THE *NUCLEAR NEWS* INTERVIEW:

Training at Duke Power: Insights from four managers

A portable simulator and real-time remote response units are some of the tools used, or planned for use, at Catawba.

Training at nuclear power plants is evolving as more computer-based processes and hands-on techniques become incorporated into the classroom. New training tools include portable reactor simulators that are rolled into classrooms and hand-held remote devices that students use to answer instructor questions in real time during training sessions.

Four training managers from Duke Power's Catawba nuclear power plant assembled to discuss changes in training techniques over the past several years. The managers, who represent a wealth of training experience, are:

■ Al Lindsay, Catawba's training manager for almost three years. Lindsay has worked at Duke Power for 26 years, and his responsibilities include all training for the site.

■ Elliott Wallace, training manager for Catawba's technical programs (engineering, maintenance, radiation protection, and chemistry). Wallace started in his current position in November and has been at Catawba in various capacities for 20 years.

■ Bill Pitesa, operations training manager, who is responsible for initial and requalification training for control room and plant operators. He has worked at Duke Power for 21 years.

■ Ronnie White, Catawba's training support supervisor for almost a year. His responsibilities include support of all programs in the areas of technology and accreditation oversight. He has been at Duke for 18 years.

Duke Power operates seven nuclear units at three sites. Catawba, in Clover, S.C., has a pair of 1129-MWe (net) Westinghouse pressurized water reactors. McGuire, in Cornelius, N.C., has a pair of 1100-MWe (net) Westinghouse PWRs. Oconee, in Seneca, S.C., has three 846-MWe (net) Babcock & Wilcox PWRs.

The interview was conducted by Rick Michal, *NN* senior associate editor.

Catawba training managers Elliott Wallace (from left), Al Lindsay, Bill Pitesa, and Ronnie White meet regularly to discuss the effectiveness of programs.

What is the scope of training activities at Duke?

Lindsay: We try to ensure that all three of Duke Power's nuclear sites—Catawba, McGuire, and Oconee—utilize the same operating and training philosophy. While each site may do some things slightly differently, training is basically the same. We try to ensure that if something new, better, or different is introduced at one of the sites, it also is evaluated at the other two sites.

Pitesa: For example, in the operations area, we are purchasing 20 laptop computers. We'll use file retrieval systems so that our trainees will be able to download all training materials into their laptops and eliminate some major administrative work. We used to have large volumes of hard-copy manuals that now will be available electronically. This is a venture that we're hoping will be successful at all three sites.

How do training managers stay consistent with what's being taught at the other sites?

Lindsay: Our training managers from all three sites meet on a frequent basis. We get together once a month in face-to-face meetings, and we also have weekly conference calls. It's the same throughout the training divisions, which have routine conference calls to share information to ensure that all three sites are on the same page.

Are you trying to incorporate more computer-based training (CBT) into your program?

Lindsay: Yes, but our primary focus is still on having instructors in front of the classroom. We try to find creative ways to use technology to make us better trainers and instructors. For example, we're incorporaing Dr. William Junkin's software [Beyond Questions] technology that we'll be using at all three sites (see sidebar). Dr. Junkin's process involves a classroom presentation using Web-based training. It will help us validate that learning is taking place. We're always looking at creative ways to use technology to help instructors make better presentations.

What about other CBT processes that you use?

White: We use CBT in the classroom for knowledge-based applications. We also use electronic forms that we've developed from our e-mail program, Lotus Notes, that allow us to process our training material for review/approval electronically. Additionally, we plan to convert our PowerPoint presentations into Web-based technology.

Is much of your software purchased off the shelf?

White: We use both off-the-shelf and in-house–developed software. Dr. Junkin's program was developed at Erskine College and we have modified it for our specific application. We also have site and corporate development of Web-based CBT. However, we've also recently purchased multiple software products that fit our needs. We bought an off-the-shelf tool called Designers Edge. Once we implement it, the instructor will develop the lesson material in Designers Edge and then have the option to link to different media formats, including CBT development software.

How do the different learning capabilities of individuals affect the design of your curriculum?

