

from another site. We've had an individual provide remote monitoring job coverage for the drywell and for the refueling floor during the outage at Brunswick while stationed at the Harris plant, freeing up people at Brunswick to do other tasks.

### How do the cameras installed in the plant support your maintenance program?

**Ratliff:** We strategically place cameras around the facility in areas where we want continuous monitoring. We use cameras to monitor parameters such as pressure, temperatures, and flow throughout the plant. We can take video footage of gauges and utilize pattern recognition technology and convert that still image into data that can be stored and tracked on a graph as well. We can also see how quickly parameters are changing. If we see a step change or something that starts to decrease, whether it's pressure, temperature, flow vibrations, or something else, we can set alarm set points for flow thresholds to know the pump is saying, "Hey, come look at me. I have something going on here."

Another use of the pattern recognition technology I just described is a wireless gauge reader that can be put on an analog or digital gauge. We can use this wireless reader to take an image of the analog gauge, just like the gas gauge in your car, and convert that to a digital signal, which can be sent over a wireless network. We started implementing that in the beginning of 2019. We have a number of those in use around the plant. They give us more data to analyze so we can identify conditions.

The latest technology we've

installed is called motor current signature analysis. The current transformers measure the current coming through the cables that are supplying power to the motor. It can compare all three phases and look for any kind of imbalance or shift. If something mechanical were to change in

the pump, such as a bearing starts to seize up or the cooling water flow ceases and the pump is running at a hotter temperature, then we can identify that before it impacts the component itself.

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**It's impossible to diffuse a threat without seeing it.**

**Until it's not.**

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