VCAT October 2023 Safety Briefing

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NIST | OFFICE OF **SAFETY, HEALTH & ENVIRONMENT**

Agenda

➢ Listen and Learn

➢ Vision for Safety   NIST Director, Dr. Laurie Locascio

➢ Focus on Culture

➢ Action Plans

➢ Safety Metrics   Chief Safety Officer, Dr. Liz Mackey

FY23: Learn from the Experts and DOE Peers

NIST Safety Commission Report

AUGUST 2023

Argonne NATIONAL LABORATORY

NREL NATIONAL RENEWABLE ENERGY LABORATORY

NATIONAL ACADEMIES — Sciences, Engineering, Medicine

Workplace Safety in Hybrid Federal Laboratories: A Workshop

SHARE

SEVEN INSIGHTS INTO SAFETY LEADERSHIP

1 Safety performance leads business performance

2 Safety leadership starts with attention to serious injuries and fatalities

3 Leadership sets safety improvement in motion

4 Culture sustains performance – for better or for worse

5 Safe decision making is built on the understanding of core safety concepts

6 Understanding the role of behavior in safety performance improvement

7 Cognitive bias affects safety decisions

LEARN MORE

Fundamental Changes in Safety at NIST

Audits & Assessments

Inspections

Investigate Incidents

Hazard Review

Education & Training

Safety Culture

New Vision: Safety Excellence

Structural Changes:
- Safety Management System
- Roles and Responsibilities
- Enterprise Level Integration

Foundational Change: Safety Culture

Renewed Focus on Culture

NIST

Change our Culture: Integrate safety into how we think and what we do

Develop a culture that values safety excellence on a par with excellence in our work – our science, standards, and services

Everyone accepts personal responsibility for safety. We hold each other accountable, and our actions and decisions reflect our values.
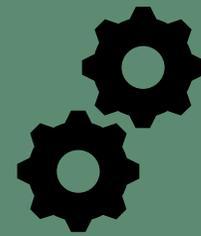
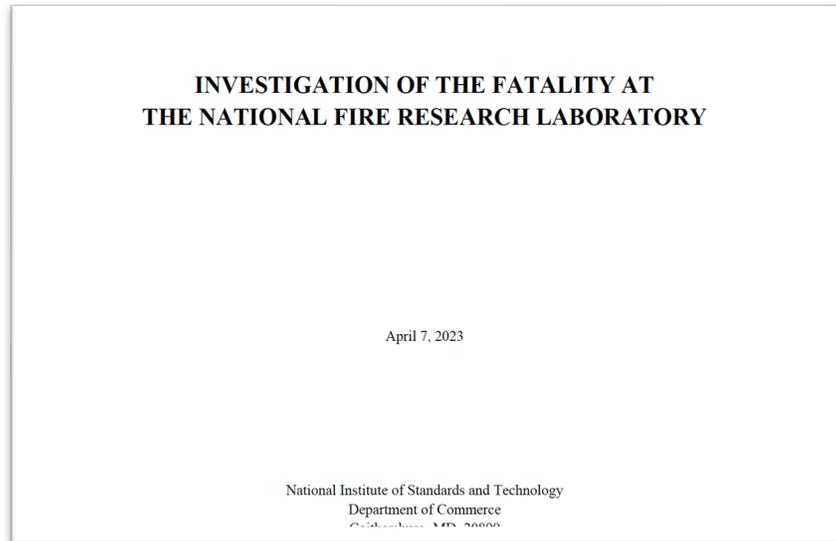Personal Responsibility

Accountability

Actions

Corrective and Improvement Actions

Incident Investigation: 41 Corrective Actions

Safety Commission: 17 Recommendations

Benchmarking with DOE Labs: 3 Improvement Actions

Safety Culture Improvement Plan: 9 Improvement Actions

INVESTIGATION OF THE FATALITY AT
THE NATIONAL FIRE RESEARCH LABORATORY

April 7, 2023

National Institute of Standards and Technology
Department of Commerce
Gaithersburg, MD 20899

NIST Safety Commission Report

AUGUST 2023

nsc SURVEYS

FY23: Respond and Investigate

NIST Director Response Initiatives

- ➢ All staff safety stand-down day
- ➢ Stop work for the project
- ➢ Listening sessions with staff
- ➢ FY23 initiative re-assess and observe hazardous work, include safety SME

Internal Investigation

- ➢ Determine what happened
- ➢ Why it happened
- ➢ How we can prevent incidents due to similar causes

INVESTIGATION OF THE FATALITY AT THE NATIONAL FIRE RESEARCH LABORATORY

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Incident Investigation Action Plan

NIST

**Investigation Team Corrective Action Areas
(26 Actions: workgroup, OU, NIST SMS level)**

• Strengthen requirements for and improve implementation of the NIST Hazard Review Program

• Improve line management oversight of hazardous work, and accountability with respect to safety

• Address gaps in NIST's safety management system in the areas of:
  – Overhead cranes and rigging; and
  – Audits and assessments (Contracted)

65% complete

**Additional ESC Subcommittee Corrective Action Areas
(15 Actions: NIST level deeper root causes)**

• Strengthen and add to hazard review program requirements (Revised version under review)