Pitesa: We augment our training by using technology along with the flow-loop. The flow loop is a mechanical training system with pumps, valves, and electrical devices. For many of our employees, this blended training provides a better learning environment.

Looking to the future, what is the most significant change you see coming for training in the industry?

Lindsay: Our vision is to better utilize technology in a Web-based format. We're focusing on making it easier for the instructors to pull down information from the Web and develop training and technology pieces to use in the classroom. Our presentation format is moving toward "blended training" techniques. This process blends multiple training techniques into the same training session. For example, the students may initially complete a CBT program, then meet with the instructor for an objective review, then go to the flow loop for hands-on applications, and finally take a test to validate that the training was effective.

Distance learning is also in our future. We are working in partnership with INPO to develop a distance-learning program, but we've not yet finalized it or put it into practice.

How has senior management responded to training's needs and requirements?

Lindsay: Senior management's commitment is evidenced by their involvement in training and their financial support. Management has provided us with appropriate resources and tools necessary to provide quality training. Duke Power has a long-term vision, one that recognizes that training is an integral part of power plant performance.

Where have you had your greatest training successes?

Pitesa: I think we are successful at Duke in our line-training partnership. We meet with operations management on a monthly basis to discuss training activities from the past month and what the training will be for the next month. Operations management frequently observes our training and provides feedback so that we can continuously improve the training.

Another success is the portable control-room simulator. We have taken software from the control-room simulator and placed it on what we call a roll-around, or portable, trainer. We frequently take it into the classroom to show real-time dynamics on a system.

Lindsay: The roll-around trainer is a versatile tool and we have found that it significantly enhances student learning.

What problems exist for Duke's training managers?

Wallace: A challenge I see for our technical training programs is the resurgence of hiring in our engineering and craft organization. Much of our workforce is reaching an age where they are eligible for retirement. Therefore, all four of our technical programs—maintenance, radiation protection, chemistry, and engineering—reactivated their initial training programs. The engineering department has been hiring all along, as has operations, but this is fairly new for the technical programs. This need for new employees encompasses a significant resource demand and one that our senior management has supported very well.

What are the most important day-to-day concerns in training?

Lindsay: My most important day-to-day concern is how training has had a positive effect on plant performance.

How has the role of the training manager at Duke changed through the years?

Lindsay: Advancements in technology have driven significant change in the training arena. Our focus is how to take that technology and effectively apply it. As a training manager, I am challenged to determine that new technology is valuable and not just a novelty. We need to ensure that we don't lose sight of our mission—that learning must take place.

What portion of your resources is devoted to initial training versus requalification?

Wallace: In maintenance and operations, it's about a one-to-one split between continuing and initial training. In radiation protection, chemistry, and engineering, it's roughly two-to-one continuing training versus initial training.

What is the quality of new employees hired over the past five years, and have you had recent success hiring from the nuclear Navy?

Wallace: We typically hire individuals with a two-year technical education in the technical programs. We're also in a good part of the country relative to engineering universities. We're able to draw from them and therefore have maintained a strong engineering base.

Pitesa: Our recruitment plan in operations has leaned more toward hiring people from the Navy nuclear program. We think the skills and training the Navy provides to an individual set the right attitude for coming into a nuclear power plant.

Continued

Beyond Questions and Duke Power

A physics professor from Erskine College in South Carolina has developed a software that helps poll students during classes about the value of lessons being taught. William Junkin, who developed the software while working in partnership with Duke Power, currently uses it during his physics classes at Erskine. Duke Power plans to use the software during nuclear plant training sessions.

The software, known as Beyond Questions, informs the instructor on a real-time basis of whether or not the day's lesson is of value to the students. As the lesson is being taught, the students, using computer keyboards or hand-held devices similar to TV remote-control units, punch in opinions on the material being covered. Upon surveying the opinions, the instructor could adjust the day's lesson plan. Little time could be spent on material that the class already understood well, while more time could be spent on issues where class responses indicated that improvement was needed.

Beyond Questions also could be used to poll students before the start of a class. Students' responses and instructors' lesson plans could be saved to a database for future reference.

