



# Safety Culture Performance Measurement

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## 2008 Integrated Safety Management Workshop

Roy Schepens

Vice President

Parsons Infrastructure & Technology Group



# OUTLINE

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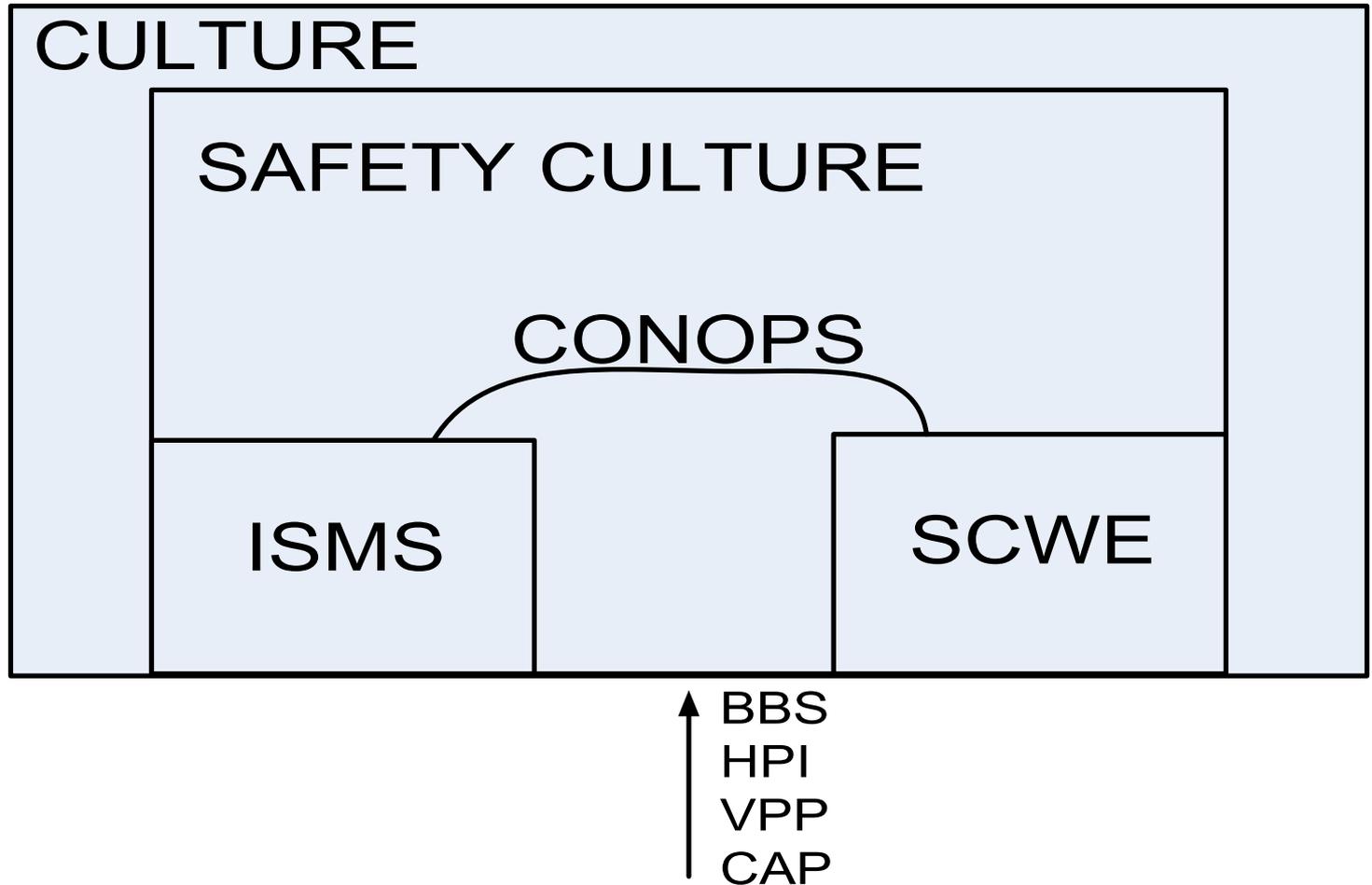
- Introduction
- Background
- Benefits of Performance Measurement
- Suggested Metrics
- Conclusion