• Additional Safety Management System Gaps
  - Construction Safety (Contracted)
  - Corrective and Preventive Action Program (Draft)

• Safety Program Implementation Insufficiencies
  - Fall hazard mitigation (Contracted assessment)
  - Require refresher safety training (Assessing courses)

• Safety Culture Insufficiencies (50% completed)
  ✓ NIST Director communicates safety expectations
  ✓ Specify supervisor performance requirements
  ✓ Review all safety-related R2As, OSHE staff R2A2s
  - Improve communication of lessons learned from incident investigations (partially completed)

Strengthen OSHE Structure, Roles and Responsibilities

Role of Chief Safety Officer:
- ✓ Accountability to NIST Director (CSO named Special Assistant for Safety to NIST Director)
- ✓ Voting Member of Enterprise Risk Management Council (Charter Revision)

Roles and Responsibilities of OSHE staff:
- ❑ Lead role in workplace inspection, verification of corrective action (program revision)
- ❑ Participate in hazard reviews and incident investigations (program revisions)

Structure of OSHE:
- ❑ Contractor to assess OSHE position within NIST (FY24)
- ❑ Contractor to assess OSHE expertise, staffing, organizational structure (FY24)

Staffing Levels: Ratio of Staff/Safety staff at two DOE labs is 40; at NIST, 160
- ✓ Approval for 12 new staff (includes 6 embedded safety staff)

Service Delivery Model: DOE best practice, embedded safety staff
- ✓ One embed positioned at NCNR; 5 more planned for FY24

Fundamental Improvements to Basic Safety Practices

NIST

Hazard Review:
- ✓ Risk assessment matrix revised to include probability <u>timeframe</u>
- ✓ <u>OSHE staff participate</u> in risk assessments to improve consistency
- ✓ Require <u>observation</u> of work for approval

Workplace Inspections:
- ❑ <u>OSHE staff lead inspections and verify deficiency abatement</u>
- ❑ Improve <u>risk-based prioritization of deficiencies</u>
- ❑ Improve and enforce <u>timeframe for abatement</u>

Incident Investigations:
- ✓ Improve <u>ease of reporting</u>
- ✓ Improve <u>sharing of lessons learned</u>
- ❑ Improve <u>root cause analysis</u>

Training:
- ❑ Require <u>refresher</u> training
- ❑ Improve <u>relevancy</u> of safety training with case studies

Management Observation Process:
- ❑ Training for managers on how to <u>conduct meaningful conversations about and observations of hazardous work</u> (consultants, Nov; Jan/Feb)

SMS Continuous Improvement

Change Management Process
- ❑ Program drafted in 2022, implementation planned for FY24
- ✓ Human Resource components developed (safety exit from duty checklist; safety hiring questions for new managers)

External Audits and Assessments:
- ❑ External audit to ISO 45001 standard (Contracted, FY24)
- ❑ External audit will be a requirement of new Audits and Assessment Program (FY24)

Benchmarking:
- - Routine benchmarking of SMS (not just individual safety programs)

Improved Tools:
- - Build safety metrics dashboard (partially completed)
- ✓ Establish Review Panel: Review COTS products and assess in-house soft-ware, make improvements as needed

Resource Commitments

Facilities Improvements ($9M)
- Fall hazard assessment for all buildings on both campuses
- Roof rail installation for all buildings where rooftop work occurs

Safety Staffing ($2.5M)
- Approval for 12 new safety staff

Safety Consultant Services ($1M)
- Assess OSHE staffing and recommend changes as needed
- Perform ISO 45001 Audit
- Work with OSHE to complete safety program development
- Evaluate improvement action plan and timeline

Sustained Safety Culture Focus

Leadership in Engaged and Sets <u>Clear Expectations</u>
- ✓ NIST Director held listening sessions focused on staff concerns
- ✓ NIST Director communicated expectations for Safety at NIST Town Hall
- ✓ Workshop on Safety Leadership, Incident Prevention for NIST Leadership Board
- ✓ Safety Culture goals discussed at all staff Town Halls
- ❑ Strategic Communication Plan for FY24

<u>Accountability</u>
- ✓ NIST performance agreements include safety element and required activities for supervisors, rolled out in FY24
- ✓ Annual Safety Rules of Behavior for all employees and associates clearly list basic rights and responsibilities, will be pushed out next week

<u>Safety Culture Program</u>
- ✓ Formal requirement for safety culture assessments, goals, action plan with employee engagement, recognition programs
- ❑ Update NIST General safety and Leadership Safety training modules