Components required for the software program include an Internet browser, such as Internet Explorer, found on essentially all computers sold today.

What effect, if any, have the events of September 11th had on training at Duke?

Lindsay: Certainly the biggest impact on the nuclear industry has been the increased focus on security measures.

Wallace: We work with our instructors to stay focused and keep the students focused on the training at hand. Our job is still to produce qualified individuals to work in the plant. We need to make sure that the focus doesn't change.

The NRC last December released information indicating that some control room operators failed tests at a plant in the northeast. Does this raise a red flag that makes you pay special attention to the training Duke gives its reactor operators?

Pitesa: We have a group at Duke Power that pulls together operating experience from the NRC, from INPO, and from other utilities. The specific operating experience you're talking about was forwarded to me from that organization. We reviewed it and in this particular case did not feel we had the same vulnerabilities as that nuclear plant. I forwarded the report to my instructors for their awareness.

What about rotating personnel back and forth between the operating side and your training group?

Pitesa: About a third of our instructors in the operations training area are loaned from the operations department for a two-year period. We believe coming from the operating side of the plant provides good credibility in training. Our challenge is to take that credibility and knowledge and translate it into good instructional skills.

Wallace: We also have people on loan from the technical side similar to what operations training does.

How heavily do you rely on contract trainers?

Lindsay: Generally, we don't use contract trainers, but we have used them in the past when we've identified a short-term need.

Wallace: The key words here are "short-term." Contract trainers are brought in only for peak work such as startup of the initial training programs.

How do other organizations on site, such as operations and engineering, interface with your group?

Lindsay: We have TPRCs [training program review committees] comprised of line and training representatives that meet on a monthly basis. The purpose of these committees is to determine what went well in training and what needs to be improved. They also evaluate what processes need to be in place to ensure continued improvement. There also is a TPRB [training program review board] that meets bimonthly to provide senior management oversight to all the training programs. The site vice president chairs the TPRB and ensures that lessons learned from individual TPRCs are conveyed across the entire organization.

How do you network with other organizations or training professionals within the nuclear industry?

Lindsay: Within Duke Power, we have processes that drive consistent work practices. Managers from the three Duke sites get together on a frequent basis, generally once a month. We also have conference calls once a week to develop strategic plans and share information within the Duke nuclear system.

Outside Duke Power, the SSNTA [Southeastern States Nuclear Training Association] provides us a forum to discuss innovations and challenges at the different sites. Additionally, we participate in industry benchmarking through self-assessments and INPO evaluations at other sites.

How have you worked out ways to control or reduce your training budget?

Lindsay: We have streamlined our organizational structure by benchmarking against the best plants in the nation. Also, as we mentioned throughout this interview, incorporating new technology continues to drive us toward more efficient delivery of our training product.

Training methods that are imaginative and indelible

A Duke Power training instructor's human-performance sessions go from mountaintops to ocean's crest.

BY TOM SHIEL

ANY DUKE POWER employee taking a human-performance training course taught by L. D. Holland may end up spending the day aboard a ship or on top of a mountain. Holland is a human performance instructor at Duke Power's McGuire nuclear power plant, in Cornelius, N.C.

Last year, employees arriving for one of Holland's classes were told they would be boarding the *Titanic* to learn about the human performance issues that caused the "unsinkable" ship to go down in the North Atlantic in 1912. Greeting employees as they entered the "ship" was Holland, dressed in perfectly tailored Dress Whites, polished white shoes, razor-sharp creased slacks, European Theatre medals, and Queen Mary seal on his captain's hat.

More recently, Holland transformed his training room into the Base Camp 5 on Mount Everest, complete with a two-

L. D. Holland leads teams of Duke Power employees through investigations of a Mt. Everest tragedy.

Tom Shiel is a senior communications specialist at Duke Power, in Charlotte, N.C.

person tent, stainless steel cookware, and climbing apparatus.

Holland took his employees (students) back to May 10, 1996, when 33 climbers were about to try to scale the summit of the highest mountain in the world. For some of the climbers, it was to be the last day of their lives.

