

Safety Management Systems

API RP 1173



**2017 South Dakota/North Dakota/Wyoming
Pipeline Safety Conference**
Wednesday, March 29, 2017
9:00-10:00 AM



Today's Agenda

- PHMSA Safety Posture Initiative and 2021 Plan
- Importance of Management Systems
- Safety Culture
- Safety management Systems (API RP 1173)



2015 Safety Initiative Goals

- Advance priority rulemakings, including:
 - Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines (NPRM)
 - Pipeline Safety: Excess Flow Valves in Applications Other than Single-Family Residences in Gas Distribution Systems (Final Rule)
 - Pipeline Safety: Enforcement of State Damage Prevention Laws (Final Rule)



Safety Initiative Goals

- Continue to pursue and foster non-regulatory approaches to effect continuous improvement in safety, such as Safety Management Systems (SMS), Safety Culture, and incentivizing regulated entities to move beyond mere compliance with regulations by adopting and institutionalizing voluntary, meaningful, comprehensive programs that will advance safety.
- Advance PHMSA's pipeline damage prevention program.
- Plan for wider adoption and shifting uses and transportation of natural gas: liquefaction, transport, distribution, export, intermodal connections



Safety Initiative Goals

- Address aging pipeline infrastructure and rapid modernization and expansion (e.g., to include new construction; replacement).
- Continue to address pipeline operations and management (e.g., continuous improvement of integrity management; information collection on existing pipeline systems; and other operational changes such as flow reversals and conversions).



PHMSA 2021

- The PHMSA mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives.
- Over the next 5 years PHMSA 2021 is a series of projects focused on 5 goals that will reposition PHMSA to reduce safety risks and increase budgetary accountability to support our mission.
- PHMSA seeks to promote continuous improvement in safety performance.
- SMS implemented within PHMSA and promoted among our regulated entities is one of these goals.



PHMSA 2021

- PHMSA's safety metrics have revealed that there is a leveling out of safety results, and a proactive approach is the next step in reducing safety risk in PHMSA's regulated entities.
- One of PHMSA's goals is to change PHMSA's stance on safety performance from a reactive approach to identified risks to a proactive, systematic approach to managing safety.
- A SMS is a cultural shift in the approach to safety performance and represents a fundamental shift in the culture of the organization.
- SMS implemented within PHMSA and promoted outside of PHMSA will foster an atmosphere of "safety first" cascading from all levels of management through to the boots on the ground.



Underlying Principles

- The Pipeline Operator Alone is Responsible for Safe Operations:
 - It is the responsibility of pipeline operators to understand and manage the risks associated with their pipelines.
- The Regulator Can Influence Operator Performance:
 - PHMSA's primary role is to establish minimum safety standards
- PHMSA also strives to impact operator performance beyond mere compliance with the regulations
- API RP 1173 - Pipeline Safety Management Systems national consensus standard has been published
 - Support maturation of safety culture within organizations
 - Support development of safety management systems



Moving from Compliance to Choice

- Our world must move from a “checkbox” mentality to understanding the health of our pipeline systems by analyzing and understanding data and information and promptly acting to reduce risks
- Prescription may need to be added to performance based IM regulations to address inadequacies identified in inspections and accidents



Safety Management Systems

- 1990's – Risk Management demonstration and Systems Integration Initiative
- 2000's – Integrity management Systems
- 2011 - Gas Transmission & Gathering ANPRM
 - Topic M - Quality Management Systems (QMS)
- SMS in other Industries and their success
- NTSB Recommendations to API from Enbridge Marshall, MI accident (2012) to develop a pipeline industry standard for SMS
- First Public Meeting was held July 2, 2014 to preview the content of the draft of API RP 1173



Safety Management Systems

- A 3rd Public Meeting was held April 22, 2015 to discuss the publication of API RP 1173
<http://primis.phmsa.dot.gov/meetings>
- API RP 1173 embodies the Best of a Dozen Other Approaches from Other High Hazard Industries
- The goal of this document is to provide pipeline operators with a framework to review an existing PSMS or develop and implement a new PSMS.
- The document is designed to provide a framework that is allows for flexibility to meet an operators unique operating environment and scalable from small to large systems



