PSC Safety Refresh

February 16, 2023

Laurent Chapon
Associate Laboratory Director for Photon Sciences
APS Director

PHOTON SCIENCES SAFETY REFRESH

- **Argonne experienced an uptick in the number of reportable cases last year**
  - 26 cases in FY22 compared to 16 in FY21, 5 in FY23 to date
  - Along with an increase in number of cases that resulted in lost time
    - 18 cases in FY22 compared to 8 in FY21, 3 in FY23 to date
- **Photon Sciences has had good safety performance in FY23 to date**
  - High emphasis placed on understanding incidents and possible improvements prior to injuries happening
- **Dark Time will require increased attention to safe practices**
  - We all must take time to acclimate to surroundings, work conditions, area restrictions
  - Pre-job briefs to emphasize changing conditions; **ASSURE RATHER THAN ASSUME. PAUSE WORK and get clarification if unclear.**

AGENDA

Laurent Chapon
PSC and Laboratory safety metrics

John Quintana
Safety improvement

Jonathan Lang
Chemical and Laboratory safety

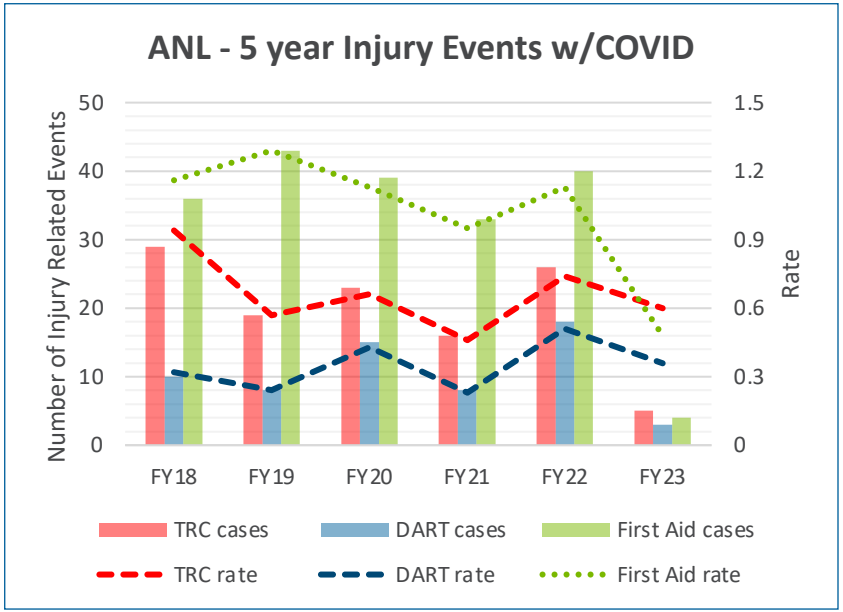
Mike Edelen
Material handling: Line of fire safety

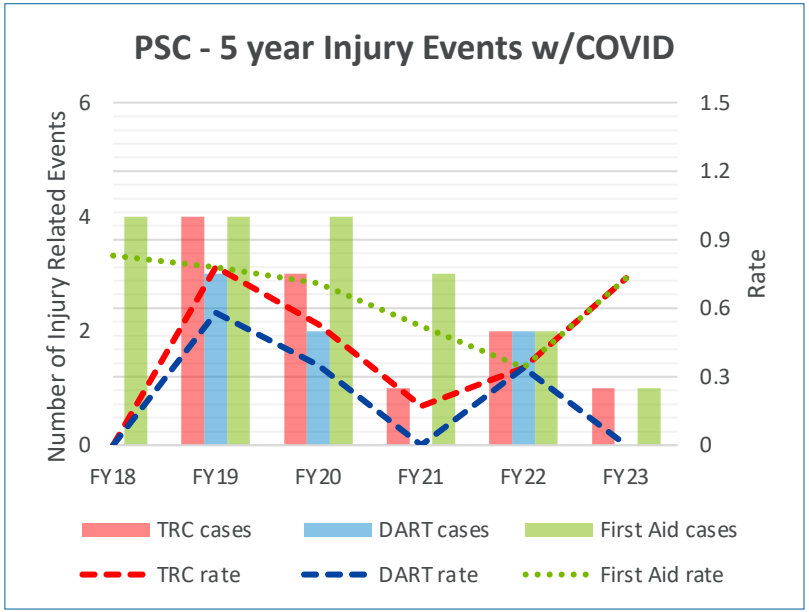
John Byrd
Work Planning and Controls best practices

Jim Kerby
Safety during the APS downtime

SAFETY

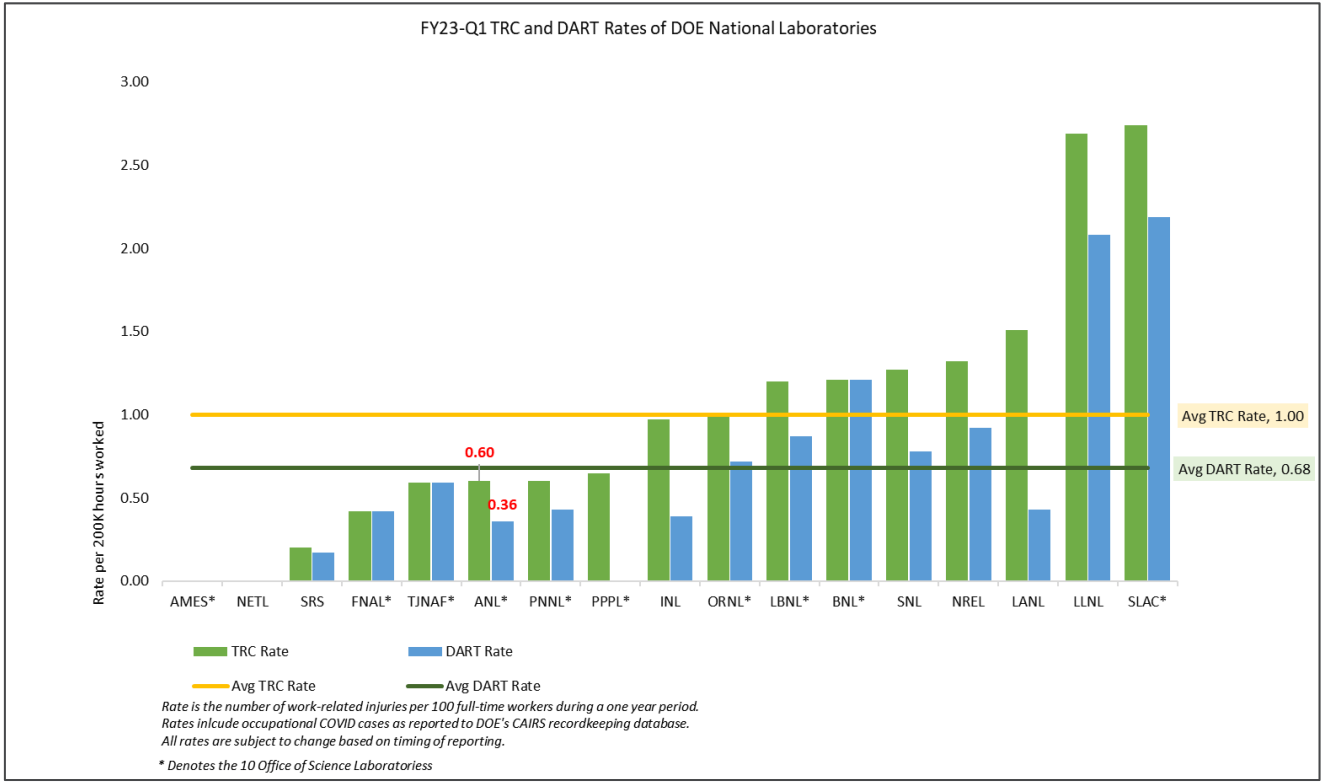
- **Photon Sciences safety record for FY23**
  - 1 First Aid Injury
  - 1 OSHA Recordable Case (TRC)
  - 0 Days Away or Restricted Time (DART)





