Trend Analysis Management Overview

EFCOG May 3, 2023

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Corrective Action, WRPS

Trend Analysis Management Overview

- Safety Message
  - Safety Share
- MS Teams Meeting Expectations
  - Microphone on mute unless speaking
  - Speak out or raise hand in MS Teams to ask question
  - Be an active participant (discussion is encouraged)
  - One person talking at a time

Trend Analysis Management Overview

- Presentation Goal
  - Provide general familiarization and understanding of trend analysis concepts and process
  - Communicate that trend analysis of human performance data is a skill that must be learned through training and practice due to the variability of factors that influence performance
  - Provide a general understanding of trending concepts, methods, and recognizing when improvement is needed due to unacceptable risk

Value Gained by Trending

- Why Do We Trend Data
  - Identifies low-level or emerging issues before they become a self-revealing consequential event or are externally identified by oversight.
  - Reveals underlying organizational/behavioral issues and aids in determining if additional actions are needed to improve performance.
  - Provides managers with a basis for better leveraging of their problem-solving resources
  - Identifies focus areas for assessments and observations
  - Identifies ineffective corrective actions
  - Used for cause analysis precursor/historical reviews
  - Used as an input for assessing overall ISMS performance and Safety Culture

Obtaining Value Out of Trending

- Maximizing the value out of trending requires a corresponding increasing level of effort
- Level of effort for manual methods could become cost prohibitive
- Software solutions automate this process and optimizes the information obtained from data for effective risk determination
- Computer-generated analyses can be used to progress the learning from what happened and why it happened to predicting what will happen and how to prevent or make conditions happen.
- Use of computer analytics makes it possible to distilling large datasets into relevant information providing analysis results within minutes versus days using manual methods
- Software based trending provides for reliable and consistent results in data reports and trend charts

Recommended Reading

- DOE G 450.4-1C, Integrated Safety Management System Guide
- DOE-STD-1197-2011, Occurrence Reporting Causal Analysis
- DOE-HDBK-1028-2009, Human Performance Improvement Handbook Volume 1: Concepts and Principles
- DOE-HDBK-1028-2009, Human Performance Improvement Handbook Volume 2: Human Performance Tools for Individuals, Work Teams, and Management
- DOE-HDBK-1208-2012, Accident and Operational Safety Analysis Volume I: Accident Analysis Techniques
- DOE-HDBK-1208-2012, Accident and Operational Safety Analysis Volume II: Operational Safety Analysis Techniques
- INPO 07-007, Performance Assessment and Trending
- INPO 12–012, Traits of a Healthy Nuclear Safety Culture
- INPO 14-004, Conduct of Performance Improvement
- INPO 18-004, Trending Gap Identification, Analysis and Closure
- Nuclear Energy Institute 09-07, Fostering a Healthy Safety Culture
- Nuclear Energy Institute Efficiency Bulletin 16-10, Reduce Cumulative Impact from the Corrective Action Program
- Safety and Security Enforcement Coordinator Handbook, April 2021, Appendix A, Contractor Corrective Action Processes and Assessments

Requirements

Requirements committed to in the current contract that specify trending:

- ASME NQA-1a-2009, Part I, Requirement 16, Corrective Action, and Part 111, Subpart 3.1, Nonmandatory Appendix 16A-1
- DOE O 226.1B, Change 1, Implementation of Department of Energy Oversight Policy, Attachment 1, Contractor Assurance System
- DOE O 422-1, Conduct of Operations, 2.f.(5), Event Investigation Reporting, Training, and Trending
- DOE O 414.1D, Quality Assurance, Attachment 3, Suspect / Counterfeit Items Prevention
- DOE O 450.2, Integrated Safety Management

Requirement Summary

- Review quarterly all reportable and non-reportable occurrences to determine the existence of trends
- Adverse conditions are to be reviewed in the aggregate to determine the existence of trends
- The significance of a trend is classified per the issue management significance screening process
- In classifying adverse conditions, consider:
  - Repetition of specific adverse conditions
  - Relationship or similarity between different conditions, in a manner and at a frequency that ensures trends are identified and evaluated for appropriate correction
  - Risk associated with frequency and potential consequences

Requirement Summary

- Final significance determination for a trend is conducted by the issue management screening process
- The contractor is to identify and communicate issues and performance trends or analysis results up the contractor management chain to senior management using a graded approach that:
  - Considers hazards and risks
  - Provides sufficient technical basis to allow managers to make informed decisions and correct negative performance/compliance trends before they become significant issues

Leadership Expectations[1]

- Set Direction
  - A leadership performance objective is to continually strive for improvement and intervene to correct performance at early signs of decline.
  - Station and department trending activities are also expected to be viewed with the same importance as analyzing individual significant events.
  - Trending governance and structure are established to provide consistency in addressing issues.
  - Governance provides a graded approach to identifying and addressing trends that allows issues to be addressed commensurate with their significance.

[1] INPO 18-004, Trending - *Gap Identification, Analysis and Closure*, November 2018

Leadership Expectations

- Maximize Competence: Leaders develop the knowledge and skills to both analyze and communicate trending issues and to maintain organizational proficiency in trending.
- Engage Workforce: Trending requires teamwork, and leaders should appropriately engage the workforce in identifying and addressing trends.
- Cope with Risk: Trending requires incorporating many diverse perspectives and fostering a questioning attitude.

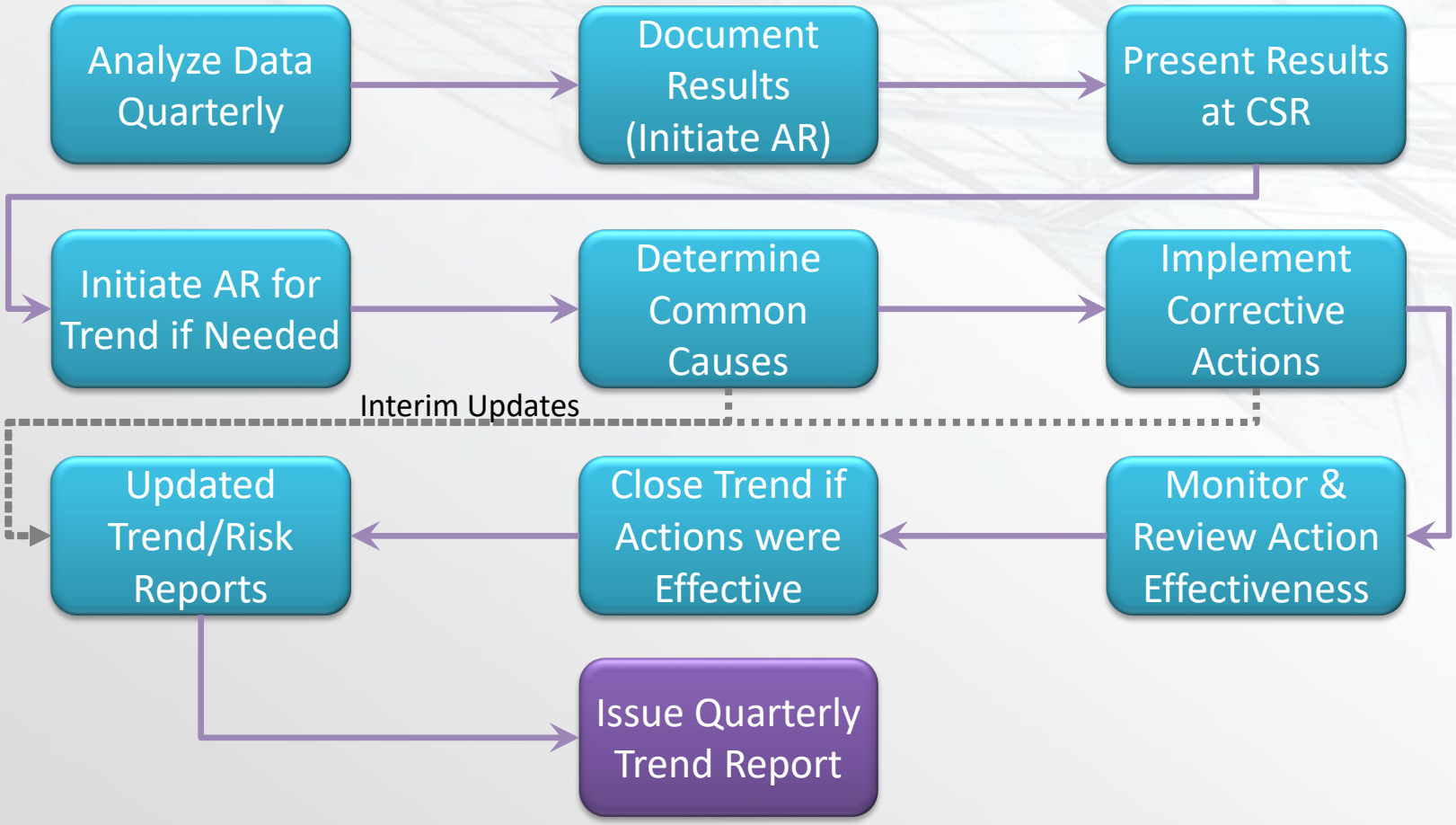
Leadership Expectations

- Achieve Sustainable Results: Leaders monitor organization's ability to be forward looking in preventing significant events, learning from the industry, and **not waiting for a major event to happen to determine underlying weaknesses**.
- Performance is monitored by trending both behaviors and results; subtle signs of decline are identified and addressed.
  - **Leaders resist rationalization or overconfidence in current performance based on sometimes deceiving high level, lagging indicators.**
  - Identified trends are monitored to verify efficacy of corrective actions with intervention if progress is not adequate.

