Culture Changed AT THIS Indiana Refinery

A WorkPlace Excellence Program redefines the way CountryMark operates every day and makes maintenance take a back seat to reliability.

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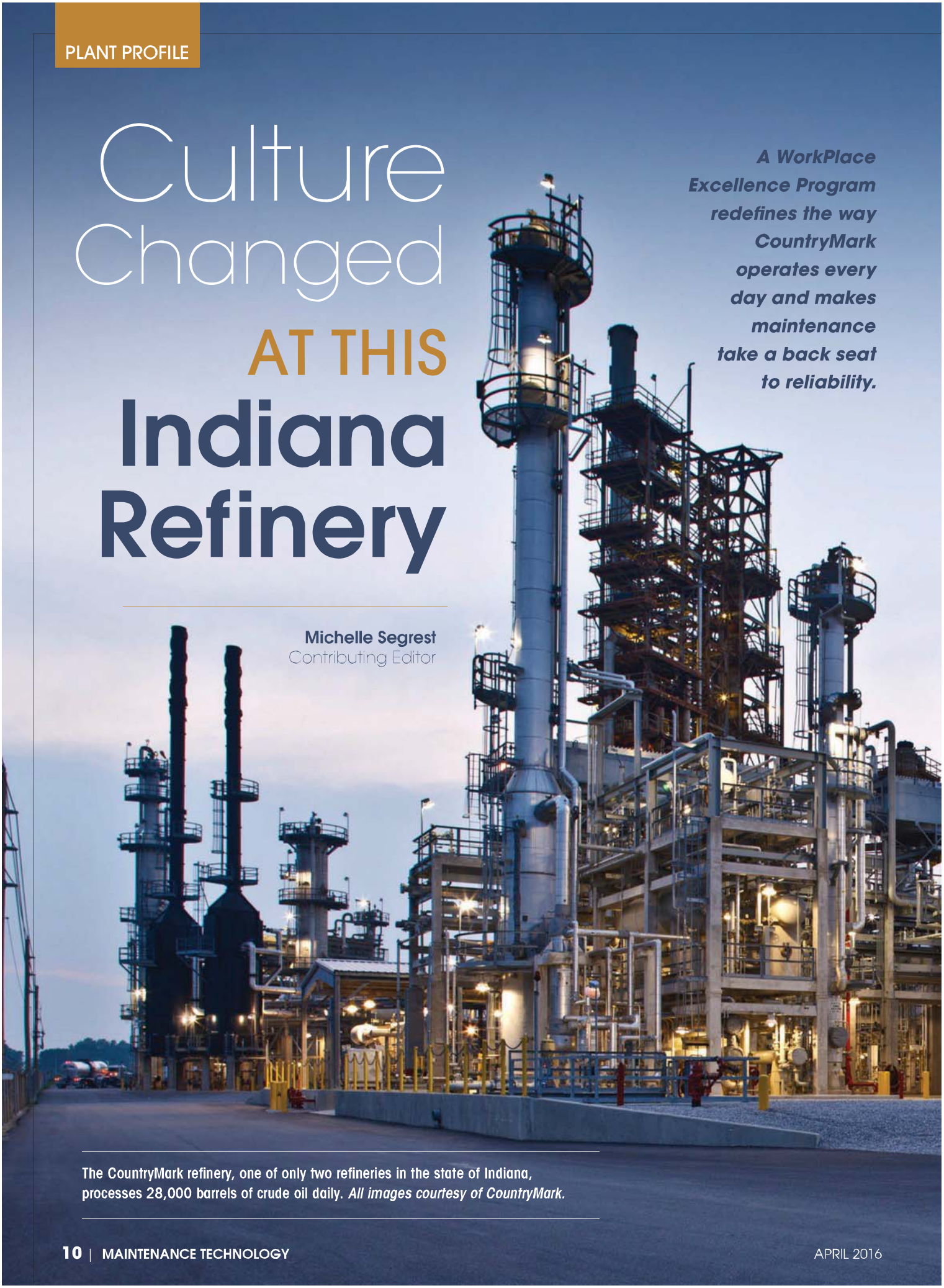


The CountryMark refinery, one of only two refineries in the state of Indiana, processes 28,000 barrels of crude oil daily. *All images courtesy of CountryMark.*

FOR 73 YEARS, THE COUNTRYMARK MAINTENANCE TEAM operated in a reactionary mode—and they were good at it.

