NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
U.S. DEPARTMENT OF COMMERCE

HAZARD REVIEW

NIST S 7101.20
Approval Date: 02/14/2026
Effective Date[1]: 05/01/2026

CONTENTS

[1] For revision history, see Appendix A.

1. PURPOSE

This suborder establishes the requirements and associated roles and responsibilities for conducting hazard reviews, also called Job Hazard Analyses or JHAs. This is the process of planning job or work activities in a manner that incorporates:

- Identifying hazards associated with performing job or work activities;
- Specifying means to control identified hazards; and
- Assessing risk associated with performing work activities with controls in place.

This suborder also defines requirements and associated roles and responsibilities for:

- Approving activities covered by hazard reviews to commence based on implementation of documented controls and acceptance of the residual risk; and
- Authorizing staff to perform activities covered by hazard reviews based on activity-specific knowledge, skills, and abilities.

2. BACKGROUND

The General Duty Clause of the Occupational Safety and Health Act of 1970 requires employers to provide a workplace free from recognized hazards. This suborder specifies the requirements used to assess work activities, identify hazards, and document the measures taken to mitigate identified hazards.

3. APPLICABILITY

a. Requirements of this suborder apply to:

(1) All work-related activities and stages of work conducted by NIST employees and covered associates (for the purposes of this document referred to as NIST staff) as part of their assigned duties under normal operating conditions, except those listed in Section 3.b. below; and

> NOTE: Stages of work include but are not limited to work for set-up, construction, fabrication, prototyping, acceptance testing, commissioning, troubleshooting, maintenance, normal operations, routine activity, non-routine activity, decommissioning, and tear-down, and includes fieldwork. That is, all hazardous work activities must be reviewed according to the process described by this suborder, not just the primary research experiment or primary activity.

(2) Any activity for which personal protective equipment (PPE) is *required* to mitigate the activity's safety risks.

b. Requirements of this suborder do not apply to:

(1) *Common Everyday Activities or Tasks Performed Routinely by Members of the General Public at Work and Home and that Do Not Involve Extraordinary Hazards* such as working at a computer, walking, climbing stairs, using scissors, or short step stools;

(2) *Inherently Low-Risk Activities* that present low safety risks without actively implementing any safety controls to mitigate those risks[2]; and

(3) Contractors operating under their employer's safety plan are not Covered Associates, however, may be required to have Hazard Reviews/JHAs per their contractor safety plan. NIST staff inspecting or observing contractor work may be required to have a Hazard Review when stipulated by this Applicability Section.

(4) Activities for which PPE is:

(a) Required solely for entry into space and not used for protection from the hazards associated with an activity;

(b) Used *voluntarily* as an additional elective layer of protection for comfort or convenience[3]; or

(c) Worn solely to protect equipment or materials.

These exemptions do not relieve staff or line management from their responsibility to manage safety-related risks associated with common tasks and inherently low-risk activities.

(4) When abnormal work conditions introduce hazards to work that would otherwise be exempt from the requirement to perform a hazard review and specific controls are required above and beyond standard workplace emergency protocols or general guidance to perform the work, the work must be covered by an approved hazard review.

4. REFERENCES

a. Public Law 91-596, 84 Stat. 1590. Occupational Safety and Health Act of 1970, Section 5. (a) (1) General Duty Clause

[2] This includes activities that involve use of equipment with built-in safety features that do not require written safe work practices, are not easily defeated, and will not be intentionally defeated or separated from the equipment.
[3] For voluntary use of respiratory protection see requirements in NIST S 7101.58.

b. 29 Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response (HAZWOPER)

c. 29 CFR 1910.132, Personnel Protective Equipment.

d. 29 CFR 1910.134, Respiratory Protection

e. 29 CFR 1910.156, Fire Brigades

f. 29 CFR 1910.1450, Occupational exposure to hazardous chemicals in laboratories

g. ANSI Z10-2019 Occupational Health and Safety Management Systems

h. ANSI Z10.100 Guidance and Implementation Manual for ANSI/ASSP Z10.0-2019 Occupational Health and Safety Management Systems

i. NIST Occupant Emergency Plan (Boulder)

j. NIST Occupant Emergency Plan (Gaithersburg)

5. APPLICABLE NIST DIRECTIVES

a. NIST O 7101.00: *Occupational Safety and Health Management System*

b. NIST S 7101.03: *Stop Work*

c. NIST S 7101.23: *Safety Education and Training*

d. NIST S 7101.29: *Medical Surveillance Program*

e. NIST S 7101.58: *Respiratory Protection*

f. NIST S 7101.60: *Chemical Management*

g. NIST S 7101.64: *Electrical Safety*

NOTE: Occupational safety and health directives, which are part of the NIST Safety Management System (SMS), specify requirements for working with hazardous materials (*e.g.*, biological materials, chemicals, compressed gases, cryogens) and equipment (*e.g.*,

forklifts, ladders, machines, and tools). These suborders should be consulted when selecting controls to mitigate these hazards.

6. REQUIREMENTS

a. Leading and Participating in Hazard Reviews

(1) An Activity Lead shall be identified for each hazard review.

(a) The Activity Lead shall be a competent staff member with appropriate knowledge, skills, and abilities regarding the job or work activity who is responsible for:

i. Conducting the activity; or

ii. Overseeing the activity with or without formal line management responsibilities[4]

(b) The Activity Lead shall:

i. Lead the hazard review process;

ii. Ensure all required hazard review elements are documented clearly and completely; and

iii. Solicit input from others who are or will be conducting the work.

(2) The Activity Lead, in coordination with appropriate line management, shall determine whether a Development Team is required to assist in conducting the hazard review.

(a) A Development Team shall be required when specified in Appendix B (Work, Hazards, and Controls that Require OSHE Participation on Development and Review Teams) or when the Activity Lead or line management deems participation of others necessary to obtain adequate technical and safety knowledge, skills, and abilities to identify hazards, specify controls and assess residual risk for the work activity covered by the scope of hazard review.

(b) If it is determined that a Development Team is not necessary, the Activity Lead should consult appropriate technical and safety experts as necessary to conduct the hazard review.

[4] Please see Section 6.c(4) for special conditions of approving work if a line manager is the Activity Lead.

b. Conducting and Documenting Hazard Reviews

(1) Work Activity Description. Provide an activity description to facilitate identification of hazards and selection of appropriate controls. Activity description documentation shall include the following elements:

(a) Scope of the work – Briefly describe the work activity or activities[5] covered by the hazard review, *e.g.*, set-up, tear-down, acceptance testing, commissioning, prototype testing, calibration, routine analysis, or decommissioning.

i. Specific tasks that are part of larger project or work activity:

(i) Shall be incorporated into the hazard review and not covered by a separate generic hazard[6] review when it is necessary to ensure that all synergistic hazards are fully assessed in the context of the larger work activity; or

(ii) May be covered by a separate generic hazard review when the generic hazard review covers all hazards and controls needed in the context of the larger activity.