INJURY AND ACCIDENTS

FY23-Q1 TRC and DART Rates of DOE National Laboratories



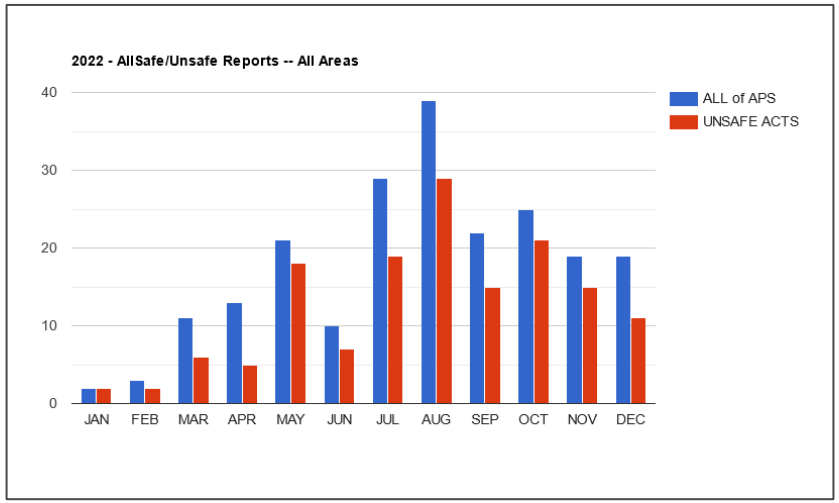
Safety Improvement

John Quintana
Interim Deputy Associate Laboratory Director for PSC Operations

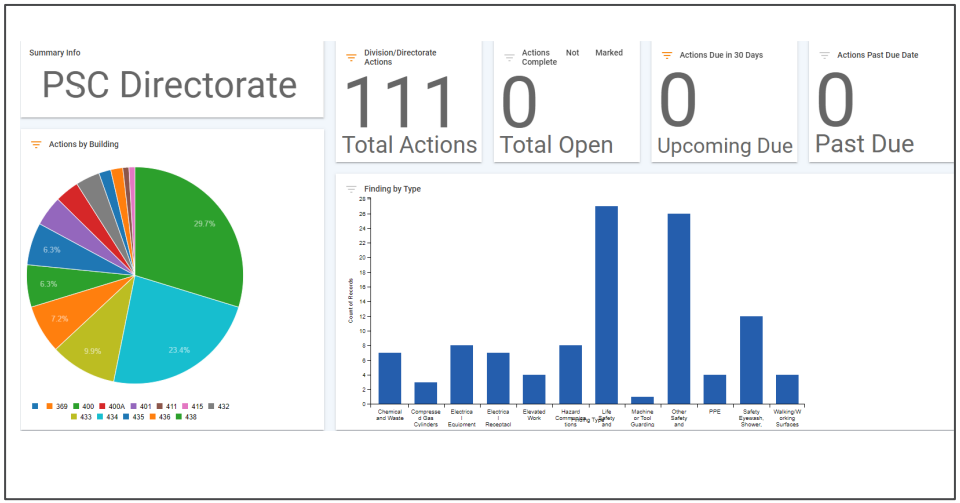
ROOM FOR IMPROVEMENT

Looking at indicators through Inspections and SMART observations to focus on areas of improvement

SMART Observations



Inspection Findings



ROOM FOR IMPROVEMENT

- Work during the last APS shutdown period indicated shortcomings:
  - Personnel not wearing safety glasses with side shields
  - Missing current dosimeter
  - Not wearing safety shoes
- Plenty of employees around to speak up about the lack of compliance
- Speak up and remind co-workers of requirements
- These are basic and fundamental safety practices
- SLAC electrical incident is a reminder that serious consequences can occur in the workplace

SLAC ELECTRICAL ARC FLASH INJURY

On Tuesday, December 27, 2022, three electricians at SLAC National Accelerator Laboratory in California were involved in an electrical incident.

The workers were preparing to perform maintenance on 12 kV switchgear. They turned off the main breaker and 3 load-side breakers in the switchgear and disconnected them. To do a ZVV (Zero Voltage Verification), they opened the back panel of the switchgear. At some point while attempting the ZVV, there was an arc flash. The electrician in the switchgear was taken to a local hospital.

The Department of Energy suspended all SLAC Electrical Work on Systems Rated at 277-Volts Alternating Current or Higher when additional concerns were identified:

- SLAC (ESH) Manual (Control of Hazardous Energy) rules were not followed.
- Management were not actively engaged in supervising work at the job site.
- Switching orders and LOTO procedures were not effective in identifying hazards and implementing controls.
- Work was overly dependent on expert-based capabilities rather than supervised procedural compliance.

SLAC ELECTRICAL ARC FLASH INJURY

Key Takeaways

Although the investigation is ongoing, there are some important preventative measures that are worth highlighting.

Consistent management presence needed on work site.

All employees and contractors have the authority to stop or pause work if they believe there is a safety concern.

ASSURE RATHER THAN ASSUME. PAUSE WORK and get clarification if unclear.

Chemical and Laboratory Safety

Jonathan Lang
XSD Division Director

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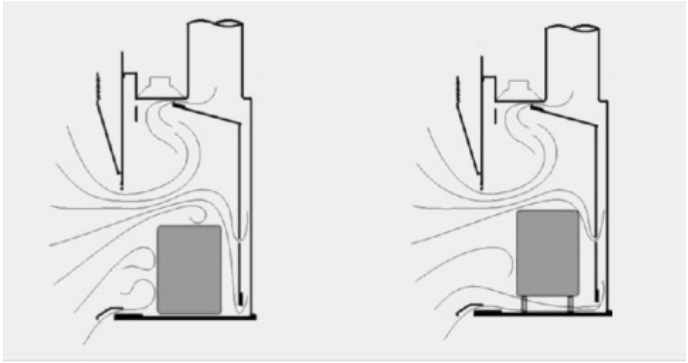
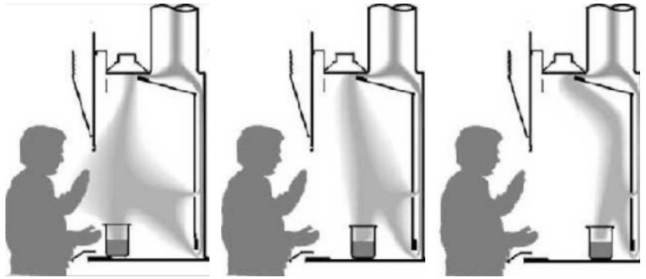
HOOD HOUSEKEEPING

- **Do not store bulky equipment or chemicals not in use in a hood.** This minimizes the effectiveness of contaminant capture and air flow away from the worker and into the exhaust hood.
- **Raise bulky equipment in hood.** This allows air to flow underneath items, such as hot plates, and helps increase the effectiveness of the fume hood.
- **Position materials at least 6 inches into the hood.** Fume hoods are designed to more effectively capture volatile gases and vapors towards the back.
- **Leave space to perform work safely.** Consider a “dry run” under low-hazard conditions to ensure everything is set up correctly before running the higher-hazard process.



