Achieving and Sustaining Operational Excellence in Manufacturing: DuPont Approach

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Process Safety & Risk Management Offerings
DuPont Sustainable Solutions
Safety is a DuPont Core Value

- Core values: Safety, ethics and respect for people and the environment
- $32 Billion revenue with 13 business units from electronics to plastics, paints and agricultural chemicals
- Over 175 operating facilities around the world
- Worldwide reputation for industrial safety
- DuPont applies a single PSM management system worldwide
The Vision of DuPont

To be the world’s most dynamic science company, creating **sustainable solutions** essential to a better, safer, healthier life for people everywhere.

We are a market-driven science company.
Mission: Sustainable Growth

The creation of shareholder and societal value while we reduce the environmental footprint* along the value chains in which we operate.

*All injuries, illnesses, incidents, waste, emissions, use of water and depletable forms of raw materials and energy.
DuPont Sustainability Accomplishments

Goal
Achieve 5% ($50 Million USD) annual decrease in energy use, consistent with sustainability goals

Results 1990 - 2009
- 19% decrease in energy use
- 20% increase in production
- $5B in cost savings

Reduction 1990 - 2009
Air Carcinogens 92%
U.S. TRI* “Releases” 77%
Air Toxics 75%

* TRI = Toxic Release Inventory
Sources: DuPont Global Reporting Initiative (GRI) report, Yahoo Finance

Energy Efficiency Initiatives Examples
- Integrated load controls
- Utilize Vented H2 in CB Boiler
- Improve Condensate Return
- Reduce Liquid Nitrogen Usage
- Steam Trap Maintenance
- Cooling Tower Water Temperatures
- Monitoring & Targeting
- Mindset and Behaviors…
Sustainable growth is rooted in core values, driven by leadership commitment, aligned with business objectives, and embedded throughout the organization and culture.
Assets Management
Integrated Production Systems

Manufacturing Asset

- Managing Process
  - DuPont Best Practices
  - Standard Operational Procedures

- Technical Model
  - Operate to Plan (Capacity, Productivity)
  - Maintenance and Reliability
  - Supply Chain
  - Manufacturing Technology
  - Small Project Implementation

- Capabilities Engine
  - 200 yrs of Manufacturing Experience
  - DuET
  - Engg. COC – M & R, Energy
  - Six Sigma Champions
  - Subject Matter Experts

- Mindsets and Behaviors
  - Technical training
  - Continuous Learning Environment

Plant Performance and Business Imperatives

Outcomes and Sustainable Improvements

Production Goals integrated with Sustainability Goals
Process Safety Management Defined

Process Safety Management is the application of management systems and controls (standards, procedures, programs, audits, evaluations) to a *manufacturing process* in a way that process hazards (risks) are identified, understood and controlled so that the process related injuries and incidents are prevented. This requires a *sustained effort by leadership* at all levels.
DuPont Process Safety Management Model
PSM Leadership Model

1. Trained, Knowledgeable, Capable People in all roles
   Adequate resources
   Financial Support
   Knowledge Management

2. Leadership
   Safety Culture, Commitment, Accountability, Resources, Involvement

3. Cat A PSM Incidents
4. Cat B PSM Incidents
5. Cat C PSM Incidents/Near misses/Key Learnings
6. Metrics & Recommendations from Incidents, PHA & Audits

Lagging Indicators
Leading Metrics

Foundational
Achieving Operational Excellence: Leadership driven

Overall “AS-IS” Position
- Culture Maturity curve

Executive Summary
- Key Risks
- Gaps & best practices

Detailed Analysis
- Findings
- Focus Areas

Future “TO-BE” Objective
- Culture Maturity curve

Safety Focus Areas
(Safety elements, timing, milestones)

Implementation Plan
Actions to upgrade upstream Safety operating model
Compliance assurance: Line Accountability

Tasks & Deliverables
- Visible program support
- Strategic guidance, direction & objectives
- Hold HSSE councils, Cross-sub working groups to commitments

Supporting Orgs
- Technical guidance
- Feedback & testing
- Ongoing support

Project Team
- Day-to-day management
- Project communications
- Information clearinghouse

Cross-sub working groups
- Design & validate policies and processes
- Develop rollout materials and plans
- Manage implementation planning and execution
- Ongoing performance monitoring
- Process adjustment and refinement
- Technical guidance
- Feedback & testing

Line Organization
- Implement policies, procedures and processes
- Ensure appropriate training and execution
- Provide data to subcommittees for ongoing monitoring

CSC Chair

HSSE Experts

Supporting

HSE Council

Implementing

Line organization

Project Team

Cross-subsidiary working group

Workplace Safety

Process Safety

Contractor Safety

Occupational Health

Environment

Security
Practical approach to establish new practices and behaviors

- **Practical Application:** Skills transfer is tested and coaching is provided in the field.
- **Experiential workshops:** Formal classroom sessions focused on knowledge transfer & skill development related to skills needed to drive the change program. Sessions provide the conviction and motivation for the change program.

Deliver

- **Content Finalization through task teams:** Development of best practice Management System and content.
- **Expert and Experiential coaching:** On-the-job coaching to build capabilities and confidence to drive the change.
- **Performance metrics to sustain change:** Selecting and implementing performance metrics with a focus on leading metrics to sustain the improvement initiatives.
Focus on Execution is Key

Management Standards \times Operational Discipline = Operational Excellence
Operational Discipline Characteristics

- Leadership by Example
- PSRM Resources
- Organizational Pride
- Excellent Housekeeping
- No Shortcuts
- Active Communications
- Strong Teamwork
- Employee Involvement
- Practices = Procedures
- Shared Values
- Up-To-Date Documentation

Operational Excellence
Leadership Responsibilities for Sustenance

- Leaders must have a clear vision of the ultimate goal of the company’s process safety management efforts.
- Leaders must set the goals and strategic objectives.
- Leaders must insure sufficient, quality resources are dedicated to PSM system requirements.
- Leaders must hold their line organization accountable for PSM implementation and results.
- Leaders must recognize and reward PSM accomplishments to drive continuous improvement.
- Leaders must lead…felt leadership.
Conclusion

• Process Safety Management is the way to deal with the most serious and challenging business risks to achieve operational excellence

• Structured and systematic managing processes and systems, high standards of performance, tracking results of key metrics and audit will help sustain operational excellence

• It provides an opportunity to prevent a catastrophic incident from occurring

• PSM. Live it. Lead it.