Management Systems

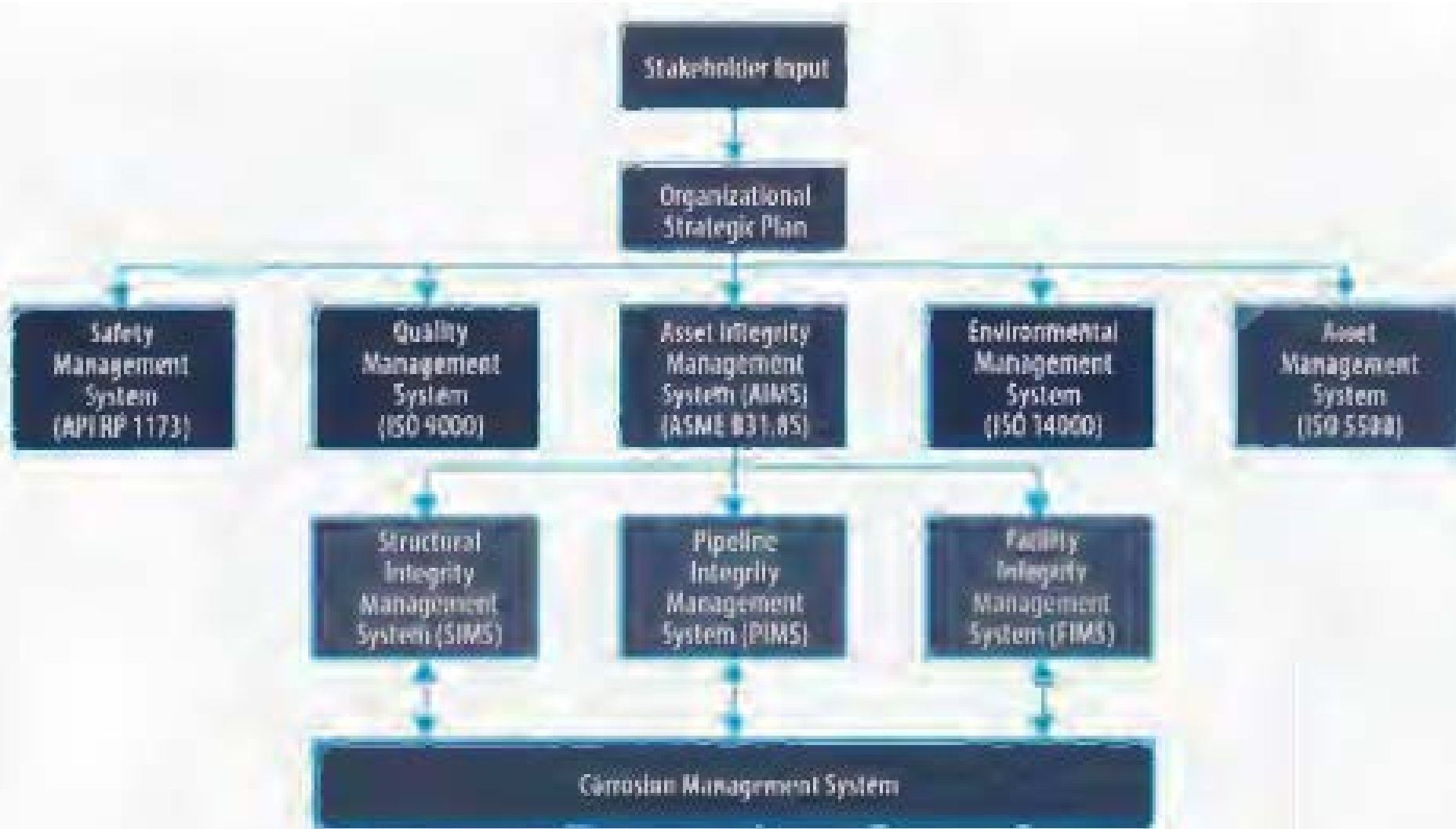


Figure 1. Interrelation of an organisation management system – pipeline example.

Safety Management Systems

- Based on “Plan – Do - Check – Act” Continuous Improvement Model
- SMS adds Dimensions to Integrity Management
 - Safety Culture Elements
 - Emphasis on the Vital Check-Act Elements
- Safety Culture is defined by DOT as the shared values, actions, and behaviors that demonstrate a commitment to safety over competing goals and demands.



