QAM 12110: Human Performance Improvement (HPI)

Revision History

Author	Description of Change	Revision Date
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1.0 INTRODUCTION AND SCOPE

Human Performance Improvement (HPI) is a powerful tool that helps one to step back, look at the big picture, and make fundamental improvements in processes. The HPI tool is an integral part of the lab's Event Response Program to help identify error precursors, latent organizational weaknesses and causal codes present in the root causes of incidents and unexpected outcomes. Analysis of data from the application of HPI can then be used to create directed initiatives to address the gaps in our work culture with an evidence-based approach.

All employees are trained in HPI concepts and principles, and all supervisors are provided a more substantial training in HPI. The primary objective is to employ these concepts and principles in the areas of hazard identification and mitigation, incident assessments, communication, and work planning. Through the prevention or reduction of critical errors, Fermilab stands to improve compliance, reliability, and quality of the work performed by lab employees. This is an imperative goal to achieve as the lab evolves.

This procedure applies to all Fermilab personnel; including full-time, temporary, part-time, and subcontract/term employees, Users, and Affiliates working at Fermilab and any leased spaces.

2.0 DEFINITIONS & ACRONYMS

Causal Codes – Are the identified causes that lead to the incident, and which are appropriately documented in accordance with the Causal Analysis Tree. [2]

Corrective Action – Action to eliminate the cause of a detected nonconformance or undesirable situation. Note: There can be more than one cause for a nonconformance. Corrective action is taken to prevent recurrence whereas preventive action is taken to prevent occurrence. [5]

Error – Human decisions or actions that unintentionally depart from an expected behavior or some standard. [7].

Error precursors – Task-related conditions for a specific activity or task that provoke human error and increase the chance of a technical error or an adverse consequence; otherwise referred to as "risk factors." Examples are time pressure, first-time activity, lack of knowledge or experience, and interruptions. [7]

Event (abnormal event) – Any unplanned, unexpected, or unwanted outcome of work that resulted in a negative impact (or had potential for negative impact to):
- o The environment,
- o The safety or health of personnel, or
- o The Lab's assets, mission, or reputation

Human Performance Improvement (HPI) – A set of concepts and principles associated with a performance model that illustrates the organizational context of human performance. HPI is a system that comprises a network of elements working together to produce repeatable outcomes. The system encompasses organizational factors, job-site conditions, individual behavior, and results. [2]

HPI Principles – the five underlying truths of human performance:
1. People are fallible, and even the best people make mistakes.
2. Error-likely situations are predictable, manageable, and preventable.
3. Individual behavior is influenced by organizational processes and values.
4. People achieve high levels of performance because of the encouragement and reinforcement received from leaders, peers, and subordinates.
5. Events can be avoided through an understanding of the reasons mistakes occur, and application of the lessons learned from past events (or errors). [7]

Incident – An unplanned event that interrupts the completion of an activity or causes injury and/or property/vehicle damage or a near miss. An incident is sometimes referred to as an "accident". [2]

iTrack – Fermilab's database used to document and facilitate the resolution of items of any nature arising from formalized activities and where reports are typically generated.

Latent organizational weaknesses – Hidden deficiencies in management control processes (for example, strategy, policies, work control, training, and resource allocation) or values (shared beliefs, attitudes, norms, and assumptions) that create workplace conditions that can provoke errors (precursors) and degrade the integrity of controls (flawed controls). [7]

Near Miss – an unplanned event that did not result in an injury or illness to people, danger to health, or damage to property or the environment, but had the potential to do so. Only a break in the chain of events prevented an injury, fatality, or damage. Other familiar terms for these events include "close call," or in the case of moving objects, "near collision."[2]

Preventive Action – Action to eliminate the cause of a potential nonconformance or another undesirable potential situation. Preventive action is taken to prevent occurrence whereas corrective action is taken to prevent recurrence.[5]

Unexpected Outcome – an occurrence which deviates from planned requirements (activities or results) or expected outcomes which may range from a simple procedural noncompliance with minimal risk to an accident/event having substantial risk to personnel. Examples may include a near miss that could have resulted in property damage, mission interruption, operational impact, or a business process incident.

