THE *NUCLEAR NEWS* INTERVIEW

David Fitzgerald: Outage work at Callaway—Challenges, planning, and lessons learned

A fall refueling outage will include replacement of steam generators and turbine rotors and will bring as many as 2000 workers on site.

AmerenUE's Callaway nuclear power plant is preparing for a fall refueling outage that will include replacement of steam generators and turbine rotors. About 2000 workers will be on site for the outage, more than half of them contract labor.

David Fitzgerald is manager of outages and work management at Callaway, named to that position last October. Prior to that he was a plant manager at two different AmerenUE hydro power stations, and he has also worked as a strategic outage manager for AmerenUE's fossil-fuel and hydro plants, which total almost 7000 MWe. He did, though, start his AmerenUE career at Callaway, where he acquired more than 18 years of experience in various positions, including general supervisor of outage scheduling, outage maintenance manager, manager of operations support, and superintendent of security. He is also licensed as a senior reactor operator and spent 14 years in Callaway's operations department.

The Callaway plant, in Fulton, Mo., has a 1171-MWe Westinghouse pressurized water reactor. The steam generators will be changed out for the first time since the plant began operating commercially, in April 1985.

Fitzgerald talked with Rick Michal, *Nuclear News* Senior Editor, about outage work at Callaway.

Fitzgerald: "Replacing steam generators and turbine rotors are huge tasks." (Photos: AmerenUE)

Callaway is preparing for a refueling outage this fall during which the steam generators and turbine rotors will be replaced. What will that involve?

The estimated duration for the entire outage is 70–75 days. Replacing steam generators and turbine rotors are huge tasks, and to me it's similar to Callaway's construction period back in the early 1980s. The complexity of the work is enormous, particularly the job of replacing the steam generators, bringing in the number of workers that will be needed, and coordinating it all. We started preparing for the outage two cycles ago—our operating cycles are 18 months long. During preparations, we mapped out the containment area and evaluated any interference that might have hindered equipment movement. We ended up having to modify the working platforms to facilitate the actual replacement of the steam generators.

Are you planning to use any new techniques or state-of-the-art equipment during the fall outage?

Not really. Many other nuclear plants have performed steam generator replacements previous to Callaway, and while an industry outsider may see some of the equipment that will be used as exotic, we're primarily going to use what previously has been proven at other nuclear plants.

Callaway is extremely fortunate in its design in regard to facilitating the steam generator replacements. For example, our containment equipment hatch is large enough to allow placement of the new and removal of the old steam generators intact, without cutting any additional entry holes in the containment structure. And our interior dimensions and primary shield wall locations are such that the shield walls can remain in place. In addition, our containment polar crane is sized to perform the required lifts without modifications. Prior to the outage, we will also be performing steam generator nozzle welding fit. The weld radiography will be performed outside of containment. No radiography will be required inside of containment during the outage, and that will greatly alleviate scheduling issues that other plants have experienced with radiography.

Are you confident the outage will be sufficiently staffed, considering the manpower issues the industry has faced?

We anticipate that approximately 1800 to 2000 workers will be on site for the outage. Callaway's work force is approximately 800 people, so we'll be bringing in about 1200 workers beyond that. Workplace staffing has been an industry issue, of course, but I'm confident that we'll be sufficiently staffed for the outage. We have union labor here at Callaway, so in preparing for the outage we started talking with

business agents and union people some time ago. Business agents are people who represent the union workers. Our biggest need will be welders, but I am certain that their union will provide us with what we need.

Regarding our permanent staff, we're experienced at getting the work done, but we are on the verge of having a significant number of people go into retirement. One of the things we're doing for outage work is bringing back retirees—we've developed a more flexible approach to staffing by keeping an experience base. Other sites are doing the same thing, too.

What jobs are done by the former employees that you bring back?