(b) Frequency of the work – Specify how often the work activity is conducted, *e.g.*, weekly, monthly, occasionally as needed, one time, typically less than yearly.

(c) Physical Location – Identify the physical location(s) where the work will be conducted, noting any applicable restrictions relevant to conducting the work in the specified location(s).

(d) Specific Activity Description – Identify the specific steps or tasks performed under the scope of the hazard review. For each activity, the following shall be identified:

i. Steps or tasks that involve exposure to specific hazards;

ii. Equipment or tools to be used;

[5] A hazard review may cover a simple task comprised of several steps, a work activity comprised of multiple tasks, or a project consisting of many activities. When determining the scope of a hazard review, the activity lead should consider the dependencies of multiple activities, task frequency, and whether all staff will be approved for all tasks.
[6] Generic Hazard Review is a hazard review that covers a basic, non-complex, common task that is performed routinely and for which hazards are well known, well controlled and for which the relative hazard index is RHI ≤ 2; examples include soldering, cleaning optics, filling squeeze bottles with isopropanol, *etc*.

NOTE: Specify when equipment is automatically/autonomously controlled, *e.g.*, using Artificial Intelligence or machine learning algorithms, and may require additional controls to ensure boundary conditions are not exceeded.

iii. Materials used, *e.g.*, materials fabricated or machined, samples under analysis, solder, solvents, and other chemicals;

iv. Materials, products, wastes, generated or produced; and

v. Applicable boundary conditions *e.g.*, actions/processes, limits on temperature, pressure, and equipment settings or type or amounts of materials to be used.

(2) Work Location Assessment. The physical workspace shall be assessed to determine whether the location(s) in which the work will be performed is appropriate and adequate. Any inadequacies, limitations or restrictions based on work location shall be documented.

(a) Determine whether equipment needed to conduct the work is present, ventilation is adequate, safe storage of materials is available, safety features are installed, safety equipment is readily accessible[7].

(b) Assess compatibility with other work activities in the location(s) and identify any potentially negative or antagonistic interactions, considering both planned operations and off-normal conditions that could reasonably be expected to occur and could impact the workspace or neighboring workspaces, as applicable.

(c) If the location assessment identifies additional hazards, appropriate controls shall be identified to eliminate or mitigate the hazard; see Section 6.d(3)(c).

(d) When activity-specific alarms must be tied into building or facility alarm systems, relevant groups shall be consulted (*e.g.*, OSHE – Fire and Facilities Safety Group, ESO – Police Services Group and Fire Protection Group, OFPM – Facilities Maintenance Division).

NOTE: For work that will occur in multiple different locations (*e.g.*, installing a new electrical outlet), work may be approved without prior evaluation of every specific location where the work will be performed, but a site-specific hazard analysis shall be conducted prior to performing the work. Any site-specific

[7] Identified inadequacies may result in modification of workspace (*e.g.*, installation of eyewash, or fire extinguisher), or change in the location to perform the work. Final Hazard Reviews reflect changes implemented.

additional hazards that require controls shall be documented as an addendum to the hazard review for the activity.

(3) Emergency Response Plan. An emergency response plan(s) shall be developed and documented when foreseeable emergency scenario(s) cannot be adequately managed by employing the local campus NIST Occupant Emergency Plan, or host provided plan.

(a) Where required, an emergency response plan shall include:

i. Activity- or equipment-specific emergency response or shut-down protocols required to ensure safe operations or to place equipment in safe configuration in the event of a power failure, building evacuation, or other foreseeable off-normal condition;

ii. Activity-specific equipment and supplies required for incident response, *e.g.*, communications (*e.g.,* phones[8], alarms), eye washes, safety showers, fall rescue and descent equipment, emergency shut-off switches, panic buttons, specialty spill containment equipment, special-purpose vacuum cleaner; and

iii. Any additional requirements to assist out-of-hours workers.

(b) An emergency response plan for fieldwork must take into consideration availability of amenities, utilities, and emergency response capabilities.

(4) Identification of Hazards. For each activity specified in the work planning stage, all sources of hazards associated with the specific tasks and steps shall be identified and documented.

(a) Results of any exposure assessments or calculations performed to characterize or quantify identified hazards shall be included in the documentation[9]; and

(b) Hazard identification for fieldwork shall include assessments of environmental conditions and physical and environmental hazards[10].

(5) Identification of Controls. Control(s) specific to each hazard shall be selected based on efficacy of hazard mitigation and fully described in the hazard review document.

[8] Per 47 U.S.C. § 623(b): Must be in working condition; and able to contact 911.
[9] For example, oxygen deficiency calculations or noise exposure calculations.
[10] Use a Fieldwork Pre-Project Safety Plan (a form to facilitate completion of Hazard Review) or a similar approach to evaluate physical and environmental hazards as well as mitigating measures as appropriate.

(a) The selection of control(s) shall be based on the "hierarchy of controls"; see Appendix C.

(b) Where procedures (*e.g.*, standard operating procedures that specify how to conduct the work, or safe operating procedures that specify required safety precautions), instrument manuals, safety data sheets or other documents are required as administrative controls for specific hazards, these shall be included, or their location referenced in the documentation.

(c) Training controls shall be specified, including applicable NIST-level safety training[11] and OU-activity specific training required to perform work safely.

(d) Where PPE is selected, the type required shall be fully specified (*e.g.*, glove material and thickness; laser glasses with optical density and frequency range; respiratory mask type and cartridge).

(e) The Activity Lead, in consultation with the supervisor of the activity, shall determine when verbal or written pre-work briefings are required as controls for tasks assessed as Relative Hazard Index (RHI) = 3, and when required, shall specify the frequency of briefings as necessary.

(f) Where roles for individuals are listed in the controls (*e.g.*, serving as a "buddy" to help mitigate risk, fire watch, or spotter during a crane lift), the responsibilities and required training for each role shall be included in the documentation.

(g) Specific consideration of appropriate controls (*e.g.*, required oversight, the buddy system, prescribed frequency of check-in with or by supervisors, restrictions on activity duration or hours performed) shall be given to work performed alone, outside of normal business hours (7:00 am to 7:00 pm), including shift work or for any situation where psychosocial hazards may amplify physical hazards.