Safety Culture Improvement: Survey
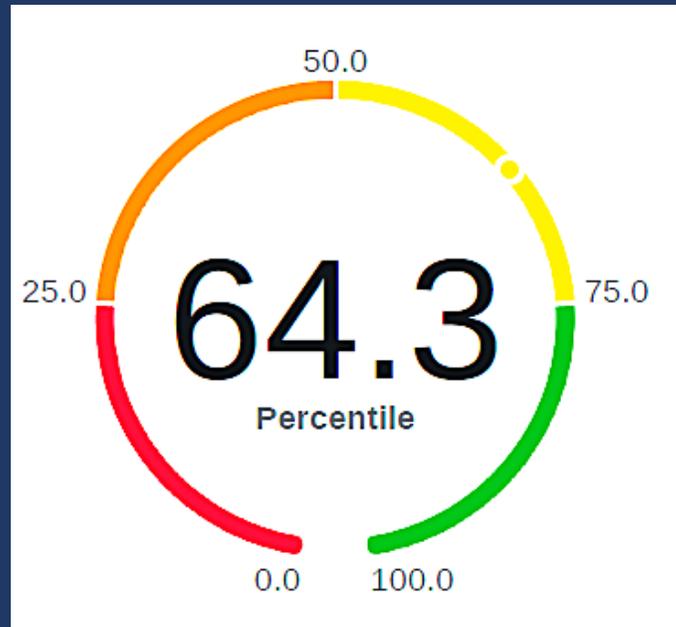
- ✓ Conduct survey National Safety Council's Safety Barometer
- ✓ Share the results, responses, how we compare to others with NIST staff
- ✓ Multi-OU, multi-level teams, from each campus studied survey results and developed action plan to address low scoring items
- ❑ Representatives from each team will present action ideas to NIST executives at a Safety Town Hall (tomorrow)

Safety Culture Survey: NSC Safety Barometer

Percentile Scores of Performance Categories by Benchmark Group ⓘ ▽

Category	Industry-Specific	All Industries
Management Commitment	60.5	58.1
Supervisor Engagement	90.9	86.8
Employee Involvement	68.9	51.6
Safety Support Activities	56.0	53.3
Safety Support Climate	56.1	58.4
Organizational Climate	72.2	72.6
OVERALL	69.5	64.3

■ Industry-Specific   ■ All Industries
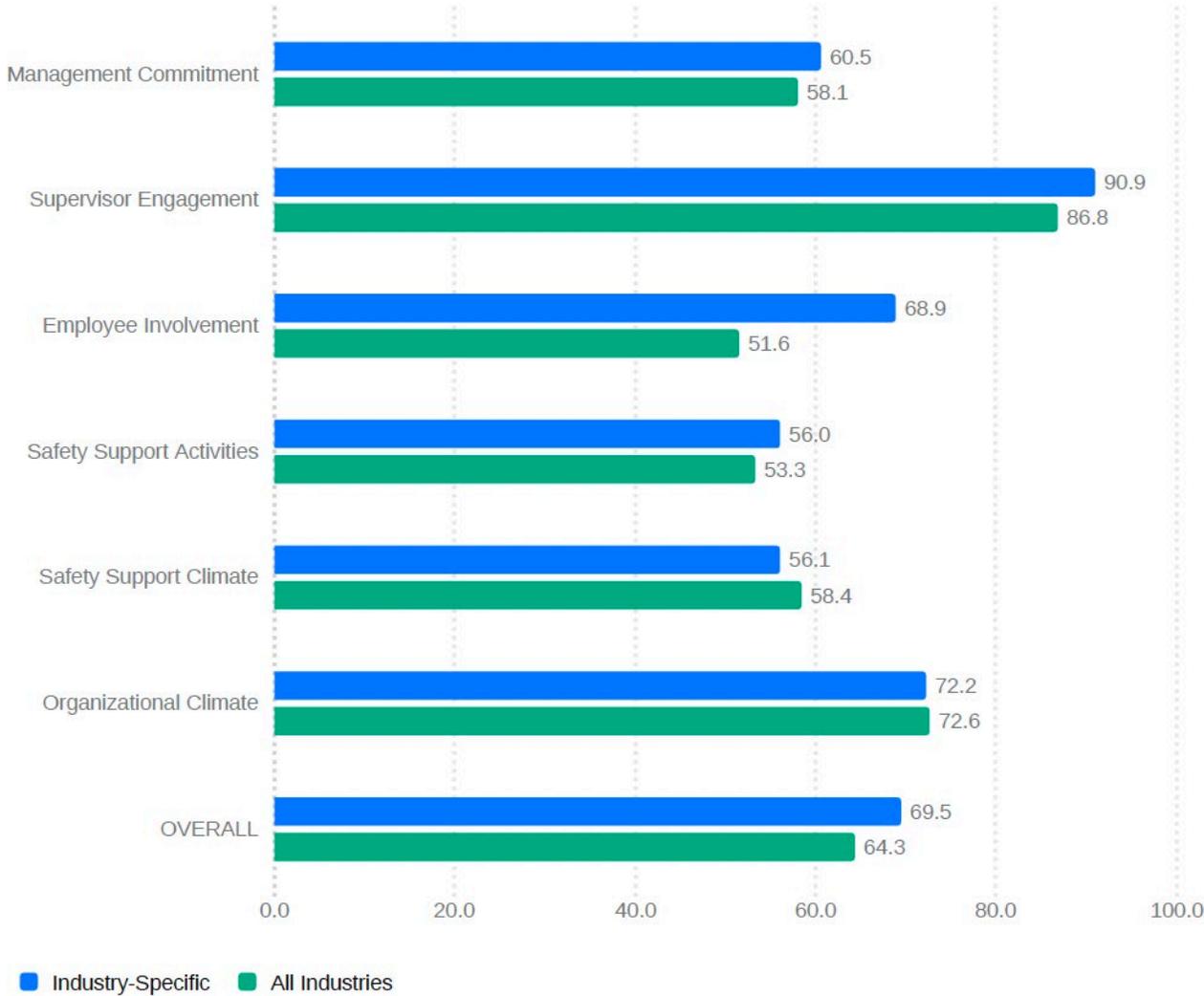
2078 Federal Employees; about 66%
178 Non-Federal Staff; <10%

