
Nuclear Powered Patient Safety

April, 2004

Howard W. Bergendahl



the Bergendahl Institute, LLC

In 1979 the Three Mile Island Nuclear Power Plant overheated to well over 2000 degrees and the nuclear core began to melt. Nuclear Power and Three Mile Island became common terms in households across America. In a few short hours the meltdown of a nuclear power plant went from a theory to a reality. It was an especially sobering wake up call for the hard working people in that industry, who thought they were prepared for any situation because they were screened, tested and trained extensively and told they were the smartest of the smart. The leaders of the U.S. Nuclear Power Industry knew that from that day forward the term “safety first” needed to be more than a catchy phrase. Like the words “First, do no harm” in the Hippocratic oath, the words must be the meaningful basis and the prerequisite for all other activities. The Commission investigating the accident determined that human error was a key factor. The Industry immediately set out to reassess the risks of human errors and find new ways to reduce them.

Today in the Nuclear Power Industry, after more than 25 years of intense trial and error and learning from other high-risk industries, significant improvements have finally been achieved. Although some equipment changes were warranted the bulk of the changes involved the way things got done in this Industry. Training, work processes and behaviors of everyone involved had to change. The end result has been an unprecedented improvement in performance, which has not only produced one of the safest work environments of any Industry but also has reduced costs and improved overall performance. The number of Significant Events is 45 times lower than it was 10 years ago. The Industrial Safety Accident rate is 10 times lower than it was immediately following the Three Mile Island accident, making the risk of injury at a nuclear plant less likely than the risk in the Financial Industry! State of the art techniques for error reduction were tried and tested with intense scrutiny and evaluation. A network for sharing experiences and identifying good performance helped keep the progress moving forward.

During this evolution in the Nuclear Industry, many false starts did occur. The U.S. Healthcare System does not need to go through that same trial and error process. The lessons learned on improving safety and reducing human errors are not specific to Nuclear Power Plants. They are generic to any situation where highly trained people are challenged to perform complex tasks with potentially significant consequences for errors. The Technology Transfer opportunities between Nuclear and Healthcare have been known for some time. Practices such as contamination control and clean room techniques have been shared for many years. Nuclear power and healthcare both learned much in the area of crew training from the airline experiences. Today, with the additional lessons learned, Nuclear can provide insights into human errors occurring due to the complex systems, the production, time and financial pressures and the variety of other issues facing highly trained staffs.

During the 1980's and 1990's the Nuclear Industry evolved from having many different facilities, all organized and run differently, to a cohesive group with a common vision of excellence and goals for performance. It became understood that the lessons learned through unpleasant experiences at one facility could be learned at many others without reliving the negative aspects of the event. The solutions developed for one facility, if implemented at another, could prevent a repeat event. Those facilities that adopted the new standards quickly became the better performers and those that lagged behind learned after more events and the associated management turnovers that the answers were available should they choose to proactively learn.

By looking outside the nuclear field to find the experts in human behaviors and organizational effectiveness, industry leaders gradually established standard programs and processes to incorporate the behaviors proven to minimize errors. Although errors were not eliminated, the reduction in rate combined with an aggressive program for correcting weaknesses revealed in analysis of events, resulted in significant reduction in the number of events. Also, experience has given the staff the ability to identify the precursors to events and as a result, problems are detected before significant impacts can occur. With fewer significant events, those occurring are more thoroughly analyzed and the causes are corrected. In fact, the sensitivity is high enough that, when a pattern of behavior at the individual or organizational level emerges, the emphasis shifts to eliminating the error precursor behaviors or the error likely situations thereby further reducing events.

Today, an entire generation of nuclear power professionals have worked their entire career using the error reduction techniques and can share their experience. The truly desirable behaviors and conditions for success have become apparent and proactive, preventative measures are taken. Programs which have been developed include the industry Operating Experience program, where events are shared with similar facilities in an open and timely manner. Another program is the nuclear power plant "Observation Program". This is a process whereby workplace conditions, processes and behaviors are continuously monitored to identify error precursors and correct them before they lead to an event. This program was derived from the Chemical Industry's industrial safety programs, which showed exemplary improvements in the 1970's and 1980's. Many other programs such as advanced trending, statistical process controls and continuous self-evaluations are in use today helping performance to continue to improve.

These programs are now tested and developed to the point they can be incorporated into Patient Safety programs and put to work to gain the benefits of the 25 years of trial and error. The Individual tools used by the nuclear power plant workers everyday to help them work through their busy schedules event-free can be used by Doctors, Nurses and Technicians without modification. The programs for identifying current problems and future risks in a facility, can be adopted and begin paying dividends immediately. Much like the health care environment, the complex procedures in a nuclear plant are only performed by qualified professionals, using approved processes. There is

however, a difference in how the task is carried out and what happens when there are unexpected results. This difference is a learned behavior, which is easily cultivated and has a tremendous impact on the probability of events.

The secret to error management has been shown to have three components; the individual, the systems and the culture. The nuclear professional has been given tools through training on how to identify an error likely condition. They then minimize risks by using self-checking, peer checking, special communication tools and briefings. Today, the benefits of stopping and asking for a check from a peer have been learned from real life experience and are second nature. When the errors do occur, the organizations today treat them as an opportunity to improve the system and prevent other workers from experiencing the same outcome. All events are documented, screened and trended with the more significant events analyzed to determine the root cause and the corrective actions required to prevent recurrence. This information is already available at many hospitals and can be quickly processed to yield meaningful results. The highly trained staff at most healthcare facilities can quickly learn the error reduction tools and begin utilizing them.

It is important to note that a truly high level of success will not be achieved until the culture at a facility supports an open self-critical analysis of issues. When the cultural issues were first addressed in the Nuclear Industry, reservations about discussing errors openly and documenting negative details existed. Concerns were voiced about job security, negative media coverage and lawsuits. Attorneys gave reasons why errors couldn't or shouldn't be documented and openly discussed. However, as nuclear facilities have learned, organizations must stop using legal risks as a justification for living with safety risks. By not openly discussing and learning from events, they will continue to occur. Once the discussions can occur, the desirable behaviors and conditions for success become apparent and preventative measures can be taken. Ultimately, the focus on these activities in the Nuclear Industry has resulted in a positive impact on job security, positive media coverage and less litigation because the significant events began to fade away. When the people personally involved internalized the issues, they did what was needed to prevent events. They began to help each other, versus focusing on preventing negative impressions, and good things started to happen. Instead of a cycle of; errors, claims, defensive behavior, higher costs, pressure, more errors, more claims etc., the negative cycle can be broken and turned into an upward spiral of; error, lessons learned, improved performance, less claims, lower costs.

Healthy organizations are Learning Organizations. The best Patient Safety Program is one, which is built on a vision of sharing information, learning and continuous improvement. The Nuclear Power Industry is an excellent source for sharing and learning human error management processes for those healthcare organizations that would rather learn from someone else's negative experiences.