(h) All identified controls must be implemented properly and maintained as effective to mitigate the associated hazards, *i.e.*, equipment used as controls shall be maintained in good working condition, protected from decline, and used properly (*e.g.*, a laboratory hood must be functioning properly, certified, not blocked with stored items in a manner that would impede airflow, and users must use the hood properly; gloves cannot be ripped or degraded and must be properly donned and doffed).

[11] NIST-level safety training that is not specific to the activity or applies more generally to the position, *e.g.*, as PPE training and hazard communication training apply to chemists, does not need to be specified as a control in the hazard review.

(6) Risk Assessment. For each hazard identified, the risk of exposure to the hazard while conducting the work activity as specified in the hazard review shall be estimated and documented.

(a) Risk shall be assessed assuming all identified controls have been implemented and are effective.

(b) Risk shall be estimated by assigning a relative hazard index value using the matrix shown in Appendix D, based on the combination of:

i. Potential severity associated with exposure to the hazard;

ii. Estimated likelihood of being exposed to that hazard while performing the work as specified in the hazard review;

NOTE: RHI values for any given hazard may be reduced by modifying previously identified controls; or adding new controls.

(c) The overall work activity risk shall be assigned an RHI value equal to the highest RHI value of any given hazard specified in the hazard review.

c. Approving and Concurring Work Activities

(1) Work covered by the requirements of this suborder shall be planned, documented, reviewed, approved, and concurred prior to commencing work covered by the hazard review.

(2) Work shall be approved by the line management[12] of the activity lead based on:

(a) Review of the hazard review documentation; and

(b) For RHI ≥ 2 activities, observation of the activity in the work location, as feasible.

i. For a new, unapproved activity that has no authorized users, conditional approval shall be granted to conduct the work for the purpose of observing the work to assess the adequacy of the hazard review and specified controls.

ii. When it is not feasible to observe work prior to approval, *e.g.*, for field work or when there is only one instance of the work (*e.g.*, commissioning a new

[12] Please see Section 6.f for requirements when staff or space from multiple OUs are involved in the hazard review.

instrument) OUs may grant approvals based on partial observation, a walk-through to assess adequacy of controls, or observation of a "dry run" where feasible.

NOTE: There are two types of observations required as part of the hazard review process for RHI ≥ 2 activities: one to assess the adequacy of the hazard review prior to final approval (see Section 6.c(2)) and the other to assess worker competency prior to authorization to perform work (see this section). Hazard Review adequacy and worker competency may be conducted simultaneously when practical.

(3) Approval by line management shall signify the following requirements.

(a) Hazard review documentation has been thoroughly reviewed for accuracy and completeness to verify compliance with applicable SMS requirements.

(b) The work has been described and scoped appropriately.

(c) The work location:

i. Is suitable to conduct the work;

ii. Is compatible with other work to be performed in the location; and

iii. Includes identified equipment needed to work safely or respond to emergencies (*e.g.*, eye washes for work with corrosives; laboratory hoods, flammable cabinets for work with flammable solvents).

(d) Observable or reasonably anticipated hazards have been identified.

(e) Controls, including specified PPE,[13] are implemented and effective (provide the level of protection anticipated or planned to mitigate the hazards).

(f) Documented procedures reflect actual practice.

(g) RHI values assigned to each hazard are reasonable.

[13] The approved hazard review serves as the Certification of Hazard Assessment required by 29 CFR 1910.132, *Personal Protective Equipment*.

(h) The overall work RHI represents an acceptable level of risk, *i.e.*, the risk is as low as reasonably practical in the context of the work and work location.

(4) For hazard reviews with an overall evaluation of RHI = 1, the first-level supervisor of the activity leader may approve the work.

NOTE: If Activity Lead is a supervisor, their supervisor shall be required to approve the activity, *i.e.*, supervisors may not approve their own hazard reviews.

(5) For hazard reviews with an overall evaluation of RHI ≥ 2:

(a) A Review Team[14] shall be required to concur with the elements in Section 6.b prior to line management approval.

i. The Review Team shall consist of staff with sufficient expertise in hazard identification and specification of controls and sufficient expertise to verify compliance with applicable SMS requirements such as:

(i) Subject matter expert(s) with technical expertise with respect to the work under review, *e.g.*, a NIST staff member or external participant;

(ii) OU or Division, full-time or collateral duty safety staff (*e.g.*, Division Safety Representative or Safety Program Coordinator, or similar), or specified proxy safety subject matter experts; and

(iii) When required as specified in Appendix B, appropriate OSHE staff members.

ii. The Review Team membership shall be documented (in the Hazard Review Documentation) as part of the approval process, with an indication of the task each one engaged in *i.e.*, review of hazard review documentation and/or work observation.

(b) Hazard reviews shall be approved by line managers at a level that is commensurate with risk as estimated by the overall work RHI value.

i. RHI = 2 shall be approved by:

[14] NIST Guidance Document 7101.20 provides additional information regarding the constitution and qualifications of the Review Team and the general conduct of Hazard Reviews.

(i) Official first-level supervisor (*e.g.*, group leader);

(ii) Official second-level supervisor (*e.g.*, division chief), in consultation with their full-time or collateral duty safety personnel or designated alternate safety-subject matter expert; and

(iii) With concurrence of the OSHE Review Team member for activities with one or more hazards for which severity was rated as "Catastrophic" or "Severe", regardless of likelihood, and as required in Appendix B.

ii. RHI = 3 shall be approved by:

(i) Official first-level supervisor (*e.g.*, group leader);

(ii) Official second-level supervisor (*e.g.*, division chief), in consultation with their full-time or collateral duty safety personnel or designated alternate safety-subject matter expert;

(iii) OU Director, in consultation with their OU Safety Coordinator or designated alternate safety-subject matter expert; and

(iv) With concurrence of the OSHE Review Team member.

iii. RHI = 4 shall not be approved and the work shall not be conducted at NIST.

iv. Special considerations:

(i) Work involving minors (*i.e.*, those under age 18) that could result in exposure to a hazard with RHI = 2 shall require approval as if the overall work was RHI = 3.

(ii) Work for which the overall RHI level is determined by one or more hazards that are fully controlled to industry standards (as defined by OSHE) may be approved at one RHI value lower. However, the RHI remains the same value, that is, it is not lowered or decreased.

(6) Concurrence by Upper-Level Management

(a) After approval of the hazard review, upper-level management shall provide their concurrence.