Safety Culture

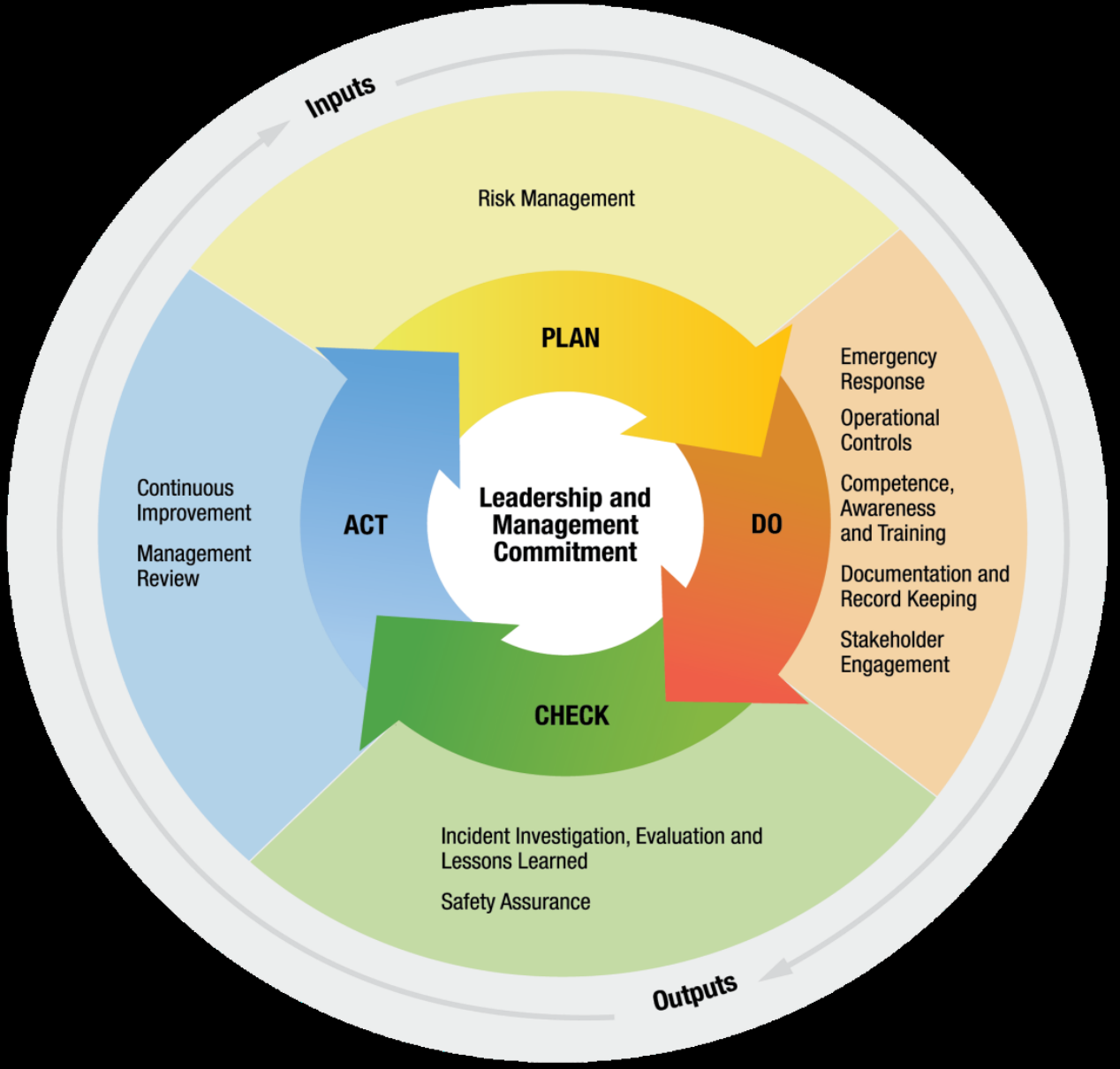
Critical elements of a strong safety culture:

1. Leadership is Clearly Committed to Safety
2. There is Open and Effective Communication Across the Organization
3. Employees Feel Personally Responsible for Safety
4. The Organization Practices Continuous Learning
5. There is a Safety Conscious Work Environment
6. Reporting Systems are Clearly Defined and Non-Punitive
7. Decisions Demonstrate that Safety is Prioritized Over Competing Demands
8. Mutual Trust is Fostered between Employees and the Organization
9. The Organization is Fair and Consistent in Responding to Safety Concerns
10. Training and Resources are Available to Support Safety



Plan, Do, Check, Act The core of the standard

Continuous Improvement is the Goal of the standard



PSMS Processes

Essential Pipeline Safety Management System Elements

- Leadership and Management Commitment
- Stakeholder Engagement
- Risk Management
- Operational Controls
- Incident Investigation, Evaluation and Lessons Learned
- Safety Assurance
- Management Review and Continuous Improvement
- Emergency Preparedness and Response
- Competence, Awareness and Training
- Documentation and Record Keeping



PSMS Meeting website

<http://primis.phmsa.dot.gov/meetings/>



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Public Workshop on Pipeline Safety Management Systems

YOUTUBE LINK: [HTTPS://WWW.YOUTUBE.COM/PLAYLIST?LIST=PL4wHDSuQ-UkMawECLAEKqMDKIDNLEOUBO](https://www.youtube.com/playlist?list=PL4wHDSuQ-UkMawECLAEKqMDKIDNLEOUBO)

PRESENTATION FILES ARE AVAILABLE FOR DOWNLOAD BELOW.

Meeting Information

<i>Status</i>	Completed
<i>Starts</i>	Apr 22, 2015 at 8:00 AM CDT
<i>Ends</i>	at 4:30 PM CDT
<i>Location</i>	Westin Galleria, 5060 West Alabama Street, Houston, TX 77056
<i>Virtual Information</i>	Webcast Link: http://www.onlinevideosevice.com/clients/PHMSA/042015/
<i>Purpose & Summary</i>	This is a one-day public workshop to discuss the recent Pipeline Safety Management Systems (PSMS) national consensus standard. The meeting will include participation from all major pipeline sectors, State and Federal regulators, and public safety advocates. This workshop will detail the development process of the SMS standard. The workshop will also emphasize the core elements of the standard including leadership and management commitment, risk management, emergency preparedness and response, competence awareness and training, management review and continuous commitment, and the critical role of safety culture.

Results

Additional Information

PSMS Processes

- **Leadership and Management Commitment (Section 5)**
 - Goals and Objectives
 - Responsibilities of Leadership
 - Top Management
 - Management
 - Employees
 - Responsibility, Accountability and Authority
 - Making Communication, Risk Reduction and Continuous Improvement Routine
- When Leadership Has a More Visible Role in Demonstrating the Safety Culture it Brings Rigor to Asset Protection / Safety



PSMS Processes

- **Stakeholder Engagement (Section 6)**
 - Internal
 - External
- Internal Focus on Employee Engagement, Involvement and Learning.
- External Focus on Moving from Awareness to Dialogue to Help Identify and Control Risk and Share Performance.
- Supports Processes to Identify and Resolve Concerns about Transparency on Safety Matters



PSMS Processes

- **Risk Management (Section 7)**
 - Data Gathering and Evaluation of Quality
 - Risk Identification and Assessment
 - Risk Prevention and Mitigation
 - Periodic Analysis
 - Analysis Report
- Responsiveness to Employee-identified Risk Builds and Improves the Safety Culture
- Identification of Operational Risks for Mitigation. (Beyond Regulatory Requirements)



PSMS Processes

- **Operational Controls (Section 8)**
 - Operating Procedures
 - Safe Work Practices
 - Quality and System Integrity
 - Management of Change
 - Outsourcing and Contractors
- Greater Certainty That Activities Are Performed as Expected and there is a Commitment to Safety.
- Employee Understanding That Following Procedures Is Important and can Confidently Stop Work and Identify Unsafe Activities.



PSMS Processes

- **Incident Investigation, Evaluation and Lessons Learned (Section 9)**
 - Investigation of Incidents
 - Follow-up and Communication of Lessons Learned
 - Learning From External Events
- Ensures the Right Information Is Gathered from Events.
- Sharing of Lessons Learned Within the Organization Builds the Safety Culture.
- Uses the Incidents of Others to Prevent Their Occurrence Within the Organization.