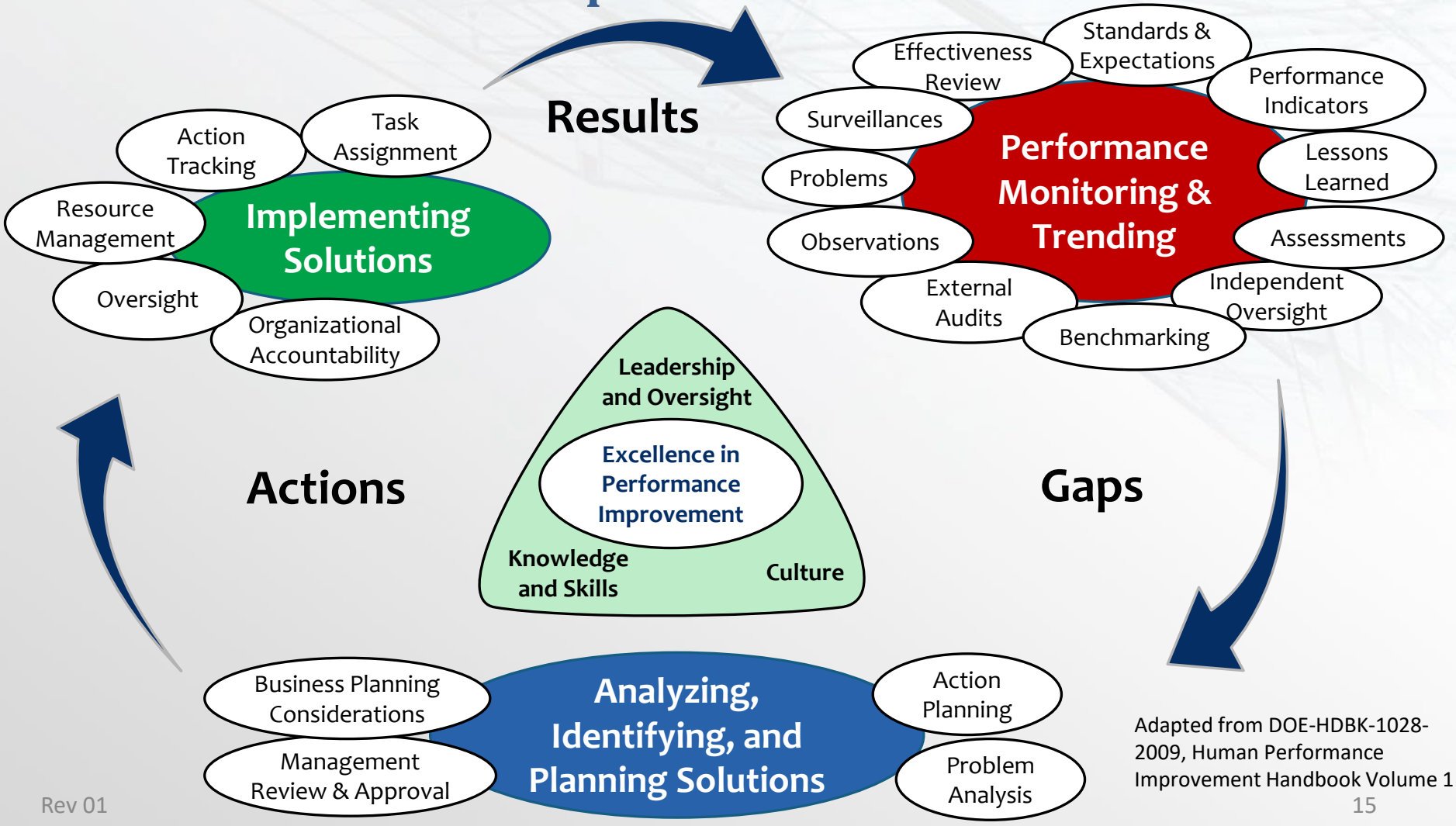
Trend Analyst Expectations

- Review occurrences weekly and assign trend codes
- Review reports (e.g., cause analysis, assessments, surveillances, observations, etc.) when completed and adjust trend codes as necessary
- Collect and analyze data quarterly for trends
- Document analysis results to include identified trends/focus areas, supporting evidence, a status of open trends
- Submit analysis results for inclusion in the CSR meeting
- Monitor department performance

Trending Process



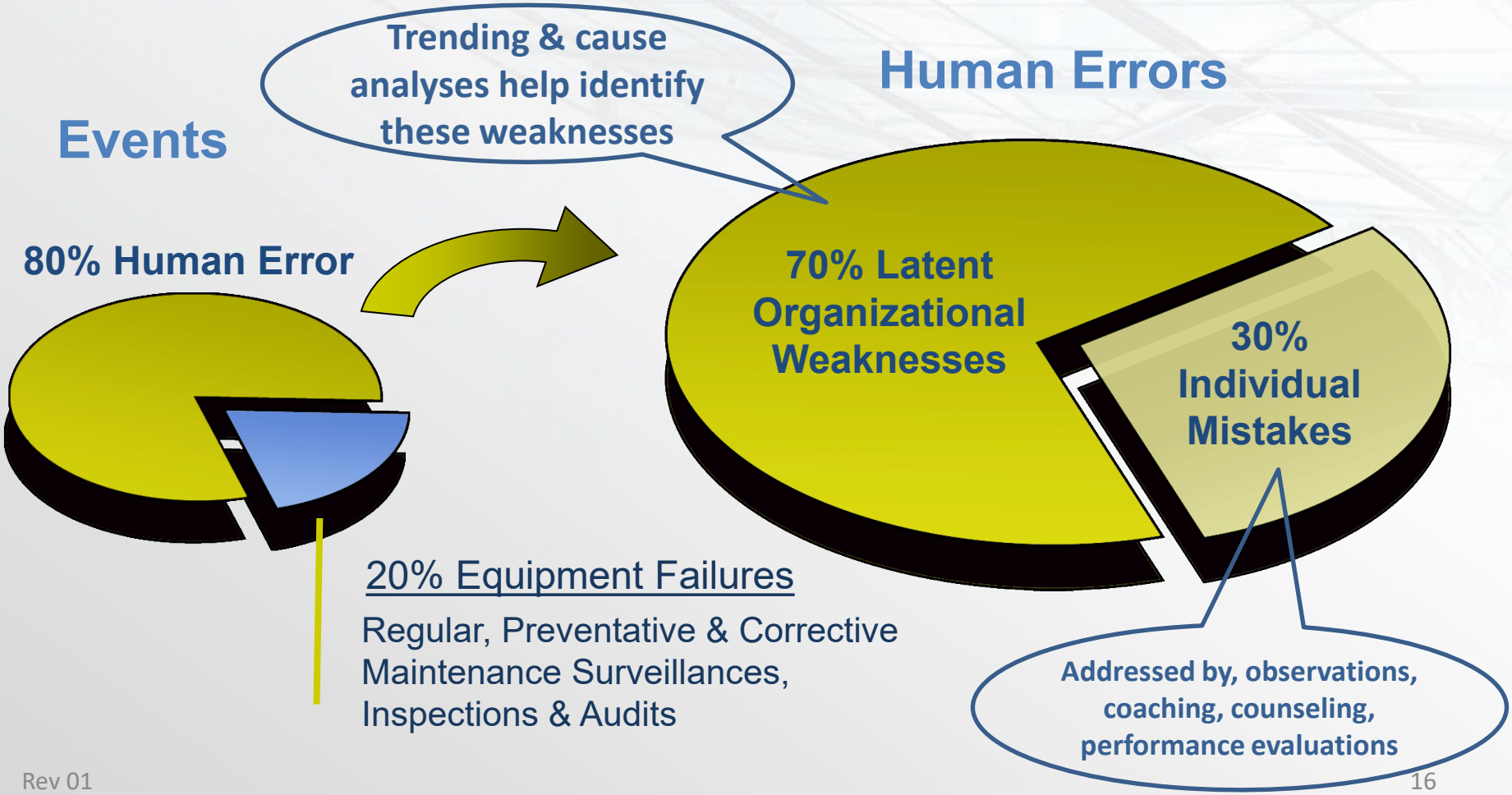
Human Performance Improvement Model



Adapted from DOE-HDBK-1028-2009, Human Performance Improvement Handbook Volume 1

Performance Monitoring Concepts

- Perspective on Human Performance and Events

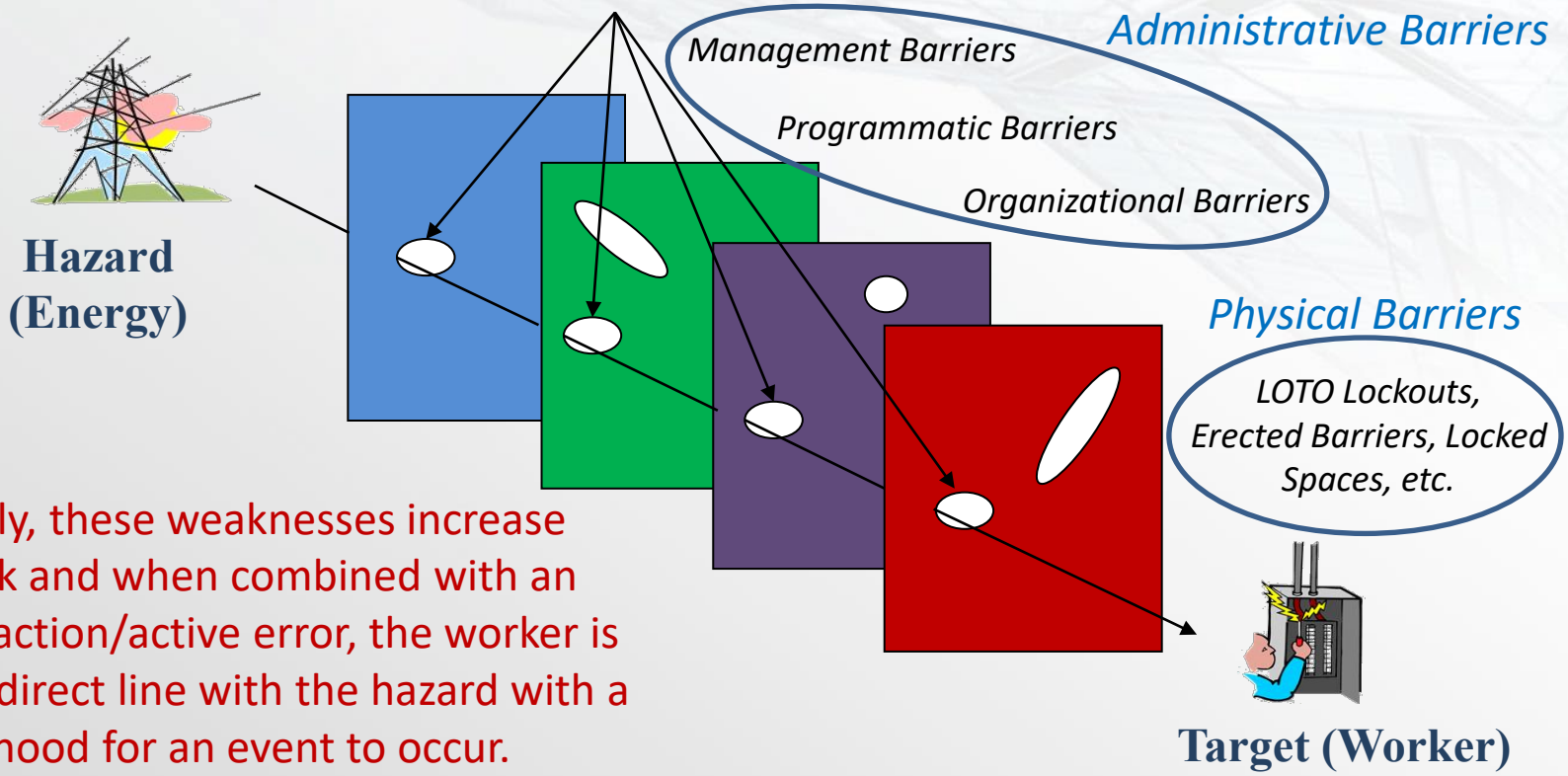


DOE-HDBK-1028-2009, Human Performance Improvement Handbook Volume 1

Performance Monitoring Concepts

- Human Performance & Trending (Cont.)

Latent errors create holes in the barriers that go undetected until the right conditions are present for an event to occur. Trending identifies these weaknesses for correction.