They do things like quality control. Or, for example, we're bringing back the former manager of quality assurance, who will assist with our reactor vessel disassembly and head removal. There are many jobs that retirees can fill. We've brought people back as containment coordinators, maintenance supervisors, and outage planners. We have not, to date, brought back craftspeople, but we are considering it for the future. In that regard, we have set up a union organization that can act as the vehicle to supply us with craftspeople who are former plant union members. If they come out of retirement to work for us during outages, they will still be union members.

Overall, it's been extremely difficult attracting younger people to work in the nuclear power industry. I think there needs to be an effort by some of us who have been in the industry a long time to establish successors to our positions. We need to develop young people so that they have a good understanding and skill set relative to the industry. I'm hoping that with the promise of the revitalization of the nuclear industry we will attract younger people who want to make this a career.

Has Callaway partnered with local colleges to set up training programs for prospective employees?

Yes, we have partnered with Linn State Technical University, in Linn, Mo., in establishing a radiation protection technician program, which involves two years of study. People from Callaway serve on the advisory board for that program, and suppliers like Bartlett Nuclear and Eberline Services, Inc., have provided equipment to get it set up. We've developed lesson plans for the program, and we've offered to bring the students in during our refueling outages to give them on-the-job experience. We've helped set up the process to assist students in gaining national certification as technicians in radiation protection. We've also offered to assist them in job placement.

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Have you had success with the program?

It's too early to tell. There are students in the program, but we haven't reaped benefits yet because it's a two-year program and the students are only one year into it. Another avenue we're taking is volunteering to do career days at high schools to encourage young people to enter the field—specifically meaning the radiation protection field and the nuclear technology field. As it is today, students in high school essentially are aware of only the medical side of radiation protection. A light bulb goes on when they find out there is a whole other field out there associated with power production.

We have also done things to attract young people into apprenticeship programs to become boilermakers, ironworkers, and craftspeople. Success there has been limited, however. The fact is, everyone wants to do what is clean and high-tech, and young people seem to have an aversion to getting dirty. But once they hear about the wages, they become interested, because crafts jobs are good-paying jobs.

Another detriment to attracting people for crafts work is the potential for travel. Some of these crafts, particularly when someone first enters the field, require a lot of travel, but I've learned that a great number of people want to settle at one locale.

The brief outage durations are having a detrimental effect on attracting craftspeople, aren't they?

Yes, most definitely. Craftspeople are more interested in working a longer duration. With our fossil fleet, for instance, we've increased our intervals for major boiler outages from once every 12 months to once every 48 months. Everyone in the power industry is trying to increase that interval and increase their availability time, and that means that there are fewer outages to work. Everyone is also trying to reduce the duration of the outages. The result has been, however, that it has made the prospect of working at a power plant less attractive to craftspeople.

One of the things that we had going for us in the nuclear industry was the fact that we were viewed as offering "clean" jobs versus the dirty jobs of working at a refinery or a fossil-fuel plant. Now, though, people would rather work on construction jobs, which are relatively clean. Plus, construction jobs usually have the advantage in that they are of a longer duration than our refueling outages.

What we're seeing at Callaway—and I think this is typical throughout the industry—is that our contract labor has aged right along with the plants. We're all in the same

Some of the old condenser tube bundles removed from the turbine building during Callaway's refueling outage in spring 2004.

position in that the craftspeople who are working for us now during outages, in many cases, did the initial construction of the plants. These people are aging, too, and at some point we're going to lose them. The next 10 years will be a challenge for the industry because we must attract new workers in all segments.

What other outage challenges do you anticipate?

For the outage coming up, I would say one of them would be controlling schedule and budget risks. We are also aggressively pursuing scope control and looking at our work assignments. We're trying to schedule our in-house people with work that is technically challenging or has high safety significance, so that the lower-risk jobs can be done by outside contractors. We have had a good effort so far on holding the line on scope additions—we have not added any significant jobs to the schedule since our freeze date, which was last November.

We have also reduced our elective maintenance items because we're trying to keep our focus on the turbine and steam generator replacements. And, of course, we'll be doing our normal, scheduled preventive maintenance, surveillance, and inspections.