(b) Concurrence shall signify the line manager has determined:

i. Those who developed and reviewed the hazard review have the appropriate knowledge, skills, and abilities to effectively participate in the hazard review process; and

ii. The overall RHI assigned to the work is reasonable for the activities to be performed with the identified controls implemented.

(c) For RHI = 1, all new and revised hazard reviews shall be reviewed and concurred upon by division-level management, in consultation with their full-time or collateral duty safety personnel or designated alternate safety-subject matter expert.

(d) For RHI = 2, all new and revised hazard reviews shall be reviewed and concurred upon by OU-level management, in consultation with their OU Safety Coordinator or designated alternate safety-subject matter expert.

(e) If upper-level management does not concur, the hazard review shall be returned to the lower-level line manager who approved the work with an explanation as to why.

i. The lower-level line manager shall request concurrence again once the feedback has been appropriately addressed.

(f) Concurrence shall be documented on the hazard review.

d. Authorizing Workers[15]

(1) Prior to conducting work covered by a hazard review, each staff member shall be authorized to perform work covered by an approved hazard review by their official first-level supervisor (or higher-level manager) based on the following:

(a) Completion of required training as specified within the hazard review, training on the NIST safety programs that apply to activity, and where necessary, training on activity-specific emergency response procedures;

[15] Please see Section 6.e for requirements when staff or space from multiple OUs are involved in the hazard review.

(b) Confirmation that the staff member has reviewed the hazard review documentation (*e.g.*, procedures or manuals included or referenced, the list of identified hazards and associated controls, safety data sheets, emergency response plans); and

(c) Confidence that the staff member is competent and has level of expertise necessary to perform the work safely and correctly (this may be based on personal knowledge, observation[16], and where applicable, reliable input from others).

(d) Due consideration of adequacy of the specified controls to help ensure safety and well-being of the individual staff member, considering any psychosocial hazards. Where necessary, additional controls, work precautions, or other requirements shall be documented.

(e) For work involving a hazard with an RHI ≥ 2, the staff member shall be observed conducting the work, including implementing the specified controls, by one or more observers who have the knowledge, skills, and abilities to assess technical competency and proficiency in safety-related tasks and use of controls.

i. The observation shall be documented as part of the authorization and shall specify:

(i) Tasks observed;

(ii) Competencies assessed; and

(iii) The individuals who performed the observation.

(f) Staff may be authorized by task or step, if necessary, rather than by the entire activity hazard review. Documentation shall reflect the scope of approval as necessary.

(2) OU's that wish to grant limited scope or conditional authorization for staff-in-training shall clearly define the limits on the scope of work permitted and any conditions required for the authorization (*e.g.*, hands-on training provided, work must be supervised), specify OU requirements and authorization process in their OU procedure(s); see Section 6.h).

[16] This is a one-time observation for approval unless deficiencies are noted during the observation or later. Observation would be required for reapproval, three years later, or more frequently as determined in the Hazard Review

e. Multi-OU Hazard Reviews

(1) A hazard review shall be owned by the *de facto* lead OU[17], typically the OU of the Activity Lead.

(a) The *de facto* OU shall be responsible for:

i. Conducting and documenting the hazard review (per Section 6.b); and

ii. Approving the work activity (per Section 6.c).

(b) Where the OU of the specified activity location in the hazard review differs from the OU of the Activity Lead, the line manager responsible for the work location shall concur with the approval of the work through:

i. Participation on the review team; or

ii. If applicable, by OU-specified approval processes.

(2) Authorizing staff to perform work from outside the *de facto* OU shall require the authorization of:

(a) Their first-level supervisor; and

(b) The approving supervisor of the work from the *de facto* OU.

f. Periodic Review and Revision of Hazard Reviews; Re-Approval and Re-Authorization

(1) Approved hazard reviews shall be reviewed periodically according to the process in Section 6.b, to determine whether any changes or modifications are necessary.

(a) The frequency of re-review:

i. Shall be established by the Activity Lead, in concurrence with OU line management, at the time of approval (re-review);

ii. Based on the potential for changes in work; and

iii. Shall not exceed three years.

[17] If the *de facto* lead OU is not obvious, the involved OUs shall discuss the work and specify a lead OU.

(b) Work may continue while the hazard review is undergoing a re-review.

i. Work must be suspended, or a stop work order shall be instituted immediately (per the requirements of NIST S 7101.03) if the review determines an identified hazard is not adequately controlled.

(2) Upon completion of the re-review, if no changes are needed, the OU shall determine whether refresher training is needed for authorized users.

(3) Hazard Reviews shall be revised:

(a) Immediately when it is recognized that scope of the work has changed (*i.e.*, steps, tasks, materials, equipment, or specified boundary conditions), work practices have changed, new hazards have been identified, or there is evidence that the specified controls are inadequate (or there is any deficiency in the current hazard review); and

(b) Work shall be suspended, or a stop work order shall be instituted (per the requirements of NIST S 7101.03) if an identified hazard is not adequately controlled while the hazard review is undergoing a revision[18].

(c) For minor revisions that do not directly impact the health and safety of the workers, work may continue under the original approved hazard review, with approval of the Official first-level supervisor (*e.g.*, group leader), based on the information therein. However, revisions involving new hazards or any decrease in controls must be reviewed and approved at the appropriate management level prior to working.

(4) Re-approval of revised hazard reviews shall follow the requirements in Section 6.c with the level of review determined by the highest RHI of the tasks, hazards or controls that were changed in the revision; *e.g.*, changes to an RHI = 1 task may be approved at the GL level, regardless of the overall activity RHI.

(5) When hazard reviews are revised, re-authorization of staff shall follow the requirements in Section 6.d, with the supervisor:

(a) Ensuring that workers have been informed of the specific changes to the hazard review;

[18] Administrative, minor revisions that do not impact hazard mitigation may be done at any time without stop work.

(b) Determining whether the specific changes require additional or new training (*e.g.*, training on new hazards identified or conduct of new procedures), or refresher training; and

(c) Determining whether new observations are needed to ensure worker competency.

g. OU-Level Procedures

(1) A documented OU procedure(s) shall be developed, provided to OSHE for review, and final version(s) maintained by each OU to specify:

(a) Any OU-specific roles or responsibilities required to implement this suborder;

(b) OU processes for determining the adequacy of Development Team and Review Team member expertise for any activity with a hazard that is potentially Catastrophic or Severe, regardless of likelihood, and all RHI 3 activities.;

(c) OU requirements for conditional authorization of staff-in-training, including requirements to specify hands-on training, degree of oversight, any additional controls or limitations on the work conducted;

(d) Required training on the OU procedure(s); and

(e) Required review period of OU procedure(s).

