

NIST Director's Update on Safety Improvement Actions

November 2023

Starting Point

NIST

We recognize that we must fundamentally change our culture and our way of doing business to achieve lasting and meaningful change to improve safety at NIST.

NIST must fully integrate safety into decision-making processes for all aspects of our mission, from planning through mission delivery, over the full life-cycle of programs and projects.

Building Momentum and Leading Change

NIST

instill safety culture from bottom up

reinforce importance of safety in office environment

be example to colleagues

make resources available for excellence in safety

hold ourselves accountable

solicit staff reactions

integrate safety into regularly scheduled discussions

communicating safety expectations

May 2023 Presentation: Concepts and Actions to Improve Safety

flag and elevate safety topics for the organization

check in on staff more frequently

ask questions

integrate safety through lens of equal opportunity

not see safety as a chore

help staff feel empowered to ask questions in safety

champion and live a new safety culture

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Everyone engaged and working toward a common vision of safety excellence

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Expanded Key Action Areas



Leadership Expectations and Accountabilities. *NIST leadership established a vision for safety excellence, and is demonstrating commitment through rigorous accountability, providing resources, and ensuring continuous improvement of the safety management system, processes, and culture.*

OSHE's Role and Authorities. *NIST has strengthened the role of the Chief Safety Officer (CSO), ensuring the CSO has responsibilities within the Enterprise Risk Management Council, formal accountability to the NIST Director, and is strengthening the roles of OSHE safety professionals by requiring safety staff to specify hazard mitigation measures during inspections, investigations, work observations and hazard reviews.*

Safety Management System Improvement. *NIST is developing new and enhancing existing safety processes to proactively manage safety related risks, including a new process for audits and assessments, and to elevate safety-related risks to enterprise level in a timely manner*

Safety Culture. *NIST is committed to making safety an integral part of NIST's culture, by engaging all staff, conducting regular surveys, and developing and implementing action plans to improve the safety climate*

Achieving and Sustaining Safety Excellence. *NIST is committed to ensuring that continuous improvement is informed by use of leading safety performance metrics, external benchmarking, independent audits and assessments, and maintaining and tracking annual improvement goals.*



Leadership Expectations and Accountability

Key Actions: Vision, Communication, Accountability



A NIST Executive Team was convened to establish a vision for safety excellence

NIST Director, Associate Directors and other leaders communicate their value for safety, at regular town hall meetings, local meetings, and in conversations

As NIST Leaders, we hold ourselves accountable by fulfilling our roles as safety leaders, and we hold our staff accountable by setting clear expectations for all staff, evaluating performance and enforcing basic safety rules



Key Action: Communicate Clear Expectations for All Staff



NIST Safety Rules of Behavior: Responsibilities and Requirements

Provided automatically upon on-boarding to all new *employees and associates*, and annually thereafter

Signature acknowledging review required

Covers basic rights and responsibilities

1. You have the right, and are expected, to stop work if it is unsafe to proceed and to promptly report any unsafe condition(s) to your supervisor/sponsor or OSHE.
2. If you observe someone working in an unsafe manner and/or under unsafe conditions, you must promptly request that the individual stop work and/or you must inform a supervisor/sponsor or OSHE.
3. You must report unsafe conditions promptly to a supervisor/sponsor or OSHE or correct the issue yourself if you have the knowledge and skills to do so safely.
4. You must report all safety-related incidents and near misses promptly to a supervisor/sponsor or OSHE and assist in safety investigations upon request.
5. You must complete all assigned safety training in a timely manner and before starting related work.
6. You must inform a supervisor/sponsor or OSHE if you do not have the knowledge, skills, and/or equipment to conduct your work safely (e.g., if you need additional training or equipment to work safely).
7. When directed, you must participate in workplace safety inspections and correct safety-related deficiencies found during inspections.
8. You must participate in management observations of your work by line management.
9. You are expected to help others to work safely by respectfully challenging unsafe actions or behaviors, and by sharing your knowledge, expertise, and lessons learned.