Another challenge is leadership accountability, which means ownership for the schedules. We're working hard on that. And site teamwork is always an issue, to ensure that everyone understands that they have their own responsibilities, while at the same time we in management have a site responsibility for the overall outage success.

Who are the suppliers of the big components?

The steam generators are coming from Framatome, in France. We're aiming to receive them this summer. They'll be shipped by barge, coming up the Mississippi River from New Orleans, eventually on to the Missouri River, and then off-loaded at our river-docking station approximately five miles from the plant. They'll then be brought up on heavy-haulers from there to the site.

The rotors are being made in the United Kingdom by Alstom, which is headquartered in France. The rotors will also be shipped by barge and brought in to the plant.

Callaway is halfway through the term of its 40-year operating license. Do issues like obsolescence management and license renewal affect what you try to do during an outage?

Yes. Equipment obsolescence and an aging plant have an impact because there will be parts that need to be evaluated for replacement due to wearing out. In many cases, the original manufacturer is no longer in business or the equipment is no longer available. A challenge to plant operators and owners is maintaining equipment reliability while using company financial assets wisely. Investment in the plant is continually made to maintain nuclear safety systems and commercial availability. As the plant ages, we need to continually evaluate our equipment and its ability to go from cycle to cycle to keep us from being in a forced-shutdown situation. Additional wear and tear on our equipment is something that we are always conscious of.

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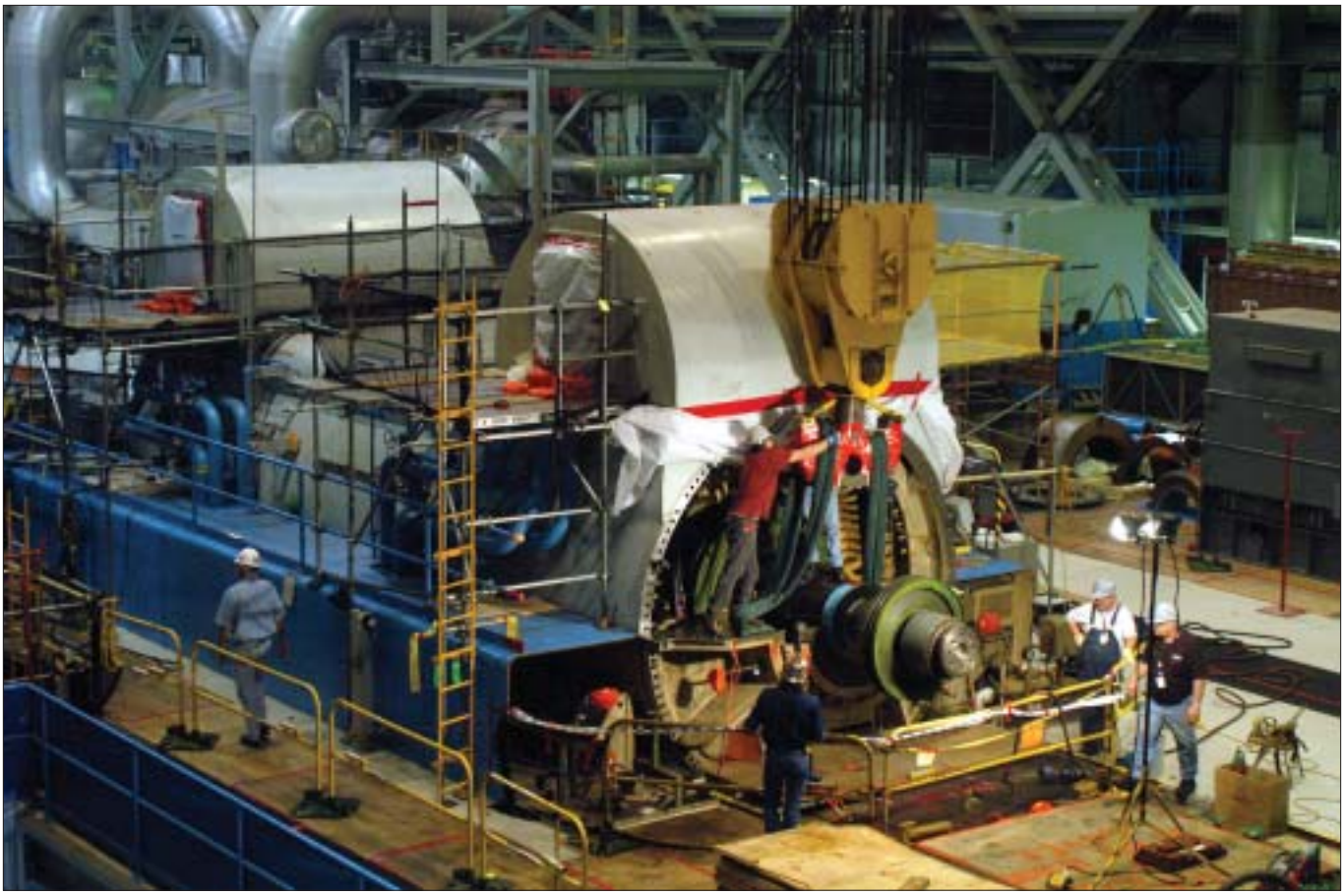
Have post-9/11 issues affected how outages are planned?