PSMS Processes

- **Safety Assurance (Section 10)**
 - Audit and Assessment
 - Employee Reporting and Feedback
 - Analysis of Data
 - Performance Evaluation
 - Evaluation of Safety Culture
 - Evaluation of Maturity
- Validation that Risk Management Is Systematic and Disciplined.
- Evaluates the Openness of the Organization and Trust of the Employees in the Organization.



PSMS Processes

- **Management Review and Continuous Improvement (Section 11)**
 - Management Review
 - Input Requirements
 - Output Requirements
 - Continuous Improvement
 - Evaluation of Technology
- Defines Opportunities and Obtains Authorization for Continuous Improvement Activities.
- Sets Safety as a Priority.



PSMS Processes

- **Emergency Preparedness and Response (Section 12)**

Procedures include the following elements:

- Potential types of emergencies
 - Internal and external notification requirements
 - Identification of response resources and interfaces
 - Recognition and use of Unified Command/ICS
 - Safety, health, and environmental protection processes
 - Communication plan
 - Training and drills
 - Lessons learned and improvement process
 - Periodic review and updating of the plan
- Being Prepared Leads to Good Safety Culture Characteristics.
 - Identifies the Resiliency of the Organization and Gives a Realistic Sense of Vulnerability and Therefore Watchfulness.



PSMS Processes

- **Competence, Awareness and Training (Section 13)**

Training to ensure that personnel and contractors are updated and aware of:

- applicable elements of the PSMS that affect their job requirements
- accountabilities, responsibilities, and authorities in executing the PSMS
- newly emerging or changing risks, problems in execution of the pipeline safety management system, and opportunities to improve processes and procedures
- potential consequences of failure to follow processes or procedures



PSMS Processes

- **Documentation and Record Keeping (Section 14)**
 - Control of Documents
 - Control of Records
 - Procedures
- Ensures procedures and programs are up to date
- Enables accurate reporting and tracking of data, which is the basis of learning and improvement



Executing a Pipeline Safety Management System Strengthens Safety Culture (Section 15)

Contribution of Each element:

- Leadership and Management Commitment
- Stakeholder Engagement
- Risk Management
- Operational Controls
- Incident Investigation, Evaluations and Lessons Learned
- Safety Assurance
- Management Review
- Emergency Preparedness and Response
- Competency, Awareness and Training
- Document Control



Why is Leadership the Heart of PDCA? Leadership is everywhere

Top Management- accountable for continuous improvement, routine review of safety performance and communications about safety

Management- ensures process, procedures and training to meet objectives; assess, evaluate and adjust as needed to meet objectives; foster continuous improvement

Employees– identify improvements, reveal risks

Consider employee, public and pipeline safety when stopping work for safety concern

Bring rigor of employee safety to asset protection



SMS Conclusions

SMS require More

- Intentional and systematic actions
- Diligence and oversight
- Involvement at all levels - communications
- “Go and Check” attitude

The rewards of SMS are

- Increased pipeline safety – risk reduction
- Creation/Enhanced safety oriented culture
- Broader organizational involvement



Seven Rules of Admiral Rickover

- 1. You must have a rising standard of quality over time, and well beyond what is required by any minimum standard.*
- 2. People running complex systems should be highly capable.*
- 3. Supervisors have to face bad news when it comes, and take problems to a level high enough to fix those problems.*
- 4. You must have a healthy respect for the dangers and risks of your particular job.*
- 5. Training must be constant and rigorous.*
- 6. All the functions of repair, quality control, and technical support must fit together.*
- 7. The organization and members thereof must have the ability and willingness to learn from mistakes of the past.*



High Reliability Organizations

Preoccupation with failure - seeking out small faults in the system and using those to improve performance,

Reluctance to simplify – valuing diversity of views and resisting the temptation to jump to quick conclusions,

Sensitivity to operations – valuing experienced operating people who have a nuanced system understanding,

Commitment to resilience – using layers of protection, valuing redundancy in equipment and people, and