Poor large equipment placement. Good large equipment placement.



Poor placement of materials. Good placement of materials. Best placement of materials.

GLOVEBOX HOUSEKEEPING

Workspace, PPE, Operation

WORKSPACE

- Manage **sharp** equipment, razors, syringes to protect yourself and your gloves from cuts.
- Leave **space** to perform work processes safely.
  - If you have to reach over items or find the space too cramped, then workstation is set up incorrectly.
  - Consider worker position and ergonomics — crouching, reaching, awkward positioning.

PPE

- Check **integrity** of glovebox gloves.
- Wear disposable gloves under the glovebox gloves to protect hands from **chemicals** in case of breach.
- Wear sturdy gloves over glovebox gloves to protect gloves from **wear and tear** when lifting or moving equipment by manually or with a chain fall.

OPERATION

- Check that glovebox is **operating properly** before working with reactive or toxic material. Check gas alarms or pressure gauge as appropriate.

SATELLITE ACCUMULATION AREAS

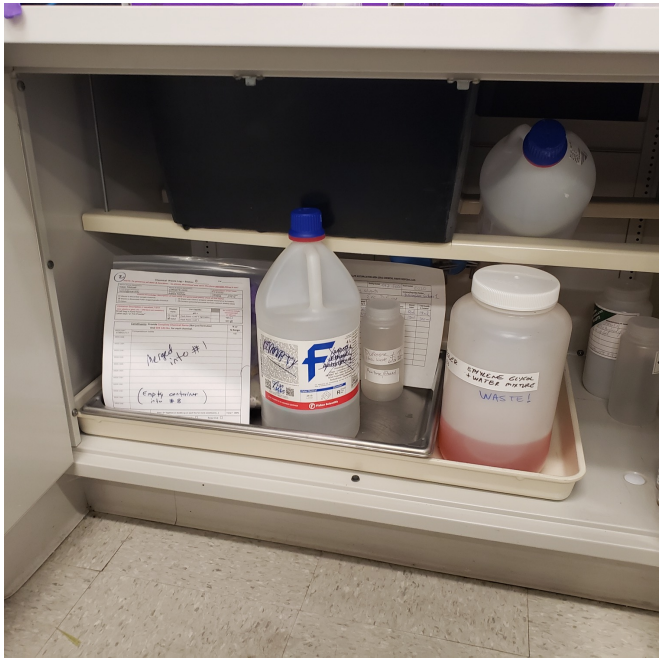
Basic Requirements

- Must follow LMS-PROC-103
- Must be established using CORAL system
- Must be used for management of hazardous waste — as defined by EPA
  - Nonhazardous waste accumulation in SAA is acceptable
  - Used oil accumulation acceptable
  - Must still follow LMS-PROC-103 if SAA used for nonhazardous waste
- Must establish plan for transfer of waste custody to others in event of waste generator departure from division or Argonne

ACCUMULATION AREAS

Housekeeping

- Maintain containers in good condition: no cracks, leaks, or deterioration
  - Evaluate container needs before generating hazardous waste
  - Order containers through NWM, using Vector system
- Liquid hazardous waste containers within secondary containment
- Separate incompatible wastes
- Containers in SAA no longer than one year
- Maintain waste inventory for each container
- Conduct and document regular inspections monthly
  - Look for leaks, container degradation
  - Look for containers nearing one-year time limit



SATELLITE ACCUMULATION AREAS

Regulatory Requirements

- Labels most important
  - Must say words “hazardous waste”
  - Must include indication of hazard (e.g., words like “corrosive” or “ignitable,” or pictograms)

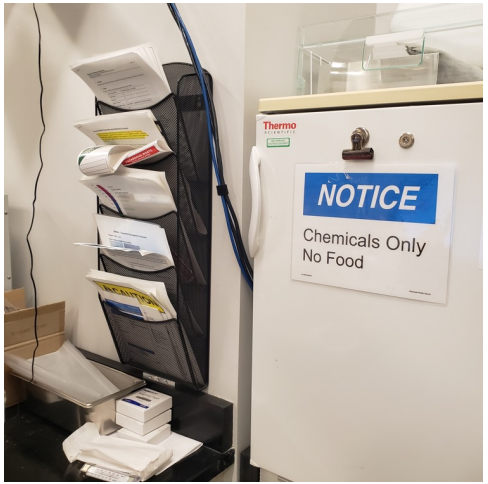
- SAA must be established at or near the point of hazardous waste generation
- Each type of waste documented on a waste determination document

- Less than 55 gallons (<1 quart acutely hazardous waste)
- Containers must be kept closed, except:
  - When adding waste
  - To reduce pressure

ACCUMULATION AREAS

Best Practices

- Include brief description of waste on label in plain English (no formulas)
- Waste inventory for each waste container
  - Update when adding waste
  - Date and quantity of each waste addition, running total container volume
  - Mark each inventory sheet with waste requisition number before NWM pickup
- Maintain at least 10% headspace in containers — prevent pressure buildup
- Maintain “SAA Book” at SAA
  - Inspection forms and blank forms
  - Waste determination document
  - Copies of container inventory
  - Copy of LMS-PROC-103 and SAA Job Aid
  - Extra labels



SAFE LABS 2022

A Partnership Across the Lab

- Safely disposed of:
  - 1,010 hazardous or RCRA individual items (over 730 gallons)
  - 337 compressed gas cylinders (equivalent to 163 lbs. of TNT)
- Hundreds of unknown chemicals were characterized by FD/NWM/CFCT

SAFE LABS 2023

A Partnership Across the Lab

- Kicked off on 1/30/2023
- Chemical owners are to complete the MS Forms survey by 2/28/2023 for review by ESH/IS team
- Waste requisition creation and waste pick-up will occur March – August
- Look for an e-waste disposal campaign this summer
  - Send any feedback on e-waste disposal needs to safelabs@anl.gov