NOTE: OUs should not include the requirements of this suborder in their OU procedure except where necessary to provide context for the OU-specific requirements established.

h. Training Requirements

(1) Safety program training on this Suborder shall be completed by:

(a) Staff who participate in the development of or review hazard reviews (Development Team and Review Team, respectively);

(b) Line managers who approve hazard reviews; and

(c) Line managers who authorize staff to perform work under a hazard review.

(2) Training on the conduct of hazard reviews shall be completed by:

(a) Staff who participate in the development or review of hazard reviews (Development Team and Review Team); and

(b) Line managers who approve hazard reviews.

(3) Prior to performing work, as a condition of authorization, staff shall:

(a) Review the hazard review documentation (best practice would include a discussion with the Activity Lead or experienced individual);

(b) Complete the required NIST-level and OU activity-specific training (including but not limited to activity specific: emergency response, energy source, hazardous materials, physical hazards, mitigating measures, *etc*.) associated with the hazard review; and

(c) Participate in verbal or written pre-work briefings when specified in the hazard reviews and described below:

i. The briefing, verbal or written, shall cover, as applicable, the following subjects: work procedures, associated hazards, special precautions, controls including required PPE and other mitigating measures, energy sources, stop work authority, and emergency response procedures.

ii. A staff member working alone who is required to perform pre-work briefings, shall review the written briefing or at a minimum, examine the relevant part(s) of the hazard reviews to ensure the activity to be performed is reviewed, emergency response plans are reviewed, as if a verbal briefing occurred.

iii. Frequency of pre-work briefings shall be specified in the hazard reviews.

iv. As part of the OU procedure(s), the requirement to document and keep records of these briefings shall be specified.

i. Records

(1) Copies of all current hazard review, including work and worker authorizations, shall be maintained in hard copy or electronic form (recommended) by the OU that owns the hazard review.

(2) Copies of hazard reviews, including work and worker authorizations, for work that has ceased shall be maintained in hard copy or electronic form for at least one (1) year by the OU that owns the hazard review.

NOTE: Per the requirements of NIST S 7101.29, OSHE shall maintain copies of hazard reviews that involve exposure monitoring.

(3) NIST-level training required by this suborder shall be documented and recorded in accordance with the requirements of NIST S 7101.23.

(4) NIST-level training and OU activity-specific training required by a specific hazard review shall be documented and recorded in accordance with the requirements of NIST S 7101.23.

7. DEFINITIONS

a. Activity Lead – A staff member who is competent with respect to the activity covered by the hazard review, based on relevant knowledge, skills, and abilities, and who is responsible for either conducting the activity or overseeing the activity with or without formal line management responsibilities. The "Activity Lead" is typically the person in charge of conducting or overseeing the work with or without formal line management responsibilities, *e.g.*, the principal investigator, supervisor, manager, foreman, or shop steward.

b. Abnormal Conditions – State caused by external factors not expected to occur as part of normal work or anticipated as off-normal conditions and that present additional hazards.

c. Activity – A job, experiment, operation, process, or procedure, often comprising subtasks, conducted to achieve a specific outcome. (Also, job or work activity).

d. Buddy System – A buddy system[19] is a means of organizing staff to ensure that every staff member is being monitored or observed by another staff member who can provide rapid assistance in the event of an emergency.

[19] A buddy system is explicitly required, in some situations for: Hazardous Waste Operations and Emergency Response (HAZWOPER), 29 CFR 1910.120; Respiratory Protection, 29 CFR 1910.134 Immediately dangerous to life or health (IDLH); Fire Brigades, 29 CFR 1910.156 (primarily emergency operations involving interior structural firefighting); and Section 5(a)(1) of the Occupational Safety and Health Act of 1970 (General Duty Clause- when required by the hazard assessment, *i.e.*, there is a well-recognized serious hazard).

e. Concurrence

(1) As it relates to an OSHE Review Team Member – As part of the process for hazard review approval, agreement with the overall detailed analysis of the work to be performed, potential hazards, and appropriate control measures to mitigate those hazards.

(2) As it relates to upper-level management – Subsequent to approval of the hazard review, agreement that those who participated in the development or re-review of the hazard review had the appropriate KSAs to do so and given the implemented control measures the RHI is deemed appropriate for the overall work to be performed.

f. Controls – Actions, procedures, alarms, signage, devices, equipment, *etc.*, that can be used to eliminate or mitigate a hazard.

g. Development Team – A group of two or more people, organized by the Activity Lead, who collectively have the technical and safety knowledge, skills, and abilities necessary to conduct the hazard review, specifically to identify hazards, specify controls and assess risk for the specific activity under consideration.

NOTE: Others may participate or contribute as needed. Development Team membership is formally documented in the hazard review.

h. Fieldwork – A work location that is not a single, well-controlled, defined workplace and that may vary. Examples include providing on-location services to other organizations or collecting samples or data or making measurements in the natural environment.

i. Fully Controlled to Industry Standards (Used in Reference to Hazards) – Controlled by a device, apparatus, or system being designed in accordance with applicable regulatory and consensus standards and predicated upon that device, apparatus, or system being used in a prescribed manner. The mitigation of hazards that are fully controlled to industry standards relies primarily on built-in/engineering controls or inherent design features but may, in some cases, rely upon best practices. In either case, the control should be traceable to a broad industry, consensus-based set of controls.

j. Generic Hazard Review – A hazard review that covers a basic, non-complex, common task that is performed routinely and for which hazards are well known, well controlled and for which the relative hazard index is RHI ≤ 2.

k. Hazard – Source, situation, or act with a potential for harm in terms of human injury or ill health, adverse impact on the environment, damage or loss of equipment or property, or a combination of these (from NIST O 7101.00).[20]

l. Hazard Identification – Process of recognizing that a hazard exists and defining its characteristics (from NIST O 7101.00).

m. Hazard Review – Process for planning work consisting of hazard identification, selection of controls (using the hierarchy of controls) specific to the identified hazards and performing a risk assessment; also used to describe the documentation resulting from the process.

n. Hierarchy of Controls – A range of hazard control methods arranged in order of implementation preference from elimination to substitution, engineering controls, administrative controls, and personal protective equipment.

o. Inherent/Built-In Controls – Features of a system's design that prevent or limit the severity of the consequences of system failure. Inherent/built-in controls cannot be defeated or separated from the system without conscious or willful effort.

p. Job Hazard Analysis – a technique that focuses on job tasks to identify hazards before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment to identify and mitigate hazards.