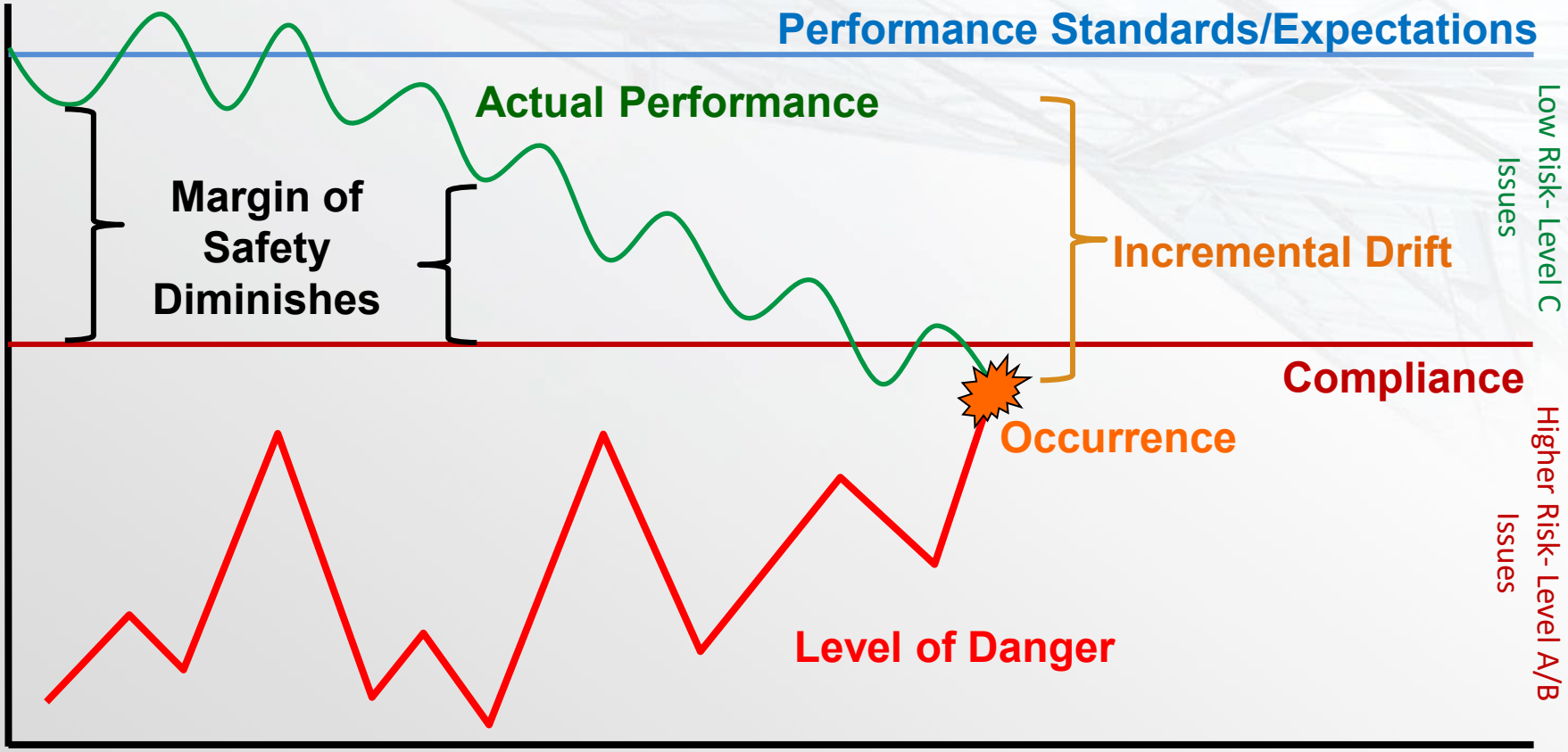


Collectively, these weaknesses increase overall risk and when combined with an initiating action/active error, the worker is placed in direct line with the hazard with a high likelihood for an event to occur.

Adapted from J. Reason. *Managing the Risks of Organizational Accidents*. 1998,

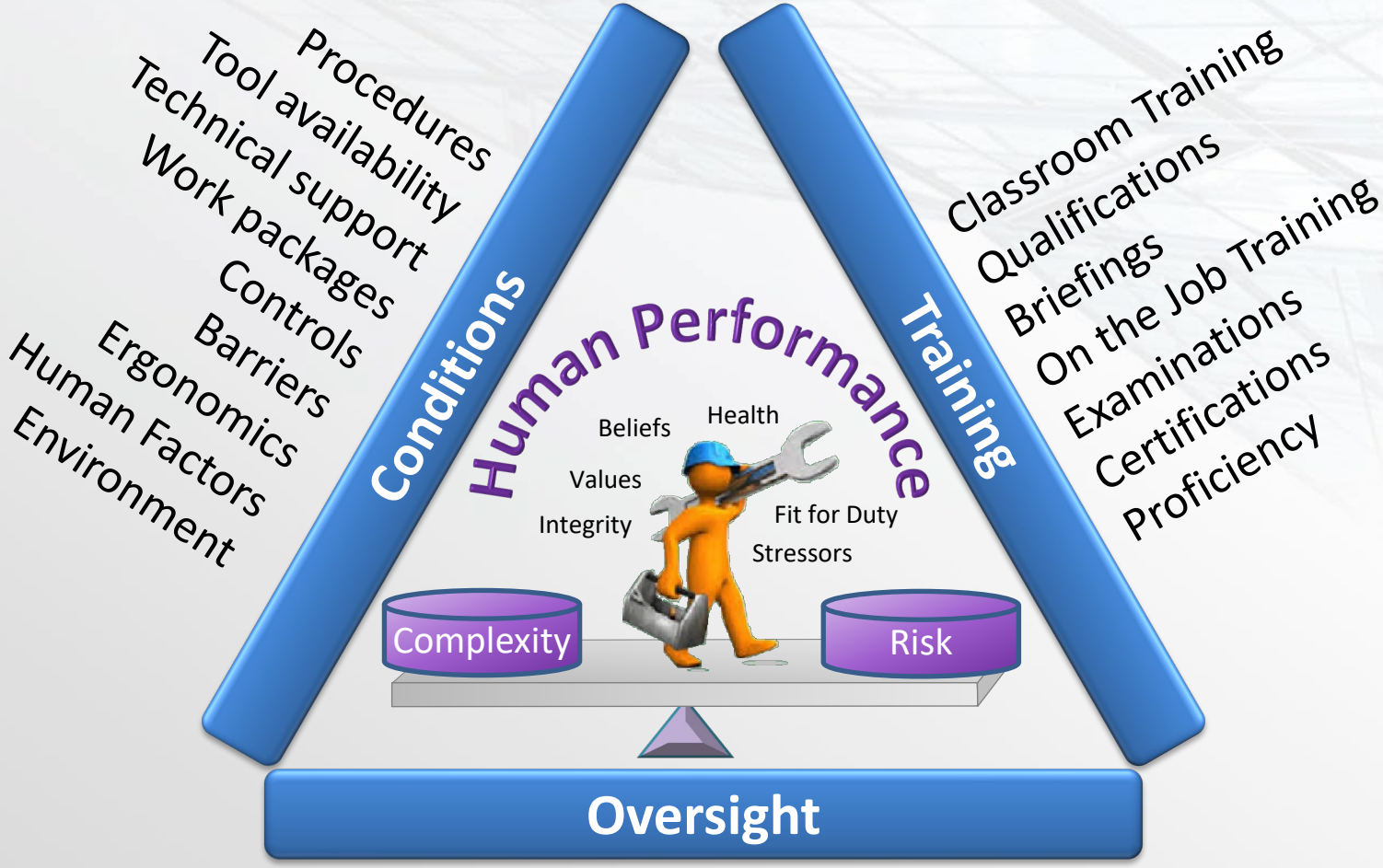
Performance Monitoring Concepts

Organizational Drift



 Based on principles from DOE-HDBK-1208-2012, *Accident and Operational Safety Analysis Volume I: Accident Analysis Techniques*

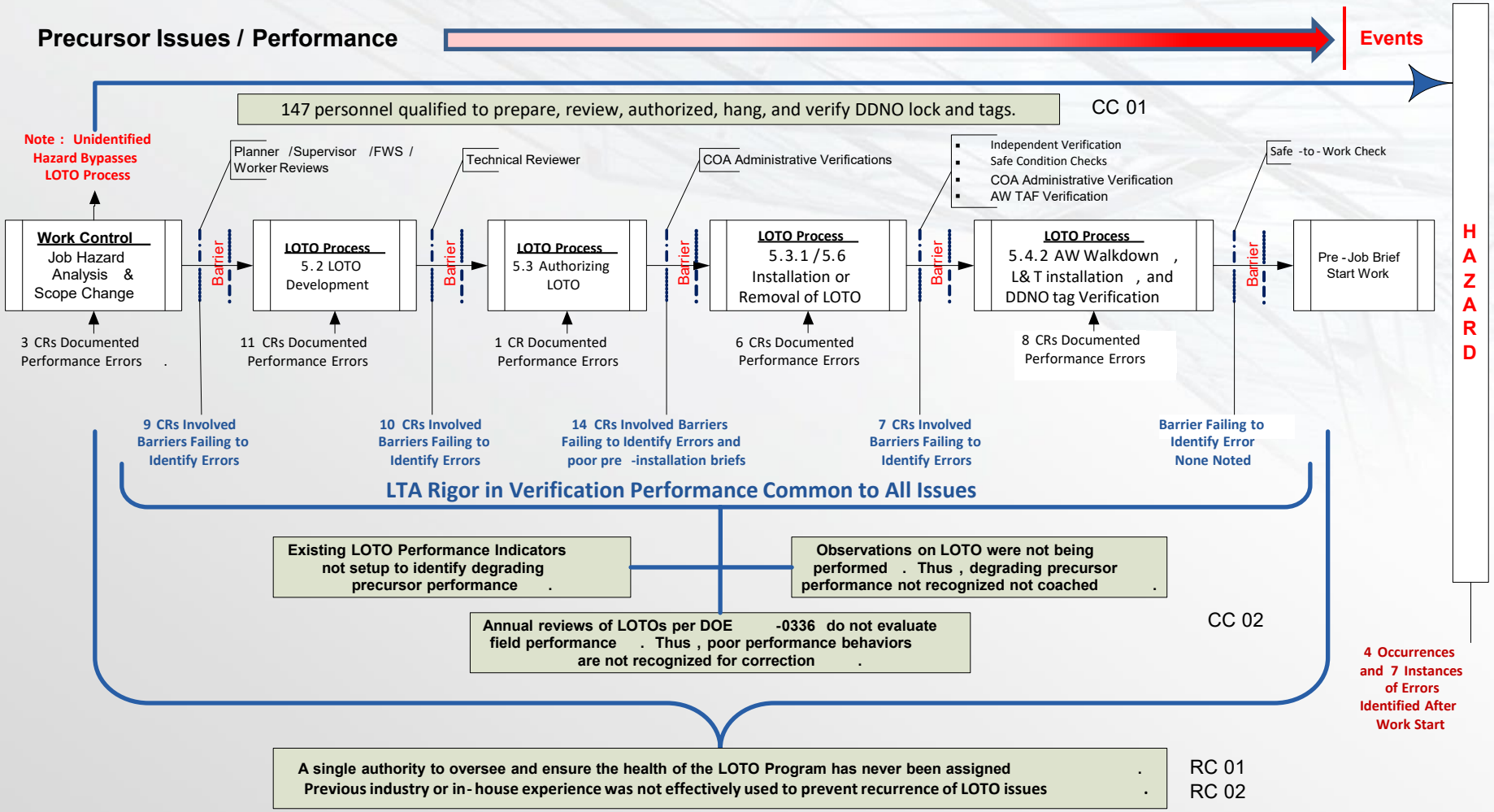
Human Performance, a Balanced System



Observations, Reviews, Approvals, Coaching, Accountability

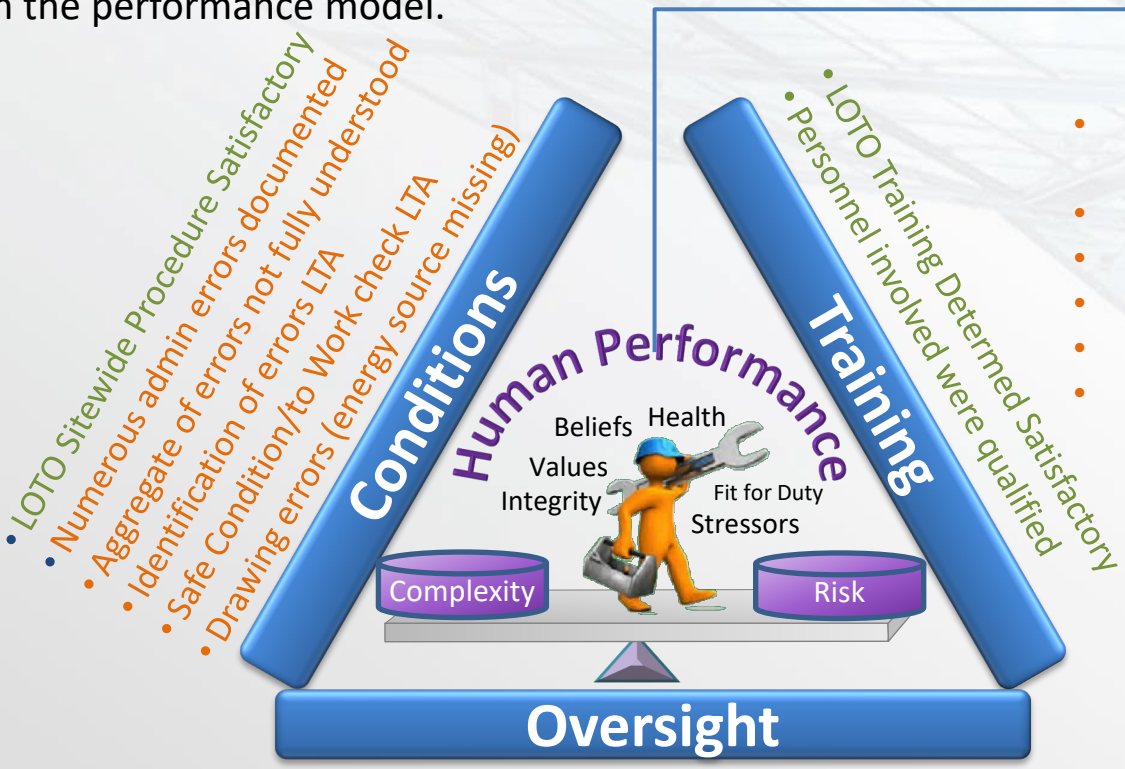
Performance Monitoring Concepts

Hazardous Energy Control Process Map and Barrier Analysis



2010 Adverse Trend- Hazardous Energy Control

Below is how causal factors from the 2010 Root Cause Analysis on Hazardous Energy Control align with the performance model.



