QAM 12110: Human Performance Improvement (HPI)

Revision History

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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. Fermilab's HPI program is an integral part of the lab's efforts to not only review incidents, near misses, and unexpected outcomes for corrective and preventive actions; but also, to help identify error precursors, latent organizational weaknesses and causal codes present in each occurrence. Analysis of this data can then be used to create directed initiatives to address the gaps in our work culture with an evidence-based approach.

As part of this program, 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, and Users working at Fermilab and any leased spaces.

2.0 DEFINITIONS & ACRONYMS

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]

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 underling 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]

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HPI Review – An incident investigation that utilizes HPI concepts and principles.

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 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 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 work place 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 injury, illness, or damage 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 is a "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 – Is an incident that results in an unexpected or unintended outcome within a process or program.

3.0 PROGRAM

Fermilab's HPI program originated from the efforts of the Environmental, Safety and Health (ES&H) Section, however, through the expanded applicability of the HPI Program beyond ES&H-related events, the program now resides under the auspices of the Quality Section. The Quality and ES&H Sections collaboratively provide guidance to the laboratory on the best methods for applying HPI concepts and principles to not only injuries and illnesses but also to unexpected outcomes and other events.

A key feature of the HPI program is the HPI Event Timeline Database. The HPI Event Timeline Database contains the HPI 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 HPI Review highlights the Organizational Weaknesses, Error Precursors, Causal Codes, as well as the corresponding corrective and preventive action items. Furthermore, the HPI Event Timeline 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 Event Timeline Database can upload any pertinent information related to the review such as pictures and supporting documentation.

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The HPI program includes the efforts of two main groups, the Incident Analysis Team (IAT) and the Incident Prevention Subcommittee (IPS) whose description and primary functions are outlined in FESHM Chapter 3020 - Incident Investigation and Analysis. Through the effort of these groups; incidents, near misses and unexpected outcomes are reviewed, captured, and later analyzed to create directed initiatives that address the gaps in Fermilab's work culture. The metrics analyzed from the HPI Event Timeline Database include: Error Precursors, Latent Organizational Weaknesses, and Causal Analysis Codes.

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. HPI Lead Reviewers are expected to receive one of the HPI courses plus the Internal Assessor Training (FN000557) course. New HPI Lead Reviewers also receive help, guidance, and mentoring from their Division Safety Officer, Quality Section Liaison, and/or Incident Analysis Team.

HPI Reviews

Although many incident investigation aspects and requirements are covered in FESHM Chapter 3020 - Incident Investigation and Analysis, HPI Reviews are also applicable to unexpected outcomes and near misses, therefore, it is important to include several key aspects that make an HPI Review different from a standard incident investigation.

1. HPI Lead Reviewers are expected to have completed at least one of the HPI classes along with the Internal Assessor Training course.
2. HPI Lead Reviewers shall assemble their investigation teams 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. HPI Lead Reviewer should begin each incident interview by reviewing the 5 HPI Principles which establishes a no-fault approach to ensure a high level of transparency.
4. HPI Review Teams should understand that the recommendations 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. 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. HPI determinations should be made within 7 days of the incident and HPI Reviews are to be completed within 45 calendar days.
6. HPI Lead Reviewers are responsible for entering their review into the HPI Event Timeline Database and any items into iTrack.
7. HPI Lead Reviewers will present their draft HPI Reviews to the Incident Analysis Team (IAT) as a quality control check that includes:
    a. Review and comment on draft HPIs and provide feedback to Lead HPI Reviewer for follow-up.
    b. Have the Lead Reviewer address any unanswered questions or other causes of concern.
8. HPI Lead Reviewers will present their finalized HPI Reviews at Fermilab's Senior Management Meeting.

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4.0 RESPONSIBILITIES

4.1 Laboratory Director and Chief Operating Officer

1. Support an open reporting culture and use of HPI concepts and principles for the investigation of incidents, near misses, and unexpected outcomes.
2. Support the use of the HPI Event Timeline Database to create focused initiatives and improvements to address the opportunities in Fermilab's work culture.

4.2 Division/Section/Project Line Management

1. Complete HPI training as required and incorporate HPI concepts and principles into the daily work activities.
2. Support the HPI Program requirements and flow requirements down to respective areas of responsibility.
3. Assist, as necessary, in the designation of the HPI lead investigator and SME participants.
4. Ensure that corrective/preventive actions within the organization are addressed.
5. Actively support the HPI Program by attending monthly HPI summary presentations or sending a designee to attend and obtain applicable lessons learned for their areas.
6. Review HPI summary information distributed via email by the Chief Safety Officer.
7. Review analyzed HPI data pertaining to their areas of responsibility and address trends and recurring issues.

4.3 Division Safety Officers and/or Quality Section Liaisons

1. Communicate new HPI Reviews for your Division/Section/Project (D/S/P) to Incident Prevention Subcommittee (IPS) chair including title, lead, and brief summary of incident.
2. Ensure HPI Review title and lead are entered into the HPI Event Timeline Database as soon as reasonably possible for tracking.
3. Lead and/or participate in HPI Reviews
4. Provide guidance to the lead of any HPI Review in your D/S/P as needed.
5. Follow up on HPI Review status, report completion, and iTrack findings for ALL HPIs in your D/S/P and provide updates on these items during the monthly IPS meetings.
6. Communicate with your D/S/P management.
    a. HPI Review status updates
    b. Data analysis and trending
    c. Recommendations and lessons learned

4.4 Laboratory Employees and Users

1. Complete HPI training as required and incorporate HPI concepts and principles into the daily work activities.
2. Assist in the identification of unexpected outcomes for possible HPI review.
3. Participate in HPI Reviews as requested.

4.5 Users and Subcontractors

1. Participate in Fermilab HPI Reviews as requested.

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4.6 HPI Lead Reviewer

1. Perform Incident Investigations utilizing HPI concepts and principles.
2. Use the HPI Event Timeline Database to capture Incident Investigations and HPI Reviews associated with near misses and unexpected outcomes.
3. Present HPI Reviews at IAT and SMM meetings as well as IPS meetings, when requested.

5.0 PROCEDURES

1. For incidents or near misses, following the requirements and procedures outlined in FESHM Chapter 3020 Incident Investigation and Analysis.

2. For Unexpected Outcomes:
    a. Evaluate the benefits of performing an HPI Review of the unexpected outcome to your D/S/P and other areas of the laboratory. This is especially true if more than one organization is involved.
    b. Solicit input from your D/S/P DSO or QS Liaison.
    c. If the determination is to move forward with an HPI Review, follow the requirements and procedures outlined in FESHM Chapter 3020 Incident Investigation and Analysis.

6.0 REFERENCES

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

[2] FESHM Chapter 3020 Incident Investigation and Analysis

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

[4] QAM Chapter 12030 iTrack Procedures and Risk Assignment

[5] QAM Chapter 12040 Corrective and Preventive Actions

[6] QAM Chapter 12050 Root Cause Analysis

[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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