# INTRODUCTION

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- Safety Culture – The shared values an organization exhibits through its policies, procedures, and actions that makes safety a core value
  - Create a safety atmosphere
  - Employees embrace ownership
  - Accept personal responsibility
- A Safety Culture resides with the overall culture of an organization

# INTRODUCTION



# INTRODUCTION

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- Instilling a safety culture requires concrete and visible actions
  - Focus on continuous improvement
  - Institutionalize learning
  - Invest in safety training and leadership development
  - Demand a healthy pessimism
  - Demand a disciplined conduct of operations, engineering, and maintenance
  - Assure that safety programs are visible and empowered
  - **Transition focus from mitigative to proactive measures**

# INTRODUCTION

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- Transition Focus from Mitigative to Proactive
  - Actions are identified to prevent events vs identifying actions to be taken after an event has occurred
  - Robust safety programs focus on proactive activities/controls (fire prevention, radiological controls, nuclear safety, industrial safety)
  - **Performance measurement tools include leading indicators that help gauge safety culture maturity**

# BACKGROUND

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- Traditional DOE performance measures tend to be lagging and compliance based
- Recent additions to DOE ISM manual recognize the need to shift from compliance to safety culture excellence and maturity
- IAEA safety culture maturity model identifies 3 stages that an organization goes through in achieving a mature safety culture
  - Safety based solely on rules and regulations
  - Good safety performance becomes an organizational goal
  - Safety performance can always be improved- There is personal ownership and commitment to safety and continuous improvement

# BACKGROUND

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- Developing performance measurement tools that can gauge an organization's safety culture maturity is a challenge due to the intangible nature of the safety culture concept
- **The commercial nuclear industry has some ideas on safety culture performance measurement that can be of benefit to DOE**

# BACKGROUND

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- NRC work in this area considered experience from many sources
  - INPO
  - IAEA
  - NPO
  - NEA
  - Academia/NRC staff
- Various studies done for large non-nuclear organizations (i.e. BP refineries) provide additional insight

# BENEFITS

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- Provide an indication of where emphasis should be placed for an organization to continuously improve (i.e. achieve IAEA Stage 3)
- Provide a basis for more extensive evaluation of safety program implementation and effectiveness
- “What gets measured gets managed”

# SUGGESTED METRICS

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- A combination of assessment criteria (ac) and leading performance metrics (pm) are proposed to help assess an organization's safety culture maturity
- Proposed criteria and metrics are grouped (NRC grouping) into four categories:
  - Organizational Safety and Accountability
  - Safety Conscious Work Environment
  - Organizational Learning and Assessment
  - Work Planning and Human Performance
- These categories also align with the Core and Supplemental Principles from the DOE ISM Manual and with INPO safety culture principles (see backup)

# ORGANIZATIONAL SAFETY & ACCOUNTABILITY

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- Safety Policies (e.g. emphasis on safety first and all accidents are preventable)
  - (ac) Reviews performed by corporate and external industrial & nuclear oversight groups are of appropriate depth and breath
  - (ac) Management plant walk-throughs result in safety improvements
- Accountability & Incentive Programs
  - (ac) Personnel/Teams are rewarded for safety behaviors and achievements
  - (ac) Senior management incentive programs reward actions which promote long term plant safety and performance

# ORGANIZATIONAL SAFETY & ACCOUNTABILITY (Cont'd)

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- Adequate Resources
  - (pm) Number of deferred capital improvements
  - (pm) Number of PM/CM backlog
  - (pm) Average age and number of temporary modifications
  - (pm) Average age and number of instruments out of service
  - (pm) Average overtime hours per person by department
  
- Organizational Change Management
  - (ac) Effectiveness of change is monitored so as not to erode trust nor safety
  - (ac) SRB evaluates safety impact of organizational changes

# SAFETY CONSCIOUS WORK ENVIRONMENT

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- Policies
  - (pm) Percentage of personnel who have received initial & refresher SCWE training
  - (ac) SCWE assessments/surveys are conducted regularly
  
- Willingness to Raise Concerns
  - (pm) Number of contractor & DOE allegations of chilling effect
  - (ac) Concerns are documented, tracked and trended in the Condition Report System and resolved in a timely and effectively manner
  - (ac) DPO process is effectively utilized
  - (ac) Motive is never ascribed to an employee raising an issue

