40 years as an Environment, Health and Safety Professional

CHAS 40th Anniversary Symposium
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40 Years of Questions

- Does Compliance equal Safety?
- Which are better performance standards or design standards?
- Do individuals understand the number of regulatory requirements?
- What defines safety culture?
- Does an organization need an EHS management system?
- How are Safety and Sustainability related?
- What drives performance?
• 1979 – 1980 Process Engineer
• 1980 – 1982 Section Head Production Services
• 1982- 1984 Department Head Facilities Services
• 12/84 - 11/94 - Divisional Manager, Environmental Affairs, Occupational Health & Safety

• 11/94 - 7/97 Associate Director, Environmental Affairs, Occupational Health & Safety, Consumer Products

• 7/97 – 7/2002 Associate Director, Environmental, Health & Safety - Hopewell & Hillside

Environment 2000
Pollution Prevention Throughout the Product Life Cycle

Bristol-Myers Squibb Company
Dedicated to Environmental Leadership

Published 1992
All Rights Reserved!
Used to market and share “What Does Pollution Prevention Throughout the Product Life Cycle Mean!”
<table>
<thead>
<tr>
<th>PERFORMANCE STANDARDS</th>
<th>DESIGN STANDARDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance-based regulation</td>
<td>Prescriptive-based regulation</td>
</tr>
<tr>
<td>Set results-oriented goals</td>
<td>Mandate a technology, equipment, or action</td>
</tr>
<tr>
<td>Establish objectives or tiered standards</td>
<td>Specify behaviors or methods of compliance</td>
</tr>
<tr>
<td>Encourage flexibility and innovation</td>
<td>Demand certain solutions be implemented</td>
</tr>
<tr>
<td>Focus on outputs and outcomes</td>
<td>Focus on inputs and products</td>
</tr>
</tbody>
</table>
What is an EHS organization's role?

The anticipation, recognition, evaluation and control of the work environment to ensure a safe and healthy workplace and protect the environment for our employees and communities.
EHS Organization must be a High-Performance Team

- Outperforms external standards
- Performs better than its potential
- Generates energy, excitement and enthusiasm
Process Roll
of EHS Professional

- Facilitator
- Educator
- Marketer
- Auditor
- Business Leader
- Business Partner
- Knowledge Resource
- Regulatory Liaison
Content role of an EHS professional

- General Safety
- Emergency Response
- Fire Safety
- Environmental permits (air, water, waste)
- Process safety
- Radiation Safety
- Reproductive health evaluation
- Accident injury investigation & prevention
- Waste Management
- DOT

- Industrial Hygiene
- Biologics
- Process safety
- Biosafety
- Indoor Air Quality
- Ergonomics
- Construction/Contractor safety
- Engineering Support
- Training
- Regulatory reporting
What are our current and future challenges?

<table>
<thead>
<tr>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homeland Security</td>
</tr>
<tr>
<td>Regulatory Requirements &amp; Certifications</td>
</tr>
<tr>
<td>Global Warming/Climate Change</td>
</tr>
<tr>
<td>Sustainability</td>
</tr>
<tr>
<td>Nanotechnology</td>
</tr>
<tr>
<td>Biomedical Engineering</td>
</tr>
<tr>
<td>Accident prevention</td>
</tr>
<tr>
<td>Artificial Intelligence</td>
</tr>
<tr>
<td>Fear of the Unknown</td>
</tr>
</tbody>
</table>
Management System Examples

- Plan Do Check Act Model
- ISO 9001 Quality Management
- ISO 14001 Environmental Management
- ISO 18001 Occupational Health and Safety (OH&S)
- ISO/IEC 27001 Information Security Management
- BS8800 British guide to occupational health and safety management systems
The Importance of Metrics

Linked to vision, values & key success factors

Focus on past, present and future

Linked to needs of the customers, stakeholders and employees

Should be shared at all levels of the organization

Should be consistent

Multiple measurements can be combined into an indices of performance
<table>
<thead>
<tr>
<th>Metric</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accident Statistics</td>
<td>Lagging</td>
</tr>
<tr>
<td>Training</td>
<td>Leading</td>
</tr>
<tr>
<td>Near Miss Reporting</td>
<td>Leading</td>
</tr>
<tr>
<td># of Permit Conditions</td>
<td>Leading</td>
</tr>
<tr>
<td># of observations/inspection</td>
<td>Lagging</td>
</tr>
<tr>
<td># of Emergency Responses</td>
<td>Leading/lagging</td>
</tr>
<tr>
<td>Defined Contractor Safety Metrics</td>
<td>Leading/lagging</td>
</tr>
<tr>
<td># of governmental interactions</td>
<td>Leading/lagging</td>
</tr>
</tbody>
</table>
## EHS Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committee activities</td>
<td>Leading</td>
</tr>
<tr>
<td>Customer Service</td>
<td>Leading</td>
</tr>
<tr>
<td>Internal processes</td>
<td>Leading</td>
</tr>
<tr>
<td>Web site review</td>
<td>Lagging/leading</td>
</tr>
</tbody>
</table>
## Compliance

