QAM 12140: EVENT RESPONSE PROGRAM

Revision History

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1.0 INTRODUCTION AND SCOPE

This manual chapter provides the procedural framework for conducting an effective event response and review which includes sufficient data collection, detailed causal analysis, and the development of meaningful corrective actions and lessons learned. The review process will help identify those error precursors and organizational weaknesses that could leave Fermilab vulnerable to future events with similar or worse consequences.

This program applies to all Fermilab employees, users, and affiliates performing work on the Fermilab site, in Fermilab leased spaces, and elsewhere when performing work for Fermilab.

2.0 DEFINITIONS & ACRONYMS

Best Practice – an item type that is a positive example of a work process or innovative approach with the potential to be the basis for significant operational improvements or cost savings.

Business process incident – Failure of a business process that has wide-spread consequences, affecting the lab's assets or mission. This could include major IT incidents, policy deviations (procurement, accounting, recruitment, onboarding/offboarding, etc.) that broadly impacted the lab, or any incident that has the potential to damage the credibility of the lab or DOE or may result in inquiries to DOE Headquarters.

CAIRS – Computerized Accident Incident Reporting System

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

DSO – Division Safety Officer

EAWG – Event Analysis Working Group

Emergency Event – A situation that poses an immediate risk to health, life, safety, property, or environment. Emergencies require urgent intervention to prevent further illness, injury, death, or other worsening of the situation.

ERPM – Event Response Program Manager

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

Event Owner – An individual responsible for ensuring that adequate resources are available to review the event, identify cause(s), develop and close corrective actions. Typically, the Event Owner is from the owning organization where the event occurred.

Extent of Condition – A process to determine if the conditions or causes related to an event extend beyond the specific event being reviewed and analyzed.

Fact-finding – A process of gathering of information and sources of evidence, with the purpose of ascertaining facts about an event.

FSO – Fermi Site Office

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 organization factors, job-site conditions, individual behavior, and results.

HPI Review – An event review that utilizes HPI concepts and principles.

Incident – Any event or unplanned or unexpected outcome which has harmed or could have the potential to harm lab personnel or property, the public, the environment, or the lab's mission.

Independent Reviewer – a trained reviewer who is not a part of the Directorate, Division, or Project involved in the event under review.

Injury or Illness – an injury or illness is an abnormal condition or disorder. Injuries includes cases such as, but not limited to, a cut, fracture, sprain, or amputation. Illnesses include both acute and chronic illnesses, such as, but not limited to, a skin disease, respiratory disorder, or poisoning.

Lesson Learned – an item type that is a best practice captured and shared to promote repeat application, or an adverse work practice or experience that is captured and shared to prevent recurrence.

OSHA Recordable Injury/Illness – Any work-related injury or illness resulting in death, days away from work, restricted work or transfer to another job, or medical treatment beyond first aid.

Motorized Vehicle - For the purpose of this chapter, a motorized vehicle is any conveyance that transports people or objects. This includes automobiles, trucks, mobile cranes, fork trucks, golf carts, tow motors, magnet movers, riding lawn mowers, tractors, and electric carts.

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."

Occurrence – event or condition that adversely affects, or may adversely affect DOE or contractor personnel, the public, property, the environment, or the DOE mission.

Point of Contact (POC) – An FRA-approved individual who has sufficient knowledge of a user/affiliate's job duties and Fermilab requirements to be able to perform the responsibilities listed in Section 3.0. (See FESHM 1080 – Environment, Safety and Health Requirements for Experimenters)

Preserve the scene – actions taken to record or collect information at the scene of an event (e.g., set up cones, tape/rope off the area; take photographs, components of failed equipment, samples of spilled materials, etc.)

QAL – Quality Assurance Liaison

Secure the scene – actions taken to stabilize all existing factors which could disturb the conditions of the scene of an event and prevent other personnel from entering the area to ensure their safety.

Stakeholder – an individual, group, or organization that's impacted by the outcome of an event.

