Control Room Management: Implementation, Evolution, Moving Forward

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Control Room Management

- Agenda Review
  - CRM Background
  - Accidents = Regulation
  - Canada & USA
  - PHMSA (USA) Inspection Evolution
  - What to use in Brazil
    - Develop
    - Implement
  - Moving Forward

Questions – Ask at any time during the session

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Accidents with Control Room/SCADA Involvement
2005 NTSB SCADA Safety Study

- Brenham, TX, April 7, 1992 – Seminole Pipeline
- Gramercy, LA, May 23, 1996 – Marathon Pipeline
- Fork Shoals, SC, June 26, 1996 – Colonial Pipeline
- Murfreesboro, TN, November 5, 1996 – Colonial Pipeline
- Knoxville, TN, February 9, 1999 – Colonial Pipeline
- Bellingham, WA, June 10, 1999 – Olympic Pipeline
- Winchester, KY, January 27, 2000 – Marathon Pipeline
- Greenville, TX, March 9, 2000 – Explorer Pipeline
- Chalk Point, MD, April 7, 2000 – Piney Point Oil Pipeline
- Kingman, KS, October 27, 2004 – Enterprise Pipeline

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U.S. Government:
PHMSA – Control Room Management Rule in 2010

Natural Gas: CFR Title 49 Part 192.631
Hazardous Liquids: CFR Title 49 Part 195.446

The US Govt has been REACTIVE to accidents.

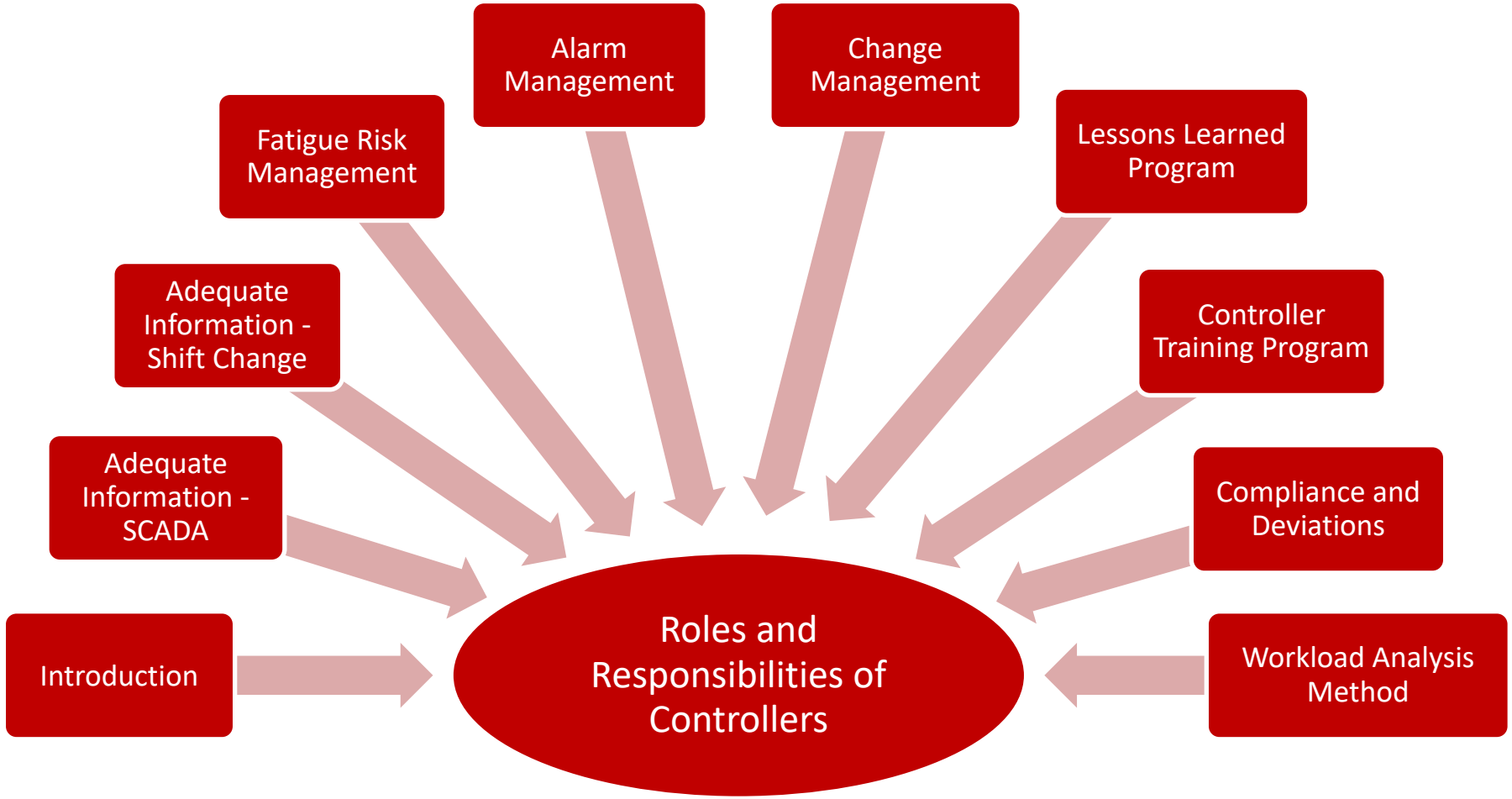
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Regulatory Intent of the PHMSA CRM Rule