NIST scored in top 30% of 156 similar organizations; top 36% of 1,530 companies in the NSC database

Safety Culture Action Plan– Cross OU, Multi-level Teams

Survey Question	Score	Improvement Idea
The same basic precautions are used by employees who deal with hazardous materials	**5.9%**	Introduce an annual training requirement of NIST staff.
Medical resources are sufficient for treating the injuries that occur.	**12% (Boulder)**	Establish equitable and unencumbered access to the Boulder Health Unit to meet NIST's, NOAA's, and NTIA's needs
Management has published a written policy that expresses their attitude about safety	**36%**	Create an accurate, succinct, emphatic statement to express the value of safety at NIST. Update NIST policy to back it up.
Management has provided adequate staff to manage and support its safety program	**36%**	Conduct an assessment to determine what constitutes adequate safety staffing levels in OSHE and the OUs, making additional safety hires based on the results.
Job performance standards for production/work output are higher than safety performance standards	**36%**	Raise awareness of opportunities for NIST scientists (students through directors) to engage with OSHE on effective hazard review SOP development, approval.
		Develop safety objectives in all performance plans that are measurable and specific to each role.
The work of committees like the ESC, SAC, and OU Safety Councils improve safety conditions	**25%**	Create, execute an enhanced strategic comms plan, building upon the results of an analysis of current communications plans for the ESC and SAC
Safety office has high status at NIST; safety reps (e.g., SPC, DSR) have high status at NIST	53% NIST **25% Boulder**	Require demonstration of safety leadership as a prerequisite for promotion to leadership positions.
The hazard review or JHA (job hazard analysis) process reduces risk associated with my work	7% negative; 53% agree; 40% neutral	Optimize hazard review process across NIST Labs for usability, safety benefit, and time invested.

Incident Data

FY23 Incidents: 166 Reports

NIST

Type	Number of Cases	# of Affected Staff	OSHA Recordable Cases
Injury	45	46	13
Illness	33	41	25
Near Miss	49	0	
Property Damage	12		
Contamination by Radioactivity	6	8	0
Spill/Release	10		
Exposure	5	4	0
Other	6	0	0
Total Cases FYTD	**166**		38

Notes
1. Of 38 OSHA Recordable Cases, 27 were DART (Days Away, Restricted or Transferred), 7 non-COVID, 20 COVID
2. COVID: 31 of 33 Illness Cases were Covid-19; 23 of which were recordable
3. Of 25 recordable illnesses, there were 23 were COVID cases; one hearing loss case; one altitude sickness case