TM/CC/SC – Task Manager, Construction Coordinator, Service Coordinator

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 Injured or involved employee/user/affiliate

- Secure/preserve the scene, when applicable.
- Immediately report to their supervisor/point of contact any work-related injuries or illnesses. Report to the Fermilab Occupational Medical Office (FOMO) for medical treatment. If the injury/illness requires emergency treatment, call x3131 for emergency medical assistance.
  - *For individuals at leased locations, follow the local emergency response procedure for injuries requiring emergency medical treatment.*
  - *For individuals on business travel, use local medical facility for treatment. Report injury/illness to supervisor as soon as reasonably possible.*
- Immediately report to their supervisor/point of contact any involvement in abnormal events no matter how minor it may initially appear. This includes near miss events.
- Immediately report motorized vehicle accidents that occur on-site or while operating government vehicles to Security Operations Center (x3131 if an emergency, x3414 for non-emergency).
  - *For individuals at leased locations, follow the local procedure for reporting motorized vehicle accidents.*
- Participate in the review and analysis of events they are involved in or witness to.

- Complete Event Response training, as required per their Individual Training Needs Assessment (ITNA).

3.2 Involved subcontractors

- Immediately report to their supervisor any abnormal events, including work-related injuries or illnesses, and near misses.
- Ensure the Fermilab Task Manager, Construction Coordinator, or Service Coordinator (TM/CC/SC) is notified of any abnormal event that occurs while performing work for Fermilab Research Alliance (FRA)
- Participate in the review and analysis of events they are involved in or witness to.

3.3 Supervisor/Point of Contact (POC) or designee for the activity or personnel who were injured or involved in an event

- Ensure injured or ill person(s) is seen by the Fermilab Occupational Medical Office (FOMO) or call x3131 for emergency medical assistance.
    - *For individuals at leased locations, follow the local emergency response procedure for injuries/illnesses. Ensure the injury/illness is reported to FOMO.*
- Ensure the event scene is preserved, document the conditions (e.g. take photographs to include in event reports), and perform other activities to preserve evidence, when applicable.
- Complete an Event Information Form within 2 hours of awareness of the event (except for injury/illness cases, which will be entered by the Fermilab Occupational Medical Office).
- Make notifications to line management with preliminary details of the event.
- Review the Injury/Illness Evaluation Form-5 per the requirements of FESHM 3020.
- For Level 1 event reviews, lead the fact-finding meeting, with assistance from the DSO or QAL. Follow the process outlined in Section 5.3.
    - Complete the Level 1 Event Review report.
    - Enter final report into the Event Response Database.

3.4 Department Heads/Group Leaders

- Ensure the implementation of this process within their department/group.
- Ensure reviews are completed within timeframes in Table 1.
- Ensure personnel have completed Event Response training described in Section 5.5.
- Identify unexpected outcomes within their area of responsibility that warrant a formal analysis to uncover the drivers behind the event in order to minimize recurrence.
- Consult with the Event Response Program Manager for unexpected outcomes that warrant a formal analysis to determine the appropriate event review level.
- Assist in assignment of appropriate reviewer for Level 1 Event Reviews.
- Participate in reviews of draft Level 1, 2, and 3 Review reports.
    - Provide feedback on identified corrective/preventative actions and assignment to personnel.
- Assist in implementation of corrective/preventative actions identified in the reports by providing the required resources.

3.5 Task Managers/Construction Coordinators/Service Coordinators (TM/CC/SC)

- Ensure injured/ill subcontractor(s) receives medical attention through the process defined by the subcontractor.
    - Notify the Fermilab Occupational Medical Office of subcontractor injuries/illnesses incurred while working under contract to FRA.
- For all events, ensure an event scene is preserved and documented, and perform other activities to preserve evidence, when applicable.
- Submit an Event Information Form within 2 hours of the subcontractor event/incident (except for injury/illnesses, which will be entered by the Fermilab Occupational Medical Office).
- Make notifications to line management and the Procurement Officer with preliminary details of the event.
- Share the subcontractor's incident investigation report with the ERPM so it can be attached to the Event Information Form.
    - Participate in the review of the report with the ERPM to ensure causal analysis and corrective actions are appropriate.
    - Enter an iTrack item indicating the TM/CC/SC will verify subcontractor-identified corrective actions have been addressed/completed.

3.6 Lead Reviewers

- Complete training described in Section 5.5.
- Lead review team through the event response process, following the procedures outlined in Section 5.3.

