many plants extending their lives through license renewal, a lot of the "qualified, middle-aged people that have plenty of energy, capabilities, and work life left" will have hard decisions to make when another decade or so passes. Will they stay at the plant or retire a few years early? "That's going to be as difficult if not a more difficult situation than the one we find ourselves in right now," he said.


Durham

Durham stressed the importance of nuclear plants establishing partnerships with other plants and other industries, at least when it comes to sharing employees for jobs. He also touched on a subject that was brought up to lead off the session—money. "Money is not always a motivator," he said, "as much as the absence of it is a demotivator." Employees will go to other jobs that pay less money if the work environment at a nuclear plant is one where they don't want to stay. So, Durham posed, is the nuclear industry a victim of its own undoing? "I think sometimes we are," he answered. Referring to his own experience of working for a nuclear utility years before and the psychological testing he was required to take—which, he implied, stretched the limits of job applicability—Durham said, "We need to look at the way we're doing business and realize that the folks we're trying to attract are probably more perceptive than we give them credit for."

Peer checking

A maintenance session was devoted to peer checking in the control room and best practices in that area. Peer checking can be a valuable tool in preventing human errors during equipment and system manipulations, which have the potential to cause adverse results.

Mary Warren, a reactor operator from Crystal River-3, said she was a bit skeptical of peer checking at first. Warren wondered how quickly peer checking would die out, considering that there were other "next big things" for improving work conditions that had come down from management, only to be forgotten in a month or two.

"Peer checking isn't going to solve all our problems," Warren admitted. "It's a tool, and like all tools it has to be used properly for it to work." Good peer checking, she said, "is watching out for your buddies. It's becoming a part of the evolution; understanding the goal and working with your peers to ensure that the goal becomes a reality."

Peer checking can be used in many situations, Warren added. It can be a reality check when an operator has a funny feeling that something just isn't right. It can be a bookmark, "saving your place when you get distracted, then getting you back on track," she said. "It can be a remedy for that spot amnesia you get sometimes when you find yourself staring into space."

But there is also bad peer checking, she warned, which includes unfamiliarity. "This could be unfamiliarity with the system, the procedure, or the goal of the evolution," she said. Other examples of bad peer checking are inexperience and inattention. "It's also possible that peer checking has become routine," she said. "You're not really concentrating, you're just saying the words."

Warren listed three methods for clearing up bad peer checking. These are:

1. *Developing a questioning attitude.* Know what you don't know. Don't proceed in the face of uncertainty.
2. *Increasing your familiarity with your responsibilities.* Expand your qualifications. Never stop learning new things. Find out why procedures are written the way they are. Use them properly and constantly toward making them better. Finally, practice, practice, practice. Continually improve your skills.
3. *Pay attention to the details.* Don't be a witness. Be a participant.

Warren closed with words of caution: Good peer checking sometimes does go bad. "If peer checking isn't the right tool for the job, it will only make things worse, not better," she said. "If there is a better tool, use it. Don't require peer checking just because it's the latest and greatest thing."

David Holm, operations superintendent at Calvert Cliffs, offered a look into the event-free operation of his plant using methods in addition to peer checking. In the "bad old days," as Holm referred to the 1991–92 time frame, Calvert Cliffs averaged about one significant event per month. Then, five years ago, in conjunction with an "event free" program, the plant started issuing Gold Cards. As their name implies, they are golden colored cards upon which supervisors and others write up both positives and negatives of operations. A checklist of procedural items is also listed on the cards. These include Effective Communication, Self Verification, Questioning Attitude, and Conservative Decision Making. Under these items is listed another subset of positive job reminders.

The cards, as many as 200 written a month when first used, are posted on display near the control rooms at the two-unit Calvert Cliffs. Holm found that when negative criticism is offered, the name of an employee is usually not used, and instead the example of the deficiency is cited.

