

## **“The Goal is Zero” High Reliability Organization Exemplar The DuPont Company**

“The goal then, now, and in the future is to prevent serious injuries and catastrophic incidents – the goal is zero. Learning from experience, based on the lessons of the past, is essential if zero is to be achieved.”<sup>1</sup> The DuPont Company which was founded along the Brandywine River in Wilmington, Delaware in 1802, has a long tradition and history of safety and safe process management. They have had to! DuPont began manufacturing gunpowder in the 1800’s and expanded into chemical manufacturing in the 1900’s. Having a “core value for safety has helped the company reduce risk and prevent serious injuries and incidents.” An explosion at DuPont’s gunpowder mill in 1815 resulting in 9 deaths and another serious explosion that occurred in 1818 resulting in 34 deaths was perplexing to E.I. DuPont who had already recognized the inherent risks of his business and instituted strong safety measures. These catastrophes began DuPont’s incessant devotion and commitment to safety and safe operations. Lessons from these early safety failures are reflected in DuPont’s safety practices today: employee training; incident investigation; safe work practices; pre-startup safety reviews; emergency response; and operational safety disciplines. “The foundation of the strong current process safety program and performance at DuPont rests in this early corporate history.”

DuPont’s founder E.I. DuPont understood the inherent dangers of the business he was in – high risk but not yet highly reliable – and identified for all of us interested in the safe operations of a high-risk endeavor, the core element of safety enhancement and incident reduction. E.I. DuPont: “We must seek to understand the hazards we live with.” DuPont has devoted over 200 years of safety engineering and enhancement to better “understanding the hazards present in our processes, and in successfully managing them to prevent serious injuries and incidents; [this] has contributed significantly to current process safety....” DuPont safety practices to be emulated in health care include:

**Everyone Is Responsible for Safety** – As DuPont developed greater safety sophistication, responsibility for safety shifted from safety departments to

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<sup>1</sup> onlinelibrary.wiley.com, Klein, J., Two Centuries of Process Safety at DuPont, p. 10

operations management and to the actual workers. Training programs are provided to all workers “since employee commitment to working safely was recognized as essential for the success of safety programs. The safety morale and attitude of the actual workers will mostly govern the success of the safety effort.”

**Process Safety Management (PSM)**—DuPont facilities routinely assess the potential for catastrophic events and take appropriate preventive action to avoid incidents. The review also analyzes process additions or changes to make sure they did not create new hazards. PSM includes an in-depth process hazard review to evaluate process safety and to focus efforts on Process Safety.

**Inherently Safer Processes (ISP)** – DuPont adheres to many of the principles of Inherently Safer Processes and Inherently Safer Design (ISD) which focuses on avoiding hazards instead of controlling them. ISP and ISD attempt to eliminate or minimize hazards in every step of a process rather than accepting the existence of the hazards and designing safety systems to control them.

**Zero Incidents...Period! (ZIP)**– DuPont formed a corporate ZIP Team in 1996 to focus on eliminating process-related injuries and incidents as an extension of their Process Safety Management (PSM) program and to enliven their efforts to prevent all serious process incidents. The team reaffirmed the vision that “The Goal is Zero” and all business entities and workers implemented the ZIP safety plan throughout the organization including upgraded safety standards and practices, safety training programs, evaluation tools, and safety and business metrics.

**“Standing Still Will Not Work”** – As systems and organizations continually experience change, the organization must continually work to maintain robust process safety programs. “Standing still and celebrating our successes...will not work...continuous improvement will always be necessary.” Safety defenses, redundancies, and other precautions added to protect against human error are often likely to degenerate systematically over time. Therefore, an organization’s Process Safety Management efforts must be continuously strengthened to counter the deterioration of its safety controls and defenses.

**Safety is Never Finished** – DuPont maintains a high reliability culture which is essential to significant improvement. “There must be a belief that all failures are

preventable, just as DuPont acknowledged that all injuries are preventable when they adopted the goal of zero injuries.”<sup>2</sup> DuPont’s Safety Program is based on the deeply held belief that safety is every employee’s responsibility. Workers must be able to practice proactive safety behaviors in a safe environment for reliability improvement efforts to be successful. “Creating new habits requires repetition of the new desired actions.”<sup>3</sup>

**Moving from Reactive to Proactive Behaviors** – Most organizations and workers have a long history of reactive habits. Workers must develop proactive habits to recognize “that defect elimination is an integral part of their daily job.” As organization’s improve their reliability over time, they move from a “Reactive” stage (fix it after it breaks) to a “Planned” stage (fix it before it breaks) to finally a “Precision” stage where workers just don’t fix it, they improve it.<sup>4</sup> Organizations move from “Management Enforcement” to expecting that all workers demonstrate “Self-Discipline” and responsibility for safety and safe operations.

**Safety Management System** – DuPont has developed and uses a 22-element Safety Management System (SMS) that addresses both the “hard” technical aspects of safety management as well as the “soft” people aspects of safety. DuPont’s Safety Management System encompasses leadership, organization, and operational components “that guide organizations on a journey to zero injuries and incidents.”<sup>5</sup>

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<sup>2</sup> reliabilityweb.com, Ledet, W., The Principles Driving Safety & Reliability: A Look at the History of DuPont

<sup>3</sup> reliabilityweb.com

<sup>4</sup> reliabilityweb.com

<sup>5</sup> Leinweber, M., DuPont Safety Resouces, PowerPoint, February 2009