3.7 Level 2 and Level 3 Review Team Members

- Complete training described in Section 5.5.

3.8 Event Response Program Manager (ERPM) and designees

- Manage the Event Response Program.
- Review all Event Information forms.
    - Determine appropriate event type.
    - Determine appropriate review level for the event.
- Ensure appropriate reviewers are assigned for Level 1 Event Reviews.
- Coordinate with AL/D/P Director in assigning lead reviewers for Level 2 Event Reviews.
- Coordinate with Chief Operating Officer (COO) and AL/D/P Director in assigning lead reviewers for Level 3 Event Reviews.
- Review extension requests from lead reviewers when additional time may be necessary to complete a draft review report. Notify the lead reviewer in writing whether their extension request is approved or denied.
- Review all draft event review reports.
- Upload subcontractor event review/incident investigation reports to the affiliated Event Information form in the database. Review the report with the TM/CC/SC to confirm root causes and corrective actions identified are appropriate. Determine if a Level 2 or Level 3 Event Review is necessary to identify any issues associated with Fermilab's processes that may have contributed to the event.

- Act as the Occurrence Reporting Processing System (ORPS) Manager and Worker Safety and Health Enforcement Coordinator for the lab. Follow the duties outlined within FESHM 3010 and 3030.
- Act as the CAIRS Coordinator for the lab. Follow the duties outlined within FESHM 3020.
- Review security reports and fire run reports for review opportunities.
- Perform trending and analysis of review results, provide reports to lab management on a routine basis.
- Coordinate and chair the activities of the Event Analysis Working Group (EAWG).
- ERPM has final authority to adjust the review process as they deem necessary.
- Develop and oversee the Event Response Program training requirements found in Section 5.5.

3.9 Division Safety Officers (DSO)

- Participate in fact findings and reviews for injuries/ESH-related events and as needed to provide assistance with the process.
- For injuries/illnesses, follow process for CAIRS reports outlined in FESHM 3020.

3.10 Quality Assurance Liaison (QAL)

- Participate in fact findings and reviews and provide assistance with the process as needed.

3.11 Event Analysis Working Group (EAWG)

- Participate in evaluations of draft report reviews.
- At least annually, review the list of trained lead reviewers against the review lead expectations to ensure consistency in the event reviews.
- Evaluate programmatic concerns brought forth by the ERPM.

3.12 Associate Lab/Division/Project Directors (AL/D/P Directors)

- Ensure the implementation of this process within their Directorate, Division or Project.
- Ensure reviews are completed within timeframes in Table 1.
- Identify unexpected outcomes within their area of responsibility that warrant a formal analysis to uncover the drivers behind the event in order to minimize recurrence.
- Consult with the Event Response Program Manager for unexpected outcomes that warrant a formal analysis to determine the appropriate event review level.
- Assign a lead reviewer for Level 2 Event Reviews.
- Work with the COO and ERPM to determine an independent lead reviewer for Level 3 Event Reviews.
- Participate in Level 2 & 3 event draft report reviews.
- Provide a summary of any events relating to their area to stakeholders (e.g., senior leadership, FRA Board, Directorate/Division/Project personnel).

3.13 Head of Office of Quality Assurance

- Hire or designate a qualified Event Response Program Manager (ERPM).
- Ensure Quality Assurance Liaisons (QALs) are assigned to each Directorate, Division or Project.
- Develop and maintain event review and analysis policies and procedures.
- Provide technical assistance when requested for Level 2 and 3 event reviews.

3.14 Chief Operating Officer (COO)

- Ensure sufficient resources are available to maintain and improve the Event Response Program.
- Ensure notification of the Laboratory Director, Office of Communication, Office of General Council, FRA Board of Directors, and the DOE Fermi Site Office (FSO) of any event that may result in an independent DOE investigation.
- Work with the Associate Lab Director/Division Director/Project Director and ERPM to determine an independent Lead Reviewer for Level 3 reviews.
- Review all completed Level 3 event reports.