Human Performance

- 3-Touch method trained but inconsistently performed
- LTA energy checks
- LTA LOTO field walkdowns
- Isolation errors not identified
- Technical rigor inconsistent
- Instances of contact with hazardous energy occurred

- LOTO Field Observation not conducted, organizational drift occurred
- Performance metric was lagging, only measured reportable events
- Assessments focused on administrative compliance vs performance
- A single LOTO authority to ensure program health was never assigned

Performance Monitoring Concepts

- Trend Direction, Performance, and Type Guidance
  - Declaration of a Trend considers Level of Risk

Performance	Trend Direction	Potential Trend Type	Action
Exceeds Expectations	Improving	Positive Performance Trend if sustained > 3 months	None needed
	Stable		
	Declining	No Trend	None needed
Satisfactory or Better	Improving	Positive Performance Trend if sustained > 3 months	None needed
	Stable		
	Declining	Focus Area	Monitor, implement actions, or initiate AR
Declining Performance Improvement Needed	Improving	Focus Area	None needed
	Stable	Potential Adverse Trend if sustained for two or more months	Document in Issues Management System
	Declining	Potential Adverse Trend if sustained for two or more months	
Unsatisfactory or Adverse Performance	Improving	Adverse Trend	Document in Issues Management System
	Stable	Adverse Trend	
	Declining	Adverse Trend	

Performance Monitoring Concepts

washington river protection solutions

7. Conduct of Operations

D. Lock Out / Tag Out (LOTO) Performance

Trending Fiscal Year 2019
Month Ending July 2017

Objective

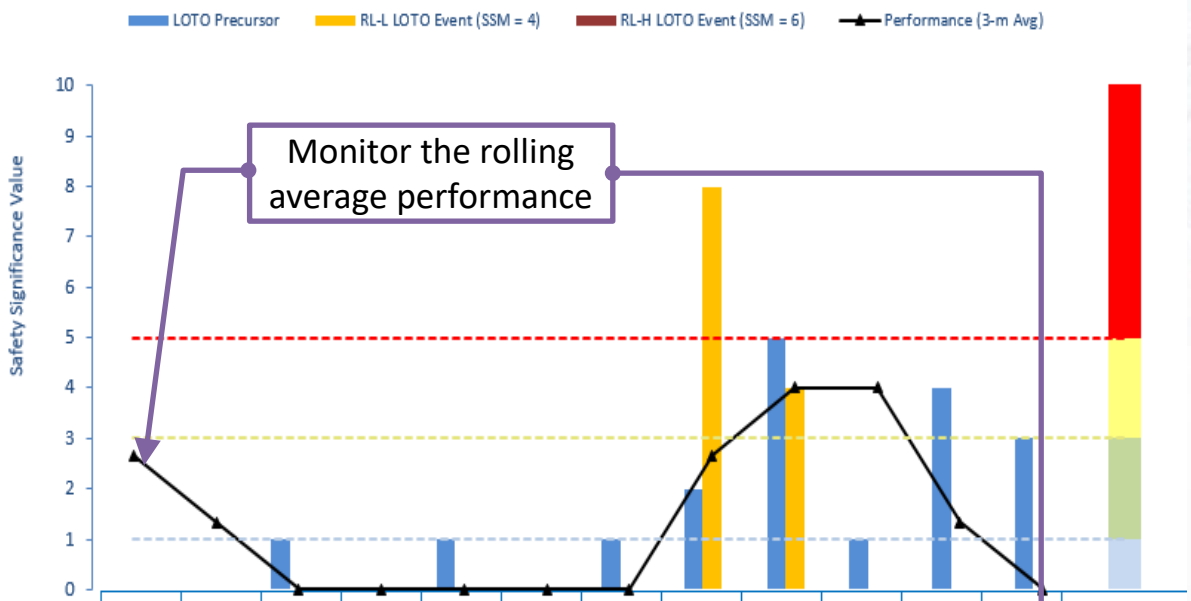
To monitor LOTO performance and take action at the precursor level to improve performance and prevent the development of an adverse trend.

Measure

Each LOTO occurrence is weighted in accordance with DOE reporting criteria for hazardous energy events (DOE 232.2 to DOE 232.2A) beginning in October 2017. The criteria breaks up issues into two categories: High and Low. The High and Low Level Events are given a weighted value: High has a value of 6, Low has a value of 4 which is indicated by the safety significance multiplier (SSM) in the performance data below. Each month, the weighted values of the issues are counted and a score is issued. The Performance Threshold data provides the scoring scale.

Performance Thresholds

Adverse	> 5
Declining	≤ 5 and > 3
Meets	≤ 3 and > 1
Exceeds	≤ 1



Performance Data

	Aug-16	Sep-16	Oct-16	Nov-16	Dec-16	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17
RL-H LOTO Event (SSM = 6)	0	0	0	0	0	0	0	0	0	0	0	0
RL-L LOTO Event (SSM = 4)	0	0	0	0	0	0	0	2	1	0	0	0
LOTO Precursor	0	0	1	0	1	0	1	2	5	1	4	3
Aggregate Safety Significance Value	0	0	0	0	0	0	0	8	4	0	0	0
Performance (3-m Avg)	2.7	1.3	0.0	0.0	0.0	0.0	0.0	2.7	4.0	4.0	1.3	0.0

Performance Monitoring Concepts

- Once a potential trend is identified based on data analysis or metric, the risk level is determined.
- If risk is Minor, Medium, or High, a trend is declared.

Consequences (Actual/Potential) / Likelihood	Not Significant	Minor Significance	> Minor Significance	Significant
Frequency is not increasing or is not at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Blue / Green	No Trend Consider tracking the issue as a focus / awareness area.	No Trend Consider tracking as an individual issue needing correction in iCAS	No Trend Consider tracking as an individual issue needing correction in iCAS	No Trend Consider tracking as an individual issue needing correction in iCAS
Gradual Increasing Frequency or ≥ two consecutive months at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Yellow	No Trend Consider tracking the issue as a focus / awareness area.	Trend Minor Risk Recommend Level C	Trend Medium Risk Recommend Level A or B	Trend Medium Risk Recommend Level A or B
Greater than gradual increasing frequency or > three consecutive months at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Red	No Trend Consider tracking the issue as a focus / awareness area.	Trend Minor Risk Recommend Level C	Trend Medium Risk Recommend Level A or B	Trend High Risk Recommend Level A

Trend Code Types

- Functional Area Codes (examples)
  - Event codes
    - OPCO080A - 2.i.(1) (PI-1)- Contact With Hazardous Energy By Worker/Equipment
    - SHIS230A - Vehicle Accident
    - SHIH230A - AOP-15 Tank Waste Odor/Vapor Event
  - Human Performance codes
    - OPCO120A - 2.a.(*)- Administrative Procedures Use and Adherence
    - ASQA030A - Control of Nonconforming items General
    - OPCO070K - 2.h.(*)- Control and Supervision of Work
  - Condition Codes
    - ASCA010C - Causal Analysis Quality Issue
    - ENDN120L - Engineering Technical Documents Issue

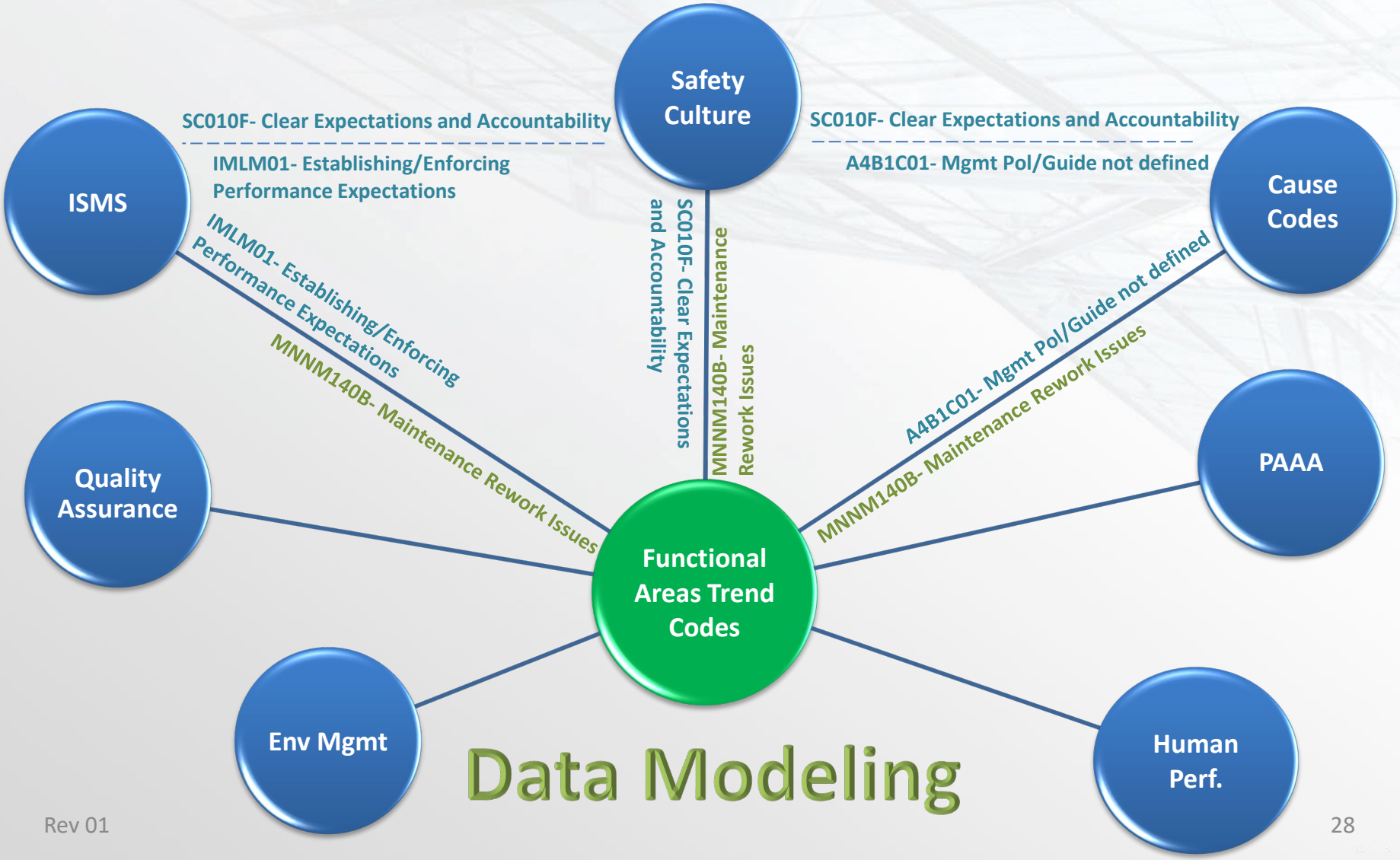
Trend Code Types

- Informational codes
  - GRPO0F - AN/AP/B/BX/BY/C Farm Team Responsible for Performance
  - GRSCHM – Subcontractor *XXXX* Responsible for Performance
- Cause codes
  - A4B1C01 - Management policy guidance / expectations not well-defined, understood or enforced
  - A4B1C07 - Responsibility of personnel not well-defined or personnel not held accountable
- PAAA CFR Non-Compliance Codes (code is CFR number)
  - 10 CFR 851.22 (b)(1) - Hazard Prevention and Abatement - Contractors must select hazard controls based on elimination or substitution of the hazards where feasible and appropriate.
- Safety Culture/ISMS Attributes for data modeling

