Using a Data Driven Approach to Improve Process Safety in a Specialty Chemicals Plant

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Our History

1846
Ellis, Chaflin & Co. founded, later Mead Paper Company

1888
Westvaco Piedmont Pulp & Paper Co. founded, later Westvaco

1900s
Carbon production begins at Tyrone, Pa. (1914) and Luke, Md. (1931)

1934
Tall oil distillation and lignin development began in Covington, Va.

1954
Pine chemicals production moved to Charleston, S.C.

1964
Formal incorporation of SCD businesses

1977
DeRidder, La. plant added to operations base

1984
St. Johns Chemical added to operations base

1997
Mead and Westvaco merged to form MeadWestvaco, rebranded to MWV in 2008

2002
Wickliffe, Ky. Carbon Plant added to operations base

2003
Commercial Applications Center established in Shanghai, China

2008
WestRock

2011
Purification Materials Wujiang (PMW) China carbon plant added to operations base

2012
MWV Brazil added to operations base & DRT Alliance formed

2015
MWV announces plans to separate specialty chemicals business

Ingevity
Ingevity announced as name of specialty chemicals business

WestRock
MWV merges with RockTenn to become WestRock

Zhuhai, China carbon facility opened

Our Future

A thriving specialty chemicals and materials company

Source: Company information
How balanced is your safety perspective?
Process Safety definition…
(We call it Operational Stewardship)

• The short description:
  • ‘Keeping it in the pipes’

• Full description:
  • ‘Process Safety is a disciplined framework for managing the integrity of hazardous operating systems and processes by applying good design principles, engineering and operating practices. It deals with the prevention and control of incidents that have the potential to release hazardous materials or energy. Such incidents can cause toxic effects, fire or explosion and could ultimately result in serious injuries, property damage, lost production and environmental impact.’
The Charleston Plant’s Journey to Sustainably Improved Process Safety Performance Begins

- The Charleston Plant is averaging nearly 2 serious Process Safety Incidents a month during 2009 – 2010

- The Charleston Plant is introduced to “The Industrial Operator’s Handbook”

- The Charleston Plant assigns a Production Supervisor to become the Process Safety Manager
## 20 Common Contributors to Industrial Incidents

1. Defective Night Operations  
2. Fitness for Duty  
3. Incomplete Communication  
4. Inadequate Turnovers  
5. Ignorance of Equipment Operating Characteristics  
6. Non-Compliance with Procedural Requirements  
7. Failure to Monitor Equipment Status  
8. Deficient Equipment Maintenance  
9. Failure to Independently Verify Critical Tasks  
10. Sense of Invulnerability  
11. Acceptance of Abnormalities  
12. Ignorance of Warning Signs  
13. Capitulation to Production Pressure  
15. Deficient Organizational Staffing & Structure  
16. Poor Leadership  
17. Insufficient Management Oversight  
18. Faulty Teamwork  
19. Degradation of Operating Limits  
20. Defective Design
So how do we use the collected data to drive continuous Process Safety Improvements?

OPEX Vision
How High is Up? & Sustainability

- Structured process to analyze business systems and operations to eliminate non-value added work through step-change improvement:
  - How High Is Up?
  - Sustainability
- Combines the best from multiple tool kits
  - Lean
  - Work flow
  - Six Sigma
    - DMAIC approach & tools
    - Data-driven mindset, Metrics & Goals
  - Change Management
    - Adapting our culture
    - Communication
  - Team Dynamics & Personnel Development
- Focus on Systems & Processes
  - “Hard on the process, easy on the people.”
- Accountability
  - Time-bound with regularly-planned reviews
  - Commitment top down

Process Safety
Operational Stewardship

- Disciplined framework
- Managing the integrity of operating systems – energy & materials
- Rigorously investigating minor process safety incidents that could lead to a major incident
- Operations, Maintenance, Engineering & Leadership Teams doing things in a systematic and repeatable way
- Communication – Expectations & Results
- Effectively improving process safety:
  - Data-driven
  - Foundational Elements – Common Contributors & Vital Skills
  - Clear metrics & goals – Accountability
  - It ‘feels’ different
- Changing our culture to one that views process safety as an integral part of our success
Ingevity Charleston Process Safety Diagnostic

Incident Data → 20 Common Contributors → Worst Case Severity Analysis → Top 8 Common Contributors

Operators + Mechanics → Interviews + OpStew Gap Analysis → Validation; How it “Feels”

Top 8 Contributors + Validation; How it “Feels” + Root Cause Analysis → Implementation Initiatives
Process Safety Incident Classification (2010 - 2011 YTD)

Incidents by Department

Using DATA to drive the process:
- What is our focus?
- What types of issues do we have?
  - Systemic?
  - Area-specific?
- Actual vs. Potential Severity

Break down the data by Operating area:
*Do we have area-specific opportunities?*

Worst Case Score by Area (with # Incidents per area)

Top 8 Common Contributors
Led us to 8 Implementation Recommendations
65% of our Process Safety Incidents

Utilized a ‘worst-case’ scoring system for each incident.

Worst-case score alone doesn’t tell the whole story.

How many incidents per area?
How much potential did each incident really have?

Non-Compliance with Procedural Requirements
Inadequate Management
Deficient Communication
Ignorance of Equipment Operating Characteristics
Inadequate Turnovers
Defective Night Operation
Inadequate Emergency Preparedness
Inadequate Organizational Staffing And Structure
Team Zero Initiatives

Organizational Structure and Culture

Design and Maintenance Philosophy

Managing Change

Communicating Effectiveness

Competency Development

Information Access

Process Hazard Identification and Mitigation

Process Control Strategy

Process Safety Incident
Charleston Plant Process Safety Events
6 Month Rolling Tier 1 & 2 Averages Based on Industry Standard Reporting
June 2010 - January 2017
Process Safety Reality Check.....

• Can you answer the following questions?
  – Is your company managing both Personal and Process Safety risk?
  – Are you investigating the minor process safety incidents that could lead to a major incident?
  – Does your Operations, Maintenance, Engineering and Leadership Team do things in a systematic and repeatable way?
  – Are you getting better or worse than last year? How do you know? What are your metrics? You can’t improve what you don’t measure.
  – Could your company be headed for a major accident or disaster?
Thank you!