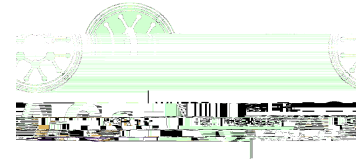


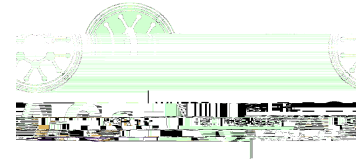
RISK-BASED PROCESS SAFETY

**North Jersey Section AIChE
January 21, 2020**



YOUR PRESENTER:

- Peter Sibilski, P.E., CEM, FAIChE
 - Plant Manager, Pharmetic Manufacturing Co., LLC
 - B.S., Chemical Engineering - NJIT
 - MBA, Technology Management - University of Phoenix
 - Member, Industrial Advisory Board, NJIT Otto York Dept. of Chemical and Materials Engineering
 - Work experience includes:
 - Diamond Shamrock – specialty chemicals
 - Occidental Chemical – specialty chemicals
 - Henkel Chemical – specialty chemicals
 - Olin Hunt – microelectronics chemicals
 - EI Associates – A/E consulting
 - BOC Gases – industrial gases
 - Schering-Plough - pharmaceuticals
 - ALZO International, Inc. – specialty chemicals
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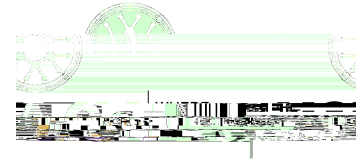


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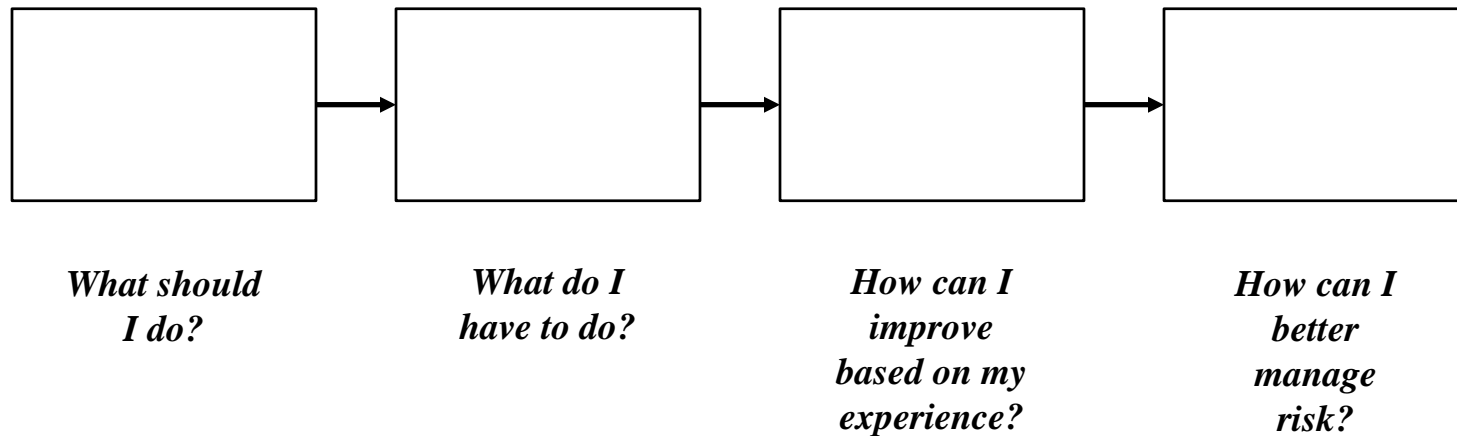
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- **Risk-Based Process Safety** – B. Karthikeyan, founding Director of Prism Consultants - Chemical Engineering Progress, March 2
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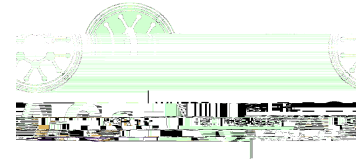
Background of Risk-Based Process Safety (RBPS) Approach