In a crucially competitive market, the Mount Vernon, IN, oil-refinery leadership team realized the operation needed a complete overhaul to streamline processes, get control of inventory, and optimize workflow. Through a carefully conceived and well-executed plan, it is making a 180-degree switch to a predictive and preventive structure that has already increased production, decreased equipment failure, and saved costs.

Pat Ward, CountryMark's vice president of Operations, is the corporate sponsor of the company's WorkPlace Excellence Program, an idea that was born in 2008 and put into action in early 2013. Ward said he knew that one day CountryMark would have an interesting before-and-after story to tell.

"I would describe the 'before' maintenance program as classic reactionary—something would break and we would fix it," Ward said. "Our craft people are very skilled and very knowledgeable about our equipment so, in this reactive structure, it is a testimony to them that we were as productive as we were. You can be very good at fixing things, but working in a reactive way comes at a very high cost."

CountryMark operates one of only two refineries in Indiana and processes 28,000 barrels of crude oil every day while producing 450 million gal. of high-quality gasoline and diesel fuel each year. On the logistics side, trucks pick up crude from tank farms and deliver it to the refinery or to another tank on the pipeline system that gathers the crude from a three-state area. On the finished-product side, a distribution system includes a pipeline that connects terminals in Indiana where the finished product is sold.

A vital benchmark in the oil and gas industry is availability. CountryMark ranks high in this category worldwide as one of the most available facilities from an equipment standpoint.

"This is important to the manufacturer because it means you can capture most of the margin available," Ward explained. "That's how you win or lose in our business. If you have availability in your equipment and your process, then you can succeed. But we were doing this in a very reactive and expensive way."

The goal was to maintain the high availability while driving down the cost and managing the risks effectively. However, arbitrarily cutting cost and putting the availability at risk could never be the answer. "We had to find a way to work differently. It was a question of committing the people, the funding, and the changes in our system so we could implement something better."

Developing the program

CountryMark's leadership fully invested in the

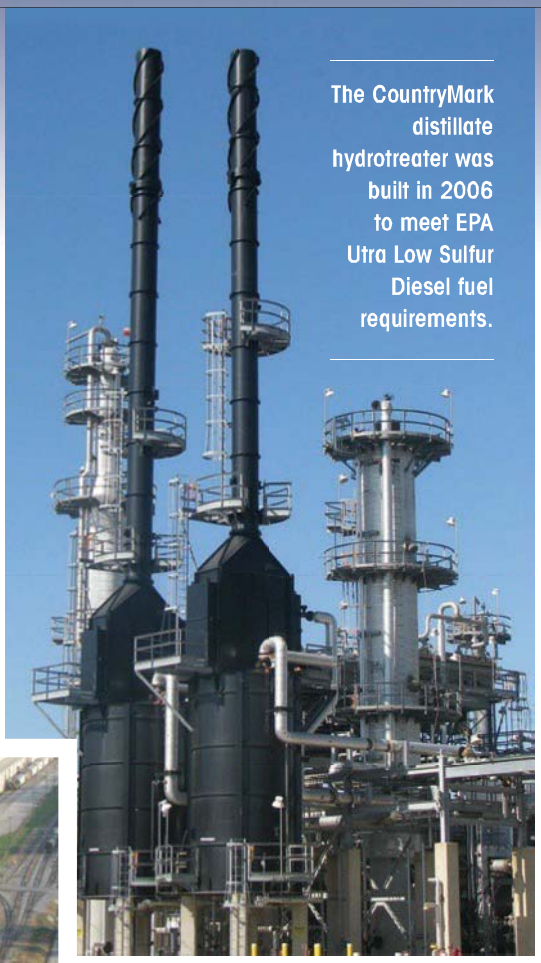
Co-Op System—Local Ownership, Local Impact

CountryMark has been a farmer-owned cooperative since 1919 and is the 12th largest agricultural co-op in the U.S. It is owned and controlled by member cooperatives that are owned and controlled by farmers or local agricultural producers. The cooperative's products and services are available to the public, and co-op members are also customers.

Patronage profits are returned to members, distributed in proportion to business volume. CountryMark profits remain in local communities to support local economies.

The company supplies fuel to member cooperatives in Indiana that distribute the premium-quality fuels through a network of more than 100 retail fuel stations, as well as more than 200 petroleum tank-wagon and transport routes. CountryMark Advantage Lubricants are distributed to member cooperatives in Indiana, Illinois, Michigan, Ohio, and Kentucky.