Trend Code Development

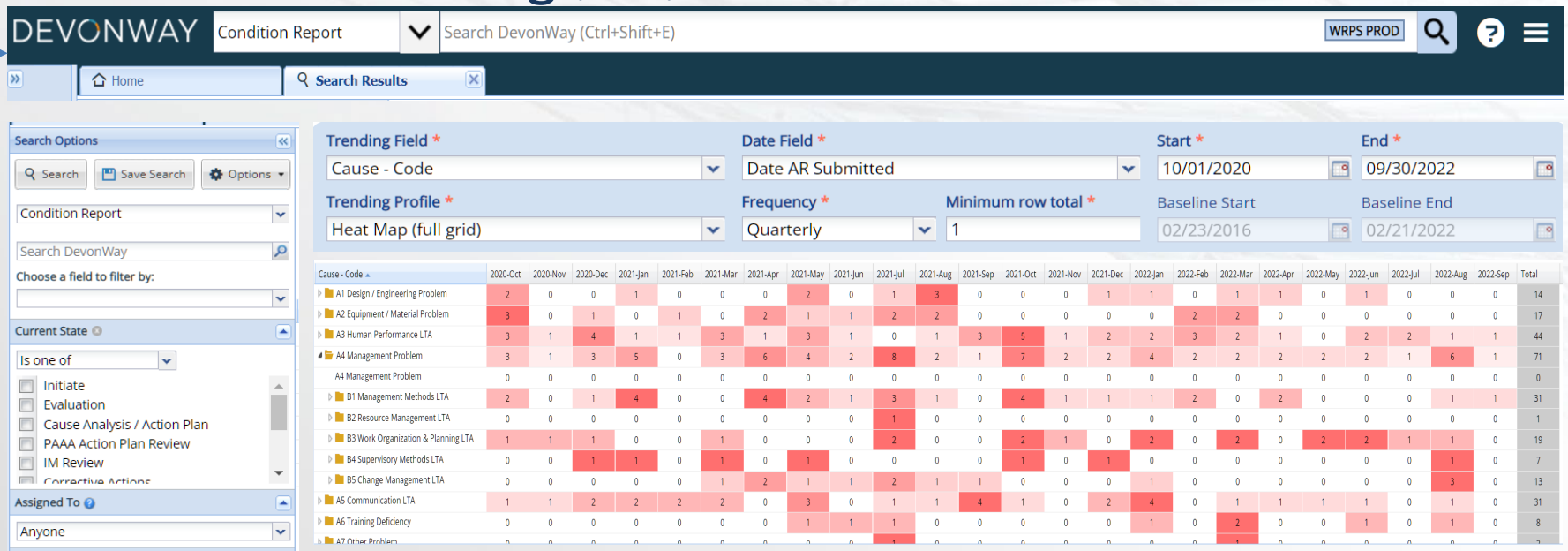
- Trend Code Development
  - Use existing process outlines or performance models for code grouping and development
  - Using a tiered structure to allow for grouping/roll-up into upper tiered categories
  - Definitions/application criteria are to be provided for each code to aid with consistency when applied
  - Codes, structure, and application criteria are embedded in software for ease of application
  - Interrelationship between code groups, activities, programs, or performance attributes should be established to created performance models

Data Modeling



Data Modeling

- Data Modeling (Cont.)



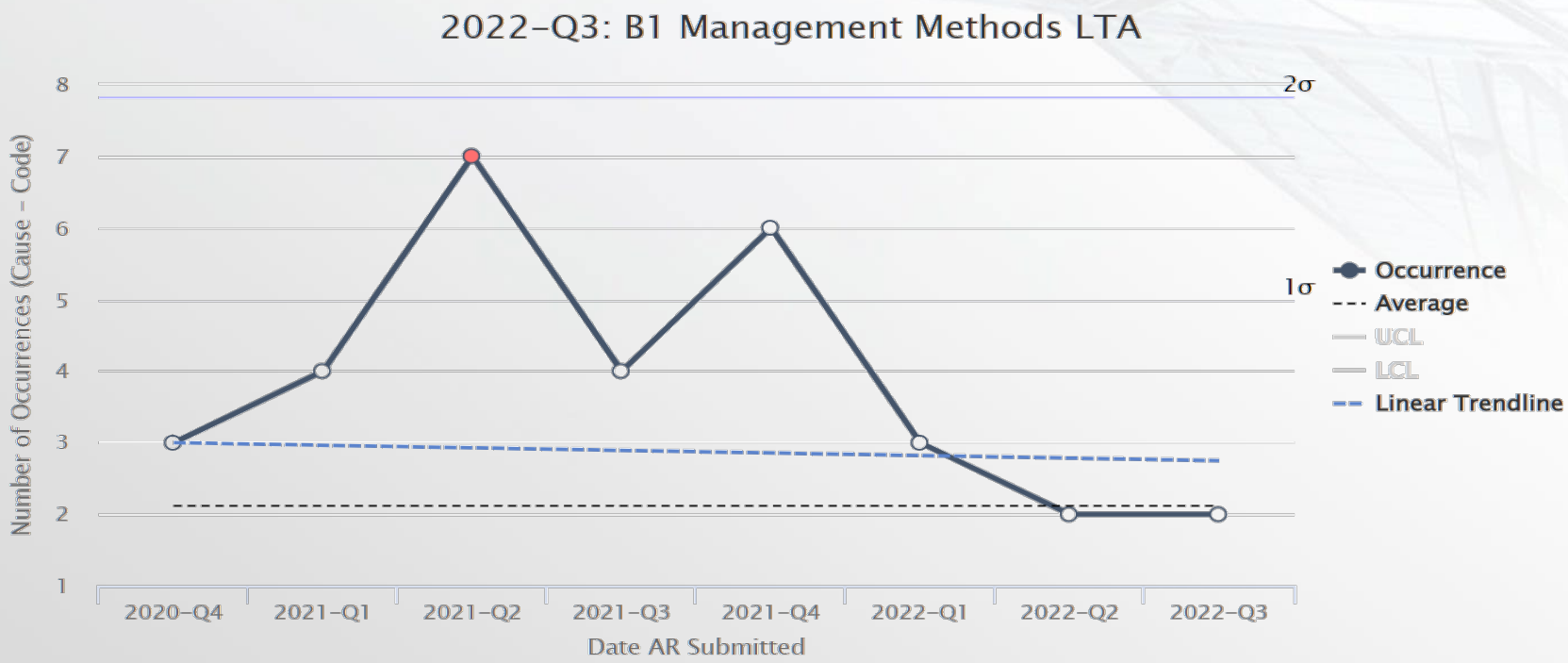
- iCAS can produce stoplight and trend charts base on numerous Trending field options

Search Module: Condition Report

Display Module: Trend

Data Modeling

- Trend Code Modeling (Cont.)
  - Below is a trend chart developed in iCAS based on assigned Cause Codes A4B1, Management Methods LTA



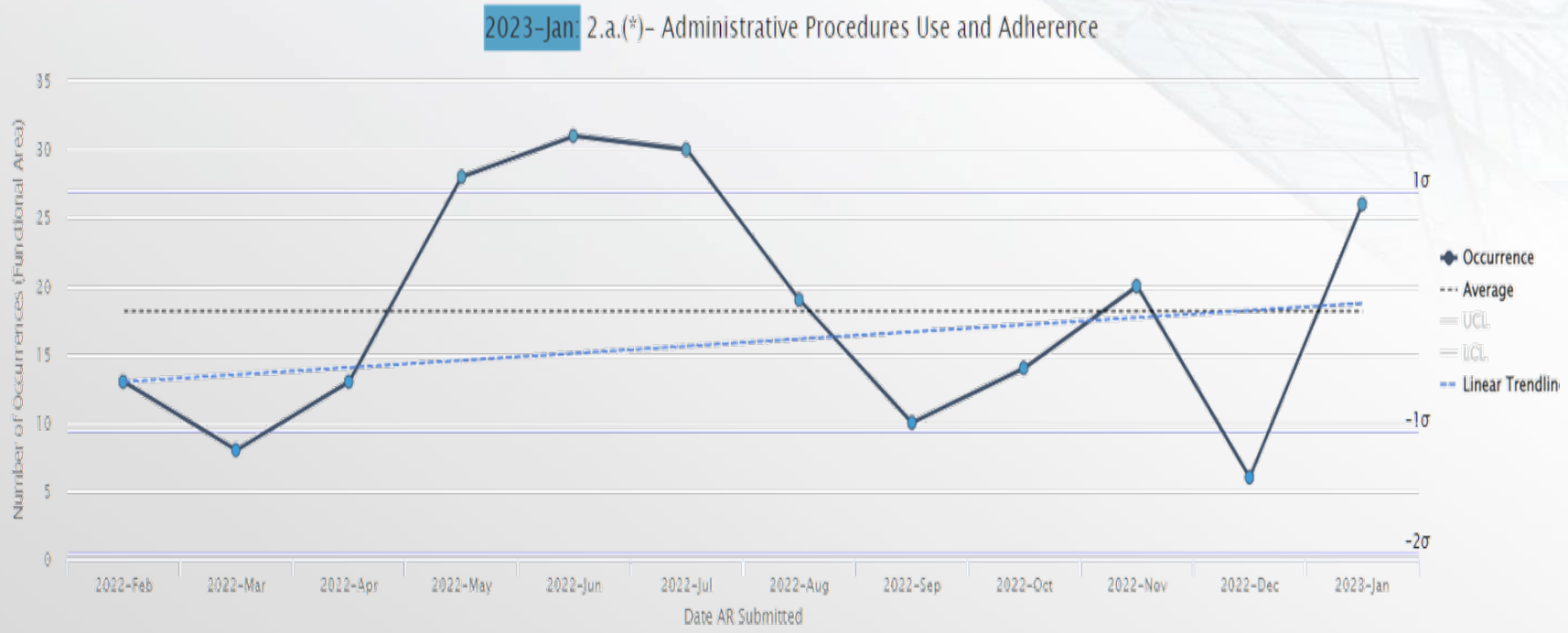
Data Modeling

- Trend Code Modeling
  - Below is a stoplight chart for Functional Area trend codes produce in iCAS using trend module.