Material Handling: Line of Fire Safety

Mike Edelen
AES Division Director

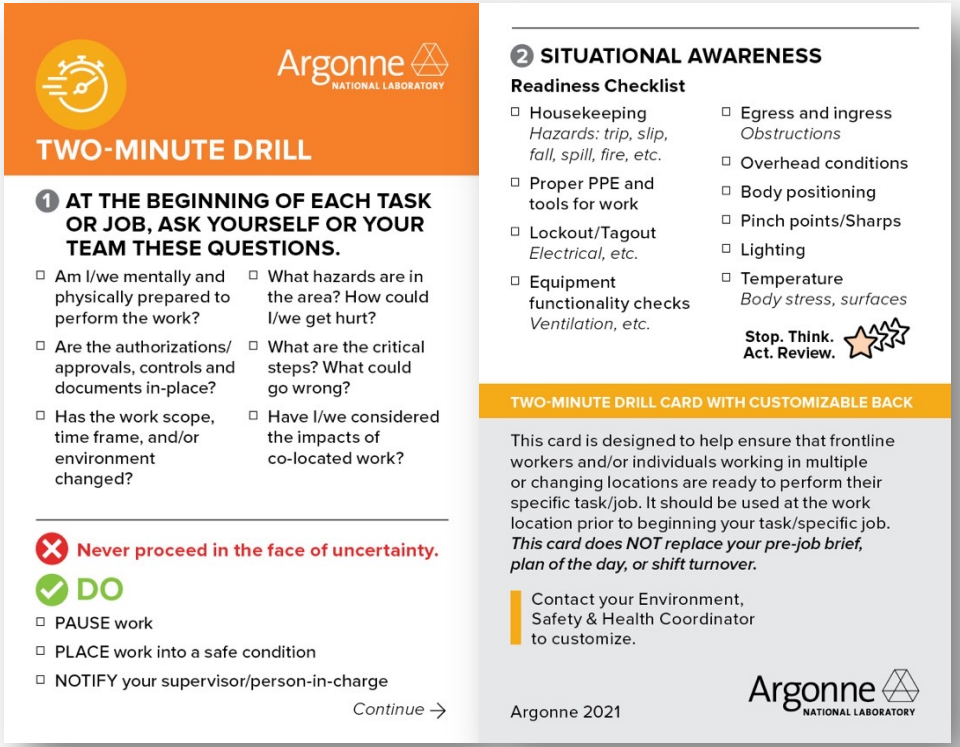
MANUAL MATERIAL HANDLING

Definition

- Manually carrying, lifting, pulling, or pushing any designated load
- Unpacking materials
- Stacking or storing drums, barrels, lumber, boxes, inventory, or other materials

TWO-MINUTE DRILL: MATERIAL HANDLING

When it comes to Safety, IT GOES HAND IN HAND



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TWO-MINUTE DRILL

1 AT THE BEGINNING OF EACH TASK OR JOB, ASK YOURSELF OR YOUR TEAM THESE QUESTIONS.

- ☐ Am I/we mentally and physically prepared to perform the work?
- ☐ Are the authorizations/ approvals, controls and documents in-place?
- ☐ Has the work scope, time frame, and/or environment changed?
- ☐ What hazards are in the area? How could I/we get hurt?
- ☐ What are the critical steps? What could go wrong?
- ☐ Have I/we considered the impacts of co-located work?

Never proceed in the face of uncertainty.

DO

- ☐ PAUSE work
- ☐ PLACE work into a safe condition
- ☐ NOTIFY your supervisor/person-in-charge

Continue →

2 SITUATIONAL AWARENESS

Readiness Checklist

- ☐ Housekeeping *Hazards: trip, slip, fall, spill, fire, etc.*
- ☐ Proper PPE and tools for work
- ☐ Lockout/Tagout *Electrical, etc.*
- ☐ Equipment functionality checks *Ventilation, etc.*
- ☐ Egress and ingress *Obstructions*
- ☐ Overhead conditions
- ☐ Body positioning
- ☐ Pinch points/Sharps
- ☐ Lighting
- ☐ Temperature *Body stress, surfaces*

Stop. Think. Act. Review.

TWO-MINUTE DRILL CARD WITH CUSTOMIZABLE BACK

This card is designed to help ensure that frontline workers and/or individuals working in multiple or changing locations are ready to perform their specific task/job. It should be used at the work location prior to beginning your task/specific job. ***This card does NOT replace your pre-job brief, plan of the day, or shift turnover.***

Contact your Environment, Safety & Health Coordinator to customize.

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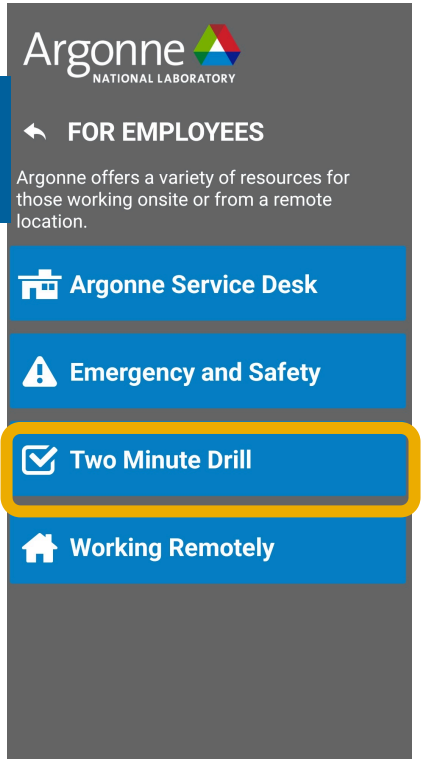
Available on the Argonne app



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MATERIAL HANDLING

Carrying or traversing with load: Utilize the two-minute drill

Survey the path of travel for:

- Hazardous walkway conditions (slippery surfaces, floor depression, T-molding)
- Changes in elevation (stairs, ramps, curbs)
- Obstructions (overhead, protruding equipment, cables)
- Tight doorways/travel paths
- Blind corners & intersections

Determine safe hand/finger positions to avoid pinch and crush hazards when traversing tight pathways and lowering loads.

INJURIES

Let's talk about injuries.

- Improperly lifting objects is a significant cause of back injuries in the workplace
- Improper storing and handling of material and equipment can cause struck-by and crushing injuries (*"Line of fire"* injuries: Remove yourself and all extremities from the line of fire!)
- Cuts, punctures, needles, splinters, sharp edges

MANUAL HANDLING

Safety

Safe Lifting:

- Breakdown loads into smaller/lighter parts
- Get help with heavy or bulky items

Use handling aids:

- Handles
- Pallet jack
- Lift table
- Hand truck
- Dolly

Safe Lifting Techniques:

- **Lift with legs, keep back straight, and do not twist**
- **Avoid lifting loads above shoulder level**
- **Keep the load close to the body**

PPE:

- Gloves with appropriate grip
- Cut & abrasion resistance gloves
- Steel-toed safety shoes
- Protect forearms

MANUAL HANDLING

Stretching Activities

Stretching can lower the risk of injuries, improve your range of motion and improve flexibility:

- Stretching increases the blood flow reminding the muscles that it is time to work
- Keep limber by
  - Focusing on major muscle groups
  - Don’t bounce
  - Hold your stretch
  - Don’t aim for pain
  - Make stretches activity specific
  - Bring movement into your stretching

MANUAL HANDLING

Reminder to seek help when:

- A load is too bulky to grasp or lift properly
- Cannot see around or over the load (even if the load is light)
- Cannot safely handle the load
- Load weighs > 50 lbs.
  - Second person or mechanical assistance

SUMMARY

Manually Handling Materials

When lifting any load or object:

1. **Use proper PPE**
2. **Determine safe hand placement**
3. **Lift with your legs/keep your back straight**
4. **Do not twist or over-reach**
5. **Use handling aids**