- Create an environment to help assure Controllers will be successful in maintaining pipeline safety and integrity
- Assure Field, SCADA, Projects/Engineering, Automation, Management, and others have procedures and know their Responsibilities to safely support the Control Room during Normal, Abnormal and Emergency Operations
- Assure companies are addressing fatigue risks in the control room
- Verify that procedures, systems, and equipment are well thought out and function as designed

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CRM Topic Area – Relationship to Controllers



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After the CRM Rule Was Published







- San Bruno, California 2010
- Marshall, Michigan 2010
- Sissonville, West Virginia 2012

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Canada & U.S. CRM Regulatory Requirements

- Canada: CER OPR
  - Somewhat less prescriptive, less detailed/specific
  - Focused on programs
  - Integrated Management System

- U.S.: PHMSA
  - More detailed and specific
  - Reactive to accidents
  - Regulation language is more prescriptive, but not 100% prescriptive

The two combined provide a more holistic approach…

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U.S. PHMSA – Approach to Inspections

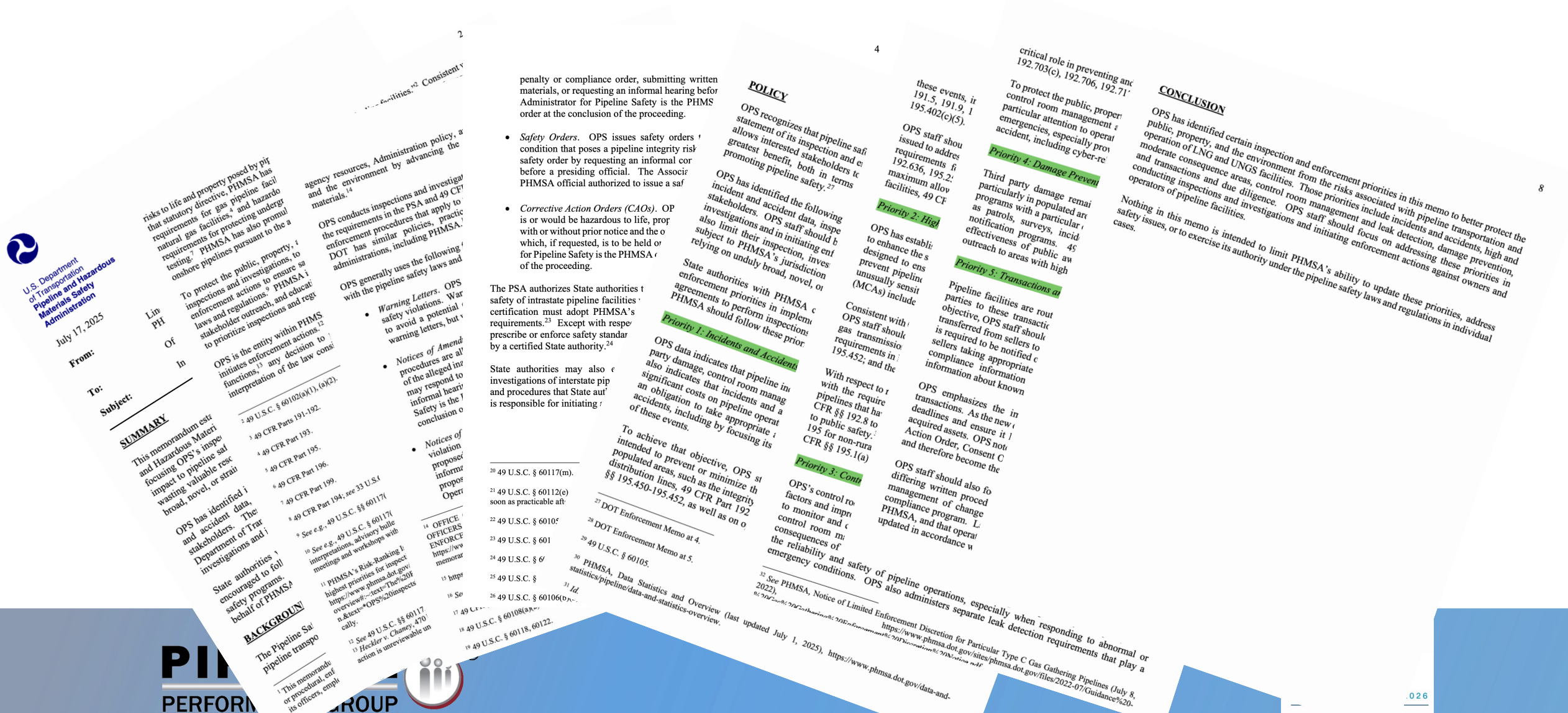
In the beginning…

For the first 8-10 years…

The last 5+ years…

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PHMSA's Top 5 Priority Focus Areas



U.S. Department of Transportation
Pipeline and Hazardous Materials Safety Administration

July 17, 2025

From:

To:

Subject:

SUMMARY

POLICY

Priority 1: Incidents and Accidents

Priority 2: High

Priority 3: Cont

Priority 4: Damage Prevent

Priority 5: Transactions a

BACKGROUN

CONCLUSION

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PHMSA's Top 5 Priority Focus Areas

17 July 2025 Memo to PHMSA Inspection & Enforcement staff

Data Driven Approach

- Incidents and Accidents
- High and Moderate Consequence Areas
- Control Room Management and Leak Detection
- Damage Prevention
- Transactions and Due Diligence

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Resources

CRM Plan and Related Procedures

CRM Plan Implementation

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Resources – Internal

- Compliance Team
  - Hands on or Hands off?
- Control Room Team (Controllers and Management)
  - Robust or Lean?
- Fatigue Risk Manager
- SCADA Team
  - SCADA and Alarm Management
- Field Team(s) (Personnel and Management)
- MOC Process Owner
- Training Team
- Other?



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Resources – Internal



- Common Issues
  - Lack of Buy-in
  - Lack of Ownership
  - Results in Lack of Participation
- Leadership Commitment