Functional Area	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Total
Functional Area	116	131	130	137	142	152	105	137	118	153	88	123	1532
Conduct of Operations	60	78	73	83	69	73	62	66	57	81	46	66	814
Administrative Procedures	27	25	40	45	32	31	20	25	16	23	7	27	318
• 2.a.(*)- Administrative Procedures Use and Adherence	13	8	13	28	31	30	19	10	14	20	6	26	218
• 2.a.(*)- Availability and Use of the Latest Revisions of Administrative Procedures	0	0	0	0	0	0	1	0	0	1	0	0	2
• 2.a.(*)- Personnel That Develop New, Revise, or Changed Administrative Procedures are Trained	0	0	0	2	0	0	0	1	0	0	1	0	4
• 2.a.(*)- Production Operations Administrative Procedure Quality	14	17	27	15	1	1	0	14	2	2	0	1	94
Communications - CONOPS - 2.d (1)-(5)	0	1	2	0	0	1	0	0	0	0	1	0	5
• 2.d.(1)- Provision of Communications Systems for Emergency and Normal Operations	0	1	2	0	0	0	0	0	0	0	0	0	3
• 2.d.(2)- Administrative Control of Communications Equipment	0	0	0	0	0	0	0	0	0	0	0	0	0
• 2.d.(3)- Methods for Control Areas to Contact Operators and Supervisors	0	0	0	0	0	0	0	0	0	0	1	0	1

Data Modeling

- Trend Code Modeling (Cont.)
  - Below is a trend chart developed in iCAS based on assigned Functional Area trend code 2.a.(*)- Administrative Procedures Use and Adherence



Data Modeling

- Trend Code Modeling (Cont.)
  - Below is a stoplight chart developed in iCAS based on Operational Location and exported to MS Excel.

Operational Location	2022-Feb	2022-Mar	2022-Apr	2022-May	2022-Jun	2022-Jul	2022-Aug	2022-Sep	2022-Oct	2022-Nov	2022-Dec	2023-Jan	Total
Not Bound to a Facility	45	203	92	118	85	67	70	510	54	80	39	45	1408
2025E- ETF/LERF	6	27	29	41	24	19	17	22	26	38	15	24	288
Admin Facility	5	30	15	5	9	16	15	26	3	17	14	23	178
TSCR Facility	21	22	16	20	14	20	8	4	19	15	8	11	178
Multiple Tank Farms	13	19	16	16	12	14	15	20	8	8	12	23	176
Operations Facility Not Listed	3	12	10	23	24	17	5	30	14	8	10	4	160
242-A Evaporator	7	27	5	9	6	16	9	9	11	11	26	16	152
Other Non-Operations Location	7	9	11	17	7	6	4	10	8	8	2	1	90
AP Farm	5	10	13	12	10	1	2	1	6	10	8	3	81

Data Modeling

- Trend Code Modeling (Cont.)
  - Below is a stoplight chart for Cause codes produce in iCAS using trend module and export to MS Excel.

Cause - Code	2020-Q4	2021-Q1	2021-Q2	2021-Q3	2021-Q4	2022-Q1	2022-Q2	2022-Q3	Total
A3 Human Performance LTA	8	5	5	4	8	7	3	4	44
B1 Skill Based Error	5	3	2	1	3	3	2	3	22
B2 Rule Based Error	1	1	3	1	1	2	1	0	10
B3 Knowledge Based Error	2	1	0	1	4	2	0	1	11
B4 Work Practices LTA	0	0	0	1	0	0	0	0	1
A4 Management Problem	7	8	12	11	11	8	6	8	71
B1 Management Methods LTA	3	4	7	4	6	3	2	2	31
B2 Resource Management LTA	0	0	0	1	0	0	0	0	1
B3 Work Organization & Planning LTA	3	1	0	2	3	4	4	2	19
B4 Supervisory Methods LTA	1	2	1	0	2	0	0	1	7
B5 Change Management LTA	0	1	4	4	0	1	0	3	13

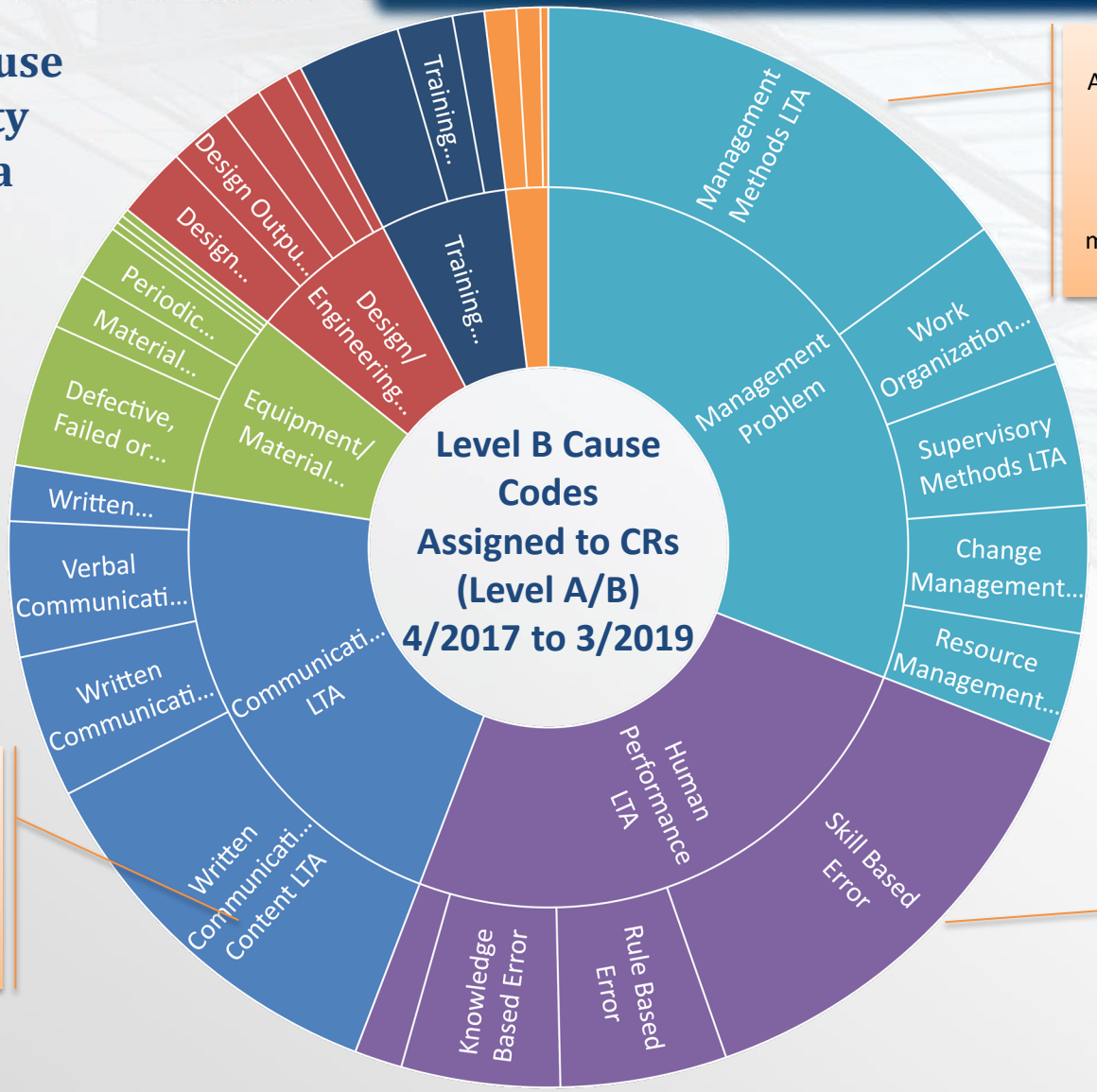
Data Modeling

- Example of Interrelationships Across Groupings

Safety Culture Attribute	ISMS Core Function / Expectation	Cause Code	FA Trend Code
SCA Leadership: • SC010F- Clear Expectations and Accountability	**ISMS Manager/ Supervisor Expectations**: • IMLM01- Establishing and Enforcing Performance Standards/ Expectations- Set, demonstrate, and enforce high standards of Integrated Safety Management System performance with emphasis on safety, quality, mission progress, procedure compliance, and personal conduct	**Management Problem/Management Method LTA** • A4B1C01- Management Policy Guidance / Expectations Not Well-Defined, Understood or Enforced	**Nuclear Maintenance** • MNNM140B- Maintenance Rework Issues
SCA Employee/ Worker Engagement: • SC020C- Participation in Work Planning and Improvement: Individuals are actively involved in identification, planning, and improvement of work and work practices; Mindful of Hazards and Controls	**ISMS Core Functions**: • IM020A- CF-4: Perform Work Within Controls • IM020B- CF-2: Analyze the Hazards **ISMS Employee Expectations**: • IMGE04- Worker Questioning Attitude (If a procedure or written instructions can't be followed, pause and get clarification or correction before proceeding on that specific activity)	**Management Problem/Work Organization and Planning LTA**: • A4B3C11- Inadequate work package preparation	**Nuclear Maintenance** • MNNM050C- Level 1 Work Package Quality Issue

Data Modeling

Example of Cause Code to Safety Culture Data Modeling



Largest Contributors:
A4B1C01- Management policy guidance/expectations not well-defined, understood or enforced & A4B1C04- Management follow-up or monitoring of activities did not identify problems

Related Safety Culture Attribute:

- Demonstrated Safety Leadership
- Management Engagement and Time in Field
- Clear Expectations and Accountability

Largest Contributors:
A5B2C08- Incomplete/situation not covered & A5B2C05- Ambiguous instructions/requirements

Largest Contributor:
A3B1C01- Check of work was LTA

Trend Identification

- Recommended Trend Analysis Approach
  - Collect and review Trend Data from various sources.
  - Create Pareto tables/charts based on keywords, trend codes, cause codes, manual binning, etc. as applicable.
  - Create trend charts for top 20% of issue categories to determine if the frequency is increasing, decreasing, or stable.
  - Review data for areas with increasing frequency or trending toward unsatisfactory performance.
  - Select potential trends and establish a baseline for acceptable performance.
  - Identify actual and potential consequence for consideration in determining risk.
  - Evaluate potential trend using risk matrix and determine if
    - Performance meets expectations and is at an acceptable level of risk (i.e., actual/potential consequences and frequency) or
    - An adverse trend exists and enter into issues management process.

EO01.6: Analysis Methods

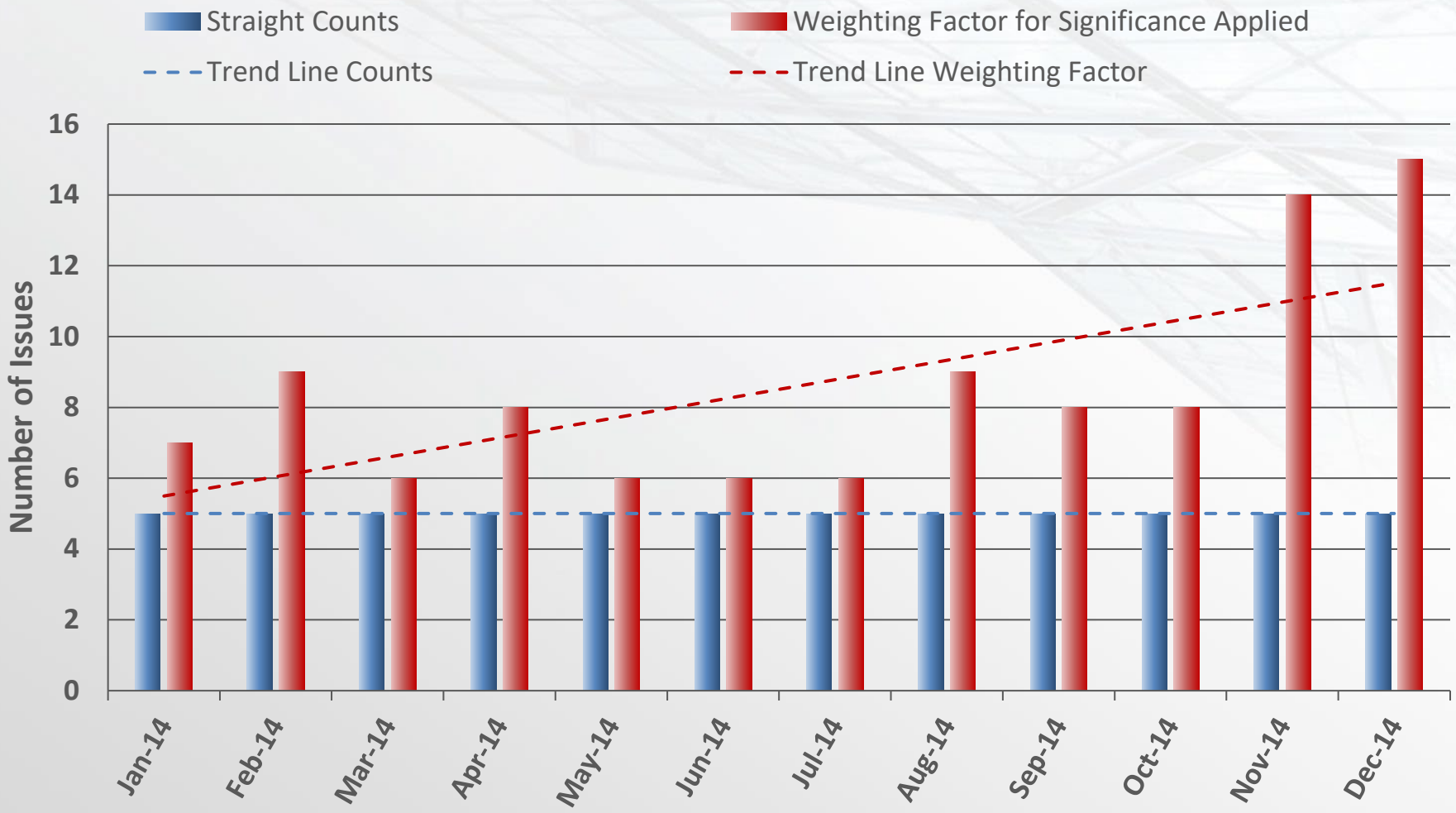
- Statistical Analysis Capabilities & Shortfalls
  - Statistical analysis methods can be used as a starting point for identifying potential trends
  - Due the nature of issues management data, statistical analysis does not produce a valid model of performance
    - Data input is not random
    - Data influence by activities (e.g., audits, surveillances, management focus areas, etc.)
    - Each issue does not carry the same significance