- Keep your travel path free from debris and materials
- Seek help when a load is too heavy or bulky. Break-down loads if possible
- Store materials safely to avoid “line of fire” injuries and hazards
- **Use the two-minute drill and evaluate the task *at hand*. It will literally protect them!**

LEAD AWARENESS

Construction activities may create Lead Work Areas

- Avoid entering areas whenever possible
- If you need to enter:
  1. **No eating or drinking in these areas**. Wash your hands and face before each break when you leave the area
  2. Utilize sticky mats when entering and exiting the area
  3. Wear disposable gloves when contacting affected surfaces (such as visibly dirty surfaces)
  4. Additional protective clothing may be necessary depending on contact potential
     - No additional protective clothing (beyond gloves) is necessary if no body contact is expected
     - Disposable lab coat necessary if arm / torso contact with lead-contaminated surfaces
     - Fully body coverall necessary if kneeling or crawling in these areas in expected
     - Ensure there is an appropriate waste container near your intended exit point to place protective clothing when exiting

Work Planning and Controls Best Practices

John Byrd
Director, Accelerator Systems Division

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WPC BEST PRACTICES

Build a positive, engaging work environment by creating a psychologically safe, diverse and inclusive, learning environment

- Empower workers
- Have a questioning attitude
- Foster open communication
- Learn from others, data and experiences

Plan

- Involve workers and SMEs in the planning process
- Ask "what if?"
- Identify critical steps and design requirements
- Apply lessons learned

Do

- Conduct a pre-job briefing
- Conduct on-the-job training
- Use the two-minute drill
- Stop/pause when unsure or conditions change