3.0   RESPONSIBILITIES

3.1 Laboratory Director and Deputy Directors
1. Support an open reporting culture and use of HPI concepts and principles as an integral part of the causal analysis of events, near misses, and unexpected outcomes.
2. Support focused initiatives and improvements identified from HPI data to address the opportunities in Fermilab's work culture.

3.2 Associate Lab Directors and Division Directors
1. Complete HPI training as required and incorporate HPI concepts and principles into the daily work activities.
2. Support the use of the HPI tool in respective areas of responsibility.
3. Provide representation to participate on the Event Analysis Working Group (EAWG), when requested, on behalf of their respective organizations.
4. Work with the EAWG to review HPI data pertaining to their areas of responsibility and address trends and recurring issues.

3.3 Division Safety Officers and Quality Assurance Liaisons
1. Communicate with Directorate/Division/Project management.
   a. HPI data analysis and trends in their areas as applicable
   b. Recommendations and lessons learned.

3.4 Laboratory Employees, Users, and Affiliates
1. Complete HPI training as required and incorporate HPI concepts and principles into the daily work activities.

3.5 Lead Reviewer
1. Perform Event Reviews integrating HPI concepts and principles and follow responsibilities documented in QAM Chapter 12140 – Event Response Program.
2. Ensure Event Review title and lead are entered into the Event Response Database as soon as reasonably possible for tracking.
3. Use the Database to capture Event Reviews associated with near misses and unexpected outcomes.
4. Present Event Review Summaries at EAWG, and Senior Leadership Meetings and Incident Prevention Subcommittee (IPS) meetings, when requested.
   a. Ensuring that the Review is initiated in a timely manner and for maintaining the momentum to completion.
   b. Selecting team members comprising of cross-functional Subject Matter Experts relating to that event.
   c. Updating the Event Response Database with event details.
   d. Leading causal analysis of the event.
   e. Organizing an Extent of Condition review.
   f. Identifying the issues from the causal analysis and the extent of condition review.
   g. Leading a meeting with the event owner/responsible parties to review the issues from the causal analysis and the extent of condition review.
   h. Working with the responsible management to create items (corrective/preventative actions) to address the issues.

    i.   Scheduling an overview to the EAWG and integrating feedback.

    j.   Finalizing the Review Report and distributing to stakeholders and interested parties.

4.0   PROGRAM

Fermilab's integration of HPI originated from the efforts of the Environmental, Safety and Health (ES&H) Division, however, through the expanded applicability of HPI beyond ES&H-related events, the program now resides under the auspices of the Office of Quality Assurance. The Office of Quality Assurance and ES&H Division collaboratively provide guidance to the laboratory on the best methods for applying the HPI concepts and principles to not only injuries and illnesses but also to unexpected outcomes and other events. HPI principles should also be integrated in programs and processes to help minimize unexpected outcomes and events; as the goal is to be preventive as opposed to corrective and continuously learn from previous errors and events.

A key feature of the HPI tool is the HPI Database. The HPI Database contains the Event Review details that include the Incident/Event Description and answers to questions such as 'What happened? (worker's perspective)', 'Why did it make sense at the time?', and 'What Immediate Actions Were Taken'? In addition, the Review contains a list of both the Review Team as well as all the Persons Involved (interviewed). The Event Review highlights the Organizational Weaknesses, Error Precursors, Causal Codes, as well as the corresponding corrective and preventive action items. Furthermore, the HPI Database is linked to the lab's issues management database (iTrack) allowing for the seamless tracking and resolution of the corrective/preventive items to completion. Lastly, the user of the HPI Database can upload any pertinent information related to the review such as pictures and supporting documentation.

The Event Analysis Working Group (EAWG) is charged with analyzing HPI data to identify trends and derive actions to address those trends to improve Fermilab's work culture. The data analyzed from the HPI Database include Error Precursors, Latent Organizational Weaknesses, and Causal Codes.

The EAWG is also charged with reviewing draft Event Reviews and providing the Lead Reviewer with feedback for improvement. The primary functions of the EAWG are outlined in their Charter.

Introduction to HPI concepts and principles begin with either a half day training for employees (FN000493) or a full day training class for supervisors (FN000469). One of these courses is identified as part of Fermilab personnel's Individual Training Needs Assessment (ITNA) that is completed by the personnel's supervisor. Lead Reviewers for Reviews integrating HPI are expected to receive one of the HPI courses plus both the Internal Assessor Training (FN000557) course and the Lead Assessor Training course (FN000728). Note: The Internal Assessor Training course is a prerequisite for the Lead Assessor Training course. New Lead Reviewers also receive help, guidance, and mentoring from their Division Safety Officer, Quality Assurance Liaison, and/or Event Analysis Working Group.

