



# MICHELLE ZIETLOW-MILLER: THE INS AND OUTS OF OUTAGE MANAGEMENT

Michelle Zietlow-Miller, outage manager at Exelon's Quad Cities plant, had no particular interest in nuclear while growing up in the (very) small town of Great Bend, N.D. She was, however, good at math and science, and taking her mother's advice to pursue a career in engineering, she earned a degree in chemical engineering from Iowa State University in December 2004.

At the time, one of her dream jobs was to work as a chemical engineer for Budweiser. ("Making beer is a chemical process that involves fermentation," Zietlow-Miller explains. "Chemical engineers are hired as process engineers to oversee the fermentation and bottling processes.") Alas, the King of Beers was not in her future. Instead, Exelon came calling, and in January 2005, she began a career in the nuclear industry as a systems engineer at Quad Cities, located in northwestern Illinois. She's been at the two-unit boiling water reactor facility ever since, but in a variety of roles.

Zietlow-Miller recently spoke about her career and outage management strategies and challenges with *Nuclear News* staff writer Michael McQueen.

## **Let's begin with that first job at Quad Cities. What do systems engineers do?**

Systems engineers are responsible for trending, troubleshooting, and maintenance associated with plant equipment. Systems engineers trend temperatures, pressures, and different parameters on the system. They implement preventative maintenance on the components, and they advocate for any corrective maintenance that needs to be completed. Systems engineers will troubleshoot any issues associated with their system and write investigation reports to identify causes of equipment failures. Those products may lead to new preventative maintenance needs, identify flaws in our maintenance practices, or identify component vulnerabilities that may need to be addressed.

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Refuel floor technicians perform vessel reassembly during the 2021 Quad Cities outage.

### **How long were you in that position?**

I was a systems engineer for roughly two and a half years, and I started out with radwaste and fuel pool cooling as my initial systems. Throughout my two-and-a-half-year tenure, I became an expert at troubleshooting. I then used those skills to learn a number of other systems before I transitioned over to operations as a senior reactor operator.

### **How long were you an SRO?**

About four years, before I transitioned to the outage work control group.

### **What motivated you to move to outage work?**

When I started, outage work control was the lifeline of the plant. They made most of the decisions as far as what work got performed, either on line or outage. They had a lot of influence, and I was really interested in how a refueling outage is put together. A large amount of work is completed in a short period of time, which requires a great depth of knowledge—to understand the system interconnections and how they work together through a plant shutdown and startup. I also wanted to learn key skills associated with influence and motivation and how to utilize those across the entire site to complete an outage within the business plan goals of dose, dollars, and duration, or the “three Ds.”

### **Could you explain that a bit more?**

The dose [to which workers may be exposed] to do the work, the [dollar] cost to perform maintenance, and the duration of the outage are the main indicators that the industry uses to measure your outage performance.

### **What was your initial job with the outage control work group, and how did you progress to your current position?**

I started as an outage scheduler, learning how the outage schedule was laid out and the key activities that happen every outage. With my operations background, I progressed to an outage specialist within a year. In that role, I learned how to lay out more complicated systems and ensure that systems required for major events during the outage were scheduled accordingly. I learned how to lead others in this position, and I took on greater responsibility reviewing other [outage] windows and providing direction to the group on issues that needed to be fixed or tracked for resolution. I also learned how to provide information to key members of the organization during the outage to help drive the schedule and ensure that key activities in the outage were monitored. I was in the specialist position for seven years before I transitioned into the outage manager role.

### **How would you describe the outage manager role?**

I am the main person in charge of our refueling outage. It's my job to ensure my team works with operations, maintenance, and engineering to select the right scope to allow the unit to run for two years upon outage completion and also balance the goals of the outage—the three Ds. I also ensure that any challenges to the outage are managed to ensure successful completion.

### **How long have you been outage manager?**

Since 2019, so two years.

### **You've progressed through a number of positions at Quad Cities. Do you see yourself remaining its outage manager?**

I've been in the outage group a long time, and I do like being outage manager, but I've got high aspirations. I see myself at the executive level someday.

### **"Executive level" meaning ...?**

I'm thinking the executive levels at corporate. I'd love the opportunity to take on the role of senior vice president of Midwest operations or senior VP of operations support.

### **What are their responsibilities?**

The senior VP of Midwest operations is in charge of the operation of Exelon's six Midwest nuclear sites. The senior VP of operations support is in charge of different ancillary services, such as turbine services, reactor services, and nondestructive examination testing, all of which support the sites' refueling outages.