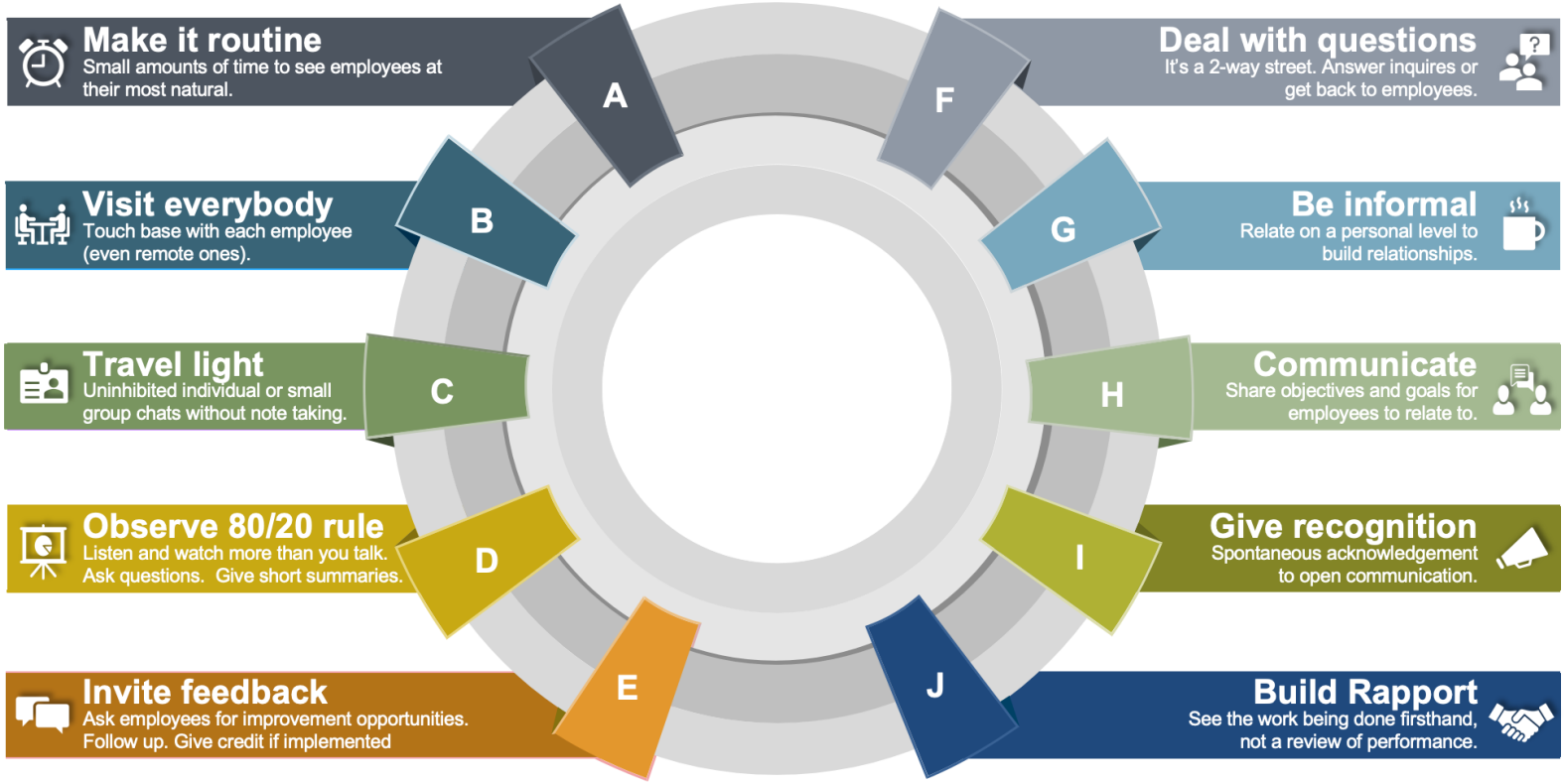
Check

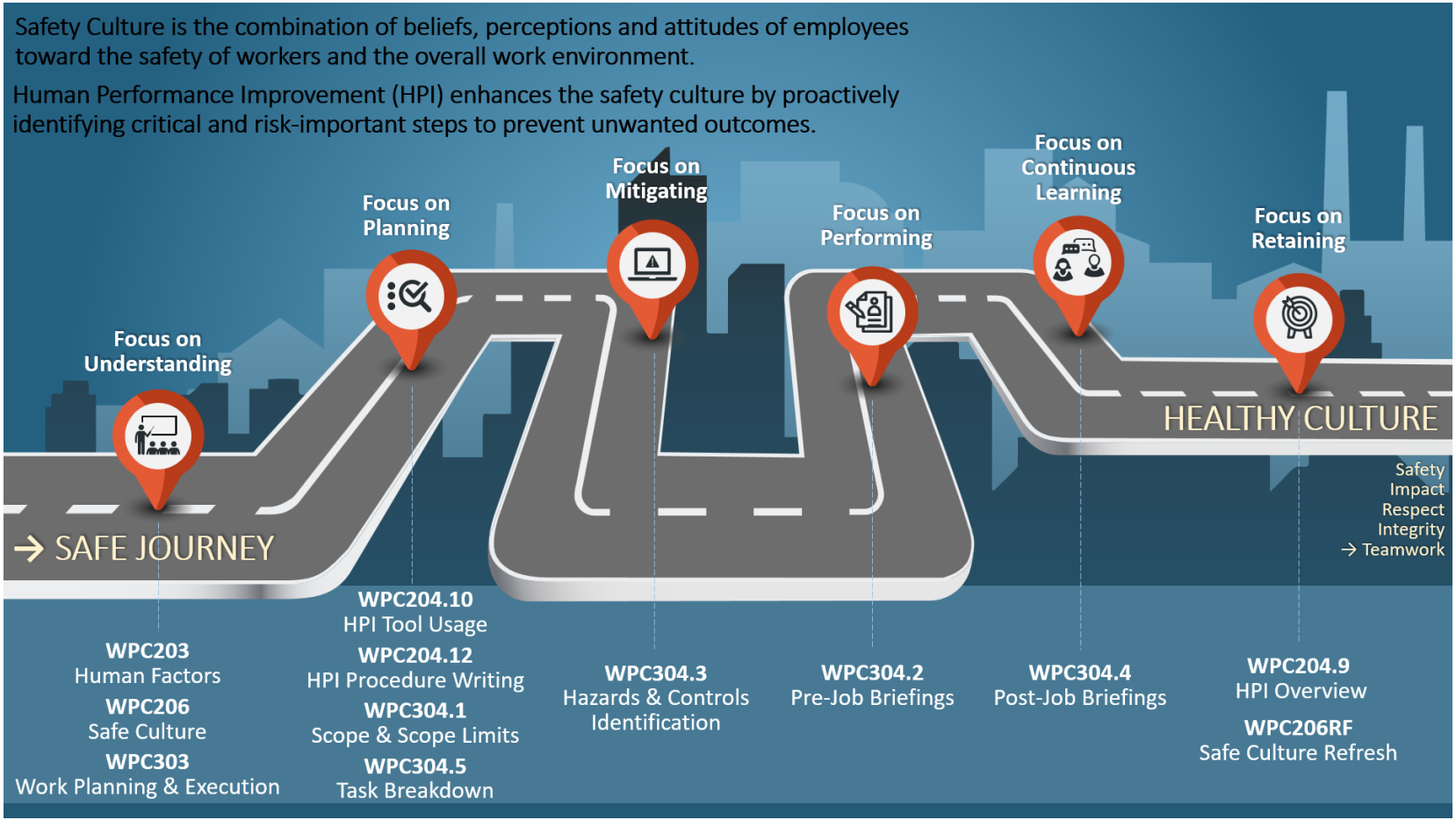
- Check-in with team on a regular basis
- Conduct walk arounds
- Create a positive, collaborative work environment

Adjust

- Collect and act on feedback received
- Share feedback/ develop lessons learned
- Focus of the process, not the person
- Celebrate successes

MANAGEMENT BY WALK AROUND QUICK REFERENCE




Safety Culture is the combination of beliefs, perceptions and attitudes of employees toward the safety of workers and the overall work environment.
Human Performance Improvement (HPI) enhances the safety culture by proactively identifying critical and risk-important steps to prevent unwanted outcomes.
Focus on Understanding
Focus on Planning
Focus on Mitigating
Focus on Performing
Focus on Continuous Learning
Focus on Retaining
SAFE JOURNEY
HEALTHY CULTURE
Safety
Impact
Respect
Integrity
→ Teamwork
WPC203
Human Factors
WPC206
Safe Culture
WPC303
Work Planning & Execution
WPC204.10
HPI Tool Usage
WPC204.12
HPI Procedure Writing
WPC304.1
Scope & Scope Limits
WPC304.5
Task Breakdown
WPC304.3
Hazards & Controls Identification
WPC304.2
Pre-Job Briefings
WPC304.4
Post-Job Briefings
WPC204.9
HPI Overview
WPC206RF
Safe Culture Refresh

Safety During the APS Downtime

Jim Kerby
APS Upgrade Project Director

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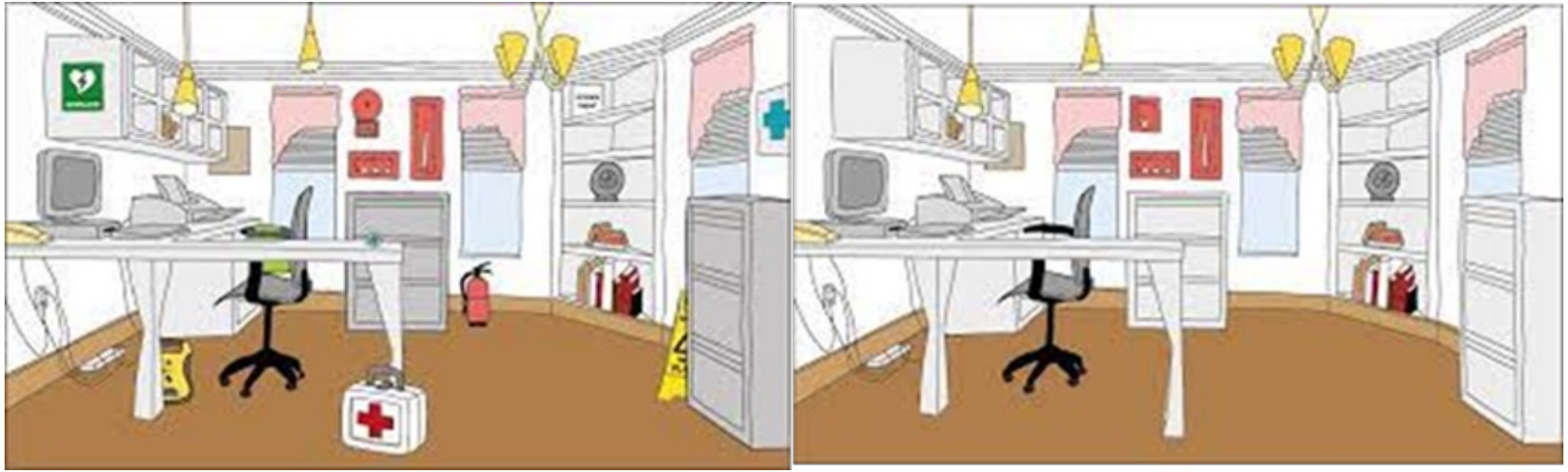
WHAT IS GOING TO CHANGE? ASSUME EVERYTHING!

A COMPLETE CHANGE IN DAY-TO-DAY ACTIVITIES

- The dark time will require increased attention to safe practices
  - More frequent changes to Work Assignments
  - Daily acclimation to work surroundings and conditions to understand your situation
    - Is the Work Control Document understood? Is the Work Procedure understood? Are the proper tools / PPE in use?
    - What are the points of vulnerability?
    - What protects you?
    - Order of work – sequence – Does it make sense?
    - Is everything in place prior to working?
  - Communication is key
    - LISTEN – TALK – COMPREHEND – EXECUTE WORK
  - **ASSURE RATHER THAN ASSUME. PAUSE WORK and get clarification if unclear.**