Event Reviews Integrating HPI Principles

Although the Event Review aspects and requirements are covered in QAM Chapter 12140 -– Event Response Program, Event Reviews integrating HPI are also applicable to unexpected outcomes and near misses, therefore, it is important to include several key aspects that make a Review integrating HPI principles different from a standard incident investigation.

1. Lead Reviewers are expected to have completed at least one of the HPI classes along with both the Internal Assessor and Lead Assessor training courses.
2. Lead Reviewers shall assemble their review teams, with input from the Event Response Program Manager or Coordinator, the applicable FESHCom Subcommittee Chairs, Authorities Having Jurisdiction (AHJs for Electrical/Fire/Structural), or Chief Engineer, by selecting a diverse group of Subject Matter Experts (SMEs) from across the laboratory that have in depth knowledge about the topic or related issues surrounding the incident.
3. Lead Reviewers shall begin each event interview by reviewing the 5 HPI Principles which establishes a no-fault approach to ensure a high level of transparency.
4. Review Teams shall understand that the event review outcomes identified to address or improve the situation are entered into iTrack are not only created to address the immediate issue, but they are also to take into consideration other areas of the laboratory which could benefit from the corrective/preventive actions, responses or lessons learned usually via an Extent of Condition. Furthermore, that the data (Latent Organizational Weaknesses, Error Precursors, and Casual Codes) collected will be used to create directed initiatives and improvements to address the gaps in our work culture with an evidence-based approach.
5. A Review integrating HPI principles will be conducted per the defined Event Review Levels table defined in the QAM Chapter 12140 – Event Response Program, including conducting a causal analysis when applicable.
6. Lead Reviewers are responsible for entering their review into the Event Response Database and any items into iTrack.
7. Lead Reviewers will present their draft Event Reviews to the EAWG as a quality control check that includes:
   a. Review and comment on draft Review reports and provide feedback to Lead Reviewer for follow-up.
   b. Address any unanswered questions or other causes of concern.
8. Lead Reviewers will create a summary overview of the event for distribution to Fermilab's Senior Leadership and other stakeholders.

5.0   PROCEDURES

1. For abnormal events or near misses, follow the requirements and procedures outlined in QAM Chapter 12140 - Event Response Program description document.

2. For Unexpected Outcomes:
   To assist with the determination for when an Event Review is necessary, consider the following:

    a. The review provides an opportunity for a greater organizational understanding of a work process/key business process for your Directorate/Division/Project.
        i. Involvement with more than one organization.
        ii. Critical nature of the operation.
        iii. Complexity of the operation.
        iv. Impacts to safety, safeguards, and security.
    b. The incident carries a risk assessment code of either a "Critical" or "Serious" based on the Technical Appendix A – Determining the Risk Assessment Code from the Quality Assurance Manual Chapter 12030: iTrack Procedures and Risk Assignment.
    c. Input from the Event Response Program Manager or Coordinator, your Directorate/Division/Project DSO, or QA Liaison.
    d. Input from applicable FESHCom Subcommittee Chairs, AHJs or Chief Engineer.

After the determination is made to move forward with a Review integrating HPI principles, follow the requirements and procedures outlined in QAM Chapter 12140 Event Response Program.

6.0   REFERENCES

[1] FESHM Chapter 1010 Laboratory Environment, Safety and Health Management System and its Implementation

[2] QAM Chapter 12010 Fermilab Lessons Learned Program and Procedures

[3] QAM Chapter 12030 Fermilab Quality Tool Suites Procedures and Risk Assignment

[4] QAM Chapter 12040 Corrective and Preventative Actions

[5] QAM Chapter 12050 Cause Analysis

[6] QAM Chapter 12140 Event Response Program

[7] DOE Standard Human Performance Improvement Handbook Volume 1: Concepts and Principles; June 2009

[8] DOE Standard Human Performance Improvement Handbook Volume 2: Human Performance Tools for Individuals, Work Teams, and Management; June 2009

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