10-y Trend in Total Reports
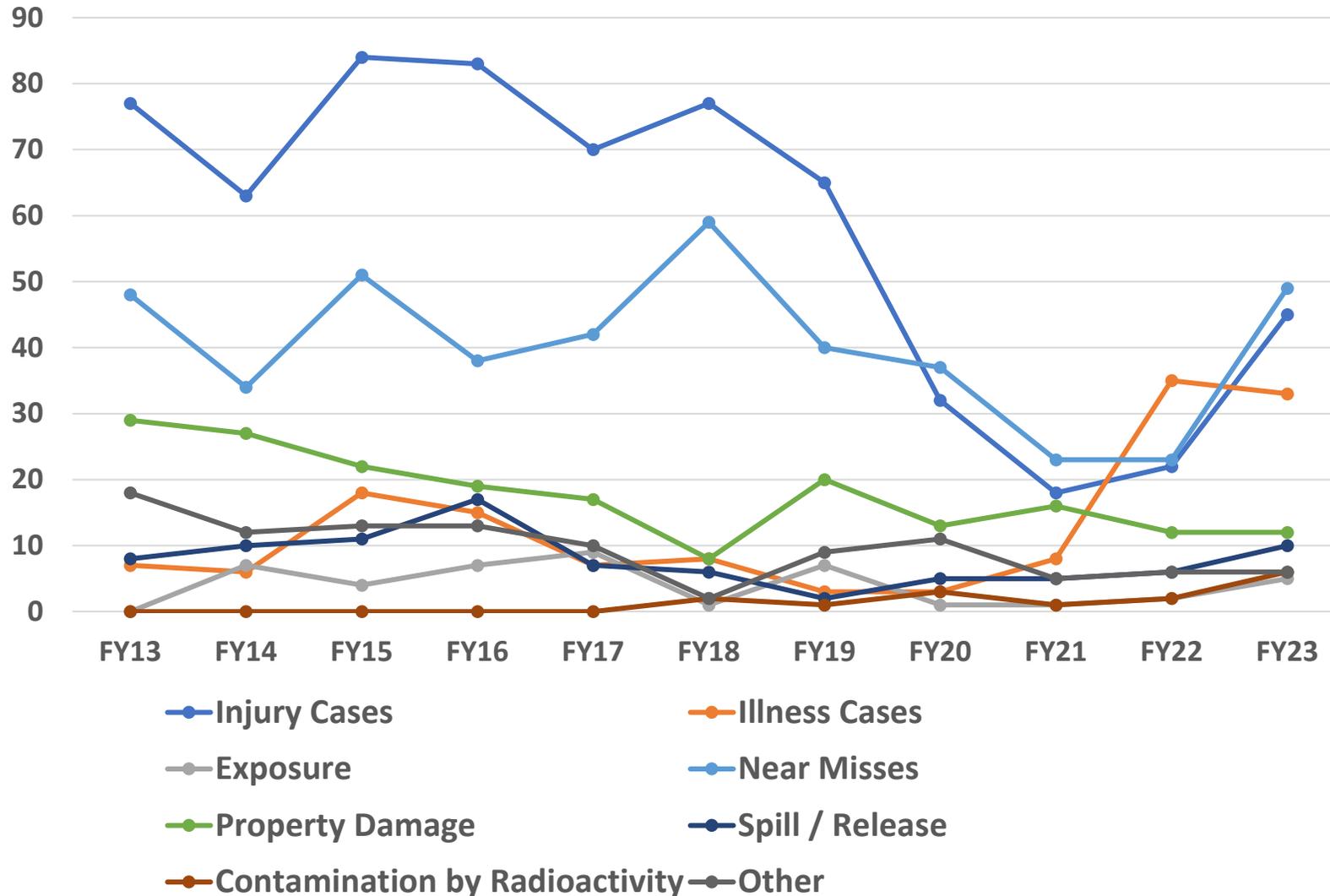
NIST

IRIS Cases FY13 - FY23
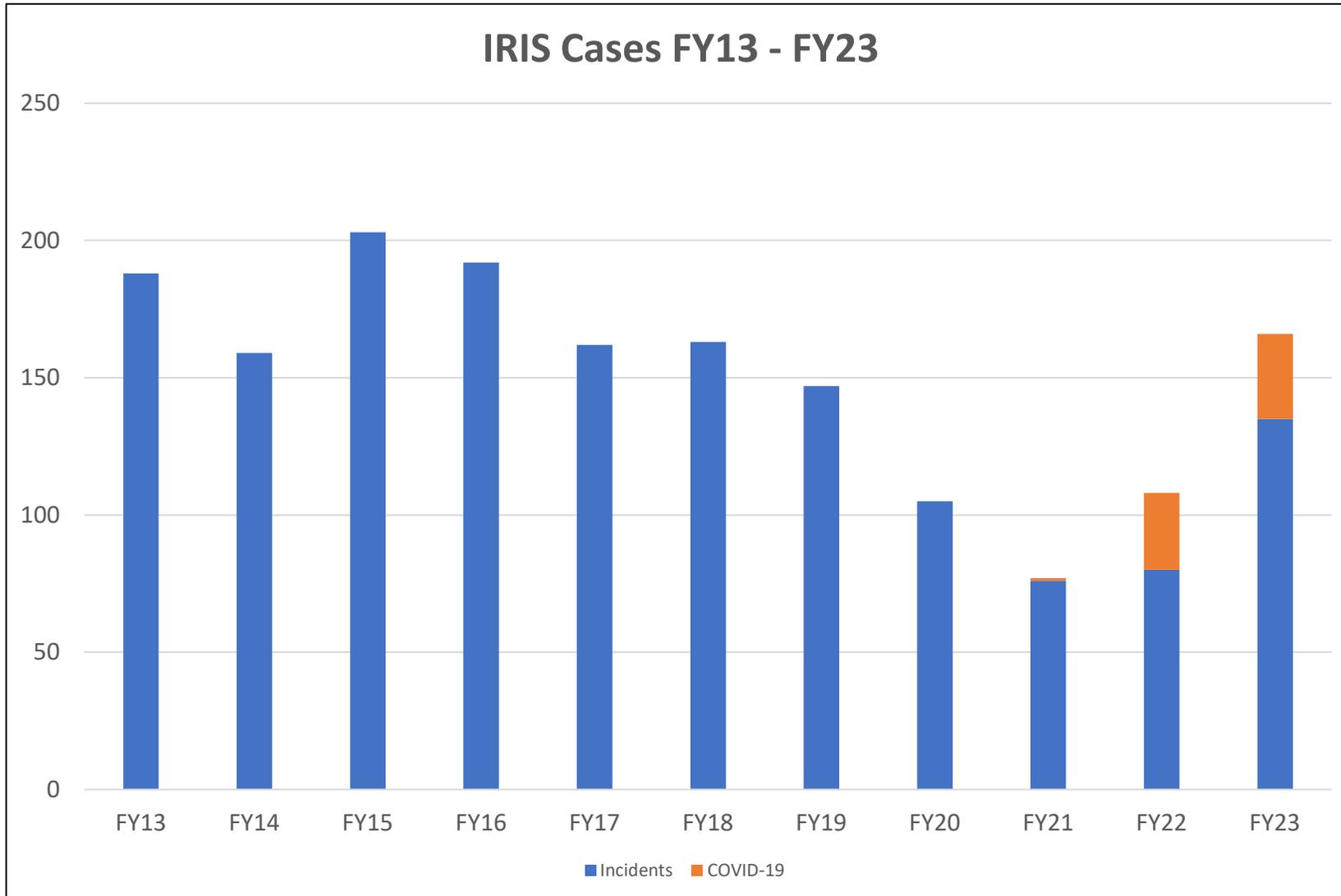
Total number of events reported has almost returned to pre-COVID numbers reported, but still lower