Key Action: Hold Everyone Accountable



Enforcement

Federal Employees. Any failure to adhere to the NIST Safety Rules of Behavior may subject the employee(s) to loss of privileges, prohibition of access to workspaces, and discipline and/or adverse action, up to and including removal, in accordance with applicable statutes, existing DOC policy, OU policies, and provisions of applicable collective bargaining agreements, as appropriate, including the penalties provided in Department Administrative Order (DAO) 202-751, Discipline.

Associates. Any failure to adhere to the NIST Rules of Behavior by associates will result in notifications sent to the host organization management and may result in similar penalties and possible termination of the agreement to work with DOC.

Failure to adhere to the Safety Rules of Behavior is grounds for disciplinary action and may result in loss of access, privileges, up to and including separation from NIST

Key Action: Performance Accountability for Supervisors



Critical Element on Safety for Supervisors/Managers – Required for those who supervise (employees and associates) lab activities and/or hazardous work.

Objective: Provide leadership in promoting a positive safety culture and implement, maintain, and proactively monitor applicable elements of the safety management system.

NIST 01 Required Activity Sections

1. Communications
2. Safety Culture
3. Management Observations
4. Recognize Safe Actions
5. Management of Safety Activities
6. Conduct of Safety Activities
7. Incident Prevention
8. Hazard Reviews

All NIST Senior Executive Service members, managers and supervisors are now required to incorporate safety activities into their annual performance agreements ; supervisors will rate managers on safety performance

Key Actions: Leadership Committing Resources

NIST

INCREASE SAFETY STAFFING (\$3M)

- OSHE staff to support SMS, audits, inspections, investigations
- Instructional Design Specialist to improve training
- Occupational Medicine Physician to enhance services

FACILITIES AND INFRASTRUCTURE (\$10M)

- Infrastructure for safe operations, improved controls, maintenance
- Installation of roof rails on all buildings for worker safety
- Fall hazard assessment for all laboratory and facility spaces

IT TOOLS AND DATA SYSTEMS (\$1M)

- 3 IT FTEs (contractors; revise/integrate Hazard Review System)
- 1 Data Analyst (metrics, dashboard improvements)

EXTERNAL SAFETY CONSULTANTS (\$1.6M)

- Professional External Safety Consulting/Audit Services for FY23-FY25



Processes for Leadership to Assess Resource Needs

- **Enterprise Risk Management**
- **SMS Management Review**
- **Facilities Review and process for Safety, Capacity, Maintenance and Major Repairs (SCMMR)**



OSHE Roles and Authorities

Key Actions: Strengthen OSHE Position and CSO Role



COMPLETED

- NIST 7101 Occupational Safety and Health Order, revised to state that the Chief Safety Officer serves as Special Assistant for Safety to the NIST Director, with formal reporting requirements
- Chief Safety Officer meets weekly with the Director as part of the Director's Cabinet
- Chief Safety Officer designated as a voting member of the Enterprise Risk Management Council
- Chief Safety Officer on Facilities Safety, Capacity, Maintenance, and Major Repairs Board

FY24 PLAN

- Contract experts to assess OSHE's location within NIST, OSHE's structure and staffing levels, KSAs
- Develop and implement transition plan to optimize OSHE's position, staffing levels, and KSAs

1 RECOMMENDATION

“Revise the reporting structure such that the Office of Safety, Health, and Environment (OSHE) and all related environmental, health and safety (EH&S) functions report directly to the NIST Director.

Further, the Chief Safety Officer (CSO) should be a voting member of the Enterprise Risk Management (ERM) Council. Moreover, the NIST Director should make any other organizational changes needed to ensure the success of these specific recommendations.”

Key Actions: Strengthen OSHE Authorities and Involvement



COMPLETED

- Newly revised Hazard Review program requires OSHE staff to participate in hazard reviews, and observe hazardous activities to help ensure consistent and effective mitigation strategies
- OSHE staff participated in hazard reviews as part of the FY23 initiative for re-review of hazardous work

FY24 PLAN

- Hire 3 new OSHE safety professionals to improve the safety staff:customer ratio (DOE best practice)
- Embed 5 new OSHE staff to provide services and improve consistency in hazard mitigation practices (DOE best practice)
- *See also Workplace Inspection and Incident Investigation program changes that include lead roles for OSHE staff*

Recommendations on NIST SMS Policies, Structure and Procedures

“OSHE has no direct authority to direct or approve OU hazard reviews...the OUs may invite OSHE to participate in hazard reviews, but OSHE is not required to participate.”

