John Dowling: Ensuring equipment reliability is a job that never ends

The goal is to find potential problems before they become reality.

John Dowling is the equipment reliability manager at the Callaway Energy Center in Portland, Mo. The plant is operated by Ameren Missouri. Dowling and his staff of four engineers form the Equipment Reliability Group at the plant.

Starting in 2018 and into 2019, Callaway operated continuously for 467 days in a breaker-to-breaker run—which means that it operated from one refueling to the next without being out of service. The run marked Callaway’s fifth breaker-to-breaker stretch since it began operating in 1984: the first coming in 2008 (520 days), the second in 2012 (489 days), the third in 2013 (500 days), and the fourth in 2017 (514 days).

Dowling has spent his career working for Ameren, which owns Callaway. Before joining the nuclear plant, he started on the ground floor while still in school before moving up to meter reading and work in substation construction and repair. He started at Callaway in the 1980s as an electrician and then became an electrical training supervisor. He filled various rotations for the next 15 years with the maintenance and planning groups. Dowling became the supervisor and then the general supervisor of maintenance leading up to 2000, after which he became a work week manager, overseeing and orchestrating the daily schedule for the week. He then transferred to engineering work week manager. It was then that he first got involved with equipment reliability.

It was 2003, and Dowling noted that equipment reliability as a process was just starting in the industry in terms as they are understood today. He was supporting the development of a preventive maintenance program and similar activities. He became equipment reliability manager in 2008 and has had that role since then.

Callaway was recognized in August by the American Nuclear Society with the Meritorious Performance in Operations Award for the plant’s online equipment reliability excellence that has resulted in five breaker-to-breaker runs over the past 12 years.

Dowling spoke with Rick Michal, ANS director of publications and standards, about the equipment reliability program at the Callaway nuclear power plant.
Is your staff responsible for all the components in the plant?

The equipment reliability staff is charged with ensuring that we have programs that support reliable equipment. We administer the station’s preventive maintenance program, and two regulatory programs that monitor key equipment reliability and availability under our maintenance rule and mitigating performance index programs. We do failure trending, looking for common causes and common equipment issues. If we see a trend, we enter those into our corrective action program to get resolution. In addition, we facilitate and ensure that equipment-related improvement projects get risk ranked, reviewed, approved, scheduled, and funded. In doing this, we support the larger Callaway team. Each member of the Callaway team is responsible for all the components in the plant.

Does your staff work 24/7?

The station’s operations and security staff are on site 24/7. The maintenance and engineering personnel work a normal work week, but are available around the clock if needed. My staff works a normal dayshift schedule. During the work day, the station’s staff performs periodic surveys of the plant equipment on an ongoing basis. Through the course of an 18-month operating cycle, we will visit every component to get a sense of how it’s behaving. These visits will be exploratory, where there would be no indication that something is wrong, but we visit just to see if there are indications of something going wrong.

We rely primarily, of course, on our operations staff to be the station’s eyes and ears. There is a lot of equipment that our operations technicians check on shift throughout the plant, making notations about subtleties. The technicians are there all the time and will notice things. We also depend on our security force to notify us of issues. The security force is often in a portion of the plant where many others don’t get to very often. Security goes through there on a regular basis. They can check things that don’t seem right. When they do find something, they report it.

Your goal is to identify an issue before it becomes an issue?

Absolutely. The primary goal of the equipment reliability program is to identify those items that could result in the failure of an important piece of equipment early on and to start looking at measures to prevent the failure from actually occurring. It’s a very strategic practice we’re involved in.

What are the challenges for your program?

If there is an item where we need to get ahead of it before it can fail, we do what we call risk ranking. Sometimes we have to make decisions between items that seem to be equally important. We have to allocate the resources available to us to service those items of greatest importance or those of the most urgent need. The challenges we get are those sorts of things. For those challenges, we depend on the rest of the leadership team at the plant—and actually everyone working at the plant—to provide us with input on how important the challenge is so that we can make a good and sound risk ranking.

Then the decision about what to do about the challenge usually falls on our engineering staff to provide the options needed to resolve it, as well as getting other technical input into the challenge, and on how urgent it is and how much of a margin we have to deal with. We take that information to our leadership—at our plant, that’s the department director level—and they collectively review the data and decide when and how to fund the resources to resolve the challenge. The idea is that the challenge is not a problem yet, but it will be if we ignore it.

It seems that there is no finish line for your group, is there?

You are correct. We are never done and we’re never going to be done. When I say “we,” I mean the entire Callaway staff. It’s a daily task to ensure that we always look forward at what potentially can fail and to do something about it before it happens. It’s a strategic view that needs to be maintained on a daily basis. It’s something we have to do and it’s one of the most important lessons learned. We can never say, “We’re reliable now. We’re fine.” If we don’t see anything coming our way, we still need to keep looking and be on guard. We have to engage as many people as we can to help in that.