q. Likelihood – A relative and qualitative estimate of the probability of a hazardous event or exposure for a selected unit of time item or work being considered.

r. Line Management – For the purposes of this suborder, the OU Director, Division Chief, and Group Leader, or equivalent.

s. Off-Normal Conditions – States or operational occurrences which may be expected to occur but that are generally outside routine or planned operations, *e.g.*, power failures.

t. Psychosocial Hazard – Source or situation arising from the interrelationship of social factors, including work organization or environment, physical health, and individual behavior that has the potential to cause an adverse effect on the physical, mental, or cognitive condition of

[20] See also *OSHA 3071, Job Hazard Analysis, 2002 (revised)* defines a hazard as "the potential for harm, often associated with a condition or activity that, if left uncontrolled, can result in injury, illness or damage to property or the environment", and *American National Standard for Occupational Safety and Health Management Systems, ANSI/AIHA Z10-2019, that* defines a hazard as "a condition, set of circumstances, or inherent property that can cause injury, illness or death".

a person. Examples include shift work, long hours, unrealistic deadlines for work completion, and include individual stressors that supervisors are trained to address using existing NIST policies, that include, *e.g.*, anti-harassment program, reasonable accommodation program.

u. Relative Hazard Index (RHI) – A measure of the risk of a hazardous event or exposure based on a combination of the severity of the consequences of the hazardous event or exposure to a hazard and its likelihood.

v. Risk – An estimate of the combination of the likelihood of an occurrence of a hazardous event or exposure and the severity of injury or illness that can be caused by the event or exposure (from NIST O 7101.00); also includes facility/property damage and environmental impacts.

w. Risk Assessment – Process of evaluating the risks arising from hazards, considering the adequacy of any existing controls (from NIST O 7101.00).

x. Scope Creep – The gradual and unchecked expansion of a work's scope without adequate planning or review. It may result in significant changes and additional unmitigated risks.

y. Severity – A qualitative estimate of the consequences of the worst credible hazardous event or exposure associated with an identified hazard, *e.g.*, due to design inadequacies; procedural deficiencies; human error; environmental conditions; or system, subsystem, or component failure or malfunction.

z. Supervision – Oversight of the staff member by someone who understands the work, associated hazards, and required controls, and who is physically present in the work location while the work is being conducted or available for consultation within a reasonable amount of time commensurate with level of oversight needed, based on the proficiency of the staff member.

aa. Work – An experiment, operation, process, or job, often comprising activities, conducted to achieve a specific outcome.

bb. Worst Credible Hazardous Event – Most severe or serious event that is realistic, believable, considering the context of work and other relevant considerations.

8. ACRONYMS

a. CFR – Code of Federal Regulations

b. ESO – Emergency Services Office

c. JHA – Job Hazard Analysis

d. OFPM – Office of Facilities and Property Management

e. OSHE – Office of Safety, Health, and Environment

f. OU – Organizational Unit

g. PPE – Personal Protective Equipment

h. RHI – Relative Hazard Index

i. SMS – Safety Management System

9. ROLES AND RESPONSIBILITIES

a. OU Directors are responsible for:

(1) Ensuring written OU procedures are developed, maintained, and implemented to clarify OU roles and responsibilities necessary to execute the requirements of this suborder within their respective OUs;

(2) Approving or disapproving hazard reviews according to requirements in Section 6.c; and

(3) Ensuring regular assessments and observations of active hazard reviews are performed to assess compliance with this suborder and OU procedure(s) associate with this suborder.

b. Line Management is responsible for:

(1) Ensuring hazard reviews are conducted, reviewed, approved, and concurred (as appropriate) for all new work and are re-reviewed regularly thereafter according to requirements in Section 6, including ensuring that work has been observed to ensure planned controls are in place and adequate;

(2) Ensuring inclusion of technical and safety subject-matter experts, obtaining services of external experts as warranted, to conduct hazard identification and recommend controls based on the hierarchy of controls;

(3) Ensuring participation of OSHE Subject Matter Experts for reviews of work as specified in Appendix B;

(4) Ensuring staff who perform the work activity participate in the conduct of hazard reviews, as feasible and appropriate;

(5) Authorizing staff in accordance with the requirements of Section 6.d, ensuring staff are competent, *i.e.*, have the appropriate knowledge, skills, and abilities to perform work safely and have completed required training prior to conduct of work;

(6) Ensuring subordinate line managers are competent, *i.e.*, they have appropriate knowledge, skills, and abilities to authorize staff to perform work and subsequently oversee the work being performed;

(7) Being vigilant for "scope creep" while engaging in actions such as visiting work locations, participating in inspections, discussing work, or conducting management observations, and if scope creep is identified, shall require staff to stop work, revise the hazard review, and ensure re-review and re-approval of the hazard review and re-authorization of staff, according to requirements of this suborder;

(8) Ensuring staff are appropriately supervised when work initially begins and thereafter is sufficient to help ensure safe work practices, including implementing required controls; and

(9) Maintaining records in accordance with the requirements of Section 6.j.

c. Activity Leaders are responsible for:

(1) Managing the hazard review process; and

(2) Ensuring all elements of the process are clearly and completely documented.

d. Development Teams and Review Teams are responsible for:

(1) Completing required training (initial and refresher) provided by OSHE on this suborder which includes training on how to conduct a hazard review;

(2) Collectively as a team, having the requisite technical and safety knowledge, skills, and abilities to review the work being assessed;

(3) Participating in reviews of hazard reviews according to requirements of this suborder;

(4) Informing line management when technical expertise is not available within NIST and helping to ensure adequate expertise is obtained elsewhere; and

(5) Consulting with OSHE as necessary to obtain adequate safety expertise.

e. OSHE Program Managers and Subject Matter Experts are responsible for:

(1) Participating in hazard reviews according to requirements of this suborder, based on areas of expertise;

(2) Working with Activity Leads, Development Teams and Review Teams when required or upon request, to help identify hazards, recommend controls to effectively mitigate hazards based on use of the hierarchy of controls, and assess residual risk; and

(3) Exercising judgement to provide or withhold concurrence on behalf of OSHE as part of the approval process for hazard reviews.

f. Authorized Staff Members are responsible for:

(1) Participating in the development of hazard reviews, as necessary and upon request;

(2) Completing all required training prior to working;

(3) Working within the boundary conditions of the hazard review and in accordance with required controls and training at all times;

(4) When necessary or desirable to work outside the boundaries/conditions of an approved hazard review or to change existing controls, requesting the change by submitting a revised hazard review for line management review in accordance with the requirements of this suborder; and