“OSHE has had very little proactive involvement in observation and assessment of work and processes as actually practiced.”

“NIST policies have historically promoted a siloed approach to safety wherein OUs can have different and independent approaches.”

OSHE EMBEDS FOR OUS

COMPLETED

- 1 FTE embed for NCNR hired in FY23
- 5 position descriptions developed, positions posted

FY24 PLAN

- Embed 5 new OSHE staff to provide services and improve consistency in hazard mitigation
- Contractor will review roles of OSHE staff, OU safety representatives and provide recommendations on roles, responsibilities, authorities and accountabilities to support an integrated and collaborative approach to safety at NIST

Recommendations on NIST SMS Policies, Structure and Procedures

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“OSHE has had very little proactive involvement in observation and assessment of work and processes as actually practiced.”

“NIST policies have historically promoted a siloed approach to safety wherein OUs can have different and independent approaches.”

Key Actions: Strengthen Role of Occupational Medicine



COMPLETED

- New Medical Surveillance directive, drafted with input from NIST Occupational Medicine professionals, documents existing medical surveillance requirements and practices, and specifies positions requiring fitness for duty physicals
- Assistance from NIST Health Unit Physician on re-review of NRC requirements for physicals

FY24 PLAN

- Establish a Boulder Campus Health Unit to improve access to medical services for Boulder staff (contract modification completed, implementation planned for Jan 2024)
- Hire FTE, federal Occupational Medicine physician to supplement existing services, oversee health unit contracts for both campuses, and advise NIST Leadership as needed

Recommendations on Occupational Medicine Program

"...focus on evaluating and identifying hazardous positions requiring medical surveillance ..."

"The occupational and environmental medicine (OEM) physician and medical team of competent and qualified, licensed professionals are underutilized or missing resources in the risk management process."



Safety Management System Improvement

Key Actions: Establish and Implement Audit Program



COMPLETED

- OSHE Program Managers assessed customer implementation of safety programs, reviewed relevant inspection and incident data
- OSHE Program Managers recommended program improvements based on these assessments
- Draft of Audits and Assessment Program

FY24 PLAN

- Contractor will conduct ISO 45001 audit
- Contractor will revise OSHE's draft Audits and Assessments Program as necessary to comply with ISO 45001

NOTE: The new Audits and Assessment program will require both internal and external audits

2 RECOMMENDATION:

“Establish and implement a safety audit system into the Safety Management System (SMS) that proactively identifies hazards and their associated risks, provides quality-assurance-based feedback on performance of corrective actions and activities, and is compatible and consistent with the intention of a high-quality SMS as exemplified by the standards set by ISO 45001 or ANSI Z10.”

See also, R10, R15

Key Actions: Hazard Review Improvement



COMPLETED

- Hazard Review Program revised to include:
 - Observing work as part of approval process
 - OSHE participation in review and observation of higher hazard activities (potentially catastrophic, severe)
 - Likelihood timeframes, based on textbook definitions
 - More clarity on emergency response plans
 - More examples to clarify requirements
 - Stronger focus on hierarchy of controls, focus on engineering controls, avoid inexpensive work-arounds

FY24 PLAN

- Following stakeholder review, deploy revised program
- Revise training to include case studies and examples of risk assessments for common tasks and work processes
- *See also Hazard Review System upgrade*

3 RECOMMENDATION:

“Improve the Hazard Review and Approval System (HR) and Relative Hazard Index (RHI) process, to include quantifiable likelihood definitions based on specified timeframes, validation/verification of user proficiency, and requirements for a reviewing role by OSHE.”

“The HR is a capable tool for hazard identification but needs improvements for quality hazard management.”