### **Quad Cities' last refueling outage was earlier this year?**

Yes, our last outage was in the March–April time frame on Unit 1. The next Unit 2 outage will be in 2022. We're on a two-year cycle, performing one unit outage each year.

### **How long was the last outage?**

That was our best outage ever, at 16 days and 15 hours.

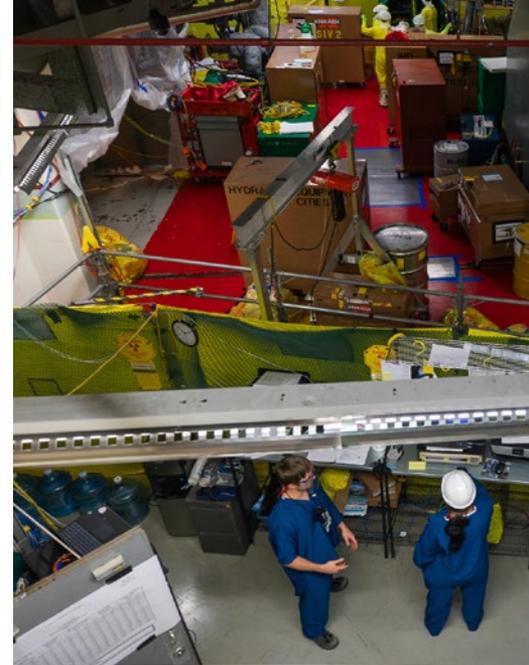
### **So last year's outage on Unit 2 would have been the first performed during the COVID-19 pandemic?**

Yes. The 2020 Unit 2 outage, my first as manager, was also in the March–April time frame. When our outage kicked off there were minimal guidelines in place, such as social distancing, but the pandemic was starting to peak. Within days, they had started the mask guidelines.

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A technician performs refueling moves during the 2021 outage.





Workers perform maintenance during the 2021 outage.

### **I presume that presented some challenges?**

Absolutely it did, but we were prepared. Before our outage began, we had started putting together a playbook on how to operate and perform an outage within a pandemic. The playbook included guidance for symptom monitoring upon entrance into the plant and critical areas, personal protective equipment, six-foot social distancing requirements, break area and work area requirements, and cleaning guidance to help maintain the health of our workforce. We had to reconfigure many of our work areas prior to the outage to meet the new guidance.

We started putting together our protocol for how to respond to positive cases. We identified critical groups, such as operations and reactor services, and laid out minimum staffing requirements so that we could adequately respond to a large outbreak. The intent was to ensure that we would have enough staff to operate the other unit and continue with the outage.

Also, for that outage we had to set up a daily protocol for reviewing our work scope against our staffing. We developed a decision tree to allow for quick decision-making in the event of an outbreak. We identified potential scope removals that were reviewed through the outage scope panel prior to the outage. Our goal was to keep scope that would provide us the opportunity to improve the plant, but if removed would not impact our equipment reliability or affect our ability to complete a breaker-to-breaker run upon completion of the outage.

### **Did those challenges result in a longer outage than was hoped for?**

Than was hoped for, yes. However, our 2020 outage was, at the time, a record outage at 16 days and 23 hours. Prior to 2020, we hadn't been able to perform an outage in less than 18 days.

### **Regarding this year's outage, what were the major challenges that presented themselves?**

The pandemic was a large part of it. We had had a lot of experience from the year before, however. Our top priority was the workers' health and safety. We were able to use our site OPEX [operating experience] along with fleet OPEX to set up temporary workspaces or break areas for our supplemental staff. We brought several temporary trailers on-site to house our contractors during break periods and ensure we were within the CDC guidelines. We also implemented staggered shifts, which allowed us to spread out break times to minimize personnel in break areas and help keep our personnel apart to minimize spread of the virus.

In 2021, we implemented an entrance-testing strategy. Anyone traveling to a site for an outage or any supplemental staff, such as contractors, had to be tested prior to entering the site for the outage. We also implemented an exit-testing strategy. A lot of our staff and contractors travel from outage to outage; this strategy ensured that the health of staff was not compromised and minimized any spread from site to site.



The other specific challenge we had was resource challenges due to an extended outage at LaSalle. As you know, Exelon has a large fleet, and our outages are strategically scheduled to minimize overlap. The extended outage at LaSalle impacted resource availability for the remaining spring outages.

Fortunately, we employed some of our lessons learned from the previous outage to identify potential scope removals that would not impact equipment reliability to help maneuver some of our resource challenges.

**While the 2021 outage can obviously be considered a success, what things could still stand improvement?**

There are a few things that we're going to focus on. Specifically, at Quad Cities, I'm experienced with building decision trees to deal with the unknown in staffing or in COVID. We continue to look for opportunities to use those tools to aid in decision-making during the outage.