While the events that caused the *Titanic* to sink and several mountain climbers to die may not seem related, they are, according to Holland. Both incidents provide valuable insights into activities to be avoided when successfully operating a business, or in this case, a power plant.

In both "*Titanic*" and "Summit Fever," Holland shows videos that provide the actual accounts of events according to survivors and people who analyzed what happened.

Holland wants his students to feel what the passengers and climbers went through. A lot of people chalk up the accidents to arrogance, ignorance, or bad luck. Holland proves the factors that sank the *Titanic* and led to the climbers' deaths on Everest are the same ones that cause problems in many of today's businesses.

Complacency, arrogance, a win-at-all-costs attitude, human error, and failure to learn from the past are characteristics not unique to seafaring vessels or daredevils trying to climb to the sky. The lessons he offers are valuable at all levels, he observes. "What defines a leader? Is it just a first-line supervisor? No, it's everybody in the plant. Every person in the plant is making decisions."

Titanic

"We use the uniform, boarding passes, boson's whistle, and other items to create the proper atmosphere to teach the lesson," Holland said. "Once the participants are in the proper mindset, we go through what happened on the day the *Titanic* went down."

Were the captain and crew complacent? Was there infighting among the junior officers? Was anybody capable of controlling this mammoth beast of steel and steam?

There was no single factor that caused the tragedy, Holland noted. Instead, a multitude of human performance issues added up to disaster.

Holland's program lets his passengers piece together the puzzle. *Titanic* was competing against its sister ship, the *Olympic*, for the transatlantic crossing record within its own company. Everyone involved with the *Titanic* was so convinced of its indestructibility that little time was devoted to testing it at sea before its maiden voyage.

After students go through the *Titanic*'s retelling, Holland splits them up into five "boarding rooms"—one room for each principle of human performance. For example, one room tackles the principle that everyone makes mistakes. Students list examples of where this principle was either challenged or failed during the *Titanic* adventure. Another room considers how the crew could have avoided the situation, while another explores how management caused the tragedy by emphasizing the importance of production without considering safety issues.

Holland points out that if the crew had been properly trained, it would have known to steer into the iceberg instead of swerving to try to avoid it. According to Holland, the ship could have survived a head-on crash because it was designed with numerous chambers in the hull that could be sealed off to prevent sinking in the event of a head-on crash.

In trying to avoid the iceberg, the crew tried to make a maneuver the ship was incapable of making, and the iceberg ripped a gash along its side, assuring its watery demise.

Of course, the simplest answer for avoiding the iceberg was to keep the ship out of the ice field until a procedure was developed to navigate it safely.

"There was a captain on board another ship, the *California*, that was in front of the *Titanic* that night," Holland said. "He had called the *Titanic* and said he was not go-

ing to try to navigate the conditions at night. He would try again in the morning. That captain was focused on prevention. Did he get to New York? Sure he did. Did anyone die in the process? No."

Holland asks his students to recall instances in their own lives when achieving goals caused all other issues to become secondary.

"You wouldn't believe the discussions that get started when everyone starts realizing the lessons learned," Holland remembered. "It's really powerful. It drives the point home."

Summit Fever

That same drive to succeed led to disaster for members of the two teams that failed to follow appropriate human performance procedures in their efforts to reach Everest's summit in 1996.

As background, both teams were led by accomplished climbers, and each team consisted of climbers of varying abilities.

One of the leaders felt indestructible. He had never gotten caught in a storm high on the mountain. He was convinced that with all of the people attempting to climb the mountain, there would be a tragedy, but it wouldn't involve him or his team.

The other team leader felt that his skills weren't fully appreciated in the climbing community. He believed that he was capable of getting anyone to the top of the mountain no matter their skill or experience. His goal was to bring a media person to the summit to conduct a cyber-interview from the peak. That, he felt, would bring him the recognition he deserved.

In each case, a plan had been formulated for success. For the climbers, it involved staying on the mountain only until 1 or 2 p.m. on the day of the final ascent. Anyone not having reached the summit by that hour would have to turn around. This deadline was determined by weather conditions.

"Reaching the summit is always optional. Getting down safely is mandatory." Holland uses this quote by mountain climber Ed Viesturs as the opening theme of his presentation.