EO01.6: Analysis Methods

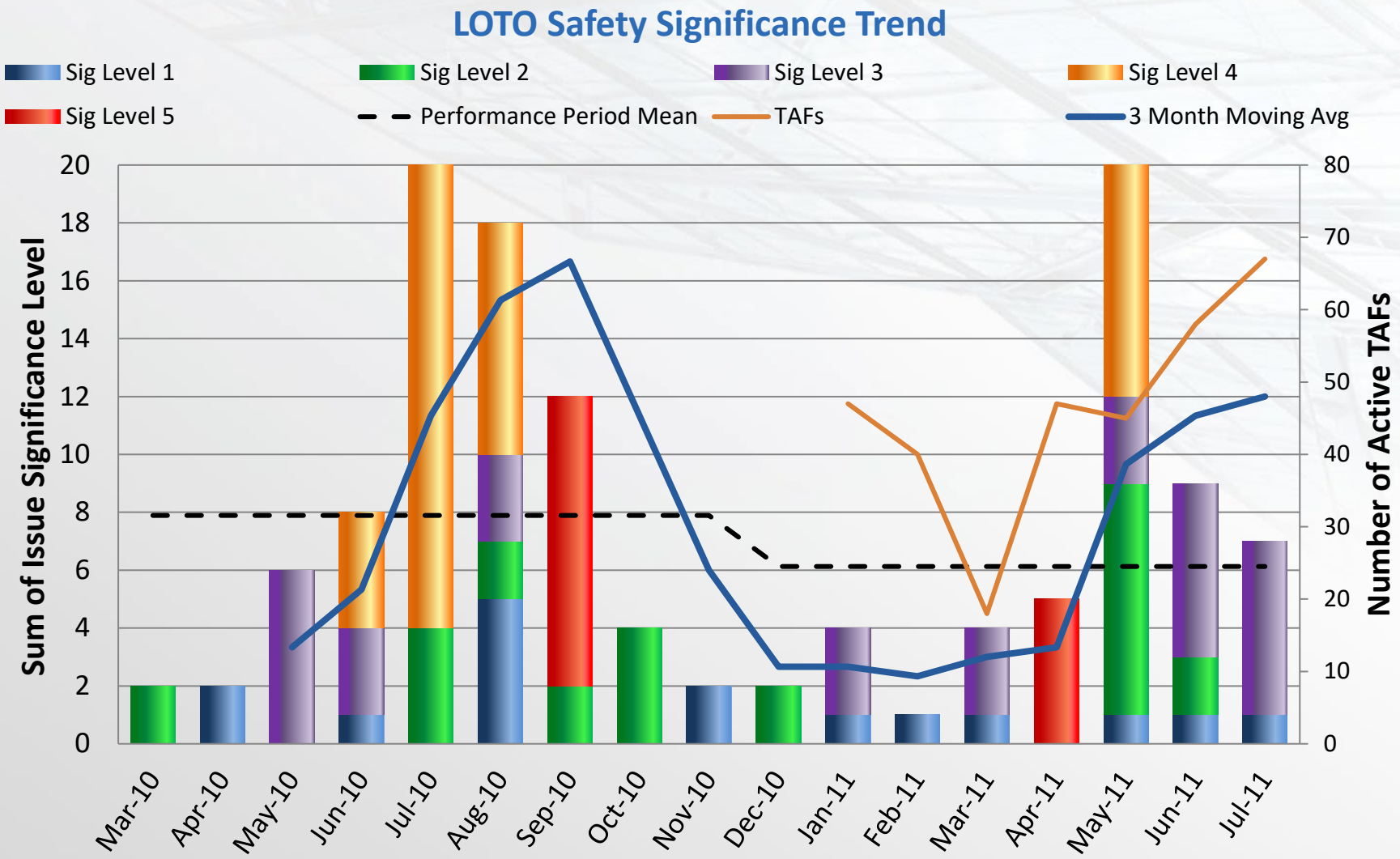
- Trending By Significance
  - Helps to account for variables not addressed in statistical calculations by applying a weighting factor to each issues, which can be charted
  - Helps to put performance in perspective since not all issues are of equal significance
  - Simplest method is to assign a weighting factors to the significance category assigned to an issue, for example:
    - Level A (Root Cause Analysis): Factor of 5
    - Level B (Apparent Cause Analysis): Factor of 4
    - Level C (Correct adverse condition): Factor of 1

EO01.6: Analysis Methods

Straight Counts vs Weighting Factor (Example)