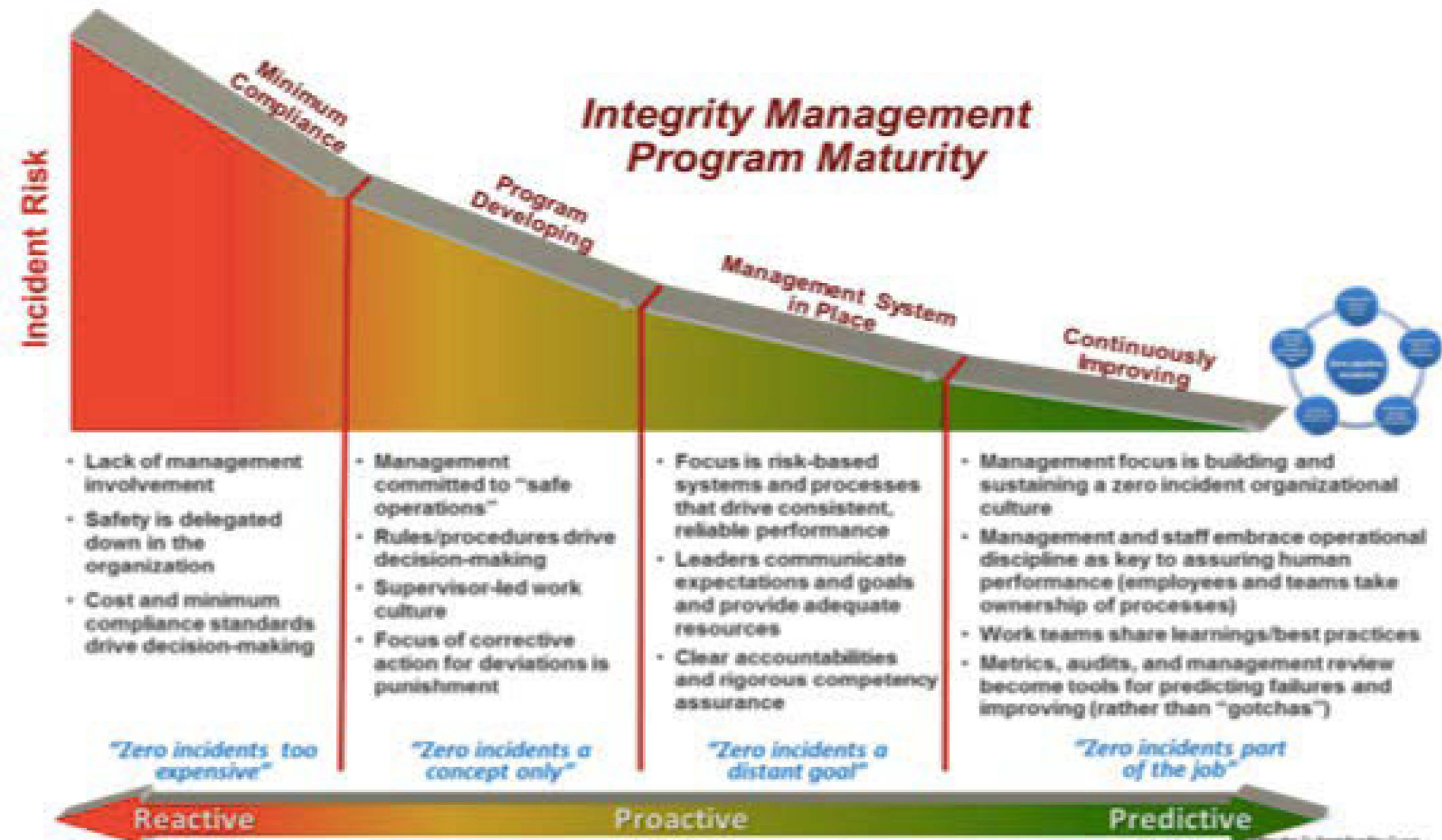
Deference to expertise – placing appropriate value on the advice of technical experts in decision making.

ORGANISATIONAL SAFETY – A NEW RESEARCH VENTURE FOR THE AUSTRALIAN PIPELINE INDUSTRY:

Dr Jan Hayes, Peter Tuft, and Professor Andrew Hopkins, Australian National University, Canberra, Australia



Assessing Maturity



Thank you for your Participation

Websites are our primary form of communication

- <http://phmsa.dot.gov/pipeline>
- <http://primis.phmsa.dot.gov/dimp/>
- <http://primis.phmsa.dot.gov/meetings/>
- <http://www.phmsa.dot.gov/foia/e-reading-room>