FY19, n=150 cases
FY23, n=135 (non-COVID) cases
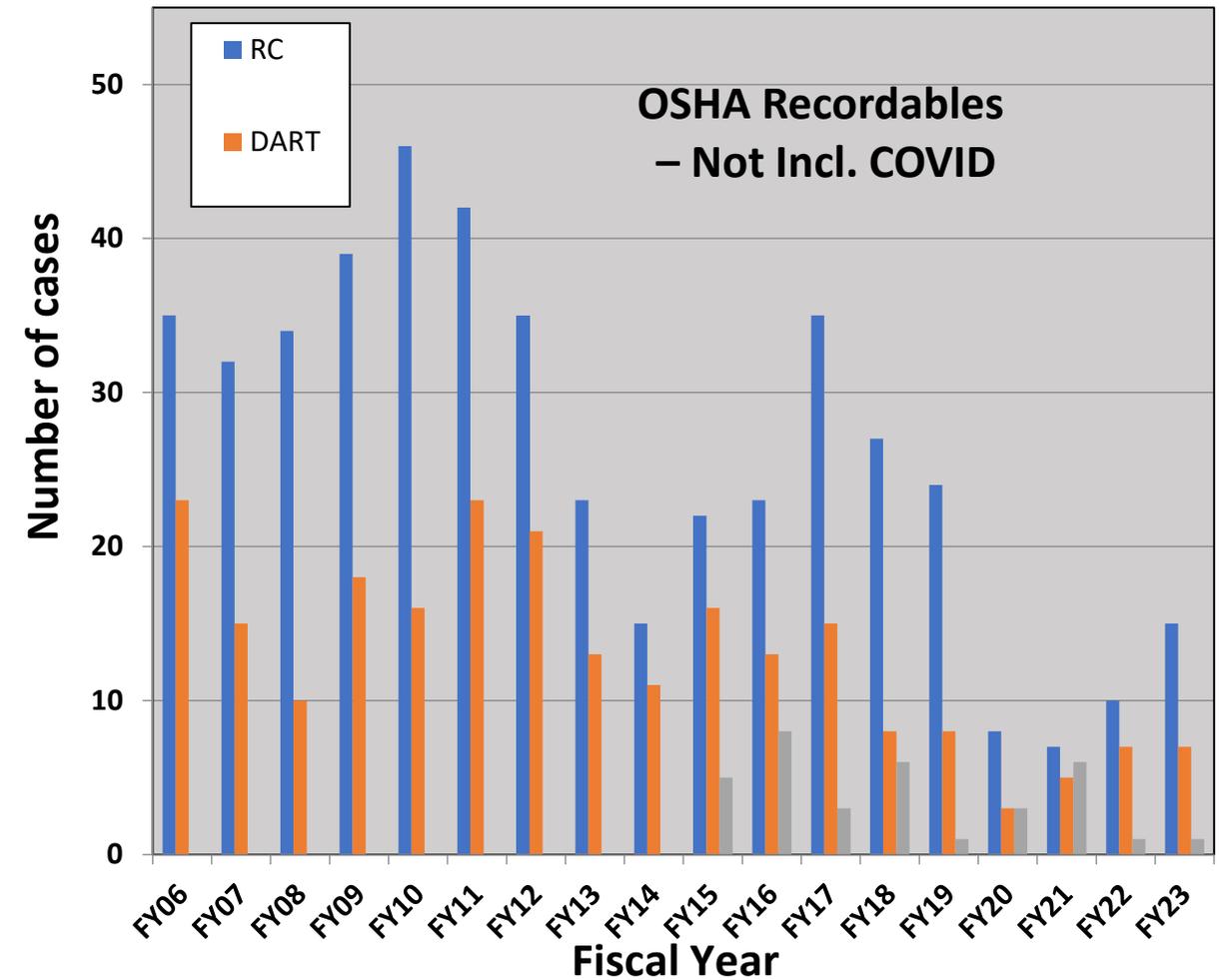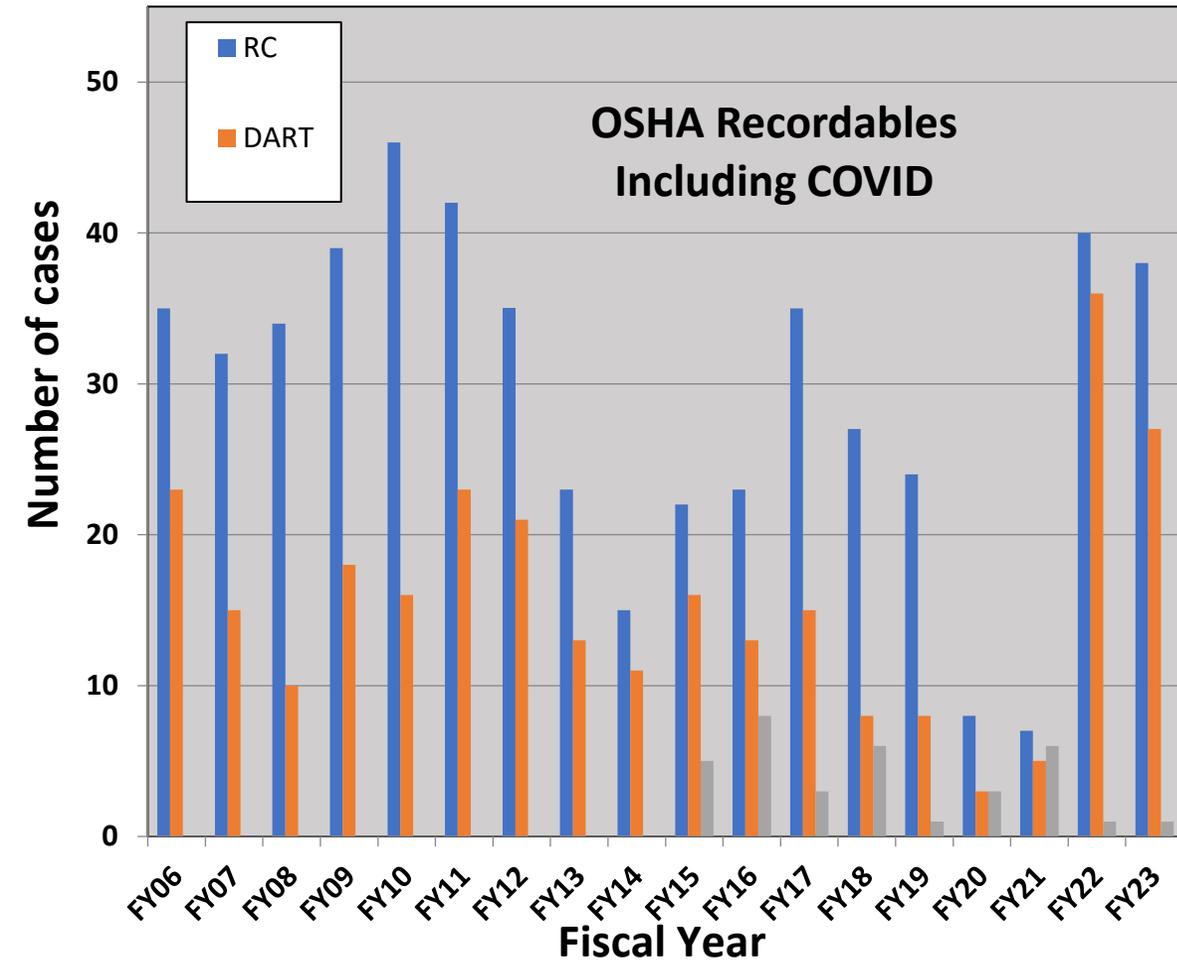
Trends by Incident Type