# SAFETY CONSCIOUS WORK ENVIRONMENT (Cont'd)

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- Alternative Processes (AP) for raising concerns (i.e., alternative to the corrective action program or line management)
  - (pm) Number and type of concerns raised to AP and DOE
  - (pm) Percentage of AP resolutions that meet timeliness goals
- Preventing & Detecting Retaliation
  - (pm) Number of Harassment, Intimidation, Retaliation, and Discrimination (HIRD) allegations
  - (pm) Annual number of substantiated HIRD allegations
  - (ac) Effectiveness of corrective actions to HIRD concerns

# ORGANIZATIONAL LEARNING AND ASSESSMENT

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- Internal & External Operating Experience (OE)
  - (pm) Percentage of operating experience reports completed on time by department
  - (pm) Percentage of OE evaluations that result in safety improvements or corrective actions
  - (pm) Number of condition reports written to review systems and procedures against OE
  
- Self-Assessment Process
  - (pm) Number of departmental/cross functional self-assessments performed each year
  - (pm) Number of repeat findings in self-assessments
  - (pm) Percentage of recommendations implemented as result of self-assessments

# ORGANIZATIONAL LEARNING AND ASSESSMENT (Cont'd)

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- Problem Identification and Resolution (PI&R) Corrective Action Program (CAP)
  - (pm) Percentage of self identified SCAQs and CAQs versus those that are self-revealing or identified by external organization
  - (pm) Number of corrective action program backlog (by significance level) both evaluations and corrective actions
  - (pm) Number and significance of repeat events
- Continuous Learning Environment
  - (pm) Average age and number of open simulator discrepancies
  - (pm) Number of good practices and lessons learned identified from benchmarking activities that are internally communicated or selected for further action

# WORK PLANNING AND HUMAN PERFORMANCE

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- Work Control
  - (pm) Number of engineering backlogs
  - (pm) Percentage of important to safety systems that contain temporary modifications
  - (pm) Number unplanned LCO entries
  - (pm) Number of repeat equipment failures in maintenance important to safety systems
  - (pm) Ratio of corrective maintenance versus preventive maintenance
  - (pm) Number of work planning deficiencies entered into the CAP

# WORK PLANNING AND HUMAN PERFORMANCE (Cont'd)

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- Systematic Decision Making
  - (pm) Number of root causes due to non conservative decision making
  - (pm) Percentage of risk significant equipment that is assessed periodically (e.g., system health reports)
- Conduct of Work (including Maintenance, Operations, Radiation Protection, and Engineering)
  - (pm) Percentage of pre-job reviews found unacceptable from quality assurance field observations
  - (pm) Percentage of post job reviews which identify good practices and improvements for the job

# CONCLUSION

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- As a component of DOE's ISM program, a balanced suite of performance metrics and assessment criteria can assist in the identification of areas needing attention and help measure progress toward becoming a high performing organization with a mature safety culture.

# BACKUP MATERIAL

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- Crosswalk between NRC safety culture attributes and DOE ISM guiding principles/supplemental elements and INPO safety culture principles
- Keyed to NRC four safety culture attributes
- Crosswalk is subjective and further study may group differently

# BACKUP MATERIAL

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- Organizational Safety and Accountability (NRC)
  - DOE ISM
    - Line Management responsible for safety
    - Clear roles and responsibilities
  - INPO
    - Leaders demonstrate commitment to safety

# BACKUP MATERIAL

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- Safety Conscious Work Environment (NRC)
  - DOE ISM
    - Individual attitude and responsibility for safety
  - INPO
    - Everyone is personally responsible for nuclear safety
    - A questioning attitude is cultivated
    - Trust permeates the organization

# BACKUP MATERIAL

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- Organizational Learning and Assessment (NRC)
  - DOE ISM
    - Competence commensurate with responsibility
    - Operational Excellence
  - INPO
    - Nuclear technology is recognized as special and unique
    - Organizational learning is embraced

# BACKUP MATERIAL

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- Work Planning and Human Performance (NRC)
  - DOE ISM
    - Balanced Priorities
    - Identification of safety standards and requirements
    - Hazard controls tailored to work being executed
    - Operations authorization
    - Oversight of performance assurance
    - Organizational learning for performance improvement

# BACKUP MATERIAL

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- Work Planning and Human Performance (NRC)
  - INPO
    - Decision making reflects safety first
    - Nuclear safety undergoes constant examination