CountryMark products fuel an estimated 65% of Indiana farmers and power about 50% of the buses that deliver children to school each day within the CountryMark trade area.



The CountryMark distillate hydrotreater was built in 2006 to meet EPA Utra Low Sulfur Diesel fuel requirements.

Left. The CountryMark refinery, as seen from a plane that flies over the company's pipeline system every two weeks, checking for any potential problems in the company's pipeline system.

Below. CountryMark employees work to optimize refinery operations while ensuring the health and safety of all workers.

WorkPlace Excellence Program. Proactive and preventive maintenance training began several years ago with consulting firm Life Cycle Engineering (LCE), Charleston, SC. Coaches were brought in to train leaders in four focus areas:

- operations improvement
- work management
- reliability engineering
- materials management.

Two systems were targeted for replacement or an upgrade. The CMMS system needed to be replaced and the financial-management system upgraded. The enterprise system existed, but it needed an upgrade to accommodate the new maintenance-management system software interface and inventory module.

The first step was preparing the organization for the change, with extensive training and multiple teams defining the work process in the four focus areas. In addition to key skills training, the teams included a combination of planners, craftsmen, frontline supervisors, maintenance managers, warehouse workers, and operators who were all involved in mapping out more than 30 new work processes.

Ward put EAM manager Mike Willman in charge. The LCE coaches for each of the four focus teams began working full force in February 2014.

Putting the plan in motion

EAM coordinator Leslie Alton became the guardian of the program and the champion of change.

"We had used Excel spreadsheets for years," Alton said. "But we had outgrown

The CountryMark Process

CountryMark is an American-owned oil exploration, production, refining, and marketing company. It is the largest buyer of Illinois Basin crude oil, which is sourced from the oil fields of Illinois, Indiana, and Kentucky. The oil is then refined to the highest specifications at the CountryMark refinery in Mount Vernon, IN.

Fuel quality is protected as it travels north along a 238-mile private pipeline. State-of-the-art blending technology at each CountryMark fuel terminal ensures that biodiesel and ethanol blended fuels are formulated for optimal driving performance and winter operability.

CountryMark also produces a complete line of high-quality lubricants, and it carries API-certified TerraCair diesel exhaust fluid (DEF). CountryMark fuels, lubricants, and DEF are delivered daily to farms, fleets, and families across the Midwest, and are available at more than 100 CountryMark-branded fueling stations. More than 65% of Indiana farmers and 50% of Indiana school corporations are powered by CountryMark fuels.

CountryMark's upstream business includes a team of petroleum-exploration professionals, geologists, production engineers, drilling specialists, and reservoir managers. CountryMark's oil-exploration and production group manage 1,400 oil wells in six states producing 3,500 barrels of oil each day.

that program. We started working on gathering all the documentation and taking pictures of each of the objects (assets) and gathering their specifications. We now have close to 45,000 documents for all the assets. It is a fantastic equipment library that required 10 to12 people several years to compile."

CountryMark graduated to a progressive software system. "It allows us to break everything down to the asset level, but we can roll it up based on equipment types or units," she said. "This gives us granularity of how much an asset is costing us."

The company's assets include pumps, seals, motors—whatever is required to process crude into sellable products. However, 45,000 documents does not equal 45,000 assets. There are about 10,000 assets identified currently.

Alton's role is to guide the program, identify roadblocks and opportunities, and make them visible so the best solution can be created.

Focus teams

The four focus teams are cross-functional, self-directed, and responsible for executing the master plan. They include site workers with diverse skills and abilities. The teams evaluate processes to identify opportunities for improvement and train in best practices.

Operations improvement

The key component of this focus is making sure operations is inspecting equipment and identifying issues before failure occurs. Equipment-care rounds happen four times during a 12-hr. shift.

There is a crucial relationship between operations and maintenance. Operators write most of the work requests because they are working with the equipment 24 hr./day, 365 days/year.

"When the equipment isn't performing as well as it should, operators write a work request that has to be clear and succinct. In the new system they can sort through it to be sure someone else hasn't already submitted it," Ward said. "We didn't have this previously. Operators also set the work priority. If it is an emergency, such as an equipment breakdown, this becomes a number-one priority. We break into the schedule in this case. If there are too many emergencies, then you are not doing very well in terms of cost management and efficiency."