4.0 PROGRAM

The Event Response Program resides under the Office of Quality Assurance and is overseen by the Event Response Program Manager. Directorates, Divisions, and Projects and the line management within those organizations will be integral to the process with their involvement in event reviews and shall own the process of determining what happened, how and/or why it happened, and what can and should be done to reduce the probability of recurrence.

5.0 PROCEDURES

The following table shall be used to determine the review level required for an event. There are some events that will meet Level 1 review requirements, but may be deemed by the ERPM, Associate Lab Director/Division Director/Project Director, or COO to be of greater significance and will require a higher level of review (Level 2 or 3).

Table 1: Event Review Levels

Review Level	Event Types	Review Team/Review Type	Draft report due for review	Report review	Final report due
Level 1 – fact finding	• First aid, recordable injuries • Informational level ORPS • Motorized vehicle accidents involving government vehicles • Unexpected outcomes (as determined by line management)	• Supervisor/POC • Include DSO for injuries/ESH-related events • Include QAL as needed • Complete Level 1 Review form	Initial event summary by 2 days to ERPM 10 business days for draft report	• Dept Head • DSO • Event Response Program Manager (ERPM)	5 business days after draft review
Level 2 – causal analysis	• DART injuries/illnesses • Low level ORPS • Unexpected outcomes (as determined by line management)	• AL/D/P Director assigns leader and team • Include DSO for injuries/ESH-related events • Include QAL as needed • HPI review w/ causal analysis and extent of condition required	Intial event summary by 2 days to ERPM 30 business days for draft report	• Dept Head • AL/D/P Director • DSO • ERPM • Event Analysis Working Group (EAWG)	10 business days after draft review
Level 3 – independent root cause analysis	• High level ORPS • Unexpected outcomes (as determined by line management)	• ERPM, COO, and AL/D/P Director identify independent review team leader • Include DSO and/or QAL • HPI review w/ causal analysis and extent of condition required	Intial event summary by 2 days to ERPM 30 business days for draft report	• Dept Head • AL/D/P Director • DSO • ERPM • EAWG	10 business days after draft review

5.1 Initial Actions

5.1.1 For Events with Injuries or Threat of Injuries

- Emergency event: call x3131 (630-840-3131 from non-lab phone). Then notify supervisor/lab POC. Provide aid to injured personnel within your abilities and without endangering yourself. Do not move personnel other than to remove them from imminent danger or to administer CPR.
    - *For individuals at leased locations, follow the local emergency response procedure for injuries requiring immediate medical treatment.*
    - *For individuals on business travel, use local medical facility for treatment. Report injury/illness to supervisor as soon as reasonably possible.*
- Non-emergency event: Notify supervisor/lab POC and assist injured person to Fermilab Occupational Medical Office (FOMO) in Wilson Hall, Ground Floor West for treatment. If FOMO is closed, contact Fermilab Fire Department via x3131.

- *For individuals at leased locations, follow the local emergency response procedure for injuries requiring immediate medical treatment.*
- *For individuals on business travel, use local medical facility for treatment. Report injury/illness to supervisor as soon as reasonably possible.*

- FOMO will create an event entry in the Event Response database via the CAIRS database, following the process outlined in FESHM 3020.

5.1.2 For All Events

Involved persons are to:

- Place the area in a safe condition and secure the scene, as necessary (e.g., injury event, near miss event, etc.).
  - NOTE: If the event initiates a Fire/EMS emergency or security response, the scene will be secured by the emergency management personnel. Once the scene has been released to area personnel, any review/documentation relating to the scene where the event occurred may proceed.
- Notify your supervisor/point of contact immediately of the abnormal event.
- Notify the building manager/area facility manager for events that impact facilities.