(5) Stopping work if any of the controls or emergency response equipment is not functioning properly, if scope creep has occurred, or if previously unrecognized hazards are identified.

g. OU and Division Full-time or Collateral Duty Safety Representatives are responsible for:

(1) Participating in the hazard review process according to requirements of this suborder and the OU procedure(s);

(2) Providing recommendations on hazard review documentation, including adequacy of procedures, hazard identification, specified controls, and risk assessments to OU and Division line management; and

(3) Participating in work observations upon request of line management.

h. The Chief Safety Officer is responsible for:

(1) Maintaining this suborder;

(2) Ensuring review of written OU-level procedures for meeting the requirements of this suborder and provide the results of those reviews to the respective OU Directors; and

(3) Ensuring adequate OSHE staffing levels and expertise to support OU implementation of this suborder.

i. The OSHE Program Manager for this Suborder is responsible for:

(1) Evaluating the effectiveness of this program with respect to efficacy of controls, associated safety programs, and implementation of applicable regulatory requirements;

(a) Performing regular audits of active hazard reviews to assess compliance with this suborder and OU procedure(s);

(2) Making determinations that hazards are controlled to recognized industry standards, where applicable;

(3) Developing and maintaining any necessary deployment tools, including forms, instructions, IT applications, training, and user guides;

(4) Serving as the primary point of contact and subject matter expert[21] on applicable:

(a) Federal, State, and local regulatory requirements and guidelines; and

[21] The Hazard Review Program Manager will serve as the Primary Point of Contact. However, they will draw upon and utilize the expertise of others for specific regulations, hazards, and subjects as warranted.

(b) Consensus industry standards and best practices; and

(c) Interpretation of this requirements of this directive.

(5) Ensuring effective communication with affected line management and staff on program-related issues.

10. AUTHORITIES

For authorities applicable to all NIST Occupational Safety and Health suborders, see NIST O 7101.00. There are no authorities specific to this suborder alone.

11. DIRECTIVE OWNER

Chief Safety Officer

12. APPENDICES

Appendix A. Revision History

Appendix B. Work, Hazards, and Controls that Require OSHE Participation on Development and Review Teams

Appendix C. Hierarchy of Controls

Appendix D. Risk Assessment and Relative Hazard Index (RHI) Matrix

1050 **Appendix A. Revision History**

1051

Revision	Document Approval	Effective Date	Description of Change
1	01/23/15	01/23/15	Modifications made to Section 3. Applicability, subsequent to Executive Safety Committee review.
2	11/07/17	11/07/17	Modified Section 6 to make more explicit the need for workers to understand the requirements of hazard reviews and the need to stay within scope or request re-review. Modified Section 9 to reflect the responsibilities necessary to fulfil the modified requirements in Section 6.
3	05/05/2020	05/05/2020	• Modified Section 2.b to include abnormal conditions. • Modified Section 3.b to include applicability of abnormal conditions. • Modified Section 6g(1)(c) to include abnormal conditions
4	12/23/2020	12/23/2020	Updated links under References and Applicable Suborders.
5	01/22/2025	04/01/2026	Extensive modifications including reorganization of the suborder to improve clarity and specificity. New requirements for OSHE, OU, Division safety representatives and worker participation, and requiring activity observation and consideration of psychosocial hazards and controls as part of worker approval.
6	01/xx/2026	02/18/2026	• Modification of Section 6.c to include the upper-level management concurrence step. • Modification of other Sections to support the upper-level management concurrence step. • Additional minor edits to the document that did not affect requirements or roles/responsibilities.

1052

1053

Appendix B. Work, Hazards and Controls that Require OSHE Participation on Development and Review Teams

Hazard reviews shall include safety subject matter experts from OSHE for work involving any of the following:

i. RHI = 3
ii. RHI = 2 with hazard severity of "Catastrophic" or "Severe"
iii. Exposures to substances specified in NIST S 7101.29 (*e.g.*, asbestos, bloodborne pathogens, beryllium, cadmium, lead, mercury)
iv. Particularly hazardous substances listed in NIST 7101.60
v. Biological Safety Level 2
vi. Work at elevations ≥ 4 feet (or ≥ 6 feet for construction) above another level that do not have passive fall protection[22].
vii. Scaffolding
viii. Cranes
ix. Permit required confined spaces
x. Powered industrial trucks, scissor lifts or boom lifts
xi. Aerosolized nanoparticles
xii. Exposure to high voltage (≥ 600 volts)
xiii. Use of unlisted/uncertified or modified electrical equipment[23]
xiv. Required use of respiratory protection
xv. Required use of hearing protection
xvi. Equipment that requires machine guarding
xvii. A requirement for first aid kits beyond Class A.

The hazard review process shall include consultation with the relevant groups in OSHE, ESO, and OFPM (*e.g.*, Fire and Facilities Safety Group, Police Services Group, Fire Protection Group, Facilities Maintenance Division) when activity-specific alarms must be tied into building or facility alarm systems and when impairments are required.

NOTE: OSHE should be consulted when unique, atypical, or unusual work is proposed that may not be consistent with the proposed location or may require specialized facilities or equipment, and the results of the consultation should be noted in the hazard review. For example, OSHE should be consulted when work involves unusual quantities or classes of

[22] Typically, guardrails, parapets, railing, *etc*. Passive systems do not necessitate the use of personal protection equipment or active worker engagement.
[23] 29 CFR 1910.303(a) and 29 CFR 1910.399 include a general mandate that all electrical equipment be accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory or subjected to a complete and thorough evaluation before use. See NIST S 7101.64.

hazardous materials or requires specialized fire and life-safety systems or emergency-response equipment.

Appendix C: Hierarchy of Controls

The hazard control selection process shall employ the following control categories, listed in the order of preference and efficacy, or in the following hierarchy:

a. Elimination. Elimination refers to removing the hazard entirely. This is the preferred control but is not always practical or possible.

b. Substitution. Substitution refers to use of safer, less hazardous methods, tools, equipment, or materials to perform the work[24].

c. Engineering controls. Engineering controls are typically effective by design, and with little or no user interaction. These include automatic shutoffs, interlocks, glove boxes, fume hoods, gas cabinets, blast walls.

d. Administrative controls. Administrative controls require workers to implement processes, obtain specific knowledge, skills, or abilities, or abide by restrictions. These include use of procedures, supervision, the "buddy system", signage, warnings, alarms, restrictions on the conduct of work (*e.g.*, based on time of day, lone worker and out-of-hours provisions, environmental conditions) and training[25] required to conduct the work safely (*e.g.*, training on equipment, use of controls, Safety Data Sheets, hands-on training to perform work).

e. Personal protective equipment (PPE)[26]. Use of PPE is often an essential component of a layered approach but is considered the least effective because PPE requires proper use to be fully effective, providing only barrier between the user and the hazard.