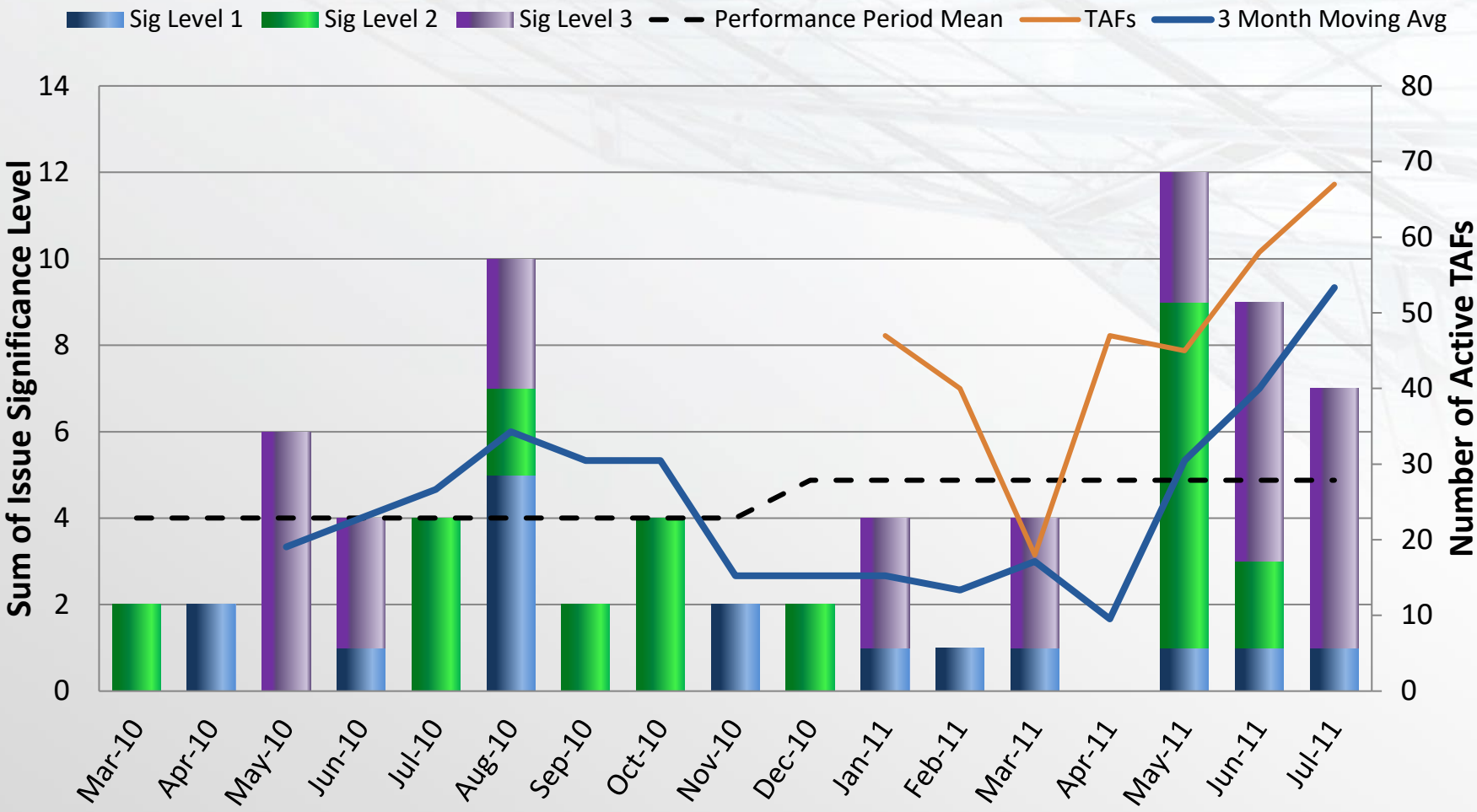
EO01.6: Analysis Methods



FY2011-OPS-S-0353, WRPS-CR-2010-2243, *LOTO Adverse Trend End Point Assessment*

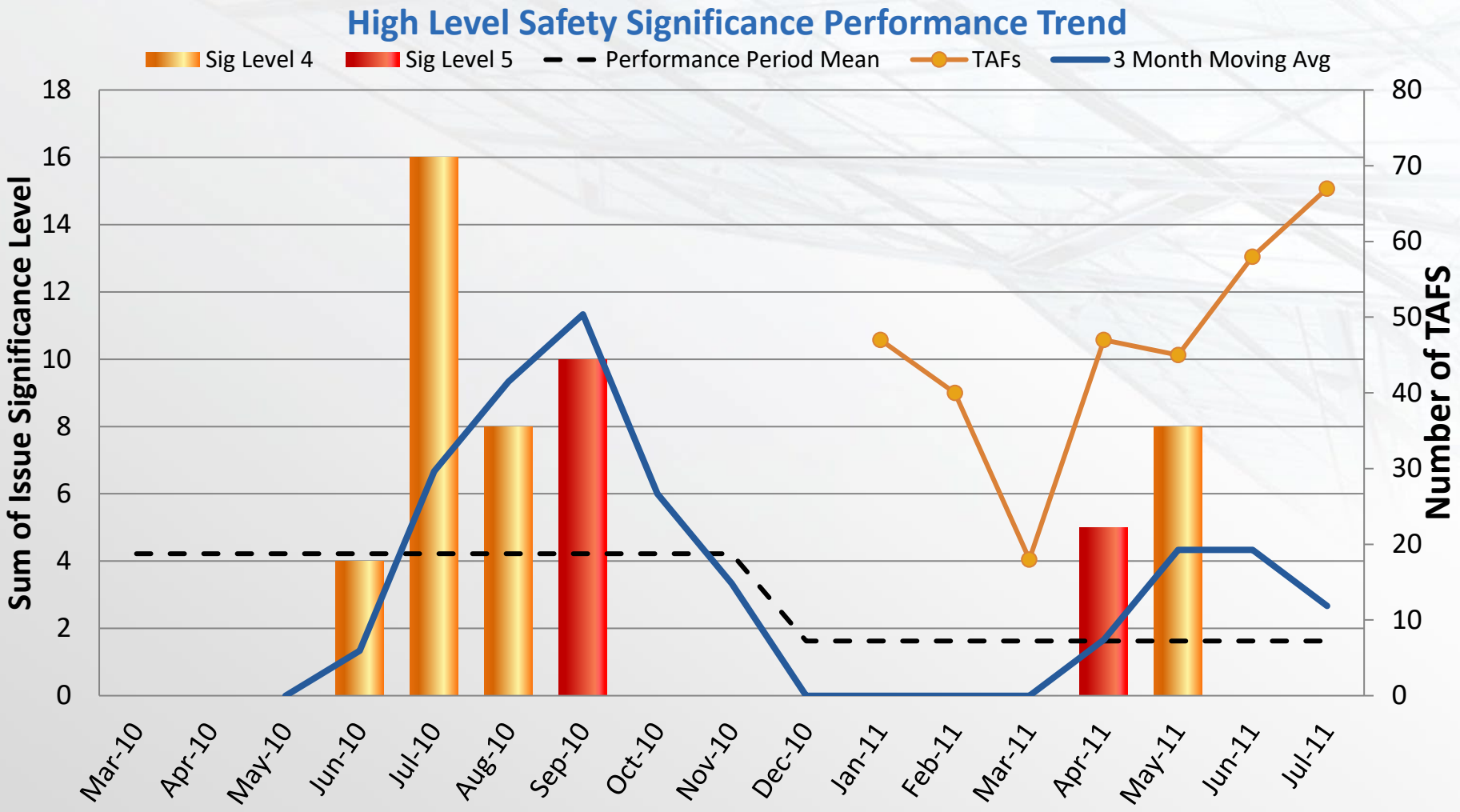
EO01.6: Analysis Methods

Low Level Safety Significance LOTO Performance Trend



FY2011-OPS-S-0353, WRPS-CR-2010-2243, *LOTO Adverse Trend End Point Assessment*

EO01.6: Analysis Methods



EO01.6: Analysis Methods

- Historical Reviews: Identifying Performance Trends
  - Office of Enforcement (OE) stated:
    - Event investigations/cause analyses should include a review to determine whether the same or a similar problem has occurred previously
    - This determination helps to determine if the problem is recurring
    - Unlike an extent of condition (EOC) review, a precursor or historical review is retrospective in nature and can usually be conducted effectively using site database information for such items as events and assessment results.
  - OE is describing Trend Analysis

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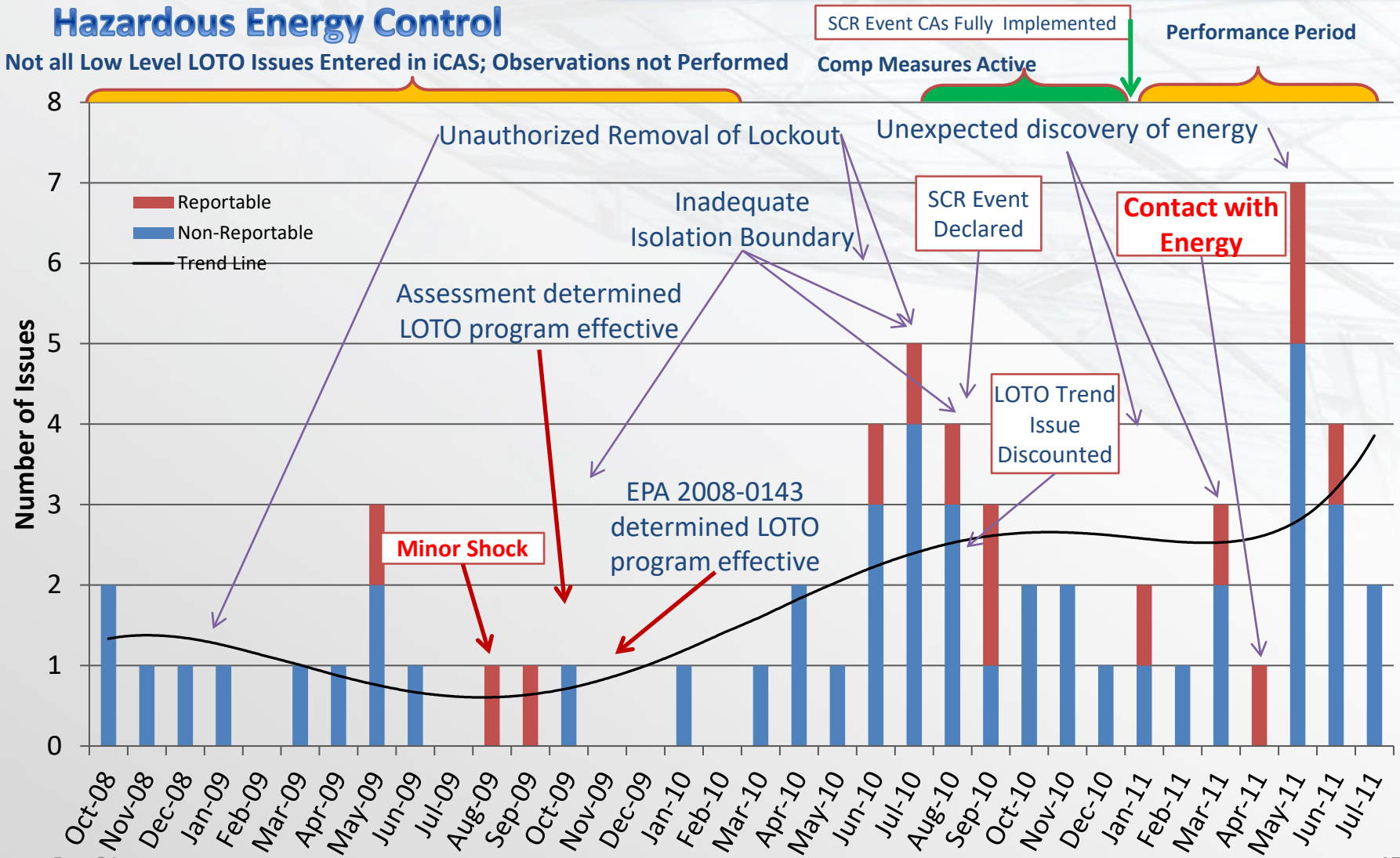

Adapted from Root Cause Analysis Report WRPS-CR-2010-2243, *Lockout/Tagout Performance Issues*, and FY2011-OPS-S-0353, WRPS-CR-2010-2243, *LOTO Adverse Trend End Point Assessment*

Trend Declaration

- When to Identify a Trend

  Significance:

  - When determining the significance of an issue, consider the following aspects[1]:
    - Impact on health and safety of the public or environment
    - Impact on reliability, availability, or maintainability of the equipment or facility
    - Importance in meeting regulatory requirements
    - Consequence of recurrence (consider the potential for worst case consequences if no action is taken to mitigate risk)
    - The extent to which the adverse condition (finding/issue) may apply to other items or activities beyond the specific occurrence where it may have greater impact

1 NQA-1, Appendix 16A-1, *Non Mandatory Guidance on Corrective Action*

Trend Declaration

- When to Identify a Trend (Cont.)

  Frequency:

  – Is the frequency of the issues increasing or at an unacceptable level (as considered by management / customer / stakeholders) commensurate with the significance of the issue?

  Or

  – Has an established performance indicator (PI) entered into declining or adverse performance based upon a 3-month rolling average? For example:

    - Declining (Yellow) for two or more months commensurate with the significance
    - Adverse (Red) performance for the first time commensurate with the significance

Performance Monitoring Concepts

- Once a potential trend is identified based on data analysis or metric, the risk level is determined.
- If risk is Minor, Medium, or High, a trend is declared.

Consequences (Actual/Potential) / Likelihood	Not Significant	Minor Significance	> Minor Significance	Significant
Frequency is not increasing or is not at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Blue / Green	No Trend Consider tracking the issue as a focus / awareness area.	No Trend Consider tracking as an individual issue needing correction in iCAS	No Trend Consider tracking as an individual issue needing correction in iCAS	No Trend Consider tracking as an individual issue needing correction in iCAS
Gradual Increasing Frequency or ≥ two consecutive months at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Yellow	No Trend Consider tracking the issue as a focus / awareness area.	Trend Minor Risk Recommend Level C	Trend Medium Risk Recommend Level A or B	Trend Medium Risk Recommend Level A or B
Greater than gradual increasing frequency or > three consecutive months at an unacceptable level (as considered by management / customer / stakeholders) or PI indicates Red	No Trend Consider tracking the issue as a focus / awareness area.	Trend Minor Risk Recommend Level C	Trend Medium Risk Recommend Level A or B	Trend High Risk Recommend Level A

Trend Declaration

- When to Identify a Trend (Cont.)
  - Based on Actual/Potential Consequences and Frequency, is the risk to quality (includes nuclear safety), personnel safety, the environment, and/or the public considered to be:
    - ❑Trend Minor Risk (Recommend a Significance of Level C)
    - ❑Trend Medium Risk (Recommend a Significance of Level B or A)
    - ❑Trend High Risk (Recommend a Significance of Level A)

Questions

Feedback

Thank You for Your Participation

Definitions

- Adverse Trend (or Trend): Repetitive occurrences of the same problem, or closely related problems that indicate a deteriorating condition or are sufficiently frequent and important to collectively warrant analysis and corrective action.
- Cognitive Trending: A mental association among similar events to identify recurring problems and performance gaps that has not been validated.
- Condition: The as found state (e.g., environment, barriers, components, procedures etc.) that influences performance positively or adversely.
- Deficiency: a minor system process/program issue or condition that that does not reflect an overarching systematic, programmatic, or organizational weakness issue.
- Focus area: Repetitive occurrences that are at an acceptable performance level with a declining trend that may warrant actions to improve performance.

Definitions

- Event: Something significant and real-time that happens (e.g., pipe break, valve failure, loss of power, environmental spill, injury).
- Occurrence: An event, problem, issue, or adverse condition.
- Programmatic Problem: Weakness in administrative / management controls, or their implementation, to such a degree that a broader management or process control problem exists.
- Repetitive Occurrences: Two or more events or adverse conditions, separated in time, that have comparable causes/circumstances and involve substantially similar work activities, locations, equipment, or individuals. As such, it would be reasonable to assume that cause(s) identified (i.e., Level A and B significance assigned) and corrected first occurrence should have prevented/reduced the likelihood of a subsequent occurrence or mitigated the consequences to an acceptable level. If not, the past corrective actions may not have been effective.

Trend Analysis Management Overview

Data Sources for Trend Analysis (not all inclusive)

- Analyses: Cause, Stream, Culture, etc.
- Benchmarking reports
- Defense Nuclear Facility Safety Review Board (DNFSB) issues
- Department of Energy issues and operating experience summaries
- Employee Concerns improvement areas
- Independent, external, and management assessment reports
- Information from facility events and the analyses performed (Cause Analyses)
- Issues Management System data
- Lessons Learned (i.e., OPEXSHARE database)
- Management & Safety observations
- Non-Compliance Reports (NCRs)
- Occurrence reports
- Performance indicators (company-level and department-level)
- PAAA Non-compliance Tracking System (NTS) reports
- Quarterly department reports
- Results of employee surveys or other methods of employee feedback
- Safety and Health Injury Report Log
- Safety Management Program presentations to the Executive Review Board (ESRB)
- Supplier Corrective Action Reports (SCARs)
- Suspect/Counterfeit Item (S/CI) Reports
- System Health reports