Success Story

Honeywell

Entergy Nuclear Plant Improves Safety, Increases Efficiency and Reduces Costs with Honeywell Wireless Gauge Monitoring System

"Honeywell's Wireless Gauge Reader devices allow our operators to perform rounds and observe plant conditions without spending additional time in high radiation areas to manually record gauge readings. We have seen improvements in our efficiency and our ability to reduce radioactive exposure."

Gary Von der Esch, Vermont Yankee Operations Manager, Entergy

Benefits

At Entergy's Vermont Yankee nuclear power generation facility, the company wanted to find a way to improve its plant efficiency and safety by reducing radioactive exposure throughout the facility. The facility partnered with Honeywell to conduct a trial implemenation using Wireless Gauge Readers (WGR). The plant installed 13 WGRs to allow field technicians to remotely read a digital output of an analog gauge via a wirelessly-transmitted signal. The WGR is a wireless instrument that attaches to the front of existing analog gauges to help address the issues above and provide accurate, safe and reliable measurements to allow the end user to view and trend gauge readings remotely.

The utilization of Honeywell WGRs was very successful with gauge readers performing above expectations and the technology proving to be accurate and reliable – paving the way for expanding the installation of additional WGRs on safety-class gauges in high-dose areas.

Results show that the 13 installed WGRs are providing Entergy with an annual savings of more than $40,000/year and a six-month return on investment. Other benefits documented at the facility include the following:

- Dose savings was $30,000/REM which equated to an annual savings of more than $11,000. With the expansion of the WGRs, expected future savings should top $60,000/year.
- Employee time spent near high temperature or energized equipment was minimized by eliminating accumulation of unnecessary radiation dosing.

Entergy improves safety and increases efficiency at power generation plant thanks to Honeywell Wireless Gauge Readers

- Automated monitoring of 10 gauges is saving about 730 man hours annually, with an annual labor savings total of $29,200.
- The enhanced monitoring capability of the WGRs enabled anytime access to monitor the system within seconds from any network computer.
- Engineers now have more data on the performance of the system in between scheduled manual readings, improving the analysis of the system when needed.

Background

Entergy Corporation is an integrated energy company engaged primarily in electric power production and retail distribution operations. Entergy owns and operates power plants with approximately 30,000 megawatts of electric generating capacity, and it is the second-largest nuclear generator in the United States.

Entergy delivers electricity to 2.7 million utility customers in Arkansas, Louisiana, Mississippi and Texas. Entergy has annual revenues of more than $10 billion and approximately 15,000 employees.

The company's Vermont Yankee facility employs 650 people who live in communities throughout the region. The men and women at Vermont Yankee are proud of the contribution they make to the region's energy needs. Not only does Vermont Yankee meet the electricity needs of the region, but its low-cost power significantly increases consumer savings on electricity. Furthermore, Vermont Yankee and its employees are proud of the facility's safety record and its ability to produce pollution-free energy, which goes a long way to keeping the Green Mountain State green.

Since acquiring Vermont Yankee in 2002, Entergy has saved its New England customers about $330 million. Vermont also generates $100 million in economic benefits through payroll, taxes and local purchases.

Challenge

The nuclear industry has an ongoing goal of reducing radiation dose to "As Low As Reasonably Achievable" (ALARA). Entergy, a company known for its commitment to safety and pollution-free energy wanted to find a way to increase efficiency and improve safety at its Vermont Yankee power generation facility.

With more than 100 gauges monitored manually throughout the plant, Entergy recognized several issues to address including errors that occurred with manual readings, radiological exposure with more than half the gauges located in radiological controlled areas and infrequent gauge measurements with periods of six hours or more when no measurements were available.

"We knew that we needed an advanced technology to help us improve our nuclear safety and performance at the Vermont facility and recognized the benefits that wireless technology could provide as a cost-effective means of achieving these goals," said Gary Von der Esch, Vermont Yankee Operations Manager, Entergy.

Solution

Vermont Yankee partnered with Honeywell to implement and optimize the use of Wireless Gauge Reader technology in its nuclear power plant to reduce radiation exposure and enhance system monitoring.