<table>
<thead>
<tr>
<th>Level</th>
<th>Education</th>
<th>Customer Service</th>
<th>Internal Processes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level One</td>
<td>✅</td>
<td>🟦</td>
<td>🟦</td>
</tr>
<tr>
<td>Level Two</td>
<td>🟦</td>
<td>✅</td>
<td>🟦</td>
</tr>
<tr>
<td>Level Three</td>
<td>🟦</td>
<td>🟦</td>
<td>✅</td>
</tr>
<tr>
<td>Level Four</td>
<td>🟦</td>
<td>🟦</td>
<td>🟦</td>
</tr>
</tbody>
</table>

**Qualitative Assessment**
Leadership

- Everyone is a leader
- Develop the leader from within
- Create and articulate a vision
- Set priorities and allocate resources
- Drive innovation
- Accept accountability and achieve results
- Develop others
- Set the example and shape the culture
Levels of Accountability

• Get on with it
• Find Solutions
• “Own it”
• Acknowledge reality
• Wait and hope
• Personal excuses
• Blame others
• Unaware/Unconscious
Mission of Higher Education

<table>
<thead>
<tr>
<th>Create</th>
<th>Create next generation of leaders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center</td>
<td>Center of Excellence</td>
</tr>
<tr>
<td>Provide</td>
<td>Provide access to learning</td>
</tr>
<tr>
<td>Foster</td>
<td>Foster success and prosperity of each rising generation</td>
</tr>
<tr>
<td>Adapt</td>
<td>Adapt to changing times</td>
</tr>
</tbody>
</table>
College and Universities unique characteristics & challenges

- Diversity
- Horizontal Decision Structures
- Tradition of Faculty Autonomy
- Authority
- Responsibility
## Challenges

| Design across | Design across organizational boundaries |
| Engineer | Engineer processes into strategic capabilities |
| Develop | Develop individual competencies into a learning organization |
| Align | Align information technology with business strategy |
| Integrate | Integrate all the pieces |
Culture of Safety

• Core Value of Organization

• Safety is Everyone’s responsibility – campus environment must support this and empower the community

• Good Science is Safe Science – Safety is a critical component of the scholarly excellence and responsible conduct of research.

• Safety training and safety education are essential elements of research and education.

• An investment in the future
Three Cultures types of an Organization

Safe Science 2014

• **Pathological** – power-oriented, information is guarded as personal resource
• **Bureaucratic** – heavily rule-oriented, information not welcome - or ignored
• **Generative** – performance-oriented, information welcomed and directed to the right person

Generative culture allows for near-miss reporting, no blame, recognition of hazards

**THE NATIONAL ACADEMIES**
Advisers to the Nation on Science, Engineering, and Medicine

Generative cultures allows for near-miss reporting, open communication, no blame and best of all proactive recognition of hazards and elimination of those hazards
Organizations succeed or fail as a whole

Safety Culture Equation

- Leadership
- Committee Structure
- Responsible Officials
- Culture
- Information systems

Safety Culture = Leadership + organizational + empowerment of design(budget) + the individual
Accident Causation

- Reason’s Swiss Cheese Model
  - Cheese Layer = Safety layers (system defenses) capable of preventing incident
  - Holes = Gaps within each system where failure could occur

- If failures align then an incident or accident will occur!
Call to action!

- **29 Dec. 2008**: UCLA Research Assistant – sustained burns on 40% of body – died 1-16-2009
- **18 Sep. 2009**: University of Chicago researcher working with an attenuated BSL2 strain of Yersinia pestis died
- **Jan. 2010**: Texas Tech graduate student – lost 3 fingers, burned hands and face, and severely injured one eye
- **Apr. 2012**: San Francisco Veterans Affairs Medical Center Researcher contracted meningitis died 17 hours later.
- **June 2014**: University of MN graduate student was synthesizing trimethylsilyl azide when it exploded in fume hood; suffered cuts and lacerations and injured ear drum
- **16 Mar. 2016**: University of Hawaii Postdoctoral research lost her arm, sustained burns and temporary lost hearing.
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• What defines safety culture?
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• What drives performance?
A person can succeed at almost anything for which he has unlimited enthusiasm”

Charles M. Schwad
11 Questions to Measure a Safe Work Place

• Do I know what is expected of me to work safely?
• Do I have the materials and protective equipment I need to do my work safely?
• At work, do I have the opportunity to do what I do best every day in a safe environment?
• In the last seven days, have I received recognition or praise for doing a safe job or assignment?
• Does my supervisor, or someone at work, seem to care about me as a person?
• Is there someone at work who encourages my development and safety involvement?
• At work, do I share my safety concerns and do my opinions seem to count?
• Does the mission/purpose of my company make me feel my job is safe and important?
• Are my co-workers committed to doing quality, safe work?
• In the past six months, has someone at work talked to me about my safety performance?
• This last year, have I had opportunities at work to learn and grow in the areas of Safety and Compliance?
References

- ACS- Hazard Assessment in Research Labs [https://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/hazard-assessment.html](https://www.acs.org/content/acs/en/about/governance/committees/chemicalsafety/hazard-assessment.html)