Yes, there have been some impacts. The areas that are most affected are pre-outage planning and pre-outage work. Essentially, we are most affected in getting equipment in and out of protected areas. There are more barriers to go through now because of

Callaway's outage control center, where coordinators track the progress of the plant's outage performed last year



Maintenance work on the main generator during the spring 2004 outage

plant modifications that were made post-9/11. But it isn't anything that is insurmountable, and it's not extremely tedious. It's just something that has to be expected and dealt with.

How does outage planning differ for a nuclear plant as compared with a hydro or a fossil plant?

I've been involved with all three: nuclear, hydro, and fossil. The biggest difference is that at a nuclear plant, until the core is offloaded, there is still a heat source. That means that trains of safety-related equipment need to be operating, and there are always equipment-operating issues that affect our work planning and sequencing of jobs.

"We lost a portion of [our contract labor] mid-job, when they picked up [during our spring 2004 outage] and left to go to work at an oil refinery."

At a fossil or hydro plant, we can essentially shut everything off and go to "cold iron" in the entire plant. The bottom line is that the work sequencing in a nuclear plant is different and more complex, in order to preserve the needed safety-related systems and to maintain their ability to operate.

How has your role in outage management changed through the years?

On a personal level, as I've gone through different positions, I have seen that leadership has become more of a factor. High-level oversight—coordinating the entire plant site versus being responsible for only a relatively narrow focus and range of activities—has changed since I was in a supervisory role.

In general, though, outage management has been refined through the years. There are much higher expectations for schedule integrity and on the project coordinators and managers. We expect them to lead their projects, ensure that they hold to the schedule, and that they control their costs. The industry itself has also improved across the board, even though last year the average outage duration increased slightly from the previous year. That was because the industry did a lot of vessel head inspections, steam generator replacements, and large component replacements. Still, even with all that work, the duration increase was slight compared with what it would have been 20 years ago.

What was your outage duration in 2004?

We had one outage last year, of 64 days in duration, which involved 1800 people on site and a lot of complex activity, including replacing our main condenser. On a complexity level, it was equivalent to replacing the steam generators in that the number of welds that were made were on par with a steam generator replacement. Plus, we had a labor issue with some of our outside contractor union personnel. We lost a portion of them mid-job, when they picked up and left to go to work at an oil refinery. When that happened, we had to restaff, and it resulted in schedule slippage.

What is the status of Callaway's reactor vessel head?

We haven't had the experience that some other plants have had with boric acid on their vessel heads. We haven't had any cracking of the control rod drive mechanisms. We did perform an inspection of the entire reactor vessel during our 64-day outage, however, and we found that the entire vessel, including the head, is in good shape. So, to answer your question, we have not had to replace the vessel head, and we don't expect to replace it any time soon. NN