Hazard Review and Approval System

Key Actions: Training Improvement

NIST

FY24 PLAN

- Hire instructional design specialist to
 - Assess all on-line training modules to determine when instructor-led should be provided for all or key aspects of module
 - Assess current instructor-led training for improved relevancy
 - Develop case studies based on NIST work processes that demonstrate implementation of safety requirements
- Define refresher training requirements for all safety courses
- Develop and issue refresher courses for NIST General Safety and NIST Leadership Safety
- *See also Contractor provision of case studies for incident investigation and root cause analysis*

Gain the knowledge and skills to stay headed in a

SAFE DIRECTION



4 RECOMMENDATION:

“Develop more relevant safety training and more effective methods of delivery, addressing specific safety concerns of researchers and staff that are generated to provide targeted and actionable information.”

Key Actions: Workplace Inspection Improvement



COMPLETED

- Workplace Inspection Program revised to specify:
 - OSHE staff lead inspections, document findings, and recommend abatement actions
 - OU staff (SMEs) participate (as previously)
 - OSHE staff verify abatement actions
 - Timeframe to abate hazards specified, commensurate with potential risk to staff

FY24 PLAN

- Following stakeholder review of revised program, implement changes pending adequate staffing for OSHE to lead inspections and verify abatement actions

🔍 Workplace Inspection Reporting System (WIRS)

5 RECOMMENDATION:

“Revise the Workplace Inspection Program such that inspection teams include both subject matter experts and OSHE staff, inspection teams have authority to mandate changes, inspections look beyond compliance issues to work practices and research hazards, and inspection findings are corrected and verified in a timely manner.”

Key Actions: Incident Investigation Improvement



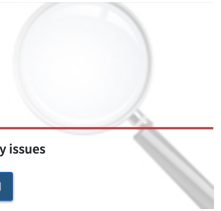
COMPLETED

- New on-line reporting application open to all staff and associates improves ease of reporting safety issues, concerns, suggestions for improvement
- Required fields in IRIS were assessed and found to align with DOC Worker's Compensation requirements (no changes at this time)

FY24 PLAN

- OSHE staff will assist in documenting incident reports and lead investigations for all serious events (OU participation) to help improve timeliness of completion
- OSHE will verify efficacy and closure of corrective actions
- The Incident Reporting and Investigation Program will be revised to reflect a tiered event management process (modeled on DOE best practice), ensuring level of investigation is commensurate with risk, extent of condition and root causes identified as necessary
- Contractors to develop case studies relevant to NIST for training on conducting investigations, determining root causes and developing corrective actions

Incident Reporting and Investigation System (IRIS)



Capturing the information necessary for NIST to successfully address systemic safety issues

REPORT AN INCIDENT

REPORT A NEAR MISS

CREATE AN INVESTIGATION

6 RECOMMENDATION

“Improve the Incident Reporting and Investigation Program to enable effective incident reporting functionality, usage, prioritization, response, and communication.

Improve the Incident Reporting and Investigation Program to enable effective incident investigations with regard to explicit risk-based prioritization of what is investigated, who leads the investigation, and how incidents are investigated; identification of true root causes; formulation of recommendations and actions that clearly address root causes (not just proximate causes); identification of contributing factors to mitigate risks; timeliness of investigations; and follow-through on completion and effectiveness of recommended corrective actions.”

Key Actions: Improve IT Apps, Interoperability



COMPLETED

- Established a panel of stakeholders to provide regular feedback on IT applications
- Evaluated best practices, COTS products (benchmarked with DOE, reviewed two COTS; to continue in FY24)
- Assessed IT applications and prioritized changes to improve integration and interoperability

FY24 PLAN

- Complete the development of a safety dashboard with clear display of safety metrics and easy access to open safety actions (e.g. approvals, deficiencies, training)
- LP and MR will work together to upgrade the Hazard Review database to improve interoperability

MY SAFETY DASHBOARD

OU: Office of Safety, Health and Environment



7 RECOMMENDATION:

“Conduct a comprehensive review and audit of all safety-related information technology (IT) systems, and based upon that review, make the necessary changes/fixes to ensure seamless integration and interoperability of safety information across all safety system IT tools.

In addition, establish an advisory panel of safety stakeholders to periodically review effectiveness of these systems, and empower the panel to make recommendations for continual improvement.”