Incident Type Trends, FY13-23

Near Miss reports (n=49) similar to pre-COVID levels

Injuries (n=45) are still well below pre-covid levels (typically about 70)

Property damage reports (n=12) are lower than most pre-covid years

Non-COVID illnesses typically <10, FY23, n=2

OSHA Recordable Cases with and without COVID cases
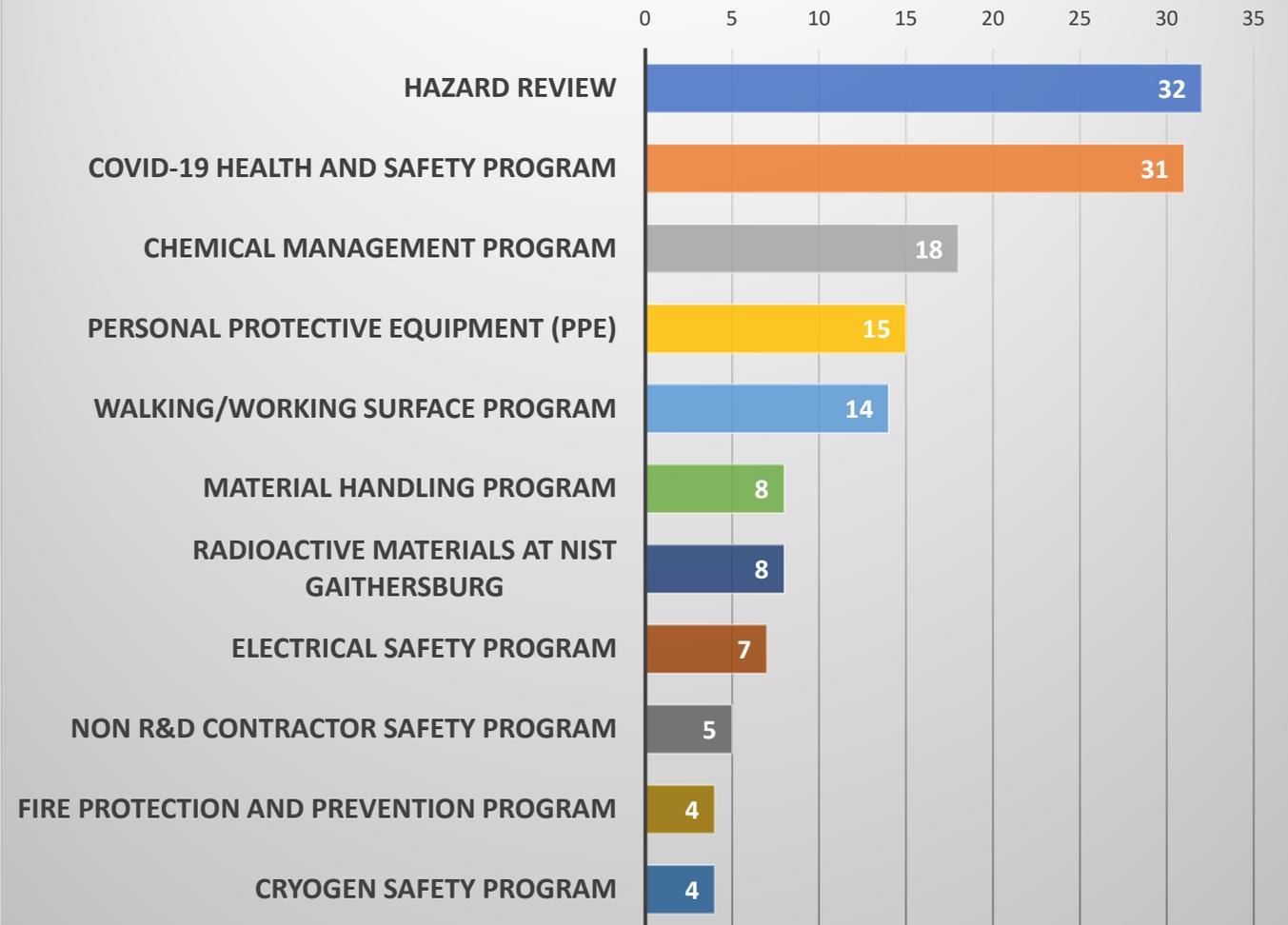
FY23 NIST-Assessed High Risk Cases

NIST

Case Number (*DART Case)	Title	Type
23-IG-0084	Unsafe Activity on Roof Due to Lack of Fall Hazard Mitigation	Near Miss
23-IB-0022	Underground Power Line Struck and Damaged by Construction Equipment	Property Damage
23-IC-0002	Over-pressurization of Bulk Nitrogen Storage Tank	Near Miss
23-IG-0072	Fire in Lab During Testing of In-House Built Oven	Property Damage
23-IG-0069	Occupational Hearing Loss	Illness
23-IB-0017	Electrical Equipment Struck and Damaged by Paving Equipment	Property Damage
23-IB-0016	Near Miss from Trip on Deteriorated Steps	Near Miss
23-IB-0015	Utility Line Strike	Property Damage
23-IB-0009	Electrical Near Miss in Cleanroom	Near Miss
23-IG-0048*	Employee Injured When Personnel Lift Falls of Truck Liftgate	Injury
23-IG-0021	Employee's Fingers Injured During Delivery of Pallet of Drums	Injury
23-IB-0005	Diffuse Scattering During Laser Alignment Results in Extended Visual Interference	Injury
23-IG-0008*	Employee Strains Back While Removing Burner Barrel from Boiler	Injury
22-IB-0011	Hazardous Gas Leak in Microfabrication Facility	Spill / Release

High Risk is defined as: - Incidents with serious or catastrophic severity (actual or potential), with a likelihood of recurrence.

Incident Data Analysis by Safety Program

NIST

FY23: Top 10 Most Frequently Tagged Safety Programs

Program	Value
HAZARD REVIEW	32
COVID-19 HEALTH AND SAFETY PROGRAM	31
CHEMICAL MANAGEMENT PROGRAM	18
PERSONAL PROTECTIVE EQUIPMENT (PPE)	15
WALKING/WORKING SURFACE PROGRAM	14
MATERIAL HANDLING PROGRAM	8
RADIOACTIVE MATERIALS AT NIST GAITHERSBURG	8
ELECTRICAL SAFETY PROGRAM	7
NON R&D CONTRACTOR SAFETY PROGRAM	5
FIRE PROTECTION AND PREVENTION PROGRAM	4
CRYOGEN SAFETY PROGRAM	4

Hazard Review is a commonly cited program, We find that many incidents could have been prevented by following requirements of an adequate hazard review. (up from 23 in FY22).

NOTE: In 7 Insights for Safety Leadership, the Krause Bell Group noted that insufficient hazard review is a common root cause of incidents.

Chemical Management– 8 Spills, 3 Exposures

Walking/working surfaces– 10 STFs

Personal Protective Equipment – 8 Injuries, 3 Contamination