Thirteen WGRs were installed at locations identified by Vermont Yankee engineering and operations personnel where the current gauge could only be read local to the equipment being monitored. The WGR is a wireless instrument that attaches to the front of existing analog gauges with different adapters to accommodate gauges with different diameters and different types of gauges, such as panel-mounted, process, magnahelic and photohelic. This new technology introduced by Honeywell transmits a gauge reading wirelessly via WiFi 802.11b/g protocol.

The WGR solution also includes an application gateway that includes the database where the gauge information is stored, OPC server software for interfacing with other host systems and internet-based software that is used to trend, alarm and analyze the gauge data.

"With the WGR installed, our operators are able to perform rounds and observe plant conditions without spending additional time in high radiation areas to manually record gauge readings," continued Von der Esch. "The operator can now take the gauge reading in seconds from any network computer – reducing time, human error and expanding system monitor data points – most importantly reducing radiation exposure."

The enhanced monitoring capability enables operators and engineers to gather data on the performance of the system in between scheduled readings which allows improved analysis of the system when needed. "Going forward Vermont Yankee will establish a feed from the WGRs to the process computer that will allow the system data from the WGRs to be captured and mapped against other system data for analysis," said Von der Esch.

Vermont Yankee was able to point to a successful utilization of the WGRs at its nuclear facility in the areas of safety, cost

savings, innovation, productivity and efficiency, and transferability.

Safety

With the remote monitoring from any network computer, the wireless gauge monitoring minimizes visits to hazardous or remote locations and reduces radiation exposure to operators required to manually document gauge readings from Radiological Controlled Areas (RCA).

In addition to the reduction in time personnel needed to be near energized and high temperature pressure equipment, Vermont Yankee has documented annual cost savings. “By reducing the need for operators and engineers to have to access radiation areas to gather data, we are able to have gauges in both our Reactor and Turbine buildings and the WGR technology provides a very cost-effective tool to help us achieve the nuclear industries goal of reducing radiation exposure to ALARA,” said Von der Esch.

Cost-Savings

Monetary savings at the Vermont plant was achieved via the elimination of both personnel dose and wasted man-hours traveling into and out of the plant. The trial phase of the Honeywell WGRs documented a savings of 730 person hours annually equating to a labor cost savings of $29,200. The full implementation going forward has the potential to save more than 2,000 person hours and approximately $90,000 plus in annual labor costs.

Innovation

Entergy partnered with Honeywell to help find a process to achieve ALARA goals. Key elements to the success of this innovation were the adapting and testing period prior to installation. Vermont Yankee was able to provide timely information and recommendations to Honeywell that were quickly adopted to improve performance and reliability of the wireless devices.

“This technology opened the door to unimaginable opportunities and benefits including dose reduction, improved equipment monitoring, ‘real-time’ readings and additional data points for analysis,” continued Von der Esch.

Innovate technologies used in the WGRs at the Vermont Yankee facility include:

- Miniature camera that captures an image of the gauge face – much like cameras on cell phones today
- Software to calculate the angle of the gauge needle and calculate a digital reading
- LED lights to illuminate the gauge face so that optical images can be captured
- Ultra-low powered WiFi radio that conserves power, allowing the device to operate from 2 commercially available long-life batteries

Honeywell Wireless Gauge Readers installed on gauges at the Vermont Yankee nuclear power plant.

Productivity and Efficiency

The use of WGRs technology saves time for the operator performing rounds, reduces potential human error, and provides real-time updates to the system. With data being collected every 15 minutes, the WGRs feed more extensive data into statistical process control models which increases the ability to monitor variation early, trend parameters and enable appropriate responses to correct.

“Honeywell’s WGRs provided a solution to the inefficiencies we saw in our current system allowing us to save time, reduce dose and provide continued monitoring – enabling

our employees to spend more time doing more productive work such as analyzing data," commented Von der Esch.

Transferability

In addition to the documented benefits above, the WGR technology is transferable to any commercial facility using the 802.11 b/g communications protocol. Entergy has plans to incorporate the technology into additional fleets.

"Vermont Yankee has demonstrated the efficiency of the WGRs and has plans to expand the use of these devices to continue to drive down dose. We will look at expanding the system monitoring features by feeding the data to the plant process computer, building an alarm notification into the program and looking at other applications for equipment monitoring," concluded Von der Esch.

More Information

For more information on Honeywell's Wireless Gauge Readers or any of Honeywell's Products, Services, or Solutions, visit our website www.honeywell.com/ps, or contact your Honeywell account manager.

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