Key Actions: Enterprise Risk Management Improvements



COMPLETED

- ERM Council Charter revised to specify the Chief Safety Officer is a voting member
- Assessed, reviewed and revised safety-related risks on the current inventory

FY24 PLAN

- Contractors working with OSHE to establish processes for elevating safety risks to enterprise level using standard safety metrics (KPIs) and analysis of events
- Contractors assist in developing Change Management processes to support deployment of program
- Develop/issue directive to document ERM processes for risk assessment, escalation and de-escalation of risk items, and required reports to NIST leadership at key decision points

8 RECOMMENDATION:

“Improve the ERM program, and its current standard of processes and practices, to better address critical research safety matters. For example, enterprise-wide audits/scans of safety issues should be conducted; and the process of adding items to the Risk Inventory, which informs strategic decisions by NIST leadership, should be more timely and efficient.”



Fatality Investigation: Root Cause and Corrective Actions

Key Action: Root Cause Analysis and Corrective Actions



FY24 PLAN

- External safety experts contracted to review the incident investigation report, conduct interviews, identify systems-level root causes and recommend corrective actions
- These experts will develop a case study, based on this incident, that will include a strong focus on the lessons learned and the fundamental changes that are necessary to create the organizational systems needed to prevent serious incidents

16 RECOMMENDATION

“NIST needs to further develop the proximate causes they have already identified and go back into the causal chain to arrive at organizational and systemic-level root causes and contributing factors.”

17 RECOMMENDATION

“Upon reaching the root causes mentioned in Recommendation 16, NIST should derive corrective actions that address those deeper elements of the causal chain, focusing on systemic mitigations for actions taken at the organizational level.”



Safety Culture

Key Actions: Accountability for Employees and Associates



COMPLETED

- Safety Rules of Behavior issued annually for all employees and associates covering basic rights and responsibilities
- Performance Plan Critical Element required for all managers and supervisors specifies safety actions
- (Confirmed that) Safety Programs specify that requirements apply to Associates, and that agreements specify Associates shall follow NIST safety requirements
- Personal Protective Equipment program revised to specify that NIST may provide generic PPE, that contracts shall specify provisions for any required, individual-specific PPE.

FY24 PLAN

- Develop and issue language for contracts and grants specifying that NIST may provide funding to the employer who must provide any required individual-specific PPE

9 RECOMMENDATION:

“Make appropriate administrative, policy, and organizational changes to establish and promote an enterprise-wide sense of responsibility and ownership for safety, by 1) increasing the role of OSHE in Organizational Unit (OU) safety operations, 2) holding all employees accountable for their safety roles, awareness, and performance, and 3) eliminating differences between federal employees and associates regarding their safety roles and responsibilities.”

Key Actions: Inculcate Elements of a Robust Safety Culture



COMPLETED

- NIST Director listening sessions
- All Staff Town Hall on the importance of Safety Culture and NIST's new safety culture attributes
- NIST-sponsored NASEM Workshop on Effect of Hybrid Work Environment on Lab Safety informed NIST's New Hybrid Work Guidance with focus on safety
- Workshop on Safety Leadership and SIF Prevention (recommended consultants)
- All Staff Safety Town Hall on Accountability, Safety Rules of Behavior and Safety Culture Action Plan

FY24 PLAN

- Training for supervisors on safety leadership, safety conversations and observing work (recommended consultants)
- Strategic communication plan to inform staff of actions taken and actions needed



10 RECOMMENDATION:

“Take visible and proactive measures to inculcate essential elements of a robust safety culture, with NIST leadership promoting an engaged and informed learning culture involving all NIST personnel.”

Key Actions: Safety Culture Improvement Plan

NIST

COMPLETED

- NIST Safety Culture Program requires surveys, action plans, rewards, engagement activities (issued FY23)
- 3rd party safety culture/climate survey completed
- 3rd party facilitated multi-OU, multi-level, Action Plan Teams who developed SMART goals and actions to address low-scoring items from the survey (9 action items)
- Action Plan Team Leads presented Safety Culture Improvement Action Ideas at All Staff Town Hall; NIST executives accepted responsibility for actions

FY24 PLAN

- Action Plan teams are presenting detailed goals to executives
- Action Plan progress will be posted on safety webpage
- Leverage Safety Advisory Committee for communication of lessons identified from incidents, targeted to OUs



11 RECOMMENDATION:

“Analyze results from the 2023 National Safety Council’s “Safety Culture Survey,” along with previous safety culture surveys, to develop a robust safety culture improvement plan.”