As an example, during our last outage, one of our supplemental workers reported to the shift engineering leaders that he was working on an expansion joint and that something didn’t look right. He’d taken a picture of it and showed it to me. I said he was absolutely correct, that something was wrong. It happened that the expansion joint needed to be able to flex, and this one had tightened up on one side and could have caused real problems had it not been identified. That, in turn, caused our plant engineers to walk down all the other similar joints at the plant during the outage, and we ended up making adjustments to a number of them. That’s an illustration of how the Callaway team, including our supplemental workers, get engaged in supporting equipment reliability. His intervention allowed us to address the issue immediately.

What lessons have been learned during your time in your position?

The first is that we have to learn from our mistakes. We can’t keep doing the same thing and expect different results. When something does fail, we have to do as much as we can to learn from it. That is, commensurate with how important that piece of equipment is, and that could entail making adjustments to our processes to make sure something like the equipment failure doesn’t happen again, but also that an early warning is put in place.

It’s a daily task to ensure that we always look forward at what potentially can fail and to do something about it before it happens. It’s a strategic view that needs to be maintained on a daily basis.

In that regard, we may increase our monitoring or change how we do our monitoring of a particular piece of equipment. We learn from our events, but we also learn from other plants’ events. We are fortunate that we are part of the STARS Alliance, along with the Diablo Canyon, Palo Verde, and Wolf Creek nuclear power plants. We communicate frequently with each other to discuss challenges and issues in equipment reliability. We also reach out to other operating units through the use of INPO’s IRIS [Industry Reporting Information System] program, through which the operating-experience reports from other plants are available. We review those reports to see if we have the same or similar equipment and, if so, could there be a similar experience at our plant. We ask ourselves if it’s something we should act on and do we have it covered in our station programs and procedures. Learning from others and learning from ourselves is the primary lesson learned.

Equipment reliability seems like it goes beyond your group to encompass many others at the plant.

That’s right. I cannot underscore enough that it is a team effort to support equipment reliability. It’s not just engineering, or maintenance, or operations, or work management. It’s everybody working together collectively to get a focus on holding critical equipment to the highest standard possible. It takes effort to build teamwork and the common understanding of what is important and making sure that individual goals and needs don’t take
outage Management and Plant Maintenance Special Section

preference over what the site needs at the
time. That probably is our biggest chal-
lenge and accomplishment, ensuring the
commom understanding of issues.

During outages, do you have any special
jobs that are outside of your Equipment Re-
liability Group?

Yes, but we also continue all of our on-
line roles. During an outage period, many
of our activities have to keep going regard-
less of whether we’re online or not. At the
same time, because I have an engineering
leadership position, I support the engi-
neering outage team. We deal with emer-
gent issues, as well as ensuring that all the
engineering work during the outage is ex-
ecuted on time. We are often in charge of
or providing technical support to a trou-
bleshooting team when something starts
to exhibit issues.

Two of my direct staff go work on our
eemergency diesel generator maintenance
project. Another one of my team quali-
fied as a thermographer. Thermography
is “temperature photography.” During an
outage, we may be challenged, at a mo-
moment’s notice, to send someone out to take
a thermography reading and determine
if we have a problem. We have an infra-
red camera, and we look for hot spots on
equipment that may indicate a problem.

Thermography is just one of many predic-
tive technologies that we employ to access
the state of a piece of equipment.

Can thermography be used for electrical
equipment and not just mechanical?

Absolutely, thermography comes into
play very often with electrical equipment.
I could have three connections right next
to each other, two of which could be cool
and one could be blazing hot in compari-
sion. That would be a good indication that
I have a loose connection that needed to be
tightened up or there could be a damaged
cable that could ultimately cause a fire.

When your team identifies emergent work,
takes action on it?

When emergent work is identified at the
station, we usually assess it using our FIN
(Fix It Now) teams. Like many other sta-
tions, we have a maintenance FIN team.
We also have an engineering FIN team that
provides the immediate support for emerg-
ing items. Each FIN team supports the
other very well. They deal with the bulk of
our emergent work. If it’s something that’s
beyond fixing immediately and requires
more extensive planning to execute, then
we would take that piece of equipment out
of service if needed until we could get the
job planned correctly, the available parts in
house, and so on. That would then go into
our normal plant work. It’s not unusual and
most plants do something similar.

Callaway won ANS’s Meritorious Perfor-
inance in Operations Award in 2019. Is that
a “whole plant award” or does any unit or
group take more responsibility for it?

This is a site award. The award is rec-
ognition for all the dedication and team-
work that goes on at the station. That is
why we sent a team to receive the award
from ANS in August. We were represent-
ing the entire station and it’s really a tribu-
eto everyone.

We also need to recognize the support
we enjoy from our corporate leadership.
We’re a member of a much larger corpo-
racion, but we’re the only operating nucle-
ar station in that entity. We enjoy strong
support both financially and technically
from the larger expertise of Ameren Cor-
poration. It’s not just a station award. It’s
also a corporate award.

Our chief nuclear officer, Fadi Diya,
summed it up best when he said: “I am
very proud of the Ameren and Callaway
team in making this unique accomplish-
ment. This was the result of significant
collaboration and focus by our co-workers
in doing the work safely, correctly, to the
highest standards, and with conservative
decisions. Simply, this was the right thing
to do and our work is never done. We still
have a lot of exciting improvement oppor-
tunities ahead of us.”

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