"Can anyone in the room adjust this quote to fit their line of work?" Holland asks.

There are several responses, but he focuses on one: "Making power is optional. Doing it safely is mandatory."

For their own personal reasons, the leaders of both climbing teams ignored the deadline for turning around. One leader was determined to get the media person to the summit so that the interview could be conducted. The other had invited a client who had failed to reach the summit the year before. The leader was determined not to disappoint his client again.

In both cases, the leaders lost sight of the ultimate goal—to get safely down from the mountain.

"Remember," Holland pointed out. "Each client pays somewhere in the area of $100 000 for the experience of reaching the summit. There is pressure for the team leaders to succeed."

Duke Power employees participating in "Summit Fever" hear from a climber who lost his nose and hands to the cold that day. They listen to the widow of one of the team leaders and how, in the final moments of his life, he spoke with her on the phone from the summit and together a name was selected for their unborn child.

Why did the climbers' deaths happen?

Class members are divided into two groups—one for each of the climbing teams. They then analyze the events from their team's perspective. Using carabiners (clips used in mountain climbing) attached to a climbing rope, they prioritize the eight leading factors that led to each team's failure:

- Unclear roles and responsibilities.
- Distractions.
- Overconfidence and complacency.
- Not working "the plan."
- Lack of teamwork and communication.
- Competitive pressures.
- Hurried decision-making.
- Unclear expectations.

Holland believes that while some Duke Power employees know about the 1996 Everest tragedy, they never consider it in light of their own performances. Yet all of his students make decisions in their daily business activities that ultimately lead to success or failure.

The settings may change—from mountains to oceans to power plants—but the philosophies of human performance are fairly consistent.

"I tell my students to look at what happened to the *Titanic* or to the mountain climbers and learn from them," Holland said. "That helps ensure we don't repeat those mistakes on our watch."

The instructor

L. D. Holland is from Statesville, N.C. After attending the University of North Carolina at Charlotte, he joined Duke Power in 1980 as a powerhouse mechanic. He later worked as an instrument and control technician at McGuire nuclear station, joined the training group at the site, then moved into the Human Performance group.

Aside from working as a human performance instructor, he has held a variety of responsibilities during refueling outages.

He holds certification from Performance Improvement International, and is also certified through the Institute of Nuclear Power Operations' Human Performance Fundamentals program.

His unique style for teaching came about as he looked for ways to present classes that would make a lasting impression on his students.

"I thought, we are always trying to teach human performance, but we're always trying to teach it through concepts that come from some Ph.D., rather than the field," Holland said. "We couldn't really apply these concepts because Ph.D.-level stuff is all conceptual. It's all that white-rat-in-the-box stuff. People who work in power plants don't relate to that very well. They want things they can grasp.

"I came up with the idea to do case studies in a way that would get people focused on something they know about. Once they're focused, I interject a few key points—like the conservative decision-making I talk about in 'Summit Fever.'"

While Holland enjoys mountain climbing, Everest is not on his list of things to do.

He got the idea for his "Summit Fever" presentation after attending a training seminar at Omaha Public Power District's Fort Calhoun nuclear station. Dave Weaver, an operations supervisor there, used the 1996 tragedy on Mount Everest as a case study.

Holland attended the program during a benchmarking trip and decided to try to make the idea hit a little closer to home.

"We try to tie it back to what a leader is supposed to do," he said. "We also try to put people in the position of going through what those climbers and their families went through.

"Then I take them from there to the plant. Now I've got them."

The presentation so far has been given to the leadership team at McGuire (17 to date). Holland also is scheduled to give it for maintenance supervisors at Duke's Oconee nuclear station.

"I'm getting a lot of feedback from a lot of the managers who want to do it for their groups," he said.

The popularity of the class is obvious from the response Holland has received both within the corporation and from other outside organizations. How does he know his method is effective?

"I still go downtown [to Duke Power's corporate headquarters in Charlotte] today and people will walk up to me and say, 'Climb any mountains lately?' That tells me that the lesson stuck."—*T.S.*