5.2 Handling Unexpected Outcomes

- Unexpected outcomes can include, but are not limited to: near misses, property damage, an environmental spill/release, fires, business process-related incidents, security incidents, cybersecurity incidents, suspected/counterfeit items, or product recalls.
- Line Management (Organization or Department Heads) is responsible for identifying if an unexpected outcome that has occurred in their area of responsibility warrants some level of formal analysis to uncover the drivers behind the event to minimize recurrence.
  - Guidance to assist with the determination for when an unexpected outcome warrants some level of formal analysis can be found in QAM Chapter 12110 – Human Performance Improvement (HPI), Section 5.0 Procedures, bullet number 2.
- If it is determined that some level of formal analysis should be conducted on an unexpected outcome, then line management shall contact the ERPM to determine the appropriate Event Review Level outlined in Table 1. After the appropriate Event Review Level has been determined, the event will be reviewed according to the procedures outlined in Section 5.3.
- Some business process incidents may be handled by existing procedures defined within a particular organization. For example, cybersecurity and IT-related incidents and events are managed via existing internal processes and procedures. The handling of incidents of Security concern are described in the Incidents of Security Concern Program Plan document. Line Management will be responsible for determing when these events may require a casual analysis or review using HPI principles and notifying the ERPM.

5.3 Event Review Process

5.3.1 Level 1 Event Review

Step 1: Assemble team and conduct fact-finding/gather information
The Associate Lab/Division/Project Director will assign a lead for the fact-finding review, typically the supervisor or POC of the individual(s) involved. For injury/ESH-related reviews, the DSO must be included on the team. The team should also include Subject Matter Experts as needed. A summary is due within two days of the event to the Event Response Program Manager.

NOTE: When an event involves multiple individuals from multiple organizations, the supervisor/POC for each individual shall participate in the review; the ERPM will select the lead reviewer.

The lead reviewer shall convene a meeting with the team preferably within 24 hours of discovery, at the location of the event (when possible).

a. Required Attendees
   - Supervisor/POC of the directly involved person(s)
   - DSO or their designee (for injuries/ESH-related events)
   - The involved person(s) and/or those directly impacted by the event
     - Note: The person(s) directly involved may not be able to attend due to injury or illness. If this is the case, the lead reviewer determines if a separate interview or discussion is acceptable.
   - Witnesses to the event (only pertinent personnel are required to attend)

b. Gather initial information, including:
   i. Review and document the event scene by taking photos, drawing sketches, etc.
      NOTE: If the event initiates an emergency or security response, the scene will be secured by the emergency management personnel. Once the scene has been released to area personnel, any review/documentation relating to the scene where the event occurred may proceed.
   ii. Debriefing/interviewing involved person(s) and witnesses to develop a timeline of events
   iii. Collecting any physical evidence
   iv. Collecting event-related documenation (work planning documents, procedures, training records, etc.).

Step 2: Team organizes and analyzes the facts to determine causes and develop corrective actions (immediate and long-term) to reduce the probability of recurrence.

- When developing corrective actions, include impacted stakeholders in the process to ensure corrective actions will be feasible and effective.

Step 3: Lessons Learned and Best Practices

- Identify any lessons learned and best practices and document on the Level 1 Event Review form.

Step 4: Draft review report using the Level 1 Event Review form.

- Draft report is due within 10 business days of the event.
  - *Note: If an extension may be necessary, a request must be made in writing to the Event Response Program Manger (ERPM), who will review the request and may or may not grant an extension of the draft due date.*
- The Department Head/Group Leader, DSO, CAIRS coordinator (for injuries), and ERPM will review the draft report and provide feedback, ideally within 2 business days.

Step 5: Finalize report following any revisions based upon feedback received within 5 business days.

- Submit final report into the Event Response Database.
- Supervisor/POC to ensure corrective actions are entered and assigned in iTrack. Corrective actions are generally expected to be closed in 6 months or less. Anything more than 6 months will require ERPM approval.
- Record any lessons learned and best practices during the review in the iTrack review.

5.3.2 Level 2 Event Review

NOTE: In addition to the steps listed below, the Lead Reviewer shall follow the HPI Review requirements identified in QAM Chapter 12110 – Human Performance Improvement.

Step 1: Assemble Review Team

Associate Lab/Division/Project Director identifies a trained Lead Reviewer (with assistance from ERPM), and with the Lead Reviewer, identifies team members to provide support to the Lead Reviewer. For injury/ESH-related reviews, the DSO must be included on the team. The Quality Assurance Liaison may be selected as a team member. The team may include involved individuals. The team may also include Subject Matter Experts, or the line manager of the impacted individual(s).

- The FSO facility representative may be invited to review meetings to participate as observers as appropriate (e.g. for ESH-related events).