The program has been a success, Holm noted. By 1999, no significant events were recorded at Calvert Cliffs. Of course, other tools were instrumental in reaching the event-free record, he stressed, including promoting control room behavior that supports event-free operations, clearly stating expectations, focusing on positive results, sticking to procedure, and conducting pre-evolution briefs.

Looking beyond the peer check was Jeanne Kittler, shift manager at the Columbia nuclear power plant (formerly WNP-2). Kittler cautioned that "a peer check is not always the correct thing to do," and quoted a senior management representative from a recent training session as saying that "peer check will be the death of the nuclear industry." Kittler's response: "I believe this individual is 100 percent correct."

Her reasons for skepticism were checked off: Peer checking is not appropriate for all situations; it can reduce accountability for a task and therefore reduce the individual's focus on performing the task error free; and, in some situations, the duty of peer checking draws a person away from the task that he or she is doing, resulting in the peer check itself becoming the source of a possible error.

Rather, to be successful in reducing human errors, Kittler offered three alternatives: teamwork, which is a measurement of how consistently each worker is ensuring that other crew members are doing the right thing; supervisory oversight, which is the crew member's and supervisor's analysis of the crew member's ability, awareness, knowledge, alertness, and distractions; and morale, which serves to build teamwork and the desire of the crew member to want to do the task correctly.

William Corcoran, president of Nuclear Safety Review Concepts, of Windsor, Conn., discussed a preventive maintenance mix-up: An employee at a nuclear plant had started working on the wrong unit at a two-unit site. It was the fourth such occurrence in the past three months at the site. The event, which had no negative consequences, was not unique in the industry, Corcoran said.


Corcoran

Continued

Corcoran observed that all nuclear plants have employees who suffer with familiarity mindset, which means that if they repeat a task enough, they can do it without thinking about it. For example, a worker sent to do a job on a train in Unit 2 may set up to do that job on a Unit 1 train. Ways of offsetting this familiarity mindset is as simple as "checking paper against the plant," Corcoran said—i.e., if a surveillance is being done on Unit 1, there should be a corresponding piece of paper the worker can physically check against labels on components in the plant.

"Everyone on a job has a job," Corcoran continued, in that either a worker is self-checking or peer checking. "On this stagecoach, there are no passengers," he concluded. "There is only a driver and a shotgun."

STA evolution

Following the accident at Three Mile Island-2 in 1979, the NRC required that each nuclear power plant have on duty a shift technical advisor (STA), whose function it was to provide engineering and accident analysis to the control room staff in the event of abnormal accident conditions. At the time the STA requirement was imposed, it was intended to be an interim measure used only until other goals were achieved (training and qualifications of control room staff, improved human–machine interface, etc.). This session explored the role of the STA more than 20 years after TMI.

A history of the STA was presented by Rick Pelton, training and assessment specialist for the NRC. When the STA was first established in the 1979–80 time frame, requirements for the position were a bachelor's degree in engineering (or equivalent) and specific training in plant response to transients and accidents. The position has now transitioned into one where the nuclear plant has the choice of having a dedicated STA or a dual role STA/senior reactor operator (SRO).

Preston Gillespie, an operation shift manager at Oconee, talked about the evolution of the STA at his plant. The three-unit Oconee site started using SROs as STAs in 1981, although, according to Gillespie, the NRC objected to this dual-role capacity at that time. By 1984, Oconee lost out to the NRC's objections and shifted the STA role directly out of the operations department into the engineering department, creating a new, independent position called shift engineer. In 1994, an initiative was started at Oconee to improve the work control process, and the shift engineer position was eliminated. In its place the shift work manager (SWM) was created. This position was filled by the STA, who reported to the work control superintendent.

The SWM position was transferred back to the operations department at Oconee in 1998, and three of five SWMs are now dual-role STA/SROs. The NRC, Gillespie concluded, now encourages the use of the dual role SRO/STA, with the eventual goal of the shift supervisor's serving the dual role.

The next ANS Utility Working Conference will be held August 4–8, 2001, at Amelia Island.—*Rick Michal* NN