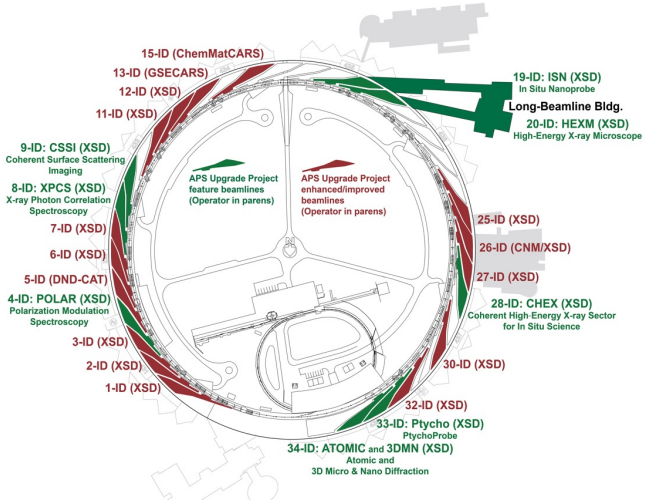
FAMILIAR AREAS CAN HAVE REAL HAZARDS



ACCESS

General access to building 400 will be limited

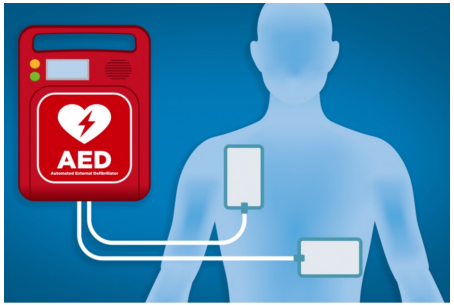
- Card Key access will be required all the time
  - Not just after hours and weekends as it is now.
- Multiple Construction areas posted through-out the facility
  - PPE and Authorization to enter areas will be posted
- Sections of current walkways will be blocked from time to time
  - Materials movements and construction activities will limit access
- **FOLLOW ALL POSTED REQUIREMENTS AND PAY ATTENTION FOR FREQUENT CHANGES**



ADDITIONAL SAFETY EQUIPMENT

STORAGE RING FIRST AID KITs and AEDs

- A First Aid Kit and Automatic External Defibrillator (AED) will be available at each of the Super Doors
- In the event of an emergency 911 and 630-252-1911
- Argonne Fire Department will be available to respond to all emergency – when reporting your location make it clear that you are in the Storage Ring Tunnel and what Sector you are in.
- HEW will be available remotely to evaluate follow-up and return to work status for extended shifts.



CHANGE IN PPE REQUIREMENTS

STORAGE RING and OTHER CONSTRUCTION AREAS WILL REQUIRE:

- Long Pants
- Safety Glasses
- Gloves appropriate for task while material handling
- OVER THE ANKLE SAFETY BOOTS (steel or composite toe).
- HARD HAT

HOW TO ACQUIRE NEW PPE

General PPE

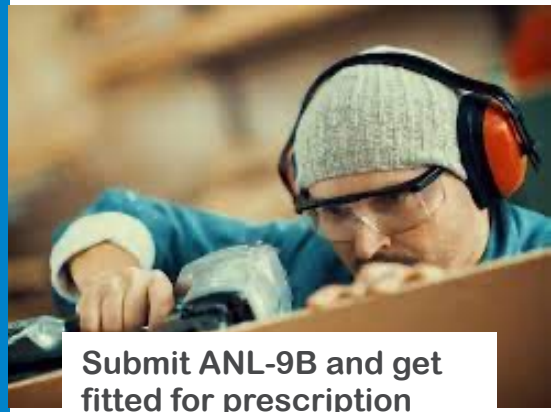
Safety Gasses, Hard Hats, Gloves, Etc.

- Visit the APS Stock Room and follow the posted procedure regarding purchasing items.

OR

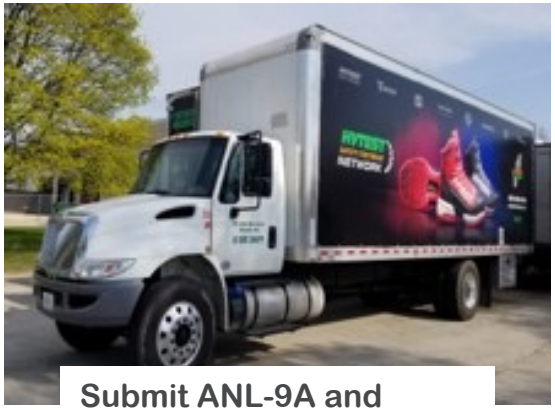
- Visit the Argonne Safety Zone in building 223 for additional PPE options (Argonne branded).

Always Practicing Safety



Submit ANL-9B and get fitted for prescription safety glasses

Visit the Safety Zone for PPE recommendations



Submit ANL-9A and order Safety Boots

PSC PPE EXPO

Monday, March 27, 2023

10:00 - 2:00, Bldg. 401 Atrium

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Always Practicing Safety

Visit Our Health Partners

Health and Employee Wellness
Health Check (20,000 VP Points)
Employee Assistance Program
Physical Therapists

Learn from Our Safety Partners

Fire Department
AED Training & Fire Extinguisher Training
Why I Work Safely

PSC PPE Expo | Monday, March 27, 2023 | 10:00 - 2:00 | Bldg. 401 Atrium

Meet with Our SMEs

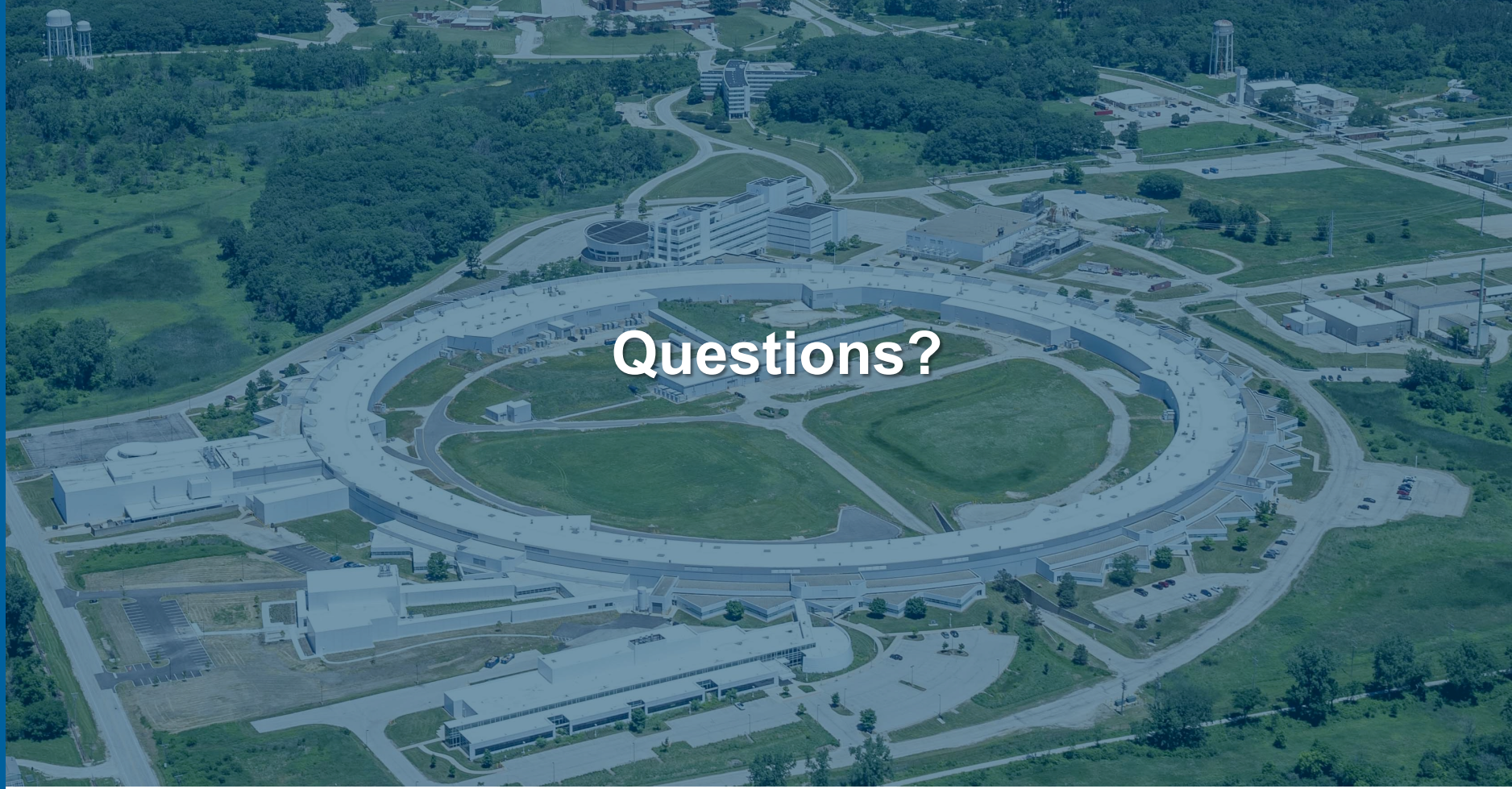
Lead Safety
Heat Stress
Radiation Safety
Electrical Safety