Step 2: Gather Information

- Document and review the scene, take photographs
  - NOTE: If the event initiates an emergency or security response, the scene will be secured by the emergency management personnel. Once the scene has been released to area personnel, any review/documentation relating to the scene where the event occurred may proceed.

- Interview witnesses
- Team generates a summary of the events, including a timeline
- Review records, work planning & control documents, pictures, and other references

Step 3: Conduct Causal Analysis – utilize one of the causal analysis methods described in QAM 12050 – Root Cause Analysis. Include the review team and involved individuals in the causal analysis meeting; invite FSO facility representatives as appropriate. Attach the causal analysis to the report.

- Root Cause – determine the underlying system weaknesses that contributed to the hazardous and/or unsafe behaviours
- Contributing Causes – analyze the actions leading up to the event to determine the contributing cause(s)
    - Use facts to determine the root and contributing causes.
    - Identify any latent organizational weaknesses and error precursors.
    - Ensure that the root and contributing cause are factual and reflect the HPI factors.

Step 4: Extent of Condition – determine if the root or contributing cause(s) exist within other processes, equipment, or human performance.

- Identify areas where processes, equipment or performances are at a similar risk of event recurrence.
- Determine what immediate actions are needed to address the extent of condition, and/or reduce likelihood of recurrence.

Step 5: Identify corrective actions to efficiently address the weaknesses identified during the review. The actions should be prioritized for those that will be most effective and achievable at reducing the probability of recurrence of the issues identified.

- When developing corrective actions utilize an integrated approach, such as including impacted stakeholders in the process to ensure corrective actions will be feasible and effective.

Step 6: Identify Lessons Learned and Best Practices

- Identify any lessons learned and/or best practices and document in the report.

Step 7: Draft report in HPI database and share for review within 30 business days of the event.

    - *Note: If an extension may be necessary, a request must be made in writing to the Event Response Program Manger (ERPM), who will review the request and may (or may not) grant an extension of the draft due date.*
- Report will be reviewed by the Department Head/Group Leader, Associate Lab/Division/Project Director, CAIRS coordinator (for injuries), DSO, ERPM and EAWG during a scheduled EAWG review. Feedback will be provided within 5 business days.

Step 8: Finalize report in HPI database within 10 business days after draft report complete.

- Lead Reviewer to ensure corrective actions are entered and assigned in iTrack. Corrective action due dates shall be 6 months or less from the date of the final report. Approval from the ERPM must be acquired for any corrective actions with a due date greater than 6 months.
- Record any lessons learned during the review in the lessons learned database.

5.3.3 Level 3 Event Review

NOTE: In addition to the steps listed below, the Lead Reviewer shall follow the HPI Review requirements identified in QAM Chapter 12110 – Human Performance Improvement.

Step 1: Assemble Review Team
ERPM and Associate Lab/Division/Project Director (with assistance from the COO as necessary) will identify an independent trained Lead Reviewer, and with the Lead Reviewer, identify team members to provide support to the Lead Reviewer. For injury/ESH-related reviews, the DSO must be included on the team. The Quality Assurance Liaison (QAL) may be selected as a team member. The team may include any involved individuals. The team may also include Subject Matter Experts, or the line manager of the impacted individual(s).

- The FSO facility representative may be invited to review meetings to participate as observers as appropriate (e.g. for ESH-related events).

Step 2: Gather Information

- Document and review the scene, take photographs
  - NOTE: If the event initiates an emergency or security response, the scene will be secured by the emergency management personnel. Once the scene has been released to area personnel, any review/documentation relating to the scene where the event occurred may proceed.
- Interview witnesses
- Team generates a summary of the events
- Review records, work planning & control documents, pictures, and other references

Step 3: Conduct Causal Analysis– utilize one of the causal analysis methods described in QAM 12050 – Root Cause Analysis. Include the review team and involved individuals in the causal analysis meeting; invite FSO facility representatives for ESH-related events. Attach the causal analysis to the report.

- Root Cause – determine the undrelying system weaknesses that contributed to the hazardous and/or unsafe behaviours

- Contributing Causes – analyze the actions leading up to the event to determine the contributing cause(s)
    - Use facts to determine the root and contributing causes.
    - Identify any latent organizational weaknesses and error precursors.
    - Ensure that the root and contributing cause are factual and reflect the HPI factors.