Operators are the first line of defense in terms of equipment care, so they sometimes perform maintenance tasks. They can also monitor the equipment and provide insight to prevent future issues.

Work management

The work-management team ensures that all maintenance work is identified, planned, scheduled, and completed in a way that optimizes resources. Once the work is planned, materials are kitted and made ready for the craftsmen. Maintenance includes four planners (one for each craft), a scheduler, 36 craftsmen, and maintenance manager Randy Yeida, who has been with CountryMark since 1990.

Craftsmen are divided into four specialties—pipe fitters and certified welders, electrical and instrument shop, rotating equipment, and the craft shop (carpenters, insulators, general maintenance). Yeida meets with the maintenance supervisors every morning to discuss the schedule. The craftsmen are then assigned to work orders.

"We continue to try to be more preventive than reactive," Yeida said. "Before, we were doing 30% to 35% emergency work. It's been a culture change to go the other way. The goal now is to be less than 10% emergency work. Right now we are at about 20%."

Planning the work makes the difference. Maintenance planners plan the jobs and ensure the parts are available before each job is assigned. Material-management kits the parts. "When the craftsmen go to work on a job, the tools are ready, the parts are ready, and the job is ready to be performed," Yeida said. "This makes them more efficient."

The maintenance team is responsible for more than 10,000 pieces of equipment, including pumps, motors, instrumentation, automation, transmitters, control valves, and other components. They work a regular 8-hr., Monday through Friday schedule, but analyzer technicians are on 12-hr. shifts with operators.

Reliability engineering

This reliability engineering area of focus involves reducing failures. Fewer failures mean less repairs and reduced downtime. Equipment is assigned a criticality and ranking that drives preventive/predictive maintenance and spare-part inventory decisions.

Repeat failures are investigated to find ways to engineer out the cause. Maintenance tries to prevent the failure.

"First, you plan and schedule and get efficient in the maintenance work,

Above. CountryMark pipeline welders help maintain the integrity of the company's pipeline systems in the tri-state area. This ensures that the necessary crude oil reaches the refinery and finished products travel safely to terminals to be picked up by CountryMark member owners.

Below. CountryMark employs more than 500 highly skilled maintenance and reliability professionals.

which raises the cost effectiveness of your crafts and reduces the backlog of work," Ward said. "But the big win is when you can eliminate defects or failures completely. In planning and scheduling, the craftsmen capture the reasons for failure and record the work they did to repair it. This generates a rich history of equipment performance from failures, which is then available to reliability engineers who identify ways to eliminate the failures."

Materials management

The materials-management team ensures that the right materials are in the right place at the right time with acceptable quality and at the optimal cost to support planned and unplanned maintenance work. It involves purchasing, kitting, and consolidating storage locations. Since the program began, storage locations have decreased from 48 to five. More than 600 pumps and thousands of other components were entered into the new CMMS system, organized, and relocated.

This program streamlined the massive inventory. With the help of the planners and kitting process, the craftsmen and foremen can now focus on critical maintenance work. The turnaround time for jobs has significantly decreased. The team created a system where all purchase orders are processed and monitored for future use. Now there is a visibility of repairs and job histories.

Read more about the refinery's materials-management program on page 36.

The transition

The company understands that developing and implementing this program is a multi-year effort if they want it to be sustainable. There is confidence that the broad group of professionals with different work skills can map it out in a way that is comprehensive and understandable.

"The maintenance work we are doing today is what we did in the past," Ward said. "We just used to do it in our heads, and we did it 50 different ways—and often after the fact. Now we have one process. It works more smoothly and all the different players do their part. The enabling part was to take some people out of the craft line and teach them to be good planners. This was a 100% culture change."

The process is precise, but it is also fluid. Feedback and positive change is constantly encouraged.

"If you have 35 work processes to follow every day, it's really important that you stay disciplined with following it," Ward said. "Leslie audits the system. She actually goes out into the field to see how we are planning and executing all the pieces. She makes sure everything is actually flowing the way it should. If it's not, we improve the process. We get input from people from the field, bring it back, make the change in the process, then go back and implement the change."

A refinery-management team meets on a regular basis to review recommended changes that will lead to improvement.

The after picture

Deep into the WorkPlace Excellence Program, a typical day at the CountryMark refinery now begins with operations performing care rounds. If something small and manageable needs repair (something that won't shut down production or cause a health or safety risk) the job is assigned a 3, 4, or 5 priority so the job can be planned. Then it goes through work approval.