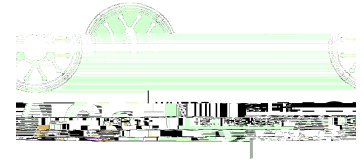
- Several strategic approaches to chemical process safety have been developed over the years, for chemical accident and loss prevention
- This evolution of process safety and accident/loss prevention strategies can be illustrated as follows:



Background of Risk-Based Process Safety (RBPS) Approach

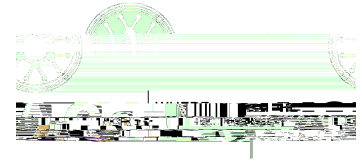


- Understanding the risk associated with an activity requires answering the following questions:
 1. What can go wrong?
 2. How bad can it be?
 3. How often might it happen?
 - Based upon the level of understanding of the answers, a company can decide what actions, if any, are required to eliminate, reduce or control existing risk
 - *...which brings us to the main objective of the Risk-based Process Safety (RBPS) approach...*
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RBPS Design and Improvement Criteria

- The main objective of the RBPS approach is to help an organization build and operate a more effective process safety management system
 - These *Guidelines* describe how to design or improve each process safety activity so that the energy put into that activity is appropriate to meet the anticipated needs for that activity
 - The RBPS strategic approach is founded on the principle that appropriate levels of detail and rigor in process safety practices are predicated on three factors:
 1. A sufficient understanding of the risk(s) associated with the processes
 2. The level of demand for process safety work activity compared to available resources
 3. The existing process safety culture
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The 20 Elements of RBPS

I. Commit to process safety

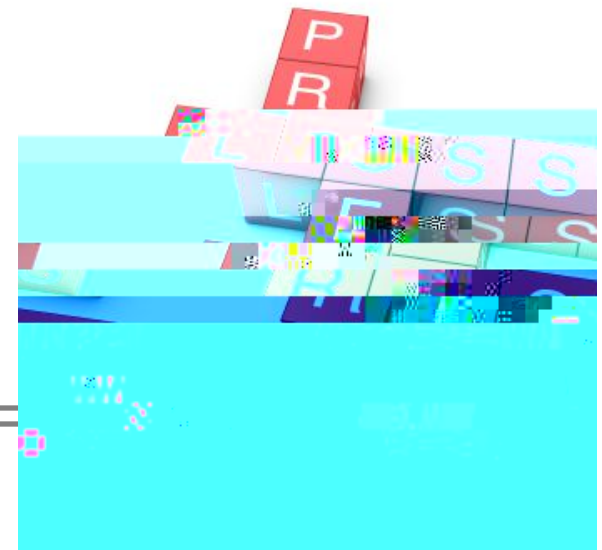
1. Process safety culture
2. Compliance with standards
3. Process safety competency
4. Workforce involvement
5. Stakeholder outreach

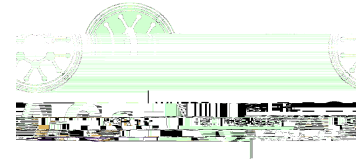
II. Understanding Hazards and Risks

6. Process knowledge management
7. Hazard identification and risk management

III. Manage Risk

8. Operating procedures
 9. Safe work practices
 10. Asset integrity and reliability
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Pillars (Foundational Blocks)

- **Commit to Process Safety**

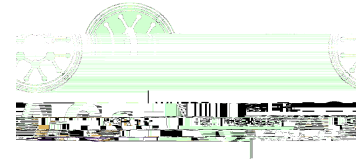
1. The cornerstone of process safety excellence, management commitment has no substitute
2. Organizations generally do not improve without strong leadership and solid commitment
3. The entire organization must make the same commitment and it must become embedded in the corporate culture

- **Understanding Hazards and Risks**

1. Organizations that understand hazards and risks are better able to allocate limited resources in the most effective manner