Step 4: Extent of Condition – determine if the root or contributing cause(s) exist within other processes, equipment, or human performance.

- Identify areas where processes, equipment or performances are at a similar risk of event recurrence.
- Determine what immediate actions are needed to address the extent of condition, to reduce the likelihood of recurrence.

Step 5: Identify corrective actions to efficiently address the weaknesses identified during the review. The actions should be prioritized for those that will be most effective and achievable at reducing the probability of recurrence of the issues identified.

- When developing corrective actions utilize an integrated approach, such as including impacted stakeholders in the process to ensure corrective actions will be feasible and effective.

Step 6: Identify Lessons Learned and Best Practices

- Identify any lessons learned and/or best practices and document in the report.

Step 7: Draft report in HPI database and share for review within 30 business days.

- *Note: If an extension may be necessary, a request must be made in writing to the Event Response Program Manger (ERPM), who will review the request and may (or may not) grant an extension of the draft due date.*
- Report will be reviewed by the Department Head/Group Leader, Associate Lab/Division/Project Director, CAIRS coordinator (for injuries), DSO, ERPM and EAWG and feedback will be provided ideally within 5 business days.

Step 8: Finalize report in HPI database within 10 business days after draft report review is complete.

- Lead Reviewer ensures corrective actions are entered and assigned in iTrack.
- Record any lessons learned during the review in the Lessons Learned database.

5.4 Effectiveness Reviews

Effectiveness reviews shall be conducted for all Level 2 and Level 3 reviews to ensure the corrective actions that were identified and implemented have effectively addressed the root causes to the event, and will avoid similar events from occurring. The ERPM will ensure an effectiveness review has been completed that follows the guidance in QAM 12030.

5.5 Training Requirements

5.5.1 Employees, Users, Affiliates

All new employees/users/affiliates will receive training on the event response process and expectations for reporting events and participating in reviews through New Employee ES&H Orientation or New User/Affiliate ES&H Orientation. Existing employees, users, and affiliates will complete a training module regarding the event response process and event reporting expectations.

5.5.2 Supervisors, POCs & Task Managers/Construction Coordinators/Service Coordinators

Supervisors, POCs, and TM/CC/SCs will receive training to conduct Level 1 Event Reviews.

- Training will include the following: Overview of how to assemble the review team, how to conduct interviews with involved persons/witnesses, how to complete the Level 1 Review form, how to enter report information into the Event Response database and iTrack.

5.5.3 Lead Reviewers

Lead Reviewers for Level 2 or Level 3 reviews shall minimally complete the following training:

- Internal Assessor Training (FN000557)
- Lead Reviewer training
- HPI Training - 1 day
- Causal Mapping training
    - e.g., Root cause analysis - Fish Bone diagram

5.5.4 Level 2 and Level 3 Review Team Members

Level 2 and Level 3 Review Team Members shall minimally complete the following training:

- Internal Assessor Training (FN000557)

6.0 REFERENCES

10 CFR 851 – Worker Safety and Health Program
29 CFR 1904 – Recording and Reporting Occupational Injuries and Illnesses

Computing Sector Incident Management Processes:

- Problem Management Process and Procedures (CS-doc-3248)
- Major Incident Management Process and Procedures (CS-doc-3064)

DOE Order 225.1B – Accident Investigations
DOE Order 231.1 – Environment, Safety and Health Reporting
DOE Order 232.2 – Occurrence Reporting and Processing of Operations Information
DOE Order 414.1D – Quality Assurance

FESHM 1080 – Environment, Safety and Health (ES&H) Requirements for Experimenters
FESHM 3010 – Significant and Reportable Occurrences
FESHM 3020 – Workplace Injury and Illness Management Program
FESHM 3030 – Noncompliance Tracking System

Incidents of Security Concern Program Plan

QAM 12030 – Fermilab Quality Tool Suite Procedures and Risk Assignment
QAM 12040 – Corrective and Preventative Actions
QAM 12050 – Root Cause Analysis
QAM 12110 – Human Performance Improvement

7.0 Technical Appendix

7.1 Event Response Process Flow Chart