Note that a combination of controls or layered approach is often necessary to achieve adequate hazard mitigation.

[24] Examples include use of scissor lifts in place of ladders, a less toxic solvent in place of a carcinogen like benzene.
[25] Training on NIST suborders that apply more broadly, *e.g.*, Hazard Communication, Chemical Management, Hazard Signage, and that are not activity-specific are required to be completed by affected workers, but do not have to be specified in the hazard review documentation.
[26] The approved hazard review serves as the Certification of Hazard Assessment required by 29 CFR 1910.132, Personal Protective Equipment.

Appendix D: Risk Assessment and Relative Hazard Index (RHI) Matrix

Assessing Potential Severity.

Each hazard shall be assessed for the degree of potential harm resulting from the worst credible hazardous event or exposure that could occur under realistic work conditions or foreseeable off-normal conditions due to design inadequacies, procedural deficiencies, human error, environmental conditions, or system, subsystem, or component failure or malfunction. The severity categories that shall be used are:

i. Catastrophic: Death or permanent (total) disability; system or facility loss; major property damage, lasting environmental or public-health impact.

ii. Severe (or Critical): Serious injury; temporary disability; subsystem loss or significant facility/property damage, temporary environmental or public-health impact.

iii. Moderate (or Marginal): Medical treatment beyond first aid[27]; injury with lost workday; more than slight facility or property damage; external reporting requirements; more than routine clean-up.

iv. Minor: First aid or minor medical treatment; no lost time, negligible or slight facility or property damage; no external (outside NIST) reporting requirements, routine cleanup.

The potential severity assessment should be based on objective information about the hazard and should consider inherent properties of the hazard source, the context of use, *e.g.*, process hazards[28], boundary conditions or controls that limit amounts or concentrations of substances, temperatures, and fail-safe, built-in, engineering controls that limit the potential severity of exposure.

Estimating Likelihood.

The likelihood of the potential harm, per instance of activity, shall be estimated based on knowledge of the hazard, experience, and where available and practical, evaluation of historical safety data from work with similar hazards. This process is subjective and relies on the judgment

[27] First aid refers to medical attention that is usually administered immediately after the injury occurs and at the location where it occurred. It often consists of a one-time, short-term treatment and requires little technology or training to administer. First aid can include cleaning minor cuts, scrapes, or scratches; treating a minor burn; applying bandages and dressings; the use of non-prescription medicine; draining blisters; removing debris from the eyes; massage; and drinking fluids to relieve heat stress.

[28] For example, water is not classified as an explosion hazard based on its material properties, however, at elevated temperatures and pressures, steam explosions are possible. Similarly, working with acids or bases at elevated temperatures can increase the process hazards.

of knowledgeable staff taking into consideration the efficacy and robustness of the specified controls[29].

i. Frequent: Likely to occur repeatedly. Current controls will not prevent this risk. Typically characterized by primary reliance on administrative and PPE controls.

ii. Probable: Likely to occur several times, *i.e.*, multiple times but not frequently. Typically characterized by some reliance on engineering controls and primary reliance on administrative and PPE controls.

iii. Occasional: Likely to occur at some time. Typically characterized by good reliance on engineering controls, high to moderate reliance on human factors for use of engineering controls, and fair degree of reliance on administrative or PPE controls.

iv. Remote: Possible, but not likely to occur. Specified controls are robust. Typically characterized by primary reliance on engineering controls with demonstrated reliability that are not easily defeated or overridden, where administrative and PPE controls may be required to in addition to engineering controls.

NOTE: If engineering controls are not feasible, robust, and demonstrably effective, administrative controls and PPE may reduce the likelihood to remote only with meticulous implementation and routine verification.

v. Improbable: Very unlikely; may reasonably assume exposure will not happen. Strong controls in place. Typically characterized by use of highly reliable engineering controls, where administrative and PPE controls may be required in addition to engineering controls.

NOTE: In general, a likelihood of "Improbable" should not be assigned to a hazard for which mitigation relies solely only administrative controls, PPE, or both, except in rare circumstances, where there is a very low probability of human-factors-related error that could defeat controls, and administrative controls include oversight to ensure implementation of controls.

Assigning RHI Values.

The RHI value for each hazard shall be determined based on the intersection of the assessed potential severity of the hazard and the estimated likelihood, based on the assumption that the specified controls have been implemented. The relative hazard index matrix shown below shall

[29] Assessment of the robustness of controls should take into consideration the frequency and duration of the activity.

be used to provide a relative ranking of risk for each hazard. The overall activity shall be assigned an RHI value equal to the highest RHI hazard of the activity.

Relative Hazard Index (RHI) Matrix

Severity⇒ / Likelihood ⇓	Catastrophic: Death or permanent total disability; system or facility loss; major property damage, lasting environmental or public-health impact	Severe/Critical: Serious injury or temporary disability; subsystem loss or significant facility or property damage, temporary environmental or public-health impact	Moderate/Marginal: Medical treatment beyond first aid; injury with lost workday; more than slight facility or property damage; external reporting requirements; more than routine cleanup.	Minor: First aid or minor medical treatment; no lost time, negligible or slight facility or property damage; no external (outside NIST) reporting requirements, routine cleanup
Frequent: Likely to occur repeatedly	High RHI=4	High RHI=4	Serious RHI=3	Medium RHI=2
Probable: Likely to occur several times	High RHI=4	High RHI=4	Serious RHI=3	Medium RHI=2
Occasional: Likely to occur sometime	High RHI=4	Serious RHI=3	Medium RHI=2	Low RHI=1
Remote: Not likely to occur	Serious RHI=3	Medium RHI=2	Medium RHI=2	Low RHI=1
Improbable: very unlikely (may assume exposure will not happen)	Medium RHI=2	Low RHI=1	Low RHI=1	Low RHI=1

NOTE: The RHI determination represents a best estimate; this risk assessment process is not an exact science, but rather a means of ensuring that due consideration is given to use of effective controls based on risk presented.

References:

- ANSI Z10-2019 Occupational Health and Safety Management Systems; and
- ANSI Z10.100 Guidance and Implementation Manual for ANSI/ASSP Z10.0-2019 Occupational Health and Safety Management Systems.