Achieving and Sustaining Safety Excellence

Key Actions: External Reviews of Improvement Plans



COMPLETED

- Safety Commission briefed in May on initial actions taken and planned in response to interim recommendations
- NIST's oversight committee, the VCAT, was informed of the Safety Commission's work and report and briefed on the status of corrective and improvement actions at every meeting
- Safety Commission briefed in November on key actions taken and planned

FY24 PLAN

- Contracted external safety experts to review progress on SMS corrective and improvement actions in FY24 and FY25 in response to the Safety Commission report
Note: Future routine audits/assessments will include review of the status of corrective and preventive actions
- VCAT briefings will continue to include status reports

13 RECOMMENDATION

“Meet with the NIST Safety Commission approximately 90 days after delivery of the final NIST Safety Commission report to allow discussions ensuring that the plans, actions, and associated schedules for NIST’s implementation are consistent with the Commission’s intent as set by these recommendations. This timeframe is before the termination of the Commission on Nov. 30, 2023, as set forth by the Charter.”

14 RECOMMENDATION

“NIST should obtain outside advice/expertise/oversight from external experts on its SMS and plans, actions, and associated schedules for implementation, as those are generated in response to the recommendations in the final NIST Safety Commission report.”

Key Actions: Benchmarking with other Agencies



COMPLETED

- Defined safety management systems topics for benchmarking
- NIST leaders benchmarked with three DOE labs (NREL, ANL, ORNL) and noted best practices
- Safety Program Managers required to benchmark their programs with other agencies or organizations

FY24 PLAN

- NIST plans to adopt three DOE best practices: better safety staff to customer ratio; embedding safety staff in labs; risk ranking events and incidents
- Plans to benchmark with NIH, PNNL, and one site that has achieved OSHA Voluntary Protection Program site

15 RECOMMENDATION:

“FINDING: NIST has not benchmarked its SMS or safety leadership actions to other federal agencies working with high hazards, such as NASA or the U.S. Department of Energy.”

“FINDING: NIST has not effectively partnered with other federal agencies that use similar hazardous equipment, materials, and processes to establish and share successful practices for safe research.”

Key Action: Establish Vision for Safety



COMPLETED

- NIST North Star Team Vision Statement

“Safety is essential to excellence and integral to everything we do.”

FY24 PLAN

- Revise OSH Policy to include vision
- Communicate vision to staff
- Align strategy and actions with vision

15 RECOMMENDATION

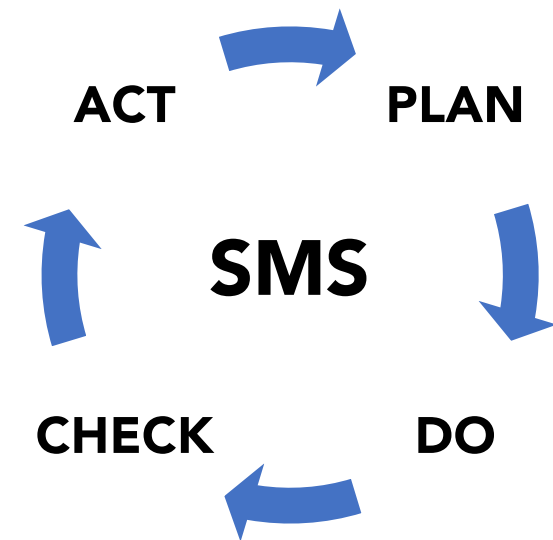
“Design and implement changes to the SMS, with a long-term vision to be a world-class model for research safety, in keeping with NIST’s role as the world leader in metrics and standards.”

Lead with a **VISION** for Safety Excellence

Roadmap to Achieve Excellence

Robust Continuous Improvement

External Benchmarking and Audits



Everyone engaged and working toward a common vision of safety excellence



**NIST Greatly Appreciates Your Service
on this Federal Advisory Committee**

**Thank you for your expertise, time
and dedication to this review**