  - Can make or break your CRM Plan and Inspection results

What issues have you experienced?

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CRM Plan and Related Procedures

CRM Plan - Organizational Approaches

- Skinny Plan – Point to/Reference many other documents/procedures
  - Pro: Possible faster Plan writing/updating
  - Con: Other docs need to be robust/fully compliant with CRM requirements
  - Con: Inspectors can dive deeper into more docs
  - Con: Users must jump around when training and when looking for information
- Robust Plan – Point to/Reference select procedures
  - Pro: Other docs can be concise for their purpose (specific compliance)
  - Pro: Keep Inspectors focused on CRM Plan itself more, less diving into other docs
  - Pro: Central robust document for users when training and when looking for information
  - Con: Longer Plan writing/updating

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CRM Plan and Implementation



Implementation

- Build a detailed Implementation Schedule
  - Topics
  - Action Items/Tasks
  - Owners/Others Involved
  - Due Dates/Follow ups
- Initial Implementation
  - One time compliance tasks
- Ongoing compliance tasks
- Annual requirements
- Updates

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CRM Plan and Implementation

- Compliance Tracking
  - Software (examples)
    - Purpose built (MaCRoM)
    - Piggyback (SAP/Maximo)
    - Proprietary (In-house)
  - Excel Spreadsheet – Difficult to “Scale”
- Ongoing Compliance Owners
  - One owner – dedicated?
  - Multiple owners (slice up the CRM Plan)
    - Coordination required



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Audit Preparation



CRM Plan Gap Analysis & Mock Audits

- Compare the CRM Plan and Related Procedures and Records to the Inspection Questions, etc.
- Third Party Audits
  - Internal
    - Internal Audit Teams – take advantage
    - Work with them prior
      - What forms are they using?
      - What rigor are they applying?
      - Ask them to be detailed and tough
  - External
    - You can also work with a third party to conduct:
      - CRM Plan Gap Analysis
      - CRM Mock Audit

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Audit Preparation & Moving Forward

Measuring effectiveness

Could spend an entire month on Effectiveness – Let's scratch the surface

- What are you looking at?
  - Metrics
    - Alarms – KPIs only or A-Rat and Work Orders, Changes/Inhibits outside, Factors
  - Leading and Lagging indicators
    - Lagging: Actual Accidents
    - Leading: Near Misses

Benefiting from measuring effectiveness – not just checking the compliance box

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QUESTIONS?

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