- **Management of Organizational Occurrences**





Pillars (Foundational Blocks)

- Learn from Experience

1. This involves monitoring and acting on, internal and external sources of information

2. The most cost-effective ways to learn from experience are to:

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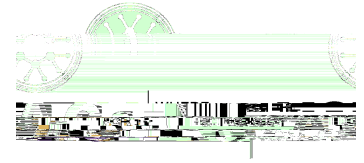
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3. The development of metrics can provide timely feedback on how the RBPS systems are performing

4. Periodic management reviews help sustain existing performance and drive improvement

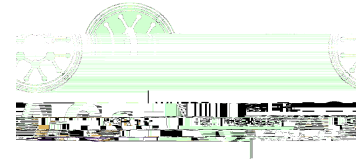




Pillars (Foundational Blocks)

- **Focus on these foundational blocks enables organizations to**
 - improve process safety effectiveness,
 - reduce the frequency and severity of incidents
 - improve long-term safety, environmental and business performance
 - **A risk-based approach also helps avoid gaps, inconsistencies and excess work, insufficient work and rework that can lead to system failure**
 - **To work most effectively, RBPS practices should be integrated with other management systems, such as those for product quality, human and equipment reliability**
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Elements of Risk-based Process Safety



- **Commit to Process Safety (Pillar 1):**

- 1. Process Safety Culture**

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- 2. Compliance with Standards**

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- 3. Process Safety Competency**

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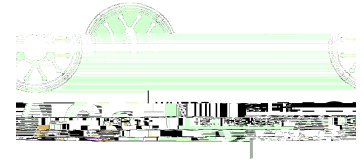
- 4. Work-force Involvement**

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- 5. Stakeholders Outreach**

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Elements of Risk-based Process Safety

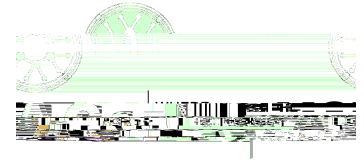
- Understand Hazards and Risks (Pillar 2):

- 1. **Process Knowledge Management**

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Elements of Risk-based Process Safety



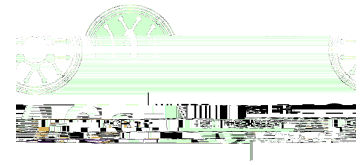
- **Manage Risk (Pillar 3):**

- 1. Operating Procedures**

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Elements of Risk-based Process Safety

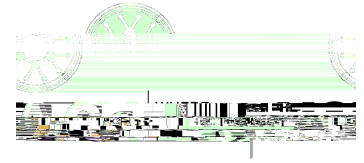


- **Manage Risk (Pillar 3) continued:**

- 5. Training and Performance Assurance**

- » *Training*
 - Performance Assurance*





Elements of Risk-based Process Safety

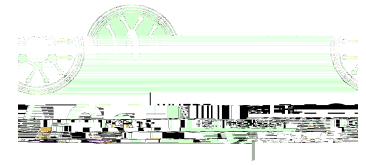
- **Manage Risk (Pillar 3) continued:**

- 9. Emergency Management**

- » *Emergency Management*

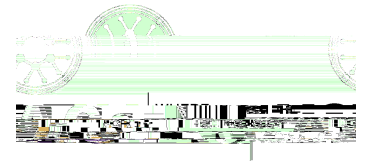
1. Planning for possible emergencies
- 2.





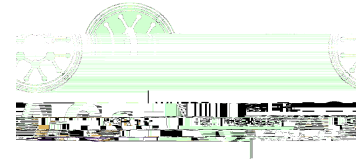
Elements of Risk-





Epilogue:

Ototoxicants and Hearing Impairment



- OSHA and NIOSH released a joint safety and health bulletin in 2018 to raise awareness of ototoxicants
 - While there are no compulsory regulations targeted toward ototoxicants, OSHA has recognized the risk associated with combined exposures
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