Quad Cities is also focusing on continuous improvement. We set out a goal after this last refueling outage to write a thousand lessons learned, and then we sat down and analyzed that data and came up with some specific actions that we're performing to improve our site outage performance. One of those actions involves my team developing tools to guide our outage control to gain better organizational alignment and understand the critical points in what we're driving to. This will result in better

communication and allow us to look ahead and validate readiness instead of reacting to issues.

The last thing that we're going to focus on at Quad Cities is benchmarking. I have a plan for my shift outage managers and shift outage directors, who lead the outage control center during the outage. I've also included my ops outage managers and my maintenance outage managers. Both groups are going to benchmark a different site and come up with recommendations for things that we can put into our outage control center training that we do prior to each outage to help ensure we're better prepared.

**Do you use Zoom or some other digital platform to meet with outage managers from other Exelon plants?**

The outage managers have a peer group. We meet weekly on Microsoft Teams. That meeting is used to discuss OPEX, lessons learned, issues that other sites are seeing as they get ready for the refueling outage. We've got a handful of sites that are going to have fall refueling outages, so I've taken notes on things that they're seeing so that I can be in front of that for my outage in the spring.

**What differences, if any, are there between the role of outage manager five or 10 years ago and your current role?**

I would say that my organization, Quad Cities, has gone from an outage manager-dominated organization to an

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Reactor operators perform a surveillance during the 2021 outage.

exceptional equipment reliability organization, where we all support each other and make sure that we scrutinize the scope to ensure equipment reliability needs are met first and outage goals are balanced. When I started, you had to have a compelling reason as to why something needed to be added to outage scope. Now, if there's some issue out in the plant, it will be added to our outage scope unless it's something that isn't a current threat to the operation of the plant.

**Are there improvements or changes that have occurred over the last few years that are making outages easier, less expensive—or conversely, harder?**

Yes. In the outage manager role, I've watched us transition from being very focused on outage duration and getting that as short as possible to minimizing on-line risk. Ten years ago, we took work out of the outage that we could perform on line. In the last five years, the industry has reevaluated our views on operational risk, and some of that work that had moved on line has returned to the outage. For example, work on redundant components associated with systems we have defined as critical to maintaining power operation are now worked in the outage to ensure we maintain our defense in depth. This has led to improved operational margin.

**What is meant by “defense in depth”?**

Defense in depth means we have redundant equipment available to provide backup capabilities in the event the operating equipment has some type of failure. Work on redundant equipment has been moved to the outage to ensure our plants maximize their reliability to produce power for our customers.

We've had to reevaluate our maintenance plan and our preventive maintenance strategies to make sure that the work that was on line that has now come back into the outage fits within our vision of continuing to drive outage duration down, which supports more operation for our customers.

**Returning to the subject of the pandemic, are there any lessons learned that can be used to inform future outage strategies?**

I think it's made us much better at contingency planning, which reduces our reaction to the unknown, and we now have a playbook that we can use going forward. It's certainly made me think differently about how I plan for contingencies in my outages. Resource planning is another area we are focusing on. We will need to be more agile in making and validating our assumptions on staffing to ensure we identify the right scope, and balance the duration to meet the business needs.

**Do you have a policy on vaccines now, with the COVID Delta variant and what have you? A lot of places are requiring vaccinations. Is that going to be required for outage workers?**

The company has not mandated vaccines. However, we are following the CDC guidelines for vaccinated and nonvaccinated workers, and we continue to reevaluate our strategy based on any changes that we see there.

**Is there anything that keeps you up at night when thinking about an upcoming outage?**

I think the thing that keeps me up at night is what I don't know about or what I can't see. So, the first time I went through an outage as the outage manager, I didn't see COVID coming. My second outage was easier, given our familiarity with COVID, but then I didn't see my sister plant having a major, never-seen-before repair that was going to impact my resources. I worry about what can't I predict that I'm going to have to deal with, and I've made it a goal for myself as the outage manager to try and finish an outage without a major emergent issue. I haven't been able to do that yet.

**Any final comments?**

Working in nuclear power has given me the unique opportunity to understand what nuclear brings to the power sector. Nuclear power is one of the most reliable power sources available, and we take pride in our ability to remain reliable for our customer base. I'm proud to work for the Exelon fleet, and I'm looking forward to the next challenge our spring outage in 2022 will bring—I'm not sure what it is, but I'm confident I can handle anything that comes my way. ☒

Workers clean a heat exchanger during the 2021 outage.

Tensioning the reactor head during the 2021 outage.