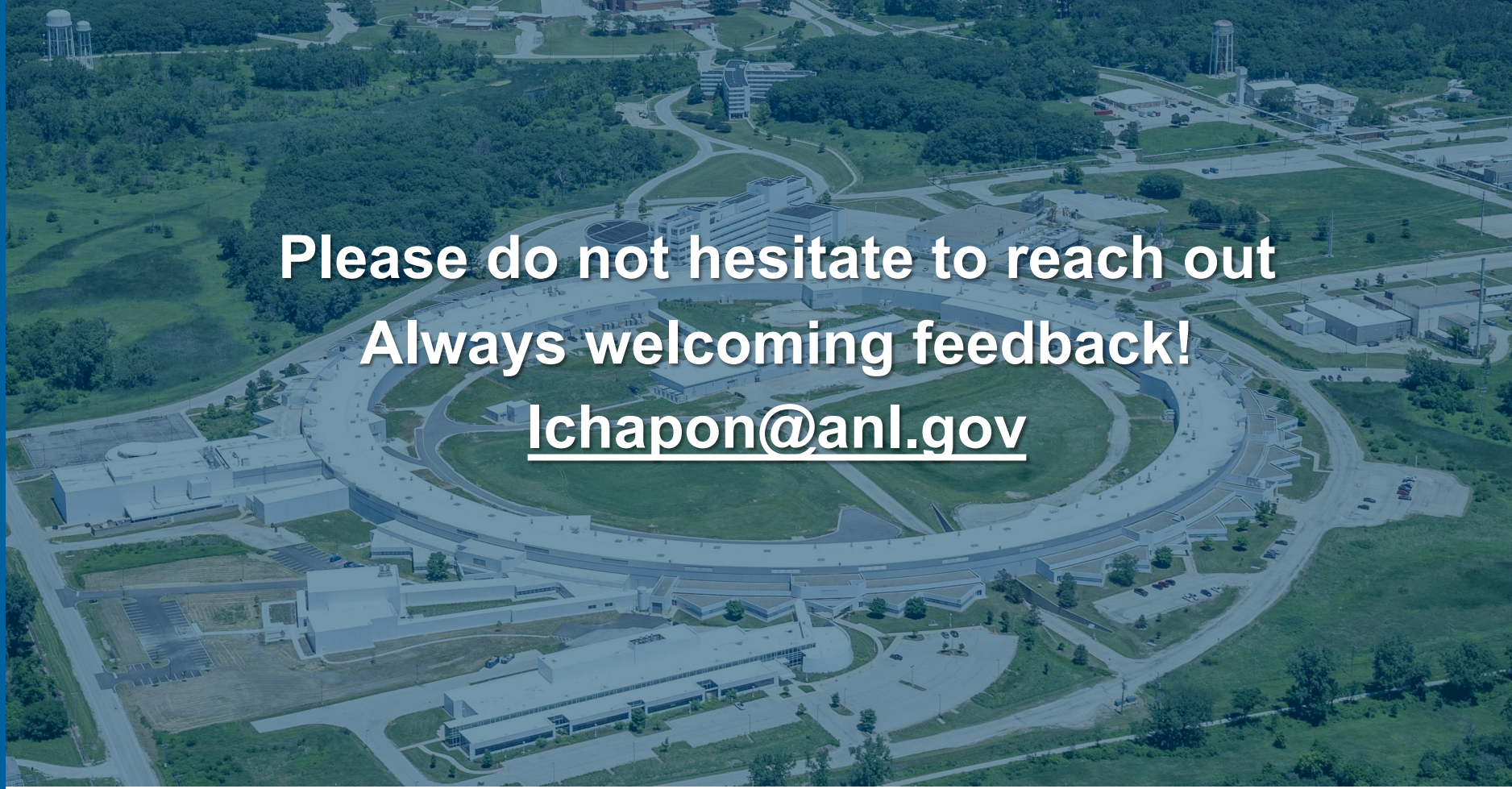
Visit Vendors

- 3M
- Bradley
- Brady
- DeWalt
- Flir and Fluke
- Honeywell
- ISI
- Kimberly Clark
- Rubbermaid
- Viega Propress
- Werner
- Zoll defibrillators
- And more

IN CLOSING

- Photon Sciences has had good safety performance, but there is room for improvement
- Dark Time will challenge all of us with an environment that few have experienced.
- Increased attention to surroundings, conditions, and area restrictions are required from workers and management at all levels.
- Increased equipment and controls are being put in place to minimize the potential for injury.
- All of us are needed to help make this a success
- **ASSURE RATHER THAN ASSUME. PAUSE WORK and get clarification if unclear.**


Questions?



Please do not hesitate to reach out
Always welcoming feedback!

lchapon@anl.gov

Backup slides

HOW TO ACQUIRE NEW PPE

OVER THE ANKLE SAFETY BOOTS

1. Complete the Request for Safety Shoe /Ice-Traction Device (ANL-9A) on XINK and follow the instructions on the form to route it to your supervisor for approval.
2. Print an approved copy of ANL-9A
3. Bring the approved ANL-9A to the Shoe Mobile, which is on-site Mondays at the Building 200/203 parking lot from 8 a.m. – 12 p.m. and in the Building 360 parking lot from 1 p.m. – 4 p.m.

NOTE - The Argonne allowance is $150. If you select a shoe style that costs more, you will be responsible for the additional amount.

HOW TO ACQUIRE NEW PPE

PRESCRIPTION SAFETY GLASSES

1. Complete the Request for Prescription Safety and/or Computer Glasses (ANL-9B) on XINK and follow the instructions on the form to route it to your supervisor for approval.
2. With the approved ANL-9B and a current Prescription.
3. Order glasses online at Eyelation.com. (Three working days needed to process the request.)

OR

1. Use the new Eyelation self-serve kiosk available in building 233 outside the Safety Zone. (Three working days needed to process the request.)