The planners then take over and create the needed work orders. They identify the crafts involved and determine the amount of time it will take. If parts are needed, they make sure they are available or parts are ordered. When all tools and parts are kitted, the job is scheduled with careful coordination between operations and maintenance.

The planned work schedule for the following week is posted on Friday and all kits are delivered before the Monday workweek begins. Then the craftsmen perform the jobs and enter the details into the system (including fault and failure codes), creating a useful work history. The planner checks the work order and closes it. Reliability professionals can then analyze key details such as mean time between failures.

If it is an emergency job—priority 1 or 2—the schedule must be interrupted to make the necessary repairs.

"In the world we live in today, after a year of implementation,

everyone can write a work request," Ward said. "If approved, operations sets priorities, and the work is planned. If there is a pump that we have to tear down and replace the bearings, for instance, the planner will walk down the job and then electronically step out each task. They determine the type of labor, the manpower, and the materials needed for each task. Only when the plan is completed and materials are on hand do we put the work on the schedule."

Many key performance indicators are measured in the new system, Yeida said. These include metrics on schedule compliance, PM compliance, planned work vs. actual work, emergency work, priority percentages, scheduled vs. available, available craftsmen, and ready-to schedule jobs.

The culture change

With every change, training is required. People must be trained on processes, but it is also important that they can understand why the change has happened and buy in.

Alton said she remembers a specific moment when she could see a shift in attitude. The pump shop previously had hundreds of bins for the 600-plus pumps. Many of the materials were redundant, and no one knew what was in stock or where it was located. The pump-shop planners had been using the bin system for decades and they were accustomed to using them.

One pump-shop planner, Jeff Goad, was resistant to embrace the new system, Alton remembered. However, he worked with the materials-management team to ensure that all the pump parts were identified. "He came in one day and was just amazed that he could finally identify the parts he needed, and know where they were stored because now there was visibility," Alton said. "He said, 'This is so much better than those grey bins we used to have.' He is now leading the charge for maintenance procedures for rotating equipment. He now understands and recognizes that we must have the PMs inside the system to ensure we are improving the reliability. The system is working."

Ward saw the shift in culture change when warehouseman Larry Conyers bought into the new system. He had worked in the warehouse for 30 years. "We got into the reorganization and migrating to the new computer system. When they made the change to his warehouse, Larry literally went on vacation because he couldn't watch the change. We were changing the way he had done things for three decades. Often, people in a situation like this will not survive, but Larry is a survivor and is now one of the leaders of the entire system. With time, the light bulb went off and he realized the system works. This realization helped him to become the champion he is today."

At first, the planners were a bit overwhelmed, Ward said. "They knew how to plan work because they were good craftsmen. But it took time to adjust to sitting at a computer and planning a job for a fellow craftsman. In the beginning, we were planning just a handful of jobs a week. The thought of planning all the work seemed daunting. They learned quickly that even the smallest plan can be a journey. It takes several years to really perfect it. They thought they were wasting time to do this. But in the end, they saved time. Now we create 300 to 400 plans per month."

Yeida has also seen the shift in culture among his maintenance team. "We must work on this on an ongoing basis, and it takes a while to see results," Yeida said. "I had one guy who was kind of a naysayer, but he got called in in the middle of the night to work on a job. He said, 'Man, we should have done this years ago. I got here and all the parts were ready, and I was ready to do the job. It didn't take long to complete it, and I was able to go home early. The system is working.' This is cool, because then they tell their buddies."

Ward agreed that word of mouth can be powerful. "The energy it takes to move the organization forward is huge," he said. "It must be sustained because there will be setbacks. Some individuals never get to that epiphany, but for most, they do. And when they do, they bring others with them."

The key to sustainability, according to Ward, is actively managing the work process, finding better ways to work, and training, and to frequently review the suite of metrics to chart the progress.

"We still are in implementation," he said. "We still have some people who are just now catching on. It's kind of like a marathon—some people are already finished while some are just starting. But this is becoming how we work. It's new. It's different. But we have burned the ships, and we are not going back." **MT**

Michelle Segrest has been a professional journalist for 27 years. She has covered the industrial processing industries for nine years. If you would like Michelle to tell your maintenance and reliability story, contact her at michelle@navigatecontent.com.