



## SYSTEMS LEARNING FOR “ERROR-FREE” PERFORMANCE AT COLONIAL PIPELINE

BY CHARLES ALDAY

Colonial Pipeline Company, headquartered in Atlanta, Georgia, operates the largest-volume refined petroleum products pipeline system in the world. Stretching from Houston, Texas, to Linden, New Jersey, the underground pipeline delivers an average of 83 million gallons of gasoline, kerosene, diesel fuel, home heating oil, and jet fuel from Gulf Coast refineries to the southeastern and eastern seaboard of the United States each day. Our mission is to be “America’s energy lifeline, linking suppliers with consumers by safely delivering energy solutions that create superior value, reliability, and choice.” Fulfilling this mission by transporting potentially hazardous material safely, effectively, and efficiently requires a strong commitment to operational excellence.

About six years ago, Colonial Pipeline had a defining moment: One million gallons of diesel fuel spilled from a ruptured pipeline into Reedy River in South Carolina. This accident damaged the company’s reputation with both the public and regulators. Forced to scrutinize how we conducted business and maintained the pipeline, we discovered that human factors are as important to the operation of the pipeline as mechanical, electrical, and computer systems. In response, our leaders worked with employees to begin making changes in the ways we did things. Relying on our frontline workers to provide answers and to become change agents has proven invaluable in the journey to operational excellence.

### Conduct of Operations Guide

Over the past several years, all employees from the executive offices

to the pipeline facilities have become involved in continuous improvement and learning. One of our first realizations in the aftermath of the Reedy River accident was that we didn’t have a set of administrative policies that guided the performance of daily operations tasks. In 1998, by working with people in field operations such as maintenance, quality assurance, and engineering, we developed a “Conduct of Operations” document that specifies the proper use of procedures, communication techniques, written information in logs, control of equipment, professional behaviors in operations areas, verification techniques, and so on. Operations employees recently updated the document, which had been based on a model from the nuclear industry.

Compiling the Conduct of Operations reflected a shift toward involving the people who do the work in setting policies and solving problems. At the same time, we adopted a guideline that any person has the authority to shut down the pipeline if he or she thinks there’s a problem. Although ceasing operation is undesirable from a business perspective, we would rather shut down and lose revenue while we investigate the cause of the unusual indicator than take the chance that there’s a leak or spill. Protecting the public, the environment, and our employees needs to be the top priority.

**STAR.** One of the elements of the Conduct of Operations is STAR, which is an acronym for Stop, Think, Act, and Review. This tool has proven to be a simple but powerful way to avoid errors. When a person does a task, he or she stops before doing the first step, thinks about the correct action, acts by doing the step, and

reviews to ensure the actual result matches the expected result. For example, if I’m going to open a valve to start gasoline flowing through the pipeline, I’ll stop, think about what I’m going to do, push the correct button, and then look to see that the valve for gasoline is open. If there’s a problem, I can immediately recognize and correct it. Through our voluntary near-miss reporting system, we receive regular accounts of how STAR has prevented errors or other problems.

We introduce and reinforce the use of STAR in a number of ways. The most effective is a yellow foam star similar to that shown in “The STAR Process.” These stars or small signs with the acronym are visible at all facilities as a constant reminder that this simple tool can prevent errors. Some people have even adopted the STAR process at home.

### The Power of Teams

When management asked for ideas about how to improve operations, one suggestion was to bring together

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### THE STAR PROCESS



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representatives from the different locations so they could share ideas. Martha McGinnis, who had worked in the corporate office, led the formation of the first so-called Operational Integrity (OPEX) team. As with most teams, the initial meetings yielded little progress, because the participants were not used to working together or identifying solutions to systemic problems. The group finally embraced the question “What would it take to have flawless operations?” and went on to recommend changes in individual behavior, work environment, maintenance, training, and procedures that are now part of our operational excellence program.

Each of Colonial Pipeline’s four districts, which span the entire pipeline, and its operating control center in Atlanta now has an OPEX team. The teams have between 7 and 12 members and include operators, technicians, project team personnel, and an operations manager. Individuals are chosen based on their experience and expressed interest in representing their local units as operational excellence “champions.” Team members regularly communicate with each other through quarterly meetings, conference calls, and e-mails. All teams have similar charters and goals that are linked to corporate, district, and individual goals.

The members of the OPEX teams have been invaluable in leading change initiatives at their locations. With the support of local and corporate management, they have conversations with their coworkers about ways to achieve “spill-free, error-free performance.” In many cases, the OPEX team members have received training as on-the-job coaches or procedure writers. One individual has led an effort to develop operating procedures that are task-specific, designed with the user in mind, and focused on mitigating risks. After five years, these procedures are used at all facilities. They have played a large part in ensuring safer operations and are used as training tools for new employees.

To increase team effectiveness, we’ve used *The Team Memory Jogger*, a

publication of Goal/QPC. OPEX team members regularly evaluate their meetings and use the ideas in the book to solve problems. They also use the “personal skills checklists” in the book to improve their own performance.

At the end of the year, all 50 team members are invited to a two-day Operational Excellence Summit. One manager calls this event “a family reunion, celebration, info-mercial, tent revival, cheerleading clinic, and time of learning.” Participants take advantage of the time together to share learnings. So team members can share their experiences with their coworkers back home, we have a graphic recorder document the event in evocative words and images. Reproductions of the illustrations are still being passed from location to location nine months after the last Summit, providing a rich source of discussion topics.

### New Approaches

Based on our success with these kinds of tools, we have tried other things that we would not have attempted several years ago. Last year, all technicians who had been with the company less than five years participated in technical training. The training involved studies of electrical and mechanical principles, basic math, print reading, and assembling and disassembling valves and pumps. It also included storytelling. If someone had told me 10 years ago that our technicians would be involved in telling stories to one another as a part of their training, I would have laughed.

In any case, we know that people learn best when they are sharing meaningful experiences. At the different sessions of the technician course, participants were required to think of a story about their work. At each class meeting, one individual shared his or her story. This approach proved very successful in helping attendees understand what being a technician at Colonial means. It also aided people from different locations and backgrounds in creating a network of support.

I recently used another technique with the Operations Leadership team, which includes those leaders in all areas of the organization who are

involved in strategic initiatives and decisions. They were dealing with a complex issue about organization redesign that required a common understanding of all the challenges and mutual agreement about the path forward. I adapted a tool called “Visual Explorer” for the group. As I travel around the pipeline system, I habitually buy postcards that convey metaphors or show local scenes. For example, last year I purchased postcards with images of Amish agriculture and people working together building barns in Lancaster, Pennsylvania, the setting for a technicians’ meeting.

At the meeting, I spread lots of the postcards on a table. After listening to a presentation, participants wrote down their thoughts about what was important to them regarding the redesign. They then went to the table and looked at the postcards until they found one or several that “connected” with both them personally and their thoughts about organization redesign. Finally, they went back to their seats and wrote about the meaning the cards had for them in this context.

I didn’t know what to expect when the time came to discuss the images. What occurred was a thoughtful conversation about many aspects of the issues involved in organization redesign. Although participants didn’t come to a final conclusion about how to approach the task, they agreed on the need to work together to build new capabilities in the organization’s workforce.

Writing this article has made me realize that our mission statement about delivering energy solutions and linking folks who need one another doesn’t just apply to transporting petroleum products from suppliers to consumers. We can supply energy for learning to one another, and we can continue to link employees with learning tools that develop individuals, teams, and the organization. Linking, conversing, developing, working together—these practices energize our workforce and lead to more systemic learning. ■

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